

Clean Nuclear Energy for Industry: The Case for SMRs and Microreactors in Puerto Rico

Presented by:

Shannon Bragg-Sitton

Luis Reyes

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Ivan Lugo



ANS Webinars



GAIN

Gateway for Accelerated
Innovation in Nuclear

GAIN WEBINAR SERIES



GAIN Clean Nuclear Energy for Industry Webinar Series highlights the innovations in nuclear energy and associated integrated-energy options that may be beneficial to a wide range of industrial applications.

The intent is to develop connections between the nuclear community and the energy end-use community to communicate the benefits of **clean, reliable, and resilient nuclear energy.**



Shannon M. Bragg-Sitton, PhD

**Lead, Integrated Energy Systems
Idaho National Laboratory**

Objective of the Clean Nuclear Energy for Industry Webinar Series

- **Objective:**
The **GAIN Clean Nuclear Energy for Industry Webinar Series** highlights the innovations in nuclear energy and associated integrated-energy options that may be beneficial to a wide range of industrial energy applications.

The intent is to develop connections between the nuclear community and the energy end-use community to communicate the benefits of clean, reliable, and resilient nuclear energy, allowing a discussion on requirements, considerations and concerns for energy system planning at “end use” facilities.

Past Webinars

- **Part 1: Kick-off**

April 16, 2020

- Introduces innovations in nuclear energy and associated integrated-energy options that may be beneficial to industrial energy applications
- Focuses on near-term demonstrations of nuclear integration with hydrogen production at existing nuclear plants – ongoing projects

- **Part 2: Advanced Nuclear Technologies**

May 29, 2020

- Features high-level presentations on the unique capabilities of advanced reactor technology concepts, highlighting key operational features, options to support industrial users, and potential deployment timelines.

- See <https://gain.inl.gov/SitePages/GAINWebinarSeries.aspx> for slides, webinar recordings and Q&A.



DESIGNING FUTURE ENERGY SYSTEMS



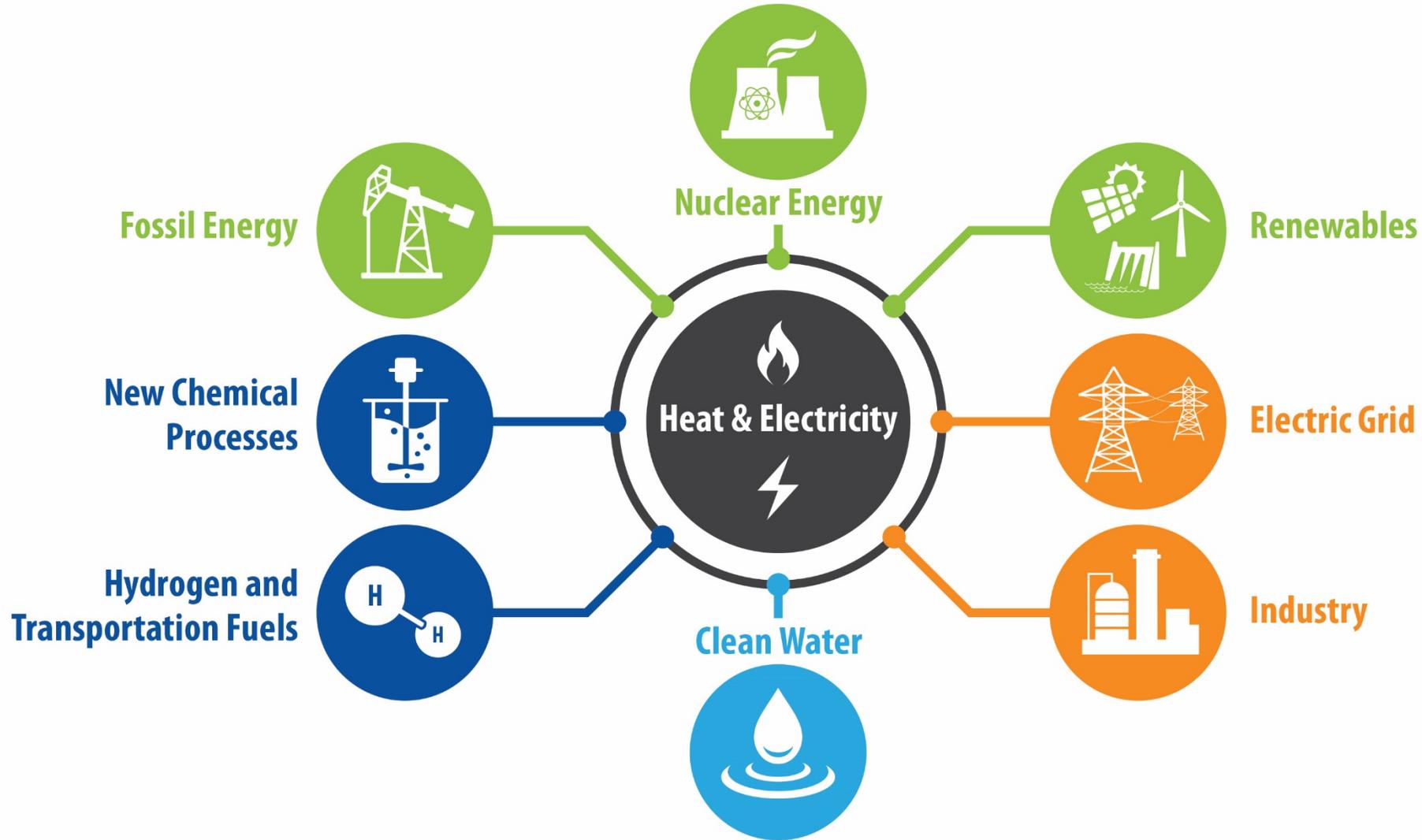
What goals are we trying to achieve?

How will energy be used?

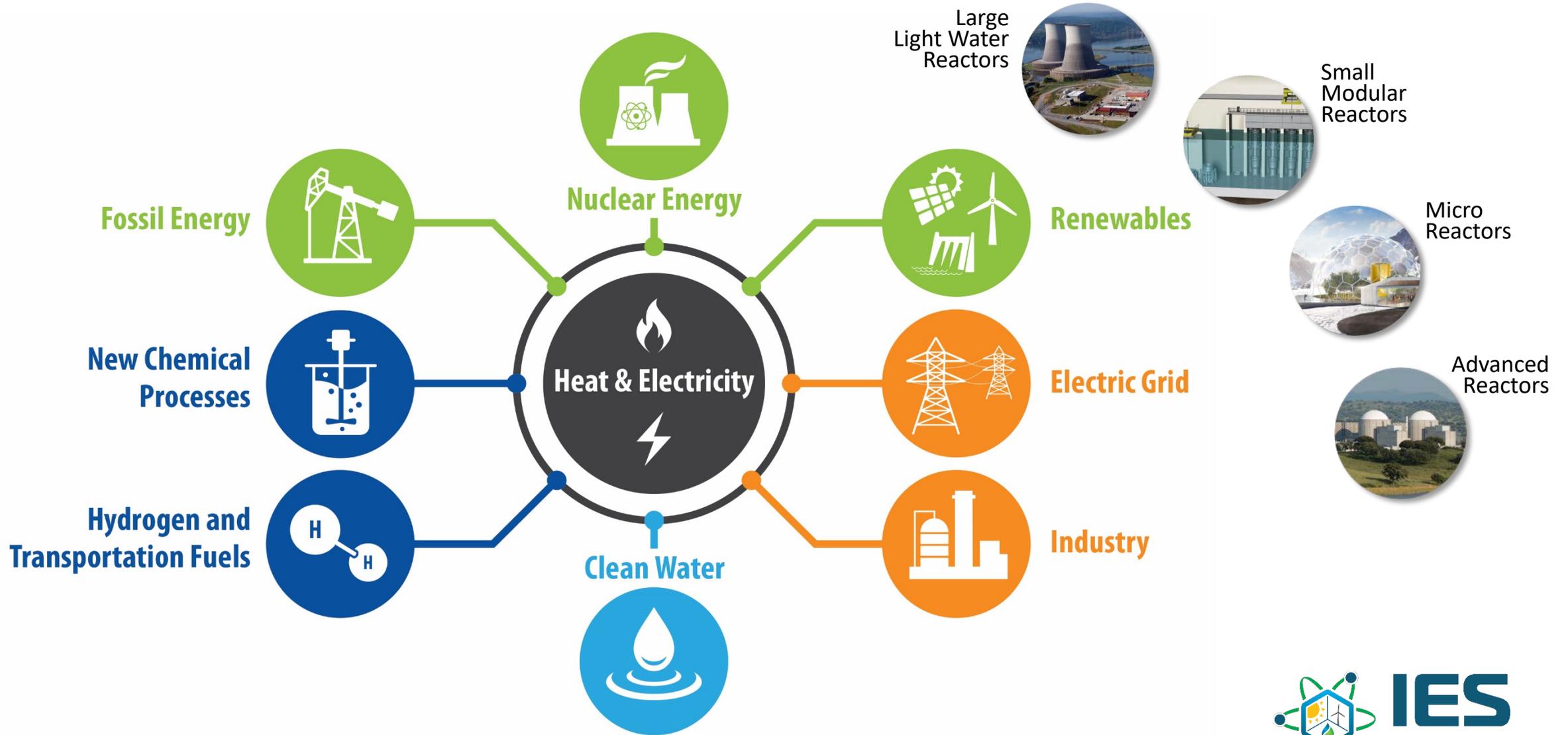
What role(s) can each energy source fill?



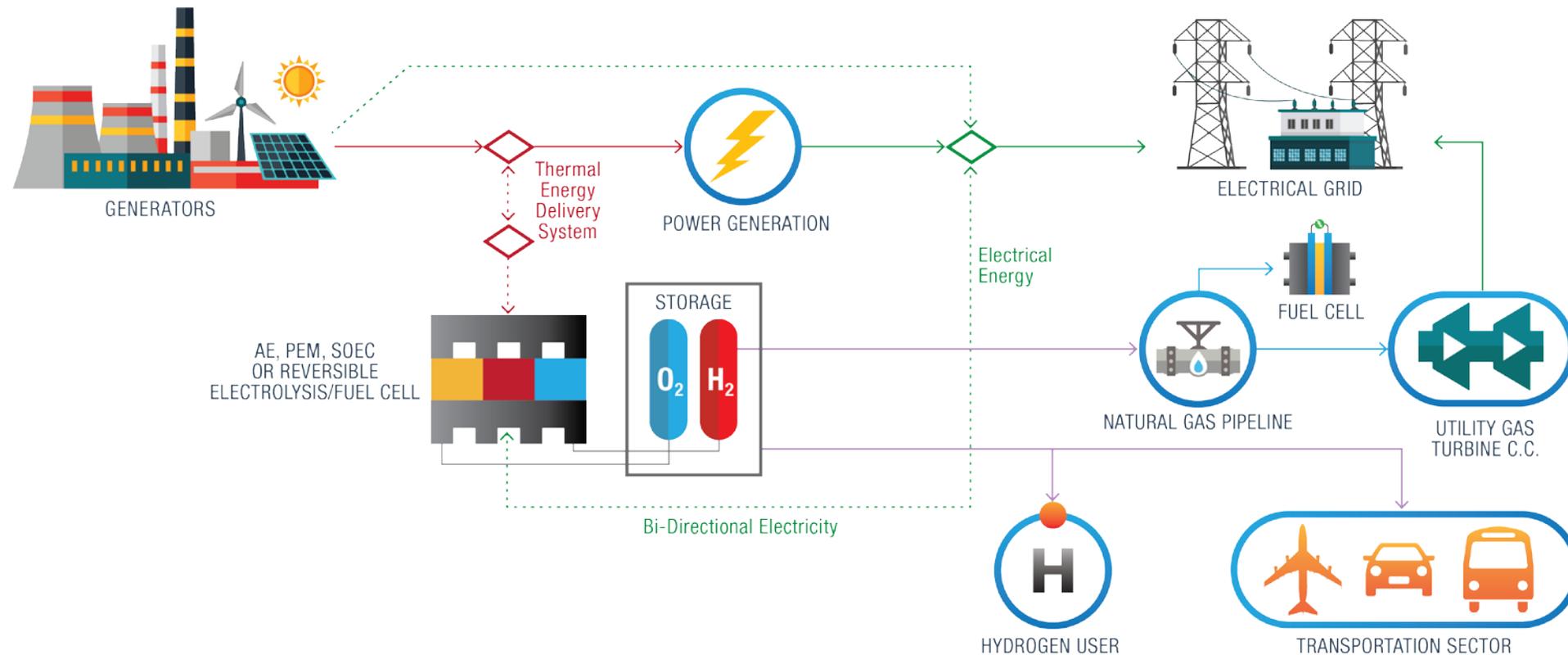
IES: Using Energy Effectively and Efficiently



IES: Using Energy Effectively and Efficiently



Example: Hydrogen Production via Electrolysis



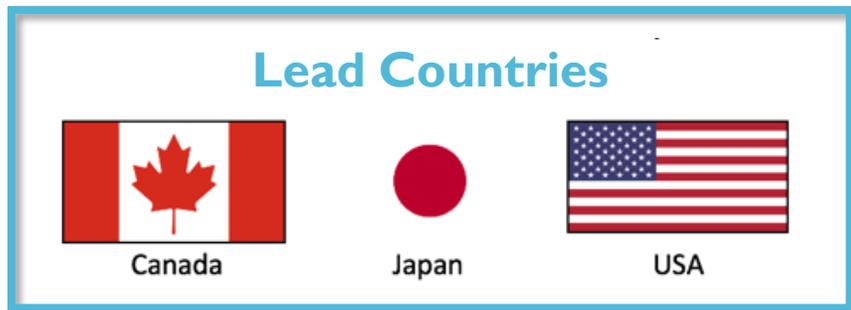
Why support multiple processes/products beyond electricity?

- 1) Provides second source of revenue
- 2) Provides energy storage, for electricity production or hydrogen user (e.g., chemicals and fuels synthesis, steel manufacturing, ammonia-based fertilizers)
- 3) Provides opportunity for grid services, including reserves and grid regulation

Nuclear Innovation: Clean Energy Future (NICE Future) — an initiative of the Clean Energy Ministerial



Initiatives under CEM are a country-led and opt-in partnership. The NICE Future initiative explores the potential for nuclear energy uses, innovations, and greater systems integration to accelerate progress toward clean energy goals.



Participant Countries



External Partners

- International Energy Agency
- OECD Nuclear Energy Agency
- International Atomic Energy Agency
- International Framework for Nuclear Energy Cooperation
- Generation IV International Forum
- ClearPath
- Third Way
- Energy for Humanity
- Energy Options Network
- Women in Nuclear Global
- International Youth Nuclear Congress
- Nuclear Industry Council
- Nuclear Energy Institute
- World Nuclear Association
- American Nuclear Society
- Electricite de France

More information on the NICE Future initiative is available at www.nice-future.org.

Nuclear Innovation: Clean Energy Future (NICE Future) — an initiative of the Clean Energy Ministerial



The CEM NICE Future initiative envisions a world in which nuclear energy innovations and applications advance clean energy goals. The initiative recognizes there is **no one-size-fits-all solution** to energy and fosters collaboration among clean energy supporters in exploring diverse solutions, including nuclear energy technology solutions, both electric and non-electric, for clean, integrated, and reliable systems of the future.

Researching innovative solutions
(photo: research lab)



Exploring innovative applications for advanced nuclear systems both electric and non-electric.

Engaging policy makers and stakeholders regarding energy choices for the future.



Talking with diverse audiences
(photo: stakeholder discussion)



Leveraging diversity of talent
(photo: research scientist)

Pooling experience on economics, including valuation, markets structure, and ability to finance.

Communicating nuclear energy's role in clean integrated energy systems and developing the nuclear workforce of the future.



Sharing the vision with future generations
(photo: student tour of lab)

Focus Areas



How do you envision meeting future **CLEAN** energy needs?



Image courtesy of GAIN and ThirdWay, inspired by *Nuclear Energy Reimagined* concept led by INL.

Download this and other energy park concept images at:
<https://www.flickr.com/photos/thirdwaythinktank/sets/72157665372889289/>



Luis Reyes

Chair, Technical Advisory Board
Nuclear Alternative Project

Former, Executive Director of Operations
U.S. Nuclear Regulatory Commission



Eddie M. Guerra, P.E.

Co-Founder
Nuclear Alternative Project

Senior Engineer
Arup



ANS Webinars

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i americannuclear





Ivan Lugo-Montes

Executive Director
INDUNIV

Part 1

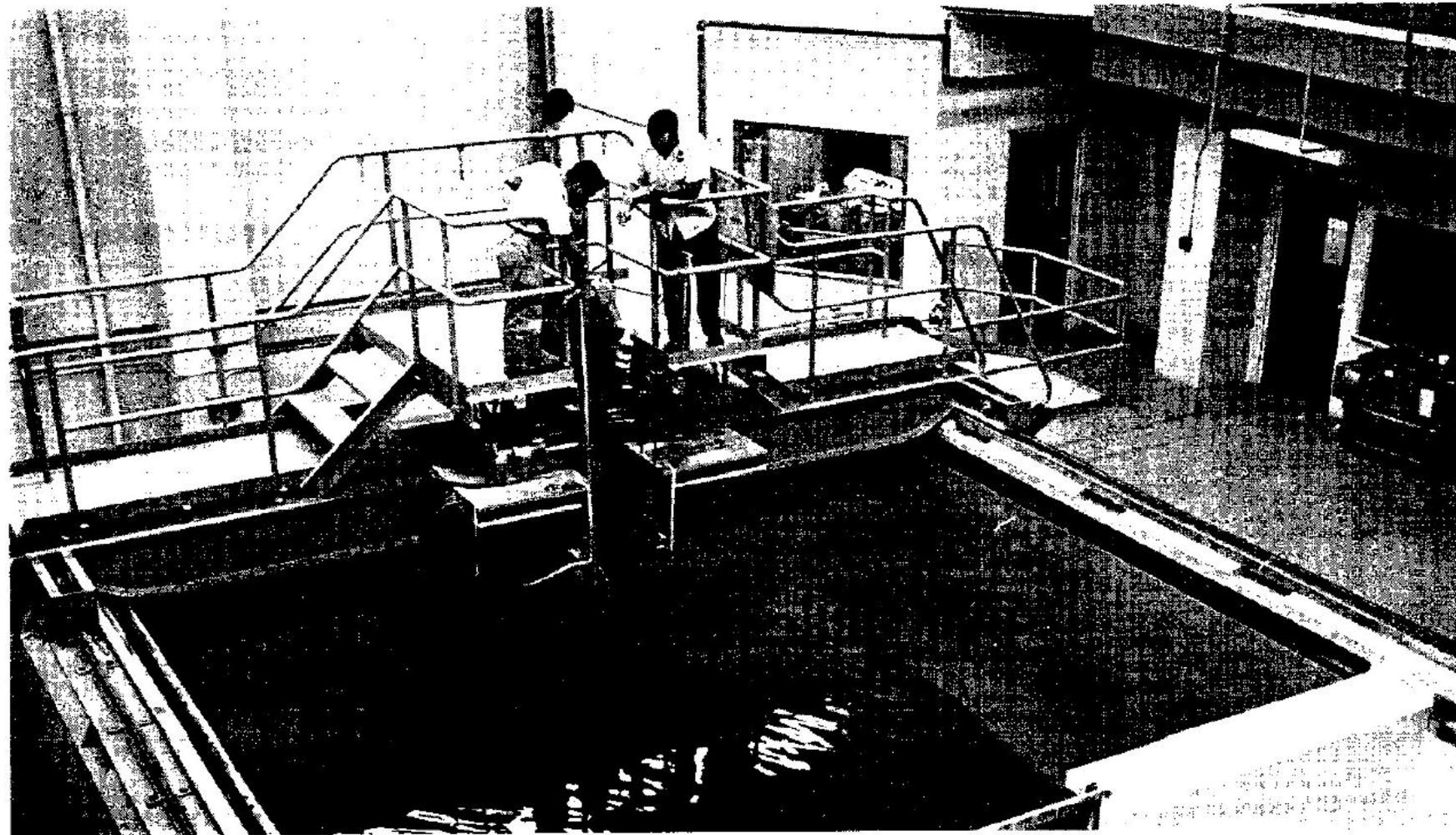
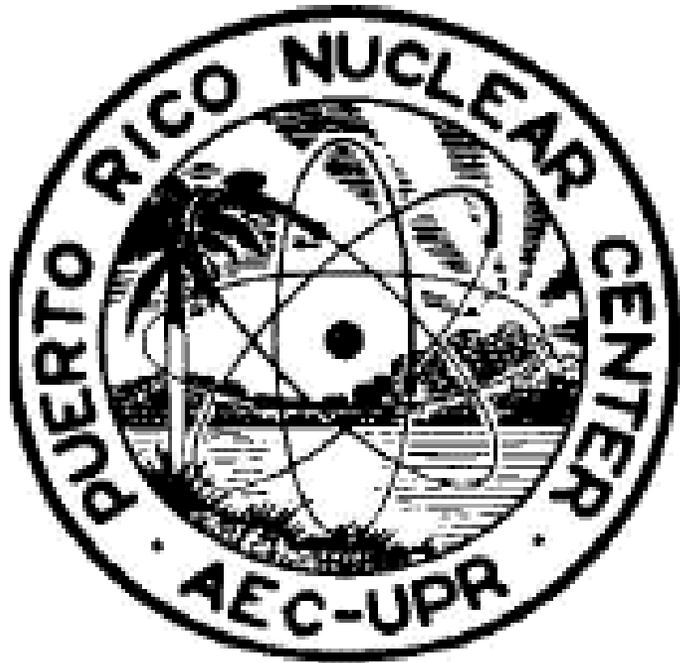
Puerto Rico's Rich History in the Nuclear Field



1946 Atomic
Energy Act
Establishes the
Atomic Energy
Commission
(AEC)



1957 University of Puerto Rico (UPR) signs contract with AEC

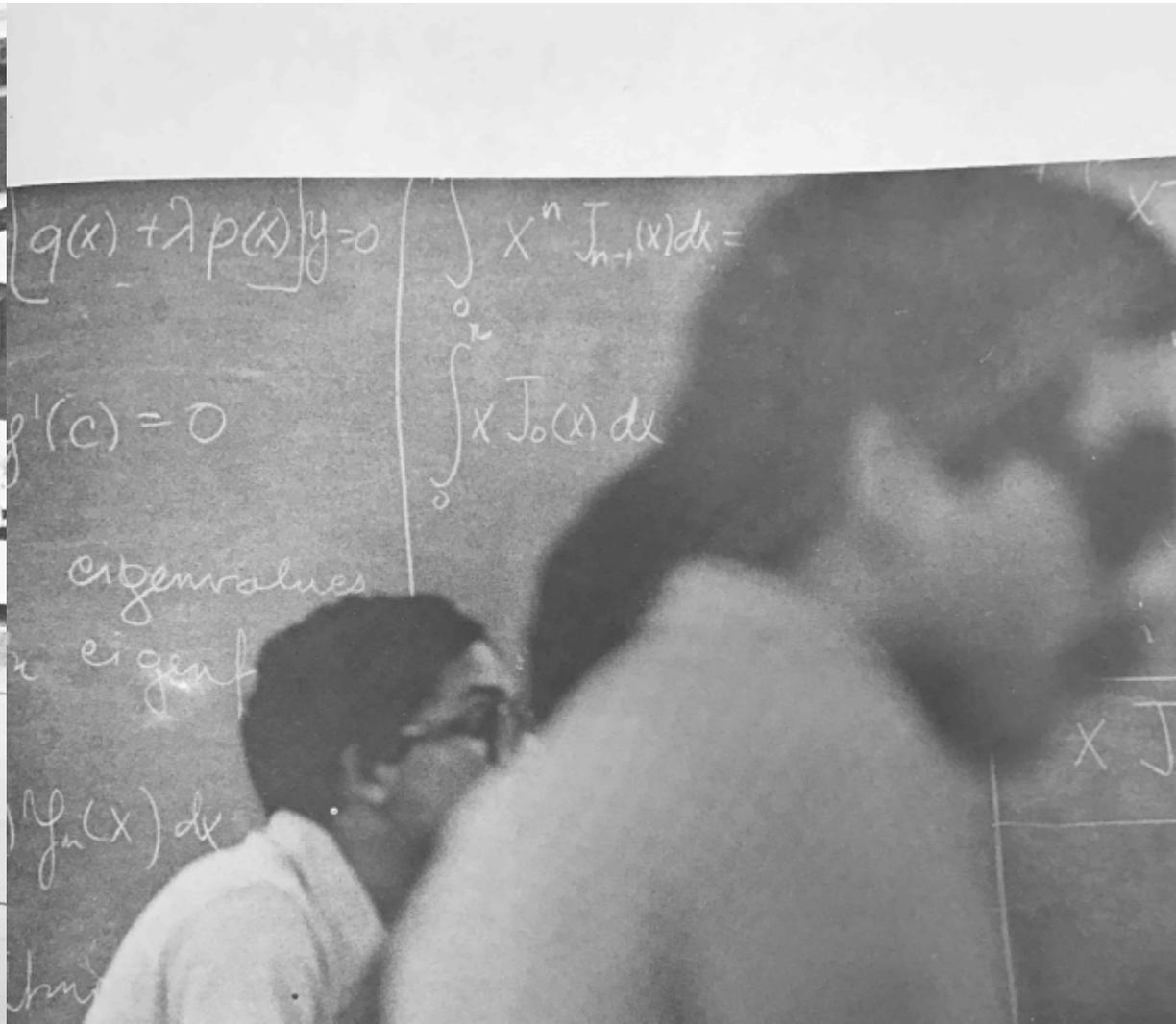


VIEW OF P.R.N.C. POOL REACTOR LOOKING TOWARD BRIDGE WITH CONTROL ROOM VISIBLE IN THE REAR

1960 Bonus Reactor Construction Starts



1970 Nuclear Engineering Dept established at UPR Mayaguez Campus



Construction Application to USNRC for a 600 MW Pressurized Water Reactor (NORCO PROJECT)

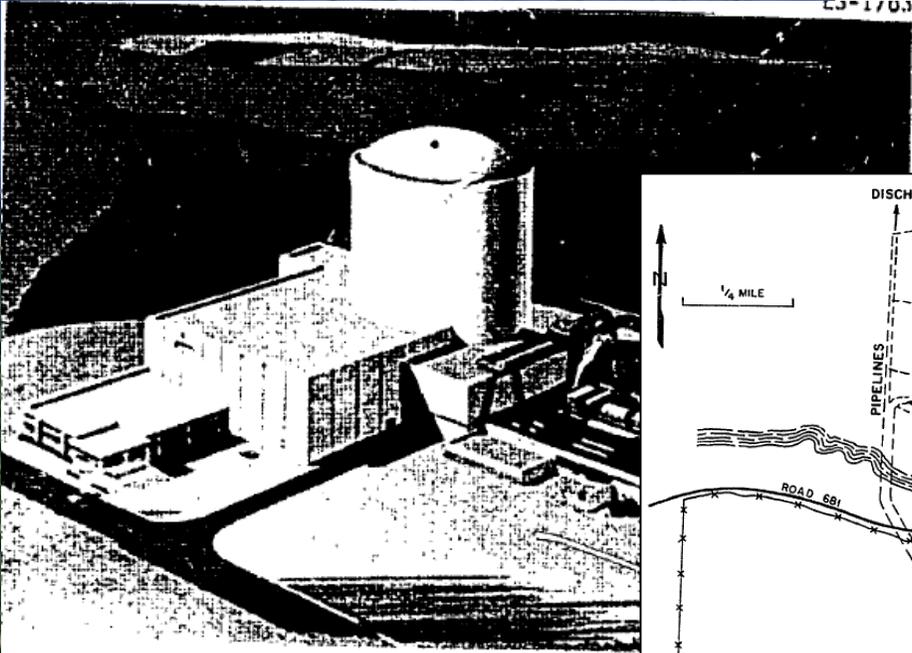
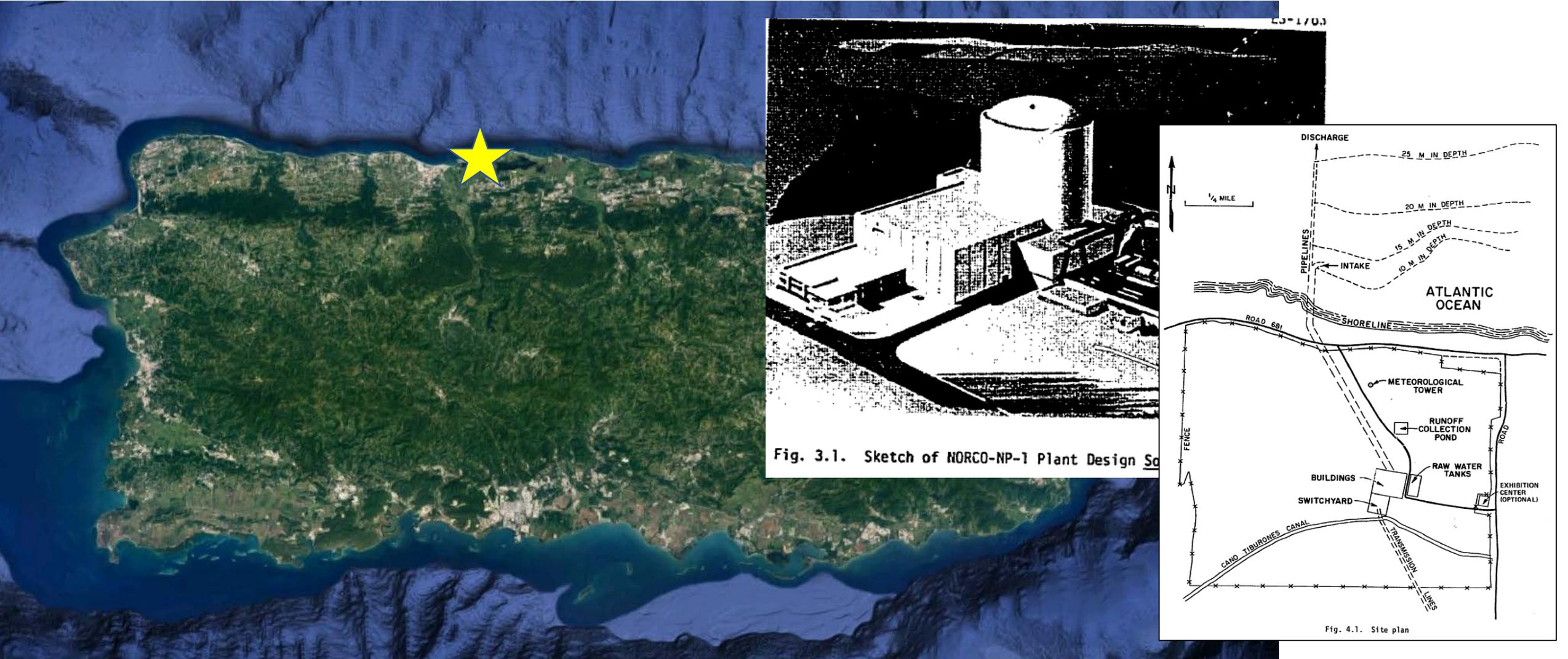


Fig. 3.1. Sketch of NORCO-NP-1 Plant Design

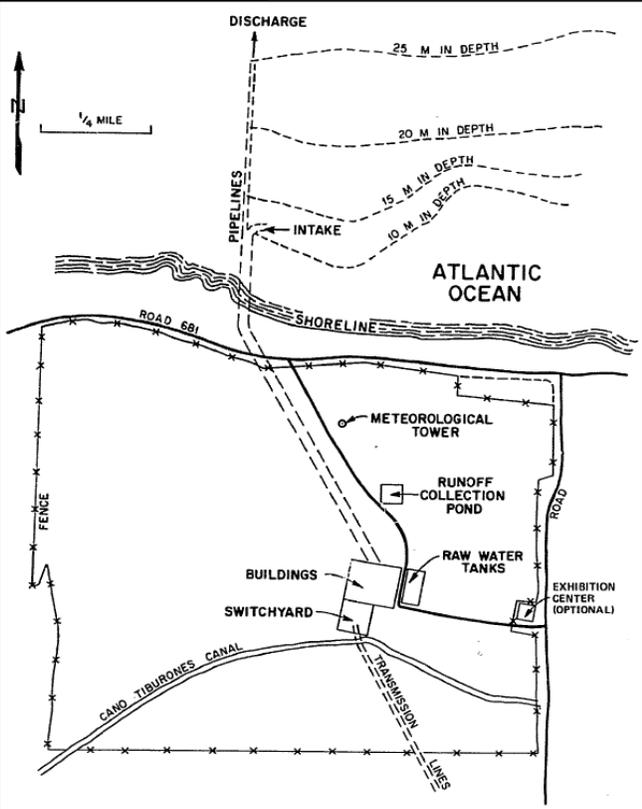


Fig. 4.1. Site plan

1980 National Academy of Sciences Study

Interim Report
of the

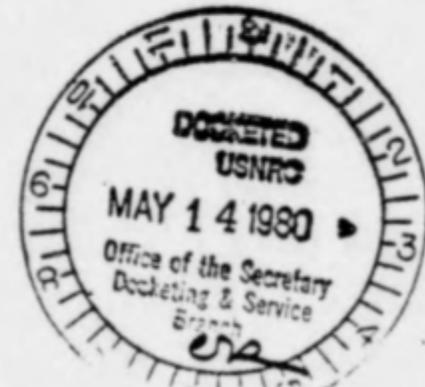
Committee on Future Energy Alternatives for Puerto Rico

poned indefinitely in 1975. At this stage of its deliberations, the Committee believes that it would be advisable to preserve the nuclear option as a possible component of Puerto Rico's future electric power system, but for the next major addition to generating capacity, considerations of both scale and timing rule it out. A plant of over 600 megawatts' capacity (approximately the minimum economic size for a nuclear plant) would be undesirably large in relation to the total capacity of the WRA system. Unless economical small nuclear plants become available, it will be at least two decades before the Puerto Rico system becomes large enough to accommodate a nuclear unit.

Furthermore, as a practical matter, it would probably be impossible to complete a nuclear power plant by 1990. In addition, the relevance of the nuclear option to Puerto Rico is likely to depend on the clarification of national policy in several respects, notably the procedures for siting and licensing plants, ensuring safety, and providing for spent fuel management and waste disposal.

For these reasons and those set forth in Section IV, we recommend

Energy Engineering Board
Assembly of Engineering



2006 Grants Provided to UPR for Nuclear Engineering related course development and Instructors training



NRC NEWS

U.S. NUCLEAR REGULATORY COMMISSION

Office of Public Affairs Telephone: 301/415-8200

Washington, D.C. 20555-0001

E-mail: opa@nrc.gov

Site: <http://www.nrc.gov>



No. 08-141

August 1, 2008

NRC AWARDS NUCLEAR EDUCATION GRANTS

The Nuclear Regulatory Commission has awarded nearly \$20 million to 60 different institutions in 28 jurisdictions to boost nuclear education and expand the workforce for nuclear energy. Congress provided NRC with \$15 million to supplement NRC's grant program.

The 88 grants are for faculty development (\$7.8 million), education scholarships and graduate fellowships (\$6.4 million), university curriculum development (\$4.7 million), and trade school scholarships (\$.75 million). Recipients included Minority Serving Institutions and Historically Black Colleges and Universities. They are located in 26 states, the District of Columbia and Puerto Rico.



2015 Puerto Rican Engineers in the U.S. Nuclear Industry Launch The Nuclear Alternative Project



Interest from Leadership in Puerto Rico



2010 Senate Energy Commission
 Larry Seilhammer
 Senate Resolution 890
 Called to study feasibility of large nuclear plants



2016 CIAPR President
 Ralph Kreil Rivera (Now Chairman of PREPA Board of Directors)
 Proposed SMRs as an option to Puerto Rico's energy needs



2018 House Speaker
 Gabriel Rodríguez-Aguilo
 Resolution 1189 to study the feasibility of SMRs and Microreactors

Cámara de Representantes de Puerto Rico
Resultado de la Votación para la Medida R. de la C. 1189 Informe Resultado: 27X MAY 13 Aprobada
 en la votación número 1 efectuada el miércoles, 7 de noviembre de 2018
 Celebrada el miércoles, 7 de noviembre de 2018

Representante	Voto
Alonso Vega, Néstor A.	A favor
Aponte Dalmás, Javier	Ausente
Aponte Hernández, José F.	Ausente
Barrón Armenta, José A.	A favor
Barrón Aragón, Carlos	A favor
Barrón Ramos, Angel	A favor
Charbonier Chirino, Lidia	A favor
Charbonier Laureano, María Milagros	Ausente
Claudio Rodríguez, Manuel O.	A favor
Cruz Berges, Ramón Luis	A favor
Diez Valle Colón, Nelson	A favor
Diez Valle Colón, Nelson	A favor
Díaz Collado, José Aníbal	A favor
Fernández, José J.	A favor
González Mercado, José O.	A favor
Hernández Álvarez, Ugovaldo	A favor
Hernández Montañez, Rafael	A favor
Lacorté Turo, Félix O.	A favor
Labron Rodríguez, Yashira	A favor
López De Armentia, Brenda	A favor
Martínez León, Diego	En comite
Más Rodríguez, Marcumar	A favor
Molina García, Angel	Ausente
Moreno Ortiz, José Enrique	Ausente
Morales Nájera, Carlos J.	A favor
Morales Siles, Laila	Ausente
Miranda Rivera, Guillermo	A favor
Montes Rodríguez, Juan O.	A favor
Núñez Abad, Manuel A.	Ausente
Navarro Siles, Jorge L.	A favor
Otero González, Jesús Manuel	Ausente
Otero Lugo, Luis R.	A favor
Pardo Otero, Víctor L.	A favor
Pérez Ramírez, Angel R.	Ausente
Pérez Rodríguez, José J.	A favor
Pérez Otero, Luis	A favor
Quilones Harray, Michael Abiel	A favor
Ramos Rivera, María de Lourdes	A favor
Rivera Otero, Rafael	Ausente
Rivera Raza de Poma, Roberto	A favor
Rodríguez Aguiló, Gabriel	A favor
Rodríguez Hernández, Jacqueline	A favor
Rumbal López, Wilson J.	A favor
Sarda Rodríguez, Jesús	A favor
Santiago Ocasio, Pedro Julio	A favor
Silva Torres, Arlene L.	Ausente
Torres Cruz, Luis Raúl	A favor
Torres González, Víctor M.	A favor
Torres Zayas, José E.	A favor
Ventura Fernández, José M.	A favor
Virgas Rodríguez, Raimundo	Ausente
Vega Ramos, Luis R.	Ausente

Certifico correcto conforme a nuestro mejor conocimiento.

Elizabeth Stuart Vilanova
 Secretaria de la Cámara

Urbano Trinidad Hernández
 Secretario en Funciones

ORIGINAL

GOBIERNO DE PUERTO RICO

18va. Asamblea Legislativa
 4ta. Sesión Ordinaria

CÁMARA DE REPRESENTANTES

R. DE LA C. 1189

INFORME POSITIVO

de noviembre de 2018

A LA CÁMARA DE REPRESENTANTES DE PUERTO RICO:

La Comisión de Asuntos Interiores de la Cámara de Representantes de Puerto Rico, previo estudio y consideración de la R. de la C. 1189, de la autoridad del representante Rodríguez Aguiló, tiene a bien someter su informe recomendando la aprobación de la medida, con las enmiendas incluidas en el entrellado electrónico que se acompaña, y cuyo título lee:

"Para ordenar a la Comisión de Gobierno de la Cámara de Representantes de Puerto Rico, realizar una investigación sobre la conveniencia y necesidad de establecer en Puerto Rico plantas nucleares para producir energía; las nuevas tecnologías modulares para el diseño y operación de las mismas; sus características de seguridad; y para otros fines relacionados."

ALCANCE Y ANÁLISIS DE LA MEDIDA

La Resolución de la Cámara Núm. 1189, tiene el propósito de realizar una investigación sobre la conveniencia y necesidad de establecer en Puerto Rico plantas nucleares para producir energía; las nuevas tecnologías modulares para el diseño y operación de las mismas; sus características de seguridad; y para otros fines relacionados.

2019 DOE awards The Nuclear Alternative Project funds to study advanced reactors in Puerto Rico

THE NUCLEAR
ALTERNATIVE
PROJECT

Preliminary Feasibility Study for Small Modular Reactors and Microreactors for Puerto Rico

May 11, 2020

Prepared for the U.S. Department of Energy
under Contract No. 226818



THE NUCLEAR
ALTERNATIVE
PROJECT

For a Better Puerto Rico

In 2015, The Nuclear Alternative Project (NAP), a non-profit organization comprised of Puerto Rican engineers, embarked on a journey to inform the people of Puerto Rico about the technological innovations of advanced nuclear reactors and their capabilities. In the aftermath of Hurricane Maria, where more than 3,000 deaths were attributed to the lack of electricity and basic services, our educational effort evolved into one of need – to evaluate the feasibility of advanced nuclear reactors for Puerto Rico.



As nuclear industry engineers and professionals we have labored to maintain the safety of nuclear reactors in the United States. We are using this same passion and knowledge base to assess the feasibility of advanced nuclear reactors to address Puerto Rico's pressing energy needs.

This document presents the results of a preliminary feasibility study developed with the support of partners and industry advisors. This report delves into the potential advantages of advanced nuclear deployment by exploring market and infrastructure conditions, legal and regulatory aspects, public interest and potential applications.

NAP is grateful for the support from the U.S. Department of Energy Office of Nuclear Energy and the Idaho National Laboratory for their sponsorship in developing this study. It is our hope that this report serves as the beginning of a transformative project for the U.S. nuclear power industry, a young generation of engineers, and for the people of Puerto Rico.

For a better Puerto Rico,

The Members of The Nuclear Alternative Project



Angel A. Reyes Jessabel I. Rivera Jesus M. Nunez Valene Lugo Eddie M. Guerra

Preliminary Feasibility Study for Small Modular Reactors and Microreactors for Puerto Rico
Report No. 20-0001 Rev 0
May 11, 2020

3

Part 2

Feasibility Study for Advanced Reactors for Puerto Rico



Our Study: What we covered?



Technology



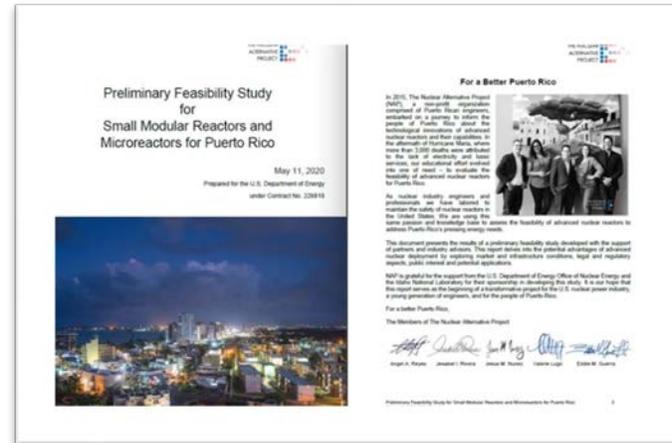
Grid



Community



Market



Recommendations



Legal



Financing



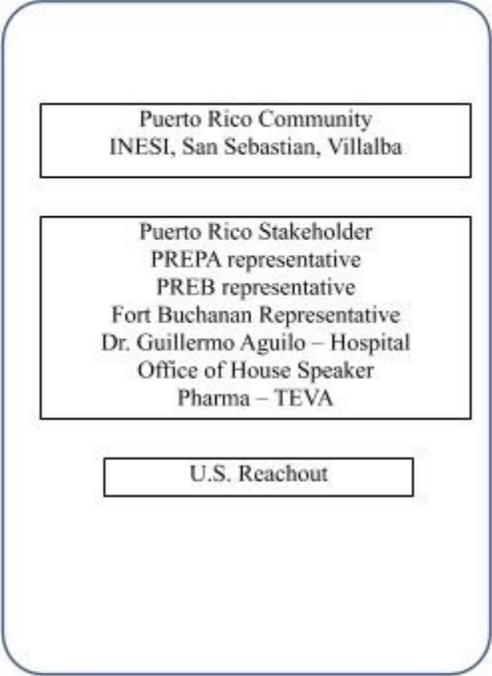
Need

Our Study: The Team



Technical Advisory Board (TAB)

Dr. Jose Reyes - PWR
 Mr. David Sledzik - BWR
 Dr. Abdul Dulloo - Micro
 Mr. Jeff Harper - HGTR
 Amr Elnashai – Natural Hazards
 Marc Nichols – U.S. Utilities/Government



Mr. Eddie M. Guerra
 Mr. Alfonso Mendez
 Mr. Jonathan Yates



Carlos Fernandez
 Jorge J. Garcia



Donald Hoffman
 Morgan Libby



Jeffrey Merrifield
 Sheila McCafferty
 Elina Teplinsky



Bruce McDowell
 Marcelo Elizondo
 James Cabe



Mr. Paul Murphy

Our Study: The Team

Technical Advisory Board



Luis Reyes
Chair of the Board
(Former Nuclear Regulatory Commission
Executive Director of Operations)



Jeffrey Harper
Vice President Strategy and
Business Development



Dr. Jose Reyes
Co-Founder and Chief
Technology Officer



Dr. Abdul Dulloo
Director, Plant Technologies &
Product Development



David Sledzik
Senior Vice President Sales &
Commercial Operations



Marcus Nichols
Director, New Reactor
Deployment



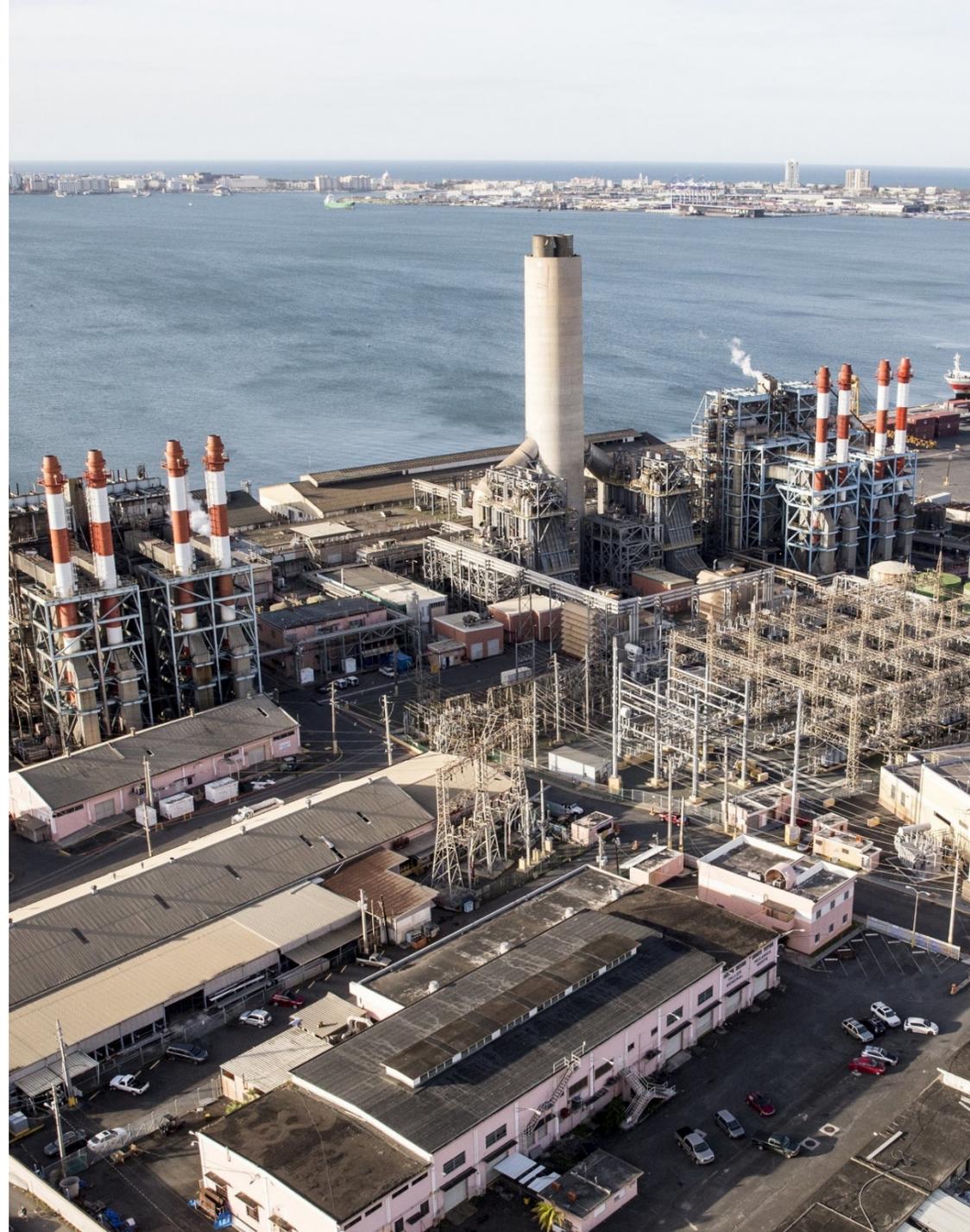
Dr. Amr Elnashai
Vice Chancellor Research and
Technology Transfer



What we found?

Need for baseload power

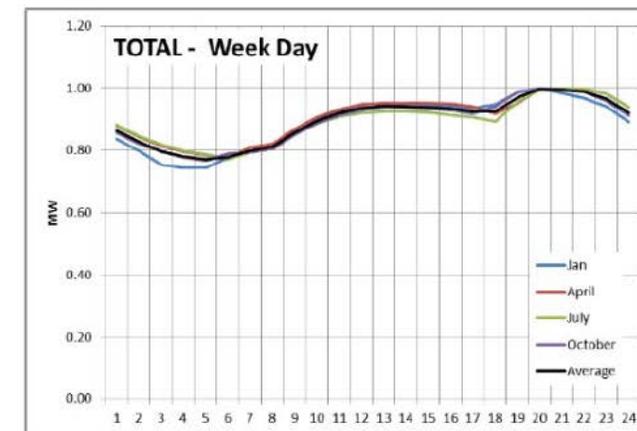
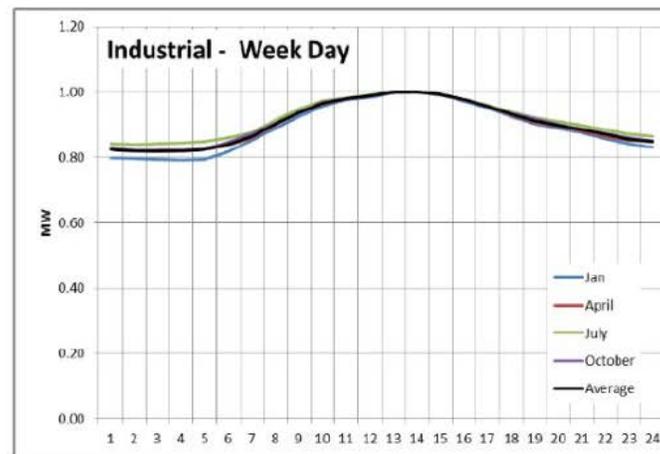
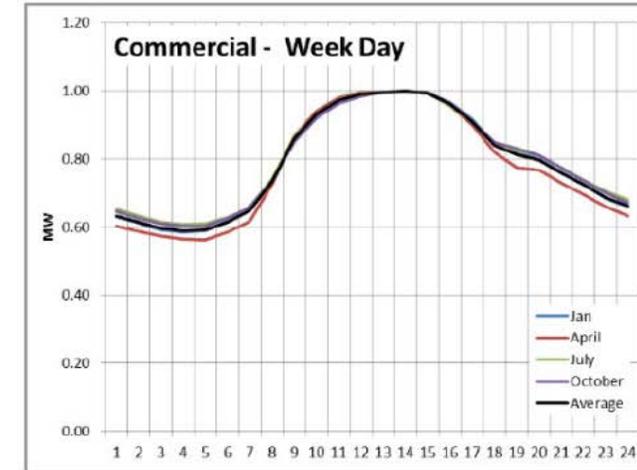
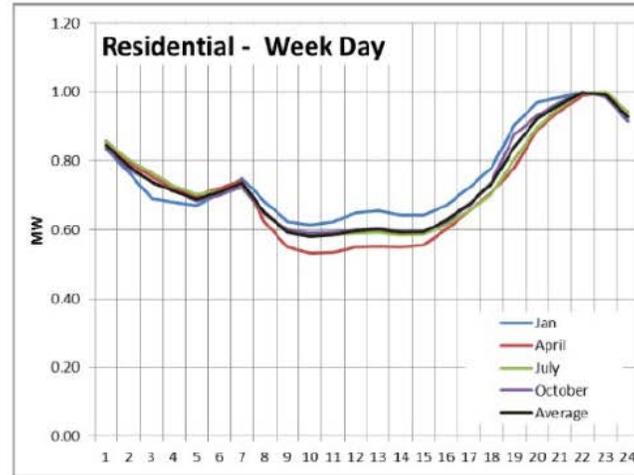
- Our study reviewed the June 2019 Version of the PREPA IRP.
- Puerto Rico is in urgent need for new generation, more specifically base load generation.
- 3,600MW planned retirements by 2030
- Current: operational 3,200MW installed capacity with 700MW reserves
- Expecting 3,000MW of peak demand for this summer
- To meet current RPS requirement of 40% renewable, IRP plans to install 1,800MW of PV and 900MW of battery by 2025 at a cost of about \$3.6 billion.



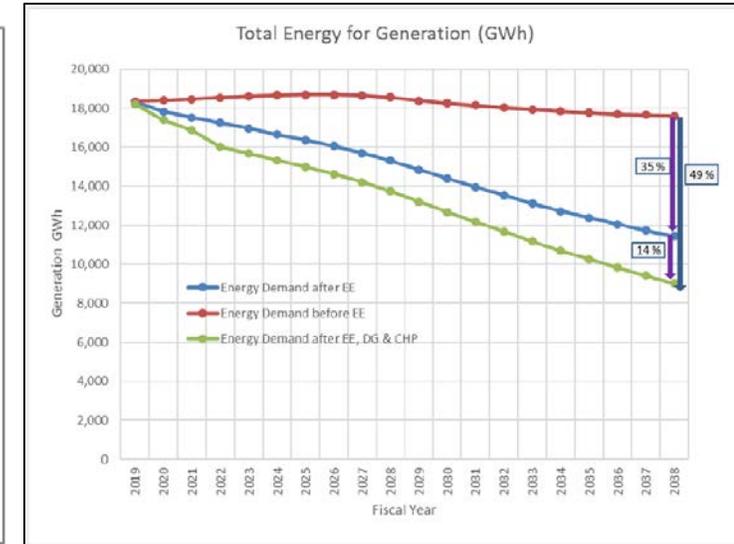
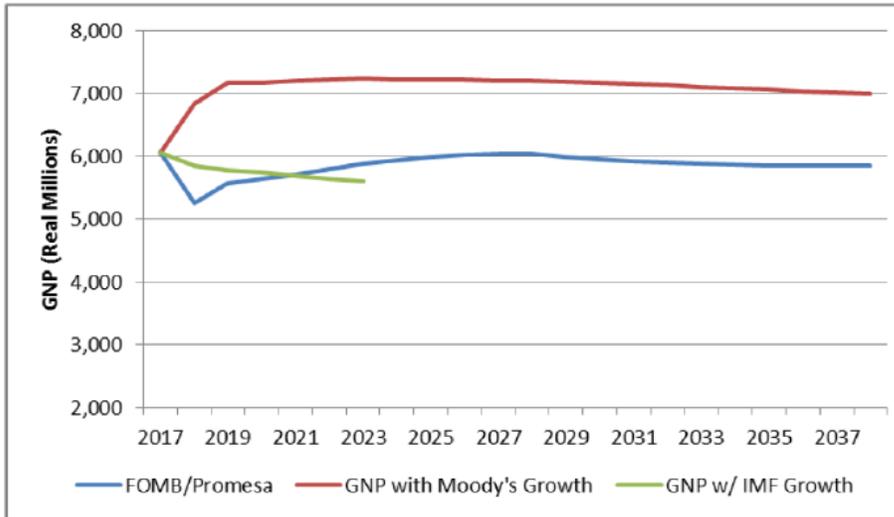
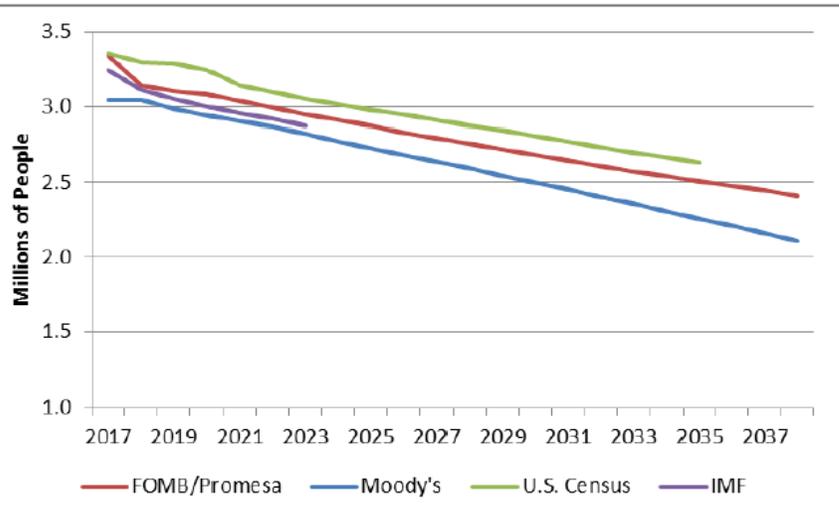
What we found?

Need for baseload power

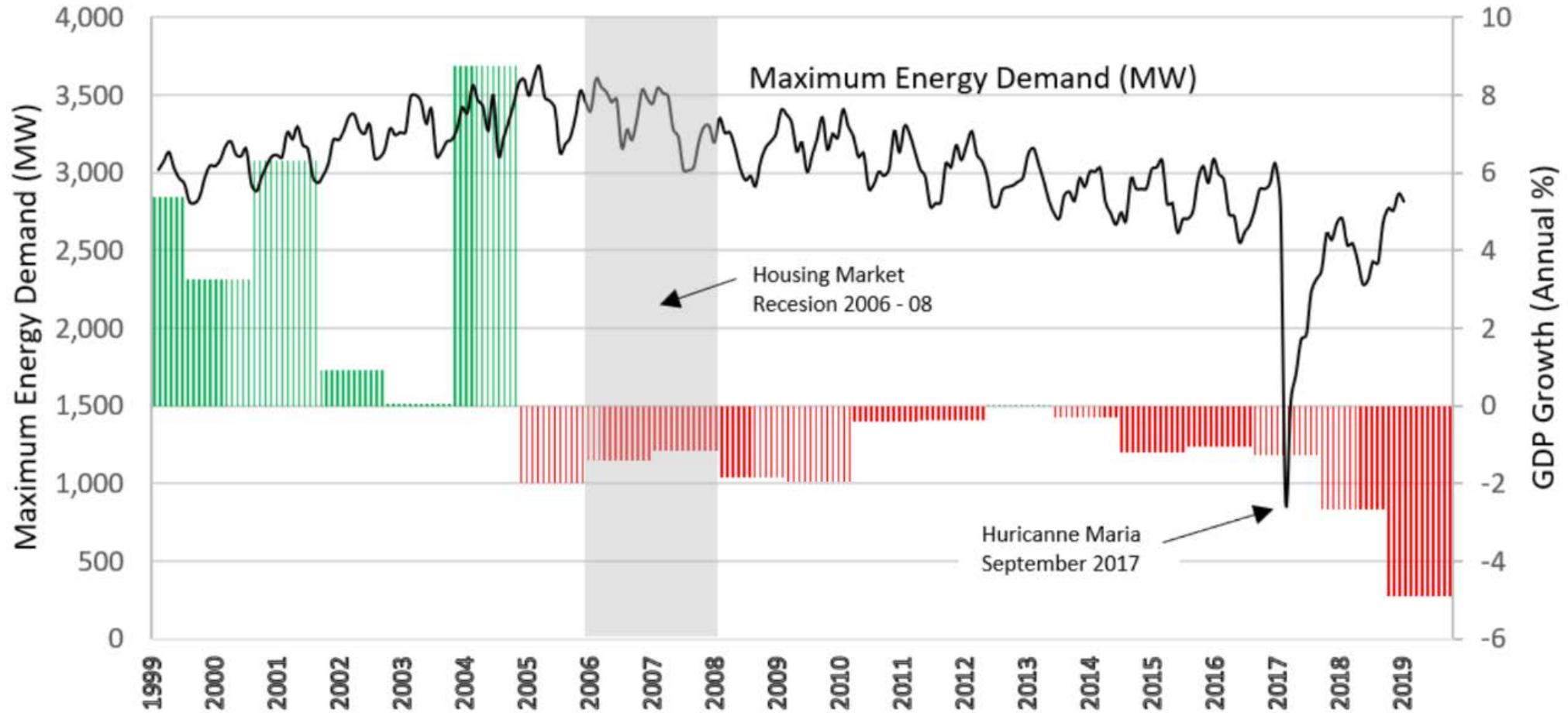
- Puerto Rico's daily electricity demand peaks at approximately 10% from average and utilization rates (load factors) in the range of 75%.
- Steady high-power demand throughout the year plus the nature of an isolated grid requires a higher than average reserve margin.



Energy and Economic Forecasts used in the IRP to justify PREPAs Plan for the next 20 years



Historical Correlation of Energy Demand and Economic Performance in Puerto Rico



For many years, local leadership thought that people were opposed or afraid of nuclear...that's not what we found



Figure 5-1: Municipalities of Interviewed Puerto Rican Residents

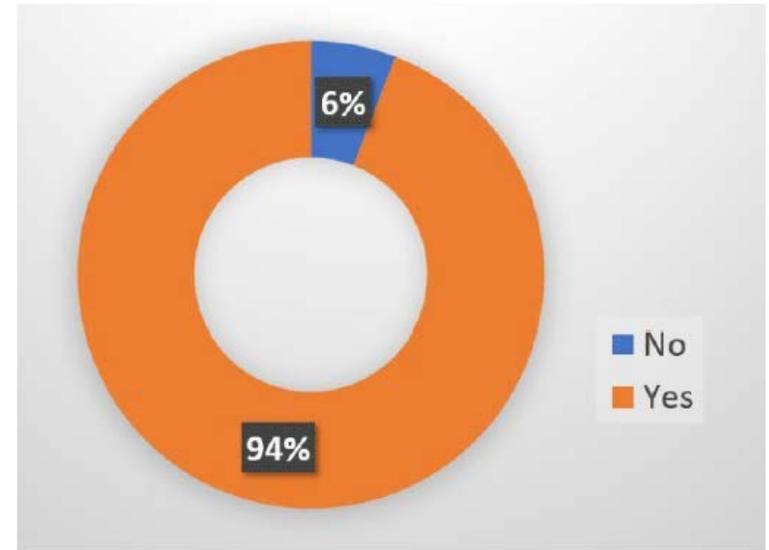


Figure 5-2: PR Residents Support More Research of Nuclear Energy

For many years, nuclear energy was deemed unfeasible due to the size and reserve margin requirements for an isolated grid like Puerto Rico. We found that SMRs and Microreactors fit Puerto Rico's planned grid.

Minigrids and microgrids: Proposed temporary (weeks to 1 month) partitioning of the Puerto Rican grid

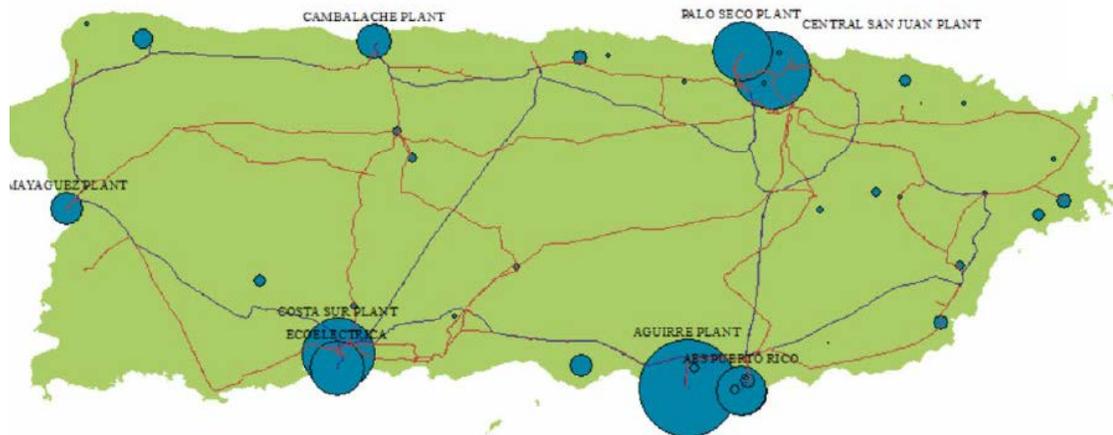
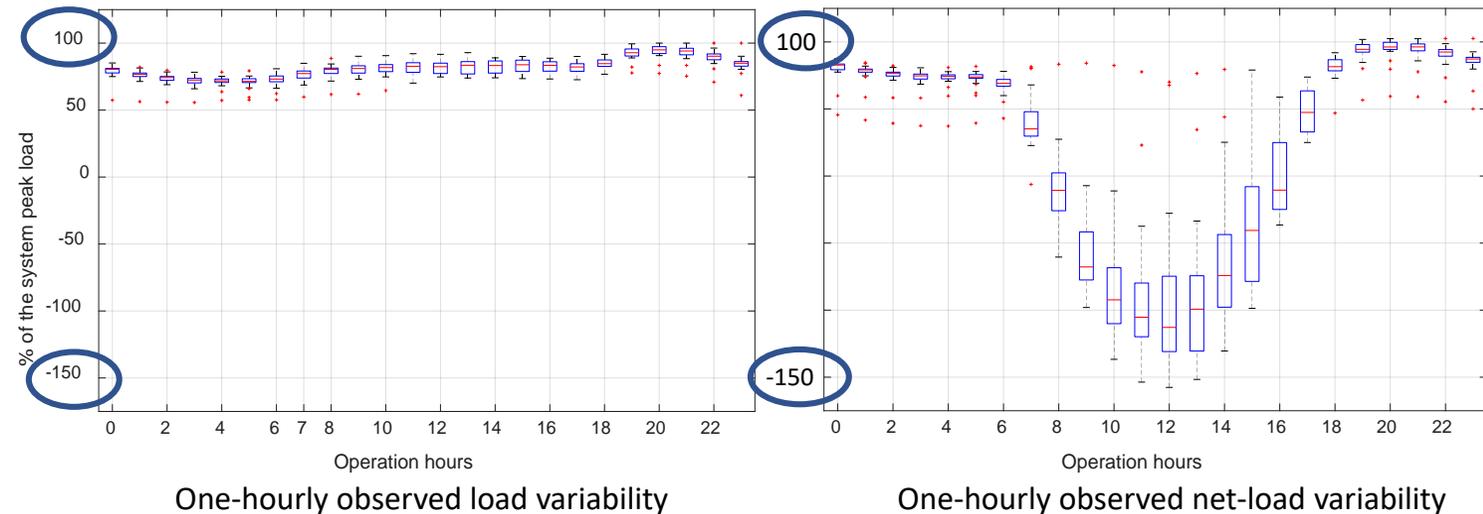


Figure 4-4: Geographic Location of Minigrids¹¹⁶.

The IRP calls for 1,800MW of solar PV for the next 5 years. This presents strict flexibility requirements for ANY generation source in Puerto Rico. Our study found that SMRs and Microreactors are designed for such conditions.



Example: Caguas MiniGrid



ESTADO LIBRE ASOCIADO DE PUERTO RICO
LA FORTALEZA
SAN JUAN, PUERTO RICO

Boletín Administrativo Núm. OE-1993-57

ORDEN EJECUTIVA DEL GOBERNADOR DEL ESTADO LIBRE
ASOCIADO DE PUERTO RICO

PARA DECLARAR LA POLITICA PUBLICA ENERGETICA DE
PUERTO RICO; ORDENAR A LAS DEPENDENCIAS
GUBERNAMENTALES A LLEVAR A CABO SUS FUNCIONES DE
MANERA CONSONA CON LA POLITICA PUBLICA ENERGETICA;
ORDENAR AL DEPARTAMENTO DE RECURSOS NATURALES Y
AMBIENTALES OFRECER UN PROCESO DE PARTICIPACION
CIUDADANA PARA RECIBIR COMENTARIOS SOBRE EL PLAN DE
IMPLANTACION DE LOS OBJETIVOS Y ESTRATEGIAS DE LA
POLITICA PUBLICA ENERGETICA.

CUARTO:

Al considerar fuentes alternas para generar
energía eléctrica, serán prioritarias las
consideraciones ambientales, de salud y seguridad
pública además de las consideraciones económicas,
por lo cual **actualmente la energía nuclear no luce
como una fuente alterna viable;**

A common misconception
was that nuclear was
prohibited due to a 1993
executive order. This is not
the case.

In fact, the public service
act allows nuclear
generation companies to do
business in Puerto Rico.

A Variety of Applications Identified in Puerto Rico:
Strong Focus on Distributed Generation and Microgrid
Integration – Hospitals, military, energy-intensive industries,
pharma, medical device and manufacturing, municipality
consortiums.



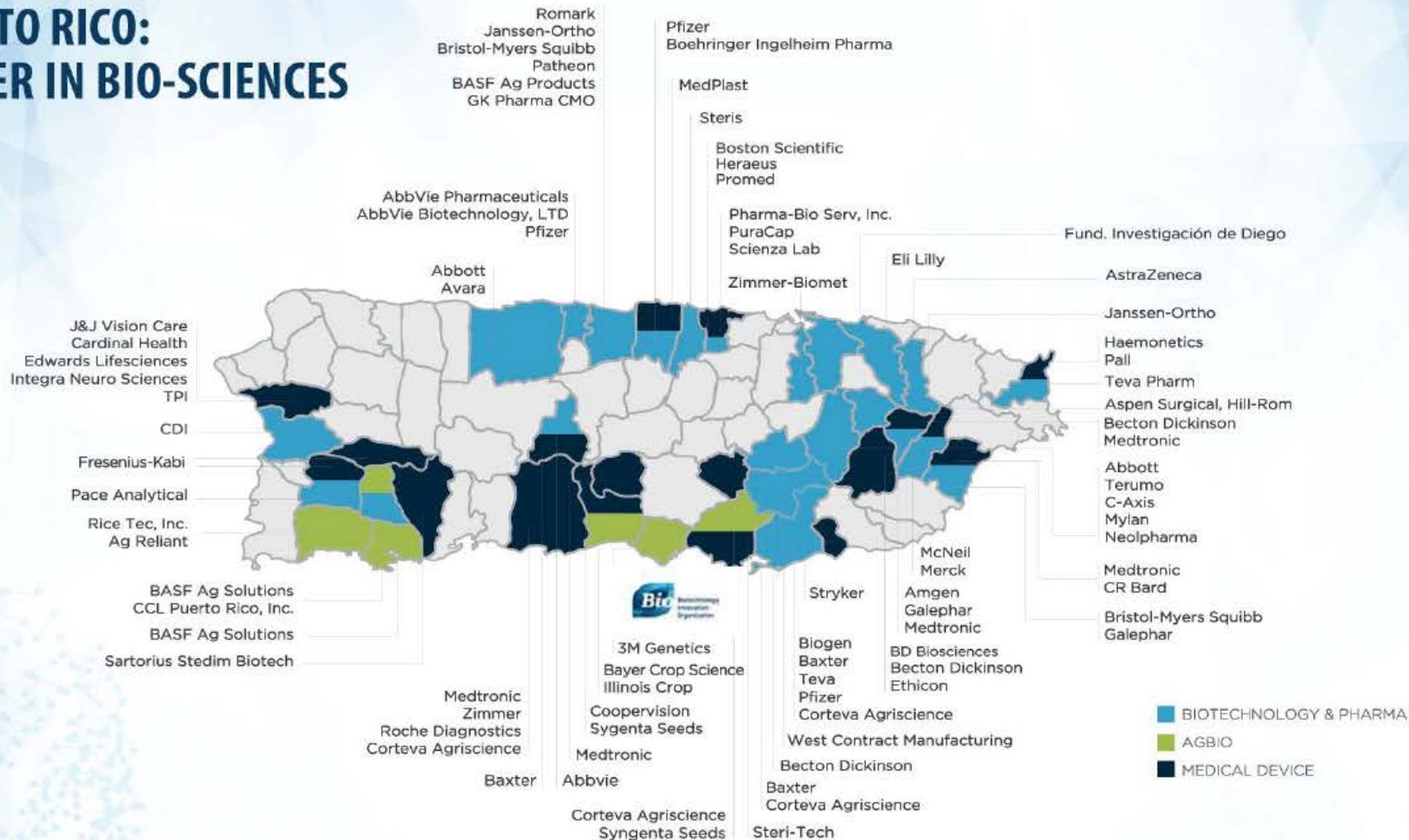
Part 3

Puerto Rico's Pharmaceutical Industry



WHY PUERTO RICO

PUERTO RICO: LEADER IN BIO-SCIENCES



WHY PUERTO RICO

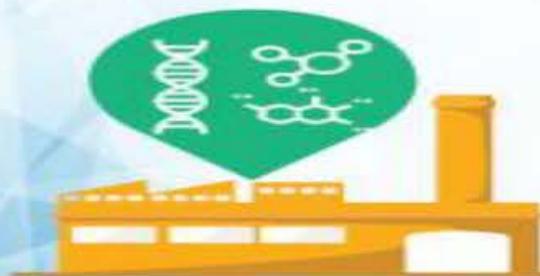
PUERTO RICO SPARKS INNOVATION

8 TOP 15

BIOPHARMACEUTICAL
PRODUCTS MANUFACTURED

OVER **50**
YEARS OF EXPERIENCE

BIO-PHARMACEUTICAL
AND MEDICAL DEVICE
MANUFACTURING



10 TOP
OF THE **20**

GLOBAL
BIOPHARMACEUTICAL
COMPANIES

- 70 MEDICAL DEVICES PLANTS
- 46 BIOPHARMA PLANTS
- 10 AGBIO STATIONS

6 TOP 10
OF THE
PRINCIPAL
MEDICAL DEVICE

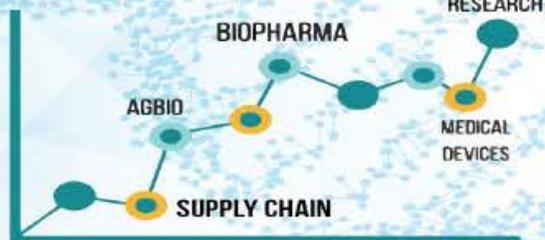
PUERTO RICO

BIOSCIENCE DESTINATION

TOP 7

USA EMPLOYMENT
CONCENTRATION AND
SPECIALIZED HUMAN CAPITAL

H
I
G
H
L
Y



SPECIALIZED

34%
GDP REPRESENTED
BY LIFE SCIENCES

45% OF
INDUSTRIAL JOBS REPRESENTED
BY BIOSCIENCE SECTOR



**BIOSCIENCE
DESTINATION**

USA Jurisdiction with
Access to Global Markets

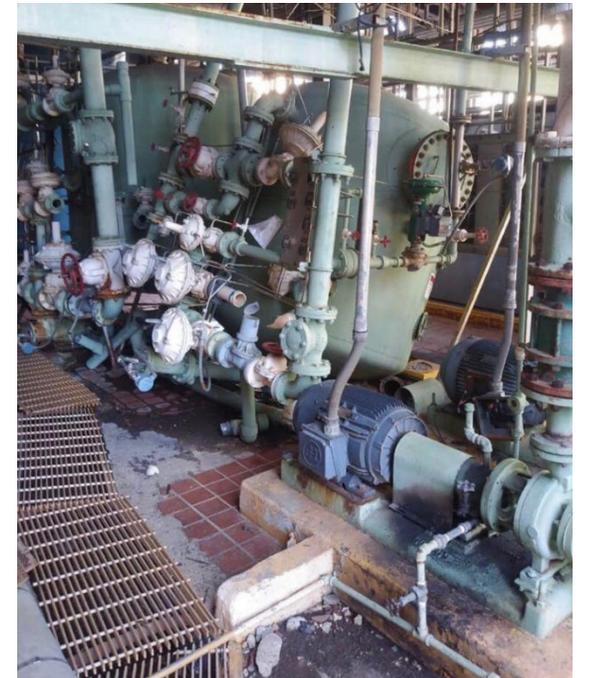
68%
EXPORTS TO OVER
85 COUNTRIES

**AUDITED
BY**

- USFDA
- GLOBAL REGULATORY AGENCIES

Energy needs of industry in Puerto Rico

- **Cost:** Attracting manufacturing to Puerto Rico will depend on competitive cost of electricity for energy-intensive industries.
- **Reliability:** risk of disrupting supply of fuel imports and exposure to extreme natural events



Current Alternatives Being Considered within the Industry



Puerto Rico Reshoring Pharmaceutical Manufacturing From Asia In Support of U.S. National Security

 U.S. CONGRESSWOMAN
JENNIFER GONZÁLEZ-COLÓN
REPRESENTING PUERTO RICO IN CONGRESS

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Puerto Rico's Resident Commissioner leads bipartisan legislation that would secure the National Supply Chain



April 5, 2020 | Press Release

Washington, D.C. - Puerto Rico's Resident Commissioner, Jennifer González-Colón introduced bipartisan legislation, which poses a risk to U.S. supply chain as evidenced by the pandemic caused by Covid-19.

H.R. 6443, Securing the National Supply Chain Act of 2020, would secure the national stockpile supply chain in the United States, including the territories. This initiative would help drive the consolidation of the manufacturing industry in the United States.


Washington Examiner

Peter Navarro calls on Congress to 'bring home' manufacturing to Puerto Rico

by Katherine Doyle, White House Correspondent |  | May 28, 2020 12:00 AM



Reliable Power is
One of the Key
Enablers in Support
of The U.S. National
Pharmaceutical
Manufacturing
Strategy



What's next?

Proposal to be submitted to U.S. DOE Site Suitability per U.S. NRC Reg Guide 4.7 for Various Regions in Puerto Rico



U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REGULATORY RESEARCH
REGULATORY GUIDE

March 2014
Revision 3

Technical Lead
Jacob Philip

REGULATORY GUIDE 4.7
(Draft was issued as DG-4021 on December 30, 2011)

GENERAL SITE SUITABILITY
CRITERIA FOR NUCLEAR POWER STATIONS



A fully integrated approach to site suitability

The collage consists of the following documents:

- GOBIERNO DE PUERTO RICO**: A letter from the Governor's Office dated January 28, 2019, regarding the Nuclear Alternative Project.
- GOBIERNO DE PUERTO RICO**: A letter from Gabriel F. Rodríguez Aguiló, dated February 24, 2020, to Ms. Valerie Lugo.
- Board of Directors 2020**: A list of board members including President Doreen Lopez-Lopez and Vice President Dr. Jorge Suredock.
- TEVA**: A letter dated February 27, 2020, from Teva Puerto Rico LLC to Ms. Valerie Lugo, offering support for the project.
- NUSCALE**: A letter dated February 24, 2020, from NUSCALE to Ms. Valerie Lugo, regarding a commitment letter for a cost study.
- Westinghouse**: A letter dated June 10, 2020, from Westinghouse to Ms. Valerie Lugo, regarding a letter of intent for a feasibility study.
- energy**: A letter dated June 10, 2020, from X Energy, LLC to Ms. Valerie Lugo, regarding a letter of intent for a feasibility study.
- HITACHI**: A letter dated June 12, 2020, from GE Hitachi Nuclear Energy to Ms. Valerie Lugo, regarding a letter of commitment for a feasibility study.

Community + Industry + Government + Technology

Figure 9-1: Timeline for Earliest Case Scenario Deployment in Puerto Rico

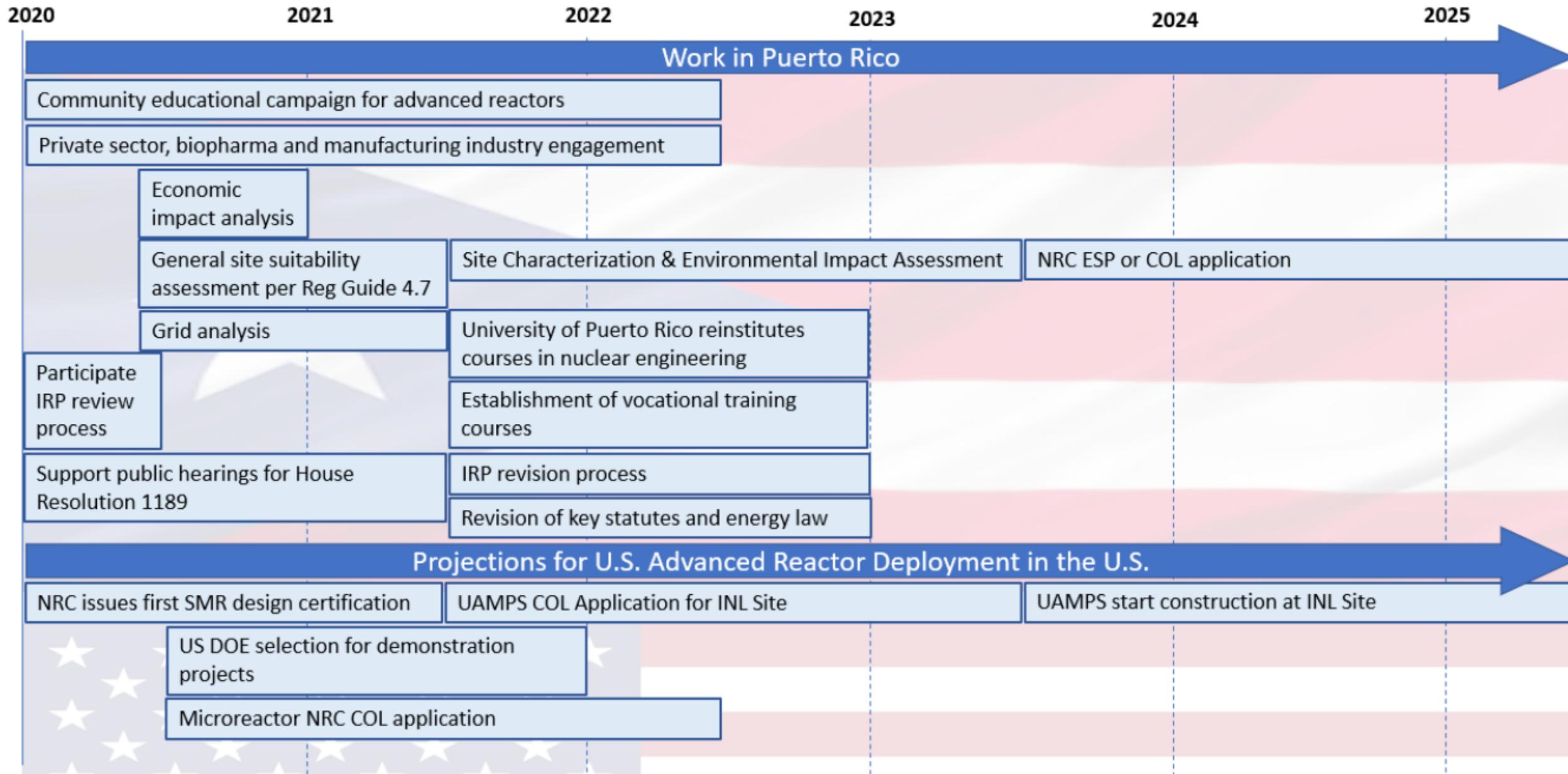
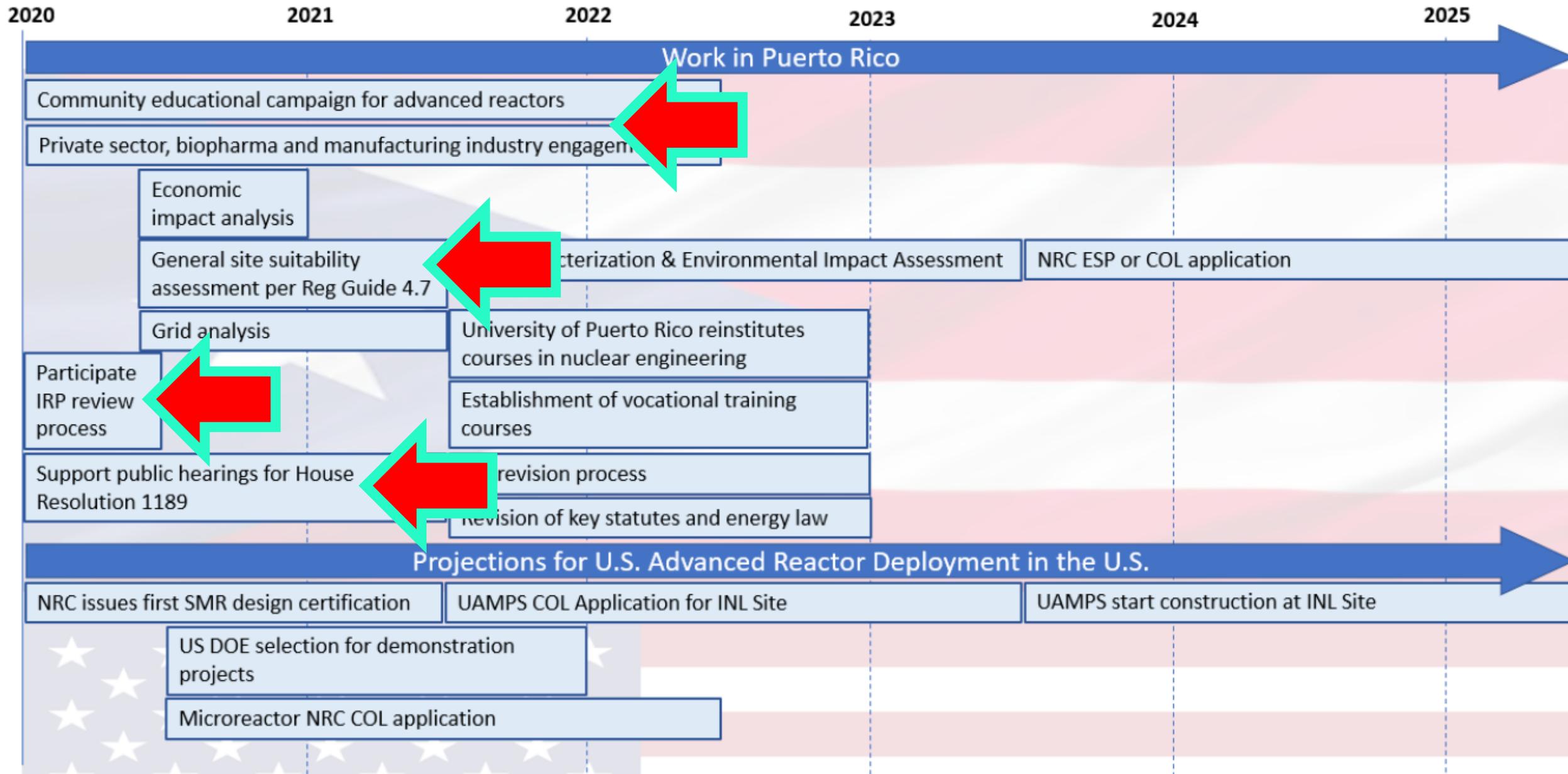


Figure 9-1: Timeline for Earliest Case Scenario Deployment in Puerto Rico



iGracias!

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www.NuclearAlternativeProject.org

Knowledge Is Power.
Conocimiento Es Poder.



Questions?





ANS Young Members Group upcoming events:

- **July 1:** Spotlight on National Labs: **Pacific Northwest National Lab**
- **July 2:** Virtual **Happy Hour Networking**
- **July 15:** Spotlight on National Labs: **Lawrence Livermore National Lab**
- **July 21:** Virtual **Trivia**
- **July 28:** Spotlight on National Labs: **Oak Ridge National Lab**

Learn more and register at **ans.org**.