A PUBLIC AGENCY
NCPA
NORTHERN CALIFORNIA POWER AGENCY

# Electrolyzer Market Participation

June 17, 2025

# Topics for Discussion

- Discuss objectives
- Operating characteristics
- Market participation
- Operational configurations

# Discussion Objectives

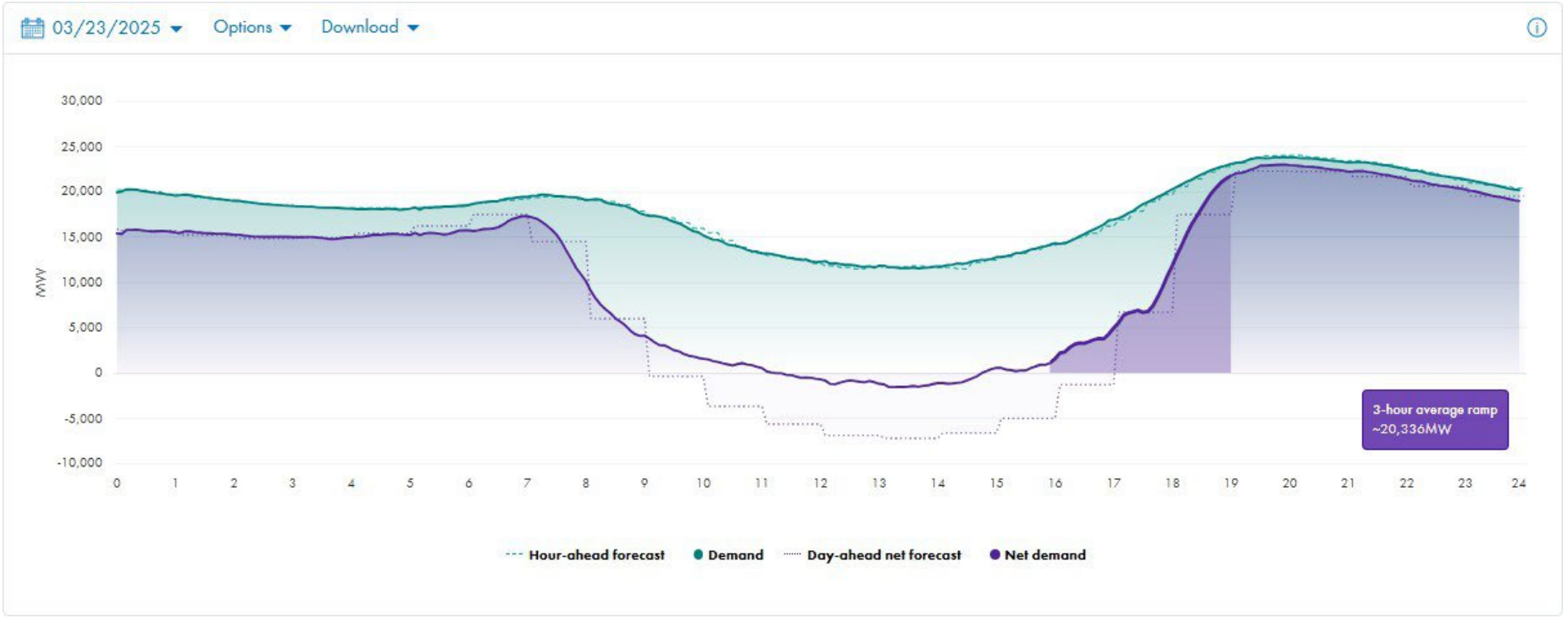
- Develop market rules that are specific to hydrogen electrolyzer participation
  - Hydrogen electrolyzer(s) operated in coordination with other technologies (e.g., natural gas generating facilities)
  - Hydrogen electrolyzer(s) operated as independent facilities
  - Combined participation
- Develop market rules that account for the specific operating capabilities of this technology
- Provide incentives to encourage further development of this technology

# Dispatchable / Flexible Capacity

- Targeted electrolyzers have flexible operating characteristics
  - Fuel / emissions reduction
  - Spinning reserves
  - Non-spinning reserves
  - Regulation services
  - Storage capability
  - SCADA set point control

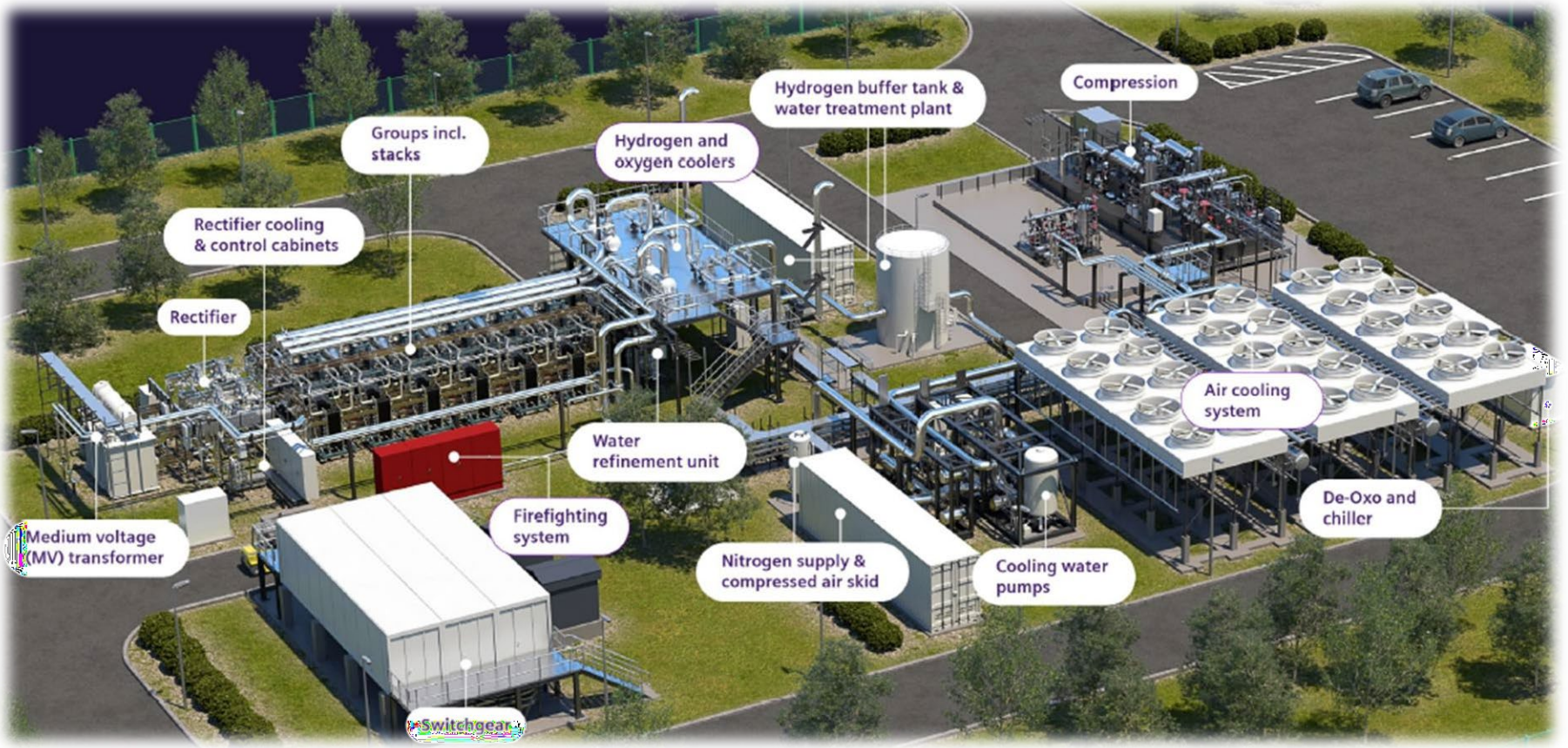
- When paired with existing or new dispatchable resources, this can act as the missing “dispatchable renewable resource” in the fleet to support reliability

# Renewable Integration



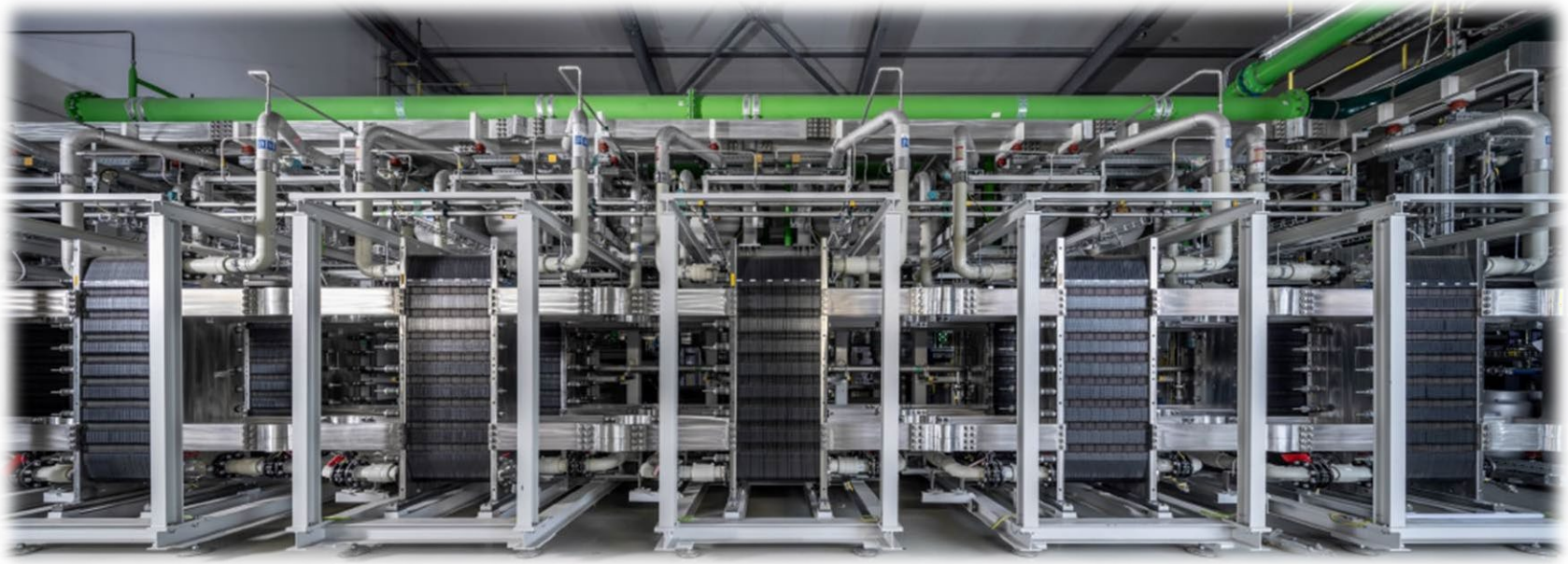
# Storage Capability

- Hydrogen electrolyzers paired with storage can act as short, mid and long term storage based on designed storage capability
- When paired with other generating technologies, electrolyzers can be operated like storage (e.g., BESS)
- Hydrogen can be produced during the day using solar production, hydrogen can then be stored, and subsequently used as a fuel in other technologies to generate power during non-solar periods
- 5 + days duration storage
- Develop market rules specific to this capability


Hydrogen buffer tank & water treatment plant
Compression
Groups incl. stacks
Hydrogen and oxygen coolers
Rectifier cooling & control cabinets
Rectifier
Air cooling system
Water refinement unit
De-Oxo and chiller
Firefighting system
Medium voltage (MV) transformer
Nitrogen supply & compressed air skid
Cooling water pumps
Switchgear

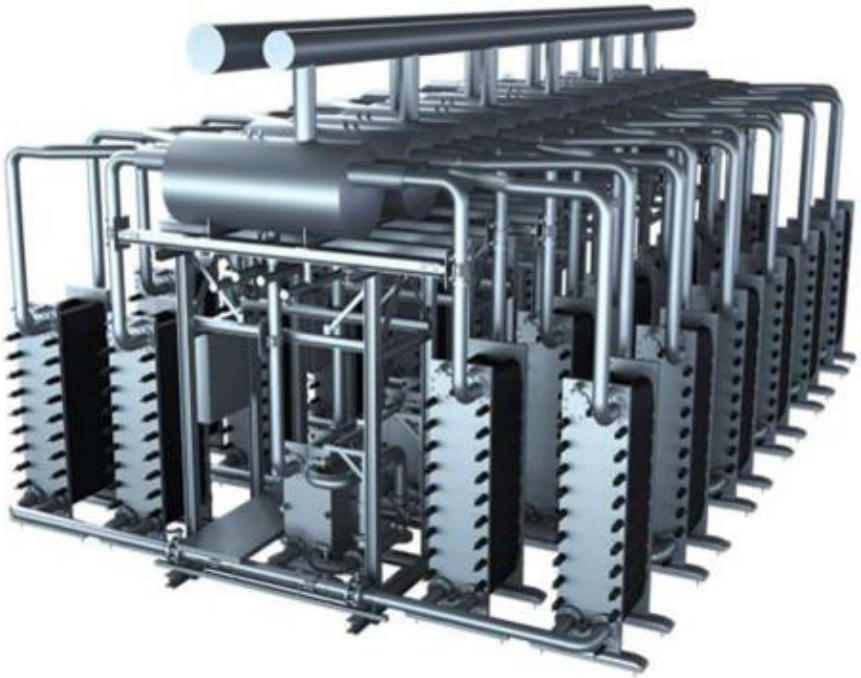
## BASF Hy4Chem, Ludwigshafen:
## 3x Elyzer P-300 (52.5 MW)
## Just went into operation in March ‘25

SIEMENS energy



# Hydrogen Production – PEM Electrolyzer

- Proton Exchange Membrane (PEM) Electrolyzer
- Feedstocks: Power and Water
- ~80MW load for 1,000kg/hr.
- 5.1 gal-H20 per kg of H2
- Need ~140 acre-feet per year (AFY) of water



| | |
|---|---|
| Power Consumed | 19 MW |
| $H_2$ Production | 330 kg/Hr |
| | 44.4 mmBTU/Hr |

# Questions / Comments