U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

DOE Packaged CHP Accelerator

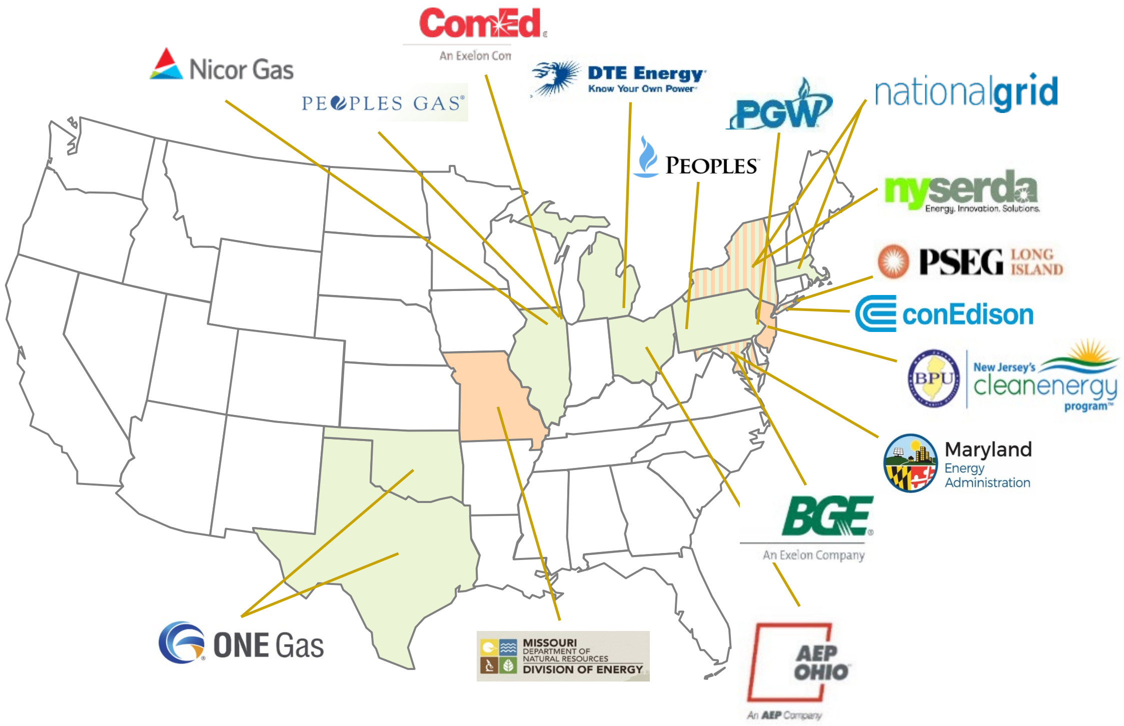
Hydrogen Infrastructure and Accelerator Update

August 4, 2022

Today's Agenda

- Welcome and introduction
- Hydrogen Infrastructure
  – Mike McCurdy, P.E.
    Managing Director, Fuels and Power
    ICF
- Packaged CHP Accelerator – Path Forward
  – Bruce Hedman
    Coordinator, Packaged CHP Accelerator

CHP Engagement Partners



This Webinar will be recorded

Hydrogen Infrastructure

Mike McCurdy, ICF

U.S. DEPARTMENT OF ENERGY

Packaged CHP Accelerator Webinar - Hydrogen Infrastructure

Mike McCurdy, P.E.
Managing Director – Fuels & Power
Energy Advisory, ICF
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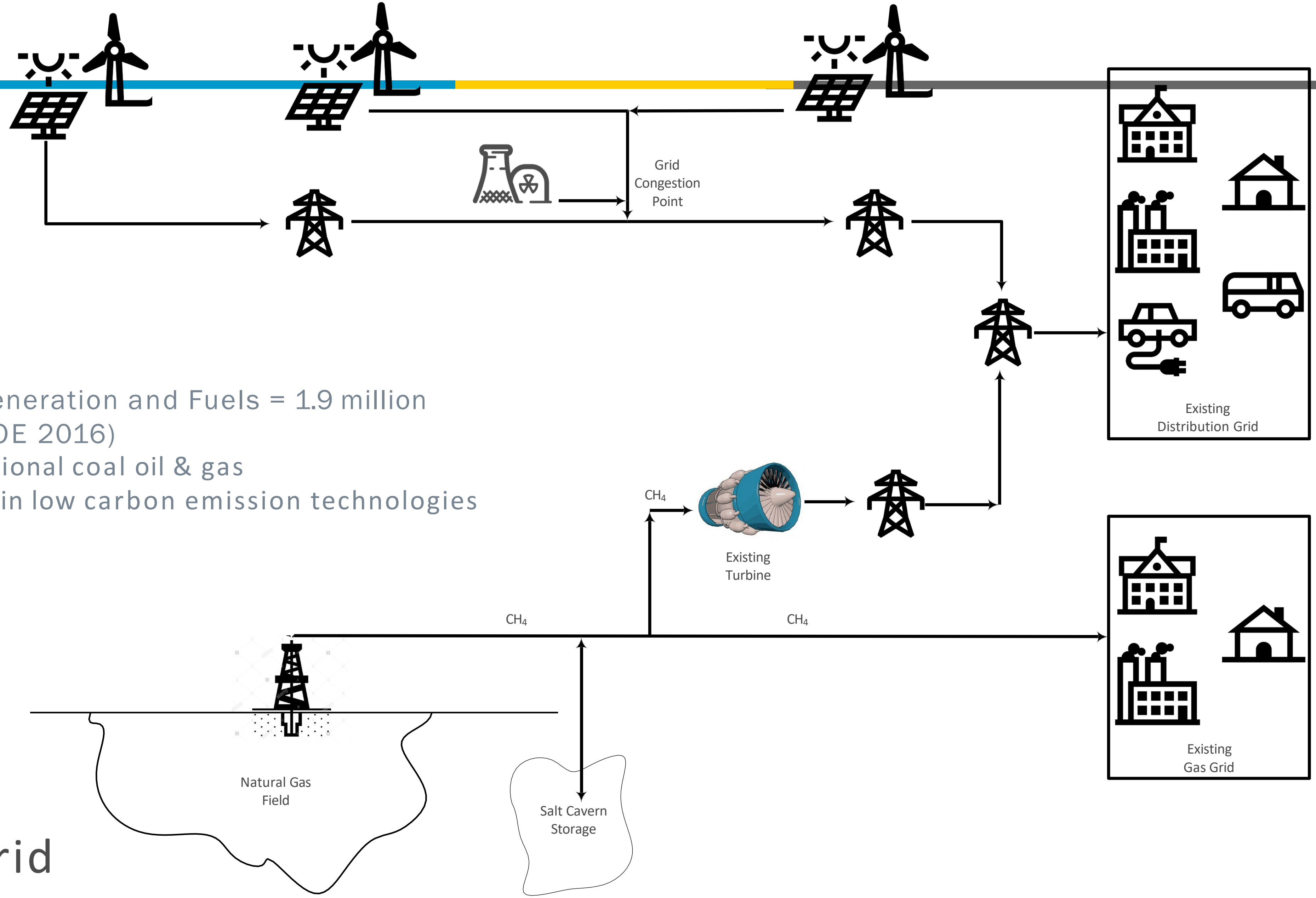
Is There a Need for Hydrogen?

Electric Power Generation and Fuels = 1.9 million workers in US (DOE 2016)

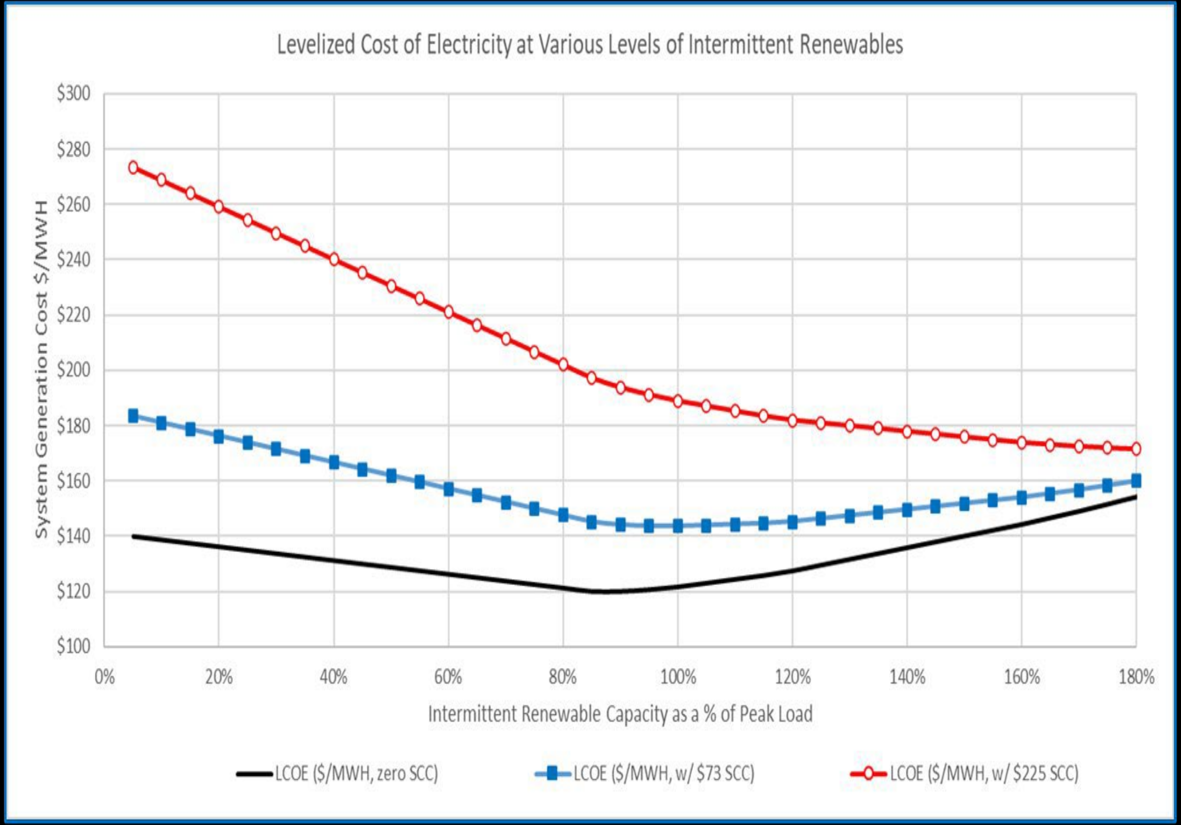
- 1.1 million traditional coal oil & gas
- 800 thousand in low carbon emission technologies

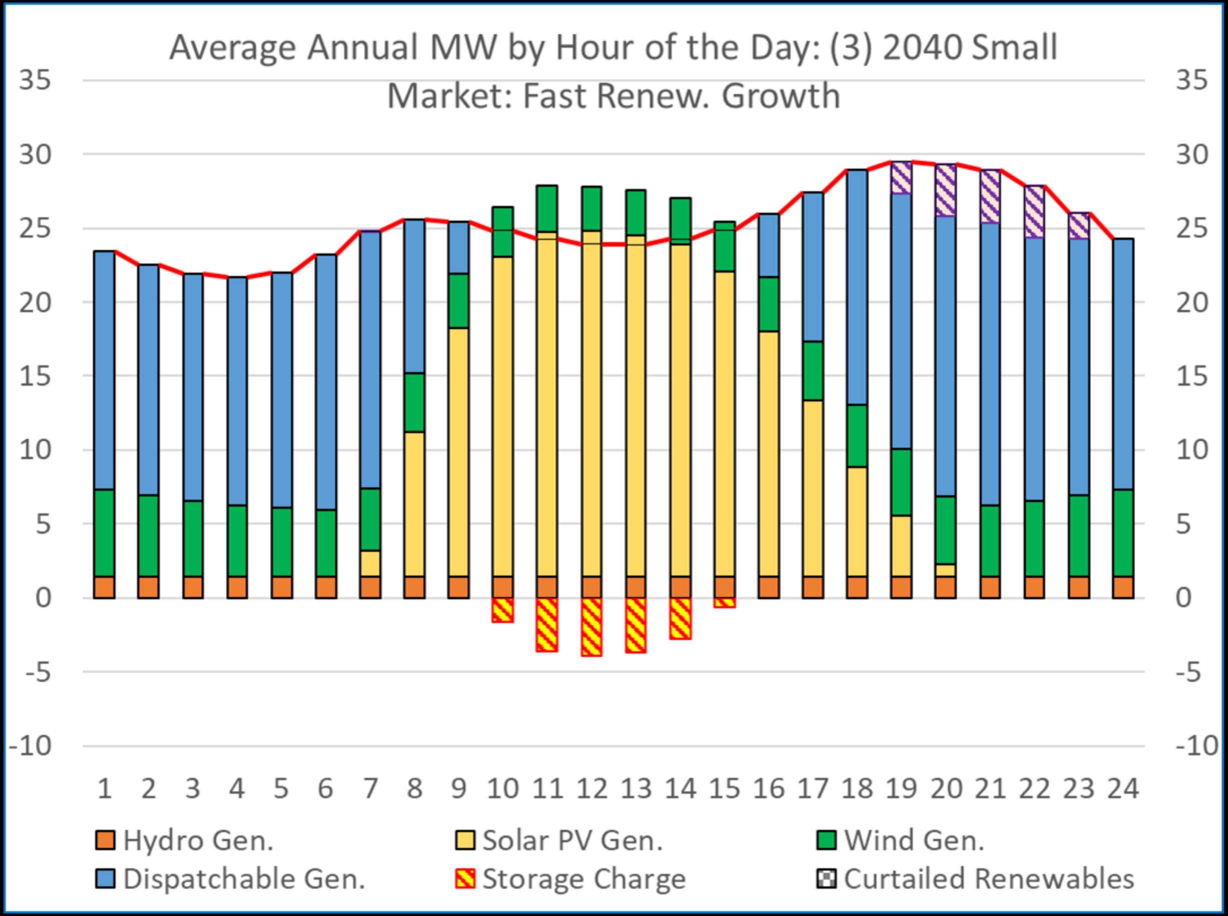


Existing Grid

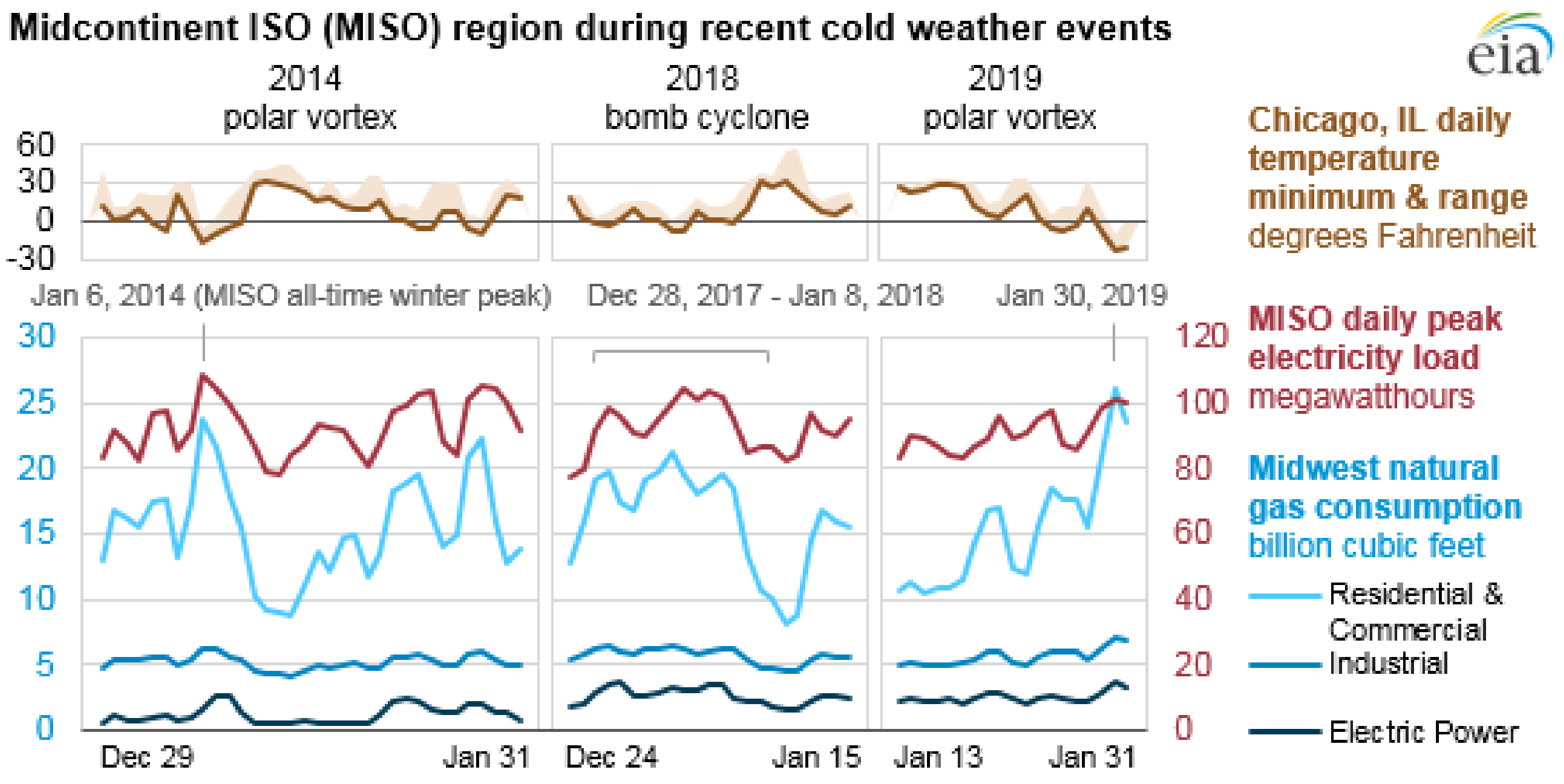
You Still Need Dispatchable Power, How to Do it GHG Free?

Renewable Penetration in Isolated Island Grid





Natural Gas System (Chemical Storage) Currently Provides Peaking and Long-Term Storage Capacity



https://www.eia.gov/todayinenergy/detail.php?id=38472

- Demand can double or even treble in days, difficult for battery storage
- Battery storage economically viable for 4-8 hours
- ERCOT would have needed ~90 hours this spring

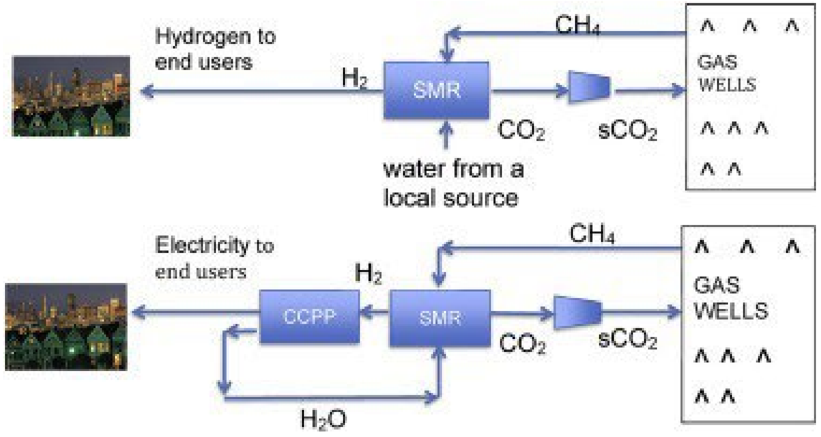
Emerging Hydrogen Technologies

Opening New Opportunities?

Note, Use of Colors as Designators Falling out of Favor

Hydrogen Production & Utilization

- Current most widely used method of mass production of hydrogen is steam methane reforming (SMR) used primarily for ammonia industry
- Types of hydrogen production:
  - **Green Hydrogen: hydrogen produced via electrolysis from renewable energy or gasification of biomass**
  - **Blue Hydrogen: hydrogen produced from steam methane reforming (SMR) with carbon capture and sequestration (CCS)**
  - **Pink Hydrogen: hydrogen produced via electrolysis from nuclear energy**
  - **Gray Hydrogen: hydrogen produced from SMR without carbon capture and sequestration**
  - **Brown hydrogen: hydrogen produced from coal gasification**



SMR with CCS

Steam-methane reforming reaction

$CH_4 + H_2O$ (+ heat) $\rightarrow CO + 3H_2$

Water-gas shift reaction

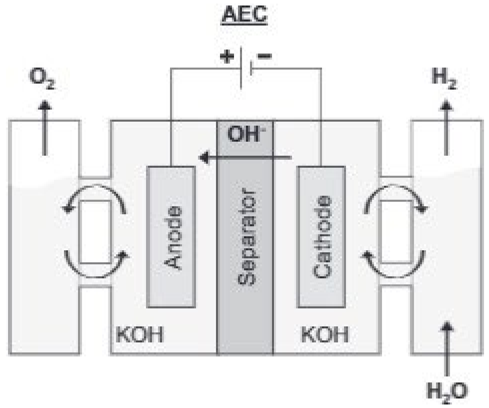
$CO + H_2O \rightarrow CO_2 + H_2$ (+ small amount of heat)

Sources:
https://www.sciencedirect.com/science/article/pii/S0360319920304262
https://www.energy.gov/eere/fuelcells/hydrogen-production-natural-gas-reforming

Electrolyzers

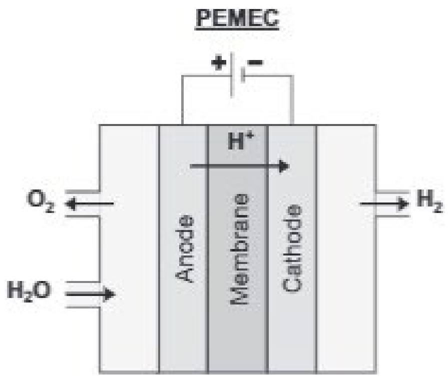
Sources:https://reader.elsevier.com/reader/sd/pii/S0360319917339435?token=9E70FEB9AFA100FDF19CCD5AF2AF193052BF92B1C3D9533FBDA878D75D1A468F17DD195646F71D75F5DE977C82D8CEDA

Alkaline



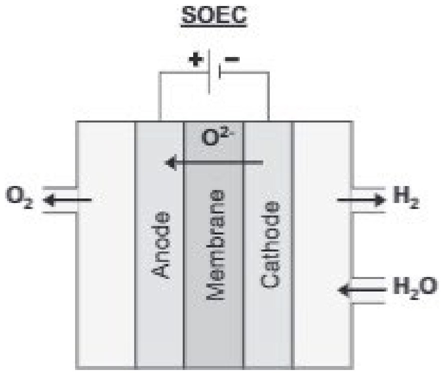
- Liquid electrolyte solution (i.e. KOH or NaOH)
- Operating temperatures: 60-80° C
- Production rate: <760 m^3 H_2/hr
- System energy: 4.5-6.6 kWh_{el}/m^3 H_2
- Cold start time: <60 mins
- Stack lifetime: 60,000-90,000 hrs
- Mature technology

Proton Exchange Membrane (PEM)



- Solid polymer electrolyte
- Operating temperatures: 50-80° C
- Production rate: <40 m^3 H_2/hr
- System energy: 4.2-6.6 kWh_{el}/m^3 H_2
- Cold start time: <20 mins
- Stack lifetime: 20,000-60,000 hrs
- Commercial technology

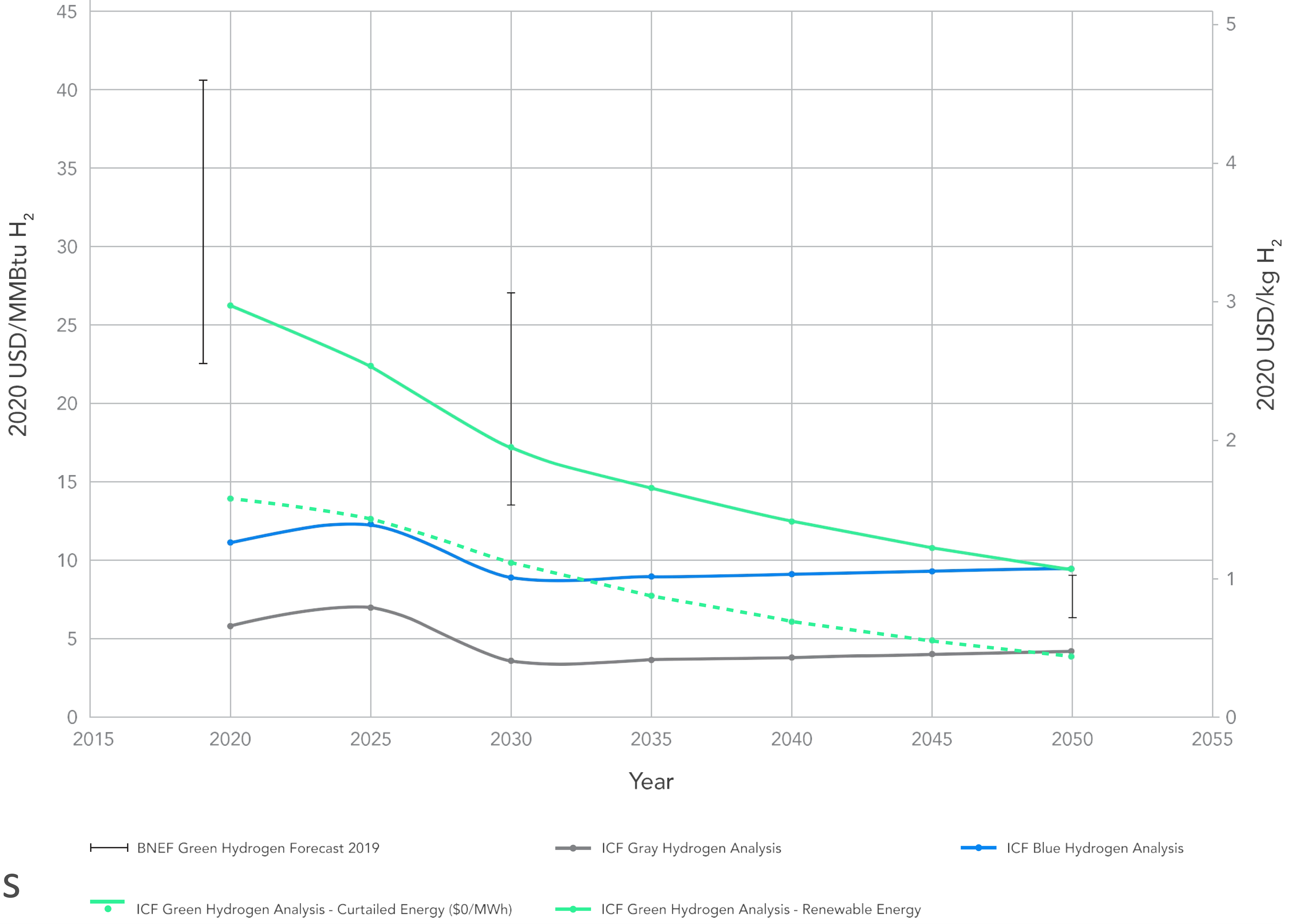
Solid Oxide



- Solid ceramic material for electrolyte
- Operating temperatures: 650-1000° C
- Production rate: <40 m^3 H_2/hr
- System energy: >3.7 kWh_{el}/m^3 H_2
- Cold start time: <60 mins
- Stack lifetime: <10,000 hrs
- Demonstration phase

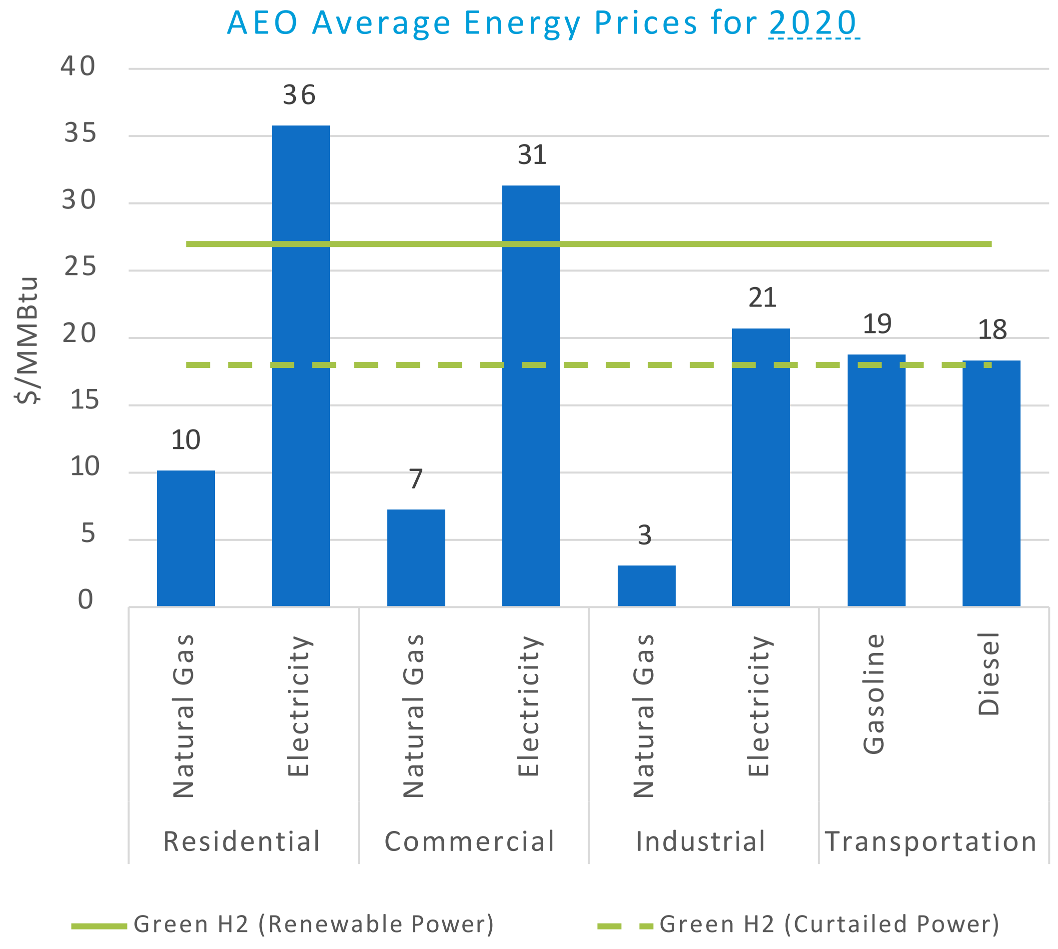
PEM electrolyzers projected to cost less ($/$kW_{el}$) than alkaline electrolyzers through scale-up and R&D technology improvements

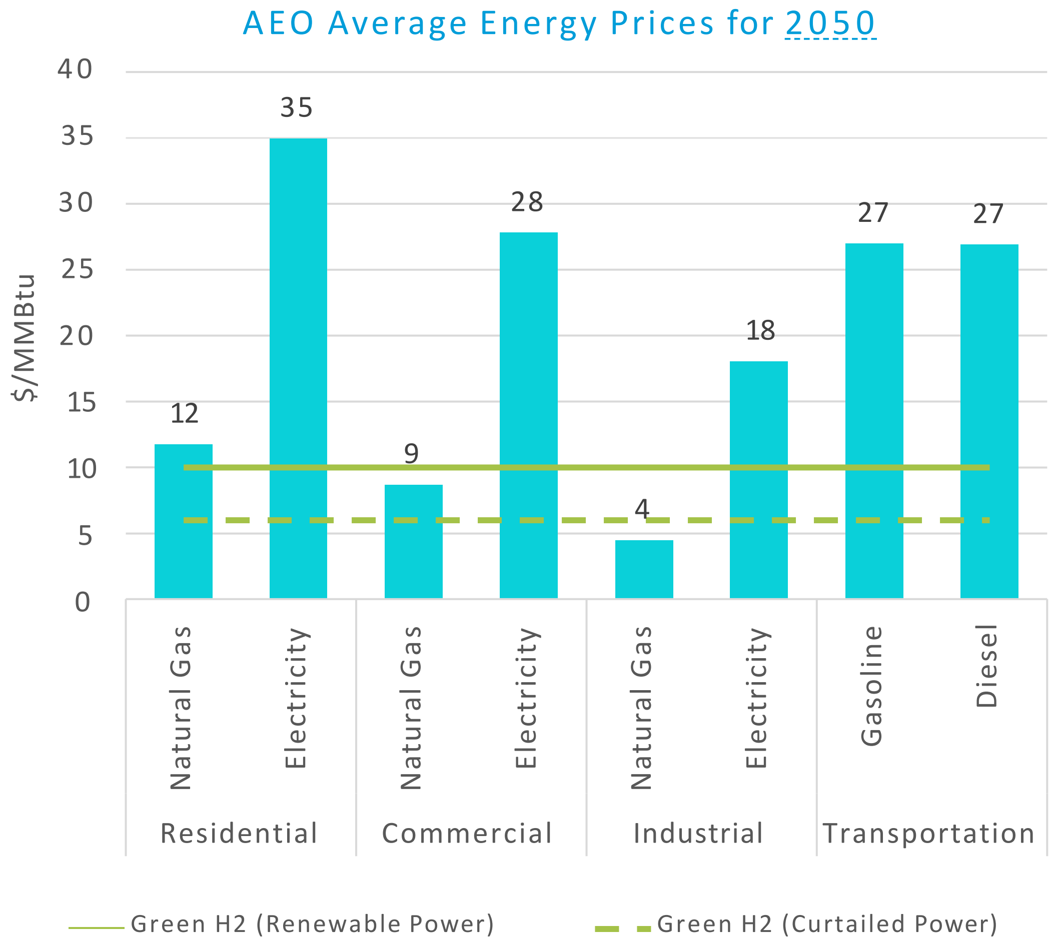
Declining hydrogen production prices are opening new opportunities



Source: ICF - Examining the current and future economics of hydrogen energy

Hydrogen production costs in context of delivered energy prices





Notes:

- Delivered energy prices/costs are national averages from EIA's 2021 Annual Energy Outlook (AEO)
- Hydrogen production costs are an ICF calculation for green hydrogen, based on assumptions on previous slide
- These bars do not account for relative efficiency of equipment using different fuel types

Opportunities to Leverage Existing Energy Assets

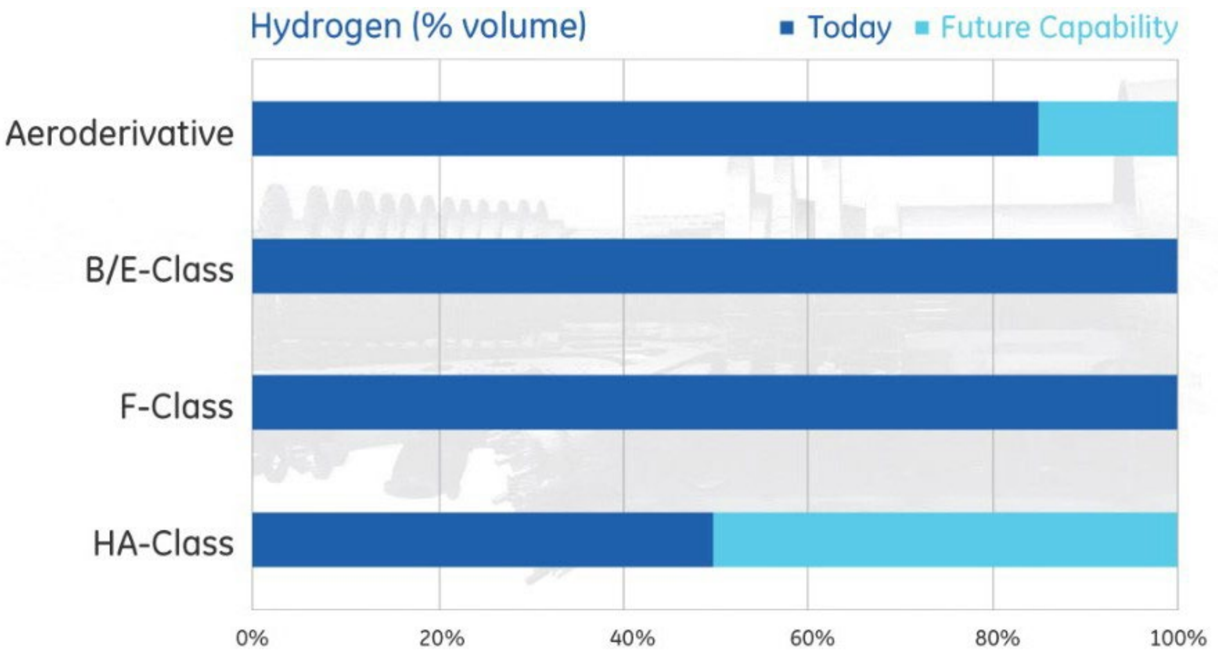
Can we build on top of what we already have?

Hydrogen in Combined Cycle Service

- Existing GT's can be Retrofit for High Hydrogen Service
  - **Hydrogen combustors**
  - **Larger fuel piping and valves**
  - **Safety sensors and flame detectors**
  - **Control system changes**

- Major OEMs (GE, Mitsubishi, Siemens) Targeting 100% Hydrogen Compatibility between 2025 and 2030

- GE lists 75 turbines with 6MM+ operating hours, the Deasan Refinery 6B's in South Korea have been running on 70-95% hydrogen since 1997 (guaranteed at 95%)



Hydrogen (% volume, actual hydrogen levels may vary based on gas turbine model, combustion model, combustion system, and overall fuel composition)

Source: https://www.ge.com/gas-power/future-of-energy/hydrogen-fueled-gas-turbines

6B.03

Source: https://www.ge.com/power/gas/gas-turbines/6b-03

Despite differences, No significant performance degradation in Hydrogen Service

- Hydrogen in nominally 3 X volume of Nat Gas, 2 X energy density, and 1/3 the friction factor
- ICF Gatecycle modeling (corroborated by OEM engineers) indicated;
  - No change in Btu/Kwh, heat rate
  - CC Power (MW) derate of 3% at 50% hydrogen, 7% at 100% H2
- Additional water in effluent gas allows HRSG's to recapture approximately 12% more energy than Nat Gas

GE7FB 2x1- GE Gatecycle 6.1.4.0 / Incremental Hydrogen Analysis (by Volume) at 79°F Summer Temp

		Combined Cycle				Simple Cycle				Power Derate		Heat Rate	
Hydrogen Feed % (v/v)	Heat Conten t (kJ/kg)	Powe r MW	LHV Efficiency	LHV Heat Rate kJ/kW	Btu/kWh	Powe r MW	LHV Efficiency	LHV Heat Rate kJ/kW	Btu/kWh	CC	SC	CC	SC
0	50,000	537,689	57.16%	1.7495	5,969	341,574	36.31%	2.7540	9,397	1.00	1.00	1.00	1.00
10	54,900	531,175	57.05%	1.7529	5,981	337,407	36.24%	2.7596	9,416	0.99	0.99	1.00	1.00
25	57,000	528,774	57.01%	1.7542	5,985	335,885	36.21%	2.7615	9,422	0.98	0.98	1.00	1.00
50	66,100	520,249	56.86%	1.7587	6,001	330,446	36.11%	2.7689	9,448	0.97	0.97	1.01	1.01
75	85,000	508,736	56.65%	1.7652	6,023	323,115	35.98%	2.7793	9,483	0.95	0.95	1.01	1.01
90	100,400	502,794	56.54%	1.7685	6,034	319,278	35.91%	2.7850	9,503	0.94	0.93	1.01	1.01
100	120,000	497,477	56.44%	1.7717	6,045	315,915	35.84%	2.7899	9,519	0.93	0.92	1.01	1.01

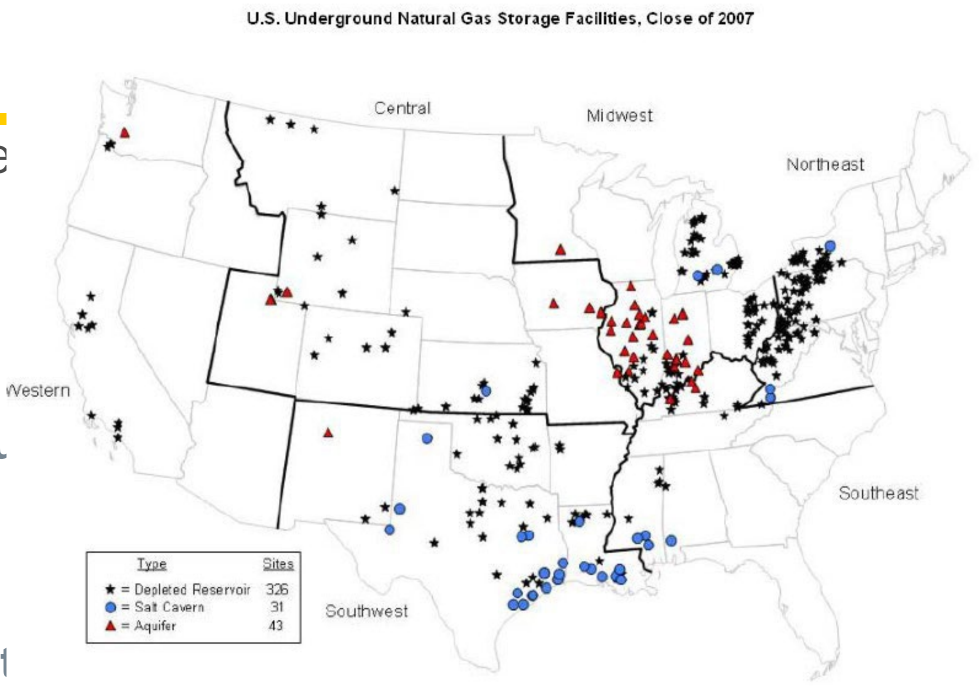
Transporting Hydrogen via Pipelines

- **Current Capability (NREL/Gas Technology Institute Study, California PUC):**
  - Up to 50% H_2 flowing through transmission pipelines
  - Up to 20% H_2 flowing through distribution pipelines
- **Challenges:**
  - Hydrogen embrittlement for existing natural gas pipelines
    - For transmission lines: concerns at high operating pressures, up to 2,000 psi (139 bar) that the pipeline steels that are subject to hydrogen-induced cracking
      - Dedicated hydrogen pipelines are run at lower pressures (500-1,000 psi) to mitigate this issue
    - For distribution pipeline: concerns of hydrogen leakage/explosion in more populated areas & confined spaces
  - Hydrogen leakage and permeation
    - Permeation rates for hydrogen are ~4-5x faster in polymer pipes that are used in the existing distribution system
    - Hydrogen leakage through threads/joints in steel & ductile iron pipelines

Source Docs:
Hydrogen Blending Impacts Study (July 2022)
https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M493/K760/493760600.PDF
Blending Hydrogen into Natural Gas Pipeline Networks: A Review of Key Issues (March 2013)
https://www.nrel.gov/docs/fy13osti/51995.pdf

Hydrogen Storage

- Two types of large-scale storage options have been most promine
  - **Salt cavern for hydrogen gas storage**
  - **Liquid hydrogen tanks**
- Salt cavern storage costs ~\$2.41/MMBTU H2
  - **Solution mined 500 ton-H2 capacity with 30% cushion gas was assu**
- Liquid hydrogen tank storage costs:
- \$3.65/MMBTU H2 in 2020 →\$2.40/MMBTU H2 in 2050
  - **Almost 80% of the costs are due to the energy required for liquificat**
  - **Assumed power costs from solar energy projections**
  - **Assumed storage capacity of ~98,850 kg H2/day, a conservative estimate for 8 hours of fuel needed for 200MW CT/CC plant**



Source: Energy Information Administration, Office of Oil & Gas, Natural Gas Division Gas, Gas Transportation Information System, December 2008.

Figure 8. U.S. underground natural gas storage facilities (2007) (EIA 2012).

Source:https://www.energy.gov/eere/fuelcells/downloads/blending-hydrogen-natural-gas-pipeline-networks-review-key-issues

NASA, 3800 m^3, 270 t

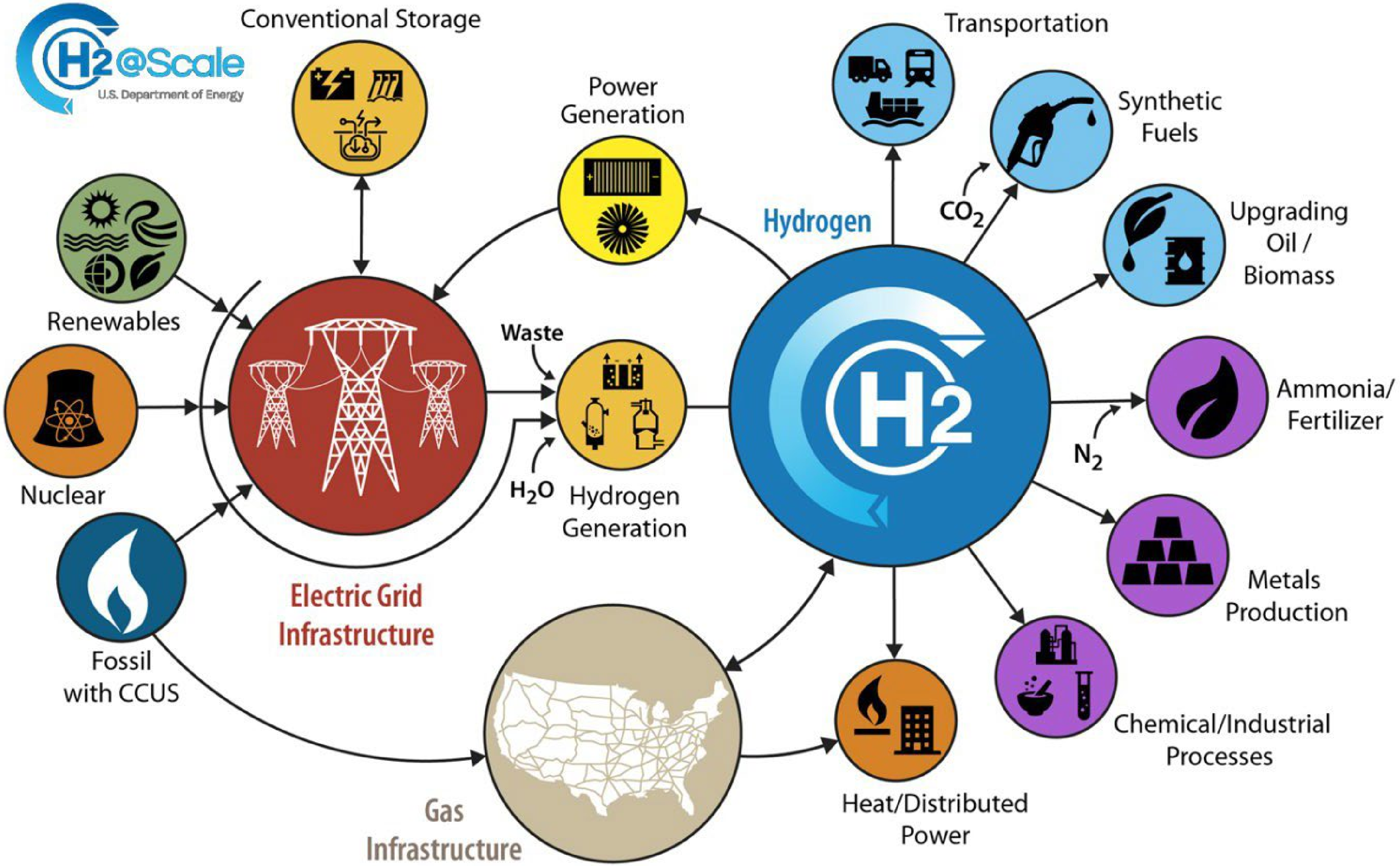
JAXA (Kawasaki), 540 m^3, 38 t

Source:https://www.utwente.nl/en/tnw/ems/research/ats/chmt/m13-hendrie-derking-cryoworld-chmt-2019.pdf

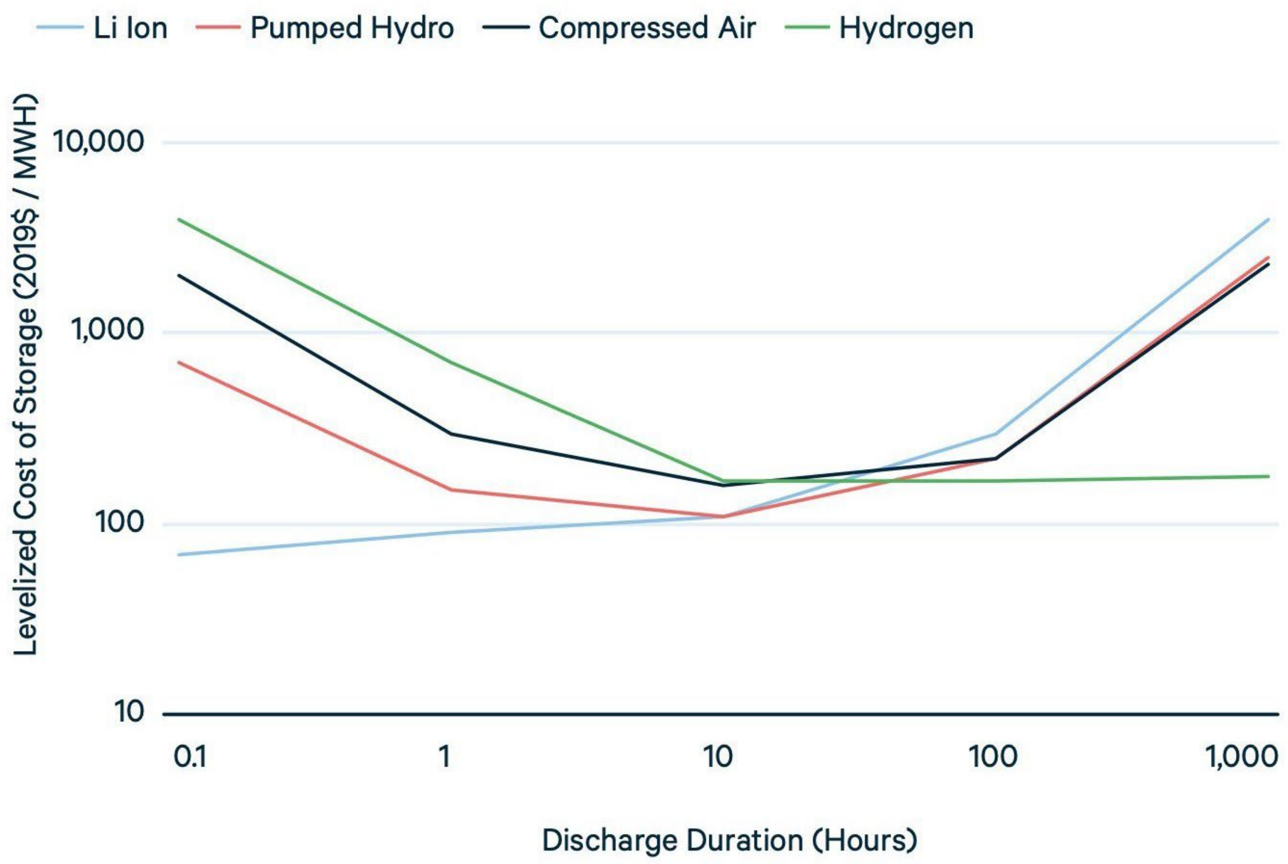
Emerging Opportunities

Where will we see hydrogen first?

Where Next?



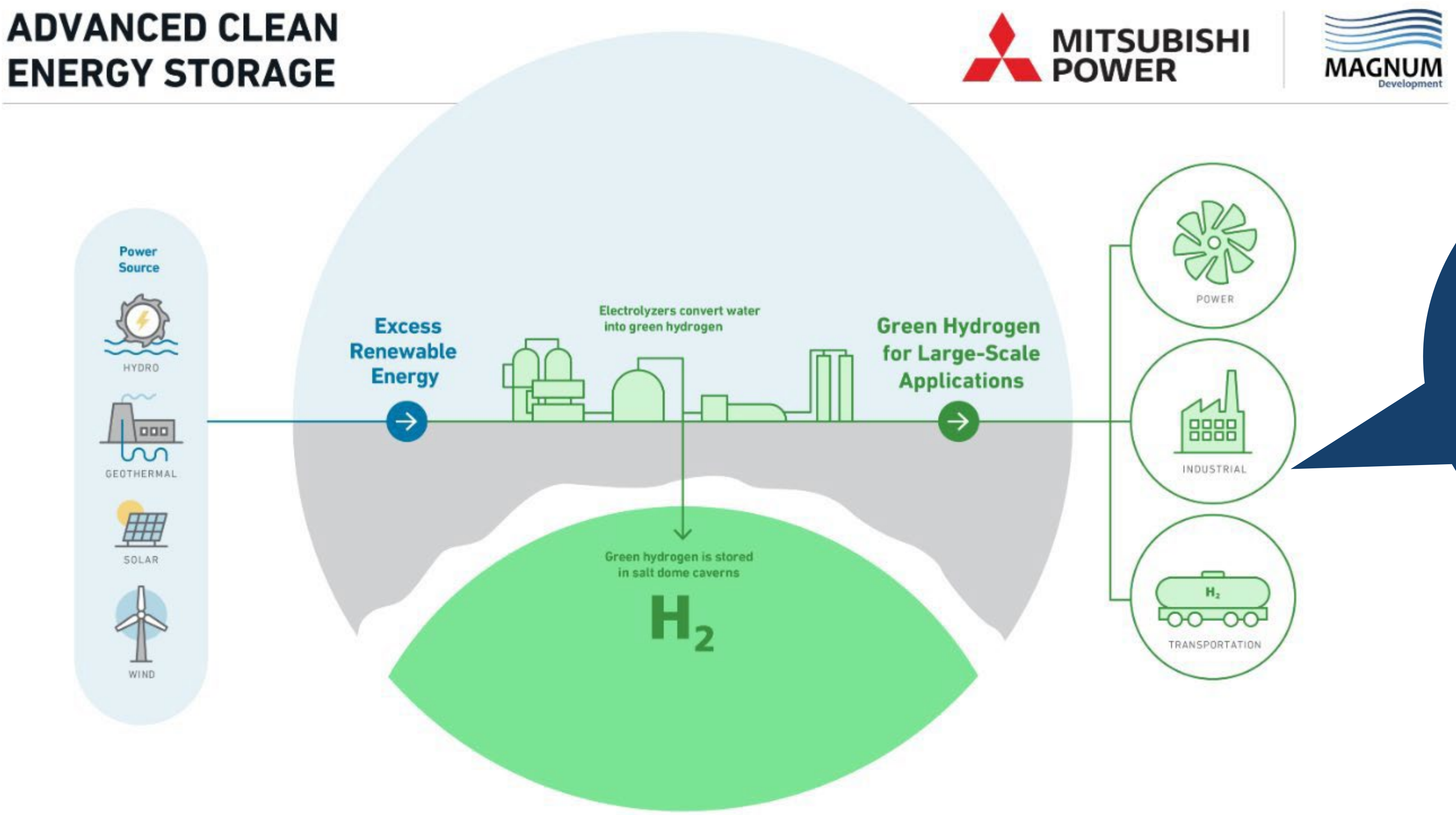
Source: US Department of Energy



Source: IEA 2019.

Note: Levelized costs of storage reflect an input electricity price of $50/MWh as well as other assumptions from IEA (2019).

Long Duration Energy Storage Opportunity



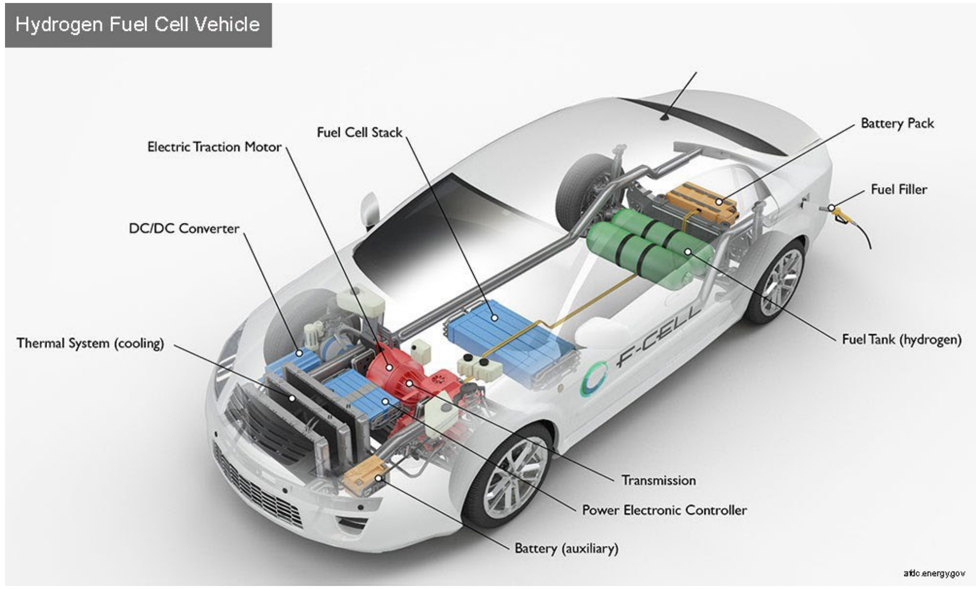
DOE Loan Programs Office Issued $504MM Conditional Loan Guarantee, April 6, 2022

https://power.mhi.com/regions/amer/news/20210511.html

→ Long Duration Storage (300 GWh) – Advanced Clean Energy Storage (Delta Utah)

Hydrogen for Transportation

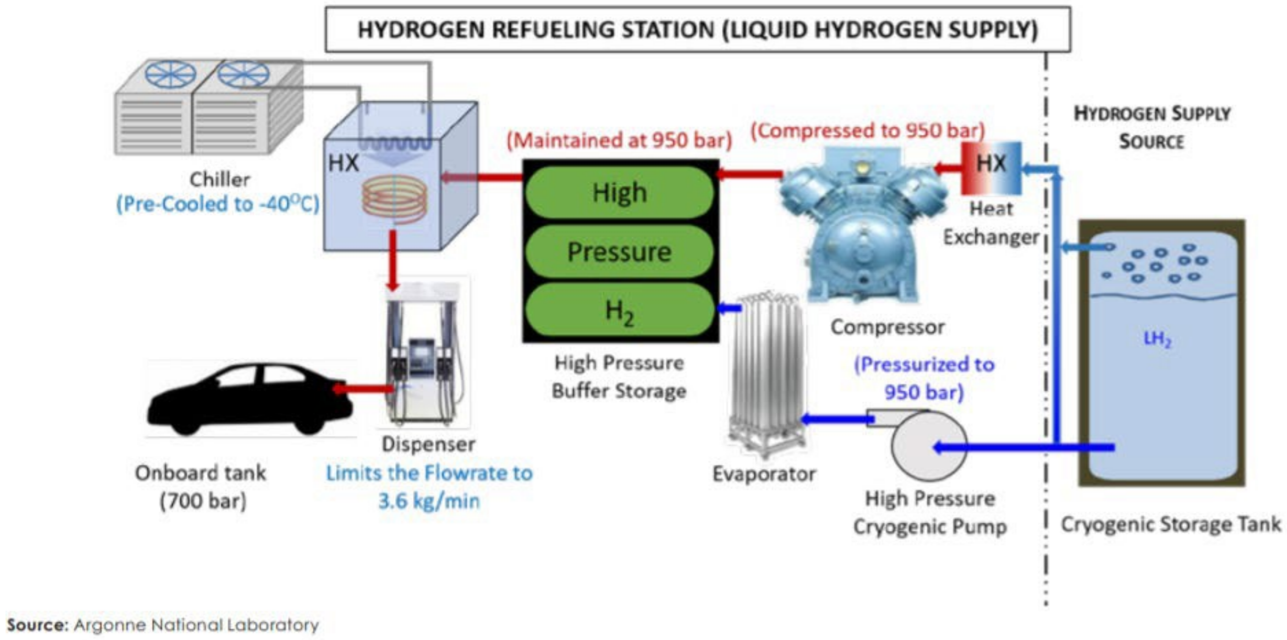
- Fuel cell technology
  - **Produces power by reacting hydrogen and oxygen (from air) in the presence of an electrolyte, no emissions just water or steam as the by-product**
  - **60-70% efficiency as compared to internal combustion engines that have 20-40% efficiency**
- Battery electric vehicles (BEVs) vs Fuel cell electric vehicles (FCEVs)
  - **FCEVs:**
    - **suitable for medium to heavy duty transport,**
    - **can travel farther and carry more load – higher energy density,**
    - **fuel tank is more compact and lighter than battery packs,**
    - **quick fill times,**
    - **limited number of fueling stations and consumers**
  - **BEVs:**
    - **suitable for light duty vehicles,**
    - **weight constraints which limits the amounts of battery packs,**
    - **more options for charging in comparison to FCEVs**
    - **operability optimization**



Source: https://afdc.energy.gov/vehicles/how-do-fuel-cell-electric-cars-work

Hydrogen Fueling Stations

- Hydrogen Stations
  - **Compressed hydrogen for smaller stations, about 200kg/day (50 vehicles)**
  - **Liquid hydrogen is predominate storage for newer stations in 400 - 1,200kg/day range (100-300 vehicles/day)**
  - **Pipeline connected, few to date but expected to be preferred method where available**
  - **On-site electrolyzers also under consideration**
- Hydrogen Transport
  - **Compressed hydrogen trailers (180 bar) limited to approximately 280kg/load due to heavy trailer weight, composite tank trailers in development for 750kg**
  - **Liquid trailers approximately 3,500-4,500 kg capacity**

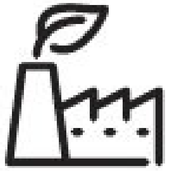


Source: California Hydrogen Station Permitting Guidebook

Where Might We See H2 and CCHP?

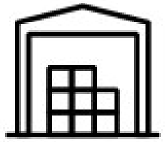
Heavy Duty Fueling Stations

- H_2 Delivered as liquid (−423 ° F), converted to gas for fueling
- Cooling Integration Opportunity?
- Backup Power?



Biofuel Projects

- Can monetize GHG savings via Low Carbon Fuel Standard Programs
- Need Both Heat & 24-hour Power



Data Centers

- Lower carbon intensity important for end users
- Locate electrolyzers on site

Warehouses

- Need for Heavy Duty Fueling
- Electrical Service Insufficient
- NOx Regs Such as South Coast Air Quality Management District (Rule 2305) Warehouse Rule

Federal Help on the Way

New Opportunities for Federal Funding?

New and Potential Federal Opportunities

DOE Office of Clean Energy Deployment (OCED)

Funding Opportunity Announcement Scheduled for September/October 2022

- $8 Billion in Hydrogen Hub Funding
- 6 - 10 H2 Hubs
- $400 million – $1.2 Billion per Hub
- 50% Federal Match Maximum
- End Use Diversity
  - Power Generation
  - Transport
  - Industrial
  - Commercial & Residential Heating and Cooling

Inflation Reduction Act (Under Consideration)

Tax Credits for Hydrogen Production

- Up to $3/kg for Prevailing Wage Projects
- Credit amount based on LCA (methodology not specified)
  - GREET vs OpenLCA
- Max Credit $3/kg = $22/MMBTU
- Blue Hydrogen = $5.50/MMBTU

ICF does produce thought pieces on hydrogen from time to time. Recent examples include;

- Exploring the Economic Potential of Hydrogen Energy (collaboration with Norton Rose)
  https://www.icf.com/insights/energy/economic-potential-hydrogen
- Examining the current and future economics of hydrogen energy
  https://www.icf.com/insights/energy/economics-hydrogen-energy
- Fueling the future of India's long-haul vehicles with hydrogen
  https://www.icf.com/insights/energy/india-hydrogen-future-long-haul-vehicles
- Exploring hydrogen as a versatile option for decarbonization
  https://www.icf.com/insights/energy/hydrogen-versatile-option-decarbonization
- The hydrogen value proposition
  https://www.icf.com/insights/energy/hydrogen-value-proposition
- Repurposing infrastructure for hydrogen in a net-zero future
  https://www.icf.com/insights/energy/hydrogen-power-zero-carbon-future
- Hydrogen's essential role in the decarbonization of aviation
  https://www.icf.com/insights/transportation/hydrogen-role-decarbonization-aviation
- Hydrogen energy insights page
  https://www.icf.com/insights/hydrogen-energy

Additional Resources

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About ICF

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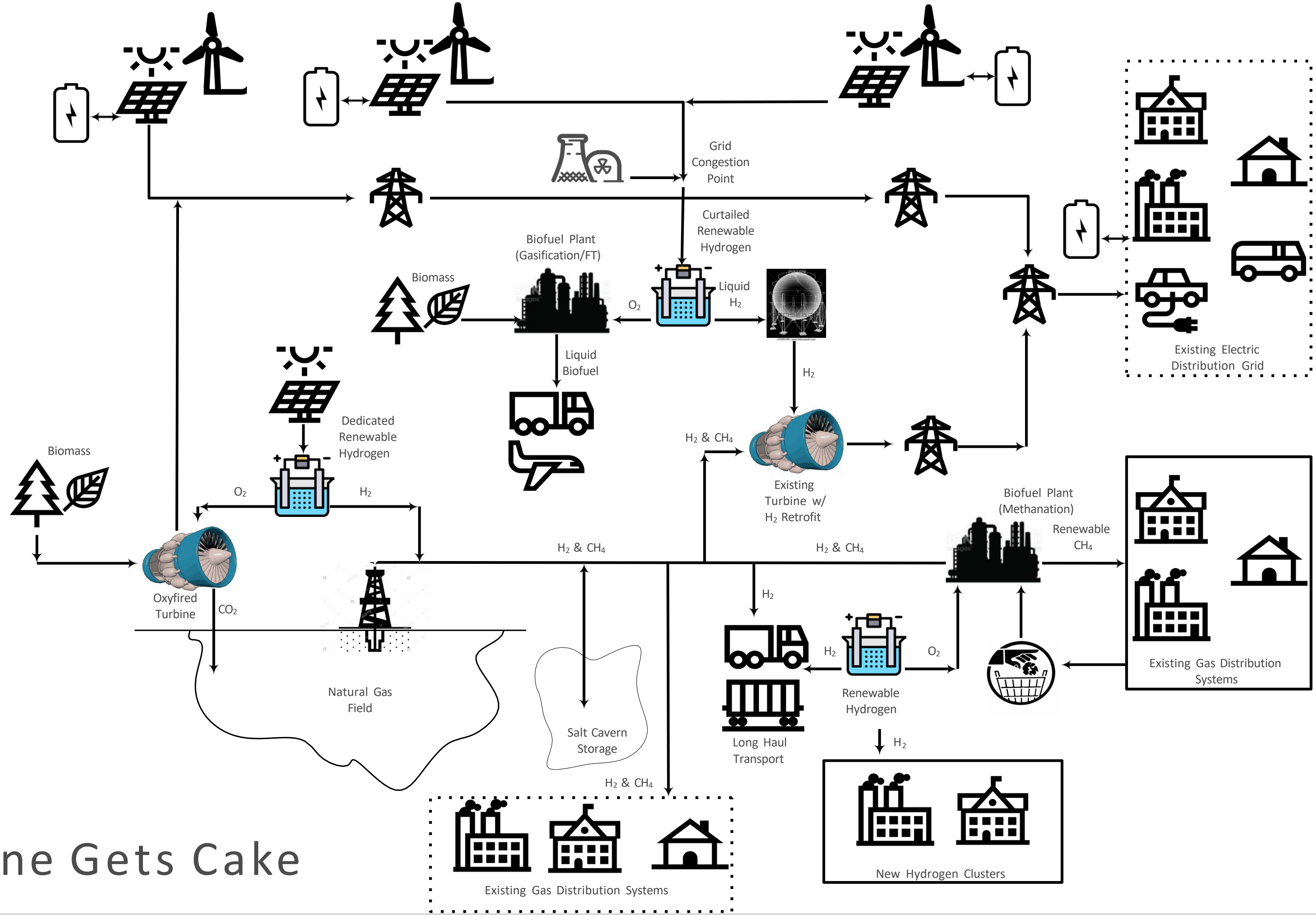


Everyone Gets Cake

Why Packaged CHP Systems

Bruce Hedman

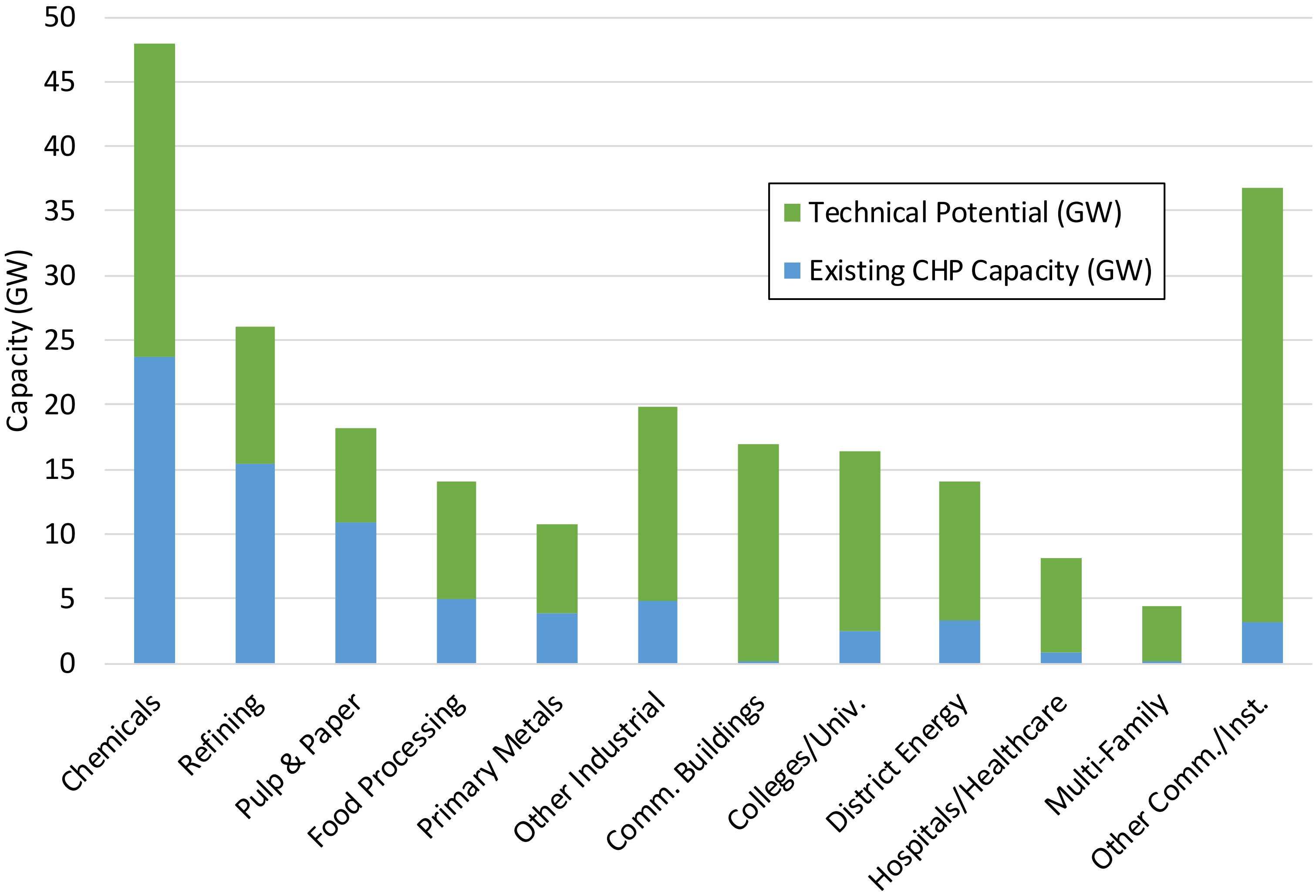
U.S. DEPARTMENT OF ENERGY

CHP Market Trends

- Non-traditional Applications
- Resilience
- Complete Solutions
- Flexible Financing Solutions
- Low Risk
- Carbon Reduction

Non-Traditional CHP Markets Are Growing

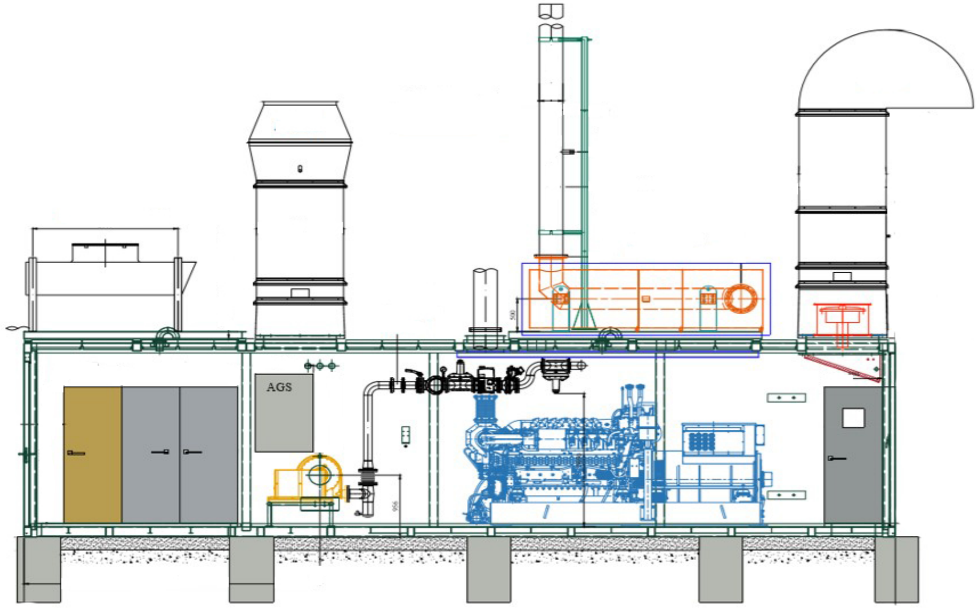
- Large CHP potential in commercial, institutional, light manufacturing, government and military applications
- Markets utilize smaller systems (< 10 MW)
- Markets have limited CHP experience
- Users have limited technical resources
- History of issues with CHP system performance and with sales and service support
- Many perceived risks by both users and suppliers

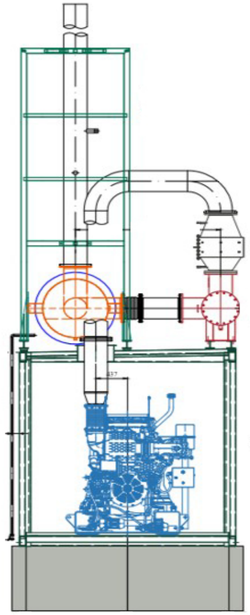


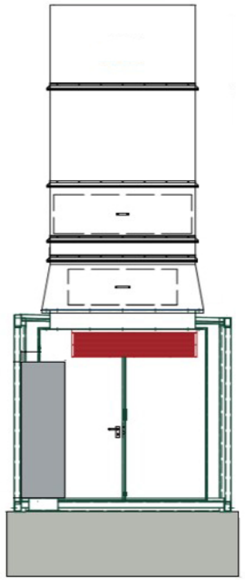
Non-traditional markets represents 35% of the capacity and 70% of the projects installed since 2008

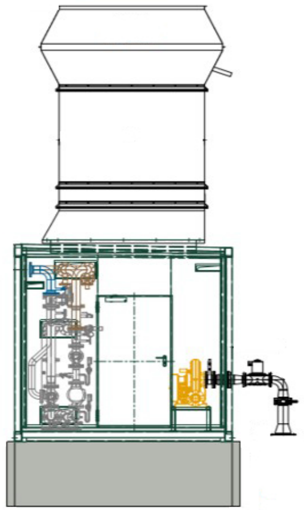
Packaged CHP Systems Are Standard Repeatable Designs

- 100% pre-wired
- 100% pre-piped with customer ready connection
- Properly ventilated
- Sound insulated
- Fire rated
- With a gas detection and smoke alarm
- Fluid containment system
- Auxiliaries sized appropriately and shipped complete with connecting piping and wiring
- Packagers have bulk purchasing power that local contractors do not have









The Packaged CHP Systems eCatalog and Accelerator

U.S. DEPARTMENT OF ENERGY

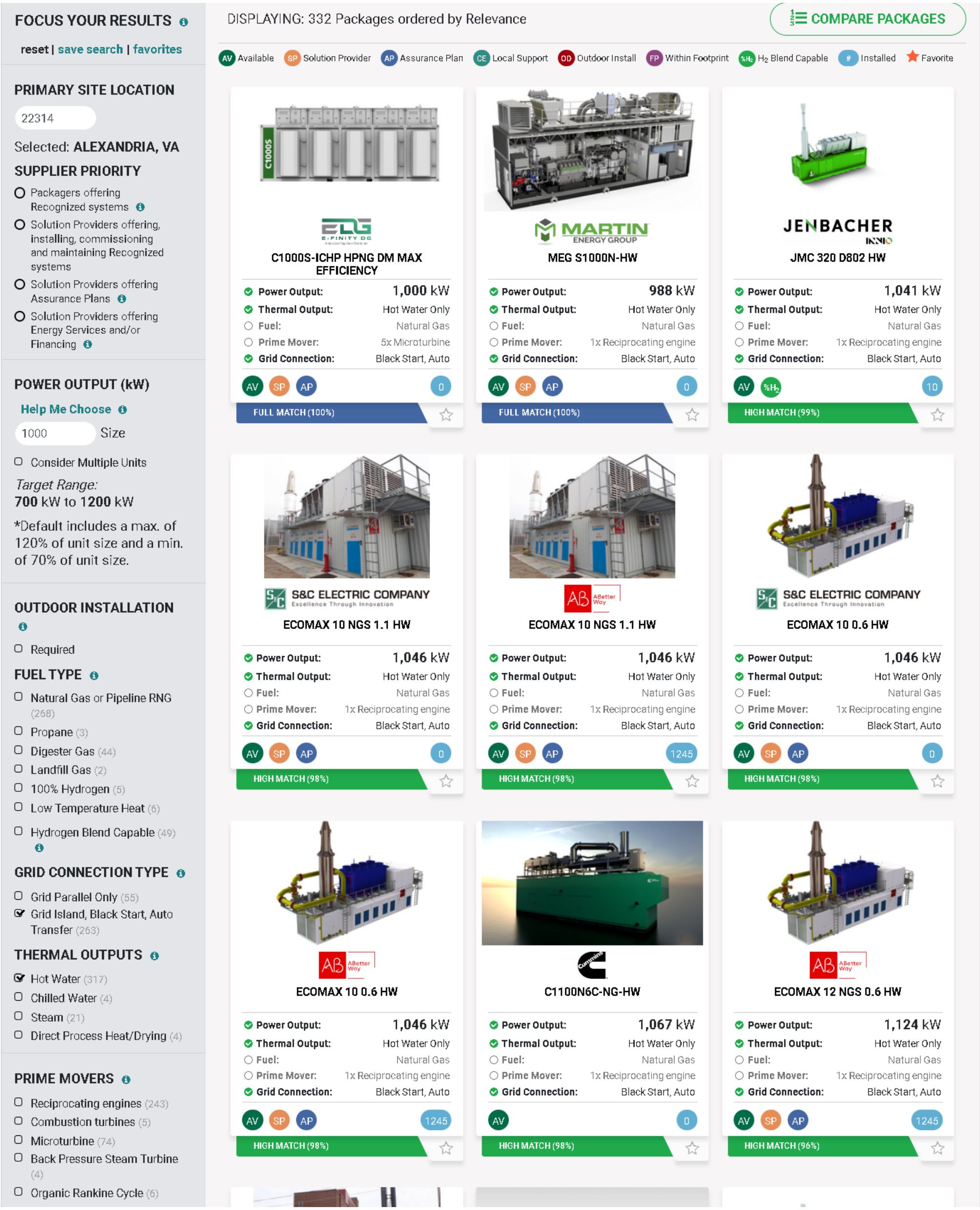
DOE Packaged CHP eCatalog

- **A national web-based searchable catalog of DOE-recognized packaged CHP systems and suppliers** with the goal to reduce risks for end-users and vendors through partnerships with:
  - **CHP Packagers** that assemble and support recognized Packaged CHP Systems
  - **Solution Providers** that install, commission and service packaged CHP systems
  - **CHP Engagement partners** that provide CHP market deployment programs at the state, local and utility level
- **Pre-engineered and tested packaged CHP systems that meet DOE performance requirements**
- **eCatalog audience:** end-users with engineering staff, consulting engineers, utilities, state energy offices, regulators, federal agencies, and project developers.
- **Users search** for applicable CHP system characteristics, and get connected to packagers, installers and CHP engagement programs
- Allows users to **compare technology options on a common basis**

https://chp.ecatalog.ornl.gov/

Packaged CHP eCatalog Status

- **Launched Nov 8, 2019**
- **42 recognized Packagers**
- **25 recognized Solution Providers**
- **17 Customer Engagement Partners**
- **332 Package Offerings**
  - Multiple suppliers and packages in every zip code
  - 24 kW to 7.5 MW
  - 243 reciprocating engine
  - 74 microturbine
  - 5 gas turbine
  - 4 back pressure steam turbines
  - 6 organic rankine cycles
  - 268 natural gas
  - 46 digester gas/landfill gas
  - 3 propane
  - 49 hydrogen blend capable
  - 5 100% hydrogen

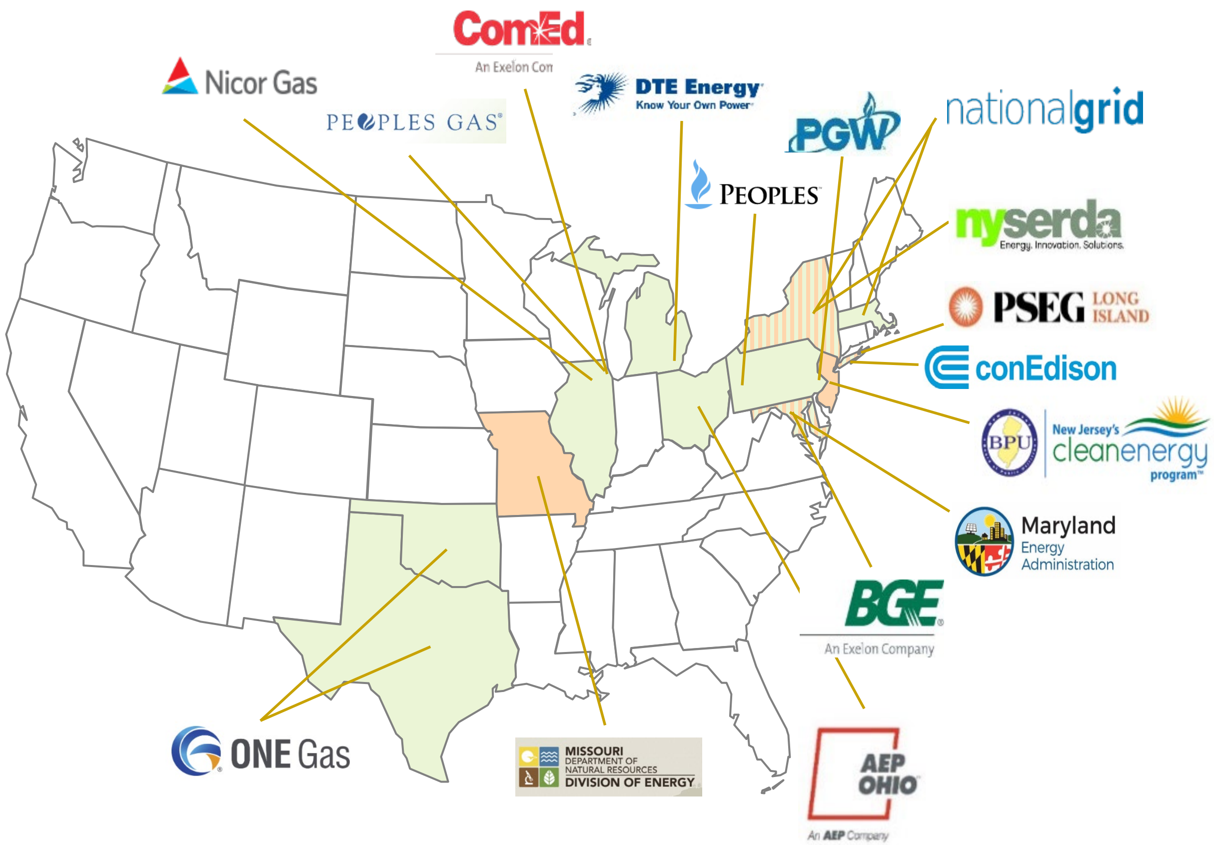


August 4, 2022 Status

DOE Packaged CHP Accelerator

- **Better Buildings Accelerators** demonstrate innovative policies and approaches designed to accelerate investment in energy efficiency
- **Objective:** Populate, launch and publicize the eCatalog and promote packaged CHP
- **Goals:** Verify packaged CHP system performance in industrial, commercial, institutional and government markets
- **CHP Engagement Partners:** Utilities, states and energy efficiency program administrators committed to promoting packaged CHP via CHP deployment and/or incentive programs
- **CHP Supplier Partners:** CHP packagers and solution providers participating in the national eCatalog

Current CHP Engagement Partners



https://betterbuildingssolutioncenter.energy.gov/accelerators/packaged-chp

Why the Packaged CHP Accelerator?

- A venue to populate and launch the Packaged CHP eCatalog
- Get input from customer engagement and supplier partners to enhance the functionality of the *eCatalog*
- A vehicle to recruit utilities, state agencies and other CHP enablers nationally to promote packaged CHP
- Improve end-user confidence through performance verification
- Serve as the beginning of long-term DOE effort to promote the benefits of packaged CHP solutions
- The *eCatalog* alone is not enough – success depends on state and utility market engagement programs to promote packaged CHP deployment, publicize the *eCatalog*, and provide technical and market assistance

DOE Support for the Accelerator

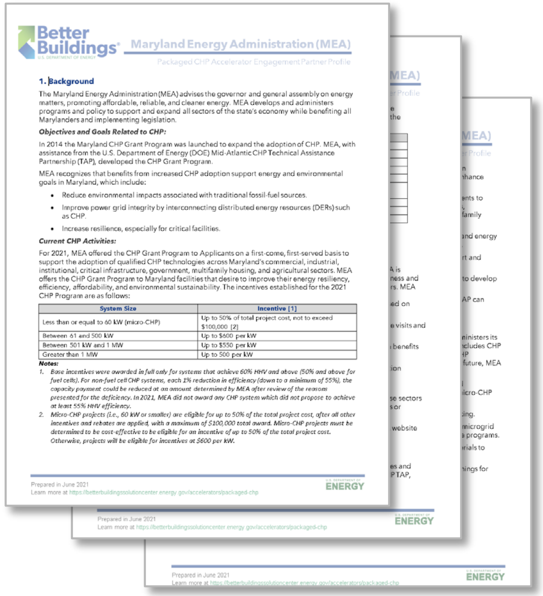
- Develop and maintain a national, web-based CHP *eCatalog* of DOE-recognized CHP packaged systems offered by pre-qualified CHP suppliers
- Review and validation of the packaged CHP systems in the *eCatalog*
- Strategic partnerships with DOE CHP Technical Assistance Partnerships (TAPs) and access to TAP technical assistance
- Direct engagement with DOE CHP Deployment program and access to DOE-developed tools, resources and market materials
- Aggregate and analyze installation, cost, and performance data to validate the benefits provided by packaged CHP systems
- Collect and share best practices and lessons learned
- Facilitate peer-to-peer information exchange

DOE Packaged CHP Accelerator Impacts

- Launched in June 2019 with in-person meeting
- Packaged CHP eCatalog enhancements
- Approaching 100% enrollment in eCatalog
- Topical Webinar Series
  - CHP market engagement programs
  - CHP incentive program design and EM&V
  - CHP and Microgrids
  - CHP and Resilience
  - DOE tools and resources
  - CHP financing strategies
  - Renewable Natural Gas
  - CHP and hydrogen
  - CHP markets (Hospitals, Controlled Environmental Agriculture)
- Two Packaged CHP panels at DOE's Better Buildings Summit (2020 and 2022)
- CHP Market Fact Sheet Series
  https://betterbuildingssolutioncenter.energy.gov/accelerators/packaged-chp/market-sector-fact-sheets

DOE Packaged CHP Accelerator - Path Forward

- Packaged CHP Accelerator scheduled to reach completion this Fall
  - – Close out virtual meeting in October
- Final Deliverables
  - – Complete CHP Engagement Partner enrollment in eCatalog
  - – Complete Customer Engagement Partner Profiles
    - Brief summaries of CHP programs, goals and objectives
    - Integration of eCatalog
  - – Packaged CHP Report – DOE Team
  - – Packaged CHP Accelerator Webpage will remain active
- Transition to eCatalog *Customer Engagement Network*
  - – Maintain partnership with DOE CHP program
  - – Continue Topical Webinar Series
  - – Input to Packaged CHP eCatalog enhancements



Better Buildings U.S. DEPARTMENT OF ENERGY

Maryland Energy Administration (MEA)

Packaged CHP Accelerator Engagement Partner Profile

1. Background

The Maryland Energy Administration (MEA) advises the governor and general assembly on energy matters, promoting affordable, reliable, and cleaner energy. MEA develops and administers programs and policy to support and expand all sectors of the state's economy while benefiting all Marylanders and implementing legislation.

Objectives and Goals Related to CHP:

In 2014 the Maryland CHP Grant Program was launched to expand the adoption of CHP. MEA, with assistance from the U.S. Department of Energy (DOE) Mid-Atlantic CHP Technical Assistance Partnership (TAP), developed the CHP Grant Program.

MEA recognizes that benefits from increased CHP adoption support energy and environmental goals in Maryland, which include:

- Reduce environmental impacts associated with traditional fossil-fuel sources.
- Improve power grid integrity by interconnecting distributed energy resources (DERs) such as CHP.
- Increase resilience, especially for critical facilities.

Current CHP Activities:

For 2021, MEA offered the CHP Grant Program to Applicants on a first-come, first-served basis to support the adoption of qualified CHP technologies across Maryland's commercial, industrial, institutional, critical infrastructure, government, multifamily housing, and agricultural sectors. MEA offers the CHP Grant Program to Maryland facilities that desire to improve their energy resiliency, efficiency, affordability, and environmental sustainability. The incentives established for the 2021 CHP Program are as follows:

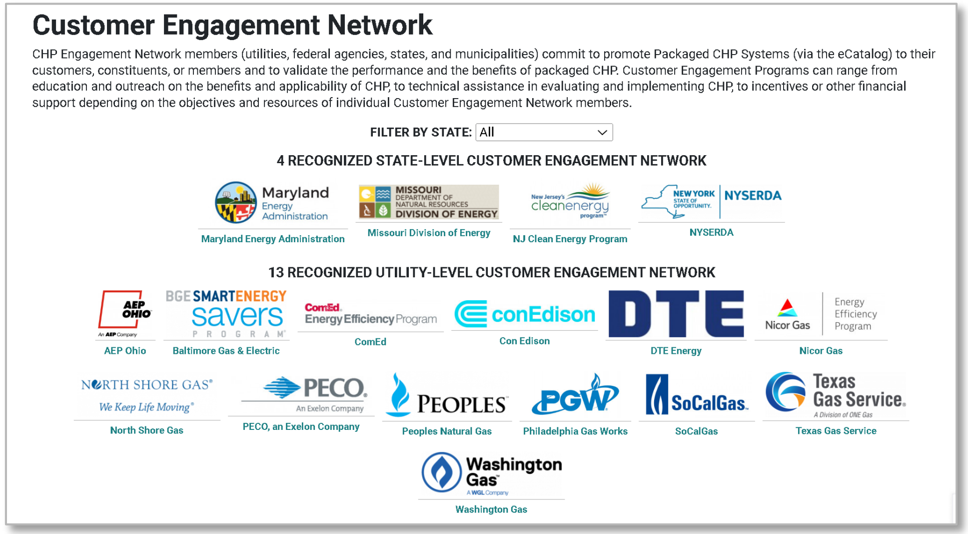
System Size	Incentive [1]
Less than or equal to 60 kW (micro-CHP)	Up to 50% of total project cost, not to exceed $100,000 [2]
Between 61 and 500 kW	Up to $600 per kW
Between 501 kW and 1 MW	Up to $550 per kW
Greater than 1 MW	Up to 500 per kW

Notes:

1. *Base incentives were awarded in full only for systems that achieve 60% HHV and above (50% and above for fuel cells). For non-fuel cell CHP systems, each 1% reduction in efficiency (down to a minimum of 55%), the capacity payment could be reduced at an amount determined by MEA after review of the reasons presented for the deficiency. In 2021, MEA did not award any CHP system which did not propose to achieve at least 55% HHV efficiency.*
2. *Micro-CHP projects (i.e., 60 kW or smaller) are eligible for up to 50% of the total project cost, after all other incentives and rebates are applied, with a maximum of $100,000 total award. Micro-CHP projects must be determined to be cost-effective to be eligible for an incentive of up to 50% of the total project cost. Otherwise, projects will be eligible for incentives at $600 per kW.*

Prepared in June 2021
Learn more at https://betterbuildingssolutioncenter.energy.gov/accelerators/packaged-chp

U.S. DEPARTMENT OF ENERGY



Customer Engagement Network

CHP Engagement Network members (utilities, federal agencies, states, and municipalities) commit to promote Packaged CHP Systems (via the eCatalog) to their customers, constituents, or members and to validate the performance and the benefits of packaged CHP. Customer Engagement Programs can range from education and outreach on the benefits and applicability of CHP, to technical assistance in evaluating and implementing CHP, to incentives or other financial support depending on the objectives and resources of individual Customer Engagement Network members.

FILTER BY STATE: All

4 RECOGNIZED STATE-LEVEL CUSTOMER ENGAGEMENT NETWORK

Maryland Energy Administration
Missouri Division of Energy
NJ Clean Energy Program
NYSERDA

13 RECOGNIZED UTILITY-LEVEL CUSTOMER ENGAGEMENT NETWORK

AEP Ohio
Baltimore Gas & Electric
ComEd
Con Edison
DTE Energy
Nicor Gas
North Shore Gas
PECO, an Exelon Company
Peoples Natural Gas
Philadelphia Gas Works
SoCalGas
Texas Gas Service
Washington Gas

Accelerator Support Team

Packaged CHP Accelerator Coordinator	eCatalog Coordinator	Packaged CHP Accelerator Support
Bruce Hedman	Rich Sweetser	David Jones
Entropy Research	Exergy Partners	ICF
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https://betterbuildingssolutioncenter.energy.gov/accelerators/packaged-chp