Microgrids – District Energy & CHP Synergies

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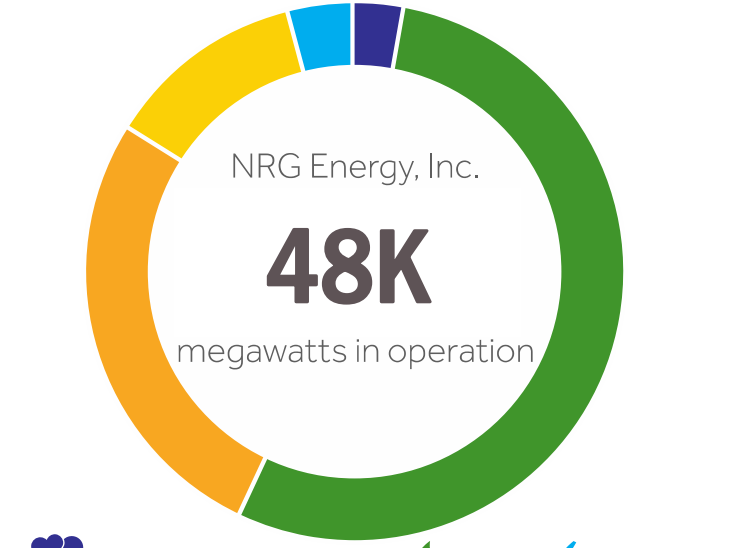
NRG by the Numbers

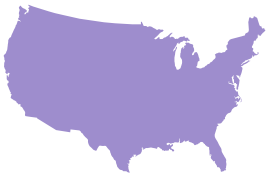


Global, diverse energy

3,000,000
recurring customers within NRG retail brands

One of the nation's largest
SOLAR
power generators

Ownership interest in nearly **140**
power-generation facilities across 29 states



Largest independent
power producer in U.S.

Fortune 200

District Heating and Cooling

San Francisco, CA

- Steam: 454 MMBtu/hr
- 175 customers

Omaha, NE

- Steam: 735 MMBtu/hr
- Chilled water: 29,250 tons
- 120 customers

Minneapolis, MN

- Steam: 1,100 MMBtu/hr
- Chilled Water: 40,000 tons
- 150 customers

Pittsburgh, PA

- Steam: 295 MMBtu/hr
- Chilled water: 12,935 tons
- 50 customers

Harrisburg, PA

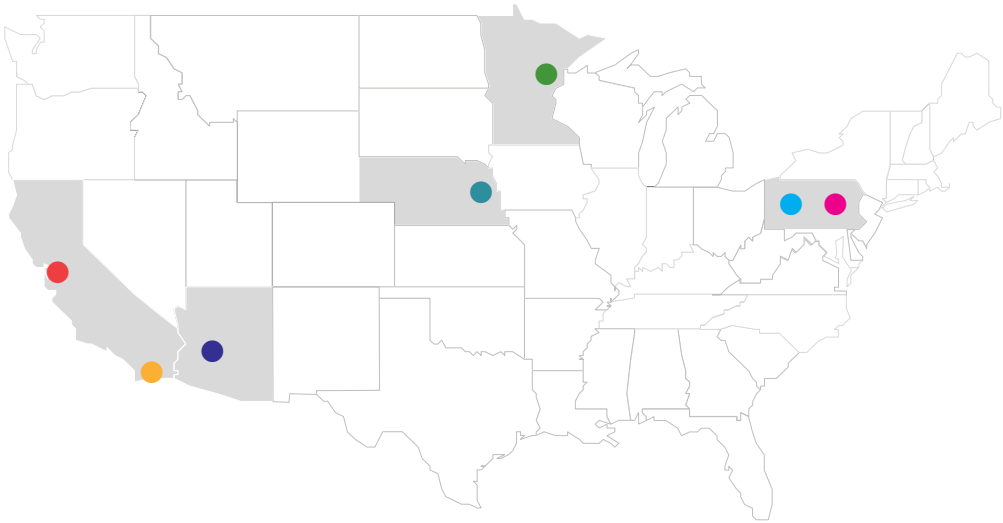
- Electricity: 12 MW
- Steam: 370 MMBtu/hr
- Chilled water: 3,600 tons
- 145 customers

San Diego, CA

- Chilled water: 8,825 tons
- 16 customers

Phoenix, AZ

- Chilled water: 38,100 tons
- 35 customers



Combined Heat & Power

Harrisburg, PA

- 4.1 mmBTU/hr

Bridgeport U, CT

- 1.4 MW fuel cell power plant
- Capacity to deliver 4 mmBtu/hr of heat

Plainsboro, NJ

- 4.6 MW
- 34.1 mmBTU/hr
- 72.3 MLB/hr of boilers
- 3700 tons chilled water
- 1,000,000 gallon thermal storage

Princeton, NJ

- 248 KW
- 1,445 kBTU/hr

Dover, DE

- 104 MW
- 70 MLB/hr

San Francisco, CA

- Two 250 kW Reciprocating Engines
- 2.6 MMBTU/hr

San Diego, CA

- 1.5 MW Recip Eng
- 2,000 ton Gas Turbine Chiller
- 940 tons (waste heat to chilled water)
- District cooling

ASU–Tempe, AZ

- 8.3 MW
- 80 MLB/hr steam
- 10,000 tons chilled water

Tucson, AZ

- 1.6 MW
- 46 MLB/hr
- District heating & cooling

Henderson, NV

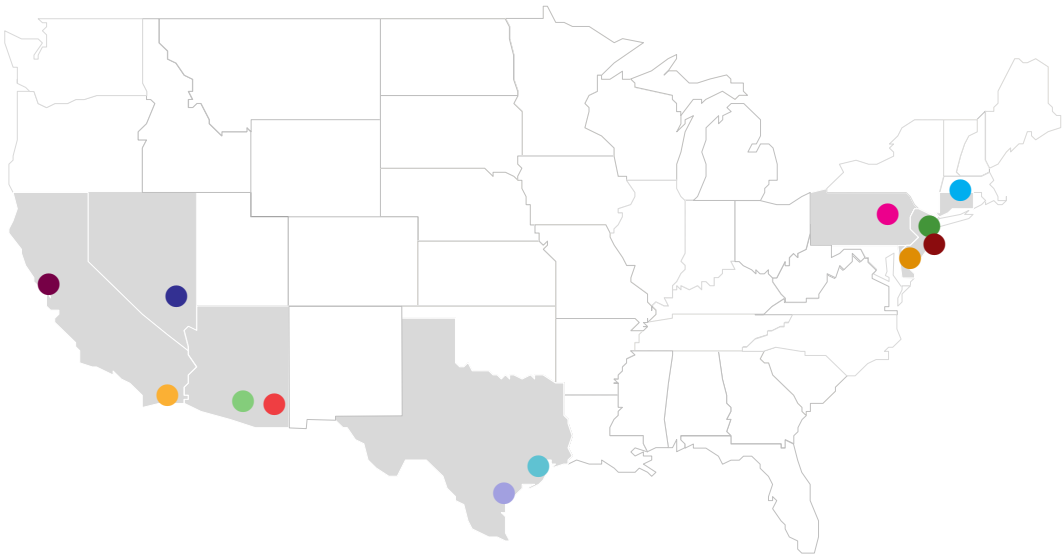
- 90 MW CC
- 140 MLB/hr

Corpus Christi, TX

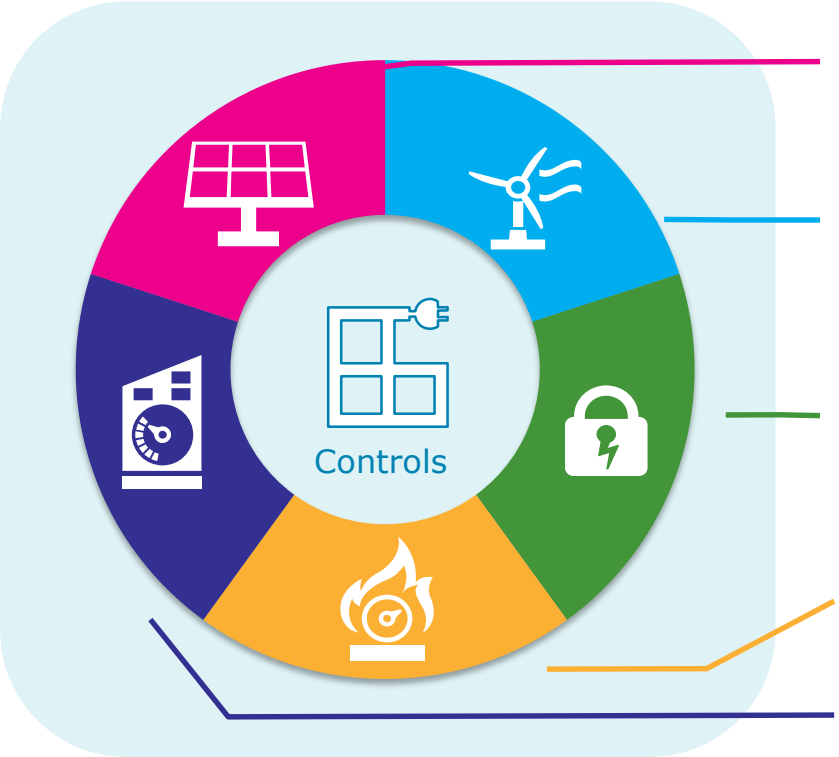
- 560 MW
- 1 MLB/hr steam

San Jacinto, TX

- 176 MW
- 1200 MLB/hr



Microgrid Systems



Solar – Providing power during daytime peak.

Wind – Can complement solar and provides low cost renewable generation

Thermal Storage, batteries and backup generation – Provides reliable source of energy

Combined Heat and Power – Maximizes thermal costs savings and efficiencies

Smart Energy – Manages the load to optimize resources and cost

Network of distributed energy resources that can either be tied to the grid or "islanded" allowing a building, city or campus to leverage diversified fuels and technologies to provide clean, reliable and high-quality power.

Integrated Energy Systems

Integrated energy systems

On-site power generation that keeps critical infrastructure running regardless of external circumstances

Resiliency	Reliability	Sustainability
Can create an island in case of grid failure, by closing the grid connection and using the facility's own energy production to run the facility	Approximately 90% uptime with CHP, and up to 99%+ with added batteries or backup generators	Options for reduced emissions, integrated renewables and energy savings

Arizona State University (Tempe Campus)

On-site Solar

Sun Devil Energy Center CHP

Total Tempe Campus System

- Electrical Capacities – 16 MW PV, 9 MW CHP, 6 MW Thermal Storage, 8 MW Diesel Gen
- Thermal Capacities - Steam 200,000 lb/hr, CHW 30,000 tons (mech), Thermal Storage 6,000 tons

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NRG Energy Center Princeton
Princeton Hospital

A state-of-the-art combined heat and power (CHP) plant

Hospital Campus System

- Electrical Capacities – 200 KW PV, 5 MW CHP, 1 MW Thermal Storage, 6 MW Diesel Gen
- Thermal Capacities - Steam 50,000 lb/hr, CHW 3,000 tons (mech), Thermal Storage 1,000 tons

CHP – 4.6MW natural gas plant supplies 100% of heating & cooling needs and most of the electrical needs

Enterprise Energy Management –Advanced software system optimizes operations for energy use and cost efficiency

Backup generation – With the grid down, the 3 back-up generators can support the hospital's essential power needs

Chillers – Three 1,000-ton electric chillers and one 700-ton absorption chiller provide chilled water

Grid – Can draw power from or export to the PJM power grid

Thermal Storage – 1.2 M gallon chilled water storage for cooling the hospital

Solar – 200kW Solar Array provides electricity, and reduces carbon emissions

EVgo – Two 30 amp electric vehicle charging stations

☑ Financing ☑ Operations & Maintenance

Growth of District Energy, CHP & Micro Grids

- Recognition of value of localized resiliency and reliability
- Local support from stakeholders & champions
- Government/utilities
- Sustainability/efficiency drivers - integrating renewables and energy efficient technologies (CHP)
- Timing
- Economics/capital

Thank you.