

February 23, 2017



Look Off-Campus for Achieving Sustainability and Resiliency Goals

2017 IDEA Miami Campus Conference

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VP Strategy & Business Development

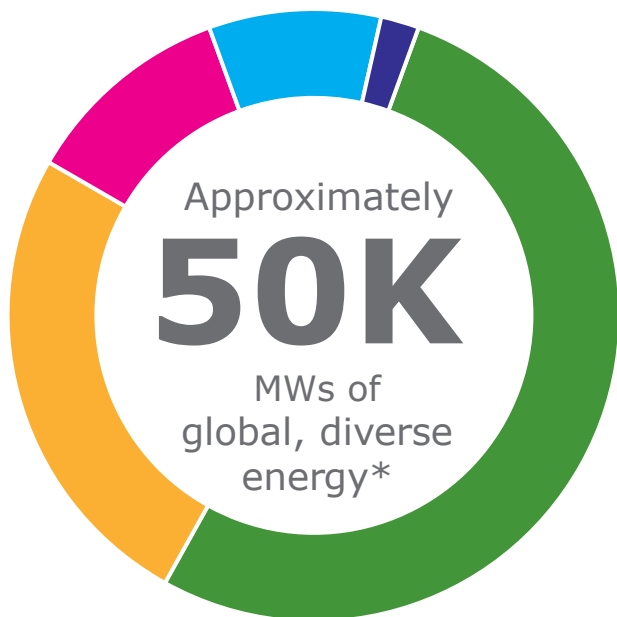


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*NRG and NRG Yield Assets excluding 1,346 MW thermal, Before non-controlling interest



Largest independent
power producer in U.S.

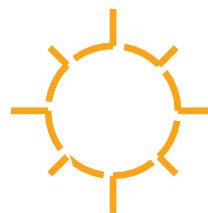


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Nearly **3,000,000**

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



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



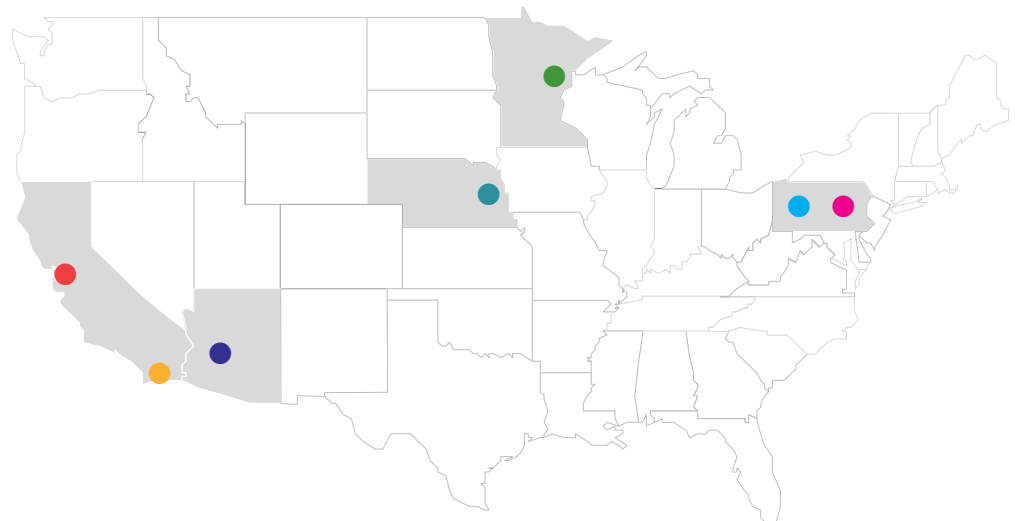
San Diego, CA

- 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

- Single 248 KW Reciprocating Engine
- 1.45 MMBTU/hr
- 45 tons of chilled water



Dover, DE

- 103 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



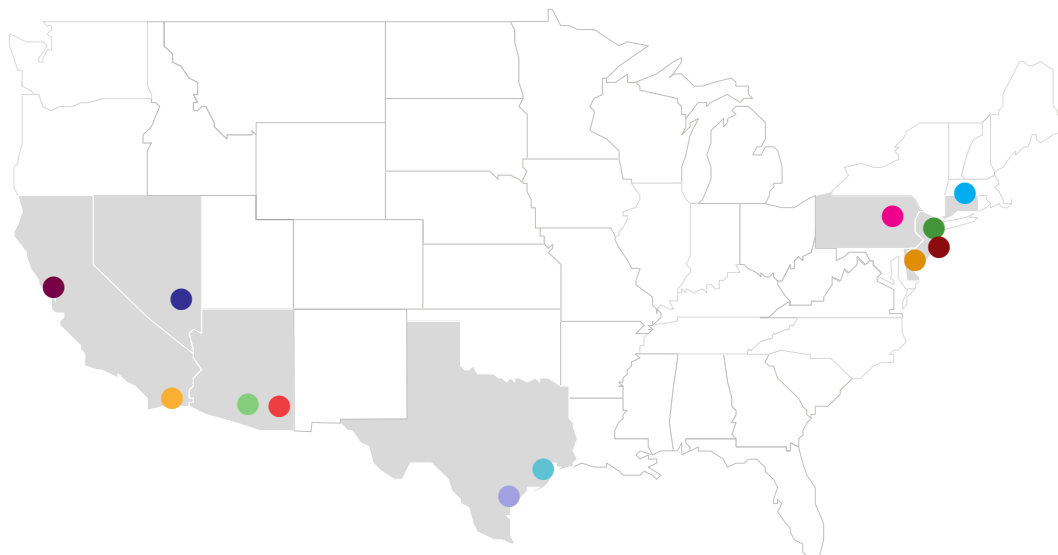
Corpus Christi, TX

- 560 MW
- 1 MLB/hr steam



San Jacinto, TX

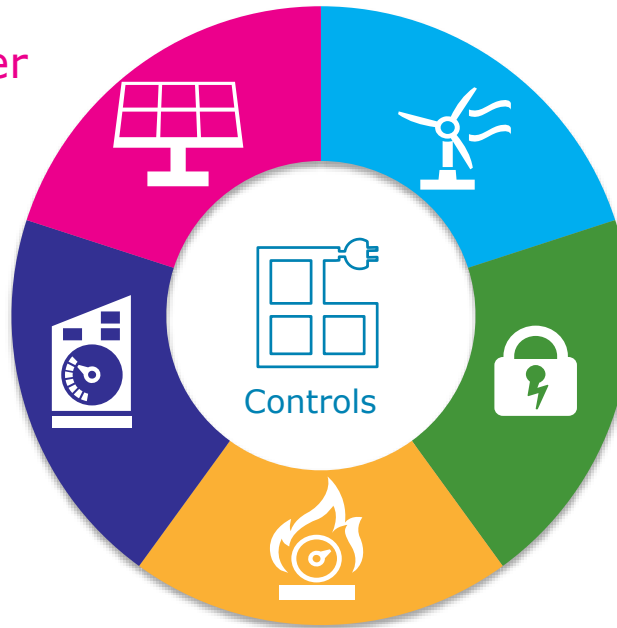
- 176 MW
- 1200 MLB/hr



Microgrid Systems

Solar – Providing power during daytime peak

Smart Energy –
Manages the load to optimize resources and cost



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

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

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

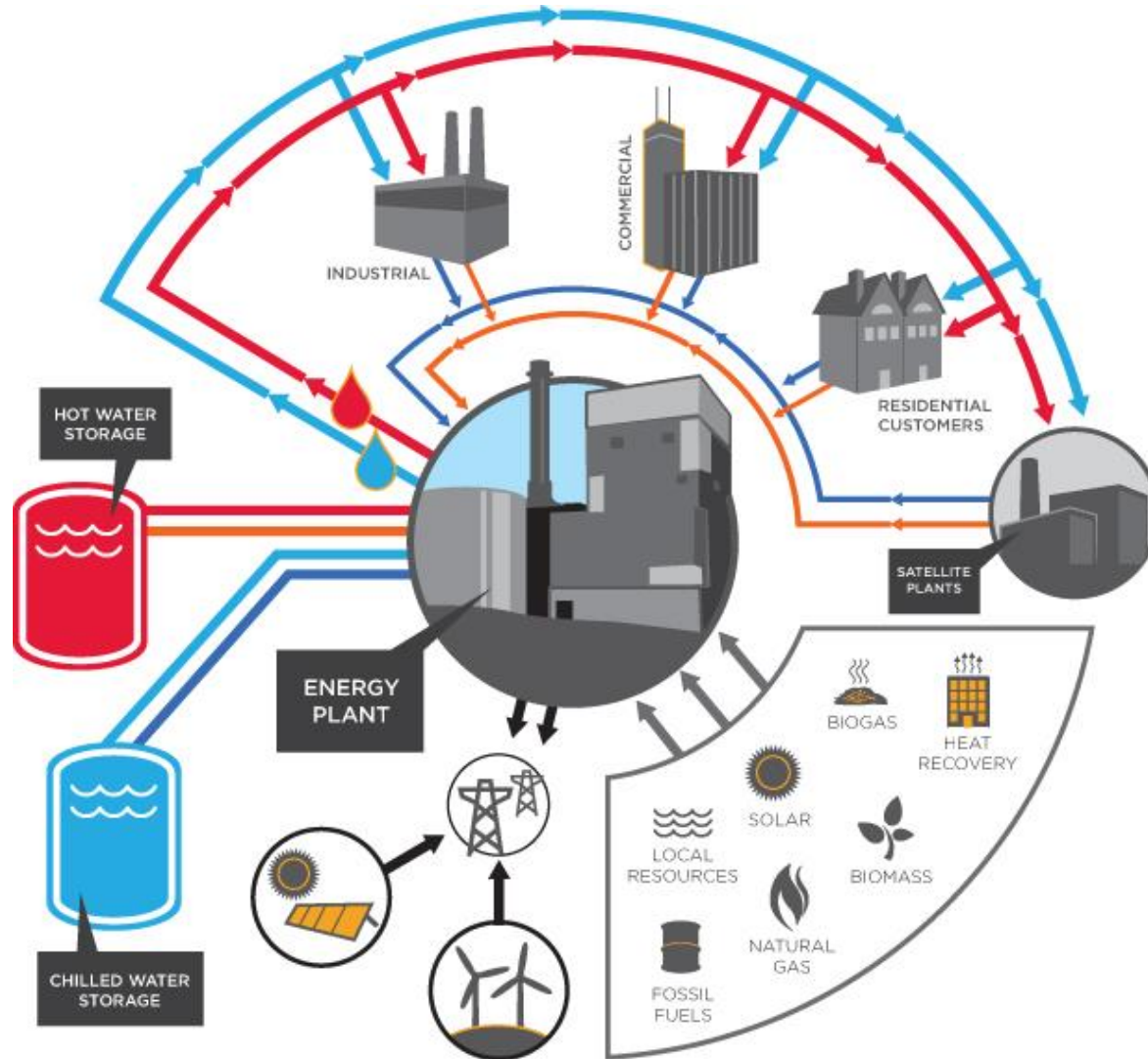
Reliability

Approximately 90% uptime with CHP, and up to 99%+ with added batteries or backup generators

Sustainability

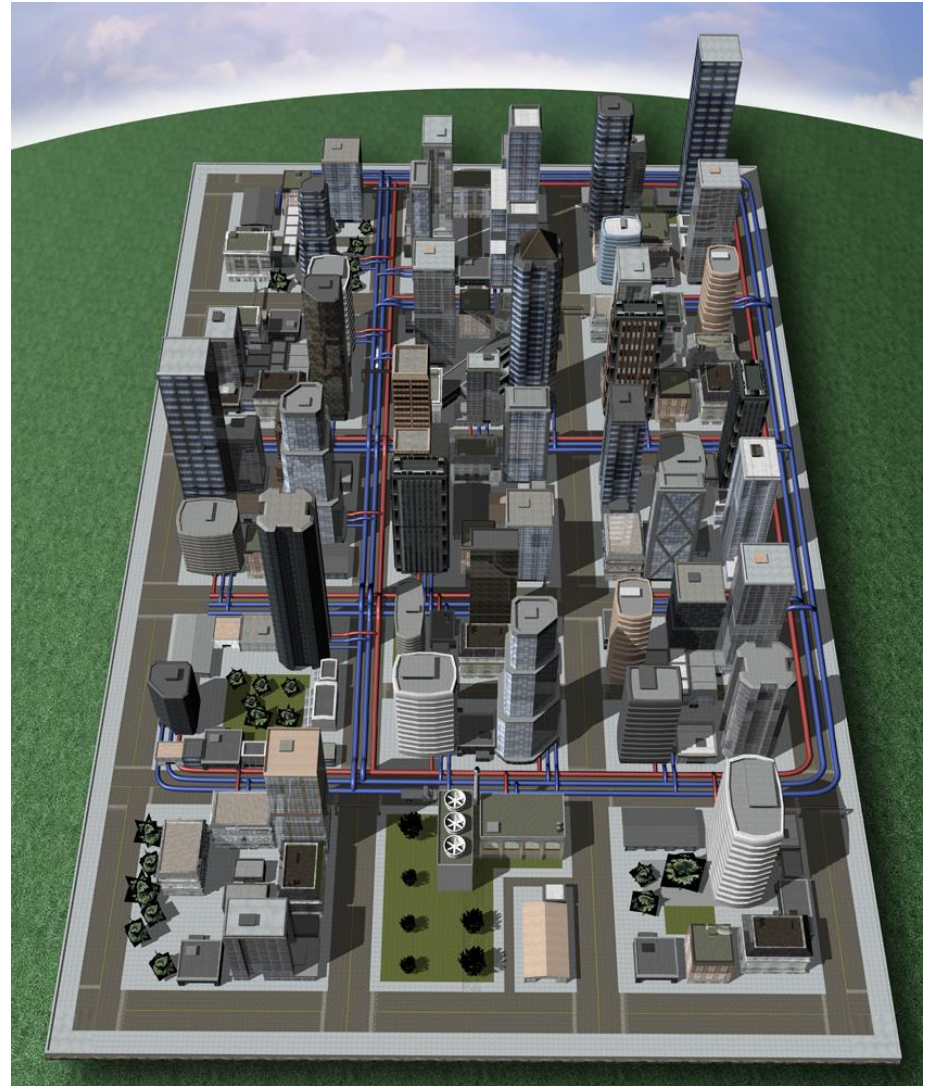
Options for reduced emissions, integrated renewables and energy savings

Integrated Thermal Smart Grid



District Energy/CHP/Microgrid – Community Scale Energy Solution

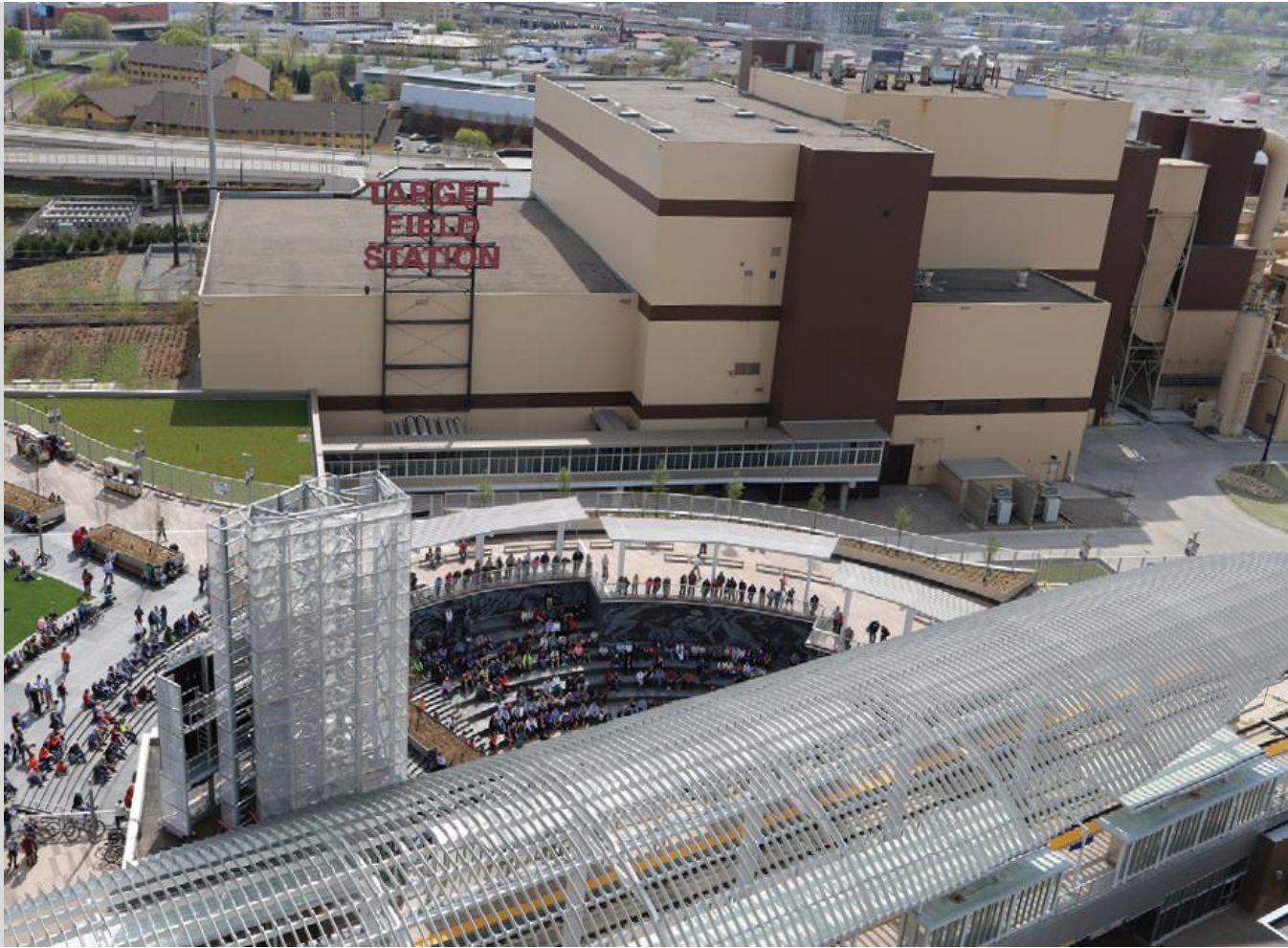
- Underground network of pipes “combines” heating and cooling requirements of multiple buildings
- Creates a “market” for valuable thermal energy
- Aggregated thermal loads creates scale to apply fuels and technologies not feasible on single-building basis
- Fuel flexibility & distributed generation improves energy security, strengthens local economy



Interconnection with Neighboring District Energy Systems to Capture Synergies

- Energy & water efficiencies
- Decrease production costs
- Monetize excess capacities and individual redundancies
- Increased reliability and resiliency
- Increased operational and maintenance flexibility

Hennepin Energy Recovery Center – Downtown Minneapolis Waste to Energy Plant



Back-up Power and Demand Response Opportunities

Reliability and asset backed Demand Response



Natural gas and diesel backup generation systems to meet your facility power needs

Provides reliable power in the event of a utility outage

Can help support utility reliability while also earning a shared DR revenue stream

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



Offsite PPA



No CapEx
required



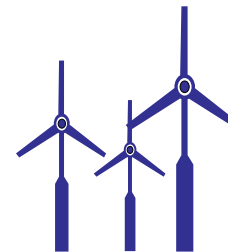
Low Risk



Energy price
hedge



Additionality



Sustainability



Off-site PPAs enable low-risk renewable energy procurement at constant energy prices, and help achieve corporate sustainability goals

Red Rock Solar Plant (Grid-Scale Solar) PPA



Arizona Public Service Co. (utility)

40 MW,
located near
Casa Grande, AZ

Off takers

- Arizona State University
- Pay Pal
- No upfront capital investment

Renewable Energy Certificates (RECs)



Off-site Renewable Sources



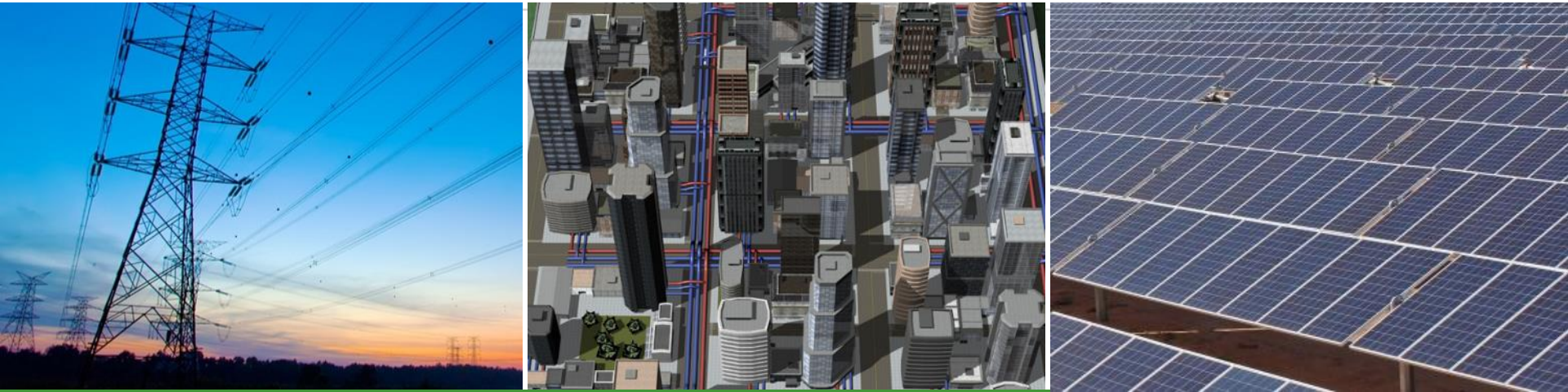
Other Sustainability/Resiliency Possibilities



- Purchase Renewable Natural Gas – Wastewater treatment biogas
- Export garbage, oil and bio-mass to processing facilities
- Virtual Power Plants – extended electrical grid
- Energy Storage
 - Thermal
 - Batteries
 - EVs



Summary – Looking beyond your Campus



Looking beyond your Campus

- Electric and Gas Utilities – investigate their programs
- City, State and Federal initiatives
- IDEA MADE program – do it at your local level
- Neighboring district energy systems – interconnection possibilities
- Other local energy initiatives

Thank you.

