GTI ENERGY

solutions that transform

Extending the Impact: Pairing EE with other DSM Resources

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MEEA
MIDWEST ENERGY EFFICIENCY ALLIANCE

MIDWEST ENERGY SOLUTIONS CONFERENCE

Who we are

GTI Energy is where complex energy challenges meet bold solutions. With expertise in energy research, technology development, and business innovation, partners across every sector trust us to build and demonstrate solutions for better-performing energy systems.

We focus on strengthening energy systems and the communities they serve

With a trusted, expert team of scientists, engineers, and partners

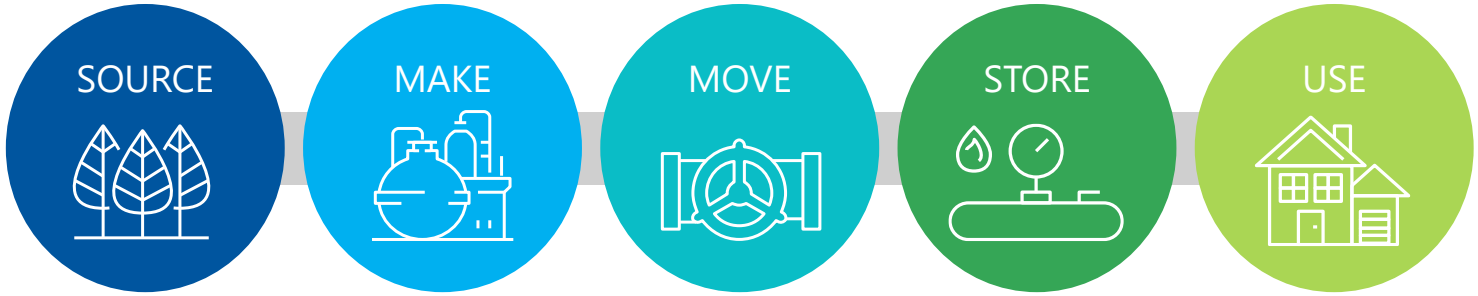
Leveraging our deep expertise in gases, liquids, infrastructure and efficiency

Embracing systems thinking, innovation, and collaboration

To deliver impactful innovations for safe, affordable, and resilient energy for everyone.

At-a-glance

Our trusted team collaborates with the operators of energy systems to progress the performance of those systems by leveraging gases, liquids, infrastructure, efficiency and operational know-how.



Enterprise Employees

500+

Voted regional Top Workplace 7 years in a row

TOP WORK PLACES 2025 Chicago Tribune

Partners in Active Collaborations

175+

80+ years of experience and leadership in energy production, storage, delivery and use

Research & Development

$1B+

In the past decade

Leading and convening collaborative R&D

Innovation & Commercialization

1,300+ Patents

500 Products

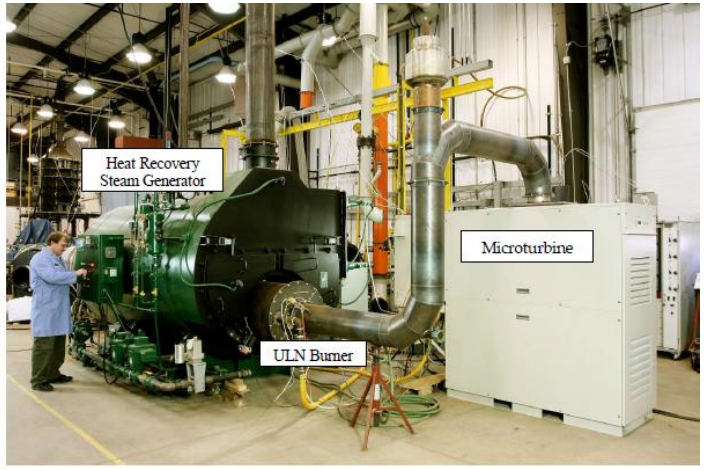
750+ Licensing Agreements

10+ Industry Collaboratives

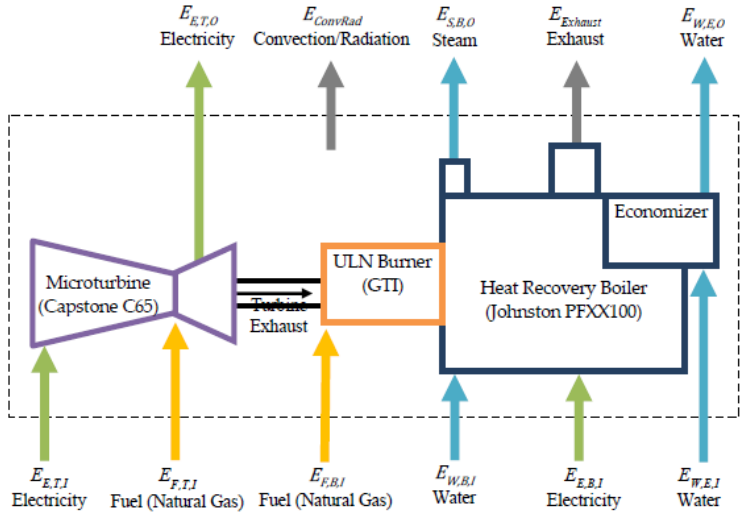
OTD Operations Technology Development · UTD Utilization Technology Development · GTI Energy Emerging Technology Program (ETP) · LCRI Low-Carbon Resources Initiative · GTI Energy Sustain H_2 · Veritas · carbon [CMIC] management information center powered by GTI Energy · Open Hydrogen Initiative · center for Methane Research · GTI Energy HyRes · GTI Energy RAISE

Flexible Combined Heat and Power

- **Integrating CHP with ultra-low-NOx supplemental burner** enables high-efficiency and low emissions CHP systems with enhanced heat recovery
- Applicable to **many industrial processes** that need electricity and steam (or hot water)
- **Increases energy efficiency** and reduces emissions in a cost-effective package
- Overall system **efficiency up to 84%**
- **Re-uses waste heat** from the C65 microturbine
- Decouple the steam/electrical power



FlexCHP installed at GTI Energy Lab. for NG fired



CHP with NG boiler (high efficiency – 84%)

Microgrid Demonstration at DOD Site

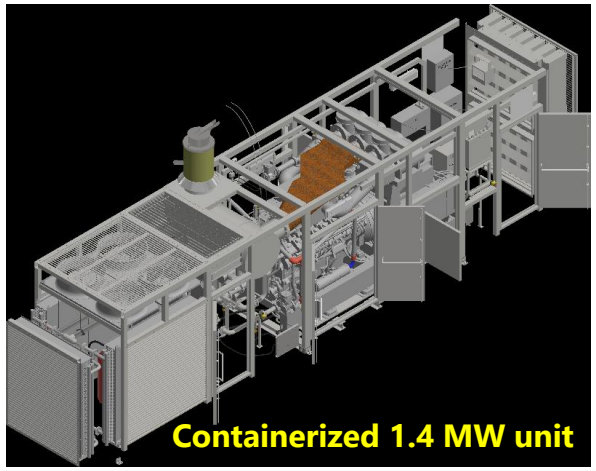
- DoD resilience plans ensure mission critical operations during a utility outage
- RDT&E study will demonstrate **new distributed energy** resources (DER) including **CHP**, PV, BESS, and natural gas CHP and diesel gensets:
  - Expand existing system to serve six facilities
  - **Improve energy resilience**
    - Grid-islanded for more than 14 days
    - Grid-connected to reduce costs with demand reduction
  - **Decrease energy use** and increase renewable utilization
  - Develop **scalable solutions** to apply to other DoD facilities

CHP system for defense sites for resiliency and energy efficiency

Information Technology Laboratory – DOD Site

- Design, engineer and demonstrate **multiple 1.4 MW backup power** generation units to increase ITL's power resilience
  - Containerized natural gas fired units
  - Transportable by road, rail, heavy-lift helicopter and cargo or military plane
  - Supplement ITLs backup power capabilities
  - Enable seamless connection to existing infrastructure at ITL to **deliver uninterrupted power**
  - Provide critical power in emergency
- Project includes electricity demand analysis, technology selection, design and engineering, procurement, installation, commissioning


ITL, Vicksburg Facilities


Containerized 1.4 MW unit

CHP System for defense sites for resiliency and energy efficiency

Natural Gas EPSS Demand Response

- **Demand Response Operation with Non-Emergency Gensets**
  - Two demonstration sites:
    - North Riverside 150 kW Genset:
    - Bartonville 200 kW Genset:
  - DR peak shaving with natural gas non-emergency genset achieved 3-yr payback relative to standby diesel genset for demand charges >$20/kW
  - Iterative adjustment of threshold required to optimize DR while avoiding additional maintenance

North Riverside RC

Bartonville RC

Hybrid Gas/Electric Chiller CHP Demonstration

- **Emerging high-efficiency hybrid (natural-gas/electric)** chiller technology being developed by **Tecogen**
- **Ease-of-integration** as a drop-in replacement for electric-chiller systems
- **Heat-recovery potential** in a field setting
  - Peak-electrical-demand mitigation
  - Potential via demand response controls
  - Reduced carbon intensity via fuel-carbon optimized performance
  - Cost-savings via fuel-cost optimized performance
- **Potential efficiency of 83% with heat-recovery**

HYBRID DRIVE TECHNOLOGY

UTD Utilization Technology Development

CHP System for heating and cooling with grid flexibility

Flexible Solutions - Hydrogen Microgrids

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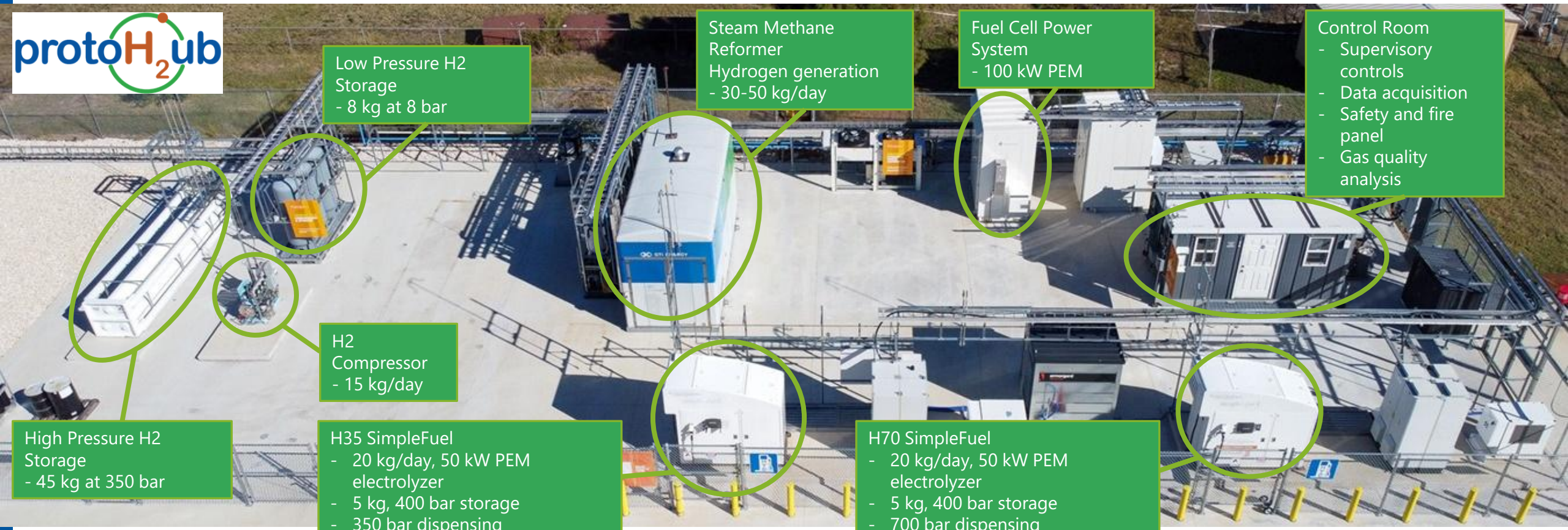
protoH2ub



Air Liquide · CenterPoint Energy · CHART · Chevron · ConocoPhillips · FRONTIER energy · MCDERMOTT · MITSUBISHI HEAVY INDUSTRIES · ONEH2 ZERO EMISSIONS ENERGY · ONE Gas · ONEOK

POWERCELL · Shell · SoCalGas · TACC Texas Advanced Computing Center · Texas Commission on Environmental Quality · TOYOTA · U.S. Department of Energy · The University of Texas at Austin Center for Electromechanics Cockrell School of Engineering · WM Waste Management

Energy Recovery From Brewing/Distilling Operations: Field Demo

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Water Heating with Brewing/Distilling Waste Heat – Heat Recovery and Storage

- Demonstration of **heat recovery of up to 60% of exhaust gas heat** from brewing and distilling to reduce fuel to heat water
- **Exhaust heat recovery** using a heat exchanger to transfer heat to hot water for brewery usage with **energy storage** for extended time of use in other systems
- **Two micro-brewery sites demonstration complete**
  - **Achieved 15 to 25% recovery,** of heat from the brew kettles or 60% of the available waste heat in exhaust gases
  - **Reduced CO2 emissions by up to 25%**
  - **Uptime** is critical, **can achieve > 40% with more runtime**
  - **Demonstrated payback period <5 years**

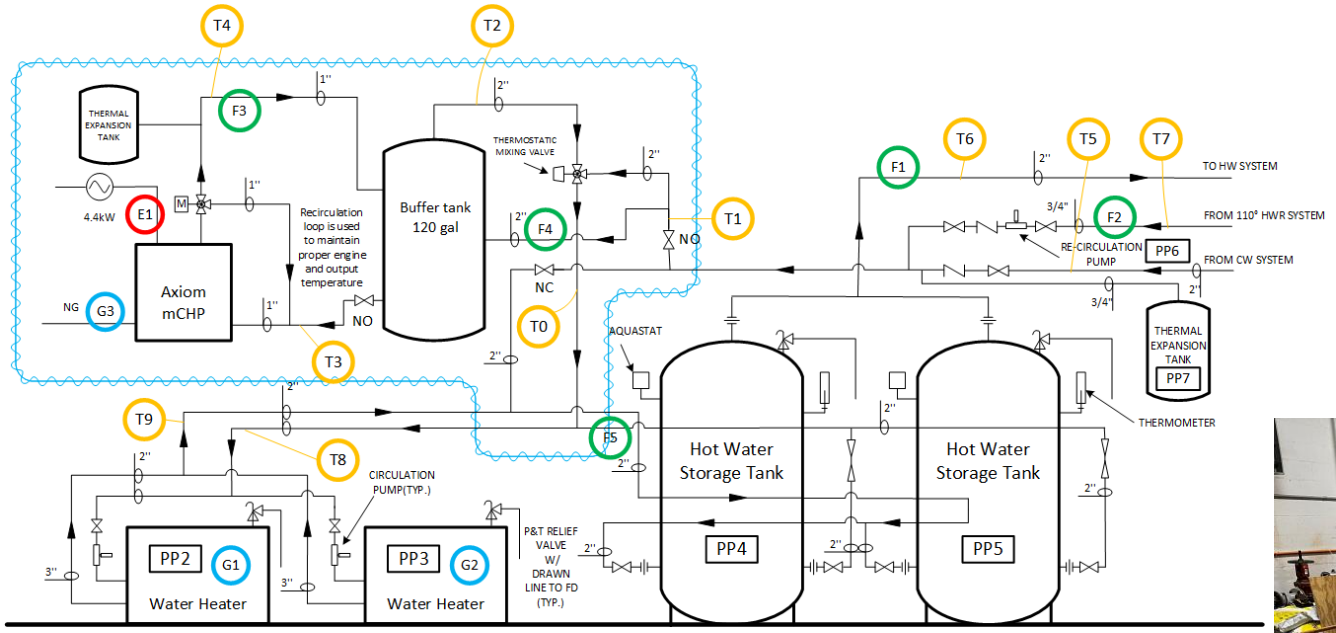
TOWER BREWING

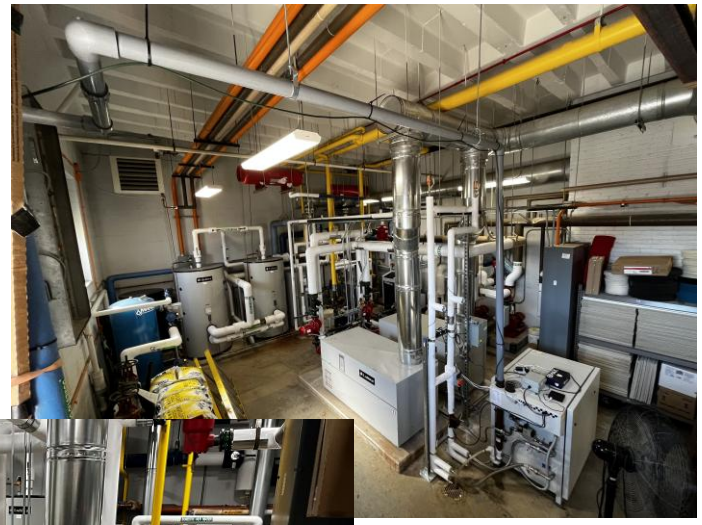
CALIFORNIA ENERGY COMMISSION

SoCalGas

UTD Utilization Technology Development

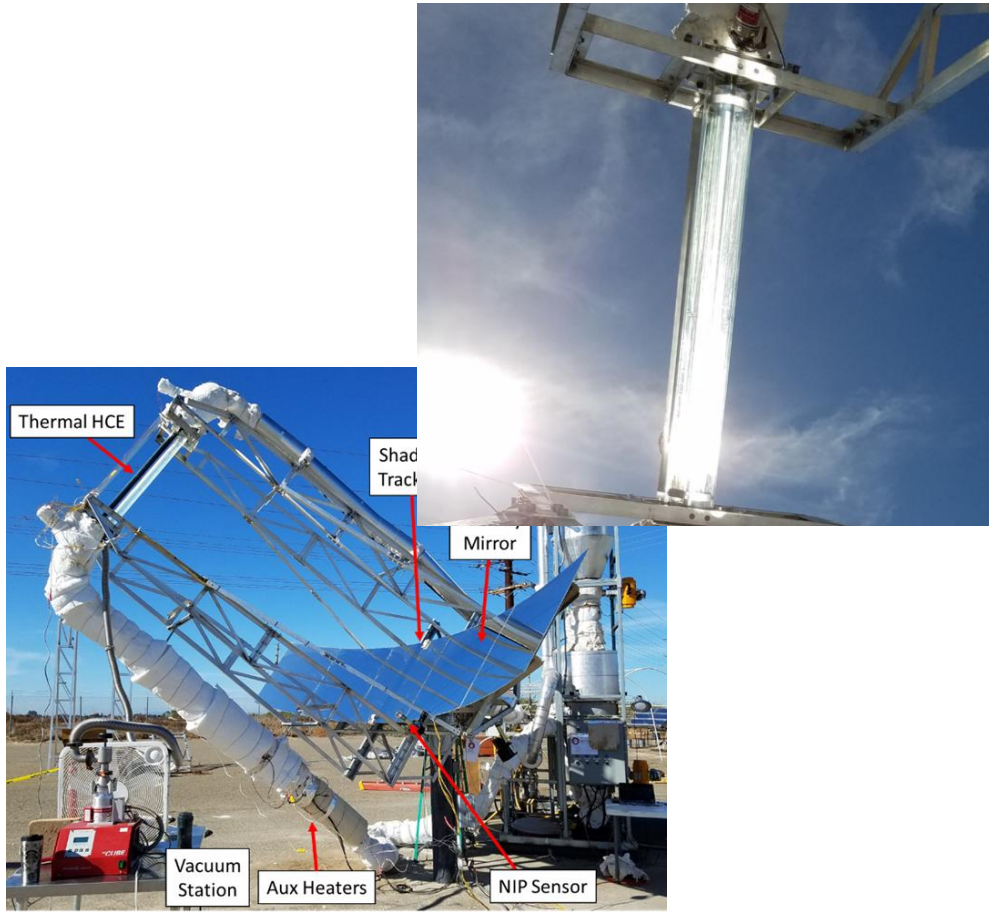
Energy Storage - DHW + mCHP Retrofit at Illinois National Guard





mCHP Systems with Energy Storage Capabilities

High Temperature Energy Storage



High Temperature Energy Storage Systems

Demand Response for Different Regions

ISO	Load Curtailment	Onsite Distributed Energy Resources	Third Party Aggregation
PJM	X	X	X
MISO	X	X	
NYISO	X	X	
CAISO	X	X	X
ERCOT	X	X	X
SPP			

State	Time of Use Pricing	Load Curtailment	Onsite Distributed Energy Resources	Third Party Aggregation
Alabama	X		X	
California	X	X		X
Florida	X	X	X	
Illinois	X	X	X	
Michigan	X	X		
Missouri	X			X
North Carolina	X	X	X	
Oklahoma		X		
Oregon		X	X	
South Carolina	X	X	X	

Summary of DR program types offered by different ISOs

Questions

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