



# 21<sup>st</sup> Century Coal

**Don't Deny the Storm!  
Chart a Course to Calmer Waters and a  
Prosperous Future**

House Coal Caucus  
October 19, 2023  
Steven E. Winberg

# ***Net-Negative CO<sub>2</sub> Baseload Power, Inc.***

- Established in June, 2021 as a 501(c)(6)
- The Team



Steve Winberg  
CEO



Ken Humphreys



Fred Palmer

- Our Members
  - CONSOL Energy
  - Peabody
  - PFBC-EET

# ***Our Focus***

- Work with states, associations and others that will litigate the EPA's proposed fossil power generation CO<sub>2</sub> regulation.
  - Provide technical and policy expertise
- Advance the concept of tax credit parity – Congresswoman Miller proposed bill
  - No credits awarded unless electricity meets minimum standards for “Dependability” and “Carbon Footprint”
  - Fuel-neutral
- Advance appropriations for 21<sup>st</sup> century coal technologies as part of a “rebalanced and reduced” DOE budget
  - Coal plant repowering technologies, which leverage existing infrastructure
    - Coal and biomass co-firing with CCUS
    - Coal pyrolysis with H<sub>2</sub> power generation
  - Coal-to-products technologies

# ***Coal's Headwinds***

- EPA's proposed Greenhouse Gas Standards and Guidelines for Fossil Fuel-Fired Power Plants
- Other EPA regulations
- The Administration is aggressively seeking to irreversibly eliminate coal both domestically and internationally.
- The Inflation Reduction Act (IRA) severely tilted the playing field against coal.
  - IRA increased 45Q tax credit to \$85/ton for CO<sub>2</sub> storage – an emerging technology
  - IRA provides much richer solar and wind tax credits – mature technologies
- The coal fleet is aging.

# ***EPA's Proposed CO<sub>2</sub> Rule***

- January 1, 2032 shutdown
  - Routine O&M
- January 1, 2035 shutdown
  - 20% max CF at effective date
  - Must perform routine O&M
- January 1, 2040 shutdown
  - Must burn 40% natural gas by heat input
  - Emissions limit must be 16% below baseline (8 quarters constitutes the baseline)
- In operation after January 1, 2040
  - Must install CCS
  - 90% capture on an annual basis
  - 88.4% annual emissions reduction is the required standard

# ***CCS – Technical Readiness***

Myth - CCS is categorically unproven

Reality - CCS is technically proven in some applications, but not others

- Proven Applications
  - Ethanol plants
  - Chemical industry
  - CO2 co-produced with natural gas
- Currently, there is limited application in power plants, both coal and natural gas
- Non-existent in majority of industrial & commercial facilities
- CO2 pipeline transport is a mature technology
- CO2 storage
  - Viable in some oil and gas reservoirs, but insufficient reservoirs to support widespread storage
  - CO2 storage is porous, non-petroleum bearing rock formations—the workhorse geology required for wide deployment--remains a nascent practice

# ***CCS - Project Commercial Readiness***

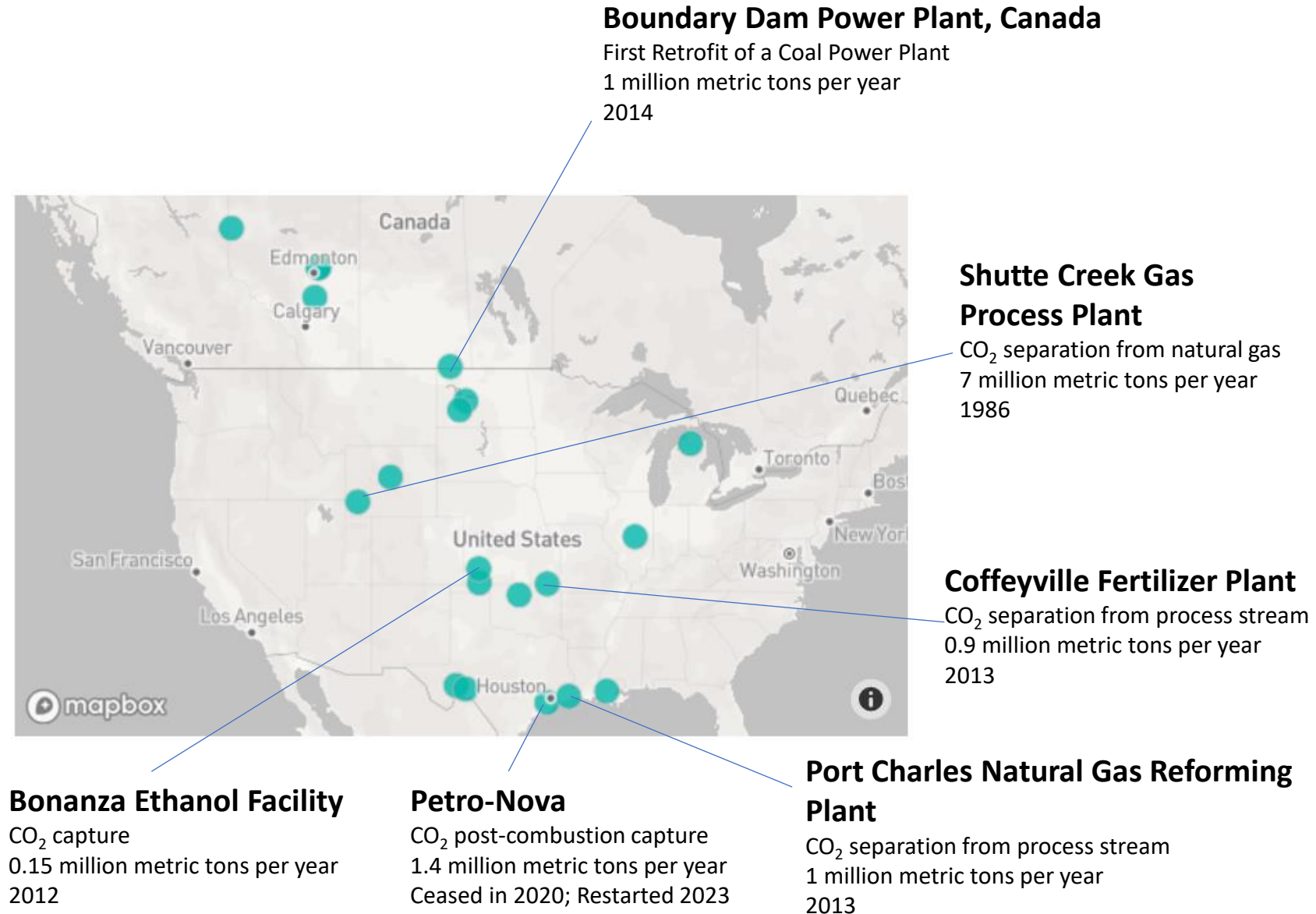
CCS is NOT commercially viable in most applications

- Expensive in most applications – technological advancements and learning-by-doing will bring costs down somewhat, but that takes investment and time
- Existing, unused CO<sub>2</sub> pipeline capacity is limited
- New CO<sub>2</sub> pipeline capacity is difficult to site
- While Federal regulations for carbon storage exist, Federal and State capacity to permit projects is highly limited; expertise and capacity will take time.
- 45Q tax credits incentivize CCS, but are generally insufficient – especially given that CCS is not a fully mature technology
- Heavy taxpayer subsidies for mature, but intermittent renewable power drives corporate investment away from CCS-enabled, dependable power



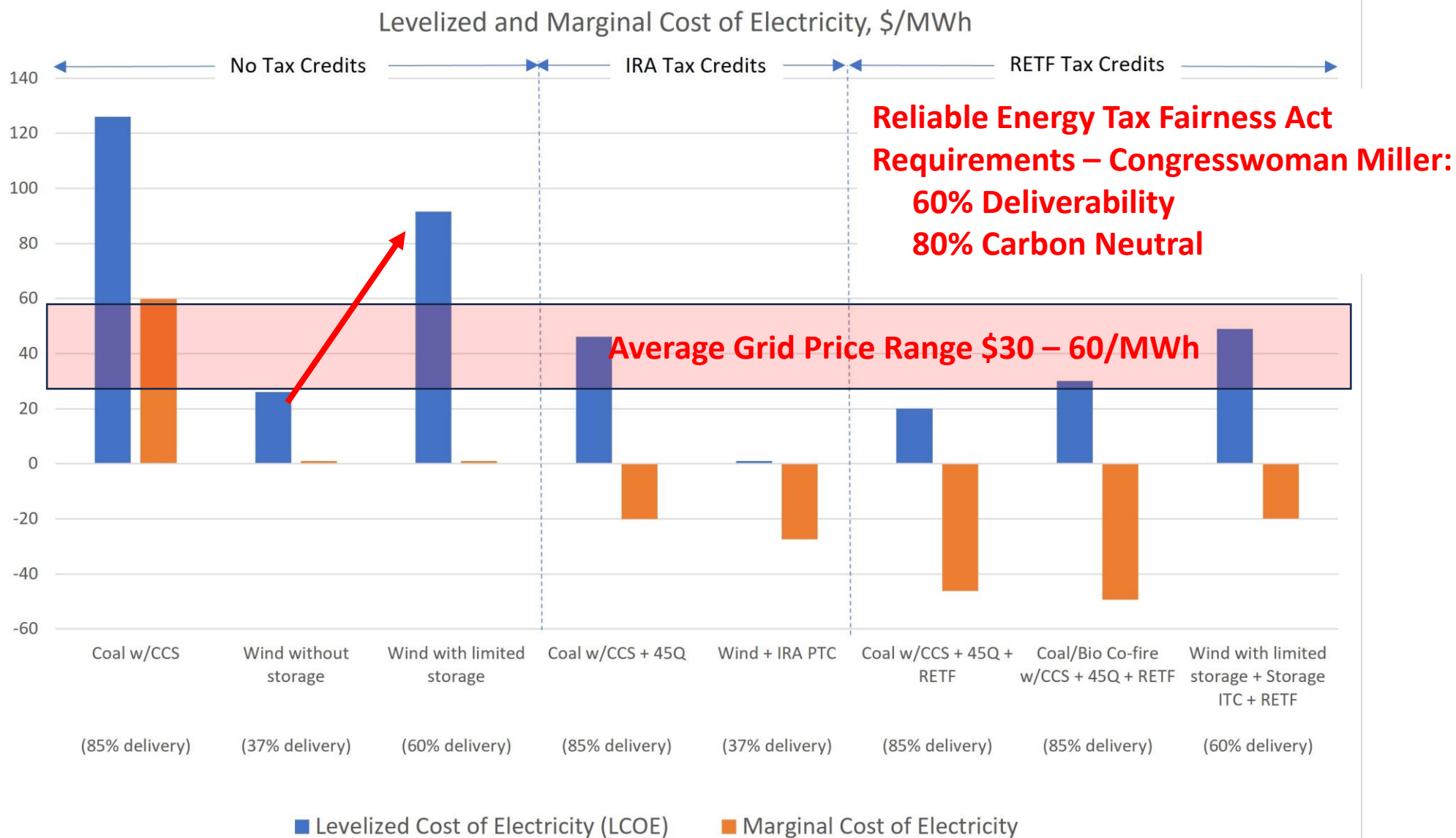
# Commercially Operating CCS Projects

- 19 commercial-scale projects
  - 17 industrial sector in less complex applications
    - Ethanol (pure)
    - Natural gas processing (not combustion)
    - Natural gas production
  - 2 power sector
    - Post-combustion
  - 17 support enhanced oil recovery for necessary supplemental revenue generation
- Very small number and diversity of applications compared to a mature CCS industry





# Inflation Reduction Act Impacts



# Coal History & Forecast – before EPA’s proposed rule

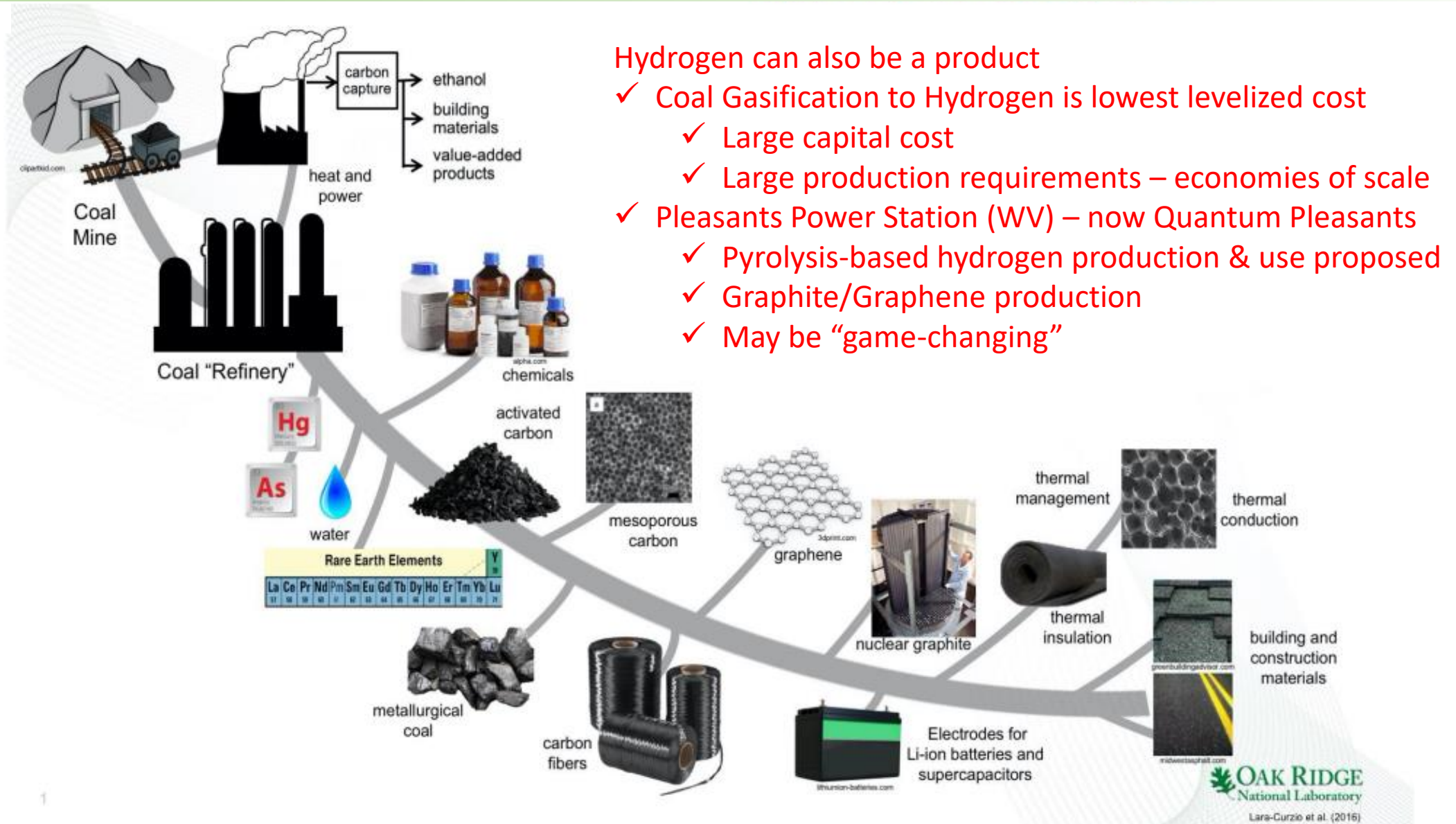
Year	Coal Consumption (Million Tons)	Capacity (GW)
2007	1,045	313
2013	861	304
2022	506 <sup>(a)</sup> <b>52% decline</b>	197 <sup>(b)</sup>
2030	234 <sup>(a)</sup> <b>78% decline</b>	91 <sup>(c)</sup>
2030 w/OTR	175 <sup>(a)</sup> <b>83% decline</b>	68 <sup>(c)</sup>

Sources: (a) Winberg estimate; (b) EIA data; and (c) America’s Power est. based on announced retirements

## Takeaways:

- By 2030 coal, will lose two-thirds of 2022 U.S. coal sales
- Losses could be even higher given EPA’s intent to impose more emissions regulations
- Fleet continues to age and investment capital is focused on maintenance of production
- Coal industry needs to protect its market share – technology is the long-term answer

# Coal to Products



Hydrogen can also be a product

- ✓ Coal Gasification to Hydrogen is lowest levelized cost
  - ✓ Large capital cost
  - ✓ Large production requirements – economies of scale
- ✓ Pleasants Power Station (WV) – now Quantum Pleasants
  - ✓ Pyrolysis-based hydrogen production & use proposed
  - ✓ Graphite/Graphene production
  - ✓ May be “game-changing”

# ***Coal's Tailwinds***

- **The House Coal Caucus!**
- **“Affordable” Electricity is getting attention**
  - In 2022, average electricity prices rose 14.3% -- more than double inflation.
  - Press focuses on middle- and lower-income families paying their high utility bills
  - Loss of manufacturing jobs is an even bigger challenge for middle- and lower-income families
  - International Renewable Energy Agency estimates \$131 trillion cost to reach 1.5C by 2050.
- **“Dependable” Electricity is getting attention**
  - Hearings with FERC and NERC have raised reliability and resiliency concerns
  - NERC’s Long-Term Forecast: >70% of U.S. grid is at risk
  - NERC’s 2023 Summer Reliability Assessment: 2/3 of U.S. grid is at risk
  - PJM – recently sounded a new warning on baseload shutdown
- **“Clean” Electricity is misunderstood – it is not limited to renewables**
  - Coal with biomass and CCS can provide 24x7 electricity with net-negative CO<sub>2</sub> emissions.
  - Coal can produce H<sub>2</sub>, ammonia, REE, and a host of other products.



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