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A Regional Approach to Energy Decarbonization

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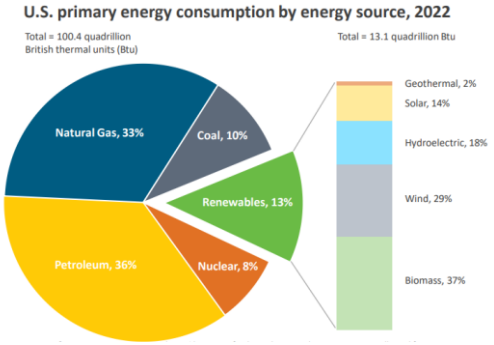
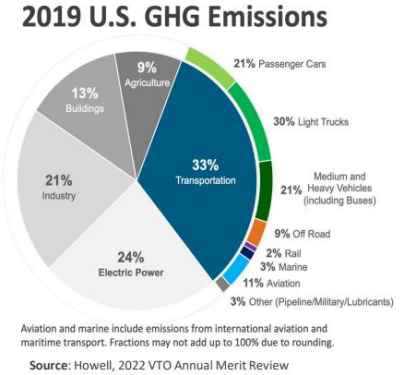
U.S. Carbon Dioxide Emissions and Goals

Source: Satyapal, 2023 FC Expo Presentation

Administration Goals include:

- Net-zero emissions economy by 2050 and 50–52% reduction by 2030
- 100% carbon-pollution-free electric sector by 2035

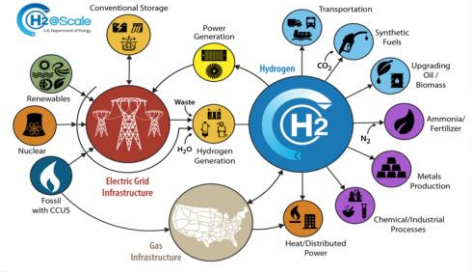




How Do We Get There?

Bipartisan Infrastructure Law

- **Includes $9.5B for clean hydrogen**:
  - $1B for electrolysis
  - $0.5B for manufacturing and recycling
  - $8B for at least four regional clean hydrogen hubs
- **Requires** developing a **National Clean Hydrogen Strategy and Roadmap**



- Invest more than **$7 billion** in the supply chain for batteries
- Provide **$21.5 billion** in funding for clean energy demonstrations and research hubs focused on next generation technologies needed to achieve our goal of net-zero by 2050
- Establish the *Office of Clean Energy Demonstrations* (OCED) to deliver clean energy demonstration projects
- Create a new **$750 million** grant program to support advanced energy technology manufacturing projects in coal communities
- Expand the authority of DOE's *Loan Program Office* (LPO)

Inflation Reduction Act

- **Includes significant tax credits** (e.g., up to $3/kg for production of clean hydrogen)

Total 3.7 GW in Electrolyzer Capacity (June 2023)
5-fold increase since 2022

Coal to Gas

- The US shed 49.2 of its 316.8 gigawatts (GW) of coal-fired power between 2010 and 2019, greatly due to power plant fuel type conversion to natural gas
- Drivers: tighter emission requirements, low prices and technological progress
- In 2019, the U.S. electric power sector produced 1,724 million metric tons (MMmt) of CO_2, 32% less than the 2,544 MMmt produced in 2005
- When can DAC (if ever) remove 800 MMmt CO_2 from the atmosphere???
- Europe can do the same
- It will not be cheap (NG is more expensive in Europe than in US)
- Consider it the price you pay for CO_2 capture/removal

With or without hydrogen…

- Gas turbines provide the fastest, least expensive and field-proven way(s) to significant reduction of CO_2 emissions in reliable electricity production
- On their own and/or in support of renewables
- They will play a prime role in decarbonization


General Electric 7HA