

Energy, Communications & Cybersecurity Subcommittee

Wednesday, December 6, 2023
11:30 AM - 1:30 PM
Reed Hall (102 HOB)

Meeting Packet

Paul Renner
Speaker

Mike Giallombardo
Chair

The Florida House of Representatives

Commerce Committee

Energy, Communications & Cybersecurity Subcommittee

Paul Renner
Speaker

Mike Giallombardo
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Meeting Agenda

Wednesday, December 6, 2023
11:30 am – 1:30 pm
Reed Hall (102 HOB)

I. Call to Order

II. Roll Call

III. Welcome and Opening Remarks

IV. Presentations and Discussion on Florida's Energy Future (Liquefied Natural Gas, Renewable Natural Gas, and Small Modular Reactors):

Robert Peek, Chief Commercial Officer
JAXPORT

Eric Kuenzli, LNG Business Development Manager
BHE GT&S

Travis Payne, Director, Alternative Fuel Systems
TECO Peoples Gas

Jorge Herrera, CEO
Nopetro

Billie Jo McCarley, Deputy Director of Operations
Miami-Dade County, Water and Sewer Department

Christine King, Director for the Gateway for Accelerated Innovation in Nuclear
Idaho National Laboratory

V. Closing Remarks

VI. Adjournment

Robert Peek
JAXPORT

LIQUEFIED NATURAL GAS (LNG) AS A MARITIME FUEL SOURCE FOR LARGE VESSELS

Presented to
Florida House Energy, Communications & Cybersecurity Subcommittee
by
Robert Peek, Chief Commercial Officer
Jacksonville Port Authority (JAXPORT)
Dec. 6, 2023

LIQUEFIED NATURAL GAS (LNG) OVERVIEW

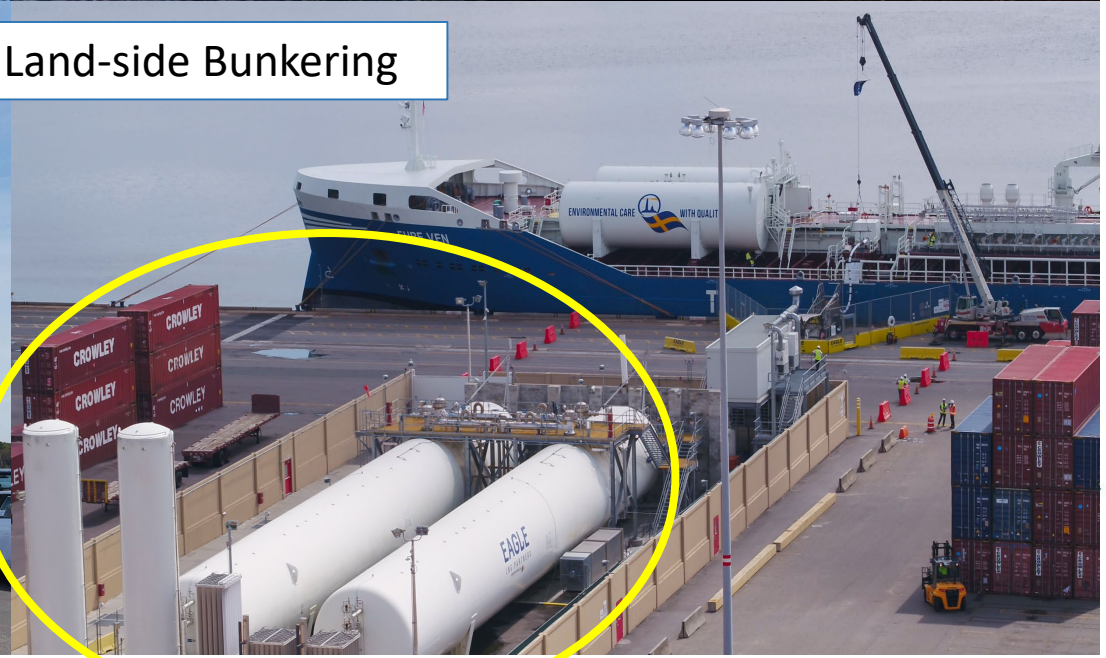


Water-side Bunkering





Land-side Bunkering



2023 MOU: LNG FROM JACKSONVILLE FOR ARUBA

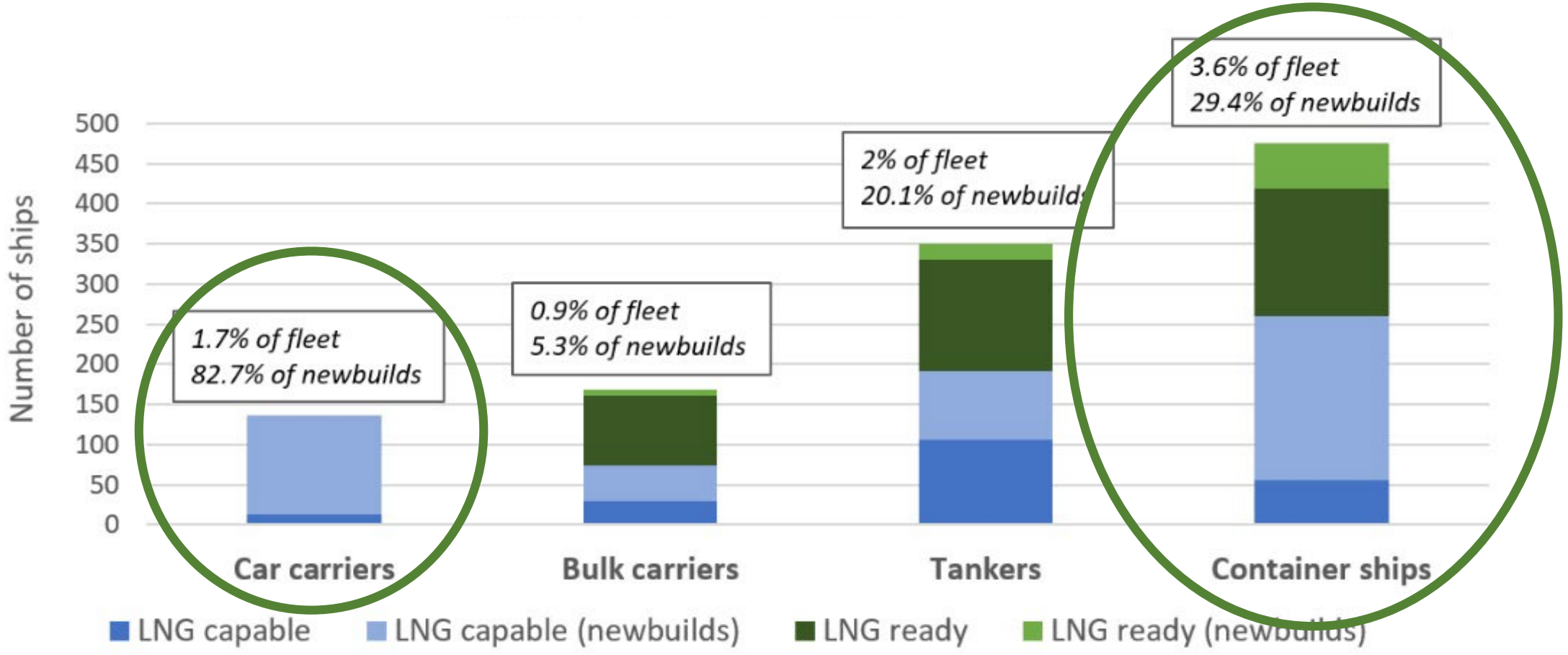


WHY LNG?

- ✓ **Abundant supply of natural gas**
  - **U.S. ships: gas sourced in United States**
- ✓ **Financially feasible**
- ✓ **Technology proven at scale**
- ✓ **Excellent energy density**
- ✓ **Reduced carbon emissions**
- ✓ **Established safety record**

JAXPORT
JACKSONVILLE PORT AUTHORITY

LNG FUEL SHARE BY CARGO SHIP TYPE



(Chart: FreightWaves based on data from Clarksons Research)

LNG-POWERED CRUISE SHIPS



Disney "Wish"

LIQUEFIED NATURAL GAS (LNG) AS A MARITIME FUEL SOURCE FOR LARGE VESSELS

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BHE GT&S

BHE GT&S

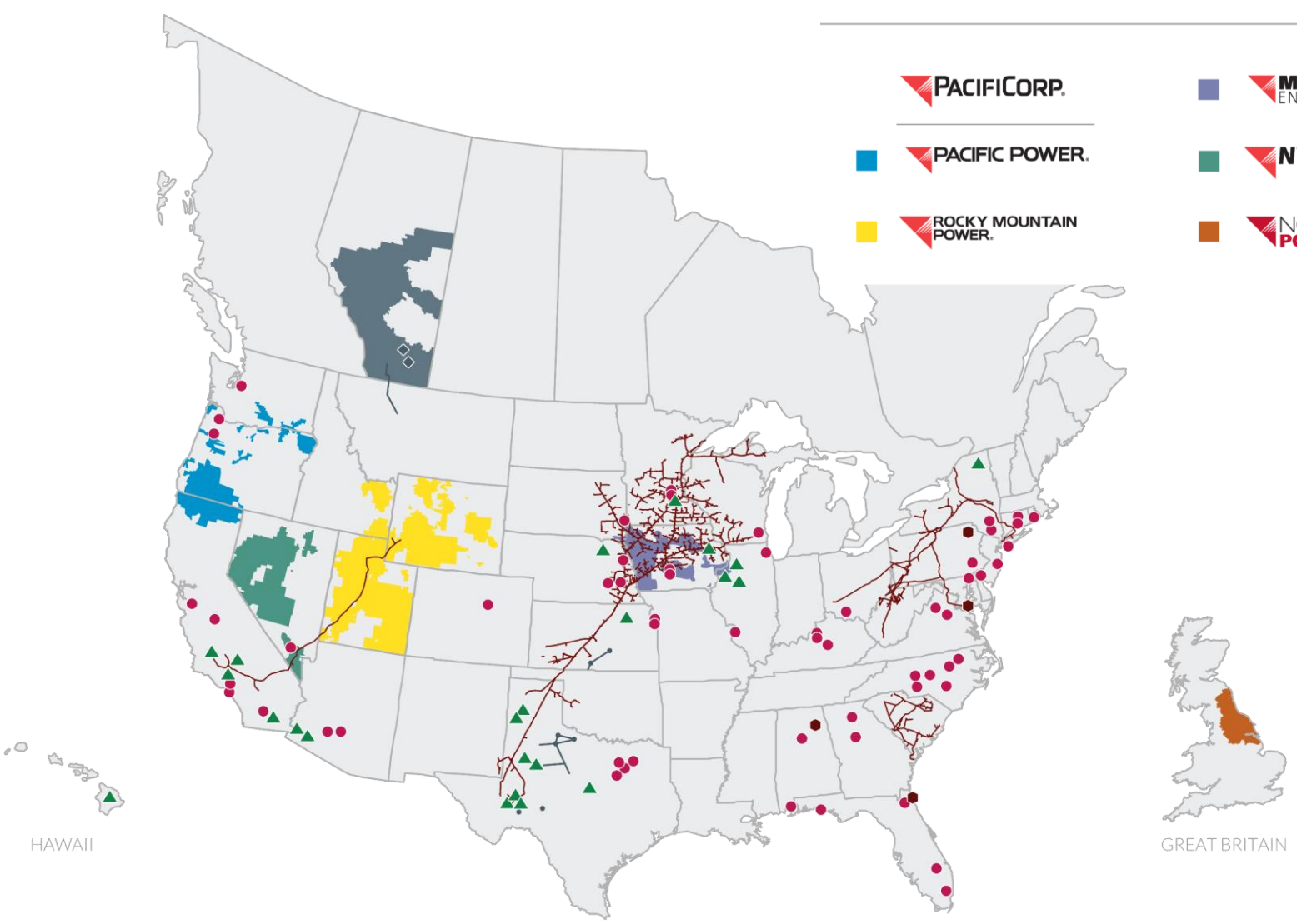
A BERKSHIRE HATHAWAY ENERGY COMPANY



A Growing Business for Cleaner Energy Solutions

Eric Kuenzli, December 6, 2023

BERKSHIRE HATHAWAY ENERGY



Berkshire Hathaway Energy

- PacifiCorp
  - Pacific Power
  - Rocky Mountain Power
- MidAmerican Energy Company
- NV Energy
- Northern Powergrid
- BHE Transmission
  - AltaLink
  - BHE U.S. Transmission
  - BHE Canada
- BHE Pipeline Group
- BHE Renewables
- HomeServices of America (A Berkshire Hathaway Affiliate)

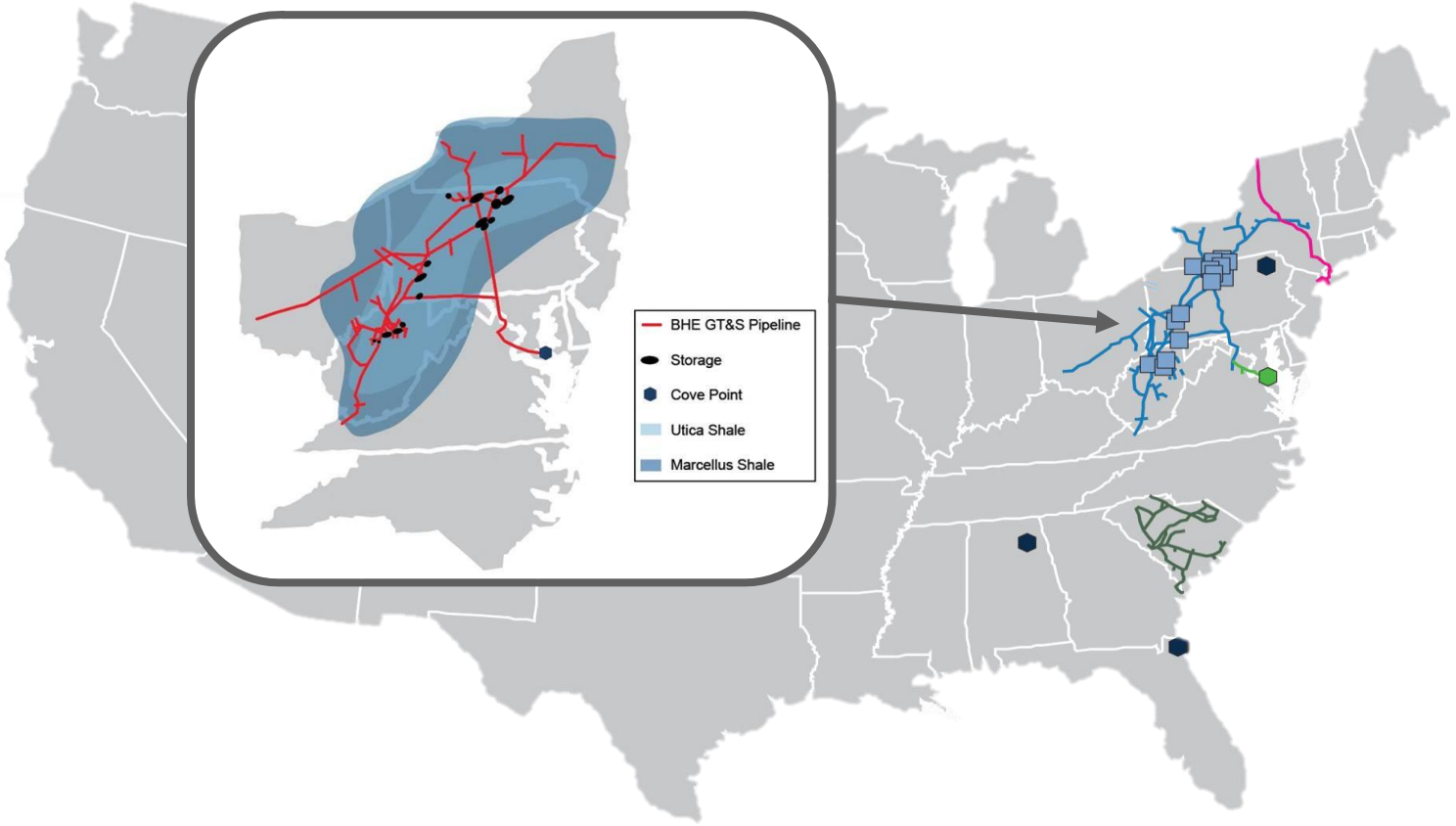
Wholly Owned Companies as of 12/31/2021

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- Pivotal LNG
- JAX LNG

Safe, Reliable Energy Production, Delivery and Storage

BHE GT&S joins the family of Berkshire Hathaway Energy companies in November 2020



Eastern Gas Transmission and Storage
- Pipeline
- Storage Facility

Cove Point LNG (25%)
- Pipeline
- LNG Terminal

- Carolina Gas Transmission
- Iroquois Gas Transmission System (50%)
- LNG Facility

10 States of Operation

1600 Employees

5400 Miles of Transmission Line

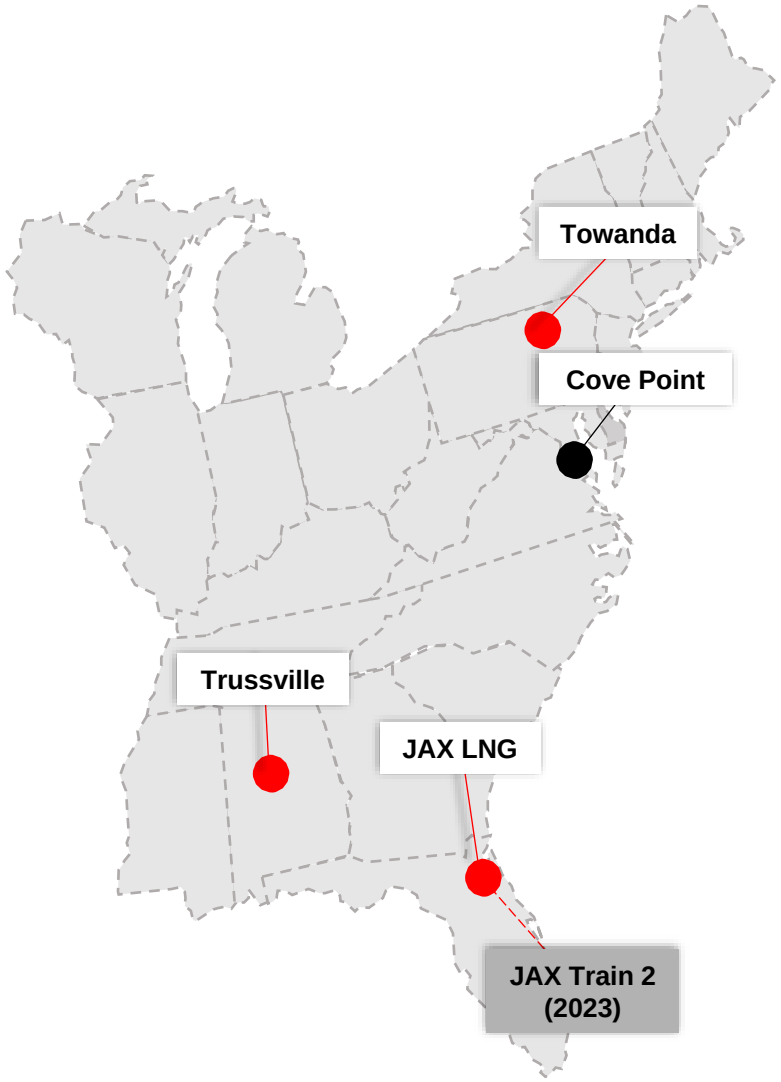
FUNDAMENTALS SMALL SCALE LNG ASSETS

Fundamentals in Place

- Gateway to Low-Cost Domestic Gas Sources
- Existing LNG Infrastructure along the US East Coast
- Key International Ports Serving Shipping Customers
- World Class Operations

Customer Solutions

- Marine Fuel
- Truck Fuel
- Aerospace Fuel
- Industrial/Peaking Capacity/Virtual Pipeline



Safety is our Priority

- COVE POINT: 300+ Commercial LNG Carriers Loaded
- JAX LNG: 132+ LNG Bunkers Delivered
- JAX LNG: Delivered over 40M Gallons to first US LNG Bunker Barge and over 30M Gallons to via Shore to Ship Operations

WITHOUT INCIDENT

PIVOTAL LNG PORTFOLIO

Trussville LNG

Trussville, Alabama



4.8 Million Gallons Storage

60,000 Gallons/day Liquefaction

Acquired in 2011

JAX LNG

Jacksonville, Florida

**50% Ownership with Seaside LNG*



4.4 Million Gallons Storage

360,000 Gallons/day Liquefaction

In-Service 2018

Plant Expansion Completed 2023

Towanda LNG

Wyalusing, Pennsylvania



180,000 Gallons Storage

50,000 Gallons/day Liquefaction

In-Service 2021

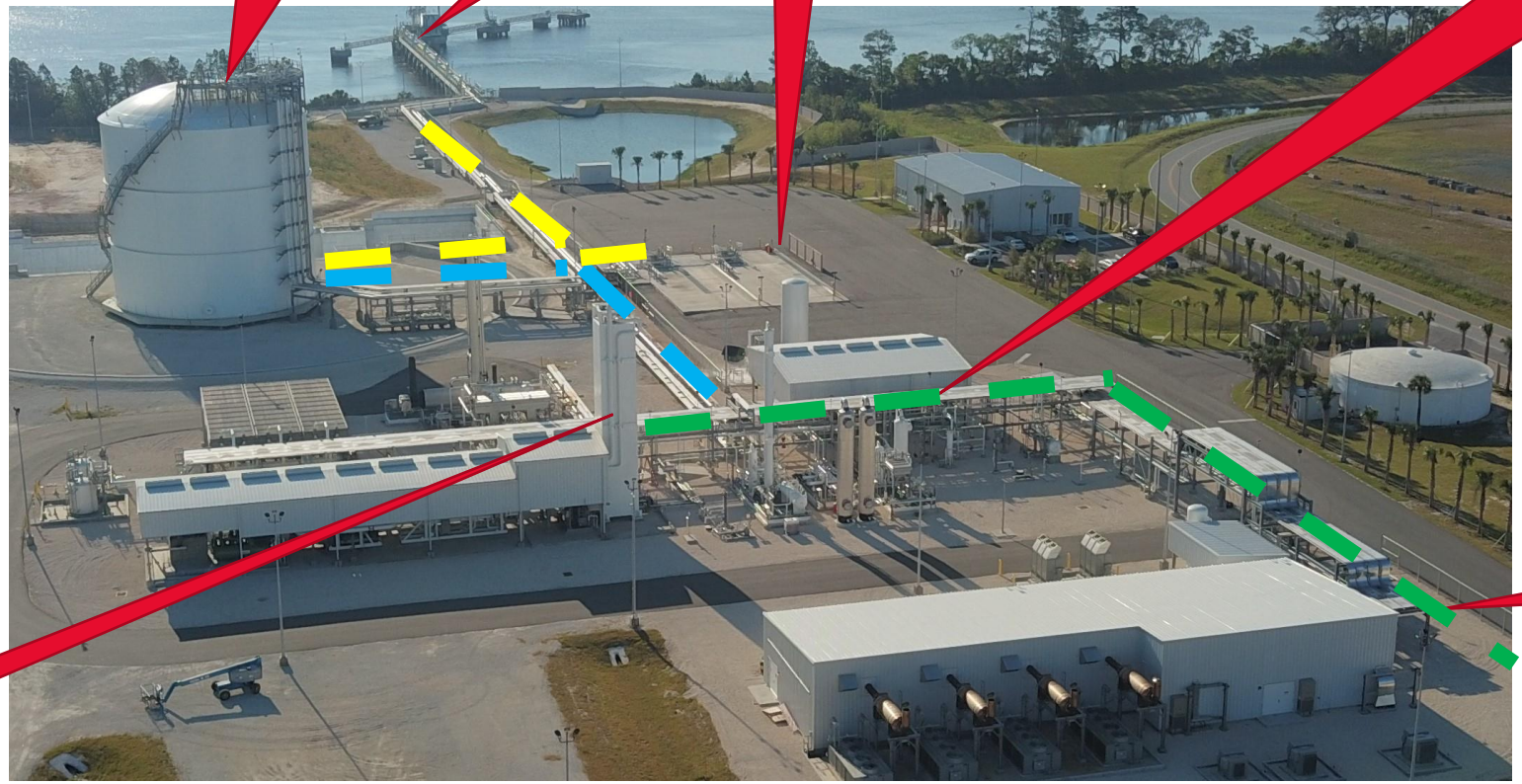
What is LNG?

- LNG is Liquefied Natural Gas, the same natural gas safely used in homes and businesses for more than 100 years but stored as a liquid.
- Natural gas becomes LNG when cooled to -260F. At this point, the natural gas condenses into a clear, non-flammable, non-corrosive liquid occupying 1/600 of the space of natural gas at atmospheric pressure
- LNG when warmed above -260F at atmospheric pressure returns to a gas
- LNG is stored at very low pressure (~ 0 – 200 psi)
- LNG is a clean burning fuel that can reduce SOx by 100%, NOx by 85%, Particulates by 98%, and GHG by 23% compared to conventional fuels.

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JAX LNG Plant – Jacksonville, FL





JAX LNG

BHE GT&S
A BERKSHIRE HATHAWAY ENERGY COMPANY

LNG FACTS

- LNG is not explosive or flammable
- LNG is not corrosive
- LNG will not mix with water (it floats)
- If LNG is spilled, it quickly vaporizes and rises into the air
- There is no residue after an LNG spill on water or soil
- LNG is odorless, colorless and non-toxic

BHE GT&S
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LNG as Marine Fuel

BHE GT&S is working with stakeholders, partners, regulators and customers to advance the use of LNG as a marine fuel

- Key drivers of LNG adoption are environmental regulations and pressure from end users
  - International Maritime Organization (IMO) regulations have been the single biggest driver
  - Reduction of greenhouse gas emissions (GHG) is seen as a top global priority
  - Pressure is on to decarbonize

- Renewable liquefied natural gas (**BioLNG**) increases the benefit of LNG (landfill, livestock waste, etc.)
  - Incentives in place for trucking and rail, but not marine
  - Renewable Fuel Standard (RFS) – federal program, EPA sets volume requirements for renewable fuels for obligated parties (refiners, petroleum importers and wholesalers).
  - Renewable Identification Numbers (RINs) – environmental credits – the currency of RFS
  - Low Carbon Fuel Standard (LCFS) – state specific programs, like the RFS/RIN program

- To accelerate the adoption of BioLNG in marine may require adding marine to the RFS/LCFS program benefitting Florida ports

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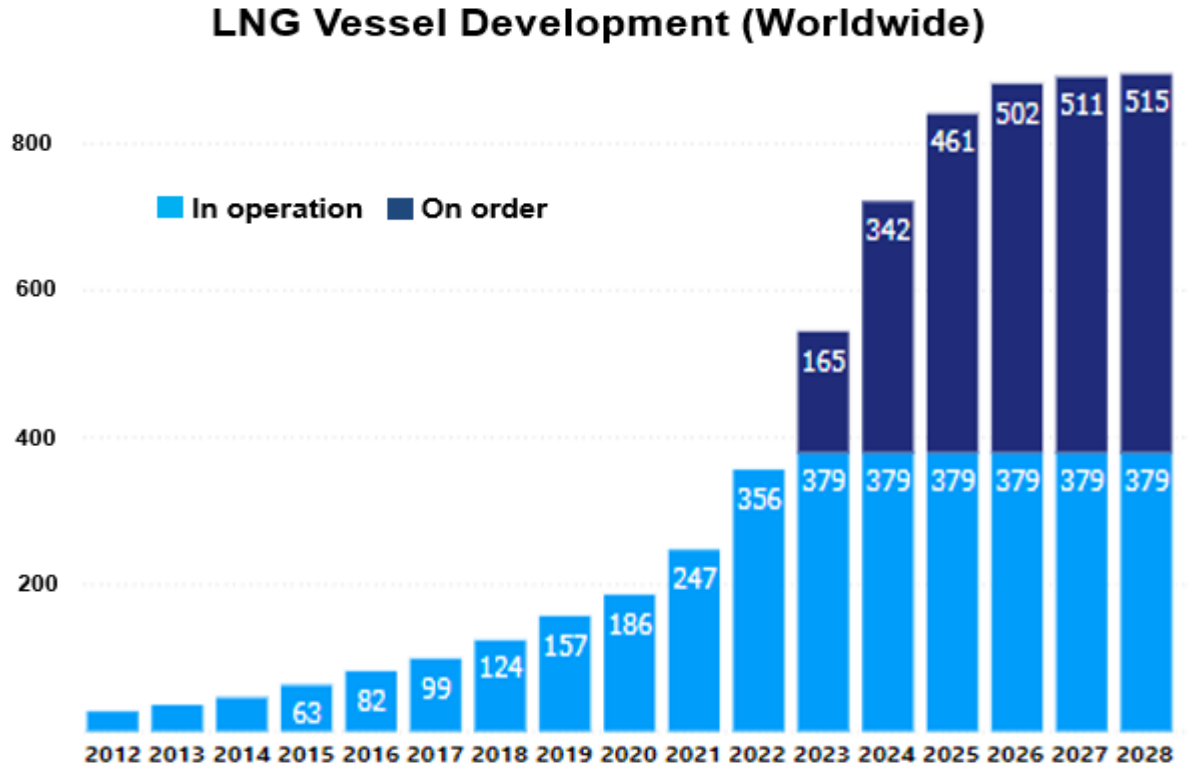
More LNG Fueled Vessels on Order

New vessels (cruise ships, car carriers, containerships) are adopting LNG fuel at a faster pace than LNG fueling infrastructure is being developed



Ship-to-Ship LNG bunkering

Siem Car Carrier fueled by the Clean Jacksonville barge with fuel sourced from JAX LNG



Sources: DNV Alternative Fuels Insight April 2023, Clarkson Research January 2023
Alternative Fuels Insights for the shipping industry – AFI platform (dnv.com)

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Questions?



THANK YOU

BHE GT&S®
A BERKSHIRE HATHAWAY ENERGY COMPANY

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Travis Payne
TECO Peoples Gas

Leading the Way to a More Sustainable Florida

PEOPLES GAS IS EXPANDING RENEWABLE NATURAL GAS

TECO PEOPLES GAS
AN EMERA COMPANY

Peoples Gas Company Overview

Making life better for our communities by delivering safe, resilient, clean, affordable natural gas energy solutions.



Market reach
Peoples Gas' service territory extends throughout Florida.



Local presence
800 team members make Peoples Gas a core part of the communities we serve.



Customer base
470,000+ diversified customers — growing at a rapid pace.

Substantial assets
14,385 miles of distribution, 8,140 miles of service lines, 82 miles of transmission.



Diversified supply
Upstream transportation contracts with multiple interstate pipelines.



Corporate support
Owned by Emera, one of North America's largest energy companies.

TECO PEOPLES GAS
AN EMERA COMPANY

RNG Overview

Reducing emissions and increasing resiliency

- RNG has been around for more than 25 years, and its use is increasing throughout the U.S. as consumers and utilities look for ways to reduce carbon emissions.
- Renewable natural gas is of increasing interest to farming, food waste and landfill businesses across the state seeking clean energy solutions.
- Increased use of RNG enables local distribution companies (LDCs) like Peoples Gas to lower the carbon intensity of their fuel supply while diverting waste streams, encouraging local economic development, and adding additional sources of supply for increased diversification and resiliency.
- RNG reduces the need to import gas into Florida (in-state fuel sources)



Renewable Natural Gas

Leading the way to a more sustainable Florida

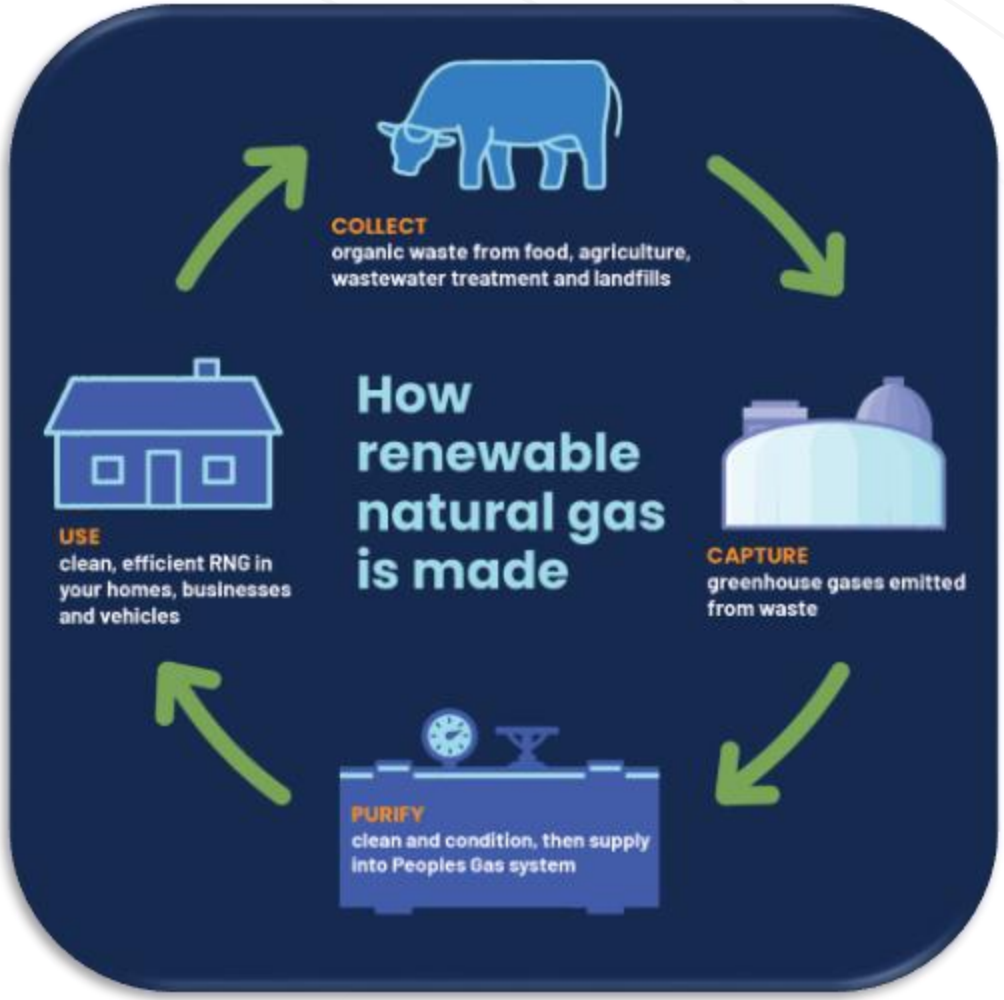
1. RNG Overview
2. Florida's RNG Potential
3. Our Interest in RNG



RNG Overview

Reducing emissions and increasing resiliency

- Waste is collected from food, farming, wastewater treatment and landfills
- Methane that would otherwise be emitted into the atmosphere is captured
- The captured gas is cleaned to pipeline standards by removing contaminants and carbon dioxide – RNG is typically carbon neutral or carbon negative
- Renewable natural gas is injected into the pipeline for customer use, or inserted directly into fleet vehicles to replace diesel or gasoline

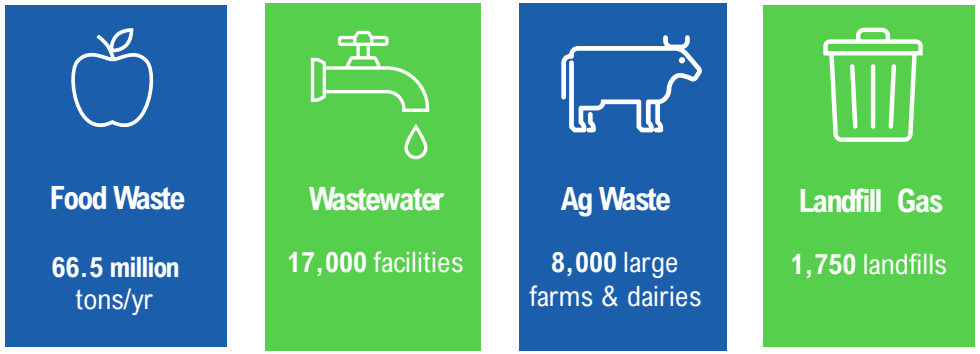


RNG Overview

Sustainability impacts

Emissions into Energy

Potential sources of organics used to produce **RNG** include:



Approximately **1/3** of the world's food goes to waste

A trillion pounds of food is squandered globally each year

The U.S. wastes **30% - 40%** of its food

U.S. retailers & consumers discard **133 billion pounds** of food annually

While Replacing Carbon Intensive Fuels

100% RNG
in vehicles can reduce GHG emissions by more than **80%**

20% RNG-blend
provides a GHG reduction of up to **30%**

RNG
from some sources is carbon negative, meaning GHGs are sequestered during the fuel lifecycle

RNG Compared to Diesel

90% *Lower NOx emissions with new "near-zero" engine*

99% *SOx reduction*

Source: The Coalition for Renewable Natural Gas.

Benefits of RNG

Locally sourced energy that helps meet environmental goals

Owner Benefits (Farm, Landfill, WTTP)

- Reduces waste costs
- Reduces methane emissions
- Generates revenue



Gas Utility Benefits

- Increases gas supply and reliability
- Investment in local community
- Decreases carbon intensity of supply

TECO PEOPLES GAS
AN EMERA COMPANY

Consumer Benefits

- Local source of renewable energy
- Displays carbon-heavy fuels, such as diesel
- Has lowest carbon-intensity of all transportation fuels



Florida's RNG Potential

There is significant opportunity

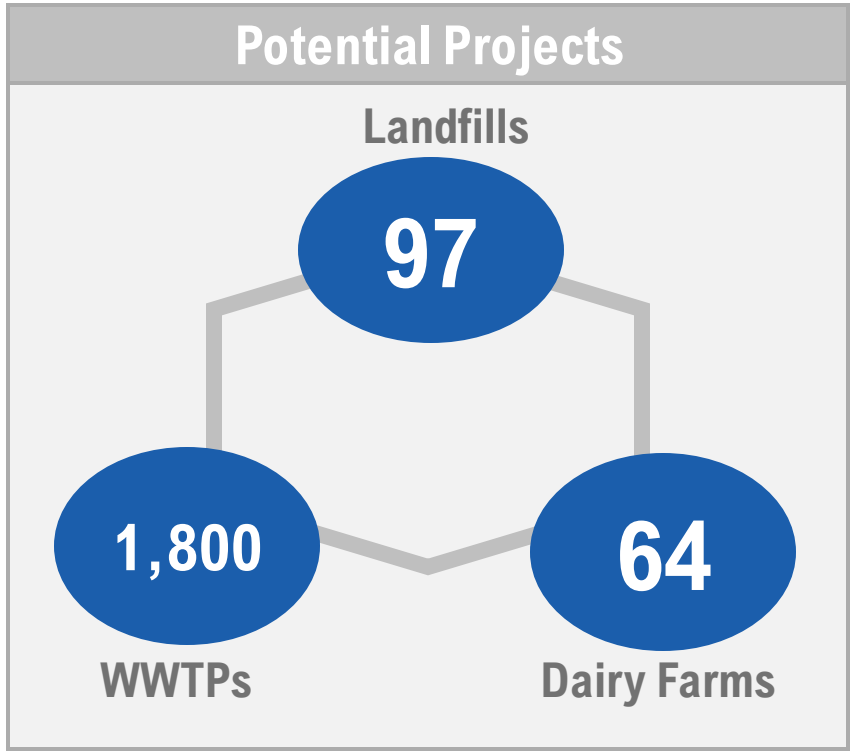
- **#13 in the U.S.** for methane production potential from biogas sources.
- **70 operational biogas projects** with potential for **375 new projects** to be developed based on the estimated amount of available organic material.
- **Generate $1.13 billion** in capital investment and create 9,383 short-term jobs and 623 long-term jobs.
- Produce **52 BCF/yr of biogas** or **33 BCF/yr of renewable methane**.
- Reduce greenhouse gases by the **equivalent of removing 3.29 million cars** from the road.

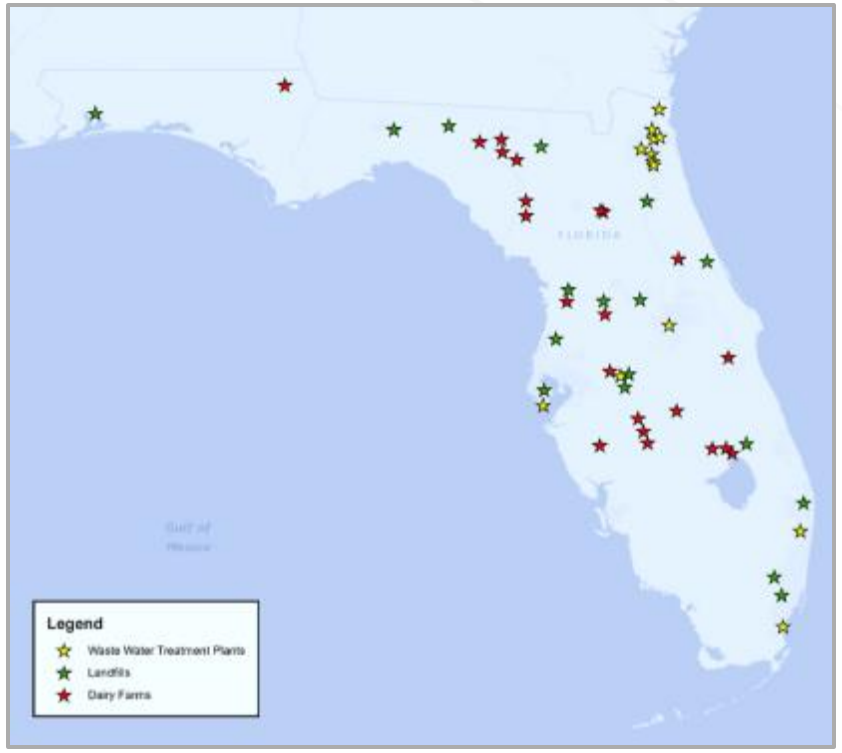
AMERICAN BIOGAS COUNCIL



Florida's RNG Development Potential

There is significant opportunity





- Florida Market RNG Projects:
  - ~2,000 wastewater treatment plants, dairy farms and landfills.

Current RNG Projects

Peoples Gas is the development leader with the first 3 RNG projects in the state of Florida.

- Three RNG Projects:
  - Landfill: New River
  - Dairy Farms: Larson, Alliance
- The total RNG output from these projects represents ~3,000 MMBTU/day of gas, approximately 5% of Peoples Gas' residential supply



Florida's RNG Potential

Customers want to understand more

We surveyed 25,000 customers to determine:

- **Awareness of and interest in RNG**
- **Awareness of Peoples Gas RNG initiatives**
- **Interest in carbon emissions**



We received 2,000 responses. What we found:

- **Customers don't know much about RNG**
  - Not sure what it is, how it's different than traditional natural gas, or the value
- **There's a willingness to learn more**
- **Several key factors of interest:**
  - Cost and incentives
  - Peoples Gas is a trusted resource
  - Reliability
- **Most customers are interested in reducing carbon emissions and are willing to pay more when they understand:**
  - Environmental impacts
  - Cost impacts

Current RNG Projects

Alliance Dairies



- Located in Trenton
- Peoples Gas constructed the biogas conditioning facility to condition biogas from Alliance Dairy Farms to pipeline-quality gas for injection into the FGT interstate pipeline system
- Peoples Gas owns and operates the processing plant
- Peoples Gas developed, built, and owns the related pipelines and interconnection to deliver biomethane from the conditioning facility to the interstate pipeline system
- Production: 300 MMBtu/Day
  Enough to serve about 4,400 homes per year





Alliance Dairies

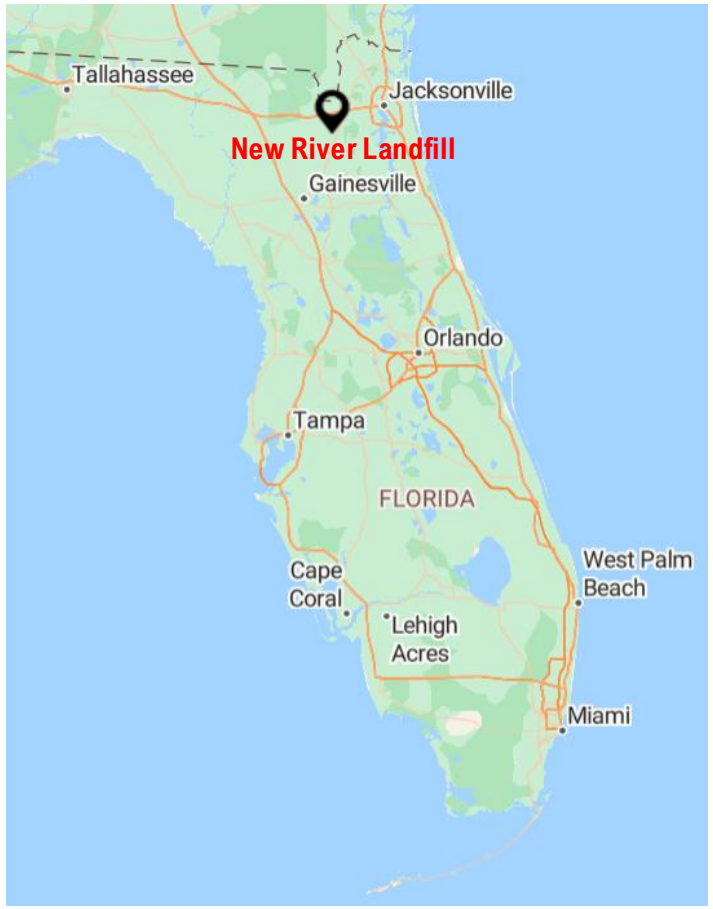
Expanding sustainability through RNG

- The Alliance Dairies RNG operation captures waste from approximately 6,500 cows and cleans it to pipeline-quality natural gas.
- An estimated 105,000 MMBtu is created, enough to serve about 4,400 homes annually.
- For more about Alliance Dairies and how RNG is part of their sustainability journey, check out our video.
  Peoples Gas Alliance Dairies Renewable Natural Gas Facility on Vimeo



Current RNG Projects

New River Landfill



- Located in Raiford
- New River RNG LLC will use the facility to condition biogas and inject the treated gas on to the FGT pipeline
- Peoples Gas developed, built and owns the related pipelines and interconnections to deliver biogas from to the conditioning facilities and deliver the conditioned gas to the interstate pipeline system
- Production: 1,900 MMBtu/day
  Enough to serve about 17,000 homes per year





New River Landfill

Reducing emissions while providing clean energy

- Peoples Gas is transporting RNG produced by OPAL Fuels from the New River landfill in Raiford for use in the Florida market.
- The RNG plant is expected to reduce the landfill's methane emissions by approximately 14,000 tons per year and will also help avoid emissions by more than 34,000 tons per year of CO_2 from fossil fuels.
- The RNG transported through the pipeline every year will equal approximately 500,000 MMBtu – the equivalent amount of natural gas required to serve nearly 17,000 Florida homes.



Current RNG Projects

Larson Dairy



- Located in Okeechobee
- Consists of two biogas conditioning facilities to condition biogas from Larson Dairy Farm to pipeline-quality gas for injection into the interstate pipeline system
- Peoples Gas developed, built and owns the related pipelines and interconnections to deliver biogas from the digestors to the conditioning facilities and deliver the conditioned gas to the interstate pipeline system
- Production: 800 MMBtu/Day





Our Energy Evolution

We're invested in diversifying energy resources for Florida



Renewable Natural Gas

We currently have three projects—from building, owning and operating RNG facilities to moving supply across our system to extend access and use.



Compressed Natural Gas

Peoples Gas serves 54 CNG stations across Florida, and we've helped fleets reduce emissions, improve reliability and lower costs.



Liquefied Natural Gas

We help Florida ports fuel industries that need a more sustainable option, and we're investing in infrastructure to expand access and use of LNG to improve reliability and resiliency of the state's natural gas system.

Renewable Natural Gas

Leading the way to a more sustainable Florida



Travis Payne

Director, Alternative Fuel Systems

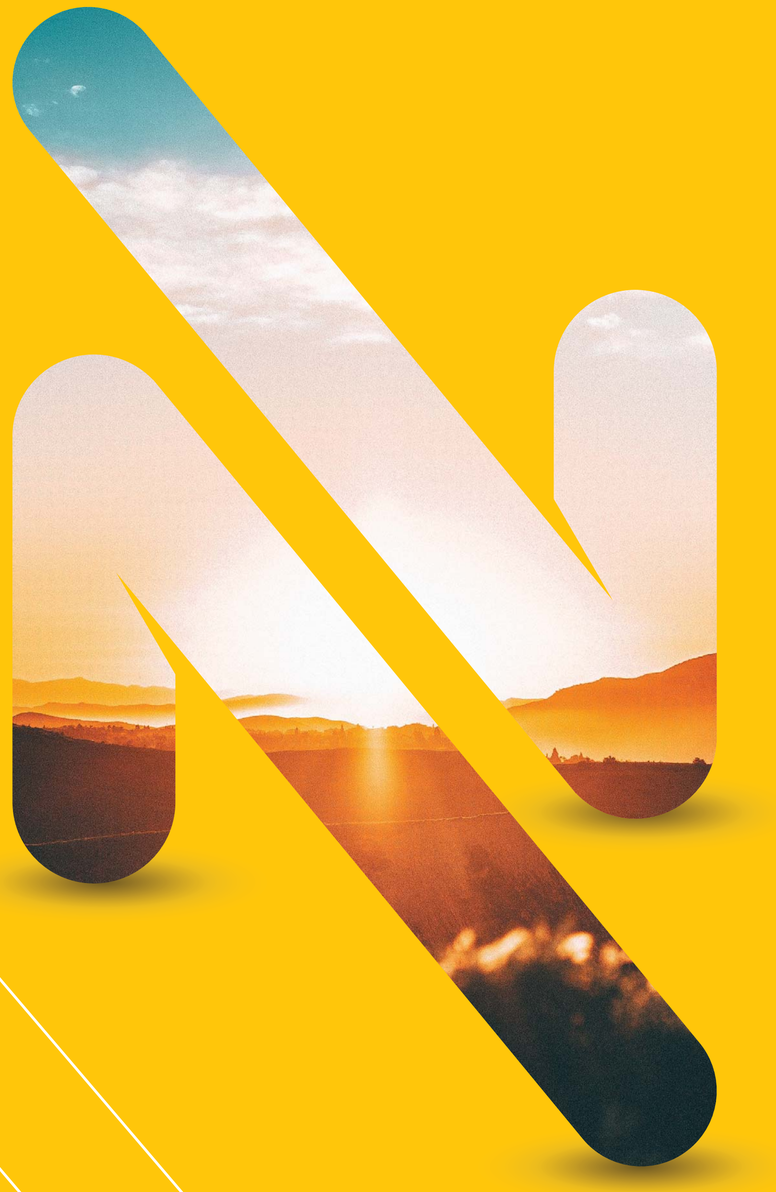
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Jorge Herrera
Nopetro

ENERGY, COMMUNICATIONS **AND CYBERSECURITY SUBCOMMITTEE**

DECEMBER 6TH 2023

NOPETRO ENERGY



We strategically develop, fund, own and operate RNG and LNG production and distribution facilities to supply heavy transportation and industrial customers with turnkey fueling solutions

	NOPETRO ENERGY CNG / NOPETRO ENERGY RNG	NOPETRO ENERGY LNG
CO_2	30-400% REDUCTION	100% REDUCTION
NOx	90%+ REDUCTION	100% REDUCTION
Particulate Matter	75% REDUCTION	100% REDUCTION

Vertically Intergrated Solutions

RNG / LNG Production & Distribution

Dedicated White-Label LNG ISO Container Shipping

Last Mile Delivery & Equipment Service

Decarbonization Targets

Industrials

Heavy Transportation

Autonmous Power Generation

Renewables Backup

FLORIDA'S LEADER IN RNG FUELING INFRASTRUCTURE DEVELOPMENT & OPERATIONS

- Designs, finances, builds, operates, maintains and supplies **renewable natural gas** production and distribution infrastructure

- Existing **10-20 years exclusive RNG FPAs** with Central Florida Transportation Authority, Leon County Schools, Republic Services, City of Tallahassee, Advanced Disposal, St. Johns County, Leon County

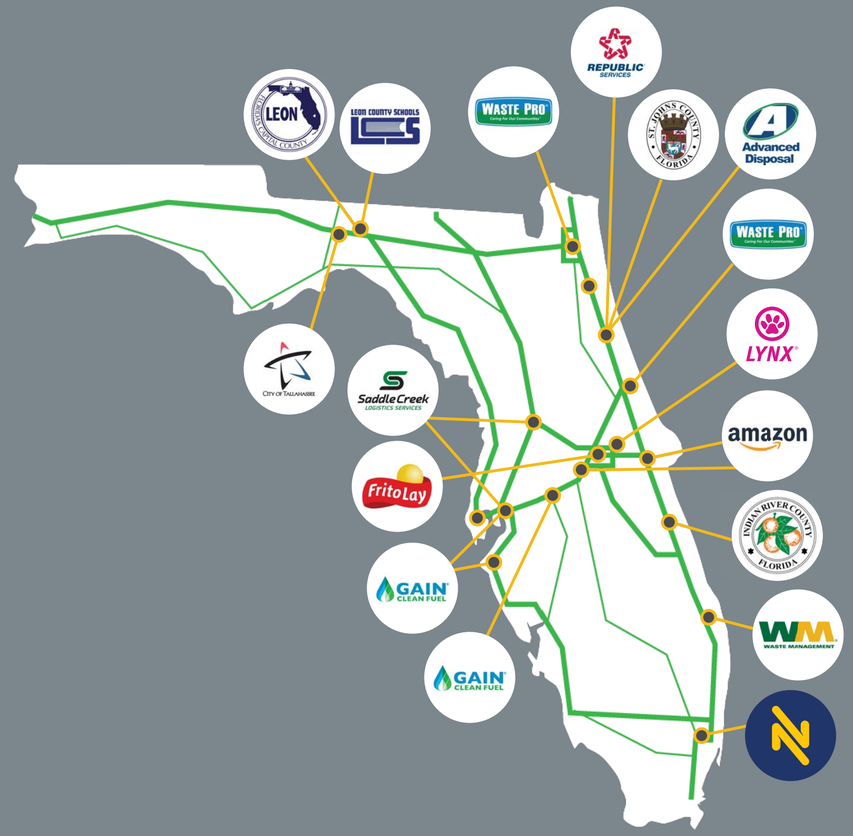
- **Core business** – turn-key developed infrastructure to supply long-term contracted counterparty (e.g. transit, solid waste, mining, industrial/power) then sell excess capacity

- **Nopetro RNG Fueling Facilities**

Tallahassee – 2 Sites
Orlando – 3 Sites
St. Augustine
Bunnell
Tampa

Jacksonville – 2 Sites
Bradenton
Daytona
Kissimmee
West Palm Beach

Miami
Vero Beach
Currently in development
RNG Production Plant
and RNG fueling station



Facilities and Counterparties

Nopetro has counterparties across the state of Florida and focuses facilities on major highways for ease of access

NATURAL GAS USE CASES AND END MARKETS

Transportation fleets, industrial and power generation customers across the globe are switching to natural gas as owners and operators see material economic benefit augmented by multiple renewable feedstocks

HEAVY-DUTY AND TRANSIT



Long Haul Trucking

Heavy-duty, high-mileage trucks consume high amounts of fuel and benefit from the lower costs of natural gas



Transit

Transit agencies are increasingly switching to natural gas vehicles ("NGVs") with over 11,000 natural gas buses on the roads today across the country



Refuse

Over 17,000 natural gas refuse trucks operate across the country and approximately 60% of all new trucks on order are NGVs



Source: NVG America

Ready Mix

Large fuel consuming ready-mix trucks operating in carbon-intensive construction are optimal for RNG transition

TRANSPORTATION INFRASTRUCTURE



Airports

Air-side NGVs include runway street sweepers, baggage tows, dump and plow trucks, tractors and staff vehicles



Land - Sea - Rail

Off-road, marine and railroad are three demanding high horsepower segments leveraging NG to reduce fuel costs

INFRASTRUCTURE



Factories



Power Plants



Off -Grid

Industries consuming vast amounts of diesel, HFO, or propane in heating processes and autonomous power generation can achieve dramatic bottom line savings and reduce their carbon footprint with delivered clean, cheap RNG and LNG.

RNG ENGINE OVERVIEW

Transportation fleets, industrial and power generation customers across the globe are switching to natural gas as owners and operators see material economic benefit augmented by multiple renewable feedstocks

CUMMINS (NYSE: CMI) HEAVY DUTY RNG ENGINES

- Diesel-like performance and range
- Maintenance free exhaust system- no particulate filters, diesel exhaust fluid, traps or SCR (Urea) required
- Reduces noise and air pollution



6.7 Liter Cummins Engine

- 200 - 235 HP
- 520 – 750 lb-ft of torque
- Designed for medium-duty trucks/school buses



8.9 Liter Cummins Engine

- 250 – 320 HP
- 660 – 1000 lb-ft of torque
- Meets EPA 2017 GHG emission reqs.
- +40,000 currently operating in US
- Designed for refuse and work trucks



11.9 Liter Cummins Engine

- 310 – 400 hp
- 1150 – 1450 lb-ft torque
- Designed for heavy-duty cycles, including regional haul, truck/tractor, vocational and refuse applications



15.0 Liter Cummins Engine

- 500 HP
- 1.850 lb-ft of torque
- Designed for Heavy-duty trucking
- Available in 2023

RNG FUELING PROJECT REFERENCE: CENTRAL FLORIDA TRANSPORTATION AUTHORITY

Designed, financed, built and operating one of nation's largest industrial RNG distribution facilities

- Exclusive 20-year RNG fuel requirements supplier to transit system in Orlando, Florida
- Top 50 largest U.S. transit agencies
- Strategic infrastructure developed with transit system as key counterparty
- Excess RNG capacity distributed to industrials and other heavy fleets



Nopetro / LYNX RNG Distribution Facility



INDIAN RIVER COUNTY RNG PLANT - COD 1/2025

SOUTH FLORIDA'S FIRST RENEWABLE NATURAL GAS PRODUCTION FACILITY

Nopetro will harden energy security by producing local source of natural gas to supply regional demand

RNG PROJECT FEEDSTOCK – LANDFILL WASTE TO RNG

- Location: Vero Beach, Florida
- 20+ Year partnership with Indian River County
- Capture & condition landfill gas to pipeline grade

ANNUAL RNG PRODUCTION

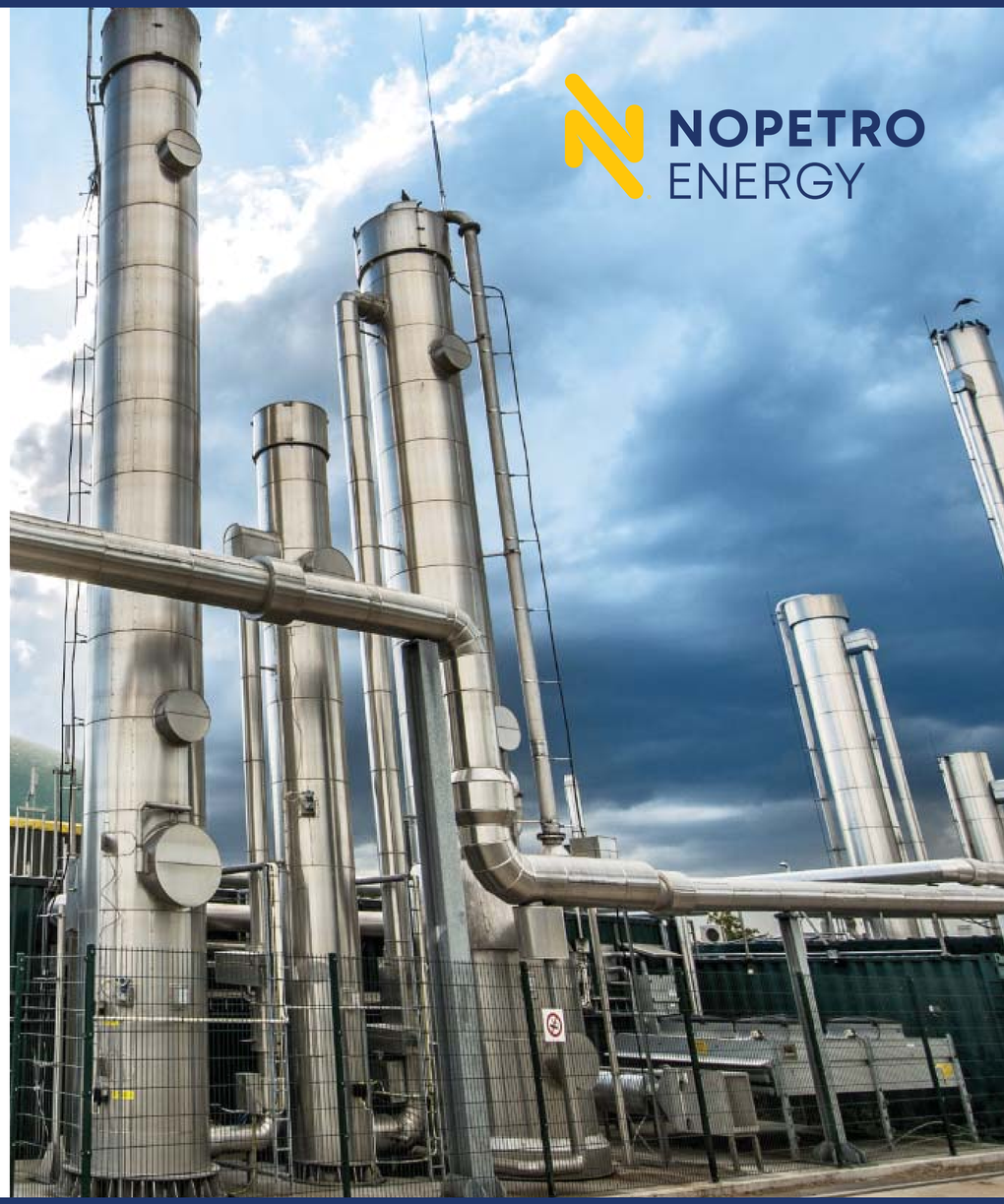
- ~3M Gallons / Year

ANNUAL RINS PRODUCTION

- ~4M RINs / Year

ANNUAL CO2 DISPLACEMENT

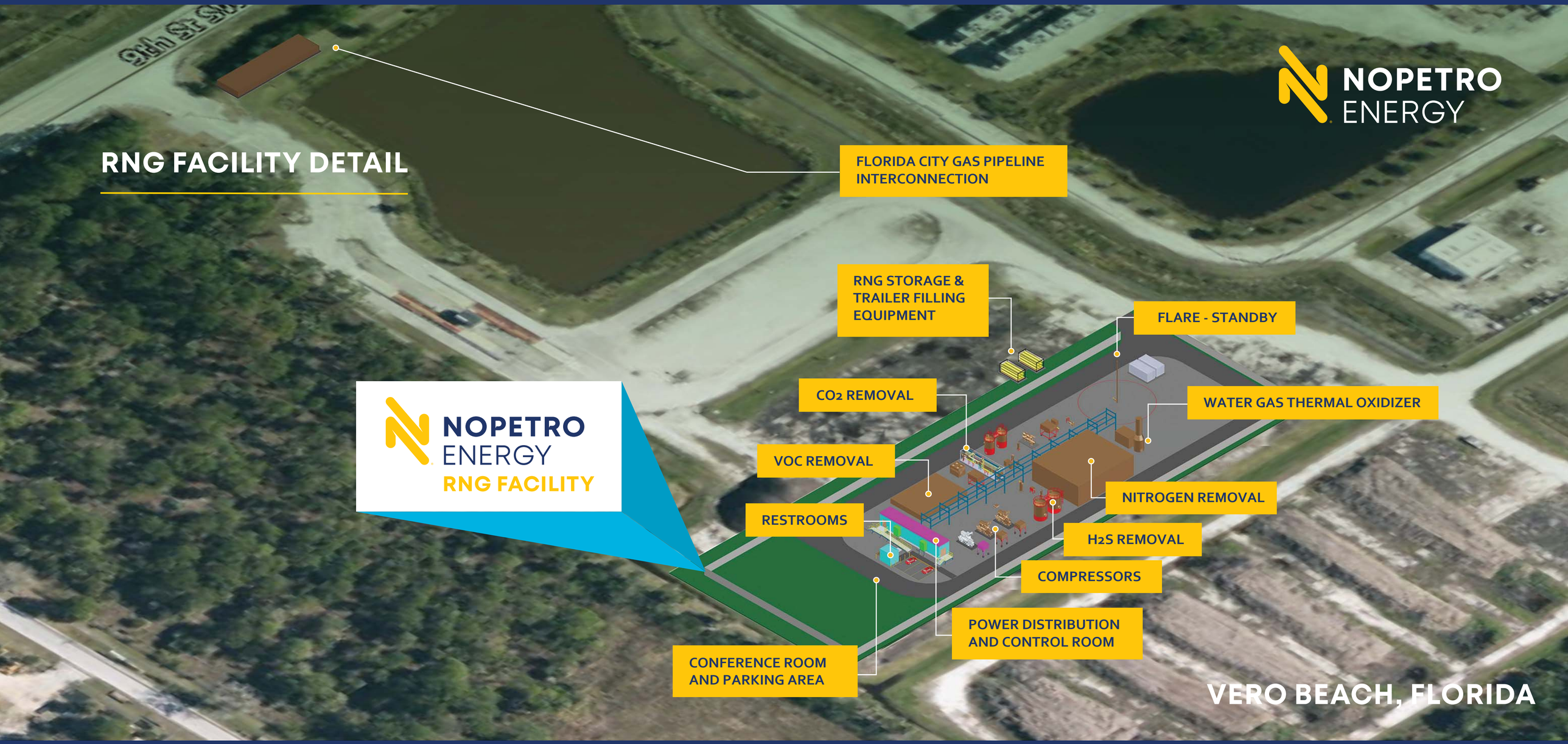
- Equals: 100,000 Metric Ton



NOPETRO ECO DISTRICT MAP



RNG FACILITY DETAIL



SUMMARY

- Florida-based Nopetro is leading natural gas development in heavy transportation and industry
- Developing South Florida first Renewable Natural Gas production plant in partnership with Indian River County
- Approximately 100 local jobs created during construction and plant commissioning
- Will enhance local energy security by producing native source of natural gas for regional demand



THANK YOU

NOPETRO ENERGY



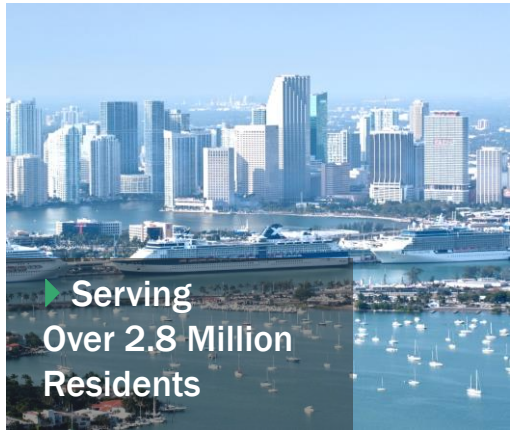
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Billie Jo McCarley
Miami-Dade County, WASD



BIOGAS USE FOR COGENERATION AT MIAMI-DADE

Presented by
Billie Jo McCarley PE,
Deputy Director of
Operations















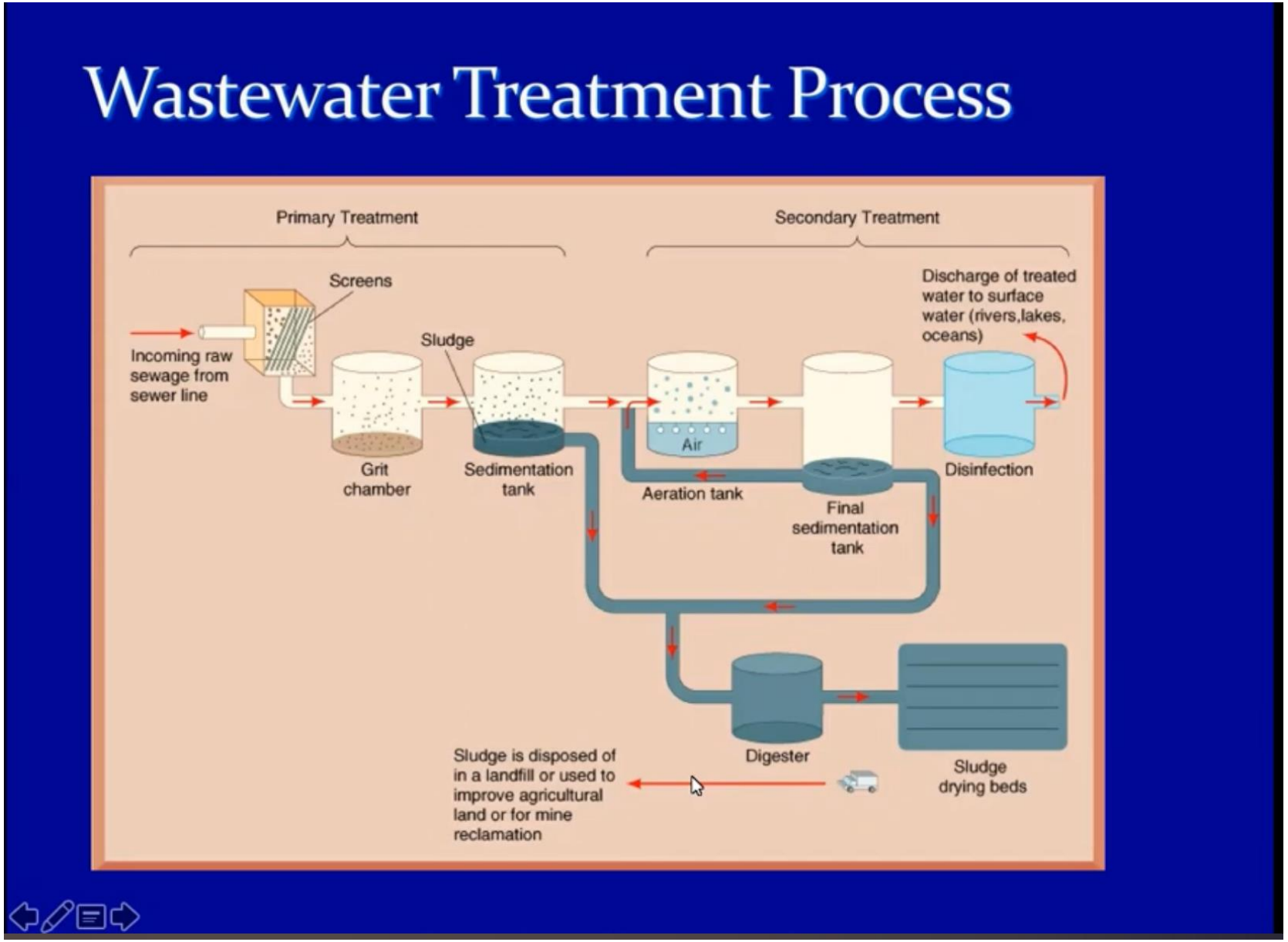


WASD AT A GLANCE

The Miami-Dade Water & Sewer Department (WASD) is the largest water utility in the Southeastern United States, providing high-quality, affordable water & wastewater services to the people of Miami-Dade County.

WASTEWATER TREATMENT PROCESS

- Two Primary Functions
  - Liquid Stream processing for discharge into deep injection wells or Ocean Outfall
  - Solids Treatment for fertilizer



COMBINED HEAT & POWER AND EFFICIENCY INITIATIVES

Waste to Energy Cogeneration - Impact



Cogeneration produces two useful sources of energy

Electricity

- 2-3 MW
- 30% of energy needs

Heat

- Add heat to digesters
- Dry biosolids
- Cool cogeneration building

CURRENT PRACTICE – COMBINED HEAT AND POWER SYSTEMS

Cogeneration of Biogas

- 36 Anaerobic digesters
  - Waste Sludge
  - Miami Dade County's only Fats, Oil, and Grease(FOG) Receiving Station. FOG is excellent methane producer. Revenue source for county through tipping fees.
  - Future use of Landfill gas



- 4- 1,200 Kw and 4- 2,000 Kw Generators
- Annually Produce 800,000 Wet Tons of Class B Biosolids
- Spend ~$26 million in electricity annually Biogas burned to produce energy for plant operations
- 22 million kWh of electricity generated in 2021
- Capacity to offset 30% of energy needs at two wastewater treatment plants
- ~$200,000/month in energy savings

WHY COMBINED HEAT AND POWER

Challenges/Benefits for Combined Heat and Power	Miami-Dade Solution
Costs	Large Initial investment. Miami-Dade has 100% power redundancy with utility power and backup diesel generators
Operating CHP not Wastewater Core Competency	Miami-Dade employs over 400 employees at our Wastewater Facilities. Skilled electricians and power plant operators already on staff. Otherwise consider third-party assistance.
Increased Resiliency/lower Energy Footprint	Harvesting methane decreases our energy footprint
Methane purity	Cleaning methane from Hydrogen Sulfide, water vapors, and other impurities key to sustainable engine operations.
Generator fuel consistency	Miami-Dade uses methane spheres for consistent flow. Option available to supplement with natural gas

THANK YOU

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Christine King
Idaho National Laboratory

GAIN Overview
Advanced Nuclear Industry

Dec 6, 2023

Florida Energy, Communications & Cybersecurity Subcommittee

Christine King, Director

Gateway for Accelerated Innovation in Nuclear

Christine.king@inl.gov

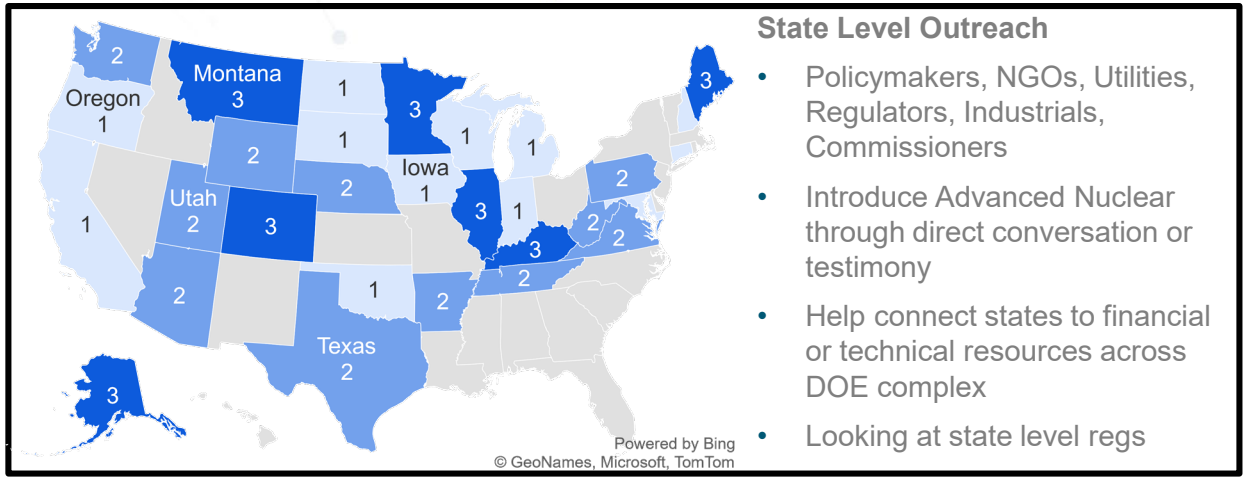
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INL/MIS-18-50189

2024 Activities

GAIN Gateway for Accelerated Innovation in Nuclear





State Level Outreach

- Policymakers, NGOs, Utilities, Regulators, Industrials, Commissioners
- Introduce Advanced Nuclear through direct conversation or testimony
- Help connect states to financial or technical resources across DOE complex
- Looking at state level regs

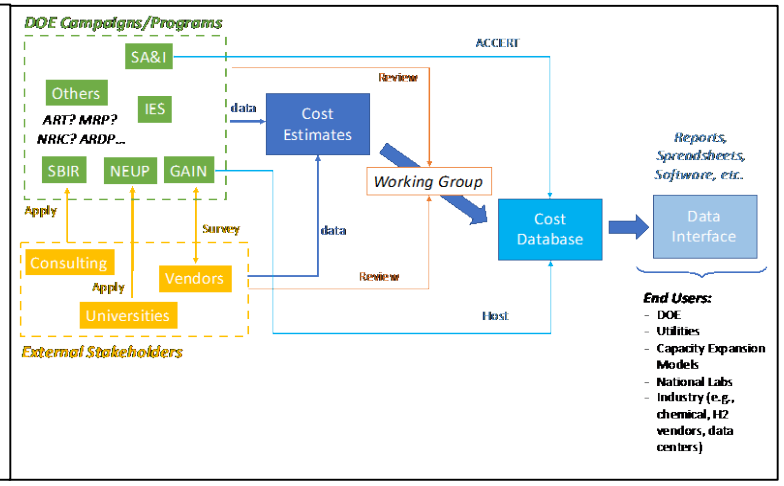




Advanced Reactor Cost

Project will update latest costs combining two approaches

- Use existing public nuclear cost data to develop advanced reactor cost ranges.
- Work with developers and utilities under NDA to collect cost projections to develop an anonymous advanced reactor cost ranges.





Advanced Nuclear Versatility

GAIN Gateway for Accelerated Innovation in Nuclear

Spectrum of Sizes and Options

Micro
(Few MW)

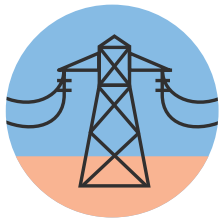
Mini
(10s of MW)

Small
(100s of MW)

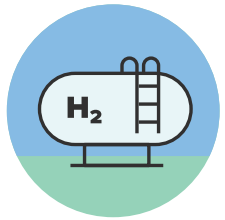
Large (1,000+ MW)

Small Town: 1 Megawatt (MW)
Mid-size City: 1 Gigawatt (GW)
The US: 1,000 Gigawatts

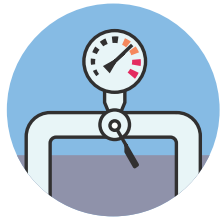
Variety of Outputs



Electricity

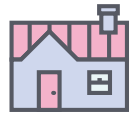


H_2 Hydrogen



Process Heat

Multitude of End Uses



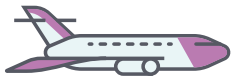
Homes



Vehicles



Businesses



Aviation



Rail



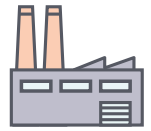
Shipping



Concrete



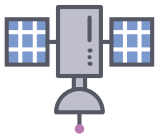
Steel



Factories



Water

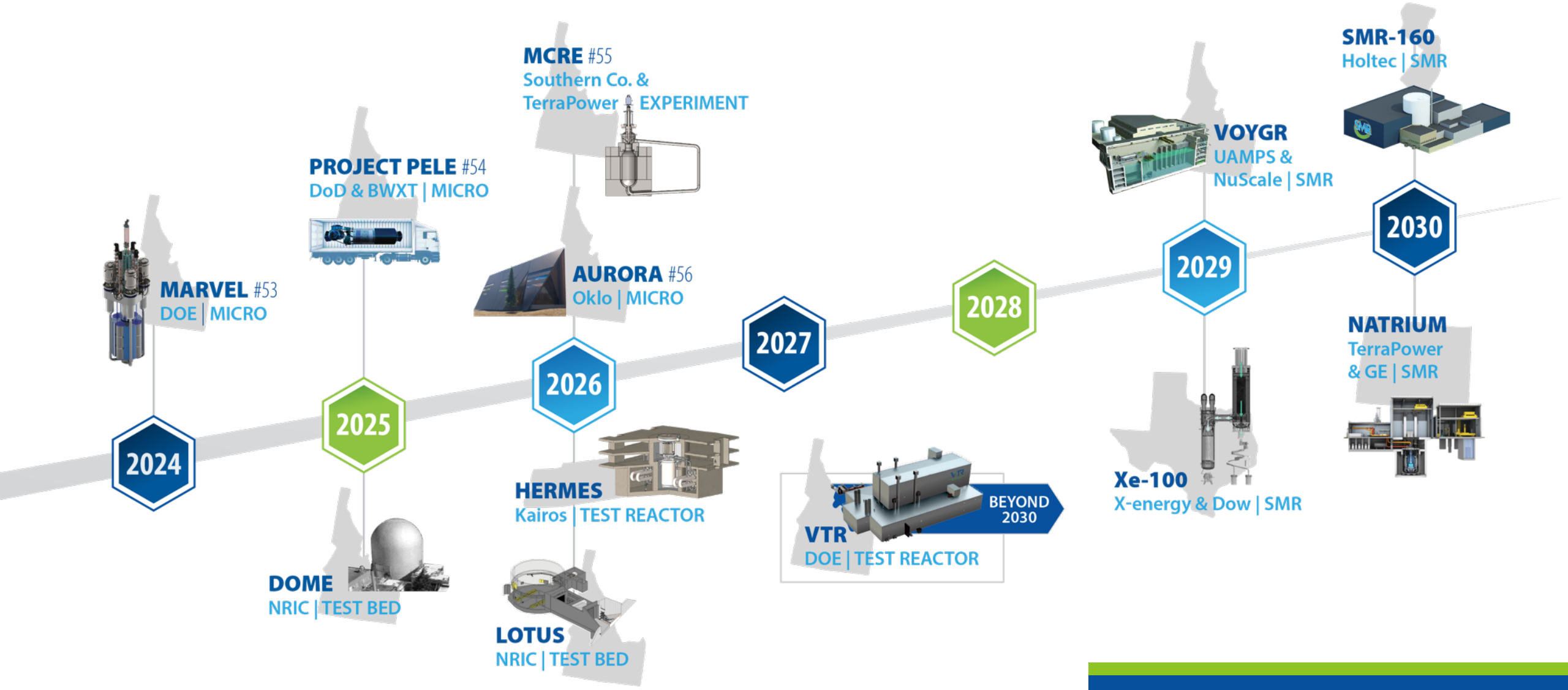


Space

NEI

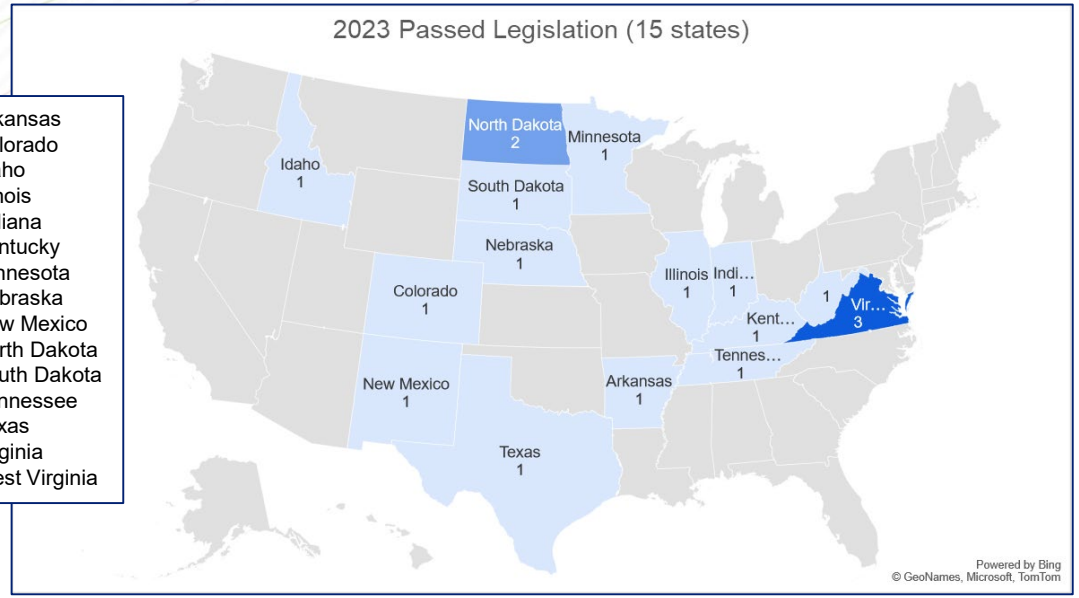
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Accelerating advanced reactor demonstration & deployment



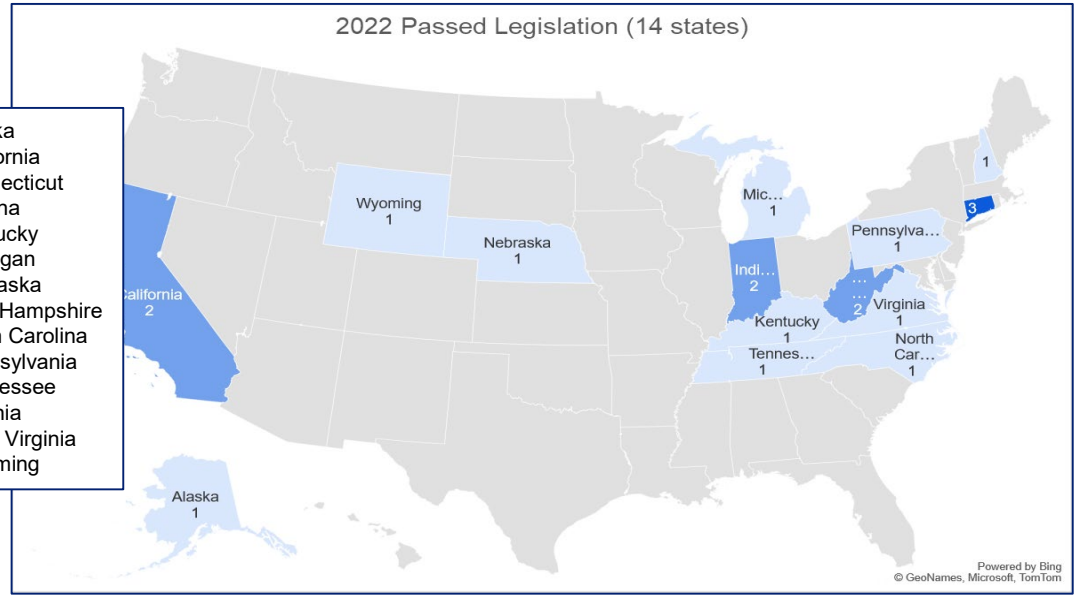
U.S. SNAPSHOT *(updated 8/17/23)*

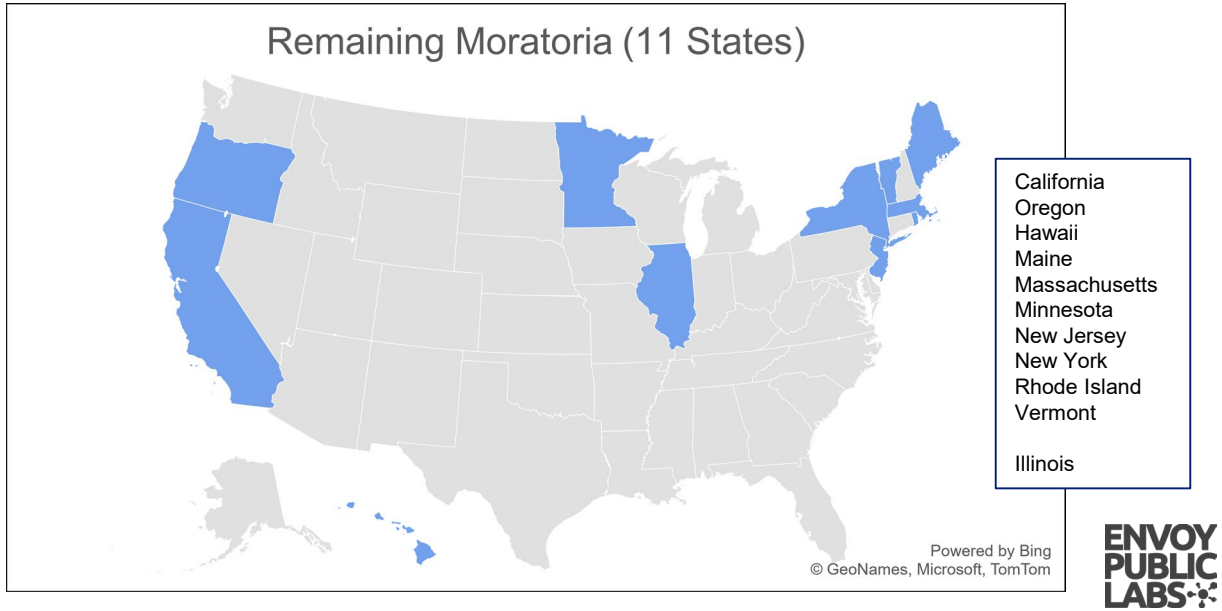
GAIN Gateway for Accelerated Innovation in Nuclear



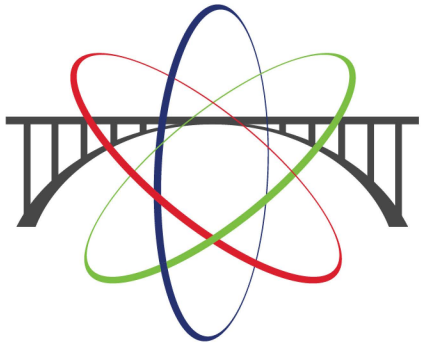
34 Bills in 23 States

- 13 Study/Task Forces (5 reports due by year end)
- 6 Regulatory/Permitting
- 2 Workforce (NE, VA)
- 5 Energy Targets
- 2 NRC Agreement (IN,CT)
- 2 Moratoria Lifted (CT, WV)
- 2 Existing Fleet (CA)
- 2 Waste/Interim Storage (AR, NM)





ENVOY PUBLIC LABS



GAIN

Gateway for Accelerated Innovation in Nuclear

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Argonne NATIONAL LABORATORY

September 12, 2022