I. Meeting Packet

State of Florida
Public Service Commission
INTERNAL AFFAIRS AGENDA
Tuesday – February 18, 2025
9:30 AM
Room 105 – Gerald L. Gunter Building

1. Public Utility Research Center 2024 Annual Report to the Florida Public Service Commission, Ted Kury, Director of Energy Studies (Attachment 1)

2. Draft Report on the Technical and Economic Feasibility of Advanced Nuclear Power Technologies (Attachment 2)

3. Legislative Update

4. General Counsel's Report

5. Executive Director's report

6. Other Matters

BB/aml

OUTSIDE PERSONS WISHING TO ADDRESS THE COMMISSION ON ANY OF THE AGENDAED ITEMS SHOULD CONTACT THE OFFICE OF THE EXECUTIVE DIRECTOR AT (850) 413-6463.

Attachment 1

PUBLIC UTILITY RESEARCH CENTER

UF WARRINGTON COLLEGE of BUSINESS

ANNUAL REPORT

2024

Update on PURC Research and Outreach

This update on PURC research and outreach is intended to serve as on overview for FPSC commissioners and professional staff. At the end of this summary is a list of recent research papers that are also available through the research papers search engine on the PURC website at www.purc.ufl.edu. We truly appreciate the support of the FPSC and wecome opportunities for future collaboration.

PURC 2024 Annual Report to the Florida Public Service Commission

UPDATE ON PURC RESEARCH AND OUTREACH

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PURC 2024 Annual Report to the Florida Public Service Commission

UPDATE ON PURC RESEARCH AND OUTREACH

STATISTICS AND HIGHLIGHTS

Statistics

- 9 Training Courses providing 242 hours of in-person classroom instruction
- 23 blog posts
- 9 working papers, journal articles and book chapters
- 4 opinion editorials
- 7 presentations, panels, and events

Plans for 52nd Annual PURC Conference, February 19 – 20, 2025

We are excited to host our 52nd Annual Conference, *Resilient Infrastructure in a Changing World: Technology, Policy, and Preparedness*, in Gainesville, Florida. This event will bring together government officials, utility executives, and industry leaders to address investment strategies for capacity expansion, the effective use of AI, and cutting-edge approaches to cybersecurity. We look forward to seeing you in Gainesville!

54th and 53rd PURC/World Bank International Training Program on Utility Regulation and Strategy

We hosted our flagship PURC/World Bank International Training Program on Utility Regulation and Strategy, January 13 – 22, 2025 and June 3 – 12, 2024. We welcomed 107 participants from 27 countries to Gainesville for these two programs. Since its inception in 1997, this program has educated more than 3900 professionals representing 157 nations. In addition, 43 participants completed the **PURC Leadership Workshop: Practicing Leadership in a Political Environment** on January 19, 2025, and June 9, 2024.

Student Engagement

As a research center at a top-ranking public university, PURC is committed to engaging students across disciplines. This year three undergraduates and one graduate student collaborated in an examination of how European regulations are impacting digital businesses. Students met with think tanks and tech firms to conduct this research. This team has expanded and is now examining the effects of dynamic pricing. A pre-doc student began work examining why some utilities are more likely to adopt green energy than others. PURC invites all university students to attend our annual conference each year at no-charge, and we sponsor students to attend the *Florida Women in Energy Leadership Forum* annually. Both events provide students with the opportunity to network with leaders and learn about the robust utility industry. Both Dr. Jamison and Dr. Kury are serving on the dissertation committee for Benjamin Morris, a doctoral student in business administration (DBA), exploring the connection between regulatory decisions and utility stock prices. PURC also employs three part-time student assistants who gain professional experience in office administration, event management, marketing, and social media.

Warrington College of Business – Business Analytics Practicum Course and Projects

PURC has connected utilities with Warrington's Business Analytics Practicum Course, run by Jim Hoover, a clinical professor and director of the Business Analytics and Artificial Intelligence Center. One such project featured five undergraduate students that helped build algorithms for Tampa Electric Company to help the company to identify incorrectly labeled meters. The students used the university's AI supercomputer, HiPerGator, for this work.

Plans for Artificial Intelligence for Utility Regulators: Navigating Opportunities and Risks

Our newest course, to be delivered in partnership with the National Association of Regulatory Utility Commissioners (NARUC), will provide regulators and others with insights into the key concepts, applications, and risks for utility applications of AI. Through a combination of presentations, case studies, practical problem solving, and hands-on work, participants will learn the basics of how AI works, where it is being applied by utilities, and challenges and future directions.

Popular Op-Eds & Interviews

- Big Tech's Data Centers Won't Get Far Unless the Power Grid is Regulated Less, MarketWatch
- The Case for a Smarter Antitrust Policy, *National Review*
- With CenterPoint in the Hot Seat, Texas Policymakers Look to Harden the State's Power Transmission and Distribution, *Houston Public Media*
- A Pole Fire Caused a Mass Tampa Bay Internet Outage, Company Says. Is it a Warning?, *Tampa Bay Times*
- What Would a Public Takeover of RG&E Look Like?, *News10NBC*
- Inside the Landmark Google Adtech Antitrust Trial That Could Transform the $700 Billion Global Digital Ad Market, *Business Insider*
- Commentary: Imposing Net-Neutrality Regulations Would be a Step Backward, *Orlando Sentinel*

PRIMARY RESEARCH PROJECTS

ENERGY

Preparing to Harden Electrical Resources for Hurricane Season

Communities that are likely to suffer effects of significant damage from named storms need to have confidence that cost estimates and projected benefits are reliable. This transparency to administrators, political leaders, and planners conveys a public message that utility hardening policies such as undergrounding cables and vegetation maintenance reflect a broad consensus among diverse experts. Collaboration among varied planners also ensures that widely noticed disparities among individual estimates do not confuse concerned public observers of the decision-making process.

Motivating the Optimal Procurement and Deployment of Electric Storage as a Transmission Asset

Examined the optimal choice between two means of relieving congestion in an electricity network: (1) traditional expansion of transmission capacity; and (2) storage as a transmission asset (SATA). Assuming the electric utility has unique knowledge of both the cost of implementing SATA and the likelihood of local network congestion, the optimal policy differs considerably from policies under active consideration, in part by paying the utility relatively little for implementing SATA. Despite the relatively limited compensation, the utility profits from its unique knowledge, particularly its knowledge of SATA implementation costs.

Load-Following Forward Contracts

Load-following forward contracts (LFFCs) are becoming increasingly popular in the electricity sector. A LFFC obligates an electricity supplier to deliver at a pre-specified unit price at a fraction of the buyer's ultimate demand for electricity. This paper shows that relative to more standard ("swap") forward contracts, LFFCs can increase the expected wholesale price of electricity and thereby reduce expected consumer and economic benefits.

Market Structure, Risk Preferences, and Forward Contracting Incentives

This paper examines the distinct impacts of forward contracting on generators and buyers of electricity. Increased forward contracting systematically reduces the variance of a generator's profit, but can increase the variance of a buyer's profit. Consequently, increased risk aversion or market uncertainty can lead buyers, but not generators, to prefer reduced levels of forward contracting. This paper examines how the extent of equilibrium forward contracting varies with industry conditions, including the number of generators, the number of buyers, their aversion to profit variation, and the structure of retail electricity prices.

Vertical Integration and Capacity Investment in the Electricity Sector

This paper examines the incentives for and the effects of vertical integration in the electricity sector. It finds that vertical integration often reduces retail prices and increases industry capacity investment, consumer surplus, and total welfare. Unilateral vertical integration often is profitable. However, ubiquitous vertical integration can reduce aggregate industry profit.

Energy Blogs

Dr. Kury blogs on energy issues for The Conversation. He addresses issues of storm hardening, taxes, and grid security. His blogs are available at https://theconversation.com/profiles/theodore-j-kury-406888/articles.

ICT AND TELECOM

Broadband Pricing Under BEAD

This paper examines how price restrictions on broadband would impact broadband deployment and adoption. The federal government's preference for extensive price controls would be counterproductive as they would decrease investment, innovation, and new technology adoption. If states find themselves in situations where subsidized broadband providers are monopolies, deployment and adoption obligations would be more effective than price controls.

AEI's Broadband Barometer Project

PURC's Dr. Jamison led a team of scholars from five universities and a technology think tank to examine state policies for broadband deployment under BEAD. The effort produced scorecards for each state and sponsored several events where state leaders provided insights on how broadband efforts could be improved.

Comparison of Business Choice of Mobile Platforms: U.S., Japan, and India

This paper examines business preferences for choosing whether to use Apple's iPhone platform, Google's Android platform, or both. The research found that businesses find the platforms to be substitutes for each other, except in rare instances.

Platform Competition and Differentiation: Developer Choices in Mobile Platforms

This paper examines how app developers and other tech companies choose whether to build on the Apple platform, the Android platform, or both. It finds that the platforms compete for these businesses and differentiate primarily in "thin" markets where it is uneconomical for more than one platform to accommodate specialized needs.

Comments filed with states regarding competition and rules for broadband subsidies

PURC researchers participated in comments filed with various state broadband offices regarding their plans for broadband subsidies. The comments emphasized lessons from research regarding imposing price constraints and how to have effective competition for grants.

Regulatory and Broadband Industry Responses to COVID-19: Cases of Uganda, Peru, and the Caribbean

The COVID-19 pandemic was particularly challenging for developing countries because of pre-existing poverty and severe inequality. Governments tended to set public safety as a primary goal, but it could not be their singular goal. Broadband was an important feature of any policy solution. Business lockdowns, school closures, and social distancing led to an unprecedented acceleration in the demand for broadband. But the government restrictions on social and economic interactions made it difficult to maintain and expand broadband networks. Governments quickly grew to believe that it would need cooperative relationships among multiple government agencies and private businesses to answer what appeared to be a broadband shortage. Regulatory controls over broadband providers were quickly suspended in favor of developing common goals and coordinated efforts.

Net Neutrality in the USA During COVID-19

The COVID-19 pandemic provides an opportunity to review policy assertions about net neutrality. There was an expectation that without *ex ante* FCC net neutrality rules, there would be harmful demonstrations of market power and anticompetitive conduct. This paper offers a review of the evidence. Given that little to no incidence of net neutrality violations could be uncovered for the period, the paper suggests some explanations as to why broadband providers behaved opposite to predictions. Contrary to many policy assertions, broadband providers did not block or throttle service, nor did they increase prices arbitrarily or decrease quality. In fact, broadband providers appeared to take significant efforts to expand availability, lower broadband prices, and make more networks available, in many cases without charge.

Revealing Transactions Data to Third Parties: Implications of Privacy Regimes for Welfare in Online Markets

This paper examines the effects of privacy policies regarding transactions (e.g., price/quantity) data on online shopping platforms. Disclosure of transactions data induces consumer behavior that affects merchant pricing decisions and the welfare of platform participants. A profit-maximizing platform prefers the disclosure policy that maximizes social benefit. Although this policy benefits sophisticated consumers, it harms those who do not understand the implications of their behavior. Consequently, the welfare effects of alternative privacy policies, data breaches, willful violations of stated privacy policies, and opt-in/opt-out requirements differ sharply, depending on the level of consumer sophistication and on other factors such as the prevailing status quo.

Comments filed with the FCC regarding Net Neutrality

PURC researchers contributed to two sets of comments filed with the Federal Communications Commission regarding net neutrality. Both sets emphasized findings in the economics literature regarding the impacts of such regulations on consumers, investment, service quality, and service providers.

Technology Blogs

Dr. Jamison blogs on technology issues for the American Enterprise Institute. He addresses issues of net neutrality, universal service, privacy, innovation, competition, and regulatory institutions. His blogs are available on the American Enterprise Institute website at http://www.aei.org/scholar/mark-jamison-2/.

WATER

Performance Assessment Using Key Performance Indicators (KPIs) for Water Utilities: A Primer

Key Performance Indicators (KPIs) are widely recognized as a basis for evaluating water utility operations in developing countries and for designing both regulatory and managerial incentives that improve performance. A number of methodologies can be used for assessing performance. However, regulatory oversight requires data analysis of trends, current performance, and realistic targets. Quantitative studies can provide clues regarding the extent of economies of scale, scope, and density, but policymakers need much more detail and specificity than most scholars provide. Here, the focus is on information systems that provide accurate, reliable, and relevant data.

MULTISECTOR

Access Pricing in Mixed Oligopoly

Characterizes optimal access prices in mixed oligopoly where a private, profit-maximizing firm competes against a public enterprise after purchasing an essential input (e.g., network access). Optimal access prices tend to be lower for the private firm than for the public enterprise, and can be particularly low for a relatively efficient private supplier. The optimal access price for a private firm is the same whether it competes against another private firm or a public enterprise. Failure to tailor the prevailing access pricing policy to the objectives of the competing suppliers can reduce welfare substantially.

Principles and Strategies for Effective Leadership in the "New Normal"

To lead effectively during times of constant change and uncertainty, leaders should: (1) Lean into the uncertainty (Learning to live in the discomfort of uncertainty will free up some space for clearer thinking.); (2) Recognize that it is all about experimentation (It is about “next practices” rather than best practices.); (3) Embrace mistakes (Mistakes are a necessary part of this evolving process and need to be used as learning tools and experiments.); and (4) Lead with a focus on empathy and communication (In a time in which so many are struggling and uncertainty is king, we must ensure people know you are “there” for them.)

Inspiring Leadership for Innovation

This book chapter examines communication and cultural strategies for companies to provide industry-leading innovations.

OUTREACH

State Leadership: Making the Broadband Equity, Access, and Deployment Program Work

On January 9, PURC and AEI's Mark Jamison hosted a discussion with state broadband leaders to evaluate the implementation challenges of the National Telecommunications and Information Administration's $42.5 billion Broadband Equity, Access, and Deployment (BEAD) Program. The participants first explored strategies to ensure BEAD funding reaches the most qualified broadband providers through competitive challenge and bidding processes. The discussion then shifted to accountability measures, focusing on developing robust systems to monitor provider performance and verify results. Finally, participants examined potential challenges and opportunities in coordinating with the incoming Trump administration.

Examining Federal Broadband Policies: Challenges, Opportunities, and Future Reforms

The Broadband Equity, Access, and Deployment Program was born out of the 2021 infrastructure bill and aims to expand high-speed internet access for all Americans. However, most communities will not see concrete benefits until 2025 at the earliest, and 16 states are waiting for their plans to be approved, two years into the process. On September 27, Federal Communications Commissioner Brendan Carr joined PURC and AEI's Mark Jamison to discuss the state of federal broadband policies. A panel of experts shared insights on how the US Department of Commerce could have mitigated these challenges and the potential reforms, such as more efficient permitting processes, needed to efficiently deploy broadband under a future administration.

Asia-Pacific Economic Cooperation (APEC) Workshop

What features make regulation effective for encouraging efficient infrastructure? This is one of the questions that PURC director Mark Jamison addressed at the Asia-Pacific Economic Cooperation meeting in Lima, Peru. Dr. Jamison explained the importance of revenue adequacy, incentives for efficiency, and a stable regulatory environment. He also discussed the keys to success in electricity market reform, emphasizing the importance of governance structures that ensure accountability and financial stability. On the topic of broadband development, he emphasized the importance of competition and limiting subsidies to areas that would not have broadband without an outside source of monies. The APEC workshop was held on August 16, 2024.

The Regulatory Role in Power Trading

The expected growth in power trading in Southern Africa raises many questions for electricity regulation. PURC director of energy studies Dr. Ted Kury explored some of those questions during a webinar on the Regulatory Role in Power Trading, hosted by the National Energy Regulator of South Africa (NERSA). As a part of the Consumer Impact Panel, he discussed why consumers would want to purchase directly from a power trader, and the implications of this increased responsibility on the rest of the system. He talked about the role of new power market participants and what consumers and regulators need to be aware of to avoid some of the problems that have been experienced in other parts of the world.

ABES Brazil Water Week

What are the opportunities and challenges in implementing regulatory contracts? PURC director of energy studies Dr. Ted Kury explored that topic with participants in ABES Brazil Water Week. He talked about why countries implement contractual regulation and how it differs from discretionary regulation. He also explored the elements of regulatory contracts and why each is important. The main conclusion from his talk was that regulatory contracts can allow for more options and flexibility in regulation, but that diligent preparation before the contract is signed is the key to success.

Connecting America: Getting Taxpayers Their Money's Worth in Broadband Expansion

Dr. Mark Jamison hosted a panel discussion at the American Enterprise Institute on strategies for transparency, efficiency, and accountability in state broadband programs. The March 28, 2024, panel featured representatives from high-performing state broadband offices: Broadband Expansion and Accessibility of Mississippi's Sally Doty, Idaho Commerce's Ramón S. Hobdey-Sánchez, and ConnectLA's Veneeth Iyengar. It also featured the University of North Texas's Janice Hauge, who is a member of AEI's Broadband Barometer Project.

51st Annual PURC Conference – Beyond Convergence: Designing Florida's Utility Future

As the utility landscape undergoes rapid transformation with advances in artificial intelligence, renewable energy sources, and smart systems, utilities and their regulators face unprecedented challenges. The 51st Annual PURC Conference provided utility and regulatory professionals the platform to engage in insightful discussions, share ideas for next practices, and explore strategies to navigate the complexities of technological adoption. The 51st Annual PURC Conference was hosted in-person from February 21 – 22, 2024.

Annual PURC Award for Best Paper in Regulatory Economics

The 2024 Public Utility Research Center Prize for the best paper in regulatory economics was awarded to Lauri Kytomaa (Cornell University) for *The Roles of Borrower Private Information and Mortgage Relief Design in Foreclosure Prevention*.

TRAINING AND DEVELOPMENT

Practicing Leadership in a Political Environment – A One-Day Intensive Training for Leaders in Utility Policy

Forty-three (43) regulatory and utility professionals participated in our January 2025 and June 2024 Leadership Workshop. Throughout the workshops, they identified and developed their individual leadership profiles; examined personal practices of successful leaders to develop vision, resolve conflict and set priorities; analyzed what is different about practicing leadership in a political environment; and developed their own personal action plans and an accountability system to address their unique challenges.

54th & 53rd PURC/ World Bank International Training Program on Utility Regulation and Strategy

One hundred and seven (107) regulatory and utility professionals from around the world travelled to the University of Florida for PURC's flagship program! The international training program is an intensive course specifically tailored to the professional requirements of utility regulators and regulatory staff. The course is designed to enhance the economic, technical, and policy skills required for implementing policies and managing sustainable regulatory systems for infrastructure sectors. This training was held in-person from January 13 – 22, 2025 and June 3 – 12, 2024.

Customized PURC Training on Principles of Water Regulation and Pricing

What are the challenges faced by utilities and regulators in the Central American water sector, and how can these agencies adapt? Participants from Belize Water Services, the Belize PUC, and other stakeholders addressed applications to address these challenges in a PURC course in Belize City in December 2024. PURC Director Mark Jamison, Associate Director and Director of Leadership Studies Araceli Castaneda, and Director of Energy Studies Ted Kury worked with participants in addressing regulatory strategy, the political economy of water access and pricing, financial frameworks, and regulatory incentives. The course also included more specialized topics such as addressing non-revenue water, challenges with interconnection policies, and water rate design. The week closed with a workshop on leadership skills and practices. This course was held December 9 – 13, 2024 in Belize City, Belize. The leadership workshop was hosted December 14, 2024.

Customized PURC Training on Principles of Regulation

How does changing the organization of the electricity sector present new challenges for regulatory agencies around the world? PURC Director Mark Jamison and Director of Energy Studies Ted Kury conducted a course for the Electricity Regulatory Authority of Uganda and other stakeholders in Kampala in November 2024. Participants discussed not only regulatory form and strategy and improving cost efficiency, but also regulatory considerations in evaluating mergers and the changing role of the regulator and other stakeholders as Uganda moves towards the Eastern Africa Power Pool. The course utilized a variety of case studies and analytical tools to study the ways that stakeholders must adapt to an evolving landscape of electricity service in Africa. This course was held November 11 – 15, 2024 in Kampala, Uganda.

Customized PURC Training on Economics of Regulation

What do ICT regulators need to know about the underlying economics driving the industries? That was the question that the Thailand National Broadcasting and Telecommunications Commission studied with PURC in October 2024. The course began with foundational topics like the purposes of regulation, industry economics, and platform economics. Participants then studied more advanced concepts such as regulatory finance, incentive regulation, and the economics of innovation, using case studies and exercises for applied learning. They also examined issues like the digitization of business, radio spectrum management, and broadcast regulation, emphasizing the impact of policy and technology changes. The course concluded with discussions on emerging issues like AI and privacy. This course was held October 7 – 11, 2024 in North Pattaya, Thailand.

Advanced International Practices Program: Benchmarking Infrastructure Operations course

We hosted 18 utility and regulatory professionals from the energy and water sectors for an intensive four-day technical course in benchmarking. Participants analyzed the benefits, best practices and pitfalls of benchmarking utilities. After completing the course, participants were able to understand why benchmarking is essential for improving the performance of infrastructure organizations. They could analyze the implications of partial, limited, or incorrect information as well as assess how information on trends in key performance indicators helps decision-makers. They could understand how model specification and data outliers affect performance comparisons as well as identify the strengths and limitations of alternative quantitative methodologies and how to communicate results. This course was held in-person on the University of Florida campus from August 5 – 8, 2024.

Advanced International Practices Program: Energy Pricing course

We hosted 10 utility and regulatory professionals from the energy and water sectors for a week-long technical course in pricing. Participants discussed the challenges and best practices in pricing; the innovative ideas to addressing efficiency and environmental issues; and the core principles in pricing. After completing the course, participants were able to prepare for and perform price reviews, develop economic incentives appropriate for utilities in small economies, evaluate market competition and develop remedies for market failure, analyze financial statements for rate setting and evaluating sector performance, and develop innovative price structures that create incentives for consumers and producers to behave in a manner consistent with your utility policy. This course was held in-person on the University of Florida campus from July 29 – August 2, 2024.

Customized PURC Training on Regulation by Contract in Brazil

Seventy-seven (77) government and industry professionals from Brazil learned about the economics, political economy, and best practices for infrastructure regulation by contract. They studied regulatory tools, contract design, economic incentives, engaging with policy makers and other stakeholders, negotiation strategies, risk management, financing, applications of artificial intelligence, and causes of regulatory failure. Participants examined numerous case studies from around the world. This training was held April 8-12, 2024, in Belo Horizonte, Brazil.

FACULTY RESEARCH FOCUS

Mark A. Jamison, Director

Dr. Jamison conducts studies on regulation and strategy in telecommunications, information technologies, and energy. In recent years, his research has been presented at meetings of the American Economic Association, Industrial Organization Society, Western Economic Association, Australian Competition and Consumer Commission, Telecommunications Policy Research Conference, the Caribbean Electric Utility Services Corporation, the Organization of Caribbean Utility Regulators, and the National Association of Regulatory Utility Commissioners. He is the director of the university's Digital Markets Initiative and was a co-principal investigator on a National Science Foundation grant to examine barriers to adoption of solar technologies in developing countries. His current research examines broadband development, market competition, innovation, antitrust, and institutional change. He has conducted training programs for regulatory organizations in Africa, Asia, Australia, the Caribbean, Central America, Europe, North America, and South America.

Ted Kury, Director of Energy Studies

Dr. Ted Kury's research has focused on four current issues confronting energy markets: efforts to change ownership structure in utility markets, the impacts of distributed generation, the efficacy of relocating power lines, and the effects of restructured electricity markets. There have been recent calls to change the ownership structure for electric utilities in California, Maine, and New York, but these efforts have essentially highlighted how complicated the process is, and the role of community preferences in the process. Analyses on the impacts of distributed generation have exhibited notable gaps. First, current policy analysis makes the implicit assumption that distributed generation has no impact on consumption. Dr. Kury, along with Dr. Michelle Phillips and Dr. Mark Jamison, studied the impact of distributed generation on consumption in a single-utility sample and found that consumption increased 8-14% for customers that installed solar panels. While this result may not scale to larger samples, it certainly is evidence that the standard assumption that distributed generation has no impact on consumption is suspect. Further, as more countries move away from net metering as a compensation mechanism for distributed generation, they create an incentive for unregistered installations. Present detection methods involving satellite photos and image processing software are expensive with low detection rates. Dr. Kury is developing a machine learning algorithm for detecting unregistered installations from simple billing data. The relocation of power lines is a complicated question because relocation is very expensive and does not necessarily reduce the damage associated with storm events. In areas more susceptible to storm surge and flooding, the relocation may even increase damages, leading to a waste of valuable consumer and utility resources. Understanding how the efficacy of undergrounding changes with location is critical to ensuring that customers are receiving safe, reliable electricity service at just and reasonable rates. In addition to his academic work, Dr. Kury has published a number of essays in the popular press on the topic. Restructured electricity markets have led to more opportunities, but it is not clear how these opportunities are distributed. Dr. Kury's research has shown that the benefits of increased trade in transparent wholesale markets are not uniformly distributed, with larger and privately-owned utilities more apt to participate.

Araceli Castaneda, Director of Leadership Studies

Ms. Castaneda served as faculty for several PURC in-country training programs in 2024. These include "Principles of Water Regulation and Pricing", hosted by the Belize Water Services Ltd. (BWSL) in Belize City, Belize, December 9 – 13, 2024; "One-Day Leadership Workshop: Practicing Leadership in a Political Environment" also hosted by BWSL in Belize City, Belize, December 14, 2024; and "Regulation by Contract" hosted by the Brazilian Association of Regulatory Agencies (ABAR) in Belo Horizonte, Brazil, April 8 – 12, 2024. Ms. Castaneda led the development work for the programs afore mentioned, and for other in-country programs such as "Principles of Regulation" delivered in Kampala, Uganda, November 11 – 15, 2024 for the Electricity Regulatory Authority of Uganda (ERA), and the "Training Program on the Economics of Regulation" for the National Broadcasting and Telecommunications Commission of Thailand (NBTC) delivered in Thailand October 7 – 11, 2024.

Ms. Castaneda also contributed to a number of training sessions in other PURC courses in Gainesville, FL. These sessions include *Effective Independence*, *Country Lessons from the Pandemic*, *Thinking Strategically*, *Balcony Perspectives in ICT Strategies*, or *Taking a Balcony View Point on Energy Pricing*. She ran peer consulting groups to address participants' pressing issues and leadership challenges, and also co-delivered PURC's one-day leadership workshop June 2024.

David Sappington, Lanzillotti-McKethan Eminent Scholar

Professor Sappington's ongoing research focuses on the design of regulatory policies to: (i) limit peak electricity consumption by providing incentives for demand response; and (ii) promote efficient distributed generation of electricity via net metering and related policies.

APPENDIX

Public Utility Research Center

Recent Publications and Working Papers

Aytug, Haldun, Anuj Kumar, and Xiang Wan. 2022. "Estimating Optimal Recommendation Policy Under Heterogeneous Treatment Effect of Product Recommendation" In Information Systems Research Journal.

Bandyopadhyay, Subhajyoti. 2022. "The Streaming Games: Analyzing the Revenue Models of Online Media Firms" University of Florida, Warrington College of Business, PURC Working Paper.

Barrentes, Roxana, David Cox, Mark Jamison, and Dorothy Okello. 2023. "Regulatory and Broadband Industry Responses to COVID-19: Cases of Uganda, Peru, and the Caribbean." In *Beyond the Pandemic? Exploring the Impact of COVID-19 on Telecommunications and the Internet*, ed. Jason Whalley, Volker Stocker, and William Lehr, 169-193. Bingley, UK: Emerald Publishing.

Brown, David P., and David E. M. Sappington. 2022. "Vertical Integration and Capacity Investment in the Electricity Sector," *The Journal of Economics and Management Strategy*, forthcoming.

Brown, David P., and David E. M. Sappington. 2022. "Load-Following Forward Contracts," University of Florida, Department of Economics, PURC Working Paper.

Brown, David P., and David E. M. Sappington. 2022. "Market Structure, Risk Preferences, and Forward Contracting Incentives," University of Florida, Department of Economics, PURC Working Paper.

Castaneda, Araceli, and Mark A. Jamison. 2023. "Inspiring Leadership for Innovation," In *New Leadership Communication – Inspire Your Horizon: World Lecture*, ed. Nichole Pfeffermann and Monika Schaller.

Channagiri Ajit, Tejaswi, and Mark Jamison. 2022. "Effects of Conferring Business Resource on Rivals" University of Florida, Warrington College of Business, PURC Working Paper.

Esmaelian, Behzad, Joseph Sarkis, Sara Behdad, and Mark A. Jamison. 2023. "Sustainable Future: Principles and Expectations in Cryptocurrency Design," *In Blockchain and Smart-Contract Technologies for Innovative Applications*, Berlin, Germany: Springer Nature.

Haak, Lily. 2024. "COMMENTARY: DataU: How Much Are You Worth Online?" University of Florida, Warrington College of Business, PURC Working Papper.

Hauge, Janice, Mark A. Jamison, and Jakub Tecza. 2023. "Mobile platform preference: A comparison of U.S., Indian and Japanese firms" University of Florida, Warrington College of Business, PURC Working Paper.

Howell, Bronwyn, Fernando Herrera González, Georg Serentschy, Mark Jamison, Petrus Potgieter, Roslyn Layton, and Íñigo Herguera García. 2024. "Perspectives on Political Influences on Changes in Telecommunications and Internet Economy Markets," *Telecommunications Policy*.

Jamison, Mark A. 2022. "Adapting Merger Guidelines to a Digital Environment," *CPI Antitrust Chronicle*.

Jamison, Mark A. 2023. "An Alternative Focus for Antitrust: Addressing Harmful Competitive Advantage," University of Florida, Warrington College of Business, Digital Markets Initiative working paper, 2023.

Jamison, Mark A. 2023. "A Public Portal Option for Content Management" University of Florida, Warrington College of Business, PURC Working Paper.

Jamison, Mark A. 2023. "Broadband Pricing Under BEAD" University of Florida, Warrington College of Business, PURC Working Paper.

Jamison, Mark A. 2023. "Lessons From Economics Literature Regarding Title II Regulation of the Internet" University of Florida, Warrington College of Business, PURC Working Paper.

Jamison, Mark A. 2024. "The State of Broadband in the United States" University of Florida, Warrington College of Business, PURC Working Paper.

Jamison, Mark A. 2024. "Minimum Standards for Maximum Pricing Constraints" University of Florida, Warrington College of Business, PURC Working Paper.

Jamison, Mark and Jakub Tecza. 2024. "Determinants of Industry Concentration and Dispersion" University of Florida, Warrington College of Business, PURC Working Paper.

Jamison, Mark, Jakub Tecza, and Peter Wang. 2023. "Effects of platforms' entry into own marketplace: Evidence from the mobile application market" University of Florida, Warrington College of Business, PURC Working Paper.

Kury, Theodore. 2023. "Public-Private Cooperation in Broadband" University of Florida, Warrington College of Business, PURC Working Paper.

Kury, Theodore. 2025. "Potential Energy Savings from Load Shifting at University Chiller Plants" University of Florida, Warrington College of Business, PURC Working Paper.

Layton, Roslyn, and Mark A. Jamison. 2023. "Net Neutrality in the USA During Covid-19." In *Beyond the Pandemic? Exploring the Impact of COVID-19 on Telecommunications and the Internet*, ed. Jason Whalley, Volker Stocker, and William Lehr, 195-214. Bingley, UK: Emerald Publishing.

Li, Xitong. 2022. "How Do Product Recommendations Help Consumers Search Products? Evidence of Underlying Mechanisms from a Field Experiment," *Management Science*.

Rosston, Greg, Michelle Connolly, Janice Hauge, Mark Jamison, James Prieger, and Scott Wallsten. December 2023. "Economists' Comments on State BEAD Proposals," Comments filed with various state broadband offices.

Tecza, Jakub, Scott Wallsten, and Yoojin Lee. 2023. "Do Broadband Subsidies for Schools Improve Students' Performance? Evidence from Florida." University of Florida, Warrington College of Business, PURC Working Paper.

Yang, Yang, Sang K. Park, and Shunyuan Zhang. 2022. "Mitigating Inequalities Caused by Awareness of Algorithmic Bias," *Journal of Marketing Research*.

Attachment 2

State of Florida

Public Service Commission

CAPITAL CIRCLE OFFICE CENTER ● 2540 SHUMARD OAK BOULEVARD
TALLAHASSEE, FLORIDA 32399-0850

-M-E-M-O-R-A-N-D-U-M-

DATE: February 4, 2025

TO: Braulio L. Baez, Executive Director

FROM: Cayce H. Hinton, Director, Office of Industry Development and Market Analysis

RE: Draft Advanced Nuclear Power Feasibility Report

CRITICAL INFORMATION: Please place on the February 18, 2025 Internal Affairs Agenda. **Commission Approval is sought.** The Advanced Nuclear Power Feasibility Report is due to the Governor, the President of the Senate, and Speaker of the House by April 1, 2025.

Pursuant to Chapter 2024-186, section 21, Laws of Florida, the Commission is required to prepare a report on the potential use of advanced nuclear power technologies in the State of Florida. As part of that directive, the Commission is required to study and evaluate the technical and economic feasibility of using advanced nuclear power technologies, including small modular reactors, to meet the electrical power needs of the state. Also, the Commission must research means to encourage and foster the installation and use of such technologies at military installations in partnership with public utilities. In conducting this study, the Commission is to consult with the Department of Environmental Protection and the Division of Emergency Management. By April 1, 2025, the Commission is to submit this report to the Governor, the President of the Senate, and the Speaker of the House of Representatives.

Please place the attached Draft of the Advanced Nuclear Power Feasibility Report on the February 18, 2025 Internal Affairs. Staff is seeking Commission approval.

Attachment

cc: Mark Futrell, Deputy Executive Director, Technical
Apryl Lynn, Deputy Executive Director, Administrative
Keith Hetrick, General Counsel

DRAFT

Advanced Nuclear Power Feasibility Report

Florida Public Service Commission

April 1, 2025

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LIST OF ACRONYMS

AFB ..... Air Force Base
ANPTC ..... Advanced Nuclear Production Tax Credit
ARDP ..... Advanced Reactor Demonstration Program
BWR ..... Boiling Water Reactor
CCRC ..... Capacity Cost Recovery Clause
CFR ..... Code of Federal Regulations
CHIPS ..... Creating Helpful Incentives to Produce Semiconductors
CNCP ..... Civil Nuclear Credit Program
COL ..... Combined Operating License
CR3 ..... Crystal River Unit 3
CSO ..... Commercial Solutions Opening
DAF ..... Department of the Air Force
DEF ..... Duke Energy Florida
DIU ..... Defense Innovation Unit
DOD ..... Department of Defense
DOE ..... Department of Energy
DON ..... Department of the Navy
EAAS ..... Energy as a Service
EPRI ..... Electric Power Research Institute
EPZ ..... Emergency Planning Zone
F.A.C. ..... Florida Administrative Code
F.S. ..... Florida Statutes
FCG ..... Florida Electric Power Coordinating Group
FDEM ..... Florida Division of Emergency Management

FDEP.....Florida Department of Environmental Protection

FDOH..... Florida Department of Health

FOAK..... First-of-a-Kind

FPL..... Florida Power and Light

FPSC .....Florida Public Service Commission

GAIN..... Gateway for Accelerated Innovation in Nuclear

GW..... Gigawatts

IIJA .....Infrastructure Investment and Jobs Act of 2021

INL.....Idaho National Laboratory

IRA.....Inflation Reduction Act

ITC .....Investment Tax Credit

JBSA .....Joint Base San Antonio

LCOE ..... Levelized Cost of Electricity

LPO..... Loan Program Office

MIT .....Massachusetts Institute of Technology

MW .....Megawatts

MWh .....Megawatt-Hour

NCRC..... Nuclear Cost Recovery Clause

NDAA .....National Defense Authorization Act

NEAC.....Nuclear Energy Advisory Committee

NEIMA .....Nuclear Energy Innovation and Modernization Act of 2019

NOAK..... Nth-of-a-Kind

NOI ..... Notice Of Intent

NRC .....Nuclear Regulatory Commission

OCC .....Overnight Capital Costs

PEF.....Progress Energy Florida

PPSA.....Power Plant Siting Act

PTC ..... Production Tax Credit

PWR ..... Pressurized Water Reactor

RFI ..... Request for Information

SCO ..... Strategic Capabilities Office

SMR ..... Small Modular Reactor

TYSP ..... Ten Year Site Plan

UAMPS ..... Utah Associated Municipal Power System

Executive Summary

Chapter 2024-186, section 21, Laws of Florida, requires the Florida Public Service Commission (FPSC or Commission) to prepare a report on the potential use of Florida Electric Power Coordinating Group, Inc. (FCG) nuclear power technologies in the state of Florida. The Commission is required to study and evaluate the technical and economic feasibility of using advanced nuclear power technologies, including small modular reactors, to meet the electrical power needs of the state. Also, the Commission must research means to encourage and foster the installation and use of such technologies at military installations in partnership with public utilities. The Commission is directed to consult with the Florida Department of Environmental Preservation (FDEP) and the Florida Division of Emergency Management (FDEM) in the preparation of this report.

Advanced Nuclear Power Technology

The nuclear reactors operating in Florida presently are classified as generation (Gen) II reactors. Advanced nuclear reactors are classified as Gen III+ and Gen IV. Gen III+ reactors are traditional technologies using more advanced designs, while Gen IV reactors use advanced technologies and materials in their design. Advanced nuclear reactors vary in size. Large reactors are traditional central station generators that can produce over a Gigawatt (GW) of electricity. Small modular reactors (SMRs) are defined as being under 350 Megawatts (MW) in capacity. Micro-reactors are generally defined as being under 50 MW. At present, the only advanced nuclear reactor design operating in the U.S. is the Westinghouse AP1000, a large, twin unit Gen III+ reactor at plant Vogtle in Georgia. Presently there are no SMRs or microreactors in operation in the United States (U.S.). It appears these designs are technically feasible, but as of yet unproven.

Economic factors are critical to the future of advanced nuclear deployment, as these designs are new and have not yet experienced widespread deployment. One critical component of these factors is the path from First-of-a-kind (FOAK) to Nth-of-a-kind (NOAK), as manufacturers learn to reduce costs without sacrificing safety or reliability as they gain experience building these generators. Likewise, lowering the cost of manufacturing, and thus the final construction costs, helps to drive down the Levelized Cost of Electricity (LCOE) of nuclear power, because the comparatively low fuel costs of nuclear mean that LCOE is driven primarily by construction costs. While the above factors are critical to all types of reactors, there are also additional cost considerations specific to advanced nuclear reactors, as economies of scale and different use cases can lead to distinction in how they can be funded.

The federal government offers numerous incentives for both advanced and traditional nuclear power. An Investment Tax Credit (ITC) was first implemented in 1978, while a Production Tax

Credit (PTC) was first offered in 1992. Both have been updated in years since. The DOE also offers grants and loans both for development and deployment of nuclear generation. More recent legislation has also funded numerous projects that are available for the development of nuclear projects. As a result, there are numerous current projects at all scales of reactor design that have either entered active development or are expected to over the coming decade.

Military Applications

The Department of Defense (DOD) and the branches of the U.S. military have also investigated the logistics of the deployment of advanced nuclear power, seeing potential economic and strategic benefits to our military, both at domestic sites and abroad. As a result, energy supply is seen as a major security issue.

The military has multiple ongoing projects to realize the security potential of advanced energy sources. The DOD itself has an active project to test an advanced microreactor design in real-world operating conditions. The Department of the Air Force (DAF) has researched advanced energy sources since shortly after the Department's creation, and currently has numerous projects in development at Air Force Bases (AFB) around the country. Additionally, the Department of the Navy (DON), which has extensive nuclear experience from its deployment of nuclear propulsion, is currently evaluating bases for advanced nuclear generation testing. Finally, the DOD is also planning advanced nuclear generation projects at Army bases.

Recommendations

If the Legislature decides to take legislative or administrative actions to enhance the use of advanced nuclear technologies, there are several approaches that could serve as initial steps in that regard. The Legislature could commission a more comprehensive study beyond the impacts to Florida's electricity needs. The Legislature could also expand the categories of cost currently allowed alternative cost recovery under Section 366.93, Florida Statutes. The State of Florida could enhance stakeholder engagement and education concerning advancements in nuclear technology and state-of-the-art safety features. Finally, the Legislature could support new state and/or federal grant funding for the deployment of advanced nuclear reactors and establish a workforce development program.

Chapter 1 – Introduction

Chapter 2024-186, section 21, Laws of Florida, requires the Commission to study and evaluate the technical and economic feasibility of using advanced nuclear power technologies, including small modular reactors, to meet the electrical power needs of the state, and research means to encourage and foster the installation and use of such technologies at military installations in the state in partnership with public utilities. In conducting the study, the Commission shall consult with the FDEP and the FDEM.

The Commission is required to prepare and submit a report to the Governor, the President of the Senate, and the Speaker of the House of Representatives, containing its findings and any recommendations for potential legislative or administrative actions that may enhance the use of advanced nuclear technologies in a manner consistent with the energy policy goals in Section 377.601(2), Florida Statutes (F.S.).

In the report that follows, Chapter two will provide background on Florida's current nuclear fleet, previous legislative actions taken to encourage the construction of new nuclear generation in the state, and the current regulatory landscape for nuclear electric generation, both federal and state. Chapter three evaluates the technical and economic feasibility of advanced nuclear power technologies. Chapter four summarizes current federal actions intended to help develop this technology, while Chapter five explores the application of advanced nuclear power technology on military installations. The final chapter provides observations regarding the development of advanced nuclear technologies in Florida and potential recommended actions on a state level.

To begin our research, Commission staff conducted a workshop on advanced nuclear power technology to gather information from subject matter experts. The workshop involved presentations by Dr. Mary Lou Dunzik-Gougar, on behalf of the DOE Gateway for Accelerated Innovation in Nuclear (GAIN) program in association with the Idaho National Laboratory (INL), Steve Swilley, of Electric Power Research Institute (EPRI), and Jacob Williams and Lauren Sher from the FCG. The presentation from GAIN highlighted the realistic timeline of nuclear deployment, as well as a cost analysis. The presentation from EPRI highlighted the different types of microgrid reactors as well as the implementation timeline. The presentation from FCG highlighted the Florida utilities' perspective on advanced nuclear implementation, as well as federal funding opportunities and incentives. Staff from FDEP and FDEM also participated in the workshop.

Commission staff invited post-workshop written comments providing recommendations for actions that could be taken that may enhance the use of advanced nuclear power technologies in Florida, which were provided by both GAIN and FCG. [1]

[1] All documents, including presentations and post-workshop comments, as well as a video recording from the workshop can be found on the Commission's Website.

Chapter 2 – Background of Nuclear Generation in Florida

Florida's Nuclear Fleet

Florida is the second-largest producer of electricity in the nation, after Texas. In 2022, natural gas fueled about three-fourths of Florida's total in-state net generation, and 8 of the state's 10 largest power plants by capacity and by generation are natural gas-fired. The second-largest source of in-state generation is nuclear power. The state's two nuclear power stations are located on Florida's Atlantic Coast, and typically provide more than one-tenth of the state's net generation.[2]

Florida Power and Light (FPL) owns the only operating nuclear power plants in the state of Florida. The oldest, Turkey Point Units 3 and 4, are located on Biscayne Bay, 24 miles south of Miami.[3] These two units are pressurized water reactors (PWR). The first unit began operation in 1972, with the second unit following in 1973. These two nuclear power units have a combined capacity of approximately 1,600 MW of electricity generation. In 2012, the NRC approved a 15 percent uprate of Turkey Point Units 3 and 4.[4] On September 18, 2024, the NRC approved the subsequent license renewal of FPL's Turkey Point Nuclear Power Plant Units 3 and 4, enabling the continued safe operation of these units through 2052 and 2053, respectively. This significant approval ensures that the nuclear facility will continue to provide reliable, low-cost and clean energy to FPL customers for the next three decades.[5]

FPL also operates the St. Lucie Nuclear Power Plant, a twin nuclear power station located on Hutchinson Island, near Port St. Lucie in St. Lucie County. These two units, St. Lucie 1 and 2, are both PWR. Construction for Unit 1 began in 1970, with Unit 2 following in 1977. They entered service in 1976 and 1983, respectively. In 2003, the NRC extended the operating license of the St. Lucie units to 2036 and 2043. In 2008, FPL filed for uprates of both units. In 2012, the uprate modifications were completed, increasing each unit's electric output to 940 MW.[6]

The Crystal River Energy Complex, located about 85 miles north of Tampa, is owned by Duke Energy Florida (DEF). Construction of Crystal River Unit 3 (CR3) began in 1968, with the plant entering commercial operation in March 1977. CR3 was a PWR with a net capacity of 860 MW. In 2009, during a project to replace the unit's steam generators, the containment structure experienced a de-lamination event where layers within the concrete walls developed separation. Efforts to replace the section of concrete failed when additional cracking was detected. In 2013,

[2] Review of the 2024 Ten Year Site Plan
[3] FPL | Clean Energy | Turkey Point Nuclear Plant
[4] U.S. Nuclear Plant Actual and Expected Uprates by Plant
[5] NRC Authorizes FPL's Turkey Point Nuclear Power Plant to Operate for Another 20 Years - Sep 18, 2024
[6] St. Lucie Nuclear Power Plant | Florida Department of Environmental Protection

DEF decided to decommission CR3 rather than attempt further reconstruction of the containment vessel. According to the NRC, decommissioning of the unit will be completed in 2037.[7]

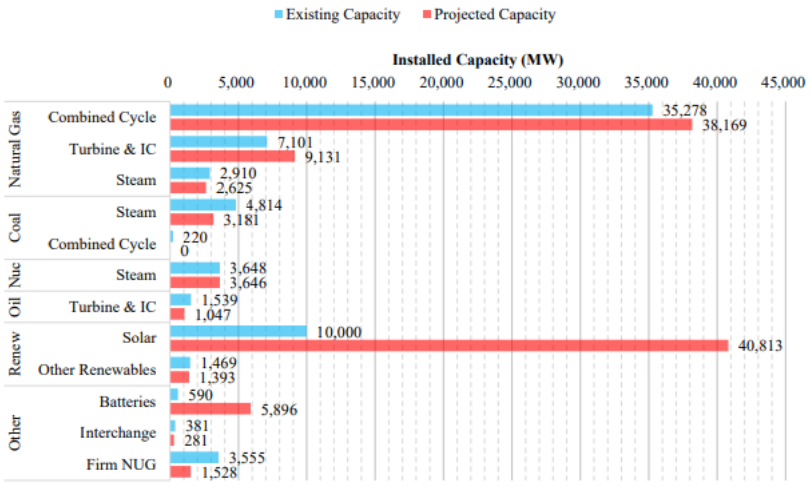
The University of Florida in Gainesville has the only nuclear training reactor in the Southeastern U.S. The control system of this training reactor is being converted from analog to digital, and will become the only digital training reactor in the U.S.[8]

Florida Energy Resource Profile

Nuclear energy provides large-scale, carbon-free electric power generation today and will likely remain a major contributor to the state's future power needs. Over the past 20 years, Florida's energy generation mix has become less diverse as natural gas-fired generation has increasingly accounted for most of the electricity generation in the state.[9]

Pursuant to Section 186.801, F.S., each generating electric utility must submit to the Commission a Ten-year Site Plan (TYSP), which estimates the utility's power generating needs and the general locations of its proposed power plant sites over a 10-year planning horizon. The TYSP summarizes the results of each utility's Integrated Resource Planning process and identifies proposed power plants and transmission facilities. The figure below, taken from the Commission's 2024 review of utility TYSPs, provides an overview of Florida's existing and projected energy generation resource profile.

Figure 1: State of Florida – Current and Projected Installed Capacity



Source: FRCC 2024 Regional Load and Resource Plan and TYSP Utilities' Data Responses

[7] Crystal River Unit 3 Nuclear Generating Plant | NRC.gov
[8] Nuclear Energy « FESC
[9] Review of the 2024 Ten Year Site Plan

With planned plant additions and retirements throughout the next decade, the generation mix in Florida is expected to diversify. Nuclear generation is expected to remain steady throughout the planning period. Coal generation is expected to continue its downward trend. Natural gas has been the primary fuel used to meet the growth of energy consumption, and this trend is anticipated to continue throughout the next decade. Solar generation is expected to exceed the growth of all other generation sources by the end of the planning period.

Past Legislative Actions

The Florida Legislature has previously taken steps to encourage the construction of new nuclear generation in Florida, as discussed below.

Alternative Cost Recovery

In 2006, the Florida Legislature enacted Section 366.93, F.S., in order to encourage utility investment in nuclear electric generation in Florida.[10] Section 366.93, F.S., authorized the Commission to allow investor-owned electric utilities to recover certain construction costs in a manner that reduces the overall financial risk associated with building a nuclear power plant. The statute required the Commission to adopt rules that provide for, among other things, annual reviews and cost recovery using the existing capacity cost recovery clause (CCRC).[11] The Commission adopted rule 25-06.0423, Florida Administrative Code (F.A.C.), to implement the statute by creating an annual review and recovery process called the Nuclear Cost Recovery Clause (NCRC).

Under the rule, all prudently incurred pre-construction costs can be recovered directly through changes to the annual capacity cost adjustment factor within the CCRC. Additionally, allowance for funds used during construction on all prudently incurred construction costs is eligible for annual recovery through the CCRC. The rule also provides that utilities may file a petition for a separate proceeding to recover prudently incurred site selection costs. The separate proceeding would be limited to determining prudence and an alternative method of recovery, which could be through the CCRC along with pre-construction costs. In the initial year of the proceeding, it was agreed that site selection costs would be treated the same as preconstruction costs.

Finally, the statute and rule address how costs can be recovered if the project is not completed. If the utility elects not to or is precluded from completing construction of the nuclear plant, the utility will be allowed to recover through the CCRC all unrecovered, prudently incurred site selection, pre-construction, and construction costs. The utility will recover these costs over a

[10] In 2007 the statute was amended to include Integrated Gasification Combined Cycle plants, and in 2008 to include transmission lines and associated facilities. In 2013, the statute was again amended to restrict cost recovery during the licensing process, require Commission approval prior to commencing certain activities, and establishing a timeframe within which the utility must commence construction after obtaining a COL from the NRC.
[11] The CCRC was originally established to provide cost recovery of capacity charges associated with power purchase contracts without changing base rates.

period equal to the time during which the costs were incurred or five (5) years, whichever is greater.

Following the adoption of the NCRC rules, FPL and DEF, doing business as Progress Energy Florida (PEF) at the time, proposed projects involving the uprate of existing nuclear power plants and the construction of new plants. FPL successfully completed the uprate of Turkey Point Units 3 and 4, as well as St. Lucie Units 1 and 2, resulting in an additional 522 MW of new nuclear generation capacity. FPL also proposed the new construction of Turkey Point Units 6 and 7, which would deploy an advanced nuclear reactor design by Westinghouse, the AP1000. FPL successfully obtained a Combined Operating License (COL) from the NRC for Turkey Point Units 6 and 7 in 2009. However, the project was paused to evaluate the progress of the construction of two AP1000 Units in Georgia at Plant Vogtle. In January of 2014, Section 366.93, F.S., was revised to implement time limits on how long a utility can wait to begin construction after obtaining a COL.[12]

PEF proposed the uprate of CR3. However, as discussed above, this unit was decommissioned prior to completing the uprate project. PEF also proposed the construction of two new AP1000 units in Levy county, Levy Units 1 and 2. The utility obtained a COL for the Levy units in 2016. However, due to economic considerations, plans to construct Levy Units 1 and 2 were cancelled and the COLs were subsequently terminated by the NRC at the request of DEF.

Determination of Need

At the same time that the Legislature enacted Section 366.93, F.S., creating the alternative cost recovery mechanism discussed above, it amended Section 403.519, F.S. Under this section, the FPSC is the exclusive forum for a determination of need for a new power plant. A determination of the need is a mandatory element of an application under the Power Plant Siting Act (PPSA). In determining the need for a power plant, the Commission is to take into account the need for fuel diversity and supply reliability.

This section also has provisions regarding nuclear power plants, specifying the contents of the need determination petition and specifying criteria the Commission shall take into account when determining the need for a nuclear power plant. These include whether the nuclear plant will provide base load capacity, enhance reliability by improving fuel diversity, and provide the most cost-effective alternative taking into account the need to improve the balance of fuel diversity, reduce dependence on fuel oil and natural gas, reduce air emission compliance costs, and contribute to the long-term stability and reliability of the grid.

Nuclear power plants were exempted from the requirements of the FPSC's Selection of Generating Capacity Rule (Rule 25-22.082, F.A.C.), which requires a utility to conduct a bidding process for alternative means to meet the need for additional generation. This exemption to this

[12] Florida Statutes 366.93

rule does not exempt the utilities from using the most prudent mechanisms, including bidding, for the construction of the plant or plant components from vendors and suppliers.

After an affirmative determination of need is granted by the Commission, utility costs incurred prior to commercial operation, including, but not limited to the siting, design, licensing, or construction of the plant shall not be subject to challenge, unless the FPSC finds in a hearing that costs were incurred imprudently.

Regulatory Landscape

There are several agencies, both federal and state, that have a role in the regulation of nuclear power plants. This regulatory landscape adds complexity to the development and deployment of nuclear power generation technology, and any consideration of further legislative action regarding advanced nuclear power technology should take into account the scope of regulation currently in place.

Federal Jurisdiction

The Atomic Energy Act of 1954 created the Atomic Energy Commission, which had jurisdiction over both the development and production of nuclear weapons and civilian uses of nuclear materials. The Energy Reorganization Act of 1974 split these functions between the Department of Energy (DOE) and the Nuclear Regulatory Commission (NRC). The DOE was given responsibility over the development and production of nuclear weapons and promotion of nuclear power, while the NRC was given regulatory authority over non-defense nuclear power.[13]

Nuclear Regulatory Commission (NRC)

The NRC is an independent agency that licenses and regulates civilian use of radioactive materials to ensure adequate protection of public health and safety. It is composed of five commissioners appointed by the President and confirmed by the Senate for five-year terms. The NRC develops regulations governing nuclear reactors and nuclear material safety, issues orders to licensees, and adjudicates legal matters. There are four regional offices which implement the NRC's programs in the states covered by the respective regions. The four regions cover the Northeast, the Southeast, the Midwest and the West/Southwest. The NRC primarily focuses on three areas: (1) reactors; (2) materials; and (3) waste.

Reactors

The NRC regulates both operating and new reactors, including reactor and operator licensing. This includes commercial reactors used to generate electric power, as well as reactors used for research, testing, and training. Oversight activities include inspections, assessments of

[13] *See* ABOUT NRC, https://www.nrc.gov/about-nrc.html (last visited Nov. 13, 2024).

performance, enforcement of actions, investigations of allegations of wrongdoing by NRC licensees, and incident responses.[14]

The NRC issues licenses in one of two ways: (1) a two-step process under Title 10 of the Code of Federal Regulations (10 CFR) Part 50; and (2) an alternative process for a combined license that provides a construction permit and an operating license with conditions for plant operation under 10 CFR Part 52.

The two-step process under 10 CFR Part 50 requires a company proposing a nuclear power plant to submit a Safety Analysis Report containing design information and criteria for the proposed reactor, a comprehensive environmental impact assessment for the proposed plant, and information for antitrust review for the proposed plant. Staff at the NRC reviews the application focusing on site characteristics, including surrounding population, seismology, and geology; design of the power plant; the plant's anticipated response to hypothetical situations; plant operations, including the applicant's technical qualifications; discharge from the plant into the environment; and emergency plans. The NRC may allow the licensee to conduct some activities prior to issuance of a construction permit if certain requirements are met, such as restoration guarantees if the permit is rejected and assurances that the proposed site is a suitable location. The applicant must finally submit a Final Safety Analysis Report to support its application for an operating license describing the final design of the facility as well as its operational and emergency procedures.

The combined license process under 10 CFR Part 52 authorizes construction of the facility much like the construction permit described under the two-step process above. The application must contain essentially the same information and specify the inspections, tests, and analyses that the applicant must perform. It also specifies acceptance criteria necessary to provide reasonable assurance that the facility has been constructed and will be operated in agreement with the license and applicable regulations. After issuance of a combined license, the NRC authorizes operation of the facility only after verifying that the licensee completed required inspections, tests, and analyses, and that acceptance criteria were met.[15]

On December 30, 2024, a coalition that included the states of Texas and Utah, as well as advanced nuclear reactor company Last Energy, Inc., filed a federal lawsuit in Texas arguing that some microreactors should not require approval by the NRC. The lawsuit alleges that the NRC licensing process is not intended for reactors as small as those produced by Last Energy, Inc., whose reactors are designed with a 20 MW capacity. The NRC has said that they will respond through filings with the court.

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[14] *See* NUCLEAR REACTORS, https://www.nrc.gov/reactors.html (last visited Nov. 13, 2024).
[15] *See* BACKGROUND ON NUCLEAR POWER PLANT LICENSING PROCESS, https://www.nrc.gov/reading-rm/doc-collections/fact-sheets/licensing-process-fs.html (last visited Nov. 13, 2024).

Materials

The NRC's Office of Nuclear Material Safety and Safeguards regulates activities that provide for the safe and secure production of nuclear fuel used in commercial reactors; the safe storage, transportation, and disposal of high-level radioactive waste and spent nuclear fuel; and the transportation of other radioactive materials. This office also develops and oversees the regulatory framework for the safe and secure use of nuclear materials; medical, industrial, and academic applications; uranium recovery activities; low-level radioactive waste sites; and the decommissioning of previously operating nuclear facilities and power plants.[16]

In addition to this, thirty-nine states (termed "Agreement States"), have entered into agreements with the NRC that give the states the authority to license and inspect byproduct, source, or special nuclear materials used or possessed within their borders. The National Materials Program is the overall framework within which the NRC and Agreement States function to carry out their respective regulatory programs for radioactive material.[17]

Florida became an Agreement State in 1964 through an agreement with the Atomic Energy Commission prior to the creation of the NRC. Under this agreement, Florida took over jurisdiction over byproduct materials, source materials, and special nuclear materials in quantities not sufficient to form a critical mass. These are under the jurisdiction of the Florida Department of Health (FDOH). The NRC maintains jurisdiction over the construction and operation of any production or utilization facilities; the export from or import into the United States of byproduct, source, or special nuclear material; the disposal into the ocean or sea of byproduct, source, or special nuclear waste materials; and the disposal of such other byproduct, source, or special nuclear material as the NRC determines should not be disposed of without a license from the NRC. The Agreement also allows the NRC to continue issuing rules and regulations concerning national defense and to protect restricted data or guard against the loss or diversion of special nuclear material. Florida and the NRC agreed to keep each other informed and to cooperate with each other in formulating standards and regulatory programs and to protect against the hazards of radiation. Lastly, the NRC retains the power to terminate or suspend the Agreement on its own initiative after reasonable notice and opportunity for hearing if the NRC finds that such termination or suspension is required to protect public health and safety.[18]

Waste

The NRC regulates four kinds of waste: (1) Low-level waste, including radioactively contaminated protective clothing, tools, filters, rags, medical tubes, and other such items; (2) waste incidental to reprocessing, which is waste byproducts that result from reprocessing spent nuclear fuel; (3) high-level waste, including used nuclear reactor fuel; and (4) uranium mill

[16] *See* NUCLEAR MATERIALS, https://www.nrc.gov/materials.html (last visited Nov. 13, 2024).
[17] *See* OFFICE OF NUCLEAR MATERIAL SAFETY AND SAFEGUARDS, https://scp.nrc.gov/ (last visited Nov. 13, 2024).
[18] *See* Agreement Between the Atomic Energy Commission and the State of Florida, July 10, 1964; *see also* Ch. 404, Fla. Stat. (2024).

tailings, which are the residues remaining after the processing of natural ore to extract uranium or thorium.[19]

The Office of Nuclear Material Safety and Safeguards develops and implements NRC policy for the regulation and safe management and disposal of spent fuel and high-level waste. Additionally, this office develops guidance for environmental compliance and oversees the decommissioning and cleanup of contaminated sites, safe management and disposal of low-level waste, and uranium recovery activities.[20]

Department of Energy

DOE's Office of Nuclear Energy has identified five goals to address challenges in the nuclear energy sector: (1) enable continued operation of existing U.S. nuclear reactors; (2) enable deployment of advanced nuclear reactors; (3) develop advanced nuclear fuel cycles; (4) maintain U.S. leadership in nuclear energy technology; and (5) enable a high-performing organization.[21] The Nuclear Energy Advisory Committee (NEAC) provides independent advice to the Office of Nuclear Energy on scientific and technical issues that arise in the planning, managing, and implementing of DOE's nuclear energy program. NEAC is composed of expert representatives from universities, industry, and national laboratories. NEAC meets twice a year to advise the Secretary of Energy on issues regarding national policy and scientific aspects of nuclear issues of concern to DOE.[22]

Additionally, DOE oversees 17 National Laboratories that conduct complex scientific research and development.[23] These National Laboratories support scientists and engineers from academia, government, and industry, providing access to specialized equipment, research facilities, and technical staff. Work at the labs includes research into new energy technologies, protecting national security, and advancing new industries critical to global leadership in science and innovation.[24]

State Jurisdiction

Florida Department of Environmental Protection

The PPSA, Sections 403.501-.518, F.S., controls the licensing of steam and solar power plants in Florida that generate 75 megawatts or more. The certification replaces all local and state permits, except those necessary under federal programs. Although siting certificates are approved by the Governor and Cabinet acting as a Siting Board, the FDEP is responsible for coordinating the certification process. The Siting Coordination Office and the FDEP Office of General Counsel

[19] *See* RADIOACTIVE WASTE, https://www.nrc.gov/waste.html (last visited Nov. 13, 2024).
[20] *See* OFFICE OF NUCLEAR MATERIAL SAFETY AND SAFEGUARDS, https://www.nrc.gov/about-nrc/organization/nmssfuncdesc.html (last visited Nov. 13, 2024).
[21] *See* OFFICE OF NUCLEAR ENERGY, https://www.energy.gov/ne/about-us (last visited Nov. 13, 2024).
[22] *See* NUCLEAR ENERGY ADVISORY COMMITTEE, https://www.energy.gov/ne/nuclear-energy-advisory-committee (last visited Nov. 13, 2024).
[23] *See* NATIONAL LABORATORIES, https://www.energy.gov/national-laboratories (last visited Dec. 2, 2024).
[24] *See* The National Laboratories, https://nationallabs.org/ (last visited Dec. 2, 2024).

provide administrative and legal support for the certification process. Local governments wherein a power plant is to be built participate in the siting process. The certification process addresses permitting, land use and zoning, and property interests. Certification grants approval for the location of a power plant and its associated facilities, such as electrical transmission lines carrying power to the grid. Florida's certification process does not include licenses required by the federal government, such as those required by the NRC. The Siting Board issues the certification; however, in non-contested cases, the FDEP Secretary may issue a certificate. There is an extensive review process for certification including an initial need determination by the FPSC, a land use determination, public noticing and public meetings, comprehensive agency reports, project analyses, a certification hearing and a Siting Board hearing if the project is disputed, and lastly, a final order on certification. Certification is a life-of-the-facility authorization and the considerations involved in the application review are extensive.[25]

Nuclear power plants do not necessarily need to obtain certification before obtaining separate licenses, permits, and approval for construction of support facilities necessary to construct the electric power plant itself. Such support facilities may include, but are not limited to, access and onsite roads, rail lines, electrical transmission facilities to support construction, and facilities necessary for waterborne delivery of construction materials and project components. If the utility has not yet sought certification for a nuclear plant when it begins construction of these support facilities, the utility must file a statement with FDEP declaring that construction of the support facilities is necessary for the timely construction of the proposed power plant and identifying those facilities that the utility intends to seek licenses for and construct prior to or separate from certification of the project. All support facilities necessary for the construction of the power plant are then incorporated into the final certification upon completion of construction.[26]

FDEP also regulates electric and magnetic fields generated by electrical transmission lines under the Florida Electric Transmission Line Siting Act.[27] The Siting Coordination Office reviews required compliance reports submitted by companies that construct or operate transmission lines.

Florida Public Service Commission

The FPSC regulates investor-owned utilities in the state of Florida. Under Section 403.519, F.S., on request by an applicant or on its own motion, the FPSC must begin a proceeding to determine the need for an electrical power plant. Specifically for proposed nuclear power plants, the FPSC must hold a hearing within 90 days after the filing of the petition to determine the need and must issue an order granting or denying the petition within 135 days after the date the petition is filed. In deciding whether to grant or deny the petition, the FPSC must consider the need for electric system reliability and integrity, including fuel diversity, the need for base-load generating capacity, the need for adequate electricity at a reasonable cost, and whether renewable energy

[25] *See* POWER PLANT SITING ACT, https://floridadep.gov/water/siting-coordination-office/content/power-plant-siting-act (last visited Nov. 13, 2024).
[26] *See* 403.506(3), F.S.
[27] *See* Sections 403.52 – 403.5365, F.S.

sources and technologies, as well as conservation measures, are utilized to the extent reasonably available.[28]

The FPSC also oversees cost recovery mechanisms, discussed above, for costs incurred in the siting, design, licensing, and construction of nuclear power plants in order to promote electric utility investment in such plants.[29]

Florida Division of Emergency Management

The FDEM has a Radiological Emergency Program in place that is tasked with coordinating the response between state and local agencies to a nuclear power plant emergency, as well as updating and coordinating the response plans with other organizations.[30] FDEM has a series of emergency classification levels for events at nuclear power plants.

The lowest level classification is for Unusual Events. These are often minor, non-nuclear incidents such as plant worker injury or severe weather. No public action is required for these events.

The next level is Alert. This level is for events that involve actual or potential substantial degradation of safety, combined with a potential for limited uncontrolled releases of radioactivity from the plant. This level is for events that are still relatively minor and no public action is required.

The third level is Site Area Emergency. This level is for events that involve actual or likely major failures of plant functions needed for public safety, combined with a potential for significant uncontrolled releases of radioactivity. At this level, sirens within a ten-mile emergency planning zone around the plant sound and the public is alerted on local radio and television stations as well. This level is for serious incidents, such as reactor coolant leak or fire in a safety system.

The last and most serious level is General Emergency. This level is for events involving actual or imminent substantial core degradation and potential loss of containment integrity combined with a likelihood of significant uncontrolled releases of radioactivity. The sirens within the ten-mile emergency planning zone sound and the public is alerted through local radio and television. Public protection measures would be likely once this level is reached.[31]

In the event of a disaster at a nuclear power plant, FDEM has a Radiological Emergency Plan in place for how to deal with the disaster. The primary objective of this plan is to minimize

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[28] *See* 403.519, F.S.
[29] *See* 366.93, F.S.
[30] *See* RADIOLOGICAL EMERGENCY PROGRAM, https://www.floridadisaster.org/dem/response/technological-hazards/rep/ (last visited Nov. 13, 2024).
[31] *See* NUCLEAR POWER PLANTS EMERGENCY CLASSIFICATION LEVELS, https://www.floridadisaster.org/dem/response/technological-hazards/rep/nuclear-power-plants-emergency-classification-levels/ (last visited Nov. 13, 2024).

radiation exposure for any events that could expose the public to its dangers. FDEM is responsible for receiving notification of an emergency from the nuclear power plants, verifying information contained in the notification, and alerting appropriate state, local, and federal emergency response personnel.[32]

Florida Department of Health

The FDOH has Environmental Radiation Programs to respond to threats to public health and safety from incidents involving nuclear power plants. FDOH responds to all radiation incidents and emergencies, including unexpected radiation releases from nuclear power plants, transportation accidents, lost or stolen radioactive sources, and contamination of a facility or the environment. To prepare for these incidents, FDOH trains its staff and other emergency personnel in emergency response and decontamination procedures and dose assessments. FDOH staff learn how to respond to nuclear reactor emergencies during annual training exercises at the state's nuclear power plants.

At nuclear power plants, FDOH conducts environmental monitoring programs. Thermoluminescent detectors surrounding each power plant site identify direct radiation and special air sampling stations identify radioactive particulate emissions. FDOH staff also collects and analyzes other samples, including vegetation, fish, citrus, watermelon, milk, garden vegetables, shoreline sediment, beach sand, drinking water, surface water, and ground water.

[32] *See* THE STATE OF FLORIDA RADIOLOGICAL EMERGENCY MANAGEMENT PLAN, https://www.nrc.gov/docs/ML0822/ML082261370.pdf (last visited Nov. 13, 2024).

Chapter 3 - Advanced Nuclear Power Technology

Advanced nuclear power technology maintains the existing benefits of current nuclear power technology, while offering improved safety, scaling, and output features, as well as increased industrial applications and other use cases.

Technical Feasibility

Advanced nuclear reactors continue a trend of generational improvements in nuclear power technology. Gen II reactors – the majority of the current domestic fleet – are more economical and reliable than the first generation of reactors, while improvements in Gen III reactors are in the areas of fuel technology, thermal efficiency, modularized construction, safety systems (including more passive safety features), and standardized design.[33] Gen II reactors came into service beginning in the late 1960s, while Gen III reactors first entered service in the mid-1990s.[34] All nuclear reactors in service in Florida are Gen II.

Advanced nuclear reactors are classified as belonging to two generations of nuclear technology: Gen III+ and Gen IV. Gen III+ reactors use the same fuel and coolant as Gen II and Gen III reactors and work similarly to traditional reactors: they generate energy using fission reactions and use water as coolants and moderators.[35] Gen III+ reactors are safer than Gen III reactors with simplified and updated controls and more passive safety features. Gen IV reactor designs also use fission reactions but with a variety of fuels and coolants.[36] Coolants include molten salts, liquid metals such as sodium, lead, and lead-bismuth, and gases such as helium or carbon dioxide.

Gen III+ and Gen IV reactors also vary by type of fission reactor: thermal or fast neutron. Thermal reactors use a moderator. Fast neutron reactors do not use moderators, and they require the use of fuel that has a higher concentration of fissile material. Some thermal and fast neutron reactors, referred to as breeder reactors, generate nuclear fuel during their reactions.[37]

Gen III+ reactors have been deployed in the United States, while Gen IV reactors are still being developed. The main improvements of Gen III+ reactors are enhanced safety features and potential lower costs. Gen III+ reactor features include:

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[33] Goldberg & Rosner, "Nuclear Reactors: Generation to Generation," American Academy of Arts & Sciences, January 2011, https://www.amacad.org/publication/nuclear-reactors-generation-generation, accessed December 13, 2024.

[34] Ibid.

[35] A moderator is a material, such as water or graphite, used in a reactor to slow down high-velocity neutrons. They are used because slower moving neutrons more efficiently spark fission reactions.

[36] Nuclear fusion reactors exist, but they are still in experimental stages.

[37] Congressional Research Service, Advanced Nuclear Reactors: Technology Overview and Current Issues, updated April 18, 2019, https://crsreports.congress.gov/product/pdf/R/R45706/2, accessed October 30, 2024.

- Standardized designs to expedite licensing, reduce capital cost and reduce construction time.
- Simpler and more rugged design, making them easier to operate and less vulnerable to operational upsets.
- Higher availability and longer operating life – typically 60 years.
- Further reduced possibility of core melt accidents.
- Substantial grace period, so that following shutdown the plant requires no active intervention for (typically) 72 hours.
- Stronger reinforcement against aircraft impact than earlier designs, to resist radiological release.
- More efficient fuel use, with some estimates showing around 17 percent greater efficiency than Gen II reactors.[38]

Gen IV reactors share many of the same standardized design and passive safety features as Gen III+ reactors while expanding industrial applications and other use cases. These applications and cases include distributed electric power applications, electricity and heat waste applications, and high-temperature process heat applications.[39]

Advanced reactors are available in different sizes and generation capacities. The U.S. DOE recently classified large nuclear reactors as usually having around 1,000 MW capacity, small modular reactors (SMRs) as having 50 to 350 MW capacity, and microreactors as having less than 50 MW.[40]

Large Reactors

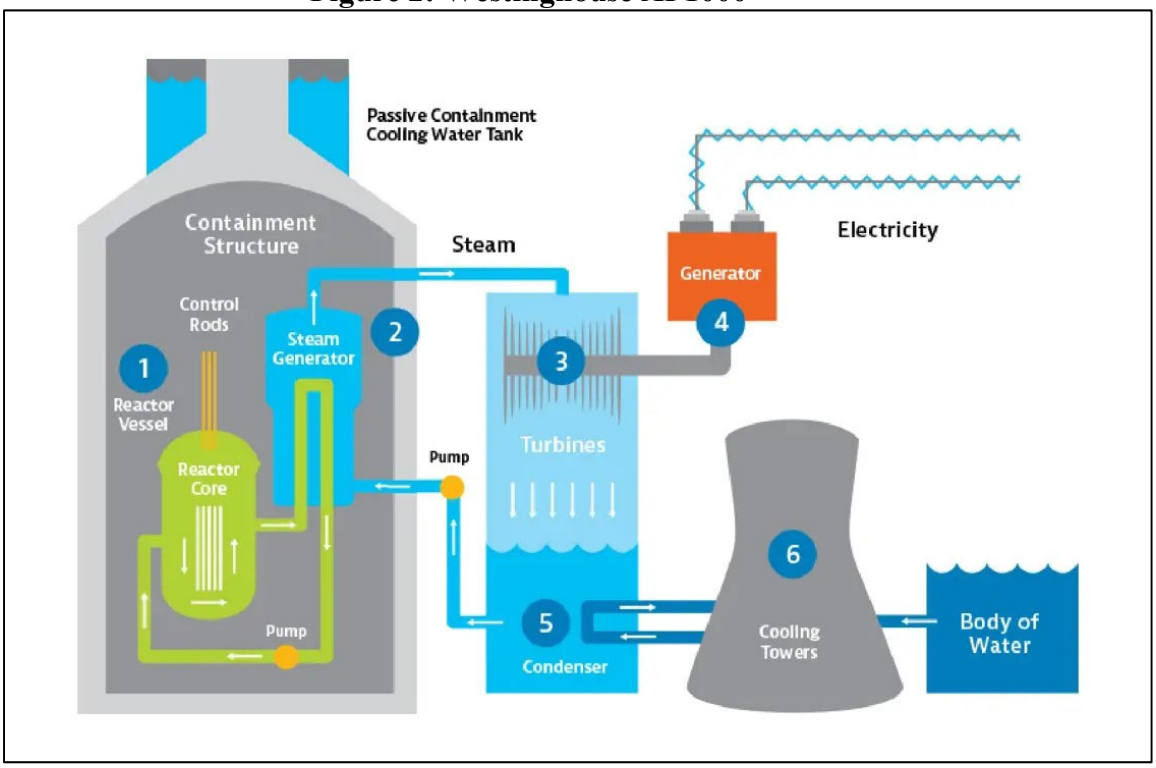
The NRC has certified three large Gen III+ advanced nuclear reactor designs: Korea Electric Power Corporation's Advanced Power Reactor 1400 (APR1400), GE Hitachi's Economic Simplified Boiling Water Reactor (BWR), and Westinghouse's AP1000.[41] GE Hitachi's BWR is designed to produce 1,520 MW of electricity.[42] The APR1400 and AP1000 are PWRs. Both BWRs and PWRs are thermal reactors that use water as a coolant and moderator. The APR1400

[38] World Nuclear Association, Advanced Nuclear Power Reactors, updated April 1, 2021, https://world-nuclear.org/information-library/nuclear-fuel-cycle/nuclear-power-reactors/advanced-nuclear-power-reactors, accessed October 30, 2024.
[39] NARUC and NASEO, Energy and Industrial Use Cases for Advanced Nuclear Reactors, p. 6, published October, 2024, https://www.naseo.org/data/sites/1/documents/publications/ANSC_Nuclear_Cases_Final.pdf, accessed November 20, 2024.
[40] U.S. DOE, "Pathways to Commercial Liftoff: Advanced Nuclear," p. 20, September 2024, https://liftoff.energy.gov/wp-content/uploads/2024/10/LIFTOFF_DOE_AdvNuclear-vX7.pdf, accessed October 28, 2024.
[41] U.S. NRC, Design Certification Applications for New Reactors, updated May 22, 2023, https://www.nrc.gov/reactors/new-reactors/large-lwr/design-cert.html#issued, updated November 20, 2024.
[42] GE Hitachi, Economic Simplified BWR General Description Book, published June 1, 2011, https://www.gevernova.com/nuclear/carbon-free-power/large-reactors, accessed November 20, 2024.

has a net generation capacity of 1,400 MW, while the Westinghouse AP1000 has a generation capacity of around 1,100 MW.[43,44]

The AP1000 is the only design of large advanced nuclear reactor currently in commercial service in the U.S., at Plant Vogtle in Waynesboro, Georgia.[45]

Figure 2: Westinghouse AP1000



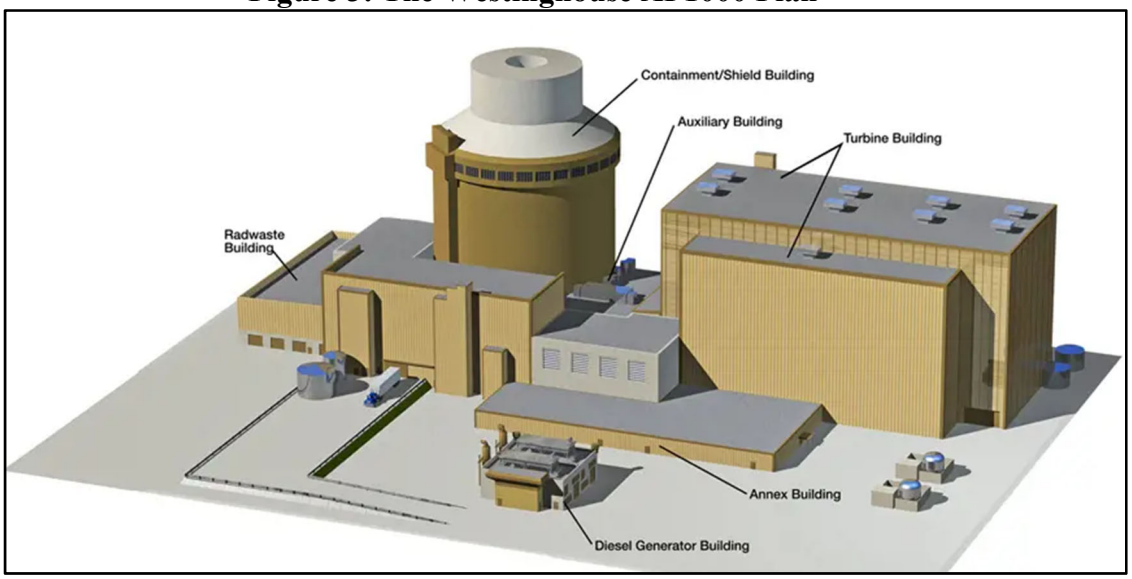
Source: Westinghouse

[43] Kepco, Major Features of Korean Reactors, https://home.kepco.co.kr/kepco/EN/G/htmlView/ENGBHP00103.do?menuCd=EN07030103, accessed December 17, 2024.

[44] Westinghouse, AP1000 Reactor Design Overview, https://westinghousenuclear.com/energy-systems/ap1000-pwr/overview/, accessed October 14, 2024.

[45] Georgia Power, Vogtle Unit 4 enters commercial operation, released April 29, 2024, https://www.georgiapower.com/company/news-hub/press-releases/vogtle-unit-4-enters-commercial-operation.html, accessed October 23, 2024.

Figure 3: The Westinghouse AP1000 Plan



Source: Westinghouse

AP1000 Reactor Design Features

The AP1000 reactor design features include:

- Simplified safety systems, normal operating systems, control room, construction techniques, and instrumentation and control systems
- 60 years operational design
- 93 percent capacity factor (represents how often a unit is able to produce electricity during a given time span)
- 18-24 month fuel cycle (amount of time a reactor can produce power until it must be refueled)
- Fully passive safety systems [46,47]

AP1000 Passive Safety Features

The AP1000 is designed to reach and sustain safe shutdown conditions without operator action, and without the need for AC power or pumps in the event of a design-basis accident by relying on gravity, natural circulation and compressed gases to keep the core and the containment from overheating.

Other AP1000 safety features include:

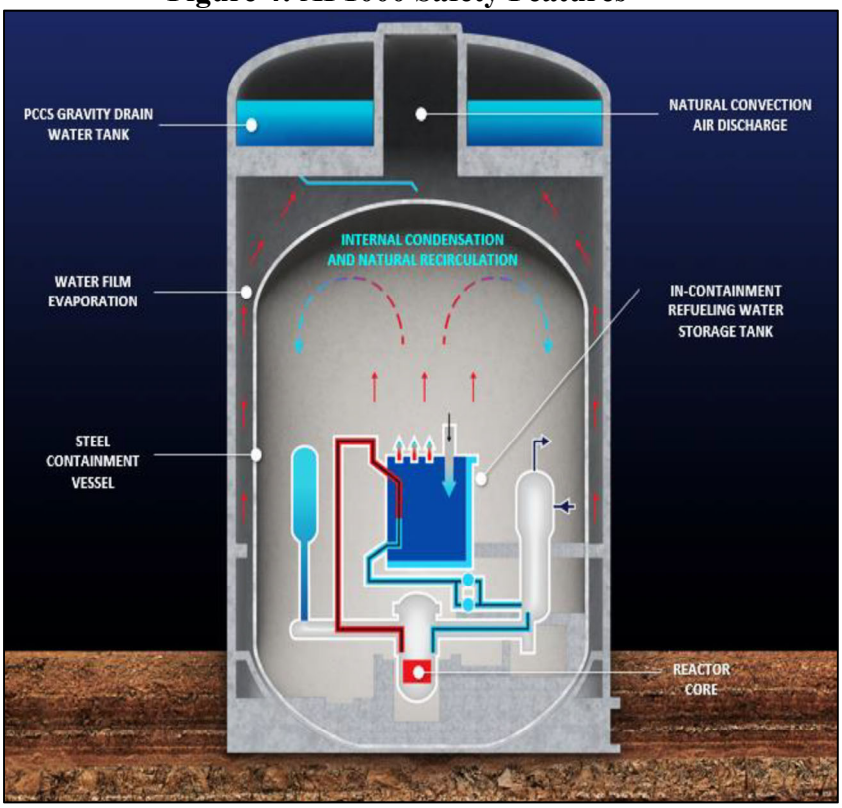
- Systems that activate automatically to respond to the day-to-day changes in the reactor coolant system temperature, pressure, or both, caused by changes in the reactor's power

[46] Westinghouse, AP1000 Design, https://westinghousenuclear.com/energy-systems/ap1000-pwr/overview/, accessed October 14, 2024.
[47] Westinghouse, Improved Nuclear Power Plant Operations, https://westinghousenuclear.com/energy-systems/ap1000-pwr/operations-and-maintenance/, accessed October 14, 2024.

output. These provide a first level of defense to reduce the likelihood of unnecessary actuation and operation of the safety-related systems.

- In-vessel Retention of Core Damage feature that drains the high capacity in-containment refueling water storage tank water into the reactor cavity in the event that the core has overheated, providing cooling on the outside of the reactor vessel to prevent vessel failure and subsequent spilling of molten core debris.
- Fission Product Release prevention features, including fuel cladding, reactor coolant pressure vessel and piping boundary, along with a steel containment vessel. Fuel cladding provides the first barrier to the release of radiation. The reactor coolant pressure vessel and piping boundary provide independent barriers to prevent the release of radiation. The steel containment vessel, in conjunction with the surrounding shield building, provides additional protection by establishing a third barrier and by providing natural convection air currents to cool the steel containment.[48]

Figure 4: AP1000 Safety Features



Source: Westinghouse

[48] Westinghouse, Nuclear Safety - Unequaled Design, https://westinghousenuclear.com/energy-systems/ap1000-pwr/safety/, accessed October 14, 2024.

Small Modular Reactors

SMRs are around one tenth the physical size of traditional large nuclear reactors, with a generating capacity of 50 to 350 MW. As the name denotes, SMRs are designed to be modular in order to standardize production, which drives down costs and facilitates construction. SMRs have a lifespan of 60 or more years. Initially SMRs may be more expensive than large reactors on a megawatt basis, but they may be better suited than large reactors for certain applications, such as replacing smaller retiring coal plants or industrial processes requiring high temperature heat. SMRs may also offer potential siting, construction, and financial advantages.

There are a variety of SMR designs under development. Some designs use the same coolant and fuel as large Gen III+ reactors. Other designs use different coolants, such as gas, liquid metal, or molten salt, as well as different or no moderators. Some designs use different fuels than the current generation of reactors. SMRs also utilize passive safety features. The World Nuclear Association listed several advanced U.S. SMR designs (table below). These reactors are near deployment, or have had deployment attempted, while other designs are at various earlier stages of development.

Figure 5: U.S. Small Reactors for Near-term Deployment – Development Well Advanced[49]

Name	Capacity	Type	Developer
BWRX-300	300 MW	BWR	GE Hitachi, USA
Xe-100	80 MW	HTGR	X-energy, USA
NuScale Power Module	77 MW	PWR	NuScale Power + Fluor, USA
SMR-160	160 MW	PWR	Holtec, USA + SNC-Lavalin, Canada
CNSP (Combined Nuclear/Solar Plant)	300 MW	PWR/solar thermal system	Holtec, USA
PRISM	311 MW	SFR	GE Hitachi, USA
Natrium	345 MW	SFR	TerraPower + GE Hitachi, USA
ARC-100	100 MW	SFR	ARC with GE Hitachi, USA

Source: World Nuclear Association

In addition to BWR and PWR designs, there are a variety of Gen IV reactor designs which include:

- Gas-Cooled Fast Reactors are fast neutron reactors that typically use helium gas as a coolant with no moderator. They can be designed to produce from 0.5 MW to 2,400 MW.
- High Temperature Gas Reactors are thermal reactors that typically use helium gas as a coolant with graphite as a moderator. Very High Temperature Reactors are a type of high temperature gas reactors that reaches reactor temperatures greater than 750 degrees Celsius. They are often designed as SMRs with capacities under 300 MW.

[49] World Nuclear Association, Small Nuclear Reactors, accessed November 12, 2024, https://world-nuclear.org/information-library/nuclear-fuel-cycle/nuclear-power-reactors/small-nuclear-power-reactors, updated February 16, 2024.

- Lead-Cooled Fast Reactors are fast neutron reactors that use molten lead or lead-bismuth alloy as a coolant with no moderator. They can be designed to produce 25 MW to 450 MW.
- Molten Salt Reactors are thermal or fast neutron reactors that typically use molten fluoride salt as a coolant with moderator use depending on reactor type. They can be designed to produce up to 600 MW.
- Sodium-Cooled Fast Reactors are fast neutron reactors that typically use liquid sodium as a coolant with no moderator. They can be designed to produce from 50 to 1,500 MW.
- Supercritical Water-Cooled Reactors are thermal or fast neutron reactors that use supercritical water as a coolant with water typically used as a moderator. They can be designed to produce between 300 and 1,700 MW.[50]

In the U.S., NuScale Power's VOYGR SMR is the first Gen IV SMR design to receive approval from the NRC.[51] It has come closest to commercial deployment. In 2014, Utah Associated Municipal Power Systems (UAMPS) proposed replacing coal-fired power plants with NuScale Power's VOYGR SMR. In 2015, the project was formally launched and designated the Carbon Free Power Project (CFPP) as part of its long-term strategy to reduce carbon emissions.

The CFPP originally called for the construction of NuScale Power's VOYGR SMR, containing twelve 77 MW power modules at the Idaho National Laboratory site.[52] It progressed through all early planning stages and was on track for a January 2024 filing of a Combined License application at the NRC. However, by 2020, multiple municipalities had withdrawn or reduced the amount of electricity they would purchase through the CFPP because of cost overruns and delays from the scheduled 2026 operational date. The reduced subscription rate led to concerns of rising costs for the remaining cities, which ultimately led to the cancellation of the CFPP in November 2023.[53,54] NuScale Power asserts that despite the cancellation, many lessons were learned that will benefit deployment of its SMRs in the future, including being able to use the Combined License application as a reference for future projects.[55]

NuScale Power Modular Reactor Design

The NuScale Power Module is the smallest PWR with natural circulation. It can generate 77 MW of electricity. Multiple power modules can be combined in a power plant with the largest plant

[50] Resources for the Future, Advanced Nuclear Reactors 101, published March 26, 2021, https://www.rff.org/publications/explainers/advanced-nuclear-reactors-101/, accessed November 20, 2024.
[51] U.S. Nuclear Regulatory Commission, Design Certification - NuScale US600, updated March 14, 2024, https://www.nrc.gov/reactors/new-reactors/smr/licensing-activities/nuscale.html, accessed October 30, 2024.
[52] Idaho National Laboratory, Carbon Free Power Project, https://inl.gov/trending-topics/carbon-free-power-project/, accessed November 25, 2024.
[53] Power Magazine, "Shakeup for 720-MW Nuclear SMR Project as More Cities Withdraw Participation," published October 29, 2020, https://www.powermag.com/shakeup-for-720-mw-nuclear-smr-project-as-more-cities-withdraw-participation/, accessed November 25, 2024.
[54] UAMPS Carbon Free Power Project, Press Release, published November 8, 2023, https://www.uamps.com/Carbon-Free, accessed October 30, 2024.
[55] Ibid.

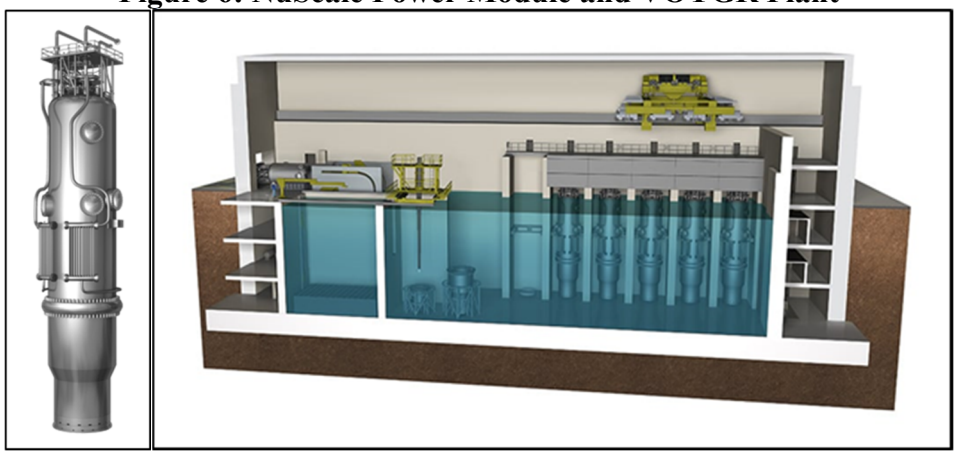
design, the VOYGRTM-12, allowing up to 12 power modules for a total output of 924 MW (gross).[56] The module is factory-built and transportable to the plant site by ship, rail, or truck, and the plant design also incorporates many commercial, off-the-shelf items.

The NuScale Power Module has a three meter diameter pressure vessel and convection cooling, with the only moving parts being the control rod drives. It uses standard light-water reactor fuel in normal PWR fuel assemblies (which are only 2 meters long), with up to a 21-month refueling cycle.[57]

NuScale Power Module Reactor Features

The NuScale Power Module will use compact Helical Coil Steam Generators that provide a large heat transfer surface area in a small volume and maximize natural circulation flow in the primary loop. The high strength steel containment vessel is immersed in the cooling pool and acts as a heat exchanger to transfer reactor heat to the pool water in order to limit containment pressure and as a passive heat sink for heat removal under loss-of coolant accident conditions.

Figure 6: NuScale Power Module and VOYGR Plant



Source: NuScale

NuScale Safety Features

NuScale's Power Module SMR safety features include:

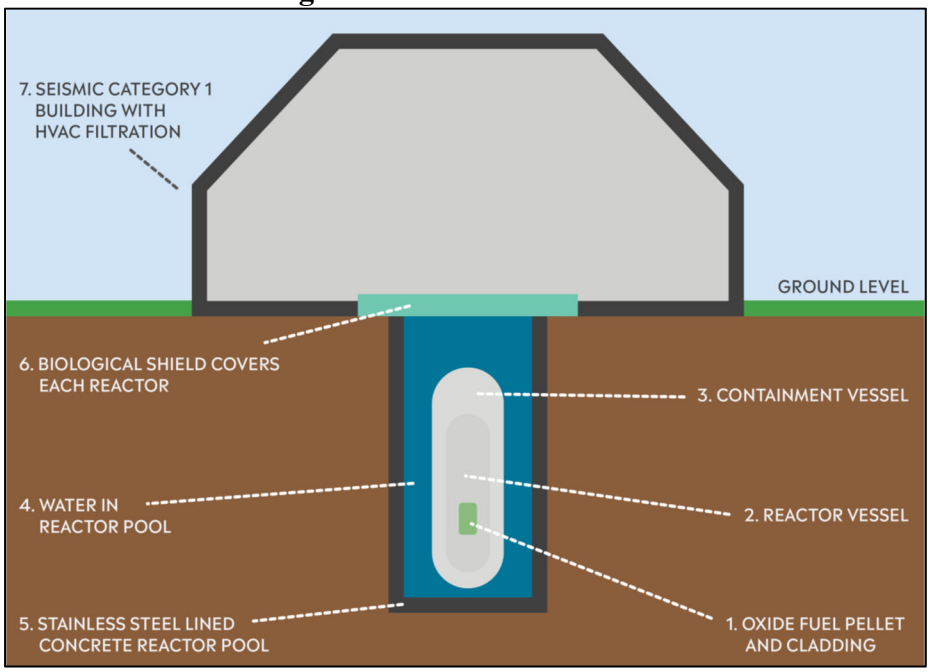
- The ability to safely shut down and self-cool indefinitely with no operator action, no AC or DC power, and no additional water. This is a first for commercial nuclear power.
- A reactor design that eliminates the need for large coolant piping and pumps.

[56] NuScale, VOYGR Power Plants, https://www.nuscalepower.com/en/products/voygr-smr-plants, accessed October 14, 2024.

[57] World Nuclear Association, Advanced Nuclear Power Reactors, updated April 1, 2021, https://world-nuclear.org/information-library/nuclear-fuel-cycle/nuclear-power-reactors/advanced-nuclear-power-reactors, accessed October 30, 2024.

- A small nuclear fuel inventory, with each NuScale Power Module housing approximately five percent of the nuclear fuel contained in a conventional 1,000 MW nuclear reactor.
- A high-pressure containment vessel with redundant passive decay heat removal and containment heat removal systems, that is submerged in an ultimate heat sink for core cooling in an underground reactor pool structure housed in an earthquake-resistant reactor building.[58]
- An Emergency Planning Zone (EPZ), the area surrounding a plant where special considerations and management practices are pre-planned and exercised in case of an emergency, that extends only as far as the site boundary (as opposed to 10 miles for current U.S. plants).[59]

Figure 7: NuScale's Barriers



Source: NuScale

Microreactors

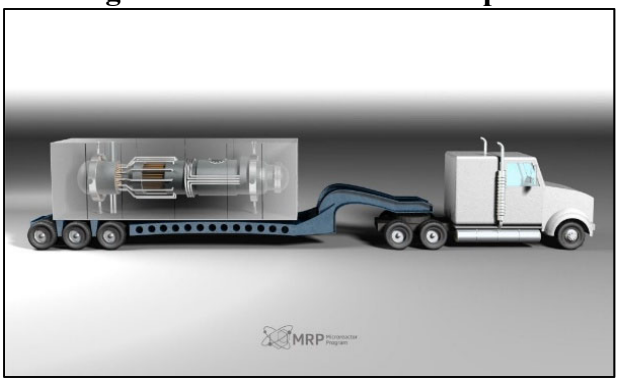
Microreactors are small advanced nuclear reactors generating less than 50 MW thermal energy. These reactors can operate as part of the electric grid or independently for other uses such as generating heat for industrial applications. Most are designed to be portable and could be hauled

[58] Nuclear Energy International, "U.S. NRC validates NuScale's Emergency Planning Zone boundary methodology," October 25, 2022, https://www.neimagazine.com/news/us-nrc-validates-nuscales-emergency-planning-zone-boundary-methodology-10115990/, accessed October 31, 2024.
[59] Nuclear Energy International, "U.S. NRC validates NuScale's Emergency Planning Zone boundary methodology," October 25, 2022, https://www.neimagazine.com/news/us-nrc-validates-nuscales-emergency-planning-zone-boundary-methodology-10115990/, accessed October 31, 2024.

by a tractor-trailer. Interest in these very small reactors is driven by a number of factors, including the need to generate power on a small scale in remote locations, at deployed military installations, and in locations recovering from natural disasters.[60]

In addition to the several microreactor designs more akin to that of a traditional nuclear reactor, there is also a Gen IV microreactor, Heat Pipe Cooled Reactors design. The Heat Pipe Cooled Reactor uses no coolant, while using a control drum often made of metal hydride alloys as a moderator. These microreactors are designed to produce less than 10 MW.[61]

Figure 8: Microreactor Transport



Source: Idaho National Laboratory

Microreactor features include:

- Factory production and modularity: most microreactor components are intended to be factory produced to increase standardization, learning rate, and cost predictability
- Transportability: could be shipped to remote areas and moved from one location to another by truck, ship, or plane
- Streamlined siting and installation: factory produced modules are intended to be shipped to location, reducing the need for on-site construction
- Grid independence: co-location with company or facility that agrees to purchase power
- Longer refueling cycle: most designs have 3-10 years between refueling (which leads to the colloquial term "nuclear batteries")
- Use of a variety of coolants and fuels
- Passive safety features[62]

[60] Idaho National Laboratory, Microreactors, https://inl.gov/trending-topics/microreactors/, accessed October 30, 2024.
[61] Science Direct, Heat Pipe Cooled Reactor, https://www.sciencedirect.com/topics/engineering/heat-pipe-cooled-reactor, accessed November 20, 2024.
[62] U.S. DOE, "Pathways to Commercial Liftoff: Advanced Nuclear," p. 28, September 2024, https://liftoff.energy.gov/wp-content/uploads/2024/10/LIFTOFF_DOE_AdvNuclear-vX7.pdf, accessed October 28, 2024.

The World Nuclear Association listed several U.S. microreactor designs (table below). These and other designs are at various stages of development.

Figure 9: U.S. Microreactor Designs Being Developed[63]

Name	Capacity	Type	Developer
Aurora	1.5 MW	HPCR	Oklo, USA
eVinci	0.2-5 MW	HPCR	Westinghouse, USA
NuScale micro	1-10 MW	HPCR	NuScale, USA
MMR-5/-10	5 or 10 MW	HTGR	UltraSafe Nuclear, USA
Holos Quad	3-13 MW	HTGR	HolosGen, USA
Xe-Mobile	1-5 MW	HTGR	X-energy, USA
BANR	50 MW	HTGR	BWXT, USA
Gen4 module	25 MW	LFR	Gen4 (Hyperion), USA
Hermes prototype	35 MW	MSR	Kairos, USA

Source: World Nuclear Association

Other Use Cases

Advanced nuclear reactors are able to be used in a variety of applications and other use cases that previous generations of nuclear reactors are not. These other use cases include distributed electric power applications, electricity and heat waste applications, and high-temperature process heat applications.[64]

Distributed electric power applications and use cases include providing electric service at remote locations and locations where reliability of power and size of the reactor is important, such as mining operations, oil and gas extraction, data centers, spacecraft, and military bases (see Chapter 5 for military applications). Electricity and heat waste applications and use cases include heating local buildings, desalination, and carbon capture processes.[65] Excess heat can also be used with heat exchanger pumps to provide district cooling.[66] High-temperature process heat

[63] World Nuclear Association, Small Nuclear Reactors, accessed November 12, 2024, https://world-nuclear.org/information-library/nuclear-fuel-cycle/nuclear-power-reactors/small-nuclear-power-reactors, updated February 16, 2024.
[64] NARUC and NASEO, Energy and Industrial Use Cases for Advanced Nuclear Reactors, p. 6, published October, 2024, https://www.naseo.org/data/sites/1/documents/publications/ANSC_Nuclear_Cases_Final.pdf, accessed November 20, 2024.
[65] Ibid, p.10-14.
[66] International Atomic Energy Association, The Use of Nuclear Power Beyond Generating Electricity: Non-Electric Applications, posted October 18, 2021, https://www.iaea.org/newscenter/news/the-use-of-nuclear-power-beyond-generating-electricity-non-electric-applications, accessed December 18, 2024.

applications include using the high temperatures generated by the nuclear reaction for chemical industrial applications, steel, glass, or cement production, and hydrogen production.[67]

Large advanced nuclear technology has been deployed in the U.S., and its benefits are beginning to be realized. SMR and micro advanced nuclear technologies appear technically feasible, but as of yet, remain unproven. The economic challenge is the greatest hurdle to the deployment of these nascent technologies.

Economic Feasibility

Meeting future electricity demand with the expansion of advanced nuclear power technology requires consideration of many economic factors, including the ability to reduce costs, the costs of electricity, and federal support. This section discusses the economics of how reactor type and changing production levels affect costs.

First-of-a-Kind (FOAK) to Nth-of-a-Kind (NOAK)

Cost estimates are critical in determining the type and number of reactors to be built. Cost analysis often quantifies differences in cost by classifying reactors by production order using FOAK and NOAK. As the first units produced, FOAK projects are the most expensive, but as additional units are produced efficiency gains reduce the cost of production until NOAK costs are realized. NOAK projects are at a cost minimum, because efficiency gains have been maximized.

Currently only two large advanced reactors are in commercial service in the U.S., while no commercial advanced SMRs or microreactors have been built. Advanced nuclear plant costs are currently at FOAK or near FOAK levels, but significant cost reductions can be realized with additional deployment. Given the importance of reducing costs in encouraging deployment, the DOE published its Pathways to Commercial Liftoff: Advanced Nuclear (Liftoff) report to detail estimates and methods of achieving these reductions.[68]

The Liftoff report states that savings from learning by producing the first few units result in estimated cost reductions of around 45 to 60 percent between the first and third plant deployed of a given reactor concept.[69] After publication of the Liftoff report, the Idaho National Laboratory (INL), Argonne National Laboratory, and the Massachusetts Institute of Technology (MIT)

[67] NARUC and NASEO, Energy and Industrial Use Cases for Advanced Nuclear Reactors, p. 10-14, published October, 2024, https://www.naseo.org/data/sites/1/documents/publications/ANSC_Nuclear_Cases_Final.pdf, accessed November 20, 2024.
[68] U.S. DOE, "Pathways to Commercial Liftoff: Advanced Nuclear," September 2024, https://liftoff.energy.gov/wp-content/uploads/2024/10/LIFTOFF_DOE_AdvNuclear-vX7.pdf, accessed October 16, 2024.
[69] U.S. DOE, "Pathways to Commercial Liftoff: Advanced Nuclear," p. 32, September 2024, https://liftoff.energy.gov/wp-content/uploads/2024/10/LIFTOFF_DOE_AdvNuclear-vX7.pdf, accessed October 16, 2024.

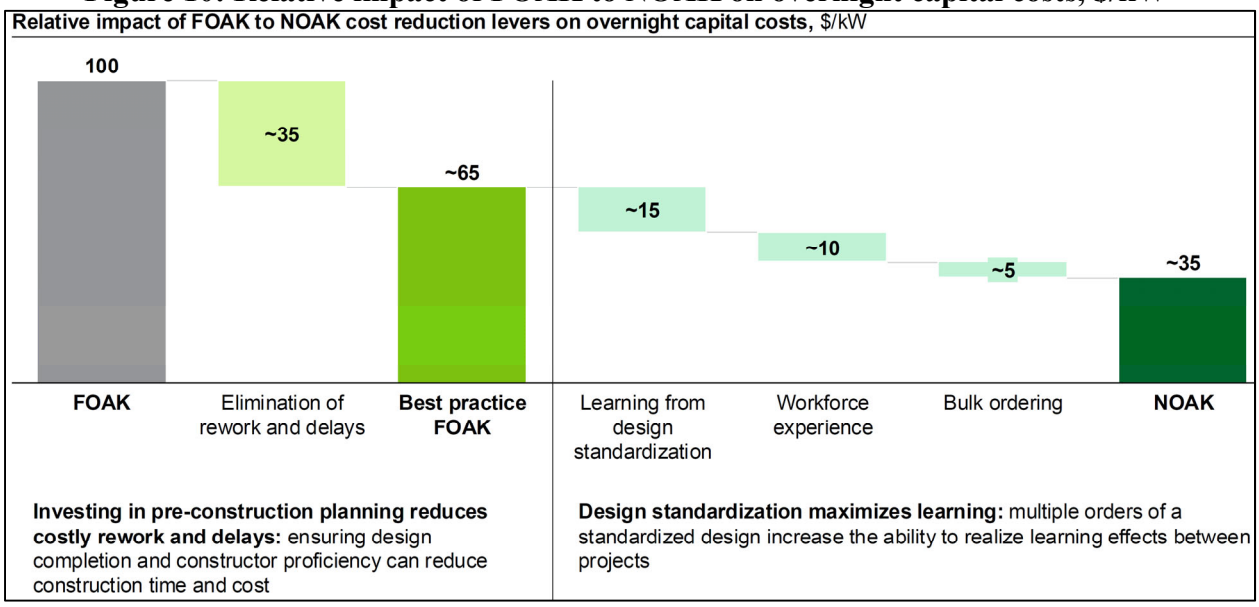
created a framework for quantifying pathways from FOAK to NOAK costs. The framework identifies learning effects that can be adjusted to evaluate their impact on cost reduction:

- **Design completion**: when construction begins with lower design completion, there are typically more licensing amendments and rework, resulting in delays and cost increases
- **Design maturity:** novel designs with complex material science that require components that have never been built before will likely have higher costs and risks
- **Cross-site standardization**: the more standardized builds are, the lower the costs of subsequent units as design modifications and engineering evaluations are minimized
- **Orderbook quantity:** bulk order discounts can reduce costs for all reactors, including the first reactor
- **Supply chain proficiency:** a combination of contractor experience and best practices implemented by the contractor
- **Construction contractor proficiency:** contractor's ability to effectively plan and execute nuclear megaprojects
- **Architect/engineer contractor proficiency**: lower proficiency leads to redesigning components, delays, and higher indirect costs[70]

Other major factors identified in the Liftoff report in progressing from FOAK to NOAK costs include investments in pre-construction planning to eliminate rework or delays and labor productivity gains from experience. The figure below estimates the reduction in overnight capital cost (OCC) due to elimination or rework and delays, learning from design standardization, workforce experience, and bulk ordering.[71] It shows that FOAK OCC's could be reduced around 35 percent through best practices, as well as a further 30 percent reduction by reaching NOAK production levels.[72]

[70] U.S. DOE, "Pathways to Commercial Liftoff: Advanced Nuclear," p. 33, September 2024, https://liftoff.energy.gov/wp-content/uploads/2024/10/LIFTOFF_DOE_AdvNuclear-vX7.pdf, accessed October 16, 2024.
[71] Overnight capital cost is the cost of capital without financing charges.
[72] U.S. DOE, "Pathways to Commercial Liftoff: Advanced Nuclear," p. 33, September 2024, https://liftoff.energy.gov/wp-content/uploads/2024/10/LIFTOFF_DOE_AdvNuclear-vX7.pdf, accessed October 16, 2024.

Figure 10: Relative impact of FOAK to NOAK on overnight capital costs, $/kW



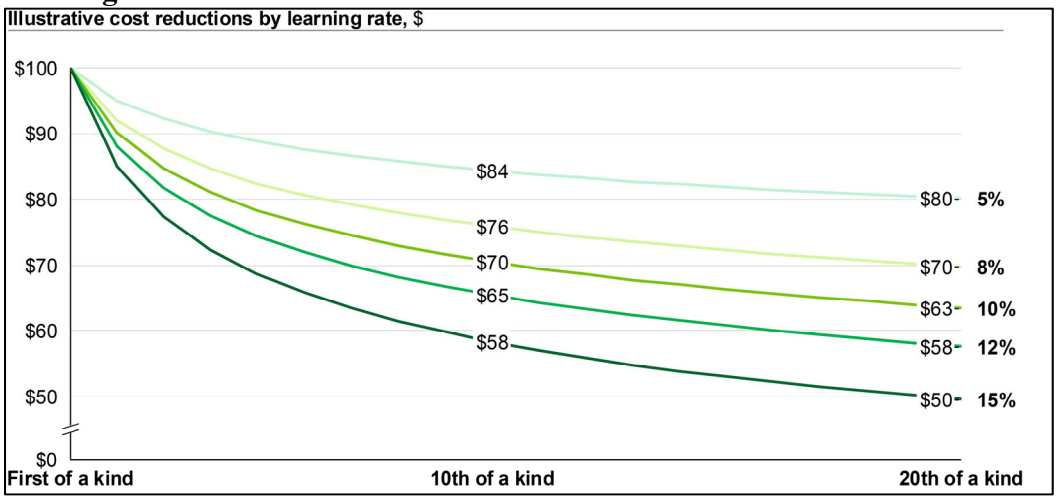
Source: Liftoff Report p. 33

The Liftoff report asserts that the greatest cost reduction opportunities are likely to come from labor cost reductions from learning by doing, from having standardized construction processes or process management, and from co-processing of tasks and proper hand-offs that reduce total construction time. It suggests that lesser cost reductions can also be achieved through supply chain development and modularization.[73]

The report also identifies additional cost factors. Construction duration affects total costs by impacting finance costs, while also potentially exposing projects to the risk of changes in the economic and political environments.[74] Another factor in cost reduction is bulk ordering. The Liftoff report states that bulk orders of over 10 reactors could lead to a cost reduction of around 15 percent compared to a single build without an order book. It suggests that a builders' consortium of asset owners spreading early construction costs or a buyers' consortium of pooling demand for an average price with a committed orderbook of 10 or more units can significantly reduce the financial risks involved, with additional savings possible by siting multiple reactors at the same location.[75] The figure below estimates the reductions in NOAK costs based on different learning rates and the number of units with a 30 percent ITC. It shows costs decreasing as the number of units deployed increases, with higher learning rates leading to lower costs.[76,77]

[73] Ibid, p. 34.
[74] U.S. DOE, "Pathways to Commercial Liftoff: Advanced Nuclear," p. 34, September 2024, https://liftoff.energy.gov/wp-content/uploads/2024/10/LIFTOFF_DOE_AdvNuclear-vX7.pdf, accessed October 16, 2024.
[75] Ibid.
[76] The ITC is discussed in the federal support section.

Figure 11: Estimated NOAK Cost Reductions with 30 Percent ITC



Source: Liftoff report p.36

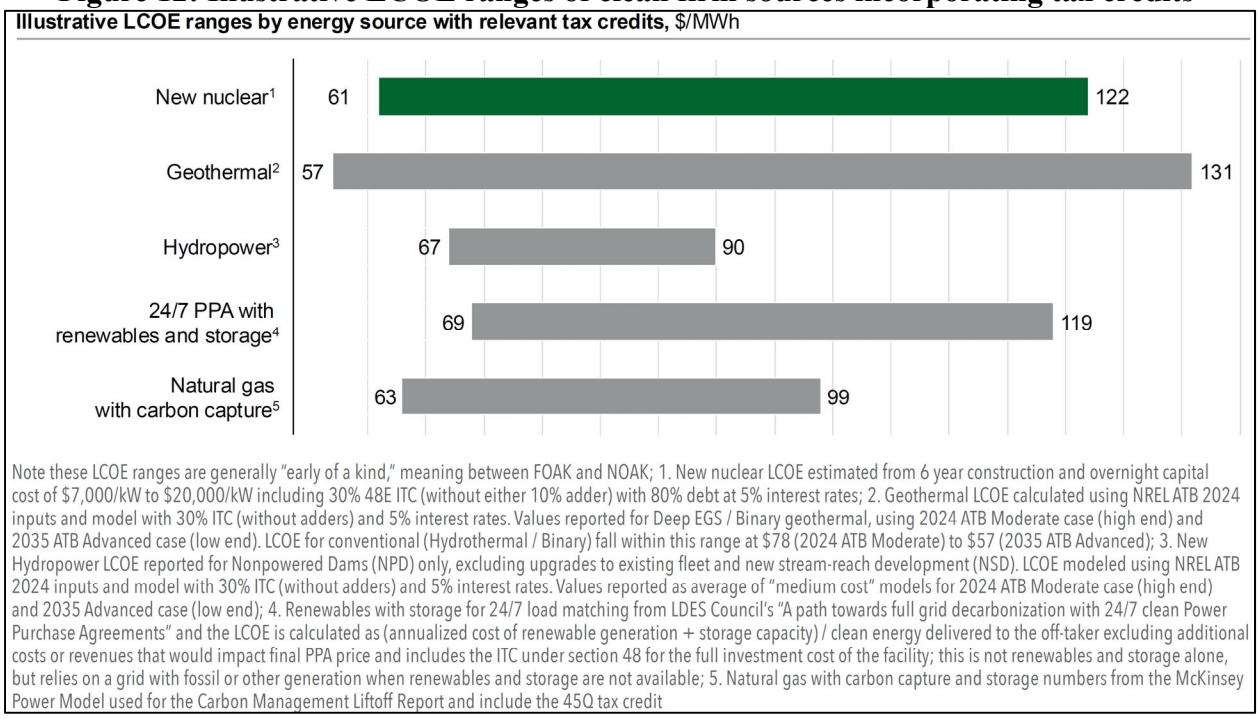
Levelized cost of electricity

The LCOE is the average cost per unit of electricity generated to cover the costs of building and operating a power plant over its lifetime. It includes factors such as capital expenditures, operations expenditures, capacity factor, fuel costs, taxes, resource availability, cost of capital, and efficiency.[78] The Liftoff report also notes LCOE estimates for other energy sources. The figure below compares LCOEs of various energy sources.

[77] U.S. DOE, "Pathways to Commercial Liftoff: Advanced Nuclear," p. 36, September 2024, https://liftoff.energy.gov/wp-content/uploads/2024/10/LIFTOFF_DOE_AdvNuclear-vX7.pdf, accessed October 16, 2024.

[78] Science Direct, Levelized Cost of Electricity, https://www.sciencedirect.com/topics/engineering/levelized-cost-of-electricity, accessed November 25, 2024.

Figure 12: Illustrative LCOE ranges of clean firm sources incorporating tax credits



Source: Liftoff report p. 11

Construction costs can drive around 70 to 80 percent of nuclear's LCOE, while operating costs are low and predictable. This predictability compares favorably with natural gas, where rather than construction costs, the LCOE is strongly influenced by fuel prices that can create volatility in operating costs.[79] LCOE does not reflect nuclear's value in reducing carbon emissions, lowering interconnection and transmission costs, providing consistent power generation that removes the need for natural gas peaking plants, not requiring overbuilding like renewable energy sources, and having operating life which exceeds the typical 30 year amortization of project construction costs.[80]

Large Gen III+ Reactor Cost Factors

Large advanced nuclear reactors are physically larger with higher corresponding electricity outputs than other advanced reactors, and the greater size of these reactors presents multiple economic benefits and challenges. These reactors benefit from economies of scale. Gen III+ are larger multi-unit nuclear plants and have the lowest production costs, with generating costs at multi-unit plants being 30 percent cheaper per MW than single unit plants. Economies of scale

[79] U.S. DOE, "Pathways to Commercial Liftoff: Advanced Nuclear," p. 36, September 2024, https://liftoff.energy.gov/wp-content/uploads/2024/10/LIFTOFF_DOE_AdvNuclear-vX7.pdf, accessed October 16, 2024.
[80] Ibid, p. 36-37.

also mean lower cost per MW because fixed costs are spread across greater capacity than in smaller plants.[81]

Large reactors also face some economic drawbacks. It is more difficult to reach NOAK costs, given the high cost of large reactors due to megaproject issues.[82] Larger reactors face longer construction times than smaller reactors. Construction time for large light water reactors varies by degree of cost overruns. Construction with no cost overruns has a median completion time of 60 months while construction with some and significant cost overruns have median completion times of 82 and 125 months, respectively. Longer construction times lead to increased financing costs and greater risk of possible adverse political, economic, and other conditions.[83]

Plant Vogtle

As previously discussed, the Westinghouse AP1000 is the only advanced large reactor design currently in commercial service in the U.S., Plant Vogtle units 3 and 4 located in Waynesboro, Georgia.[84] These reactors entered commercial operations on July 31, 2023 and April 29, 2024.[85]

The original budget for Vogtle Units 3 and 4 was approximately $14 billion, while the final cost was around $32 billion. It is unknown how much of that difference was "overrun" versus how much was due to underestimation and project management, given the design was not complete when the budget was originally estimated. The reset of the project budget to around $26 billion in 2017 (when Georgia Power's parent corporation Southern Company took over the project management role), especially after accounting for COVID impacts, was substantially closer to the final cost.[86]

Vogtle Units 3 and 4 were lengthy and expensive construction projects but they demonstrate the viability of large Gen III+ advanced nuclear reactors. Future AP1000 deployments will benefit heavily from these projects. In fact, it has been suggested by some in the nuclear energy sector that Vogtle Unit 4 may have realized as much as a thirty percent cost savings compared to Unit 3. Additional cost and schedule improvements are expected for subsequent AP1000s, as is typical for projects following a FOAK deployment. One MIT study points to a potential 26 to 53

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[81] U.S. DOE, "Pathways to Commercial Liftoff: Advanced Nuclear," p. 26, September 2024, https://liftoff.energy.gov/wp-content/uploads/2024/10/LIFTOFF_DOE_AdvNuclear-vX7.pdf, accessed October 16, 2024.

[82] Ibid, p. 26.

[83] Abou-Jaoude, Abdalla, et al., "Meta-Analysis of Advanced Nuclear Reactor Cost Estimations," Revision 2, p. 76-77, U.S. DOE, July 2024, https://www.osti.gov/biblio/2371533, accessed October 14, 2024.

[84] Four AP1000 reactors are also in service in Sanmen and Haiyang, China, with eight more under construction. An additional four approved for construction with two in Guanxi Province and two in Guangdong Province.

[85] Georgia Power, Vogtle Unit 4 enters commercial operation, released April 29, 2024, https://www.georgiapower.com/company/news-hub/press-releases/vogtle-unit-4-enters-commercial-operation.html, accessed October 23, 2024.

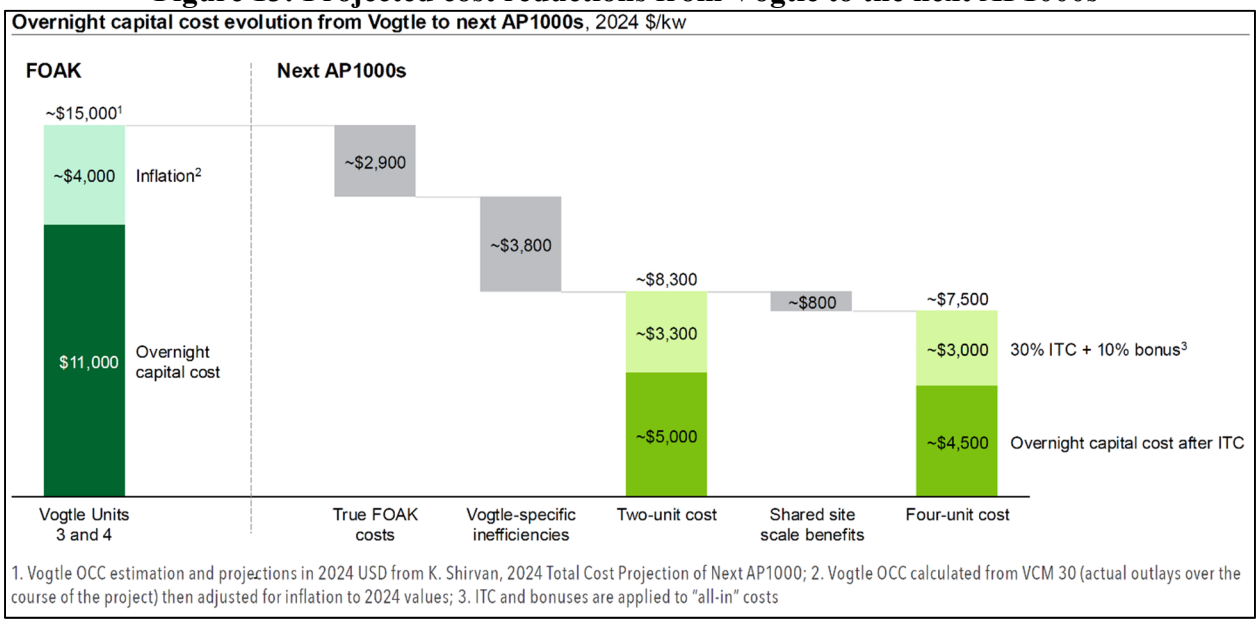
[86] U.S. DOE, "Pathways to Commercial Liftoff: Advanced Nuclear," p. 47, September 2024, https://liftoff.energy.gov/wp-content/uploads/2024/10/LIFTOFF_DOE_AdvNuclear-vX7.pdf, accessed October 16, 2024.

percent reduction in construction cost for the next AP1000 to be deployed in the U.S.[87] Factors driving the anticipated cost reduction include: the fact that the AP1000 design is now fully complete and approved by the NRC; the supply chain to deliver AP1000 components is now established; and a trained tradecraft, technical, and project management workforce with experience executing AP1000 construction projects now exists.[88]

According to the Liftoff report, the OCC of Vogtle Units 3 and 4 was around $15,000 per kilowatt (kW) in 2024 dollars.[89] It estimates that removing true FOAK costs and Vogtle-specific inefficiencies results in a pre-ITC OCC estimate of around $8,300 per kW, and including the ITC (with one adder) would further reduce the costs by 40 percent to around $5,000 per kW.[90] Further AP1000 deployments would be eligible for Investment Recovery Act support (see section on federal support), which could decrease the LCOE to below $100 per megawatt-hour (MWh), even after increased interest rates and inflation.[91,92] The report also suggests that reduced cost and shorter construction time would further reduce the projected LCOE to around $60/MWh.[93] The projected decrease in OCC from further AP1000 deployments are illustrated in the figure below.

[87] Shirvan, Koroush, "Overnight Capital Cost of the Next AP1000," Center for Advanced Nuclear Energy Systems, MIT, published March 2022, https://canes.mit.edu/overnight-capital-cost-next-ap1000, accessed October 16, 2024.
[88] Williams, Bradley J., et al., "Opportunities for AP1000 Deployment at Existing and Planned Nuclear Sites," Idaho National Laboratory, p. 2, published August 1, 2024, https://www.osti.gov/biblio/2437758, accessed October 16, 2024.
[89] 1,000 kilowatts equal one megawatt.
[90] U.S. DOE, "Pathways to Commercial Liftoff: Advanced Nuclear," p. 53, September 2024, https://liftoff.energy.gov/wp-content/uploads/2024/10/LIFTOFF_DOE_AdvNuclear-vX7.pdf, accessed October 16, 2024.
[91] A megawatt-hour is the energy equivalent to one megawatt used continuously for one hour.
[92] Ibid, p. 54.
[93] Ibid, p. 54..

Figure 13: Projected cost reductions from Vogtle to the next AP1000s



Source: Liftoff report, p. 54.

Note: These projected costs are for the next AP1000 deployment; they do not reflect NOAK costs.

Small Modular Reactor (SMR) Cost Factors

SMRs are around one tenth the size of large nuclear reactors, and they generate up to one third of the electricity. Their smaller size and outputs present different economic benefits and challenges than large reactors.

SMRs will enjoy several economic benefits. Their modular designs should help reduce construction costs by maximizing design standardization and factory production. In order to benefit from economies of scale, more than half of SMR total production costs should be incurred in factory production.[94] Their smaller size means that SMR projects require less capital for construction with lower overall costs, and it also leads to shorter construction times. The median construction completion time is projected to be 43 months with no cost overruns, 55 months with some cost overruns, and 71 months with significant cost overruns.[95] The lower overall cost for SMRs also means that less capital will be required, leading to lower financing and overall costs. Also, less labor is required for construction, so if the labor environment is constrained, SMRs may be more cost-effective than larger reactors. They may also be able to achieve some cost savings by replacing smaller coal power plants. According to a DOE study, around 80 percent of almost 400 coal power plant sites have the characteristics needed to host a

[94] U.S. DOE, "Pathways to Commercial Liftoff: Advanced Nuclear," p. 53, September 2024, https://liftoff.energy.gov/wp-content/uploads/2024/10/LIFTOFF_DOE_AdvNuclear-vX7.pdf, accessed October 16, 2024.

[95] Hansen, J., et al., "Investigating Benefits and Challenges of Converting Coal Plants into Nuclear Plants," Revision 2, U.S. DOE, published September 13 2022, https://inldigitallibrary.inl.gov/sites/sti/sti/Sort_62780.pdf, accessed October 14, 2024.

nuclear reactor.[96] SMRs' lower overall cost could entice more companies to invest, helping them to more quickly move from FOAK costs towards NOAK costs.

SMRs also face some economic challenges. Their smaller size means that they will likely be more expensive per MW for FOAK projects. To overcome diseconomies of scale, SMRs will likely need around 50 percent of OCC occurring in factory production.[97] The large number of different SMR designs could hamper deployment by delaying the cost benefits from moving from FOAK to NOAK production. The Liftoff report states that 5 to 10 reactors of the same design are needed to catalyze putting SMRs into commercial service as construction costs are largely expected to decrease based on repeat building and learning by doing.[98] They have yet to be put into commercial service in the U.S., so the true nature of FOAK costs for SMRs is unknown.[99]

Microreactor Cost Factors

Microreactors include the smallest reactor designs. Their very small size and outputs present unique economic benefits and challenges. The U.S. has no commercial microreactors in service. Cost uncertainty is high due to nascence.

Microreactors have several economic advantages. Their small size means that they can have greater factory production outputs, aiding in standardization and capital cost reduction. Microreactors have longer fuel cycles than larger reactors, with most lasting 3 to 10 years before refueling. Microreactors' small scale should reduce the need for operators.[100] Microreactors can also benefit from the same subsidies and programs as other reactors and from other programs like the ADVANCE Act (discussed in Chapter 4) which requires the NRC to develop guidance to license and regulate microreactor designs.[101] Given microreactor designers are considering factory fabrication to deploy multiple units of a standardized design, the NRC is proactively engaging with stakeholders and developing licensing strategies to support the effective and timely licensing of microreactors of a standardized design.[102] Microreactors could serve multiple use cases at military bases and remote applications such as mining, rural communities, industrial operations, and disaster relief, replacing expensive diesel generators.

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[96] U.S. DOE, "Pathways to Commercial Liftoff: Advanced Nuclear," p. 17, September 2024, https://liftoff.energy.gov/wp-content/uploads/2024/10/LIFTOFF_DOE_AdvNuclear-vX7.pdf, accessed October 16, 2024.
[97] Ibid, p. 27.
[98] Ibid, p.3.
[99] Ibid, p. 27.
[100] U.S. DOE, "Pathways to Commercial Liftoff: Advanced Nuclear," p. 28, September 2024, https://liftoff.energy.gov/wp-content/uploads/2024/10/LIFTOFF_DOE_AdvNuclear-vX7.pdf, accessed October 16, 2024.
[101] U.S. DOE, "Newly Signed Bill Will Boost Nuclear Reactor Deployment in the United States," July 10, 2024, https://liftoff.energy.gov/wp-content/uploads/2024/10/LIFTOFF_DOE_AdvNuclear-vX7.pdf, accessed October 16, 2024.
[102] U.S. DOE, "Pathways to Commercial Liftoff: Advanced Nuclear," p. 28, September 2024, https://liftoff.energy.gov/wp-content/uploads/2024/10/LIFTOFF_DOE_AdvNuclear-vX7.pdf, accessed October 16, 2024.

Microreactors also face significant potential economic disadvantages. They have diseconomies of scale with likely higher cost per MW than larger reactors, and they will likely need mass production in order to be cost effective, with as much as 70 to 80 percent of microreactor OCC occurring in factory production.[103] Orders of 30 to 50 reactors may be needed to justify the business case for microreactor factories.[104]

Future Deployment

When constructing a power generation facility, a utility typically uses a general rate base approach to recovering the investment; however, the considerations of having ratepayers shoulder FOAK costs and risk makes this option less appealing. Signing power purchase agreements with large companies or investing with a consortium helps to improve the business case for investing in advanced nuclear technologies. Multiple large companies and groups have agreed to purchase power from advanced nuclear reactors. Advanced nuclear technology is viewed as a carbon-free way to meet their energy and industrial needs. Given that high costs are the main barrier to advanced nuclear deployments, these early projects should prove critical in helping to reduce costs from FOAK levels to NOAK levels spurring further deployments.

The federal government is encouraging deployment through the Advanced Reactor Demonstration Program (ARDP).[105] The ARDP has supported the demonstration of two advanced nuclear reactors, X-energy's XE-100 and TerraPower's Natrium reactor.[106] Besides federal projects, some energy companies have recently announced plans for advanced nuclear deployments. PacifiCorp, a regulated utility, announced a joint feasibility study with TerraPower of deploying up to five Natrium SMR reactors in its territory, in addition to one demonstration reactor in Wyoming.[107] Duke Energy announced that it is planning to deploy up to 600 MW of advanced nuclear power in North Carolina and South Carolina by 2035, while Holtec International announced that it is planning to build two 300 MW SMRs at its Palisades site in Michigan.[108,109]

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[103] Ibid.
[104] Ibid.
[105] U.S. DOE, "Advanced Reactor Demonstration Program", https://www.energy.gov/ne/advanced-reactor-demonstration-program, accessed November 5, 2024.
[106] U.S. DOE, "Advanced Reactor Demonstration Projects", https://www.energy.gov/oced/advanced-reactor-demonstration-projects-0, accessed November 5, 2024.
[107] PacifiCorp, "TerraPower and PacifiCorp announce efforts to expand Natrium technology deployment," posted October 27, 2022, https://www.pacificorp.com/about/newsroom/news-releases/additional-Natrium-reactors.html, accessed October 14, 2024.
[108] Duke Energy, "Duke Energy responds to constructive Carolinas Resource Plan decision by North Carolina Utilities Commission", posted November 2, 2024, https://news.duke-energy.com/releases/duke-energy-responds-to-constructive-carolinas-resource-plan-decision-by-north-carolina-utilities-commission, accessed December 9, 2024.
[109] Holtec International, "First Two SMR-300 Units Slated to be Built at Michigan's Palisades Site for Commissioning by Mid-2030", posted December 4, 2023, https://holtecinternational.com/2023/12/04/first-two-smr-300-units-slated-to-be-built-at-michigans-palisades-site-for-commissioning-by-mid-2030/, accessed October 28, 2024.

In order to progress from FOAK to NOAK costs, more deployments are needed; however, given the potential risk to ratepayers, regulated utilities may be reluctant to be first movers in advanced nuclear without a partner. Without first movers, supply chain standup will be less efficient, gains from learning will not be realized, and construction costs will not decrease. A way of moving past this stalemate is for large customers, including technology or industrial companies, to commit to long term offtake at above market prices from advanced nuclear power.[110] As described below, several large companies have reached agreements for forthcoming advanced nuclear technology deployments, particularly to provide reliable power to their data centers.

Data Centers

The growth in Artificial Intelligence (AI), the Internet of Things, and other data-intensive computing functions is increasing the demand for data centers. The market for IT infrastructure and data centers is expected to more than double globally from $153 billion in 2020 to $317 billion in 2026.[111] This growth in data centers will require significantly more electricity. According to EPRI, data center electricity demand is projected to increase from around 4 percent of total U.S. electricity demand in 2023 to as much as 11 percent in 2030.[112] In order to meet this increased demand for reliable power, while achieving internal social goals of reducing carbon emissions, data center hyperscalers have been turning to all types of advanced nuclear technology. Recent company announcements of advanced nuclear technology support for data centers are listed below.

Amazon

Amazon has announced multiple projects to power its data centers with SMRs. On October 16, 2024, Amazon stated that it had signed an agreement with Energy Northwest to purchase power from four X-energy designed SMR reactors that should be ready in the early 2030s. The first phase of the project is expected to generate 320 MW, with the option to increase to a total of 960 MW. Energy Northwest will build, own, and operate the reactors. Amazon also announced that it will invest in X-energy's manufacturing capacity to develop SMR equipment.[113] X-energy announced that it had received approximately $500 million in equity investment from a group including Amazon's Climate Pledge Fund, Citadel Founder and CEO Ken Griffin, affiliates of Ares Management Corporation, NGP, and the University of Michigan. X-energy and Amazon plan to establish and standardize a deployment and financing model to develop projects in

[110] U.S. DOE, "Pathways to Commercial Liftoff: Advanced Nuclear," p. 40, September 2024, https://liftoff.energy.gov/wp-content/uploads/2024/10/LIFTOFF_DOE_AdvNuclear-vX7.pdf, accessed October 16, 2024.
[111] Building, Design + Construction Network, "Global edge data center market to cross $300 billion by 2026, says JLL," published August 8, 2024, https://www.bdcnetwork.com/home/news/55166298/global-edge-data-center-market-to-cross-300-billion-by-2026-says-jll, accessed November 25, 2024.
[112] EPRI, Powering Data Centers: U.S. Energy System and Emissions Impacts of Growing Loads report, published October 30, 2024, https://www.epri.com/research/products/000000003002031198, accessed November 25, 2024.
[113] Amazon, "Amazon signs agreements for innovative nuclear energy projects to address growing energy demands", posted October 16, 2024, https://www.aboutamazon.com/news/sustainability/amazon-nuclear-small-modular-reactor-net-carbon-zero, accessed October 28, 2024.

partnership with infrastructure and utility partners to bring more than 5 GW online by 2039.[114] Additionally, Amazon signed an agreement with Dominion Energy to explore developing an SMR near Dominion's existing North Anna nuclear power station adding at least 300MW in power to the Virginia region.[115] On November 26, 2024, Amazon announced that it is offering $334 million to support a multi-year feasibility study of Xe-100's at Hanford with Energy Northwest, as part of its October agreement with Dominion.[116]

Google

Google announced on October 14, 2024, that it had signed an agreement to purchase up to 500 MW of power from multiple SMRs developed, constructed, and operated by Kairos Power. The agreement would see the first SMR running by 2030, with additional reactors deployed through 2035.[117]

Meta

On December 3, 2024, to support its AI innovation and sustainability objectives, Meta announced that it had issued a request for proposals to identify nuclear energy developers to help with developing SMRs or large reactors to add 1-4 GW of new nuclear generation capacity in the US.[118]

Oracle

On September 10, 2024, Oracle Corporation Chairman Larry Ellison announced that it is designing a data center that will require more than a gigawatt of electricity. The data center will be powered by three SMRs.[119] The company has not yet announced further details.

Equinix

In an April 2, 2024 Securities and Exchange Commission filing, Colocation company Equinix announced that it has agreed to purchase 500 MW in advanced nuclear power using microreactors from Oklo Inc.[120]

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[114] X-energy, "Amazon Invests in X-energy to Support Advanced Small Modular Nuclear Reactors and Expand Carbon-Free Power," published October 16, 2024, https://x-energy.com/media/news-releases/amazon-invests-in-x-energy-to-support-advanced-small-modular-nuclear-reactors-and-expand-carbon-free-power, accessed November 25, 2024.

[115] Amazon, "Amazon signs agreements for innovative nuclear energy projects to address growing energy demands", posted October 16, 2024, https://www.aboutamazon.com/news/sustainability/amazon-nuclear-small-modular-reactor-net-carbon-zero, accessed October 28, 2024.

[116] Cascade PBS News, "Amazon offers $334M for nuclear reactors to be built at Hanford", posted November 26, 2024, https://www.cascadepbs.org/news/2024/11/amazon-offers-334m-nuclear-reactors-be-built-hanford, accessed January 25, 2025.

[117] Google, "New nuclear clean energy agreement with Kairos Power", posted October 14, 2024, https://blog.google/outreach-initiatives/sustainability/google-kairos-power-nuclear-energy-agreement/, accessed October 28, 2024.

[118] Meta, "Accelerating the Next Wave of Nuclear to Power AI Innovation", posted December 3, 2024, https://sustainability.atmeta.com/blog/2024/12/03/accelerating-the-next-wave-of-nuclear-to-power-ai-innovation/, accessed January 25, 2025.

[119] CNBC, "Oracle is designing a data center that would be powered by three small nuclear reactors", published September 10, 2024, https://www.cnbc.com/2024/09/10/oracle-is-designing-a-data-center-that-would-be-powered-by-three-small-nuclear-reactors.html, accessed January 25, 2025.

Prometheus Hyperscale

On May 23, 2024, Oklo announced a deal to supply Prometheus Hyperscale (formerly Wyoming Hyperscale) with 100 MW using its microreactors. [121]

Standard Power

On October 10, 2023, NuScale Power announced that it had reached an agreement with Standard Power, a provider of computing resources like servers, storage, and networking on demand to advanced data processing companies, to develop two facilities powered by SMRs to provide nearly 2,000 MW of electricity for its nearby data centers.[122] ENTRA1 Energy LLC has a partnership with NuScale where it develops, finances, owns and operates energy production plants powered by the NuScale SMR Technology.[123] In May 2024, cloud company Oracle announced plans to build a 1 GW data center campus with three SMRs; however, the company has yet to provide any further details.[124]

Switch Data Centers

On December 18, 2024, Switch, Inc. announced that it had signed a non-binding agreement with Oklo to provide its data centers with 12 GW of electricity through 2044 using Oklo microreactors.[125]

As advanced nuclear technology projects are being considered, the economics of deployment continue to be a challenge. In order to facilitate deployments, the federal government has taken steps to support the development of advanced nuclear technology, as discussed in the next chapter.

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[120] Data Center Dynamics, "Equinix signs deal to procure up to 500MW of nuclear power from Oklo reactors – makes $25m pre-payment," published April 5, 2024, https://www.datacenterdynamics.com/en/news/equinix-signs-deal-to-procure-up-to-500mw-of-nuclear-power-from-oklo-smrs-makes-25m-pre-payment/, accessed November 25, 2024.

[121] Data Center Dynamics, "Oklo to supply 100MW of nuclear power to Wyoming Hyperscale," published May 24, 2024, https://www.datacenterdynamics.com/en/news/oklo-to-supply-100mw-of-nuclear-power-to-wyoming-hyperscale/, accessed November 25, 2024.

[122] NuScale Power, "Standard Power Chooses NuScale's Approved SMR Technology and ENTRA1 Energy to Energize Data Centers," published October 6, 2023, https://www.nuscalepower.com/en/news/press-releases/2023/standard-power-chooses-nuscales-approved-smr-technology-and-entra1-energy-to-energize-data-centers, accessed November 25, 2024.

[123] Ibid.

[124] Data Center Dynamics, "Oracle to build nuclear SMR-powered gigawatt data center," published September 10, 2024, https://www.datacenterdynamics.com/en/news/oracle-to-build-nuclear-smr-powered-gigawatt-data-center/, accessed November 25, 2024.

[125] Oklo, "Oklo and Switch Form Landmark Strategic Relationship to Deploy 12 Gigawatts of Advanced Nuclear Power, One of the Largest Corporate Clean Power Agreements Ever Signed," posted December 12, 2024, https://oklo.com/newsroom/news-details/2024/Oklo-and-Switch-Form-Landmark-Strategic-Relationship-to-Deploy-12-Gigawatts-of-Advanced-Nuclear-Power-One-of-the-Largest-Corporate-Clean-Power-Agreements-Ever-Signed/default.aspx, accessed January 25, 2025.

Chapter 4 – Federal Support

In recent years the federal government has taken steps to help overcome the economic challenges of getting advanced nuclear off the ground. The federal government provides incentives for the deployment of advanced nuclear technology through various federal support mechanisms such as tax credits, DOE grants and loans, streamlined administrative procedures for nuclear energy generation facilities, and workforce development programs.

Tax Credits

Tax credits for carbon-neutral energy generation sources have been in effect since the 1970s. For instance, the Investment Tax Credit (ITC) was first enacted by the Energy Tax Act of 1978 as a temporary 10 percent credit for businesses that used energy sources other than oil and natural gas. The ITC was designed to reduce U.S. consumption of those energy sources and to encourage the commercialization of other energy technologies and resources.[126] Currently, the ITC provides an initial credit of 6 percent of investment costs for certain clean energy projects, and can be increased to 30 percent if labor requirements are met. Labor requirements include ensuring construction wages meet or surpass prevailing rates and that the required minimum work is done by those enrolled in apprentice programs.

Additionally, the ITC increases by 10 percent if domestic content requirements are met and by a further 10 percent if located in an energy community. Domestic content requirements refer to certifying that manufactured components (i.e. steel and iron) of an applicable project were produced in the United States. Energy communities include brownfield sites, decommissioned nuclear plants, or former coal sites. If all requirements are met, the ITC will recoup a maximum of 50 percent of project costs. [127]

Over time, the ITC has been extended and expanded to include more carbon-neutral energy production sources, including advanced nuclear energy. The Inflation Reduction Act of 2022 (IRA) extended the ITC for facilities constructed before 2025 and created a tech-neutral clean electricity ITC for electricity generation facilities placed in service from 2025 to 2032, or until emissions are reduced to 25 percent of 2022 levels.[128]

The expansion of the IRA allows nuclear facilities to benefit from the ITC. The ITC for facilities constructed before 2025 is technology-specific and includes solar, fiber-optic solar, fuel cells,

[126] Congressional Research Service, "The Energy Credit or Energy Investment Tax Credit (ITC)", updated April 23, 2021, https://crsreports.congress.gov/product/pdf/IF/IF10479, accessed November 5, 2024.
[127] Levi Morin Larsen et al., "Effects of the U.S. Inflation Reduction Act on SMR economics", *Frontiers in Nuclear Engineering*, Vol. 3, updated May 2024, https://www.frontiersin.org/journals/nuclear-engineering/articles/10.3389/fnuen.2024.1379414/full, accessed November 5, 2024.
[128] Internal Revenue Service, "Clean Electricity Investment Credit", updated October 16, 2024, https://www.irs.gov/credits-deductions/clean-electricity-investment-credit, accessed November 5, 2024.

small wind, waste energy recovery properties, micro-turbines, and combined heat and power systems.[129] The new ITC can apply to any facility regardless of technology as long as the facility produces zero or negative greenhouse gas emissions.[130]

The Production Tax Credit (PTC) was first enacted by the Energy Policy Act of 1992 as a per-kilowatt-hour credit for electricity generated using wind and closed-loop biomass.[131] The PTC provides an initial credit of $5.5/MWh of clean energy production which can be increased to $27.5/MWh if labor requirements are met. The PTC can also be increased by 10 percent each if domestic content requirements are met and the facility is built in an energy community. The maximum a facility could receive from the PTC would be $33/MWh for 10 years.[132] The PTC has been repeatedly extended and expanded to include more carbon-neutral energy production sources. Like the ITC, the IRA has extended the PTC to facilities constructed before 2025 and created a technology-neutral clean electricity PTC for new electricity generation facilities.[133] This expansion allows nuclear facilities to benefit from the PTC.[134]

The IRA is not the only source of tax credits benefiting nuclear energy projects. The Advanced Nuclear Production Tax Credit was the first tax credit to directly address nuclear generation facilities. The ANPTC originates in the Energy Policy Act of 2005 but was renewed in the Bipartisan Budget Act of 2018 to include advanced nuclear facilities placed in service after 2020. The ANPTC provides an additional $18/MWh for new nuclear generation facilities for the first 8 years of production. The credit is limited to 6,000 MW of total electric generating capacity.[135] One important note is that most of the federal tax credits cannot be used in tandem with each other.

[129] Congressional Research Service, "The Energy Credit or Energy Investment Tax Credit (ITC)", updated April 23, 2021, https://crsreports.congress.gov/product/pdf/IF/IF10479, accessed November 5, 2024.
[130] Internal Revenue Service, "Section 45Y Clean Electricity Production Credit and Section 48E Clean Electricity Investment Credit." Federal Register Vol. 89, no. 107, updated June 3, 2024, https://www.federalregister.gov/documents/2024/06/03/2024-11719/section-45y-clean-electricity-production-credit-and-section-48e-clean-electricity-investment-credit, accessed November 5, 2024.
[131] Congressional Research Service, "The Renewable Electricity Production Tax Credit: In Brief", updated April 29, 2020, https://crsreports.congress.gov/product/details?prodcode=R43453, accessed November 5, 2024.
[132] Levi Morin Larsen et al., "Effects of the U.S. inflation reduction act on SMR economics", Frontiers in Nuclear Engineering, Vol. 3, updated May 2024, https://www.frontiersin.org/journals/nuclear-engineering/articles/10.3389/fnuen.2024.1379414/full, accessed November 5, 2024.
[133] Internal Revenue Service, "Clean Electricity Production Credit", updated October 28, 2024, https://www.irs.gov/credits-deductions/clean-electricity-production-credit, accessed November 5, 2024.
[134] Congressional Research Service, "The Renewable Electricity Production Tax Credit: In Brief", updated April 29, 2020, https://crsreports.congress.gov/product/details?prodcode=R43453, accessed November 5, 2024.
[135] Internal Revenue Service, "Section 45J Credit for Production of Electricity from Advanced Nuclear Power Facilities", Notice 2023-24, https://www.irs.gov/pub/irs-drop/n-23-24.pdf, accessed October 16, 2024.

Grants and Loans

Tax credits are not the only federal incentives for nuclear energy. The DOE provides grants and loans to assist in the development and deployment of nuclear reactors. The Generation III+ Small Modular Reactor Program provides $800 million in grants for up to two first-mover teams and $100 million in grants for additional deployments.[136] The application window for funding under the program was open from October 16, 2024, to January 17, 2025.[137] The Low Enriched Uranium Enrichment Acquisition Program provides $2.7 billion to the DOE to sell domestic low enriched uranium to operating U.S. facilities. This program is intended to facilitate domestic sourcing of fuel for nuclear plants.[138]

The DOE Loan Program Office (LPO) provides loans to support Advanced Nuclear projects. The LPO was originally allocated $310 billion for the Title 17 Clean Energy Financing program, and there is $60 billion remaining for other projects. Title 17 financing was established by the Energy Policy Act of 2005 to support clean energy development and energy infrastructure reinvestment with the goal of reducing greenhouse gas emissions. Title 17 was amended by the IRA to include certain state-supported projects and projects focused on legacy energy infrastructure. The IRA leveraged additional loan authority and funding for projects that feature innovative energy technology. Through the program, borrowers can access loans from the Treasury's Federal Financing Bank, which is backed 100 percent by DOE guarantees of "full faith and credit" or partial guarantees of debt from the DOE.[139] The LPO provided loan guarantees totaling $12 billion to Georgia Power Company, Oglethorpe Power Corporation, and Municipal Electric Authority of Georgia to support the Vogtle AP1000 deployments.[140,141]

The DOE also offers other assistance to nuclear projects. The Infrastructure Investment and Jobs Act of 2021 (IIJA) provides support for nuclear energy through the funding of two programs, the Civil Nuclear Credit Program (CNCP) and the ARDP. The CNCP provides $6 billion in funding to maintain the existing nuclear fleet and prevent premature shutdowns.[142] The IIJA provided $2.5 billion in funding for the ARDP for advanced nuclear reactor demonstrations. Other ARDP related programs include $651 million for the ARDP Risk Reduction program and $55 million

[136] U.S. DOE, "Generation III+ Small Modular Reactor Program", https://www.energy.gov/oced/generation-iii-small-modular-reactor-program, accessed November 5, 2024.
[137] U.S. DOE, "Generation III+ Small Modular Reactor Program Update", https://www.energy.gov/oced/generation-iii-small-modular-reactor-program-update, accessed November 5, 2024.
[138] U.S. DOE, "DOE Announces $2.7 Billion From President Biden's Investing in America Agenda to Boost Domestic Nuclear Fuel Supply Chain", posted June 27, 2024, https://www.energy.gov/articles/doe-announces-27-billion-president-bidens-investing-america-agenda-boost-domestic-nuclear, accessed November 5, 2024.
[139] U.S. DOE, "Title 17 Clean Energy Financing", https://www.energy.gov/lpo/title-17-clean-energy-financing, accessed November 5, 2024.
[140] U.S. DOE, "Advanced Nuclear Energy Projects", https://www.energy.gov/lpo/advanced-nuclear-energy-projects, accessed November 5, 2024.
[141] U.S. DOE, "Vogtle", https://www.energy.gov/lpo/vogtle, accessed November 5, 2024.
[142] U.S. DOE, "Civil Nuclear Credit Program", updated September 27, 2024, https://www.energy.gov/gdo/civil-nuclear-credit-program, accessed November 5, 2024.

for the ARDP Advanced Reactor Concepts 2020 (ARC-20) program.[143] The ARDP has supported the demonstration of two advanced nuclear reactors, X-energy's XE-100 and TerraPower's Natrium reactor, as mentioned in the previous chapter.[144]

The Creating Helpful Incentives to Produce Semiconductors (CHIPS) and Science Act of 2022 includes significant support for nuclear energy. The CHIPS Act provides funding for national nuclear university research infrastructure, $55 million for existing university facilities and $390 million for new facilities including four new research reactors. The legislation provided $15 million for a University Nuclear Leadership Program which provides support for nuclear research, including nontechnical nuclear research aimed to increase engagement with nuclear energy systems. Importantly, it also provides $800 million for the research, development and demonstration of advanced nuclear reactors.[145]

Administrative Improvements

Apart from more direct financial incentives, the federal government has passed legislation to encourage nuclear development and deployment through the lowering of costs and administrative barriers. The Nuclear Energy Innovation and Modernization Act (NEIMA) of 2019 aimed to create a more efficient process for licensing advanced nuclear reactors. It required the NRC to establish performance metrics for licensing and other regulatory actions as well as develop a regulatory framework for advanced nuclear technologies.[146] Additionally, the legislation included a pilot program for providing predictable fees regarding licensing for uranium producers.[147]

The Accelerating Deployment of Versatile, Advanced Nuclear for Clean Energy Act of 2024 decreases licensing application fees for advanced reactors, increases staffing for NRC reviews, provides for prize awards for deployment, and eliminates costs associated with pre-application activities and early site permits at DOE sites. Furthermore, it requires 25-month deadlines for NRC license issuance after receiving an application, requires the NRC to develop guidance to

[143] U.S. DOE, "Pathways to Commercial Liftoff: Advanced Nuclear," p. 30, September 2024, https://liftoff.energy.gov/wp-content/uploads/2024/10/LIFTOFF_DOE_AdvNuclear-vX7.pdf, accessed December 13, 2024.
[144] U.S. DOE, "Advanced Reactor Demonstration Projects", https://www.energy.gov/oced/advanced-reactor-demonstration-projects-0, accessed November 5, 2024.
[145] CHIPS and Science Act, Public Law No: 117-167 (2022), https://www.congress.gov/bill/117th-congress/house-bill/4346, accessed November 25, 2024.
[146] The NRC has proposed to revise the NRC's regulations by adding Part 53, a risk-informed, performance-based, and technology-inclusive regulatory framework for commercial nuclear plants in response to NEIMA.
[147] U.S. Senate Committee on Environment & Public Works, "Nuclear Energy Innovation and Modernization Act (NEIMA)", https://www.epw.senate.gov/public/index.cfm/neima, accessed November 25, 2024.

license and regulate microreactor designs, and increases permitting speed for sites with retired or retiring fossil fuel generation and brownfield sites.[148]

Additional federal support for advanced nuclear may be forthcoming. On December 4, 2024, U.S. Senator Jim Risch (R-Idaho) introduced the Accelerating Reliable Capacity (ARC) Act to accelerate investment in new commercial nuclear projects by minimizing cost overrun risk. If passed, the ARC Act would establish a limited risk reduction program for building new commercial reactors by providing a backstop for unforeseen costs through enhanced financing terms. The program would benefit three or more next generation nuclear energy projects to jumpstart commercialization.[149]

Workforce Development

The DOE has administered several workforce development programs to train workers and equip them with the skills necessary to meet the country's energy demands. This includes initiatives like the Energy Auditor Training Grant Program, the Career Skills Training Program, and the State-Based Home Energy Efficiency Contractor Training Grant Program. The DOE also administers the Nuclear Safety Training and Workforce Development Program, which will provide $100 million for university-led partnerships with technical and community colleges, national laboratories, and industry to train people in two topic areas: (1) demonstration and implementation; and (2) training needs and curriculum development. An initial round of $50 million awards will be announced in the spring of 2025 with applications closing on January 14, 2025. Additionally, another $50 million will be available for a second round of awards, depending on appropriations. The program has three main aims: (1) to ensure the nuclear fleet is built and maintained by a skilled workforce ready to meet the demands of the industry, (2) to build on existing industry-recognized safety credentials, and (3) to establish associations to help ensure the current nuclear workforce meets the skilled training needs of the industry.

Workforce development programs can contribute to the maintenance and expansion of the current nuclear fleet. Florida may benefit from workforce development programs like those undertaken by the DOE. Workforce development for nuclear energy has the potential to create new employment opportunities and spur economic growth while meeting the state's energy demands.[150] Another DOE workforce development program is the Good Jobs in Clean Energy

[148] U.S. DOE, "Newly Signed Bill Will Boost Nuclear Reactor Deployment in the United States", posted July 10, 2024, https://www.energy.gov/ne/articles/newly-signed-bill-will-boost-nuclear-reactor-deployment-united-states, accessed November 5, 2024.
[149] Senator Risch, "Risch Introduces Bill to Accelerate New Nuclear Investment", posted December 4, 2024, https://www.risch.senate.gov/public/index.cfm/2024/12/risch-introduces-bill-to-accelerate-new-nuclear-investment, accessed December 13, 2024.
[150] DOE, "Nuclear Reactor Safety Training and Workforce Development Program", https://www.energy.gov/ne/nuclear-reactor-safety-training-and-workforce-development-program, accessed December 2, 2024.

Prize, which provides $3.3 million in awards to foster coalition-building in communities nationwide, with a focus on creating quality, accessible jobs and developing an inclusive workforce in the clean energy sector.[151]

The federal government offers a variety of support for advanced nuclear deployments. In addition to supporting advanced nuclear technology for civilians, the federal government has interest in exploring the military application of this technology, as will be discussed in the next chapter.

[151] Interagency Working Group on Coal & Power Plant Communities & Economic Revitalization, Good Jobs in Clean Energy Prize, https://energycommunities.gov/funding-opportunity/good-jobs-in-clean-energy-prize/, accessed December 19, 2024.

Chapter 5 - Military Applications

The Department of Defense (DOD) is one of the largest energy consumers globally, and its energy demands are only expected to increase as newer, high-energy-usage military systems are introduced. The White House reported that the DOD consumes 10 million gallons of fuel per day and 30,000 gigawatt-hours of electricity annually, nearly all of which is obtained through off site and civilian shared electrical grids. Bases being over reliant on energy obtained through a civilian shared electrical grid is seen as a problem, especially if the base is faced with harsh weather, physical attacks, cyberattacks, or other emergencies. Past administrations have viewed nuclear power as a potential solution to ensure military base power grids remain operational and ready for critical missions.[152]

Recent legislation has paved the way for the DOD's efforts in exploring nuclear energy for military bases. Previous initiatives from the Army resulted in the construction of eight nuclear reactor designs, five of which were portable, from 1954 to 1977; however, the 2019 National Defense Authorization Act (NDAA) is attributed as being the starting point for the DOD's advanced nuclear power research.[153] The 2019 NDAA tasked the Secretary of Energy to develop a report to Congress within one year, outlining the requirements for, and components of, a nuclear energy pilot program. This program entails contracting a third-party company to build and operate at least one microreactor, licensed by the NRC, for DOD facilities by December 31, 2027.[154] Two years later, the 2021 NDAA mandated that military bases essential for critical missions be energy resilient enough to maintain a minimum of 99.9 percent energy availability for energy loads by 2030.[155]

[152]The White House, "Fact Sheet: Biden-Harris Administration Announces New Steps to Bolster Domestic Nuclear Industry and Advance America's Clean Energy Future," posted May 29, 2024, <https://www.whitehouse.gov/briefing-room/statements-releases/2024/05/29/fact-sheet-biden-harris-administration-announces-new-steps-to-bolster-domestic-nuclear-industry-and-advance-americas-clean-energy-future/>, accessed December 9, 2024. See also, The White House, Executive Order 13972, "Promoting Small Modular Reactors for National Defense and Space Exploration," filed January 13, 2021, <https://www.federalregister.gov/documents/2021/01/14/2021-01013/promoting-small-modular-reactors-for-national-defense-and-space-exploration>, accessed December 9, 2024.

[153] SCO, Jeff Waksman, "Project Pele Overview," p. 4, approved for release May 2022, <https://www.nrc.gov/docs/ML2212/ML22126A059.pdf>, accessed December 13, 2024.

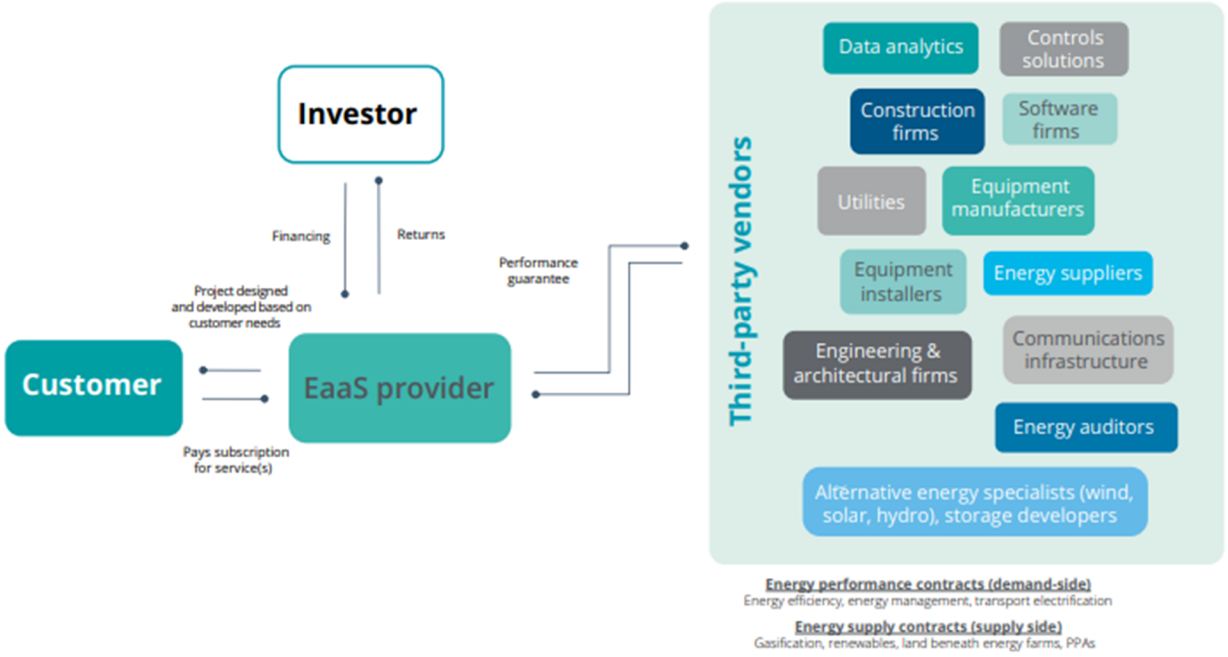
[154]2019 NDAA, "report on pilot Program for micro-reactors," pp. 86-88, SEC. 327 effective January 2, 2019, <https://www.congress.gov/115/bills/hr5515/BILLS-115hr5515enr.pdf>, accessed December 13, 2024. See also, DAF, "Micro-Reactor Pilot," updated August 2022, <https://www.eielson.af.mil/Portals/40/DAF%20Micro-reactor%20Pilot_2022%20fact%20sheet_PDF.pdf>, accessed December 13, 2024

[155]2021 NDAA, "Energy resilience and energy security measures on military installations," pp. 130-133, § 2920, effective January 1, 2021, <https://www.congress.gov/116/plaws/publ283/PLAW-116publ283.pdf>, accessed December 13, 2024.

Energy as a Service

To achieve the mandated energy resilience requirements, bases that choose to implement nuclear energy technology may adopt the Energy as a Service (EaaS) business model. Under this model, a provider designs and develops an energy infrastructure based on the customer's needs, typically through contracts such as a Power Purchasing Agreement. This method entails that a contracted provider invests in and operates the energy infrastructure, handling all aspects of the maintenance and upgrades, while the customer pays for the energy services received without needing to purchase or operate the energy equipment themselves.[156]

Figure 14: The Energy as a Service Model



Source: Deloitte, American Council for an Energy-Efficient Economy. [157]

To test the success of the EaaS model, in February 2023 the Department of the Air Force allocated $10 million to launch a three-year EaaS pilot program at Hanscom AFB in Massachusetts. This initiative was in response to a significant power outage the base experienced in September 2022, caused by an energy system failure at a substation that was built in the 1950s and thus scheduled for replacement. The project is a collaboration between the Air Force Office of Energy Assurance, the companies Eversource and Ameresco, and the Consortium for Energy, Environment, and Demilitarization, who will jointly design, construct, and operate a system of

[156]Deloitte, American Council for an Energy-Efficient Economy, "Energy-as-a-Service," published in 2019 <https://www2.deloitte.com/content/dam/Deloitte/sk/Documents/energy-resources/deloitte-uk-energy-as-a-service-report-2019.pdf>, accessed December 13, 2024.
[157] Ibid, p. 12.

solar arrays and battery energy storage systems to supply renewable energy to the base. The program consists of a build phase, a year-long operational phase, and a final evaluation phase, with success of the initiative determining whether other bases, particularly those seeking to enhance energy resiliency and transition to nuclear energy, will adopt the EaaS model.[158]

Current Nuclear Energy Initiatives

The DOD is committed to deploying at least one microreactor prototype by 2027, and ensuring that by 2030, bases essential to critical missions are energy resilient enough to maintain a minimum of 99.9 percent energy availability for energy loads. To support these objectives, a variety of initiatives are underway throughout the DOD and its military subordinate departments. The military intends to become an early adopter of advanced nuclear energy to achieve the mandated military resilience, with a particular emphasis on microreactors. For remote bases, microreactors offer an advantage of extended operation between refueling periods. Likewise, bases dependent on off-site energy can use a microreactor as a means of providing independent energy in the event the grid is compromised.[159] The following are military initiatives that are either considering or committed to using nuclear energy to meet the requirements set forth in the NDAAs.

Department of Defense Strategic Capabilities Office – Project Pele

In March 2020, the DOD's Strategic Capabilities Office (SCO) issued a Notice of Intent (NOI) in response to the 2019 NDAA, marking the official start of Project Pele, a project that entails working alongside a third-party company to design a microreactor prototype that meets the program's specific requirements.[160] In April 2022, the SCO announced BWXT Advanced Technologies (BWXT) as the manufacturer of the Pele microreactor, utilizing the company's transportable microreactor design capable of producing between 1 MW and 5 MW of electrical power.[161] The prototype will be constructed by BWXT in Lynchburg, Virginia, where it is scheduled to be separated into four 20-foot long shipping containers and transported to the DOE's Idaho National Laboratory (INL) for testing in 2026. At minimum, The Pele microreactor is expected to operate at the INL for three years until it has properly demonstrated it is capable of

[158]Air Force Materiel Command, "Hanscom leaders invest in energy resiliency," posted June 13, 2023, <https://www.afmc.af.mil/News/Article-Display/Article/3427063/hanscom-leaders-invest-in-energy-resiliency/> accessed December 13, 2024. See also, DAF, "Air Force launches Energy-as-a-Service pilot program at Hanscom AFB", published February 15, 2023, <https://www.af.mil/News/Article-Display/Article/3299294/air-force-launches-energy-as-a-service-pilot-program-at-hanscom-afb/>, accessed December 13, 2024.

[159]The White House, Executive Order 13972, "Promoting Small Modular Reactors for National Defense and Space Exploration," filed January 13, 2021, <https://www.federalregister.gov/documents/2021/01/14/2021-01013/promoting-small-modular-reactors-for-national-defense-and-space-exploration>, accessed December 1, 2024.

[160]Research & Engineering Enterprise, Project Pele, <https://www.cto.mil/pele_eis/>, accessed December 13, 2024. See also, Research & Engineering Enterprise, NOI, released March 2, 2022, <https://www.cto.mil/wp-content/uploads/2022/05/NOI-Distro-A.pdf>, accessed December 13, 2024.

[161] Research & Engineering Enterprise, ROD, released April 15, 2022 <https://www.cto.mil/wp-content/uploads/2022/05/ROD-Distro-A.pdf>, accessed December 13, 2024.

meeting the military's energy demands. This microreactor demonstrating success under real world operating conditions could make it the first Gen IV reactor to produce electricity in the United States, and could make it a model for similar technologies in the future.[162]

Defense Innovation Unit and the U.S. Army

The Defense Innovation Unit (DIU), an organization managed by the DOD, is responsible for addressing military needs by integrating commercial technologies to solve national security challenges, often through direct collaboration with commercial companies. Supporting this mission through the research of nuclear energy, the DIU has been advancing spacecraft nuclear propulsion technologies through initiatives supported by contracts with Ultra Safe Energy and Avalanche Energy, with the objective of conducting a successful orbital prototype demonstration by 2027.[163] As part of more recent developments, the DIU has also partnered with the Army in developing microreactors to enhance energy reliance at Army bases in alignment with the energy objectives set forth in the 2021 NDAA.[164] In June 2024, the Advanced Nuclear Power for Installations (ANPI) program officially begun when the DIU issued a Commercial Solutions Opening (CSO) soliciting microreactor prototype proposals from interested companies. The CSO, which was open for only two weeks, specified that the DIU and the Army are looking for microreactors that can preferably produce between 3 MW and 10 MW of power. Additionally, the CSO stated that top contenders that make it to Phase II will be invited to present their microreactor prototype designs. If the timeline proceeds as planned, the Army is expected to have one or more microreactors operational at its bases by 2030.[165]

Department of the Air Force Projects

The DAF was among the first of the DOD subordinate departments to begin researching nuclear energy in 1946 when the Nuclear Propulsion Program (also known as the Manned Nuclear Aircraft Program) began assessing the feasibility of using nuclear energy for the propulsion of an

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[162]DOD, "DoD to Build Project Pele Mobile Microreactor and Perform Demonstration at Idaho National Laboratory," published April 13, 2022, <https://www.defense.gov/News/Releases/Release/Article/2998460/dod-to-build-project-pele-mobile-microreactor-and-perform-demonstration-at-idah/>, accessed December 13, 2024. See also, DOD, "DoD Breaks Ground on Project Pele: A Mobile Nuclear Reactor for Energy Resiliency," released September 24, 2024, <https://www.defense.gov/News/Releases/Release/Article/3915633/dod-breaks-ground-on-project-pele-a-mobile-nuclear-reactor-for-energy-resiliency/>, accessed December 13, 2024. See also, BMXT, "BWXT to Build First Advanced Microreactor in United States," posted June 9, 2022, <https://www.bwxt.com/news/2022/06/09/BWXT-to-Build-First-Advanced-Microreactor-in-United-States>, assessed December 13, 2024.

[163]DIU, "Powering the Future of Space Exploration: DIU Launching Next-Generation Nuclear Propulsion and Power," posted May 17, 2022, <https://www.diu.mil/latest/powering-the-future-of-space-exploration-diu-launching-next-generation>, accessed December 13, 2024.

[164] DIU, DIU and U.S. Army To Prototype Advanced Nuclear Power for Military Installations," released June 5, 2024. < https://www.diu.mil/latest/diu-and-u-s-army-to-prototype-advanced-nuclear-power-for-military>, accessed December 13, 2024

[165] DIU, "Advanced Nuclear Power for Installations (ANPI)" Published June 5, 2024 <https://www.linkedin.com/pulse/advanced-nuclear-power-installations-anpi-andy-tennant-vlnhe>, accessed December 13, 2024

aircraft.[166] More recently, the DAF has continued to explore nuclear energy as a potential source of reliable and clean power for its bases. This effort is backed by the 2019 and 2021 NDAAs, as well as the DAF's recognition that it cannot afford to adequately maintain its current infrastructure portfolio, which accounts for up to 10 percent of DAF's total budget.[167] The DAF has particularly emphasized microreactors for their inherent safety features, ability to safely generate both electrical and thermal energy over extended intervals between refueling, and capacity to operate independently from the electrical grid.[168] Current DAF projects entail constructing a microreactor at Eielson AFB in Alaska, a simulation project at Hill AFB in Utah to evaluate the integration of a microreactor running alongside existing energy systems, and an energy resilience initiative at Joint Base San Antonio (JBSA) in San Antonio, Texas that could potentially incorporate the use of nuclear energy.

Eielson AFB, Alaska

In response to the 2019 NDAA, the DAF initiated its own microreactor pilot project, motivated by objectives similar to those of the SCO's Project Pele. In September 2020, the DAF issued a Request for Information (RFI) to identify potential sites for the construction and operation a microreactor, with the goal to have it operational by the end of 2027. In October 2021, the DAF's Office of Energy Assurance recommended Eielson AFB as the optimal location for this project.[169] Several factors contributed to the selection of Eielson AFB, including the base's need for a reliable new energy source to support its growing fleet off the grid, limited access to clean energy alternatives, existing infrastructure, and the region's extreme climate. The planned microreactor will supplement the base's existing coal-powered energy system, providing up to 5 MW of electricity and varying amounts of steam heating. In September 2022, Eielson AFB issued Request for Proposal to solicit a third-party vendor to own and operate the microreactor. The Request for Proposal was scheduled to close January 31, 2023, and a NOI to award a contract was issued in August 2023, announcing the selection of a vendor; however, a bid protest was filed at the Government Accountability Office, prompting additional proposals to be reviewed. Consequently, the NOI to award a contract was rescinded in September 2023.[170] In March 2024, the DAF presented a revised timeline, indicating that the it no longer believes the microreactor will be operational by 2027. Additionally, no definitive start date for construction

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[166]Air Force Materiel Command History Office, Jack Waid, "History in Two: Manned Nuclear Aircraft Program," published June 21, 2021, <https://www.afmc.af.mil/News/Article-Display/Article/2664365/history-in-two-manned-nuclear-aircraft-program/>, accessed December 13, 2024.

[167]DAF, RFI, Notice ID #FA8903-25-R-1002, "Introduction," published October 30, 2024, <https://sam.gov/opp/07ce87b378354929a6d10e262a99dc84/view> , accessed December 13, 2024.

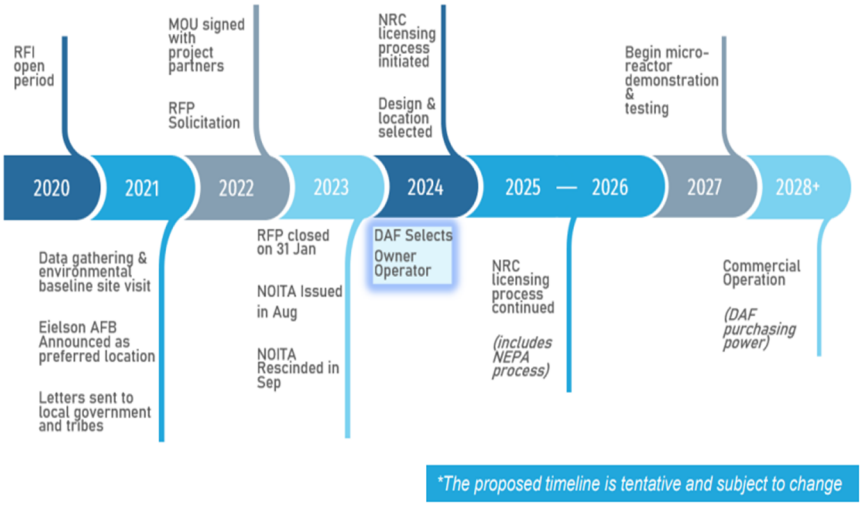
[168]DAF, "Department of the Air Force Micro-Reactor Pilot – FAQs," last updated December 2023, <https://www.eielson.af.mil/Portals/40/ENVIRONMENT/MicroReactor/DAF%20MicroReactor%20FAQs_May%202024.pdf?ver=h6qsv87q72VGP1WE4vZvyw%3d%3d>, accessed December 13, 2024.

[169] Office of the Deputy Assistant Secretary for Environment, Safety, and Infrastructure, "Micro-Reactor Pilot," <https://www.eielson.af.mil/Portals/40/DAF%20Micro-reactor%20Pilot_2022%20fact%20sheet_PDF.pdf>, accessed December 13, 2024.

[170]Eielson AFB, "Microreactor Pilot Program," <https://www.eielson.af.mil/microreactor/>, accessed December 13, 2024.

has been established, as it is contingent on the final selection of a chosen vendor.[171] The revised timeline projects that testing and demonstrations of the microreactor may commence in 2027, with the conclusion of the pilot phase and the commencement of commercial operation potentially occurring in 2028 or later.

Figure 15: Eielson AFB Nuclear Project Timeline



Source: DAF.[172]

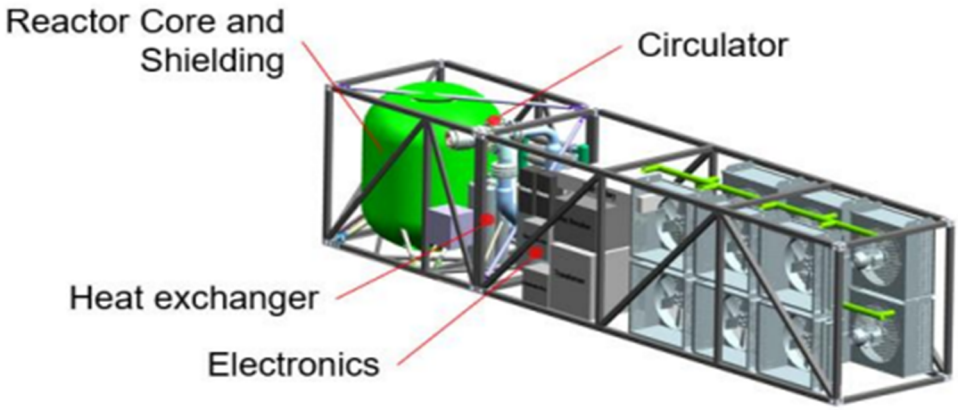
Hill AFB, Utah

The DAF is evaluating the feasibility of integrating a commercially produced microreactor alongside existing energy equipment and grid power to ensure continuous base operations during unforeseen circumstances. In March 2023, Hill AFB partnered with Radiant, a company founded by former SpaceX employees with an expertise in simulation software.[173] Radiant's advanced simulation software will be utilized at Hill AFB to identify failure points in the base's existing energy systems, including generators, steam boilers, and grid energy to assess whether nuclear power can enhance the base's energy resilience. Radiant also possesses specialized knowledge in the commercially produced microreactors under consideration at Hill AFB, as the company has been developing the Kaleidos microreactor since August 2020. Kaleidos is a 1 MW portable reactor that, according to the company, can fit into a single shipping container and be installed overnight. Additionally, Radiant asserts that Kaleidos is designed to be meltdown-proof, leak-

[171]DAF, "Department of the Air Force Micro-Reactor Pilot | FAQs," Updated May 2024," <https://www.eielson.af.mil/Portals/40/ENVIRONMENT/Micro-Reactor/DAF%20Micro-Reactor%20FAQs_May%202024.pdf?>, accessed November 4, 2024.
[172] DAF, Nancy Balkus and Thomas Brown, "Department of the Air Force Micro-Reactor Pilot Program," p. 4, presented March 18, 2024, <https://www.akleg.gov/basis/get_documents.asp?session=33&docid=31724>, accessed December 13, 2024.
[173]Radiant, "Hill AFB Partners with Radiant in Critical Energy Resilience Study," posted March 22, 2023, <https://www.radiantnuclear.com/blog/hill-afb-sbir/>, accessed December 13, 2024.

safe, and capable of operating for 20 years with refueling required every five years. Kaleidos is projected to be transported to the DOE's INL no later than 2026, where it will undergo comprehensive testing to evaluate its failsafe mechanisms and unique semi-automated control system.[174] Radiant anticipates that the first commercially available reactor could be ready within two years of successful testing at INL, with commercial production projected to begin in 2028.[175]

Figure 16: Model of Radiant's Kaleidos Microreactor



Source: Radiant Regulatory Engagement Plan.[176]

Joint Base San Antonio (JBSA), Texas

Joint Base San Antonio, one of the largest AFBs in the country, spends approximately $48.5 million annually on energy consumption and relies heavily on off-site electricity, a dependence that makes the base particularly vulnerable to power disruptions from unexpected events.[177] To address this, a Memorandum of Understanding was signed on February 26, 2024, between JBSA, the City of San Antonio, and City Public Service Energy (CPS Energy) formalizing a partnership to identify sustainable and reliable energy sources to enhance the base's operational capacity and support national security objectives. This partnership also aligns with the city's goal of becoming carbon zero by 2050 and obtaining 100 percent pollution-free electricity by 2030.[178]

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[174] Radiant, "Radiant Secures $100 Million in Series C Funding, Plans Milestone Test at INL's DOME Facility," posted November 14,2024, <https://www.radiantnuclear.com/blog/series-c-announcement/>, accessed December 17, 2024.

[175] Radiant, "Radiant Successfully Completes Passive Cooldown Test for Kaleidos Nuclear Microreactor," posted October 15, 2024, <https://www.radiantnuclear.com/blog/passive-cooldown-demo/>, accessed December 13, 2024. See also, Radiant, Doug Bernauer, "Why I Started Radiant", posted January 18, 2023, <https://www.radiantnuclear.com/blog/why-i-started-radiant/>, accessed December 13, 2024.

[176] Radiant, DOC-0A3E, Chanson Yang, "Regulatory Engagement Plan," p. 6 approved October 13, 2023, <https://www.nrc.gov/docs/ML2328/ML23286A328.pdf>, accessed December 13, 2024.

[177] Department of Air Force, RFI, Notice ID #FA8903-25-R-1002, "Opportunities," p. 7, published October 30, 2024, <https://sam.gov/opp/07ce87b378354929a6d10e262a99dc84/view>, accessed December 13, 2024.

[178] Joint Base San Antonio, "JBSA to explore resilient energy solutions, signs agreement with City of San Antonio, CPS Energy," published March 7, 2024 <https://www.jbsa.mil/News/News/Article/3699372/jbsa-to-explore-resilient-energy-solutions-signs-agreement-with-city-of-san-ant/>, accessed December 13, 2024. See also, Office of

On October 30, 2024, the DAF issued an RFI seeking third-parties to assist JBSA with projects relating to energy resiliency, demand optimization, supply assurance, and security enhancements. JBSA is interested in exploring the feasibility of nuclear energy, green hydrogen, geothermal, and technologies not yet identified to increase the base's energy resilience. JBSA requested that these companies respond by January 30, 2025.[179] The RFI stated that JBSA will eventually select a company willing to enter into a long term power purchasing agreement contract to implement the use of the EaaS model; however, interested companies responding to the RFI should not expect to be solicited by JBSA for a contract, as the project is still in the information gathering stage.

The next step of this project entails choosing the energy technology JBSA deems most suitable for both the City and the base. While other technologies are also being considered, the State of Texas is working to ensure that barriers to entry do not hinder JBSA from adopting advanced nuclear technology. On August 16, 2023, the Texas Governor established the Texas Advanced Nuclear Reactor Working Group (Working Group) to explore how nuclear reactors can provide Texas with safe, reliable, and affordable nuclear power. Operating under the guidance of the Public Utility Commission of Texas, the Working Group's primary goal is to promote and facilitate the adoption of advanced nuclear reactor technology within the state.[180] In a report sent to the Texas Governor on November 18, 2024, the Working Group advocated for JBSA to develop an SMR on its base as a solution to its reliance to off-site electricity. The report also highlighted the potential for an SMR being the solution to the increasing energy demand from entities in the San Antonio area. Additionally, the Working Group outlined steps to accelerate JBSA's nuclear energy opportunities, such as identifying state agencies that could assist in the pursuit of nuclear energy, and suggesting the use of funding from the Defense Economic Adjustment Assistance Grant Program to support the development of a SMR on the base.[181] If these incentives are enough to convince JBSA to incorporate the use of nuclear power into its energy infrastructure as its clean energy technology choice, JBSA could be one of the first military installations to incorporate the use of an SMR instead of a microreactor.

Department of the Navy

The Department of the Navy (DON), which oversees two branches of the military, the Navy and the Marine Corps, has been harnessing nuclear energy since the 1950s, initially leveraging this technology to develop advanced submarines capable of extended submerged operations and to

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the Federal Chief Sustainability Office, , "Federal Sustainability Plan," pp. 17-44, published December 2021, <https://www.sustainability.gov/pdfs/federal-sustainability-plan.pdf>, accessed December 13, 2024.

[179]Department of Air Force, RFI, Notice ID #FA8903-25-R-1002, "Opportunities," p. 8, published October 30, 2024, <https://sam.gov/opp/07ce87b378354929a6d10e262a99dc84/view>, accessed December 13, 2024.

[180]JBSA, "JBSA to explore resilient energy solutions, signs agreement with City of San Antonio, CPS Energy," published March 7, 2024 <https://www.jbsa.mil/News/News/Article/3699372/jbsa-to-explore-resilient-energy-solutions-signs-agreement-with-city-of-san-ant/>, accessed December 13, 2024.

[181]Working Group, "Deploying a World-Renowned Advanced Nuclear Industry in Texas," p. 61, dated November 18, 2024 <https://gov.texas.gov/uploads/files/press/TANRWG_Advanced_Nuclear_Report_v11.17.24c_.pdf>, accessed December 13, 2024.

enhance the propulsion systems of aircraft carriers.[182] More recently, on October 7, 2024, the Navy issued a RFI to solicit input from developers, utilities, and other parties on the feasibility of constructing and operating nuclear power plants on Navy and Marine Corps bases. The DON is exploring nuclear energy as a means to improve energy security and reliability at its bases, reduce dependence on external energy sources, and achieve the energy resilience objectives outlined in the 2021 NDAA. Under this initiative, power plants would be privately owned and operated on under-utilized land within the DON. Contracted companies would be responsible for securing the necessary NRC licenses and for managing all aspects of construction, operation, and nuclear waste disposal. The DON has identified seven bases for potential nuclear power development: Naval Base San Diego (CA), Marine Corps Base Hawaii (HI), Pearl Harbor Naval Shipyard (HI), Marine Corps Air Station Cherry Point (NC), MCB Camp Lejeune (NC), Naval Station Norfolk (VA), and Naval Base Kitsap (WA). Parties interested in responding to the RFI had until November 7, 2024, to submit their proposals; however, the DON emphasized that this RFI was intended solely for informational purposes, and that companies submitting responses should not expect to receive contract offers for a nuclear energy project.[183]

[182]The White House, Executive Order 13972, "Promoting Small Modular Reactors for National Defense and Space Exploration," filed January 13, 2021, <https://www.federalregister.gov/documents/2021/01/14/2021-01013/promoting-small-modular-reactors-for-national-defense-and-space-exploration>, accessed December 9, 2024.
[183]Department of the Navy, "Request for Information: Identification of Potential Shore Installation Contractor Owned/Operated Nuclear Power Plans," published October 7, 2024, <https://sam.gov/opp/0cda6711c0de4550b3bf80e3b98e38db/view>, accessed December 13, 2024.

Chapter 6 - Conclusion

Chapter 2024-186, section 21, Laws of Florida, requires the Commission to study and evaluate the technical and economic feasibility of using advanced nuclear power technologies, including small modular reactors, to meet the electrical power needs of the state. Also, the Commission must research means to encourage and foster the installation and use of such technologies at military installations in partnership with public utilities.

The only advanced nuclear reactor design currently operating in the U.S. is the Westinghouse AP1000, a large, twin unit Gen III+ reactor at plant Vogtle in Georgia. This is the same advanced reactor design that has been approved by the NRC for construction and operation in Florida. Vogtle Units 3 and 4 were lengthy and expensive construction projects but they demonstrate the technical feasibility of large advanced nuclear reactors. Future AP1000 deployments are expected to benefit heavily from these FOAK projects. Vogtle Unit 4 may have realized as much as a 30 percent cost savings compared to Unit 3, and additional cost and schedule improvements are expected for subsequent AP1000s, as is typical for projects following a FOAK deployment.

A study undertaken for the Idaho National Laboratory examined the potential for deploying AP1000s nationwide. Two sites in Florida were deemed to have good potential for near-term deployment of AP1000s: Florida Power and Light's Turkey Point Generating Station and Duke Energy's previously proposed Levy County site. As discussed in Chapter 2, these sites had COLs issued for dual unit AP1000s.[184] Moving forward with the issued Turkey Point COLs or reinstating the Levy COLs represent the quickest paths forward for new AP1000 deployment in Florida.[185]

Presently there are no SMRs or microreactors in operation in the U.S. However, as stated above, it appears these designs are technically feasible, but as of yet are simply unproven. Economic factors are critical to the future of these types of advanced nuclear deployment, as these designs are new and have not yet experienced deployment. The primary hurdle is moving from FOAK to NOAK deployments, as manufacturers learn to reduce costs as they gain experience building these generators. Likewise, lowering the cost of manufacture, and thus the final construction costs, helps to drive down the LCOE of nuclear power, because the comparatively low fuel costs of nuclear mean that LCOE is driven primarily by construction costs. While the above factors are critical to all types of reactors, there are also additional cost considerations specific to SMRs and microreactors, as economies of scale and different use cases can lead to distinction in how they can be funded.

[184] A COL is an NRC-issued license that authorizes a licensee to construct and (with certain specified conditions) operate a nuclear power facility, such as a nuclear plant at a specific site.
[185] Williams, Bradley J., et al., "Opportunities for AP1000 Deployment at Existing and Planned Nuclear Sites," p. 3-5, Idaho National Laboratory, p. 2,August 2024, https://www.osti.gov/biblio/2437758, accessed October 16, 2024.

The federal government offers numerous incentives for advanced nuclear power, including tax credits, grants, and loans. Steps have also been taken to improve administrative efficiency related to approving designs and COLs. More recent legislation has also funded numerous programs that are available for the development of nuclear projects. As a result, there are numerous current projects at all scales of reactor design that have either entered active development or are expected to over the coming decade. The DOD has also launched several programs specifically focused on the development of microreactors on military installations.

The Commission is to include in its report any recommendations for potential legislative or administrative actions that may enhance the use of advanced nuclear technologies in a manner consistent with the energy policy goals in Section 377.601(2), F.S. At the conclusion of FPSC staff's workshop on advanced nuclear technology, described in Chapter 1, staff requested post-workshop written comments from stakeholders. Staff specifically requested any recommendations stakeholders may provide. The FCG's Next Generation Nuclear Workgroup provided several such recommendations:

- Commissioning a more comprehensive study beyond the impacts to Florida's electricity needs. The work could be overseen by a recognized independent Florida body, such as a major university, that would help to define the benefits of new nuclear development in the state, including its influence in attracting new economic development, manufacturing, and workforce development. This study could also include creating an inventory of potential sites for new nuclear development.

- Ensuring cost recovery for preliminary costs incurred during site evaluations in order to mitigate financial risks during the early phases of project development. Cost recovery for these activities could be implemented through changes to Section 366.8255, F.S. (environmental cost recovery) and Section 366.93 F.S. (nuclear cost recovery).

- Enhancing stakeholder engagement and education concerning advancements in nuclear safety. Modern nuclear reactors incorporate state-of-the-art safety features that substantially reduce accident risks. Providing stakeholders detailed information on these safety enhancements will help dispel misconceptions and build public confidence in advanced nuclear energy.

- Moving forward with additional initiatives if the costs associated with advanced nuclear technologies are more certain and demonstrate clear benefits to utility customers. This includes support for new state and/or federal legislation providing increased grant funding for the deployment of advanced nuclear reactors, as well as establishing a workforce development program aimed at training construction and operations teams for new nuclear power plants. This dual approach presents a comprehensive strategy to not only encourage investment but also accelerate progress in advanced nuclear energy.

If the Legislature wants to encourage further investment in advanced nuclear power in Florida, these recommendations could form the basis of such policies. As the technology matures, and more advanced nuclear plants are deployed throughout the country, Florida will be poised to take advantage of the benefits advanced nuclear can offer. It is important, however, to maintain the perspective that pursuing advanced nuclear power technology is a long-term approach to meeting the power needs of Florida because these power plants are long-lead projects. Regulatory and political changes during the development of long-lead projects adds to the risk of delay, which in turn increases the financial risk.

II. Outside Persons Who Wish to Address the Commission at Internal Affairs

Note: The records reflect that no outside persons addressed the Commission at this Internal Affairs meeting.

III. Supplemental Materials for Internal Affairs

Note: The records reflect that there were no supplemental materials provided to the Commission during this Internal Affairs meeting.

IV. Transcript

BEFORE THE
FLORIDA PUBLIC SERVICE COMMISSION

PROCEEDINGS: INTERNAL AFFAIRS

COMMISSIONERS PARTICIPATING: CHAIRMAN MIKE LA ROSA
COMMISSIONER ART GRAHAM
COMMISSIONER GARY F. CLARK
COMMISSIONER ANDREW GILES FAY
COMMISSIONER GABRIELLA PASSIDOMO

DATE: Tuesday, February 18, 2025

TIME: Commenced: 9:30 a.m.
Concluded: 12:25 p.m.

PLACE: Betty Easley Conference Center
Room 105
2524 Shumard Oak Boulevard
Gerald L. Gunter Building
Tallahassee, Florida

REPORTED BY: DEBRA R. KRICK
Court Reporter and
Notary Public in and for
the State of Florida at Large

PREMIER REPORTING
TALLAHASSEE, FLORIDA
(850) 894-0828

P R O C E E D I N G S

CHAIRMAN LA ROSA: All right. By the quietness, it sounds like we should probably get ready. I think so.

So good morning, everybody. Today is Tuesday, February 18th, and this is our Internal Affairs meeting here at the Florida Public Service Commission.

I love starting this meeting because we always get to talk about good people within our organization. So this month's, February's Employee of the Month is Thelma Crump from CAO. There is Thelma in the back of the room.

(Applause.)

CHAIRMAN LA ROSA: Thelma is an expert in engaging the public with all things PSC. That is a title all in itself. As the Commission outreach coordinator, Thelma travels the state of Florida to meet with senior community center, area community action agencies and housing authorities, among other venues, to educate residents about the PSC and how we can help them from offering free publications to resolving utility complaints.

In addition to coordinating and attending regular monthly outreach events, she annually

spearheads the outreach campaign for the National Consumer Protection Week, the Older Americans Month, the Lifeline Awareness Week and our Library Outreach Project. These all reach 487 Florida libraries, specifically with the Library Outreach Project in 2024.

Thelma's knowledge for what we do here at the PSC is immense. With over 25 years of experience in her PSC knowledge, she has become an asset to both our agency and everyone that she works around. Last year, Thelma coordinated more than 40 outreach visits to spread the Commission's message.

So Thelma, thank you again for all that you do, and certainly deserving rounds of applause.

(Applause.)

CHAIRMAN LA ROSA: So as we all got prepared for today's meeting, we came in, we heard this great music. And this month's song is Midnight Star -- is Electricity by Midnight Star. And ironically, right, it was suggested by Thelma Crump. So, Thelma, you were recognized for two great contributions to our agency. And that was not planned. I just go down a list, and I said, who recommended this after we had already chosen the Employee of the Month. So certainly a great

contribution. Hopefully you guys enjoyed it.

I do have to look up some of these songs. I will admit that Commissioner Graham knew it right off the top. When I walked in, he told me the song that was planned. So thank you all for participating.

We are still welcoming more songs. So please, as you have got thoughts, ideas, as we continue to make our Agenda nothing -- well, I won't say nothing is off limits. Some things are off limits, but we are always welcoming new songs.

So let's jump in. We have got a long list of things today, some important information that we are going to be going over and working on, but let's go ahead and start with the Public Utility Research Center, PURC, their 2024 annual report.

Mr. Ted Kury, Director of Energy Studies is here with us today, and he is going to be presenting their report. We always look forward to hearing what PURC is doing. In fact, we will see you guys in a little -- maybe in a couple of hours, I guess, down in your place down in Gainesville.

Mr. Kury, please take it away.

MR. KURY: Thank you, Mr. Chairman.

Apologies for the Gator tie, but I am wearing

my FSU dad socks, so hopefully that buys me --

CHAIRMAN LA ROSA: This man came prepared today.

MR. KURY: -- buys me a little bit of time anyway, right?

So Chair La Rosa, Commissioners, staff, members of the public, thank you very much for affording me the opportunity today to talk about what we have been up to at PURC over the last year. You have the -- you have the report that we sent over. I am just going to go through some highlights, and then we have a couple of presentations that we would like to get to.

So I am going to go through some of the highlights from the report, and then I am going to be turning things over, first to Lily Padgett, one of our predoctoral students, and she's going to talk a little bit about what she's been doing with regard to research in renewable energy implementation. And then that will be followed by Lily Haak, a senior at UF, majoring in economics, and she's going to talk a little bit about some of the work she's been doing studying technology policy. But I will get to my highlights first.

So as Chairman La Rosa mentioned, a couple of

things coming up, first being our annual conference starting tomorrow, running tomorrow and Thursday, and we look forward to seeing folks there. And Chairman La Rosa is going to be kicking off our second day on Thursday morning, so we appreciate his input.

CHAIRMAN LA ROSA: Hopefully no one gets super exit excited by that, kind of lower the bar for Thursday.

MR. KURY: But from last year -- you already raised the bar from last year.

CHAIRMAN LA ROSA: I don't know about that. I appreciate it. Thank you.

MR. KURY: We have also been quite involved in engaging students at UF and beyond. And as I mentioned, in a couple minutes you are going to hear from two of them.

We also have an upcoming course in artificial intelligence that's going to be delivered through NARUC's efforts for all regulators across the U.S. And, again, for that course, we appreciate the input of Commissioner Fay and Chairman La Rosa in flooring that course. Mark will be -- Dr. Jamison will be delivering that at the -- in March. And it will be recorded by NARUC so that folks can attend

live. The course will be available for folks to view, well, as long as they want folks to be able to view it.

The next section we talk a little bit -- some of our media appearances over the last year. We primarily focused on system resilience. We get a lot of calls from different media outlets. Whenever there is a storm, folks want to talk about what do we do to make the grid more resilient? And I am always very proud to be able to point to the work that Florida has done, and y'all really -- I think this phase of it started with a series of workshops that the Commission held in 2006, and that initial order that led to the annual meetings.

And, you know, I always hear, whether it's from California with the wildfires, or the Gulf region with the hurricanes, or the north with the storms, when everybody is talking about this discussion for making the system more resilient, and I talk about the process that Florida went through and the discussions we continue to have.

Everybody always says, oh, we can't do that here. The discussions are too hard. I said, they are hard in Florida too, but the Commission, the stakeholders and everybody involved made the

decision that we are going to have the hard discussions, because that's the only way we have the system that we have.

And so it's always interesting. This past year, most of the interest came from Texas, you know, where Texas and CenterPoint, the Texas PUC had an investigation for CenterPoint, and we talked a little bit about, you know, some of that.

So the there were media appearances Mark has weighed in on a couple of places on changing technology policy.

Next section is some of the research that we have done over the last year. So in the energy space, most of it is focused on contracting, the role of contracts and market structure. So when we change the market structure, when we change the relationships between parties, how does that impact the way that parties respond to incentives, and how does it promote efficiency?

On the ICT and telecom side, a lot of Mark's work has focused on broadband deployment and pricing. They -- we completed a study, kind of an international survey of the role of broadband during the pandemic. That was an interesting aspect. And then Mark has weighed in in several

places on net neutrality.

On the waterside, most of the focus has been on KPIs, data systems, and the way those KPIs can be used to assess performance, improve performance. And then our research that spans sectors has been primarily on effective leadership.

Quite a bit of outreach over the last year. Mark has done a lot of work with the State and other states on the broadband equity and access and deployment programs at the federal level. He spoke at the Asia-Pacific Economic Cooperative workshop in Peru.

And I had a chance to participate in the forum that the South African regulator ran on power trading. Power trading is becoming a lot more popular in South Africa. You have got a lot more participants that are, you know, not necessarily generation owners or final customers. They are simply moving power from one place to another and, you know, getting their -- you know, taking their piece. And South Africa, that's kind of new for them, that expansion. So we are talking a little bit about what are some of the things that the regulator should be worrying about.

I got a chance to participate in Brazil Water

Week. That was an offshoot of a course that I will talk about in just a second, and basically talking about regulation by contract.

Regulation by contract in Brazil is popular primarily in the transportation sector, but its implementation is expanding into electricity and water. And so there has been a big focus in the last two years in Brazil on what are some of the changes from the standpoint of a regulatory agency? What are some of the things we have to worry about when we transition from traditional cost of service or price cap regulation to regulation by contract?

And so there is -- it's seen as a way to reduce regulatory costs, but really what it does is it shifts the type of costs. Instead of year-to-year monitoring or year-to-year reviewing of prices, you have to put in a lot more upfront work, because this contract that you are signing, it's going to be with you for the next 10 years, 15 years, 20 years. And you better make sure that you put everything in that contract that you wanted to consider for that particular sector for the next 20 years, because you are going to have to live with it.

CHAIRMAN LA ROSA: The company typically would

take the risk on something like that?

MR. KURY: Well, there is a sharing. It depends a lot on the way the incentives in the contractor are priced, so -- but the -- it's similar to what we are trying to accomplish with public/private partnerships, where we are shifting some of that risk to the private sector in exchange for compensation. But with a regulatory contract, it's -- you -- it's not -- there is maybe not the level of underlying public ownership of the asset that there would be in a public/private partnership, so -- but a lot of the principles are similar, yes, and it's -- and the idea behind it is the allocation of risk.

Mark did a course in Thailand for -- I am sorry, I will get to that in a second.

And Mark has had other discussions. He had a forum with FCC Commissioner Brendan Carr talking about -- talking about federal and state opportunities in broadband deployment. And then, of course, we started the -- we started the year with our annual conference last year, where, again Chairman La Rosa kicked off the second day.

For training, we expanded our portfolio quite a bit this past year. I already mentioned the

course we did on regulatory contracts for Brazil. We had a customized course just a couple months ago for Belize Water and the utility regulator in Belize focusing primarily on the interconnection and -- Belize's water sector is pretty fractured, and there is a lot of cross border complications with Mexico and Guatemala, and so these are issues that the regulator and the utility are trying to balance, and we are talking about, you know, some of the challenges we have with integration of the system, system expansion and pricing in the water sector.

We did a course inform Uganda for the utility -- the electricity regulator in Uganda focusing on principles of regulation and pricing, but dealing with a couple of issues that the Uganda regulator is dealing with. First being the movement of Eastern Africa towards a power pool arrangement, a multinational power pool.

So power -- we already know from the U.S., power pools are complicated enough when they are multistate. You make them multinational, it's even more so. And so the regulator is starting to have to deal with that idea of a multinational power pool. They are also having to deal a lot more with

mergers in the electricity sector. Something they are not used to typically. But you have seen a lot of distribution companies merging in Uganda. So part of the course was what is does the regulator have to worry about when we -- when it comes to mergers?

Mark did a course for the telecom regulator in Thailand. And then we had started the year with the course in Brazil, as I mentioned.

So that's kind of an overview of what our year has been like before things -- before I turn things over to Lily Padgett, I would welcome any questions, any additional clarification that you might need.

CHAIRMAN LA ROSA: I will start us off.

So a lot of international, you know, connections and discussions with other countries, some emerging markets and some more stabilized. Is there -- maybe more in the electric side is kind of where this question is directed, certainly curious in the water and broadband. Is there like a staple in which do they look to the U.S.? Do they look to western countries as far as what they look to model after?

And that's -- I know that's broad, and we

talked about Uganda and Belize and a few other of the other countries, but --

MR. KURY: Typically when you are talking about a change in market structure -- so for example, the preponderance, or the growth of power pools in Sub-Saharan Africa. Certainly, you know, the U.S. is a logical place to look because -- I mean, you see power pools in the UK. You see power pools in Australia, but UK and Australia aren't always as transparent from a data standpoint, or from a -- you know, these are our regulations, these are our market rules standpoint as the US is. So in that sense, absolutely, because -- and, you know, this is -- the U.S. has -- we made some mistakes in some of these transitions. I mean, you know, California power crisis being a perfect early example.

And the way I always explain it to folks is we got to understand why these things happened because people in California already paid for that. There is no reason for anybody else to be paying for that same mistake. So learn what you can, but, you know, the -- certainly, I think our capacity markets here in the U.S., they are not perfect, but they work better than the capacity markets in the

UK, the capacity markets in Australia. So, you know, there is -- they are good lessons, too. You know, there are things to avoid. There is some good lessons.

So I think when you are talking about changes in market structure, absolutely. When there are things like price caps and revenue caps, we don't use price caps and revenue caps quite as much in the U.S. as, let's say, the UK does. So if what folks are interested in is moving towards a price cap or revenue cap regime, then we tend to look more towards the UK, or maybe Australia, you know, for that type.

But, yeah, the main thing that folks are looking for is what are the lessons learned from these implementations? What are the things -- how can we take the things that worked and implement them here? How can we look at the things that maybe didn't work quite so well, or worked in a way that we didn't expect, and how can we take those lessons and apply them going forward?

That was a lot of the power trading, you know, I mean, I relied on quite a bit on some of our early lessons in the power markets, the Federated Power sales case in Illinois, for example. You

know, the ice storm in Texas a couple years ago, you know, are practical examples of times when the system -- the system actually works, but it doesn't work in the way you intended it to, and so --

But, yeah, whenever you are talking about changing in market structure, for the most part, they are looking elsewhere, because they don't have the institution additional experience, the institutional knowledge there.

CHAIRMAN LA ROSA: Interesting. I have always felt that the real failure is when you make that same mistake twice, right? And you don't learn from what's happened and how to kind of direct the future.

Any other questions or thoughts?

Commissioner Graham.

COMMISSIONER GRAHAM: Thank you, Mr. Chairman.

I think it's kind of a transition from the question you asked. With the new administration, you guys being a research center, what sort of things have you seen so far and you are anticipating, like, with USAID going by the wayside, different impacts in DOE?

MR. KURY: Yeah, I mean, it's going to be interesting. I think it's probably a little early

to -- certainly there are going to be changes at the Department of Energy. There are going to be changes at the State Department and, by extension, USAID, and certainly, you know, with our international component, that's something we are watching carefully. How much of it sticks, though, is going to be -- is going to be interesting, because a lot of this is being challenged.

So I think there are going to be changes. What we really don't know is how much it's going to change. I don't know that we have anything -- certainly, Mark's broadband research, that -- I think that flows naturally into what we are going to see, what types of changes we might expect going forward.

On the energy side, I can see -- I can see that there are going to be impacts, but I think until we actually take a look at, hey, what's a research question that we can formulate here, it's probably a little bit -- it may be premature to say, this is exactly what is going to happen.

I mean, absolutely changes are -- there are going to be changes, but where those changes shake out, you know, I don't think everything that's being done -- I think the perfect example of that

is the nuclear safety folks, you know, I mean, let go, but then, oh, wait a minute, we really need these folks and getting them back, so --

COMMISSIONER GRAHAM: What sort of things are you doing? I mean, are you going back saying, we have been doing this for the last 10 years, but that's because we were asked, not because we feel like we need to be doing it? Are you putting together that kind of list saying that, you know, if we are asked to volunteer to give some things, what you would be looking at.

MR. KURY: Yeah, so Lily Padgett is going to be talking about some of her work in renewable energy adoption, and what some of the factors have been surrounding that. Mark and I have also been doing some work in that area. And it will be interesting to see what happens to, you know, renewable energy adoption when maybe some of the incentive mechanisms change within the sector.

So that's one -- that's a specific topic that is on our radar right now, is looking at, you know, are we going to see changes as a result of incentives; because, of course, a lot of renewable energy adoption has really just been about economics. It hasn't been about necessarily a

particular policy or incentive mechanism or broader goal.

So like I said, I think we are definitely going to see some changes, but rural energy is one where I think it will be interesting to see. I mean, you will here in a second Lily has done a lot of work on that, but something like that, that may change going forward, and that will be interesting to see how that works.

Another aspect I think is interesting is in what manner do we make the grid more resilient. I mean, a resilient grid, I think, is a policy goal that's bipartisan. I mean, it doesn't really matter who is in the White House. That's something that everybody is interested in, and so --

But as you guys know probably better than anybody, there are lots of different ways to do that, and there are choices that you have to make. There are physical investments you can make. There are technological tools you can utilize. There are process improvements. There are cost recovery mechanisms that all play a role in making the system more resilient, and how will those mechanisms change going forward?

So right now, those are two particular areas

that are interesting to me. But I want to point out, you know, we are -- we are here to -- like Mark says, we are not the ones who provide service. We are not the ones who regulate the service and make the decisions. Our only job at PURC is to make the lives of people who do that critical work easier. So if there is a particular question or particular area that anyone is interested in that we can help with, we are, you know, we are more than happy to do that.

CHAIRMAN LA ROSA: Any other questions?

I mean, only because it's on our agenda, I think it's maybe right to ask. Any thoughts on where SMR, small modular reactors are? I mean, I can't -- I'll feel like I am --

MR. KURY: No. No. Actually -- and I apologize. I know it was provided to me. I didn't get a chance to look at the report but I am looking forwarding it to it.

CHAIRMAN LA ROSA: I am putting you on the spot. There is not a conference that we don't go to or a discussion that we don't have that SMRs are not somehow brought to the forefront --

MR. KURY: Yep.

CHAIRMAN LA ROSA: -- have nothing to do with

what we are talking about. So I am kind of curious just from what you've seen from a research, you know, perspective at the institutional level, you know --

MR. KURY: Yeah.

CHAIRMAN LA ROSA: -- general thoughts and --

MR. KURY: What really -- what really hurts with the research from an economist standpoint, you know, given that I am not a nuclear engineer, so I can't talk about, you know, building them, or anything else. The fact that there are -- as much as we talk about them, there are so few actual implementations of these types of reactors.

So, you know, we have the theory. We have the blueprints. We have the regulatory framework for this is what we have to do in order to construct, and operate, and put this forward, but what does it actually look like when, you know, it's operating?

There is not a lot -- there is not a lot to go on. So any type of economic analysis that basically relies on some sort of counterfactual, this is the system with this in place, this is what the system might look like without this in place, or vice-versa. You know, you need some sort of control group and some sort of study group. And

right now, the study group is really, really limited. It's pretty much limited to implementations in Russia and China, where -- well, access to data in Russia and China is not nearly what it is to access to data in the United States or the UK or Australia.

CHAIRMAN LA ROSA: That was polite.

MR. KURY: So -- yeah.

So again, something that we are interested in, but from an economist standpoint, pretty difficult to study it until we get an actual implementation of the technology somewhere.

CHAIRMAN LA ROSA: I appreciate the input on that. I know I put you on the spot a little bit --

MR. KURY: No.

CHAIRMAN LA ROSA: -- good discussion.

Commissioners, any other thoughts or questions? We can pass it off, I know you have got one of the two Lily's that are going to present.

MR. KURY: Yep.

All right. So let's see, Lily Padgett, are you on, I hope?

Okay. So as I mentioned, Lily Padgett is a predoctoral student at UF. Her majors were math and economics as an undergrad, and she's going to

talk a little bit about her research into adoption of renewable technologies. Lily.

MS. PADGETT: Thank you so much, and thank you all for the opportunity to -- once again, I am trying to pull up my slides. I am. I am going to present on -- I am so sorry --

CHAIRMAN LA ROSA: No worries. Hey, Lily, yeah, we have got a hard copy in front of us.

MS. PADGETT: Okay.

CHAIRMAN LA ROSA: I saw something up on the screen. I wasn't sure if that was controlled by us or controlled by you, we do have your three slides in front of us.

MS. PADGETT: Okay, then I am not going to pull them up if that's okay with you.

CHAIRMAN LA ROSA: Yeah. Absolutely.

MS. PADGETT: All right. Okay. So, yeah, thank you so much and thank you for the opportunity to be here and share the research that I have been working on with Dr. Jamison and PURC.

Like Ted said in his introduction, my research looks at how various factors affect the accumulation of wind and solar capacity. Specifically, I looked at some state, regional and utility specific factors. And to do this, I

connected two studies. The first of which occurred at the state level, and has state level factors, and so those are going to be the factors listed on that first slide that you have.

Within this study, I looked at both the proportion of the state's total energy capacity that's derived from solar sources, and to the proportion of the state's total energy capacity that's derived from wind sources, and two different studies. And then the tables that you have shows the results. They are listed in their order of economic significance. And the plus and minus signs indicate whether each variable had a positive or negative effect on the proportion of the state's solar or wind capacity.

So as you can see, the state's median wind speed and median sunlight have the largest amount of economic significance. They are also more statistically significant variables included in the solar model. The median wind speed has a negative effect on the amount of solar capacity. However, the sunlight didn't have a negative effect on the wind capacity. And one possible explanation that we explored through this was the difference in the adoption patterns in wind and solar utility-scale

wind was adopted much earlier than utility-scale solar was.

As for the other variables within the study, average coal price is the only variable that was not significant in the model. As you can see in your table, the number of years a state has had a competitive energy market and the number of years a state has had renewable portfolio standards had a small positive effect for solar and wind.

Now, the second part of my study was done at the plant level. Specifically, I looked at municipal and investor-owned plants. So cooperatively owned plants were not included in these results.

The plant level contained all the same variables included in the state level analysis, as well as additional regional and utility specific variables. And then again, I looked at both the proportion of plant total capacity that's derived from solar energy sources and proportion of the plant's total capacity that's derived from wind sources, which are, again, displayed in the table included in the order of economic significance.

The one on the first slide are the ones that have the highest levels of economic and statistic

significance, while the one on the second slide have lower levels of economic significance.

The two that are grayed out, that's average natural gas price for the state, and the number of state that the plant is located in has had a competitive energy market. Those are the only two that weren't specifically significant in this model, so that's why they are different.

Again, like the state model, the median sunlight exposure and medium wind speed were shown to have the most significant factors for both wind and solar, while other large -- variables of large amounts of economic significance, including the average coal price in the state where the plant is located in, the average net energy load for the regional plant is located, and then the ownership structure of the utility that owns the plant, whether the plant was investor-owned or municipally owned. But whether or not these variables had a positive or negative relationship on the proportion of the plant solar or wind capacity depended on the -- whether it was wind or solar that we were looking at.

So just to summarize, my research looked at the importance of state, regional and utility

specific factors in the accumulation of wind and solar capacity, but I found that the natural resource availability of the state typically has the largest amount of effect. And thank you again for the opportunity to share.

CHAIRMAN LA ROSA: Awesome. Well, Lily, thank you for presenting. Do you mind if I ask a few questions?

MS. PADGETT: Yes, of course.

CHAIRMAN LA ROSA: So what was your attraction to wind and solar? Was it something that drew you to it, or was it something that was suggested by others? I am kind of curious --

MS. PADGETT: Yeah --

CHAIRMAN LA ROSA: Of your motivation a little bit.

MS. PADGETT: -- so it was a bit of both. So it was something that was suggested by Dr. Jamison, and then I also worked -- had worked with a professor in the geography department here at UF, and she made suggestions to look at wind and solar. Originally, I was going to focus on two forms of energy, so that would include, like, hydro and nuclear, but I didn't have a good analog for the solar or wind geographic potential to those other

types. So ultimately, I decided to break it down into just wind and solar instead of trying to use wind and solar geographic potential to try and explain all renewable -- the total renewable proportion of a state's capacity.

CHAIRMAN LA ROSA: In your studies, did you come across any other states that had, like, similar type of comparisons, even if it was outside of the two elements you brought forward?

MS. PADGETT: I don't think so. I did not really look at the other. With the wind and solar, originally, I was looking at the potential proportion, but pretty early on in the research, I limited it to solar and wind.

CHAIRMAN LA ROSA: Where do you want to go from here? Where are -- you know, has this helped you kind of maybe paint the picture of next steps, or future endeavors or maybe even a profession?

MS. PADGETT: Yes. I have -- currently I applied to graduate school, Ph.D. programs in economics and some agricultural economics Ph.D. programs. Most of my research proposals for that program have been focused around energy economics and resource economics are kind of related to what I am doing here.

CHAIRMAN LA ROSA: Do you see energy as a growing sector? Is there -- is there an attraction thinking that there is going to be different and kind of newer maybe endeavors on the horizon?

MS. PADGETT: I think so, like there is a lot of talk about energy. And also, like, electricity is such an important part in, like, peoples day-to-day lives that they just don't really think about, or not consciously, so it's a sector that's always going to be important, and it's not one I ever thought of until I started this job with PURC.

CHAIRMAN LA ROSA: Awesome. I think the schools you applied for would be silly if they didn't accept you, so congratulations on what you have put together, and certainly impressed, and good luck on what comes next for you.

Commissioners, any other thoughts or questions? Sure, go ahead.

COMMISSIONER PASSIDOMO SMITH: Thank you, Mr. Chairman.

Thank you, Lily, for this report. I found this information very interesting. Some of it seemed more intuitive, you know, that the -- that when you explained that wind adoption taking place earlier, which making -- meaning that there wasn't

as much, you know, effect for the -- on the solar -- uptake of solar.

The thing I found the most interesting, and if you could expand upon it, that the type of market structure of a certain state didn't actually have too much of an impact on the results, thinking that, you know, if you have one of those restructured market, like Texas, or something, versus, you know, Florida, we are still vertically integrated, that the utility-scale adoption of certain resources, that there isn't -- the market structure does not have an impact on the resource adoption, is that -- am I reading that correctly?

MS. PADGETT: I think you are mostly reading that correctly. At the plant level, I found that the market structure didn't have an effect, but at the state level, it didn't, only for -- I believe it was for sunlight. Yeah. So for solar, it -- so I found that the solar model, the solar state level model, that market share did have an effect. It had a strong, positive relationship with the amount of solar capacity in the state as a proportion, but I didn't find that -- I didn't get that same finding at the plant level.

COMMISSIONER PASSIDOMO SMITH: Did those

states that you looked at that had that for the state level, did they have pretty robust renewable portfolio standards as part of their state policy goals?

MS. PADGETT: I think I would have to look more in -- I would have to go back to my data --

COMMISSIONER PASSIDOMO SMITH: I'm not trying to grill you or anything. I just was curious.

MS. PADGETT: I am not sure.

COMMISSIONER PASSIDOMO SMITH: Okay. Well, thank you so much.

MS. PADGETT: Thank you.

CHAIRMAN LA ROSA: Commissioners, any further questions?

All right. Seeing none, well, again, thank you very much, Lily.

We will throw it being over to Mr. Kury to introduce our next speaker.

MS. PADGETT: Thank you.

MR. KURY: And next up, we have Lily Haak.

Lily is a senior at UF, majoring in economics. And her research has focused on technology policy.

So, Lily, take it away.

MS. HAAK: Can you hear me?

MR. KURY: Yes.

CHAIRMAN LA ROSA: Hear you loud and clear. Thank you.

MS. HAAK: Good morning, everyone. I hope that your week has been going well so far. As Ted said, I am -- my name is Lily. We make jokes about how there are so many Lilys around in the PURC offices. I am a senior at the University of Florida, and my study is economics.

I just want to thank you for your time here today. I am really actually the lucky one that I get to share some of the incredible experiences that I have had while working at the Public Utility Research Center, and just working with the amazing educators and people that I get to work with every day.

So I am going to go through and kind of talk about some of my experiences, because they are oddly diverse, even within PURC. I have had a lot of time to engage with the staff, with professionals in the public utility research, you know, expertise, and then also engaging with other students.

So I originally became involved with PURC in January of 2024. I was an economics student, and I really wanted to get a better understanding of what

the research looked like, and kind of just have that experience of being able to empirically lay out the things that I was interested in and study them and pursue them, and so messaged to Araceli and Dr. Jamison originally, and they were incredibly receptive to me, and I came in and I interviewed with them, and right off the bat there was this -- such a belief that students are kind of the future, and that they can do anything, and that's very difficult to find in a lot of folks on campus who are kind of overall with the amount of students that are coming to them.

And so what my main focus is at PURC right now, what I do and what I am most proud of is that I work on something called Project Navigate, which was started by and designed by Dr. Jamison, where he initially, but then our team grew to both undergraduate and graduate students.

And what we do initially -- or what we did initially was we researched the effects of the DMA and the DSA, which is the Digital Markets Act and the Digital Services Act, which are European legislation, technology policy that we are kind of at the time we started this is a hot topic, because Europe and the European had essentially levied this

huge economic sanction against six companies, most of which were American, with the exception of ByteDance, which is a company that owns TikTok.

And so I have always had a profound interest in technology. I'm a digital native. I grew up with it. And as I went through college, I progressed in that, and I took courses that related to that. And I thought to myself, wow, how lucky I am that someone is -- or I should say, another institution within UF is so dedicated to this, and so interested to this as I am.

And so what we do is we aim to -- or what we say officially is that we aim to dissect the broad implications of these regulations on digital markets by studying and analyzing and emphasizing their impact on innovation, competition and at the core of everything that, of course, PURC does within the public utility center, what it does to consumers.

And something that I really cared about was that he, Dr. Jamison and PURC, brought us into so many areas where we can learn from people who are so much better than us. And so I have a lovely team of me and Rafeh, Andrew, and then the new student is Isabel, one of them is a graduate

student, Mia at Warrington College of Business, and we dedicate our time to asking questions and writing papers essentially about what is going on in technology policy and technology regulation, which actually has a huge scope, more than I had ever assumed, or actually had a chance to sit down and talk with professionals and learn more about that.

We are moving on from the DMA and the DSA, and we are shifting towards the American Technology Policy, just because of the recent changes in administration, we want to look more into what the future of technology in America will look like for American consumers. And so we are -- currently our research topic is on dynamic pricing and how adverse mechanisms can actually reduce consumer welfare by some predatory pricing, but that's what we are working on for that group.

As I said, I actually have multiple involvements with the Public Utility Research Center, and one of them, which is a personal scholastic achievement for me, is my thesis. So as I said, I came into PURC caring a lot about technology, but in, you know, in all honesty, not knowing a lot about the actual infrastructure that

supports the internet, which I thought was funny and humbling when I, you know, started doing research into it.

And so while I knew about technology before Dr. J and PURC really illuminated broadband to me, and telecommunications -- the telecommunications sector. And so my thesis for this year is called Internet Economics. And I took the impact of socioeconomic factors on 5G technology consumption in Florida, which was incredibly insightful and at times very difficult just dealing with the census. But I had a great guide, and I had a great support system from PURC.

So a little bit about my thesis. I constructed a comprehensive unique dataset from the FCC National Broadband Map, and then I conglomerated that with data from the Census Bureau just to state the socioeconomic factors. So percentage of a certain race in a county, total area population density, percent with a degree -- or percent with a Bachelor's Degree who are over 25, and I regressed them against each other, and I found actually more so that the largest -- the largest producer for whether or not someone had that 5G technology is whether they had access to 4G

technology.

And so I was -- as someone who is not as smart maybe as maybe my counterpart Lily with math, just the support and the reinforcement of empiricism that I heard and that was enumerated around me while I was doing this thesis has only reminded me of the integrity that PURC does when it executes all of its research.

There is a super high premium, at least on me, and I know for sure my coworkers, about making sure that things are done with an absolute focus on integrity and in truth, and on making sure that the data is clean.

And then also we create -- a profound idea that I have heard, and that I have listened to and that I have experienced, is that PURC creates research, and does research for consumers. So everything that I did was on how someone would even understand what implications does this have? And that is something that I have not experienced even though I have had other research positions within UF. PURC just puts a really high premium on integrity, and on making sure that they are serving consumers and serving the people in a really empirical way.

And then in addition to this, before I wrap up, I ultimately worked as a research assistant under Dr. J, and I mentioned the Broadband Access and Deployment Program. I edited the footnote, but really, during my time as a research assistant under him, I got to see kind of the -- I should say, like, the bows of what was actually going on in the top, and I got to watch him progress and talk to people, and just really have -- it was a comprehensive experience. So I got this very technical research side, and then I also got to see how he interacts with -- not constituents, because it's not public like this, but people that he was serving.

And then as a last point, I worked for the world BRACE programs during -- they have them now twice a year, one in June and also the one in January, which just happened very recently. And I have met people from Uganda, from Curacao, from Zimbabwe, Nepal, Guana, and people from around the world who come to PURC to be better practitioners in public utility, but they come because they understand how valuable the courses are, and they understand how incredible and layered and intelligent the instructors are.

So while Ted and Dr. Jamison are teaching, it's really the rest of the PURC staff, Araceli Rebecca, Blair and then Kristy, who are just creating, they are the backbone of the operation. And so PURC really is a team, and I know a lot of people say that, but this is a well-polished team, and they do everything with integrity, and they do everything, in my experience, with an ultimate support for the people around them.

And so just as a closing, PURC has been one of the best decisions that I ever made for my academic and professional life, and I know this is kind of a broader overview, and I am happy to welcome any questions, but I just want to thank you for your time today. And I hope that the testimony that I have given is an accurate portrayal, and that it is honest.

CHAIRMAN LA ROSA: Awesome. Well, thank you, Lily, for your highlights, right, and certainly congratulations on some of the work that you are doing.

Curiosity, right, so if technology brought you in, is there something else that you want to maybe dig deeper into now that you have kind of gotten into really kind of, like you said, the bows maybe

of research?

MS. HAAK: Yeah, so interestingly enough, when I first came into it, I was taking a lot of -- I should say when I first went into college and developed this interest, I was taking a lot of classes that had to do with the higher level stuff, so social media algorithms, or AI. And I very quickly realized that these are all like kind of flashy words, and they are new, and everyone is talking about them.

My true interest, though, as I have gotten more engrained in PURC, and I have learned more, is broadband, because it's really the foundation of everything. I would love to know more.

My original thesis topic I could not do with the time that I had and the nature of the data, is I want to really focus in on how broadband and technology adoption actually affects underserved communities. So my initial --

I should say this, my thesis idea now is on 5G consumption in Florida. I felt, and Dr. J and I agreed, that it would be better to shift our direction there. It's more relevant, and the data was not necessarily easier, but cleaner to aggregate.

My original idea was I wanted to talk about how broadband influences wage in Native American Reservations, and I would really like to know more about how technology can actually serve underserved communities, and how it can change the direction of peoples lives based on whether or not, you know, something as small as maybe we don't because we have, you know, digital devices on us all the time, how much a single internet access point, or how much a single computer in a local library can change the trajectory of the community's existence, how it can change one person's life and how that can affect their income or education for potentially generations to come.

So I would like to focus a lot more actually on how public utility, specifically in the telecommunications sectors, can influence and can benefit communities who are historically underserved.

CHAIRMAN LA ROSA: Well, that's awesome. Yeah. Great.

Commissioners, any other thoughts or questions? That's kind of hard to follow.

Yeah, Commissioner Passidomo.

COMMISSIONER PASSIDOMO SMITH: Okay. I just

want to say as a fellow Gator, I am so proud of you. You just sound really excited about the research that you are undergoing.

I thought it really interesting how you said, you know, like one of your findings was, like, the 5G, when you are seeing communities that have the greatest number of 5G adoption was those who already had access to 4G, which it shows that, you know, if you are an underprivileged community, especially in native reservations or something, who don't have any access to anything that, you know, how do you get to those really remote or landscapes and hit -- make sure that those people have the same opportunities?

I am sure -- I mean, your generation knows more than anyone how important access to broadband is just going through two years of COVID and not really being able to be in school regular, you know, that was probably really impactful on your studies if you are in high school maybe when that happened, so I am really excited for your future, and Go Gators.

MS. HAAK: Go gators.

Yes, actually if I am allowed to say anything on that. It was interesting.

So we ran multiple regressions. I felt -- initially it was Dr. J, of course, with me. And I felt that it wasn't capturing the simple story, and so we did individual regressions.

And the thing that stuck out the most to me was when you kind of delineate why people are choosing to reinstall 5G technology at 4G1 is obviously partially because of the service cost, right? You don't to replace all of the infrastructure. But in addition to that, it was just -- it was almost like a vicious cycle of where people who are underserved continue to be underserved because they are underserved. And it was something that may seem to, I don't know public utility professionals, or people who work in the telecommunication sector, like common sense, to me as someone who was beginning to understand the market dynamic.

Where 4G is deployed is chosen based off profitability, and then it continued 5G is deployed based on 4G decisions. It was just -- it was like abysmal to me to see that people were continuing to underserve underserved communities. Like, I understand that's kind of clumsy the way I said it, but it incentivized me, for sure, to look into more

about that subject to see how more access can -- it's all about accessibility. So if someone has access to a single internet point, it can change someone's life. That was long-winded. I apologize.

CHAIRMAN LA ROSA: All good. Well explained.

Commissioners, any further questions?

Awesome, well, Lily, thank you very much. Again, congratulations.

MS. HAAK: Thank you so much. Have a great day. I hope you enjoy your week.

CHAIRMAN LA ROSA: Excellent. You as well.

MR. KURY: Thank you, Lily, and thank you for your time, and we look forward to seeing, well, everybody that can make it in Gainesville starting tomorrow.

CHAIRMAN LA ROSA: Awesome. Great.

MR. KURY: Thank you. We will see you next year. Well, we will see you very soon but --

CHAIRMAN LA ROSA: I might wear my Hurricane socks though, so --

All right. Do I need to hang the phone up or anything? I know that it's still live on the other end. Good?

MR. TEITZMAN: If you can.

CHAIRMAN LA ROSA: Okay. I don't know how to do that, but I just --

MR. BAEZ: You are good.

CHAIRMAN LA ROSA: Like if I used it before.

All right. Let's go ahead and jump into the Draft Report on the Technical and Economic Feasibility of Advanced Nuclear Power Technologies.

All right. Gentlemen, who would like to take the lead?

MR. CRAWFORD: I will start off.

CHAIRMAN LA ROSA: Awesome.

MR. CRAWFORD: Good morning, Commissioners. I am Ben Crawford with the Office of Industry Development and Market Analysis, and this is staff's Report on Advanced Nuclear Generation.

Chapter 2024-186, section 21, Laws of Florida, requires the Commission to prepare a report on the potential uses of advanced nuclear power technologies in the state of Florida. We are required to study and evaluate the technical and economic feasibility of using advanced nuclear power technologies, including small modular reactors, to meet the electrical power needs of the state.

Also, we must research means to encourage and

foster the installation and use of such technologies at military installations and partnership with the public utilities.

The Commission was directed to consult with the Florida Department of Environmental Protection and the Florida Division of Emergency Management in the preparation of this report. The report is due to the Governor, President of the Senate and Speaker of the House of Representatives by April 1st, 2025. Staff seeks your approval of the report.

As we have already discovered a few scrivener's errors, we are also asking for administrative authority to correct such errors and to make any known substantive updates to the status of certain projects that may reach some level of advancement during the preparation of the report. And we are available to answer any questions.

CHAIRMAN LA ROSA: Awesome. Thank you.

I certainly won't be suggesting any scrivener's errors because I am not that guy to do that.

Anyone want to -- well, here, let me start with this, to kind of help me -- and thank you for that intro. And, Cayce, obviously, we had a good

discussion yesterday.

Can you help us maybe frame out what the takeaway should be for a reader of this report?

MR. HINTON: We wanted to approach this, you know, staying true to the actual directives of the bill when looking at the economic and technical feasibility of advanced nuclear, but we also wanted to tell the story instead of making this more of an advocacy document, we wanted to make it more of an education document. That's why we focused on telling the whole background of nuclear in Florida, and previous actions that have taken place.

And, you know, I think the big takeaway yeah, I am -- you know, I am very bullish personally on nuclear power, but you also have to recognize the nature of advanced nuclear technology, where it is in its development and deployment, and take an honest assessment. That's why, during the economic analysis, we focused primarily on folk to note, because you have to take a realistic, you know, approach to recognize that this is a nascent technology. It's not deployed anywhere yet. So we if we want to pursue this, we got to recognize there is going to be a learning curve, and we are going to make improvements as we learn, but we

rec -- you know, have to recognize that, at this stage, folk costs are going to be substantial, and will -- they will come down as we learn, but you have got to take that step if you are going to pursue that technology.

And so in the end, you know, we believe that the technology is certainly technically feasible. It's just unproven at this point. And so there is a number of places around the country where people are starting to take steps to get that first deployment out there, but we are still at the first stage, so...

CHAIRMAN LA ROSA: I don't think that point can be emphasized enough, frankly, and I agree in the sense that we are very early on on this, and as you dig -- try to dig deeper, you kind of keep on coming across that intersection.

So I am going to -- I don't know maybe the right way to do this. I am just going to kind of highlight some things that I saw that maybe we can just either talk about it, or if they are worthy of incorporating. And again, I am not the scriveners guy, so I am sure I bypassed a whole bunch of those.

MR. HINTON: Hopefully not a whole bunch.

CHAIRMAN LA ROSA: No, I am sure there is not many.

So in chapter -- well, actually in Chapter 2, when we talk about Florida's energy resource profile -- and let me back up by saying this, is that I learned a lot by reading this. It set, I believe, a good foundation and framework for someone who is not familiar with Florida -- and I am not saying I am not familiar with Florida, but if I didn't know anything about Florida's nuclear landscape, I understood Florida's nuclear landscape by reading this. And I think that there is a good base for that, right. So that's certainly, I believe, well covered.

In our Ten-Year Site Plan, we talked about he emerging trends, right. That was an addition that we made in this year's Ten-Year Site Plan. At the end of the Florida energy resource profile, in that section in 2, the last -- call it the last couple of sentences, we kind of start to kind of talk about nuclear generation is expected to remain steady throughout the planning period. It talks about full generation, and so forth.

Can we highlight more about the -- specifically about the planning period, and maybe

talk about where we see the trends that maybe are, frankly, similar to our Ten-Year Site Plan? Because I think that's given the same kind of forward-looking thought process.

MR. HINTON: When you talk about the planning period, you want to -- like, referencing reference, the Ten-Year Site Plan, that planning period?

CHAIRMAN LA ROSA: If that's appropriate. I don't want to necessarily get into the weeds of saying, hey, how is the right way to do it, but we do that in the Ten-Year Site Plan. Obviously, that's the intent of it. And to have some forward-looking statement in that regard, saying, hey, this is the direction that Florida is.

And all of this, of course, specific -- and some of my comments will get to this towards the end -- are specific to, like, today right now. And we did this in six months, maybe you would agree with me that this might look a little differently just because things are changing.

MR. HINTON: Uh-huh.

CHAIRMAN LA ROSA: So that's just kind of one. And again, not trying to dissect this. I am trying to stay away from some is the technicalities.

Future development, right. That's in Chapter

3, page 38.

MR. HINTON: I was about to say, towards the end of the economic feasibility section.

CHAIRMAN LA ROSA: Yeah. Right. We talk about construction of power generation facilities. Utilities typically use this general rate base approach. We start talking about shoulder full cost.

Can we emphasize more on maybe identifying maybe the balance of customer classes, or maybe the cost causer? I think that's the direction we are going, is saying that there is a need for this, or there is a request from this, but how does that get balanced across the average ratepayer?

MR. HINTON: You are talking about cost allocation according to cost of service studies and different rate classes?

CHAIRMAN LA ROSA: Yes. And I am not asking to go deep in it, but I am -- can that be emphasized?

MR. HINTON: Certainly. Is there a particular point that you are looking to hammer across so that we kind of make sure that we are following your track on it?

CHAIRMAN LA ROSA: Because that just might --

today, is this out of balance? As in is this -- who is at -- who -- where is the motivation behind the generation?

MR. CRAWFORD: Are you asking, for example, if it's a data center that's prompted this need for the generation?

CHAIRMAN LA ROSA: Correct.

MR. CRAWFORD: We emphasize that the costs be properly allocated be the cost causer, as you said.

CHAIRMAN LA ROSA: Correct.

MR. HINTON: So instead of building an SMR to serve a data center but then charging the general body of ratepayers for that SMR, you are thinking more cost causer type approach?

CHAIRMAN LA ROSA: Yes, trying to avoid that example of that -- maybe that becoming a problem.

MR. HINTON: Let's take -- let us take it a moment --

CHAIRMAN LA ROSA: Yeah. And, again, I am not trying to get into the technicalities. I am just kind of bringing up the point and, again, we have a little bit of time, if I am not mistaken, from now until when this is due.

MR. HINTON: April 1st.

CHAIRMAN LA ROSA: Okay.

COMMISSIONER FAY: Mr. Chairman, if I can just add?

CHAIRMAN LA ROSA: Yeah, please. Yeah, I am sorry, just please stop me.

COMMISSIONER FAY: You were doing great. I didn't want to interrupt you.

It I just want to add to that. You mentioned the complexities of that. Obviously, in the ratemaking process, with the cost allocation studies and the way we set the rates, and then the complexities of having a large entity, which it seems like within the sector it's debatable if they are industrial or commercial as a data center, there is debate as to kind of what their function is. But they would obviously take on the significant chunk of that power in the hypothetical of the modular.

I would say in addition to what the Chairman said, just the idea that other viable ways within our, you know, authority, where we look at the economic component, that there is a way to do that that doesn't impact customers. So that it's a little bit maybe different than what the Chairman was saying, but I think along the same lines of what, as regulators, right, what we do when someone

brings forward a great pretrial stipulation proposal that brings forward a data center, we are going to say it's arguably, you know, one of the most significant economic components of our country right now, and we want to be involved in that. What would we be able to do within our regulatory lanes to give some consideration to that, if a utility who is skilled to do it and a company that needs that resource were to get together and decide that's some function that they would be able to do?

MR. HINTON: Okay.

CHAIRMAN LA ROSA: I think that kind of leans on maybe, like, the million dollar question as a regulator of how we deal with that as that decision comes, whenever that decision comes.

COMMISSIONER FAY: Yeah, because we may see it sooner than later, and so I think we just would want to have some preparation.

And maybe that is somewhat outside the report from a decision-making perspective, but I think just the recognition that on that economic side, there is some way to look at it and decide where that cost allocation can be placed.

MR. HINTON: Yeah. And we are going to see -- probably the first deployments of that type are

going to -- probably going to be taking place in restructured markets where you have a bunch of independent power producers that can actually building is to sell to a specific customer, and then just offload the excess and sell it to the grid, that's --

I was -- early in the process I was speaking to a gentleman from a company called Intercon. And he had warned me, he said, you know, keep an eye out for the hyper scalers. They are going to be the first ones to deploy nuke. And then the next day, articles started hammering in, you know, about Amazon, and Meta and all these people started to, yeah, let's develop this SMR and put in our parking lot type thing.

COMMISSIONER FAY: Yeah.

MR. HINKLE: But, yeah, those are -- those type of situations are going to happen in those restructured markets where there is more flexibility for independent power producers. So here would be a challenge to address utility-owned generation, even if it's built to meet a specific load, it's still going to end up serving in the general body of ratepayers in some form or fashion, so how we address that through regulatory approach

is definitely an interesting question.

COMMISSIONER FAY: Yes, I just -- I think as a commission, we would be -- we would be mindful maybe not to shut the door on that. To your point, there are these favorability arguments of where they are going to go. And I do agree with you initially, we have seen articles that's where these folks are going because they are able to contract and have these long-term agreements for what they need. But I would hope, under our structure, we wouldn't be foreclosed for that.

And maybe it's some, you know, some form of a rider, or some mechanism I don't even know about at this point, but just then allows us the ability to do something like that if it comes forward, because it does seem like the economic drivers are valuable. Florida obviously a huge growth state. A lot of talent. It just seems like -- I would hate for it to get to us and then we hadn't, you know, given the Legislature and the Governor some thought about maybe what that would look like so we don't close the door on it. I am not saying we would absolutely approve it. I am just saying that I think we would at least want the possibility to give it some consideration.

MR. HINTON: Okay. Let us give that some thought in how we can potentially draft something for that.

CHAIRMAN LA ROSA: Yes. I am going to come right back to you. Sorry, Gary.

That's what we are good at, right, as a regulating boiled. And maybe we don't have some of the deep nuclear expertise. And I think it's kind of okay to say that at the beginning, because I think that's where our value comes in, right, is that understanding the regulatory landscape, and maybe some of the tough decisions that may or may not come down the road, and almost --

I am kind of going back to my notes, and I got kind of a beginning and kind of closing note to this point, is that maybe we -- is there a way to say that a little bit as we kind of go into this? I though we reference statute, but I would like to put the reader in the mindset of who put this together? What were they thinking? Because I think when you have a better understanding of the author, I just frankly think that there is more drive from the reader to really pull out the value that's in there, because there is a lot of good valuable information within that -- within this.

Commissioner Clark.

COMMISSIONER CLARK: I guess that's, you know, brought up some other points. I had one primary note at the end of reading this, and that was I don't see us talking about rate impact and rate flexibilities here. And I think that is an extremely important component that has to be considered when we look at any type of new technologies, what is the rate impact? What is the potential rate impacts? And I would like to see that coming.

And I was looking at the recommendations that came out, and I would really like to see some stronger recommendations, actually, from the Commission. We looked at -- my conclusion from the end was technology committee, or the working committee, they got together, these were some recommendations that they had. I really didn't see as much, okay, here's what the Commission thinks. I don't know that we have given that direction or that advice. But from rate impact -- some rate impact studies, I think, are one of the first things that need to be done.

We look at the -- look at the potential of SMRs going in dedicated to certain facilities,

there are ways to design rates there that protect the body of ratepayers. And I think that needs to be part of the consideration, is we are going to need some regulatory flexibility here to authorize utility companies to go design some creative rates.

You know, the idea and the concept of average costing isn't going to work when you start building and putting facilities in that have, you know, 90, 95 percent load factor. If you build a nuclear facility to serve that facility, there is no -- there is no benefit to the rest of the ratepayers if it's a 95-percent load factor. Everything that it produces is going to serve that one company.

So we are going to have to have some analysis in here that gets very specific to the industry that we are serving, and the industry that we are looking at versus how that affects the general body of ratepayers. I really want to see more -- just a little bit more direction on what happens with rates.

CHAIRMAN LA ROSA: From a recommendation perspective?

COMMISSIONER CLARK: Correct. Yes.

CHAIRMAN LA ROSA: I agree. That's probably a good sentiment to, frankly, to leave. I am going

to -- I got more to add to that.

Any other thoughts as we are just kind of talking about that?

COMMISSIONER PASSIDOMO SMITH: Yeah, I think just on that note, so if we are just sticking with -- because I had a similar sort of thoughts as far as rate impact.

I don't know -- I think we also be cognizant -- I think it's smart to think from the perspective of the author also who this report is written for, which is the Legislature and the Governor about, you know, certain recommendations that you might have to provide for them, because I think doing something like that might require some sort of legislative changes, generally like, you know, we have to -- you know, providing power to the entire non-discriminatory sort of framework that we have, so, like, maybe having some sort of -- when we are talking about nascent technology for certain, you know, data centers and things, and I -- that they, the cost causer is the cost -- that bears that cost.

The other thing, too, I don't know if it would get too convoluted, but, you know, how the -- some of their funding, the tax incentives that they are

going to be -- the federal tax incentives. Presumably, if we are talking about for working -- looking in a vacuum and we ignore the federal funding that it's come to a halt, and whether that's going to have an impact or not, or if that's still -- we are trying to, you know, we don't know that yet as far as these things. But, you know, if they have so much federal dollars going that making sure that they have that sort of economic benefit that, you know, the general body of ratepayers are not -- they are not getting, I just -- I am always cautious of that double dipping sort of thing, so that they are not getting a federal tax break -- a significant federal tax break, which is good for -- I understand the point of it, and encouraging sort of development, but at the same time that, you know, the general body of ratepayers don't also have to pick up the flack on that at the far end as well.

So if maybe there is sort of -- some sort of integration as far as rate impact with -- that they will also be able to get these sort of incentives, and things like that, and so that will bring down costs in a certain way, that might be helpful for the Legislature to look at.

CHAIRMAN LA ROSA: There were some suggestions from a funding perspective of DOE support. There was a chart given -- I think I printed it out -- I believe, in the workshop. Is there a way to demonstrate that, just to kind of maybe give federal funding opportunity. This is Slide 5.

MR. HINTON: From the workshop?

CHAIRMAN LA ROSA: Yes. And I am not saying necessarily copy and paste it, but to kind of give some visualization of where the maybe sources are.

I have a similar sentiment, and I think Commissioner Graham, you helped me, but it's all of a sudden started kind of flowing through my mind, is what happens if these things go away? So I just want to make sure that, although, there are words that say it, but I want to make sure that it's kind of understood of, you know, what tax credits might be out there; what DOE grants might be out there; what DOE loans that we consider, again, in the snapshot. This is a snapshot, because months down the road, this could look very different for a lot of different reasons.

MR. HINTON: Did you say that was page five, Slide 5?

COMMISSIONER GRAHAM: Slide 5.

MR. HINTON: Was that FCG's presentation or --

CHAIRMAN LA ROSA: It was FCG's presentation.

MR. HINTON: Yeah.

CHAIRMAN LA ROSA: And we are going to hop around a little bit if that's all right.

MR. HINTON: However you want to do it.

CHAIRMAN LA ROSA: So workforce development, I know we have a section that talks about workforce development, like, kind of how does that play into the economics and its relation to the deployment of the technology, right? So it's in Chapter -- is it Chapter 3 or Chapter 4? Chapter 4, under federal support, we talk about workforce development, page 46.

Similar sentiment, I am not going to suggest how to handle it, but there is some workforce development that are grants out there, and training programs that are out there. But how does workforce development over all from a Florida perspective, you know, relate to the deployment of advanced nuclear, specifically SMRs?

If there is anything that I would say, I would love to see more content, it's that direction, because the question is, is that is Florida -- there is a lot of questions, but is Florida the

right environment for an SMR to be developed? Maybe more importantly, maybe an underscore to all of this, and maybe probably not the initial intent of this report, is that where does the manufacturing of this, of SMRs come from, right? I don't know if we touch on it again, not expected to, but understanding where the workforce development is starts with manufacturing the material, manufacturing and assembling SMR plants, and then, of course, operating the technology.

MR. HINTON: Are -- make sure I am clear. Are you looking for some kind of Florida specific application --

CHAIRMAN LA ROSA: A tie back into Florida. Here's a great example, we talk about early on that University of Florida is the only nuclear -- I may have this wrong -- training facility in the southeast.

MR. HINTON: I believe that's correct.

CHAIRMAN LA ROSA: Something like that.

MR. HINTON: Yes.

COMMISSIONER FAY: The only digital nuclear training in the country.

CHAIRMAN LA ROSA: Yeah, there you go. That's a one-liner, maybe, and maybe something -- that's

an asset. I mean, I don't know how else to say that.

If we are trying to encourage investment -- again, not what I intend -- this report is intended for, but if it leads the reader with an understanding of that, and that's what I spin off, because I am looking at this for future economic reasons down the road, that's leading me, frankly, down a path that I want to dig and scour more for. That's -- I just think it's great information. Again, to a decision-maker who is going to end up -- who is asking us to put this report together.

MR. HINTON: Right.

COMMISSIONER GRAHAM: In the eyes of the Legislature.

CHAIRMAN LA ROSA: Yeah, I mean -- I promise you that this report will be read for a lot of different reasons, and it won't just be the Energy Committee. It will. It will be read for who knows what, because there is -- we just haven't done it -- again, talking about technology and where it's gone, is that there just hasn't been enough. If I want to know how Florida relates to SMRs, well, I am going to pick this up, because this might frankly be one of the only reports ever done

to date.

Okay. Again, not trying to scour through depth, but I am going to kind of -- I'm going to go now towards recommendations and conclusions.

So I agree with where Commissioner Clark is coming from. I think we need to go more in-depth in how we conclude and maybe separate that out to be a more clear recommendation, because we do end kind of, on page 59, the second to the last page of the report, when we lay out recommendations, but they are really FCG's recommendations. Are those -- what are our recommendations? What is --

And I am not trying to carry a brand to say, this is what the PSC says. But I think we can -- I think there is enough in here for us to say, hey, here's what should happen next.

When I am finished reading the report, I don't know what else I am supposed to do. And as a -- from a law maker's perspective, I would assume that I would want to read this and say, okay, how do we take this to the next level? How do we take that next step? What else should we be doing? Where else should we be looking? Maybe who else we should be asking.

MR. HINTON: Yeah, I can tell you that, you

know, when we got the postworkshop comments from FCG and, you know, we had asked for recommendations that they would have, and we actually liked the recommendations that FCG presented, and so that's why we kind of gave them full credit for it.

But I think there is -- we can certainly also just bring in, in addition to these, as the economic regulator of utilities in the state of Florida, we would want the flexibility to have -- you know, to establish rates that best facilitate these new developments in advanced nuclear technology, something along those lines. And we can bring specific Commission regulations, you know, added in here, for sure.

CHAIRMAN LA ROSA: There are things that we are really good at and there are things that are related to what we do. Frankly, I would say that we are -- nuclear is related to what we do. It's not -- we don't regulate nuclear specifically. I think we should emphasize, going back to what we do, what we are good at from a regulator's perspective.

The best place to hide something is in the middle, and the best place to announce something is at the beginning and at the end of something. So I

think that if we spend more time focusing on our introduction, and spend more time focusing on our conclusion, I think it leaves the reader, one, with a setup and stage, understand, okay, this is the lens that I am looking at this through, and then now that that stage has been set for me, this is what we take away is if I simply just read the conclusion. And if I want to know more, if I want to know why FCG says this, or why the PSC is suggesting to follow this day to day, well, I can pull it out and I can start kind of digging through.

An element that I would add to this conclusion is what we started talking about, about the hyper scalers and how, literally, when you look at the news that's reported within this, it's really in the last six months, kind of like we were talking about yesterday, is that the last six months -- I mean, thank goodness the Legislature gave us time they did, and I know we moved some dates around, but the last six months are really what's newsworthy. Well, what the heck are the next six months going to look like? They may even be twice or three times as much kind of the next year or two.

So I would leave the reader with the understanding of saying follow this day-to-day, because anything -- every day there could be new and breaking information related to SMRs, because I don't know if they are going to pick this up next fall. I don't know if they are going to pick this up next session. I don't know if it's going to be, you know, another three years down the road, but I wanted -- I just want to leave the reader's understanding that, hey, there is value in this, and how do I take the next steps?

Commissioners, I apologize if I have taken all the wind out of this one.

COMMISSIONER CLARK: If I could, Mr. Chairman, I would just add this is just one personal note for me, and it's something that helps me more than anything else. I love the graphs that you put.

I am a simple-minded person. When I can go back and try to reencapsulate what I have read through the pictures and the graphs, it means so much more to me. The more that you can put in there that summarize what you have written, I think is going to -- you know, we know that a lot of people are going to read it, but we also are pretty well convinced a lot of people aren't going to read

it. They are going to scan it. And if we can leave impacts in there that people can pick out of this thing from a graphic representation, I think it makes the whole point of the exercise that much stronger in our case. So that's a personal thing with me, if you find it in your heart and time to put some more in there.

CHAIRMAN LA ROSA: Yeah, listen, I mean, obviously presentation means anything and everything I read with, you know, with colors and pictures, and sometimes that paints a picture for me. I am a -- you know, maybe I was supposed to be an engineer, you know, because I want to draw things out. I want to put things on a board. I want to see them visually. I get lost in words and sometimes fall asleep. I shouldn't admit that because we do a lot of reading around here.

COMMISSIONER CLARK: Exactly.

COMMISSIONER PASSIDOMO SMITH: Can I add something, Mr. Chair?

CHAIRMAN LA ROSA: Of course.

COMMISSIONER PASSIDOMO SMITH: The only thing -- because you said this, like, things getting lost in the middle of the report. I thought it was really significant that the amount of cost savings

that could be found by converting older retired small coal plants because of the similar characteristics. Maybe even putting that within either the recommendations or something, because that's just, like, kind of a sentence in the middle but putting it in where, like, there are ways that we can get creative, that utilities can get creative to make these SMRs more of a reality, and we have -- we already have existing assets, and how do we convert them?

So, you know, putting that, yeah, exactly, because, like -- I mean, these are going to some pretty busy people who might not have the time to read all 60 pages word-for-word, but will focus on that. We always talk about the executive summary, how important that is, and then these -- I think I -- I am glad y'all put the recommendations in a bullet form like that. I think it's -- it, you know, it just makes -- it focuses the reader so something like that, where, you know, like -- so it's not all doom and gloom. There are ways that we can make this a reality even within our state. Just an idea.

MR. BAEZ: Chairman, a question.

CHAIRMAN LA ROSA: Yes, sir.

MR. BAEZ: To a lot of the points that you and the rest of the Commissioners have been making, and I will address them generally as, like, rate impacts, what Commissioner Clark was focusing on.

Would it be helpful -- so here's the friction, or where the rub is too, and I think some of you acknowledged how the relationship between regulatory considerations and the things that are ultimately -- that you are ultimately going to be, you know, are going to land on your lap and you are going to have to make hard decisions one way or the other for various reasons, the relationship between those kinds of considerations and answering a question of whether something is strictly speaking technically and economically feasible is -- isn't fully -- they don't fully jive.

And I think -- I forget which one of y'all mentioned, or at least alluded to the distinction of the decisions that you all make from a regulatory perspective is are sort of a step beyond.

And what I -- my question is, would it suffice in terms of putting it in the proper place, like, let that be the last thing to say, perhaps sort of a small section of -- I don't know what the title

would be, or I don't know how you would, but it's, like, a keep-in-mind kind of deal.

I mean, we can talk about technologies, and first of its kind, and how costs behave as technology gets developed and the impacts on feasibility, the positive impacts on feasibility, but let's not forget -- again, not to -- I couldn't quote any one of you, but at least to pick up the sentiment that you all seem to have consensus on is that let's not forget that this ends at a customer level.

I did have a question. Someone said analysis of the -- of rate impacts. And I am going to confess my concern with some of them. While it's great to know, have an idea of what the rate impact is, and perhaps we could mock something up with very general numbers. Trying to fix that number, or fix that impact to something meaningful is -- would take a lot of more specific information, and it starts sounding like Commission determinations.

But if we can just highlight rate impact as a term and as a consideration, a regulatory consideration, perhaps that puts us in the posture that we need to pay -- things we need to pay attention to without going the whole way of having

to get close to determining something. I don't know if that makes sense or not.

COMMISSIONER CLARK: And, Braulio, that's a great point and I did not imply that we should run that financial analysis here. I think that that needs to be a recommendation to the Legislature --

MR. BAEZ: Fair enough.

COMMISSIONER CLARK: -- is this going to be funded?

MR. BAEZ: Fair enough.

COMMISSIONER CLARK: And my thought is, okay, so you either aggregate the utilities together to say, okay, run some cost analysis based on your real numbers on what these things would cost, or, you know, we hire a rate consultant to come in and actually do a, you know, descent level projection.

MR. BAEZ: I would agree. And how we might go about it, my concern -- well, the obviously concern is time in which to do that. The larger, more cloudy concern is that starts becoming -- I was going to use the E word, like, that sounds more like evidence, or testimony and upon which experts tend to disagree; which is why I am trying to couch it in the point and the considerations that the Commission has to take after all this is sort of

oh, yeah, boom, it's feasible, you know. Whoa. Whoa. Whoa. Wait a second. There is additional perspective and considerations that have to be taken --

COMMISSIONER CLARK: Sure.

MR. BAEZ: -- from the standpoint of the agency, right, and the folks that are doing this, you know --

COMMISSIONER CLARK: I don't think of that takes the place of a need determination or a prudence review by any means.

MR. BAEZ: No, not technically. I am not -- I am not -- and that's not -- that's not my suggestion. But the road from here to there is long and starts looking like things, and --

COMMISSIONER CLARK: And just a quick, I guess, question. If the Legislature is the one that is -- we are making this recommendation is the Legislature fund this, this isn't necessarily something that's conducted by the Commission. This could be legislatively driven through some other mechanism --

MR. BAEZ: It could --

COMMISSIONER CLARK: -- that would eliminate that pro potential problem for us.

MR. BAEZ: There are many roads to roam, certainly. The one that -- the one that does fall in the ambit, and I will remind you, the one that fallings in the ambit of the feasibility study is, you know, how, for example, how military bases can execute on the development of SMRs, again, in conjunction with public utilities. And anyone would -- anyone looking at that, and as soon as that relationship is created as long as -- as soon as that cooperative relationship gets created, I think that puts at least a piece of it, if not all of it, in regulatory world, because now cost recovery becomes an issue. The utility presumably is making investments that need to be, you know, that are subject to all of that screening, so it does get kind of complicated.

COMMISSIONER CLARK: And I want going to take exactly what you are saying even a step further and put this back again on the Legislature and say, okay --

MR. BAEZ: Yeah.

COMMISSIONER CLARK: -- you want to look at making this work. Very possibly this traditional mechanism for cost recovery is going to be difficult, but if we got creative with some things

that I think they could do -- and I said this 10 years ago, we should have looked at pooled nuclear. I mean, you had the state come in, and have the State of Florida back the issuance of the bonds, we could lower the capital cost -- or not lower, we could lower the financing cost of the facilities, you get the government to give a blue plant boilerplate nuclear plant that you can build that cuts the permitting in half, and then allow the utilities to pool together to receive an allocation out of it and have some investment in it. Hey, look, there is an out-of-the-box way of looking at how do we get nuclear in the state of Florida that costs less money?

And my last point, Mr. Chairman. I just want to thank the staff. Y'all did a great job. This is -- I really like some of the things that you -- I think that there is a couple of important things you mentioned. You talked about looking at location. I mean, where is the facility going to -- where are these type of facilities going to be located? I think it's a very strategic part of this whole thing that needs to be considered.

So there is just a lot of things that you guys brought up that I had -- it never crossed my mind

would need to be considerations, and I just really appreciate the job that you guys did on this. Thank you.

MR. HINTON: Thank you.

COMMISSIONER CLARK: Thank you, Mr. Chairman.

CHAIRMAN LA ROSA: No. No. No. That's good.

MR. BAEZ: No. I mean -- well, no. No. I appreciate -- I appreciate the input and the feedback -- sorry. It sounds like we have got some work to do and we would love to be able to work with, if it's okay, with the rest --

CHAIRMAN LA ROSA: Yeah.

MR. BAEZ: -- to have a point, like, a point of contact with this, and whoever y'all might designate for yourselves to be sort of a clearinghouse for how the modifications are going. I guess I am trying to say, is there just one of you that we can work with, one of the commission?

MR. HINTON: Yeah. We have space in the schedule to bring this back to Internal Affairs.

MR. BAEZ: We do.

MR. HINTON: We did that just in case, but if you prefer, we will be happy to just work with the Chairman's office, or something and making sure all these --

MR. BAEZ: Because some of this is, you know, not scriveners.

CHAIRMAN LA ROSA: Well, right.

Commissioner Graham, you mentioned something?

COMMISSIONER GRAHAM: No, I said bring it back here.

CHAIRMAN LA ROSA: Yeah. So I agree. I think it comes back here. Now, what happens between today and then, right, which is, you know, a month more or less, I think that we should kind of come up with a game plan in the sense of, can we get drafts out to the different offices, and I am going to ask legal to maybe to help me out on this and bring it back and --

MR. BAEZ: Mary Anne took a very deep breath, noted for the record.

CHAIRMAN LA ROSA: No, just -- you know, can somebody take point?

MR. BAEZ: Yeah, usually.

MS. HELTON: Well, I think if you are going to circulate it to everyone, then you cannot circulate it amongst yourselves --

CHAIRMAN LA ROSA: Right.

MS. HELTON: -- under the Sunshine Law. But if we were to circulate to everyone, and you -- or

you take the draft that we have now, make comments and give them back to Ben and Cayce and their group, and let them work from those, but we can't, like, facilitate a discussion off-line between all of you.

CHAIRMAN LA ROSA: So if everyone got comments -- I mean, if everyone got a draft, made their comments, those comments went to staff, right? A designated person with met with staff, reviewed kind of what the -- call it the next version was going look like, if that got redistributed and then we talked about it at the next Internal Affairs?

MS. HELTON: Let me -- let me -- it's been a while since I have looked at this issue.

CHAIRMAN LA ROSA: Yep.

MR. BAEZ: And I want to apologize, because I know that we may have jumped ahead --

CHAIRMAN LA ROSA: No. No. No. It's important.

MR. BAEZ: -- I didn't sense that everybody was done with input or questions necessarily.

CHAIRMAN LA ROSA: No, the only other thing that I would add, and the thing that's maybe kind of the theme of what we're saying. This is a broad perspective, right?

MR. BAEZ: Yeah.

CHAIRMAN LA ROSA: We are taking, like, a broad approach to this. I don't want to take for granted that the person reading this, whomever it might be, you know, it's not just going to be 100 and so on legislators. It's going to be staff. It's going to be, you know, folks involved, and so forth.

If we have the opportunity to paint the picture of what we do from a regulatory standpoint, I think more information is better. I don't think you necessarily get the reader lost. But if we want to talk about cost analysis, and this is how the Commission evaluates traditionally those costs, that educates hopefully the reader to understand and say, oh, that's why they said that. Remember, this is the perspective that we painted in the beginning.

MR. BAEZ: I agree. I am actively trying to think where we would -- where would be a natural landing place.

CHAIRMAN LA ROSA: Well, frankly, there might --

MR. BAEZ: One of the recommendations is cost recovery, so maybe some elaboration on --

CHAIRMAN LA ROSA: If there -- I guess this is my invitation of what I am trying to open up. If there is an opportunity to say, hey, let's make sure the reader understands what we mean by X, or what we mean by Y, because we are referring to a Commission practice. Maybe there is a sentence or two or three that backs up what that practice --

MR. BAEZ: Yeah.

CHAIRMAN LA ROSA: -- what that practice is, because then that -- if my takeaway is that there is going to be some, you know, specific program that is designed and created, right, as creative as Commissioner Clark was describing, I have to understand that I can't throw it black to the PSC and say, hey, you guys go figure it out. Well, hold on, that's not in our realm, right?

MR. BAEZ: Understood. I think, in a way, it puts -- it defines what the possible is with some kind of understanding of how we would be involved in a scenario, right?

I mean, I mentioned earlier, it's like, you know, this recommendation of ensuring cost recovery, wherever that feed, you know, feeds back in the report, perhaps a brief discussion of how cost recovery works at the Commission. I wouldn't

sleep on the notion of regular -- you know, oh, by the way, regulatory considerations, because I do believe -- again, my feeble understanding of feasibility and things of that nature, that's a little bit -- that's an oh, by the way, more than it is, in fact, part and parcel of feasibility.

I don't read it that way, but I don't see any other way to make the good points that you are raising -- the proper concerns that you are raising. I mean, yeah, that's all well and good, beautiful technology. It works. It's whatever. Eventually, somebody is going to pay for it, and eventually, that's a question that a Commissioner -- the Commission has to answer. And I think that should be part of the -- part of the thinking of everyone. It shouldn't be limited to just the straight-up question, even though the square -- even though the frame of the, I guess, study started off pretty tight. I don't see any harm in, you know, kind of lending some reality to it perhaps.

CHAIRMAN LA ROSA: Commissioner Graham.

COMMISSIONER GRAHAM: We just got to make sure -- this is all great stuff, and we find ourselves going down a bunch of different rabbit

holes, but we got to make sure that we keep the question in front of us, and give the guys the answer they are looking for; because I guess this stuff all sounds fantastic, but we -- this is the question they asked.

Actually, I think it's kind of interesting, they asked specifically about military. And you know how many military bases and military things we have here in the state of Florida, and I don't really remember us getting much into that.

MR. HINTON: We had a whole chapter about what military currently is doing, and they are taking steps to begin microreactor projects on different bases. None of the Florida bases are currently in that process, but each branch has a pilot project out there trying to work on that.

COMMISSIONER GRAHAM: And how can we, as the state of Florida, get involved in some of that stuff? What are some of the other states doing to help the military facilitate that stuff?

MR. HINTON: I was kind of -- we were kind of silent on that because we don't really see the states very involved. It's just the DOD taking action and contracting with different companies to come in and create this pilot microreactor.

MR. BAEZ: They are not -- they are not interconnected. They are not on the grid, which is something less than what the part of the question for us was, you know, how do it in conjunction with, I mean, I think that's significant.

COMMISSIONER GRAHAM: I mean, we just had a rate case where we talked about something we were doing for the military. I mean, I didn't look -- I didn't dig into the stuff. I know you guys dug into it. I am just saying, one of the questions they asked here and they specifically brought up the military. Anyway.

COMMISSIONER CLARK: Okay. Here I go again. On the same issue, that goes to the -- that's one of the things you talked about in the report energies of service. And that is one of the concepts that comes with the developments of SMRs on nuclear bases. How are they going to handle and manage the system?

You begin to take out all of the energy sales that utility companies make right now to military bases, we have got some suddenly freed up capacity, and it's capacity the cost is currently allocated to customers. Okay. You got a rate impact issue there. You have got a significant rate impact.

Now, are we going to avoid some future generation needs? Absolutely. Those have to be considered. That all comes back to me, to the underlying question, what is the rate impact of this entire thing? And I think that has to be a significant component.

I appreciate Commissioner Graham's comment there, but I think it's a very valid concern. I thought had a point, I just needed to say that.

CHAIRMAN LA ROSA: No, understood.

Commissioner Fay.

COMMISSIONER FAY: Thank you, Mr. Chairman.

I just first want to say I appreciate -- I don't know whose decision it was to bring this early to an IA based on the statutory deadline, but it was the right one. I mean, I think it's very clear that we all have pretty strong opinions on the topic, and staff is trying to navigate the directive of that statutory language which, you know, talks about the technical and economic feasibility. And then, as the Commissioner Graham mentioned, that military part, it's a, you know, a heavy lift for just one paragraph, because there is so much that's occurring in the state. And you said it well. In the last six months we have seen

all of this action and movement, and we definitely will see that in the future. So thank you for bringing it forward whose ever decision it was to do that.

The second is I am not sure there is a more transparent process than what's occurring here. I mean, we are, as a body, a commission that, unlike a single agency head, is going through a 60 something page report basically picking at stuff either that we think either should be emphasized more, maybe changed in one way or another to carry out the bigger sort of holistic approach that we have as a commission.

When I saw the statutory language originally, like, I, number one, kind of felt bad for our staff, because it's a complicated thing to do. And then I really considered, I wonder if we have internally what we need to actually produce something at this level? And I think some of the comments that Commissioner Clark and you, Mr. Chairman, Commissioner Passidomo, they start -- they do start leading to this more complex question of the economics and the ratemaking and the rate impact, and all that stuff that I think will potentially come down the road, and I think staff

is obviously -- I do enjoy seeing Mr. Baez squirm over there. So, Mr. Chairman, I appreciate you bringing up some of these topics.

But I do think they are -- I am not saying Mr. Baez is right. This is very uncomfortable for me. I'm going to squirm -- Mr. Baez is right in that we do want to stop at a certain point so we allow ourselves the ability to give weight to whatever that is in the future. And I think that is very difficult for us, because then we are basing what we think we might do in the future, accepting the statutes as they are.

And we have seen states that are changing their statutes to arguably make the state more friendly, or more attractive for some of this advancement and investment. And I think that's all great, but the question at the end of the day will be what Commissioner Clark pointed out, that rate impact, that economic process that we go through, and I think it's going to be -- these will be very tough questions for commissions all over the country to make, but I think they are going to come. I think the technology is moving at a pace that it's going to come.

I think, as pointed out, we are uniquely --

and we have 20 something bases in Florida, right? I think 6,000 buildings, and 120,000 acres. I mean, the amount of energy that we use, the relationship that we have with these bases, the Commission works, Commissioner -- Executive Director Baez worked on this. NARUC put out a Department of Energy report using Eglin Air Force Base as a test case for energy resilience. They chose Eglin Air Force Base over any other base in the country to look and say what relationship can the utilities have to ensure of their consistent operation, but then also everybody around there.

That military discussion gets fixated on that parcel where the military is. Most of the people that work on that base live around there. Their families live around there. I mean, there is a significant impact to those areas.

And so I think for me, I just -- I try to sort of categorize the process itself on the civilian side where we discuss what the report discusses as far as giving it some weight, the NRC process.

I don't know statutorily if there is something we could do that would allow the Legislature to narrow the process for small modular or microreactors. I will say I felt -- I was glad you

included the Texas-Utah lawsuit in here. I mean, I -- when you read, I think Last Energy is the actual filer, and then Texas and Utah joined. There is a potential that NRC is going to be making a new rule down the road which would significantly impact what we give weight to. And if you read the filings in that case, it's a very real possibility that that -- that it's going to occur based on the changes they made from historically what the statutes recommended they to do. So that will change our position on this.

So I say all that to say that I think the product itself is a very good one based on what was put forward, and I think these changes can be made. And, of course, I will have some changes, too, so I -- you know, I will try to put those forward in the best way possible. And they will be minimal as to the substantive context, because I think the report -- this might arguably be the most significant, if not, second to cyber report that the Commission puts out because of the significance of the investments, the long-term viability, the advances in technology. The trend for renewable and zero emissions energy that isn't intermittent, that's available at all times, I mean, I think this is --

it's a really big deal, and so I appreciate the debate that we are having as it works through this.

I did have one, maybe two questions I was hoping, Mr. Chairman, I could get clarity to, and then maybe, based on that, I could provide some feedback or a recommendation --

CHAIRMAN LA ROSA: Yeah, please.

COMMISSIONER FAY: -- on what was put forward.

So I think on the civilian side, the validity of micro, SMR and/or, I call them OG regulators, but nuclear regulators, but the larger versions. It looks like DOE provided some direction, and I have page 19 in the report as a note, but that tries to categorize what these plants are as far as size and what category they fall into. And so I think that it looks like a thousand -- around a thousand megawatts you fall into these larger nuclear reactor, and then you jump down to 50 to 350 for the small modular, and then below 50 for the micro.

I want to get your thoughts, but I think there is more than one opinion kind of where these lines are drawn and maybe what would be included in there as far as you have this gap from a thousand to 350, and what are those, and where do they fall? Just

maybe if you have any clarity as to who is weighing in on that, and if DOE is kind of the primary source to set those parameters.

MR. HINTON: Eric, you want to take a crack?

MR. WOOTEN: Yeah. Well, it depends on which -- there are various definitions. So, like, DOE has one -- these categories are a little bit squishy, and so, like, the new scale SMR, you know, they have -- each core module produces 77 megawatts, but they could have up to 12 of them in one plant, and so then you are going, you know, closing to a thousand. So we just picked this particular definition to be consistent in the report, but it's a little bit squishy.

COMMISSIONER FAY: Yeah, and maybe we would be able, to your point, just to recognize there are other definitions out there. I mean, I am not trying to knock DOE. I understand, though, that this, you know, federal entity, which I think, you know, it appears that all federal entities are in question right now, but, you know, we will take it for what it's worth, but I think there is other opinions out there with where that lands.

I just don't want the Legislature and the Governor to see our directive on this as being this

limited sort of description as to here's how each one of these fall into what category, because I just think that target is moving.

And then, you know, in addition to that, as you get down to the micro, it says less than 50. Just so I understand, it seems like, from the report, the -- and you see this in the lawsuit with Last Energy. You have these educational institutions that are utilizing a very small version of a training reactor, and they essentially, from what I can tell from the report, they fall into some of the same regulatory requirements, including $100,000 a year to the NRC just to train those individuals in the academic setting. Is it -- if you are a one-megawatt training reactor, you still fall under the NRC, is that accurate?

MR. WOOTEN: I think so.

COMMISSIONER FAY: Okay. And so -- yeah, and so then maybe just some clarity as to who is included in that jurisdiction of the NRC, because I think -- it seems like there is debate both of them, the Texas-Utah lawsuit, and just in general as to what is a microreactor? And if it's at a university level for educational purposes, it

sounds like, from what we can tell in the report, UF has one, and arguably may be one of the best in the country. Do they fall into all of this regulatory structure to perform that action? I mean, it seems ridiculous, but it seems like maybe they do at this current state.

So just maybe clarity as to that. And I am not asking you to predict what happens with the Last Energy lawsuit. That's in the courts, and they will make a decision on that. But I do think that would give me some clarity, just so we are not misleading or, you know, sort of setting a parameter that maybe is, like you said, it's just a little squishy. It's not quite there. I think that would probably be helpful to not, you know, arguably set the parameter that then moves six months afterwards, and we are trying to address that change.

CHAIRMAN LA ROSA: Yeah, I think we have seen already some states even changed their laws because they have maybe prematurely jumped ahead and classified a definition of an SMR, and had to go back and change that. That was another thought I had as I was reading through this. I don't -- I think we are too early in that stage to start to

set parameters, so that's a great point to catch.

COMMISSIONER FAY: Yeah. And, Mr. Chairman, maybe our staff can confirm, but I just -- when I looked at it on the civilian side and what it entailed, I mean, once you got under a certain level because of the siting board and the requirements, I mean, it seemed like we are -- Florida is in a good position already to treat those differently. There is arguments maybe as to exactly how the statute would look, or exactly how the policy should look. But I think we are in a descent posture to say, we are not going to make you jump through a bunch of other hoops that don't apply based on the size. And it does appear that some states don't have that structure, and maybe that's why they are moving quickly to change.

So I actually think we are in a decent posture knowing that we have this debate do you want to be first or second or third? Where in this time period do you want to be? I think if we needed to make some tweaks -- we being the state of Florida, the Legislature, the Governor -- want to make some tweaks, then I think they probably would have time to do so in a way that's not kind of a knee-jerk reaction.

And I am not trying to be critical of these other states, but I think the idea is they can make those changes, and the idea is that it would drive some of these big entities to then invest and build in their state.

And we saw with solar, that the Commission, before I got here, made the wise decision to say, that all sounds great, but economically, it doesn't make sense. And then we saw as the years went on, it became much more viable, and then we started seeing projects that put us on the plaque for what we were investing in. And the good part is that's when I was here, so I got to support those.

But those are tough decisions for commissions to make when you are not sure how the evolution of those costs will look. So I appreciate all of that.

Mr. Chairman, I do have just a few comments on the fill military side, but I can wait --

CHAIRMAN LA ROSA: No. Please.

COMMISSIONER FAY: Okay. So on the military side, I -- yeah, I think we all recognize, you know, we have 20 bases. We have this report that's out there, Department of Energy and NARUC that looks at Eglin. I think, from my perspective, this

really is where I worry that we could potentially miss an opportunity.

I mean, when you look at the -- just go back through the history of our country, telecom, energy evolution, all the things at that we have seen, Bell Labs is a good example, you have this regulated monopoly structure, this vertically integrated structure, and then you -- because you don't have the market structure out there, there is this argument that there is not as much innovation, that sort of thing. I just disagree with that wholeheartedly.

I think you have these skilled people -- in particular, FPL has these nuclear facilities they are running in our state right now that just have extensions. You have those skilled people, and then you have a military base that has knowledge of these sectors that we don't really even know what level that goes to. And that's great for our safety, but it seems like if you are able to combine that in some way. And the report talks about the EASS model -- EaaS model, I think that's really where there is this opportunity that hopefully I think our policies and the law would not get into the way of because of the federal DOD

or an actual facility would be able to move forward, but I'm optimistic that we are included in that analysis. Because as you said, I was surprised when I read the report to see where DOD was moving that we weren't -- there wasn't a base within Florida that was included kind of in that microreactor discussion and I have no idea what the reason that might be, so I'm not going to speculate.

But I did think, based on some of the information that we have out there with our military bases that we would be a good option going to the future. And maybe that will work out for us because there is others that will be first. They will work out those kinks, and then look to some of our larger bases for structure.

But I really do feel strongly that our utilities do a really good job on the resiliency side, and so if anybody is going to be able to partner and develop this, however of that contracts will look, and expand in this area, it seems like some of our utilities and DOD and federal agencies would be able to come up with a really good product. And what we saw like with Bell Labs in telecom, you have this innovation that you wouldn't

have otherwise. And I think that's possible here that will literally change our -- it will change our kids' lives. It will change the way we control energy in our country, the independence that we have. I mean, I think -- I don't want us to miss that opportunity, so I just -- I think that is the only place where we need to be very conscious of our statutes and our decision-making, because if the military does move forward with something like that, I don't want us to be excluded because we are perceived as, you know, being a state that is not interested in this type of expansion.

I know it's controversial. I get that nuclear will remain controversial. But I just don't want to signal in any way that we would not be supportive of something like that based on the defense report and then this report.

CHAIRMAN LA ROSA: I mean, listen, that's a great point, and frankly, part of the emphasis as cyst of what we have been asked.

COMMISSIONER FAY: Yeah, they are specific in that point, to your point.

On the civilian side, you know, there is all kind of debate what that looks like and the economics. But on the military side, that

directive was clear, I mean, when you read that. Commissioner Graham pointed it out. So I think, yeah, we might not be able to get a consensus for a report, right, to state our position.

As to how that would -- how was positive or negative that would be moving forward, that might be a decision that we see a docket on at some point. But I do think, based on our comments publically, it sounds like everybody is pretty open to some version of that if we were to see it.

And the hard part on the -- this is my last point, Mr. Chairman. On the defense resiliency report for Eglin, it's something that our staff worked on. It's something that a lot of people -- I mean, you know, there is all these people listed in the DOE and NARUC report trying to find a way to create this mechanism.

The most challenging part of all of that, not just our state and others, was it came down to DOD and NARUC, and these utilities looking at this potential investment with the inability to know how a commission is going to rule. And that's wild. I mean, the amount of money and time that goes into that investment, and the uncertainty for them to know is this something that the Commission will

find valuable enough to support going forward?

And some of them were lucky enough to see that the project hasn't gotten off the ground, and we weigh in, and we had a rate case where we did that. But some of these other projects, if we wait too long, it might not be there. And I think, you know, the investors and the utilities have to make decisions on those things, and we can't guarantee anything in our decision-making. But I do think it sounds like we have some general optimism as to what this could do for our state.

And so those are all the comments I had, Mr. Chairman. I do think we are tech driven in our state. We have access to the Space Coast. We have lot of reasons why these people might potentially want to come here, but we will be faced with the economic question if they decide to do so. And I don't want to go any further on that, because I don't know what that project would look like.

CHAIRMAN LA ROSA: Yeah. No, and I think that's certainly a thought that each one of us have. I know I certainly do. But to many of your points, I think that's where conclusion in our recommendations maybe become divided in the sense that we conclude on a lot of the points that you

are making because they are inconclusive, or these are things we have -- that have to -- that you have to know that you have to answer them, maybe have to be further investigated, right, that leaves the reader with the understanding saying they got it. They are directing us here. Maybe it's not a recommendation of where to go, but it is a recommendation in the sense of saying there is a question here. There is substance here that still has to be figured out. And I think the more and more we dig into it this, I think that gets, frankly, larger and larger and larger. So I think you made phenomenal points, all which are important and shouldn't be ignored.

COMMISSIONER FAY: Yeah. And maybe we can include one more -- like, I know South Carolina had a long-term investment and it didn't pan out for them. Like, maybe to your point, those fail -- those failed examples are something that will educate us.

CHAIRMAN LA ROSA: I will stick by the comment I made earlier to UF and PURC, is that if you are not learning from failures, then you are failing, right? You have to -- we have to learn as professionals, as whatever realm you want to talk

about, you know, students, as athletes, as whatever, right, you have to learn from failure. So we would be maybe a little bit silly if we didn't recognize when it helps out and that we can learn from.

COMMISSIONER FAY: And we can never be accused of being biased because this is, like, love University of Florida day, like, we have loved on them so much today, and it's just, I mean --

CHAIRMAN LA ROSA: How much did it burn?

COMMISSIONER FAY: -- killing me.

CHAIRMAN LA ROSA: When you had to give accolades to UF --

COMMISSIONER FAY: I mean --

CHAIRMAN LA ROSA: -- I saw you kind of stutter a little bit.

COMMISSIONER FAY: Yeah. Well, you had your Miami socks on and UCF Knight --

CHAIRMAN LA ROSA: I don't, but I am going to wear them this week.

COMMISSIONER FAY: Fair enough. Yeah. I mean, being one of the only on e-the only facility in the country potentially for that digital version of that, I mean, we should be proud of. Yeah.

Thank you, Mr. Chairman. I appreciate the

leeway.

CHAIRMAN LA ROSA: No, listen, and thank you to all the Commissioners. Obviously, this is still a work in progress.

I will come back to Mary Anne on a question that we had asked, and then we can maybe kind of set up a framework for moving forward.

MS. HELTON: Mark and I have been talking about this, and I wanted to confer with our experts on the Sunshine Law to make sure that my reaction about having a point person, you know, come back to -- the report come back to a point person on the Commission, I didn't feel good about that. The lawyers have confirmed for me, and actually Mr. Futrell has confirmed for me that that might not be such a great idea.

So I think if each of you want to work individually with the staff and talk -- flesh out mover your comments today, or if you have any written comments, or if they wanted to come talk to you about the comments you made today, that's perfectly fine. But I think we need to -- the staff itself needs to incorporate all of those comments into a later draft and bring it back to a meeting so that it can be talked about in the

public. I don't think that a commissioner can be assigned to kind of assimilate all of the comments and work through them. That makes me uncomfortable.

CHAIRMAN LA ROSA: No. Well, let's get comfortable. So let's do that. Let's get comments -- I think there has been a lot of comments, frankly, shared today, maybe more than you anticipated, but, yeah, so let's take obviously what we talked about today, any other comments that we maybe -- we may have, let's get those to staff, and maybe with some expectation, not to put an exact day on it, that it gets back to us in which we can review in very similar fashion as we did, you know, for preparation for this meeting.

I know I will like to sit down at some point once we have -- those have been digested, and then I will let all each Commissioner, you know, do that accordingly as they wish, and then we can be prepared for next month's IA in a similar fashion as we were for today.

MR. HINTON: Very good.

CHAIRMAN LA ROSA: Does that make sense?

MR. HINTON: Chairman, if I could, before we move on, I want to particularly thank Ian

Guidicelli and his team over at the Division of Emergency Management, Hastings Read and his folks over at DEP for their help with this report.

And in particular I want to thank and acknowledge the assistance of DOE's Gateway for Accelerated Innovation in Nuclear, GAIN is what they go by. They reached out to us in the very beginning, and when we were looking at this going, I think we are going to have to hire somebody. They showed up and offered their expertise, and it was their participation through this project that really allowed us to pull this off.

CHAIRMAN LA ROSA: Well, and thank you for bringing that up. And as they are also directed to coordinate with this in this process, yeah, thank you for mentioning that. That is extremely valuable.

Did you have another thought, Commissioner Fay?

COMMISSIONER FAY: The only thing I would say, Mr. Chairman, is I will be happy to meet with the staff. I will did, for my comments, and some of the positions I made today, I mean, that -- that's inclusive of everything that I have as far as a change in the report, and so I am happy to meet

with you from a technical perspective and just make sure I can provide clarity for everything. But I, you know, knowing the complexities of the legal process in putting out a report, and the face we are a commission, I don't -- I will not be imputing anything -- nay additional information based on what I had here today.

CHAIRMAN LA ROSA: Okay. No. And that's a good point. So -- I mean, in all fairness, you know, let's not take too much time if we do have additional thoughts. You know, I would say just, you know, roughly seven days from today let's make sure staff has any other comments so to be fair to them so that you guys are the runway you need to assemble. I don't want -- I don't want you, in the last hour, getting comments, I will say from me, right? That's not fair from my office to yours.

MR. HINTON: I appreciate that. We are going to start working on this tomorrow.

CHAIRMAN LA ROSA: Yeah, I imagine so. No. No. No. I get it. But as Commissioners, let's try to get them those comments ASAP and kind of draw that artificial deadline seven days from now.

MR. HINTON: Thank you.

CHAIRMAN LA ROSA: Awesome. Thank y'all.

We have still got more business to do. So let's move on to our legislative update. I see Mr. Franks approaching the table.

MR. FRANKS: Hey. Thank you, Mr. Chairman. Good morning, Commissioners.

I just wanted to highlight some of the bills I am currently tracking. I will start off with Senate Bill 354, titled Public Service Commission by Senator Don Gaetz. This bill does not yet have a companion bill, and it is still with Regulated Industries. So not much development there. Staff is wrapping up their analysis for this bill, so we should have that to your offices shortly.

Moving on to Senate Bill 330, residential utility disconnections by Senator Lori Berman. This bill has not yet been placed on agenda for the Regulated Industries yet either. There is -- there has been an identical House companion bill filed, which is sponsored by Representative Debra Tendrich. The committee's of reference for this House Bill are Economic Infrastructure, Civil Justice and Claims and Commerce. So I will continue to keep you updated on that bill as well.

Senate Bill 344, which is the TASA bill by Senate Anna Maria Rodriguez will be heard today.

It's on the agenda for today's Regulated Industries Committee. Technical staff will be present in case there are any questions.

There was an amendment filed yet, yesterday, but it was just technical -- some technical changes and some added clarity.

The House companion bill HB 435 has not yet been placed on an agenda for Economic Infrastructure Subcommittee.

And then since my last update, there is two bills that I am looking into and currently tracking. I just wanted to briefly touch on them, but I am still kind of working through them, and I will be able to give you a much more elaborate review of them.

The first one is Senate Bill 700, titled Department of Agricultural and Consumer Services by Senator Keith Truenow. This is an agricultural bill, but it does have some sections that have caught my attention. For example, there are some provisions regarding electric utility facilities that are located on agriculturally zoned land.

This bill does have a companion bill, HB 651 by Representative Kalee Tuck. But these bills do not have -- have not been assigned any committees

yet. So keeping close eye on that one, and I will be able to give you a little bit more information as I move through that.

And then the other bill that was filed since my last update was House Bill 621, State Renewable Energy Goals by Representative Anna Eskamani. This is similar to a bill she's filed in the past. The aim is to have net-zero carbon emissions statewide by 2051. This bill has not received any committee references yet, and does not currently have a companion bill. And I will continue to look through that one as well and give you a little bit more of an update for my next one.

And then lastly, yesterday, the Joint Committee on Public Counsel Oversight voted in favor of Walt Trierweiler to continue his role as Public Counsel for a four-year term.

That concludes my update. I am happy to answer any questions. Thank you.

CHAIRMAN LA ROSA: Awesome. Thank you. Thank you for your update and your perspective. You bring up a good point that sometimes a bill includes something but maybe doesn't have a direct affect on us today, but as you know, as we all know, that sometimes that changes in the process.

Thank you for that.

Commissioners, any questions?

I do -- I believe we are still waiting for some analysis from our staff here to get to --

MR. FRANKS: Correct.

CHAIRMAN LA ROSA: -- to the Commission on some bills that were filed a few weeks back, so looking forward to those when those they are finished, obviously, and those will work its way through its process.

Awesome, well, thank you.

MR. FRANKS: Great. Thank you.

CHAIRMAN LA ROSA: I am going to take a quick five-minute break. I do anticipate -- I do -- I am planning to get the General Counsel's report. I know we have a presentation, but if we -- I just want to make sure we give -- we give -- I will look to Keith because Keith is not giving me that same look -- I am sorry, the General Counsel has a presentation. Yeah. So let's take a quick five-minute break and then we will jump right back into it. Awesome. Thank you.

(Brief recess.)

CHAIRMAN LA ROSA: All right. I think we can kind of get back and get rolling.

So we will go to our General Counsel's report, and, Keith, do you want to tee us up with where we are going?

MR. HETRICK: Sure. Thank you, Mr. Chair.

As we discussed, I do have a report today for the Commission. And in keeping with what I think has sort of developed into a theme of education, training and research, I would like to briefly talk about education and training within the General Counsel's Office today. It's one of the things we don't often highlight, but it's a very important issue I think.

And as I went back and looked at our involvement and our encouragement for our lawyers, and how we handle education and training, we see that -- give it -- it's -- we are pretty deeply involved in that.

Education and training obviously benefits the recipient, but it must also be directly relevant to and benefit the Commission. This is what I call targeted training. And what I mean by targeted training is specific training that will deepen an attorney's knowledge base of relevant specific subject matter, or will improve the attributes and specific skill sets of an attorney relative to the

job duties.

I am also a big proponent in our office giving back; that is, our office administering and conducting in-house training for others.

Now, let me give I just a few examples of how we encourage training in our office, and what we do. We support and offer attorneys the ability to improve their knowledge and craft as lawyers in energy law by attending targeted conference training events, many of which are associated with NARUC, many of you are familiar with. These conferences are intended to both broaden and deepen the knowledge in the many aspects of energy law as it relates to, primarily to the electric, gas and water and wastewater industries. This includes both mechanics and best practices, as well as big picture topics in particular industry-wide issues over the day.

For example, over the years, we have sent some our lawyers to the Wisconsin Rate School, as well as the Clearwater Rate School. There is also the New Mexico Center for Public Utilities of Albuquerque, New Mexico I know you have heard of, that annually offers in the spring what I think is a very good basics practical regular training

school for four days in the topical areas of which we regulate.

However, all these types of broad-based but in-depth courses can only be attended in our office by an individual that really has some experience. And by that, I mean when they are ready. If you send a new attorney immediately to a course like the rate school in Clearwater, they are not going to absorb the information. They won't understand anything that's presented to them. So they need to struggle with and get in and grapple with these issues for about a year before we actually send them to a rate school.

I think most of our attorneys have been to the rate school by now. We have had some longevity in our office now, and pretty stable group of lawyers, so we send them to these events as they are needed, not just as a routine matter.

So the New Mexico course also -- and I know Commissioner Graham and many of the Commissioners here have been to the New Mexico course on current issues, which occurs in the fall. It's a practicum more of larger issues in the industry. And, again, I think that's useful for the Commission from our perspective in terms of sending an attorney, but

only for knowledge gained by a really experienced attorney who can apply that specific knowledge of Florida law to the current issues events.

In other words, it's important to understand how Florida law and the Commission practice and policy might impact current issues. And that, I believe, is relevant to the Commission.

Where the industry is moving is not -- and I use Suzanne Brownless. She's been around a very long time. She will be able to put those issues in perspective and come back, and we can utilize that information in a way that ultimately benefits our resources and the Commission's knowledge.

Of course, we are active in sending people to PURC. We have three attorneys attending this year. I am always a big proponent also of having as many our attorneys attend the annual Pat Dore Administrative Law Conference. And we've had lawyers attend and participate in the Administrative Law Sections Trial Academy.

I am a big proponent the NCRA. That's the National Council of Regulatory Attorneys, which I think is an affiliate of NARUC in some fashion. That group focuses on -- an annual event, three- to four-day intensive legal training session for

lawyers across the country who mostly -- who all practice in public service commissions. And the issues deal with practice, procedure, substantive legal issues in all aspects of energy law, and issues facing PSCs throughout the country.

And Art Graham will recall that we hosted and organized one of the events and the location back in 2016 in Tampa, the Florida -- our Florida PSC sponsored that event when it was in Florida back in 2016. This year's event is being held in Raleigh, North Carolina, and myself and a few lawyers will be attending that event.

The NCRA does provide a wonderful opportunity, I think, for lawyers to interact with other PSC lawyers around the country, and glean ideas and understanding of what's going on in other states and other similar energy issues of importance. It enables us to better react to and have context in dealing with Florida specific issues that come before you.

And most of all, I think lawyers can -- for them, they can fulfill a bunch of their three-year CLE requirements by receiving up to 24 to 30 hours of continuing legal education from the Florida Bar, which is a huge benefit.

We support one course, and you might have heard this in the past, we support for new lawyers Scott Hempling's annual course on the Basics, Fundamentals and Foundation of Utility Law. And our newly hired attorneys have an opportunity to volunteer for this course.

And I say volunteer, because it's generally a 10-week long course beginning in mid-January that meets once a week in the evening, so they have to volunteer their time, usually Monday evenings, for two hours at a time -- they make sure it doesn't coincide with football season -- for two hours at the time to learn about the history, theory and basics of economic regulatory law. And this includes three to four hours of reading homework per week.

I took the course a couple years ago. I brought a prop. This was the book we had to read. It seemed like a lot to me, but if you do 20, 30 pages a week for 10 weeks, you can get through this book. And then you will have excerpts of his own information, you know, his own themes that he wants to impart to students from his other book, and you get excerpts out of that.

So we have had a handful of lawyers that have

volunteered, which I think underscores the commitment our lawyers have to really -- their dedication to and learning about energy law, and being better at the jobs that they perform. And we also get significant CLE credit for this course.

Finally, we encourage our lawyers to participate, at their own expense, in the Government Bar Association. You might have heard of that. It's for the lawyers, I think Gabby and Andrew, I think they put on a monthly one-hour course a week. Lawyers from all over the region attend. It's usually Capital City Country Club. It's a live, of course. But they also do sometimes, instead of putting that event on, and you buy your own lunch, but the courses are free for those who are a member of that section of the Bar. And I think the charge for that annual fee is, like, $25, $30. So it's a really good event. You can pick up -- a lot of lawyers can pick up a CL -- one hour CLE every month. But it's usually a pretty good presentation that occurs during that event.

They also do webcasts. So not all of it is live at the country club. But it's a good, you know, from 12:00 to 1:00, you can have your lunch

and then watch a good presentation on -- an update on the legislative session, or some administrative law issue that's of interest, or sometimes they will do an energy law. Sometimes something, you know, could be the bid protest process or something. But our lawyers, I think, are involved and go and attend those functions as well.

I would say about half of our training is live and in person, and the other half is on-line by the way of webcasts, as applicable. And we do think about that. We think about whether someone should attend by webcast or live, and what the advantages are of attending live versus a webcast, so -- and sometimes we will purchase a course and put it on in Room 362 upstairs on the third floor, and that course will, you know, cost $100, but we will have 10 attorneys in there for an hour, or however long a course is, listening to that course, and they can all receive CLE credit. So we encourage you, there is a lot of training, ongoing training that constantly occurs in the GCL's office.

In addition to receiving training, we also focus on training ourselves and others outside of GCL. An example of training ourselves is that we will often get an attorney to volunteer to teach a

one-hour, what we call lunch and learn training session. And that lawyer will prepare and organize that course, get approval from the Florida Bar, and then for that 50 minutes, come in and everyone will bring their lunch, and -- or Mary Anne and I will buy everyone's lunch, and then they will come in and enjoy lunch and listen to this presentation.

And we had the ability to bring in very notable outside speakers too to those luncheons to volunteer and can come into the Commission and make presentations for those lunch and learn sessions.

Of course it doesn't happen as often as I would like it to because of time permitting. It does take a lot of time and effort to put on those courses. And, you know, there is the work schedule as well that everyone has to work around. But I think the important thing is that we are not shy on volunteers to do those courses. And that, again, shows the commitment of all the lawyers in our office to want to participate and contribute back.

Finally, on -- oh, some ideas that we have talked about for future lunch and learn sessions include deposition objections and practicing before the Commission. Show cause proceedings. That would be someone in Adria's section. Teaching a

course. We haven't had too many of those lately before the Commission. It would be a great refresher for those courses.

When we do these courses, we would send a notice out to your office, too, so that your aides can participate, and you can even participate and come to these courses for -- and have -- participate in lunch and learn.

Draft post-hearing recommendations, that's a hot topic today, a hot topic for a variety of reasons. Points of entry and standing is always an issue, and various aspects of rulemaking pose a lot of current events topics that improve the knowledge base of our lawyers to provide better products.

Finally, on occasion we have sponsored and conducted the trainings of others throughout the Commission. The most recent example I think you will recall is ethics training. In past, that's been conducted by aid Adria Harper, but now being conducted by Doug Sunshine and Susan Sapoznikoff in our office.

In the past year, we also put on a course out of Samantha's operation for one of our technical divisions, the Economics Division, on the preparation of CERCs, which is the statements of

estimated cost. That's a big thing that all agencies have to do in the course of rulemaking.

Currently, we are in the process of preparing a two-hour course for all of our technical divisions in the PSC having to do -- and this is a very timely topic -- with witness -- PSC witness preparation in a hearing. This is an example of a PowerPoint we are going to have in that course. But that course is also going to turn -- have some live examples of cross-examining witness, and so it's going to be a very hands-on and interesting course. I think everyone will benefit from it. Again, your offices will be notified of that. Ryan Sandy is the lead attorney on that project right now. And we are very proud of him, because he has got a ton of trial experience coming from the Department of Health, and a lot of administrative law experience.

But to summarize, at the end of the day, I believe it's extremely important for us to be as knowledgeable as possible in order to give you the best well-rounded advice possible. Teaching -- training furthers this goal. In addition, I think training offers a sense of self worth. It also supports the development of knowledge and

self-confidence of the lawyers themselves, and it furthers their job satisfaction and careers to know that they are constantly improving their craft.

Of course, I always encourage our lawyers to let me know what their training interests might be to enhance their skills as lawyers. And believe it or not, they are not shy about that. And I will give you a great example of targeted training.

A while back, one of our attorneys who was interested and just didn't have the foundation, was pretty insecure about just having -- taking depositions and cross-examining witnesses, so she wanted to further those skills. And so we actually decided to send her, and she welcomed this opportunity, to a two-day intensive deposition training school in Miami. And she came back with a demonstrable skill, and her confidence just ballooned when she undertook those activities, and that stayed with her for the rest of her time here at the PSC.

So that's kind of our -- my overview. You know, we support it. We encourage our attorneys. We do it in a targeted fashion, and we also would like to give back. And our attorneys constantly volunteer to undertake those efforts, and they have

a lot of fun doing so.

To shift gears a bit, but as a further example of GCL's ongoing commitment to education training and its benefits, I would like to introduce Adria Harper to talk briefly -- and I know this is going to be short -- about the Southern Chapter of the Energy Bar Association, and just what that is.

But I would like to recognize her involvement in that group, and especially how she came to be involved in that group. And in a word, she volunteered. And that's a key thing you have heard me say a couple of times. Our attorneys volunteer to teach on their own these seminars, to put forth the effort. And again, she came and volunteered. She volunteered both for her benefit, and that of the Commission. She wanted to advance her knowledge of energy law regulation and policy on specific topics through being educated and exploring different viewpoints on those topics. And she also wanted to build connections with other commission staff around the country. And in so doing, we obviously received the benefit of her knowledge and experience on import -- issues of importance to the Florida PSC.

Now, if any of you know Adria, you know that

she's not one to sit on the sidelines and just learn. She also wants to contribute. So when she came to me a year ago asking if she could participate on the board, obviously, I am pretty supportive of that involvement as long as it doesn't interfere with her work responsibilities, which it does not, and she would never even have approached it with that. But apparently she's done such an outstanding job with her involvement, that she has been voted the President Elect of that organization for this coming year. So congratulations, Adria, on your rapid rise to President Elect, I think.

COMMISSIONER GRAHAM: Did you miss a meeting?

MS. HARPER: Something like that.

MR. BAEZ: There is a sorry there.

MR. HETRICK: Yeah, I -- at this point, I am just going to hand it over to her and let her tell you why she's pretty energized about this group, and why she thinks this organization is a worthy group and can further our collective knowledge on energy law issues.

CHAIRMAN LA ROSA: Thank you, Keith. You had us at buy us lunch, by the way.

Adria, go ahead.

MS. HARPER: Okay. Hi, everybody, and thank you for having me, and thank you, Chairman, for inviting me to speak to you briefly about this. I will not keep you from lunch. I will make this speedy. We already had wonderful presentations today.

I will go ahead and let now that the Energy Bar Association is something I am participating in. It's a little bit different than PURC. PURC is more of an academic type based research organization. The Energy Bar Association is more so a group of energy law professionals, and so we have all different kinds of people that are involved, organization -- that work for organizations, government agencies, FERC, consulting organizations. So basically anybody that's a practitioner in energy law can benefit from being part of the association.

Like PURC, like NARUC, it is educational based. So the focus is on creating dialogue about energy issues. So there is a national organization that sort of oversees various chapters. It's been around for a long time. It's -- the Energy Bar Association has been around since the '70s. There is a Canadian chapter, a chapter specifically in

Louisiana, because they deal with a lot of oil and gas. So there are regional chapters that focus on educating on their region, and so their events and their publications focus more on those areas, which is what I like about it, we can learn from others, but we can also have more targeted training events and presentations for the area. So there is one in the midwest. There is one in the northeast. There is one in Texas. And that's sort of an overview there of what they are.

Now, as the President Elect of the Southern Chapter, I work with a lot of folks from the south. So that would be Florida, of course. The Southern Chapter also includes Alabama, Arkansas, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee, Virginia and West Virginia. So I have had the opportunity to meet other Commissioners from those areas. Public Counsel from those areas, and practitioners before the commissions in those areas.

The current overall President is Mr. Connor Ward, but next year it will be Floyd Self, who you guys know, who is a practitioner here. So that will be interesting. And we, again, are -- this is just a little bit about the board membership and

responsibilities, which, again, is pretty much educational in how the board nomination process works.

As President Elect of the Southern Chapter, my focus has been to work on our annual meeting, and then I will be focusing on the student organization -- student -- or student -- getting student engagement in the organization is what I should say.

That's one of the things I really like with the EBA. There is various steering committees, including a senior attorney mentorship kind of committee, and then there is one that specifically focuses on student engagement and mentoring them.

And so along with the Chairman's interest in educating students, and so forth, I think it's a great avenue to do that. And I am looking at involving not just students that are interested in law school, but also technical aspects of regulatory practice. So hopefully we can get more student engagement, not just from law students, but others as well.

So some of the things that they offer that are educational besides the annual event that I mentioned, which this year will be in Richmond in

March, but we are -- there also are energizers that are both for students and for practitioners that are more informal. And then there is things that are virtual for those that would prefer to watch things from their computer. And then there are also publications and even a pod cast.

So if anybody is ever interested in participating or sharing their knowledge, whether it be providing an interview, or a publication, whether it be a Commissioner or staff, they are always looking for ways to discuss what things are interesting to people all around the south. So there is a lot of opportunity through the webinars. There is on-line education, on-line -- or on-demand education events, on-line and lots of different ways to get involved.

My goal as President Elect will be to have more participation from, hopefully, Florida, and get our viewpoints and our research that we need done out there. And so I am hoping to see more Commissioners or staff at some of our events, whether they are virtual or in-person.

I personally have benefited from meeting other regulators and picking their brains on how they do things in their states, so it's fun to meet other

Commissioners. And there is even people from FERC and other areas that you can really get an interesting sounding board on how they do their things over there, and it's very educational.

So I am hoping there will be opportunities for staff and the Commissioners to get involved should they so be interested. And if anybody has any questions for me, notice I put the President of EBA on there and not put my name. Y'all know where to find me, though, but Jack is the one who handles a lot of the staff and helps me out a lot with organizing stuff. So if you are ever interested in getting involved or having me do a presentation through here, through us, however you want to do it, just let me know and I will work with Jack and we will make it happen.

Are there any questions? I tried to do that really quick because I know everybody is --

CHAIRMAN LA ROSA: I will just make the quick comment. Thank you for your leadership in this. And any time we can highlight what we are doing in Florida and how, you know, Florida can learn, that's always a positive. And I think we lead the nation in a lot of things because we have got, you know, motivated individuals in organizations, and I

hope that we are a big part of that, and certainly it you are as well by taking leadership on in this regard.

A healthy membership of students, something like 14 percent, or so, is what I read.

MS. HARPER: Yes.

CHAIRMAN LA ROSA: That's awesome. Well, obviously, you know, you touched on how I share that similar sentiment, but good job. Good job.

MS. HARPER: Thank you.

CHAIRMAN LA ROSA: I think she called on us, by the way, to get more involved. I heard that --

MS. HARPER: Well, I know you participated in the past, and we appreciate it. Unfortunately, this year, the -- well, fortunately and unfortunately, the event is on March 20th, which is when we have IA, so I will be there, but if you finish IA in time, we will have a presentation on nuclear, State of the States. And we will have one on data centers in utilities, and well as some other interesting topics. So if you get done in time, you can always listen in virtually.

CHAIRMAN LA ROSA: Commissioner Graham is itching to say something.

COMMISSIONER GRAHAM: A few quick questions.

Number one, how are you guys funded?

MS. HARPER: They -- it's -- well, these that's a good question, and it's through membership. So we have to get members. And then also, like, educational events. So there is -- some of the educational events are free. Some of the webinars that they offer, and student membership is actually free. But everybody else pays a membership, and that's how it's funded.

COMMISSIONER GRAHAM: All right. Second question is, with some of the hurricane damage that we saw go north of us, still in the southeast, are you guys talking about things about that? You know, because I am sure a lot of those people are dealing with things they never had to deal with, the flooding issues and the storm damages.

MS. HARPER: Yes, we are. And actually, we have a panel that we are working on that's on emergency communications, and we are working on getting some people from North Carolina that dealt with the Asheville situation on there. And so we are. We are looking at topics like that.

COMMISSIONER GRAHAM: And do you guys deal with -- because I know we have talked about this so many times over the last 15 years. When we talk

about people coming in from other states to help us here with Florida, you have the munis and you have the co-ops and you have the IOUs. Initially before, we weren't sharing resources because of different law things. Do you guys deal with that, or are you currently dealing with that?

MS. HARPER: Well, we do have -- we definitely have -- I wouldn't say on this year's agenda there is a presentation specifically on that, but that is something that people are looking at, because we have had the hurricanes here, the fires in California, the winter storms here. So there is -- there is definitely an interest in having more research, education, presentation on collaboration and working together on these kind of emergency events.

COMMISSIONER GRAHAM: Thank you.

CHAIRMAN LA ROSA: Awesome.

Commissioner Passidomo.

COMMISSIONER PASSIDOMO SMITH: I just want to put a plug out for this organization. I was a student member in law school, and it is really beneficial for -- you see from the student membership the percentage, but, like, I distinctly remember, there is a thing on the EBA website.

Basically you post on there, I am a student, or I am a young practitioner, whatever you are, looking -- I am looking for a mentor. And I did this when I was at the Department of Energy, so I was living in DC. I put that up, and I had a flood of really intelligent and experienced energy attorneys that reached out to me, and I had coffee with five or six of them, and just explained to me their -- and they all had very different stories about how they got to where they are as partners of these really impressive law firms.

But it was just really beneficial that it was very organic, and they weren't -- they were just volunteering their time to talk to me and they, you know, it wasn't -- it wasn't a trade of -- I wasn't looking for a job. I had already committed, I think, to working here. It was really just to get a different -- to hear their experiences. So, yeah, like maybe -- for all those students that are listening in on our IA, go -- yeah, definitely use that resource, because.

CHAIRMAN LA ROSA: Both of them?

COMMISSIONER PASSIDOMO SMITH: Yeah, both of them. Definitely use that, because it's a really great organization and they really -- they open it

up for a lot of different options, so thanks for your involvement.

MS. HARPER: Thank you.

MR. HETRICK: So between Commissioner Passidomo and Adria, do you think we could recruit at least one or two more attorneys?

COMMISSIONER PASSIDOMO SMITH: Working on that.

MS. HARPER: Always on the hunt.

COMMISSIONER PASSIDOMO SMITH: Right. Thanks, Adria.

CHAIRMAN LA ROSA: Awesome.

MS. HARPER: Thank you.

CHAIRMAN LA ROSA: Thank you very much.

MR. HETRICK: That concludes my report, Mr. Chair.

CHAIRMAN LA ROSA: Awesome. Well, good job, and thank you very much for the depth and helping educate us a little bit for sure.

Executive Director.

MR. BAEZ: It's always me that's standing between everyone and lunch.

COMMISSIONER GRAHAM: Yes.

MR. BAEZ: Two real quick things. Again, to repeat, PURC starts tomorrow. See many of you

there. Drive safely.

We are currently finalizing dates, I think it was mentioned earlier, Ted Kury had given us a nice shout-out, the Commission a nice shout-out, that we are currently finalizing hurricane workshop for this year sometime in late May.

Also, I would put a plug in to Madam President Elect, you know, we do meetings down here too, and I know we are always ready to host, so if there is ever anything we can do to help out.

And lastly, also bears repeating, Commissioner Fay did agree with me. I don't even remember what it was on, but it's on the record, and I can't let that one go by.

Thank you all. It was a great meeting.

CHAIRMAN LA ROSA: The record will reflect that in bold.

MR. BAEZ: And italic hopefully.

CHAIRMAN LA ROSA: All right. Commissioners, any other thoughts or discussion points?

All right, well, thank you all for your participation. Thank you for staff, if we haven't said it enough. I know the nuclear report was a great discussion, and there is a lot of work that goes beyond that, literally months in the making.

And I look forward to working with everybody in these next couple of weeks to polish it off, so thank you all for everyone that contributed today, and we will see that this meeting is adjourned. Thanks.

(Proceedings concluded.)

CERTIFICATE OF REPORTER

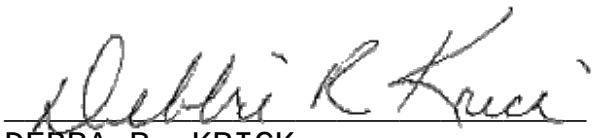
STATE OF FLORIDA)
COUNTY OF LEON)

I, DEBRA KRICK, Court Reporter, do hereby certify that the foregoing proceeding was heard at the time and place herein stated.

IT IS FURTHER CERTIFIED that I stenographically reported the said proceedings; that the same has been transcribed under my direct supervision; and that this transcript constitutes a true transcription of my notes of said proceedings.

I FURTHER CERTIFY that I am not a relative, employee, attorney or counsel of any of the parties, nor am I a relative or employee of any of the parties' attorney or counsel connected with the action, nor am I financially interested in the action.

DATED this 6th day of March, 2025.



DEBRA R. KRICK
NOTARY PUBLIC
COMMISSION #HH575054
EXPIRES AUGUST 13, 2028