NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

NEW YORK STATE OF OPPORTUNITY. | Climate Smart Communities

Building Clean and Resilient Power: NY Prize Update and Microgrid Case Studies

This webinar will begin shortly

September 10, 2015

Welcome!

Today's topic: Building Clean and Resilient Power:
NY Prize Update and Microgrid Case Studies

Questions for us? Use WebEx chat function

Contact Email: Dazzle Ekblad
dazzle.ekblad@dec.ny.gov

Agenda

Introduction - *Dazzle Ekblad, Climate Policy Analyst, NYSDEC*

Announcements - *Dazzle Ekblad*

NY Prize Update - *Micah Kotch*

Director of NY Prize and Strategic Adviser for NYSERDA

Microgrid Case Studies - *John Moynihan*

Managing Director, Cogen Power Technologies

Q &A - *Dazzle Ekblad*

Upcoming Events

- Sept. 12-20: Nat'l Drive Electric Week, https://driveelectricweek.org
  - E.g., events in Cohoes, Syracuse, Rochester, etc.
- Sept. 24-25: Energy to Lead - REV4NY Exchange (conference), NYC http://www.greentechmedia.com/events/live/energy-to-lead-rev4ny-exchange
- Sept. 25, 9am – 5pm: **Climate Smart Communities 2015 Conference**, Newburgh, NY https://climatesmart2015.eventbrite.com

Upcoming Events

- Sept. 29, 11am-12pm: Webinar - How to Write a Successful NY Environmental Leaders Application http://www.dec.ny.gov/chemical/939.html
    - Applications accepted through Oct. 31, 2015
- Sept. 21-29: Climate Week, NYC http://www.climateweeknyc.org/
- Oct. 8, 10:30am-12pm: **Climate Smart Communities Webinar** - Green Fleet Mgmt. for Municipalities: Right Sizing and Vehicle Efficiency Policies

NY Prize
Community Grid Competition

NYS DEC
Climate Smart Communities Webinar

September 10, 2015

Micah Kotch
Director NY Prize, Strategic Adviser for Innovation
NYSERDA

Building a cleaner, more resilient and affordable energy system for all New Yorkers

Large- and small-scale renewables, demand management systems, energy efficiency, and energy storage are all part of a more cost effective and clean energy system.

#REV4NY

REV initiatives helping to **modernize** the grid

REV Regulatory Reform

Transforming the way utilities operate by incentivizing smart energy management, efficiency, and renewable energy.

REV Demonstration Projects

Unprecedented partnerships between utilities and technology companies advancing private investment in clean energy.

Energy Highway

Modernizing a statewide electricity transmission system.

Large-Scale Renewables

Proposed $1.5B funding commitment to spur private investment in utility-scale clean energy.

Clean Energy Fund

A proposed 10-year, $5 billion strategy that reshapes State programs to support clean energy market development and innovation.

NY-Prize

$40M competition to kick-start development of community microgrids.

NY-Sun

$1B commitment to deploy 3,000 MW of solar and develop a subsidy-free solar market in New York State.

K-Solar

Helping K-12th grade schools statewide go solar at reduced costs.

NY Green Bank

Unlocking financing for clean energy technologies.

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Reforming the Energy Vision

Clean, Reliable, Resilient, and Affordable Energy

- ✓ Bottom-up, consumer directed, dynamic and innovative system
- ✓ Accelerates the adoption of clean and local energy generation
- ✓ Includes microgrids and the ability to preserve power for critical facilities
- ✓ Improves both customer and system-wide efficiency to reduce costs

NY Prize

Cultivating Community Prospects

- ✓ Community teaming arrangements
  - *partnering with industry experts; leverage state/federal funding*
  - *Embedded utility/community-municipal partnership*
- ✓ Targeting utility “opportunity zones”
- ✓ EE, CHP, solar, other resources part of resource portfolio (leverage portfolio of current incentive programs)
- ✓ Mix of customer types (@ least one critical public facility must be included)
- ✓ HUD objectives considered (impacted population involved (weather/income))
- ✓ Consider REV demonstration/laboratory

Multi-Stage Competition

The $40,000,000 NY Prize community microgrid competition (RFP 3044 (http://www.nyserda.ny.gov/microgrid) is comprised of three (3) stages:

Stage 1: Feasibility Assessment

Stage 2: Engineering Design and Financial /Business Plan

Stage 3: Microgrid Build-out and Operation

Open enrollment structure @ Stage 1 promoted a significant pipeline of projects – by design

NY Prize working group includes NYSERDA, DPS, NYPA, NYS GOSR, SGC

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What Does a Community Grid Look Like?

- ✓ Separating Capabilities
- ✓ Efficient Consumption
- ✓ Distributed Generation
- ✓ Backup Generation and Energy Storage
- ✓ Improved Communication for Accelerated Power Restoration

Staten Island University Hospital

NY Prize Award Process

communities enter competition and are evaluated at each stage by selection panel

Critical project partners: Municipalities and Utilities

Evaluation Panel(s)

			Allocations
Threshold ***Qualitative*** Criteria	**Stage 1** Awards to Conduct Feasibility Assessments	**83 awards** (up to $100K)	**$8m**
Threshold ***Audit Grade Design Criteria***	**Stage 2** Feasibility Evaluated Awards for Audit Grade Design	**10-12 Awards** (up to $1M) (cost share required)	**$8-10m**
Audit Grade Design Review	**Stage 3** Designs Evaluated Awards for Build-out/ Operation	**5 Awards** ($3-$5M) (cost share required)	**$20+m**

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NY Prize – Competition Schedule

Milestone	Date
Stage 1 Proposals	137 received by May 15, 2015
Stage 1 Contract Awards	83
Stage 2 Open/Entries Accepted	May 15, 2016
Stage 2 Proposals Evaluated	through June 2016
Stage 2 Contracts Awarded	July 2016
Stage 3 Open/Entries Accepted	1st Qtr 2017
Project Commissioning	2020

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NY Prize – Stage 1 Feasibility Study

✓ Minimum feasibility specifications(technical, financial, commercial, regulatory) are prescribed; **all** communities work to same scope

✓ Not necessary to participate in Stage 1 to participate in Stage 2

✓ High level analysis (+/- 30% accuracy)

✓ Local distribution utility involvement a necessity

✓ Competition produces "winners" – even those that do not move on in competition

- studies become "starting place" for alternate, bottom up innovations at the community level

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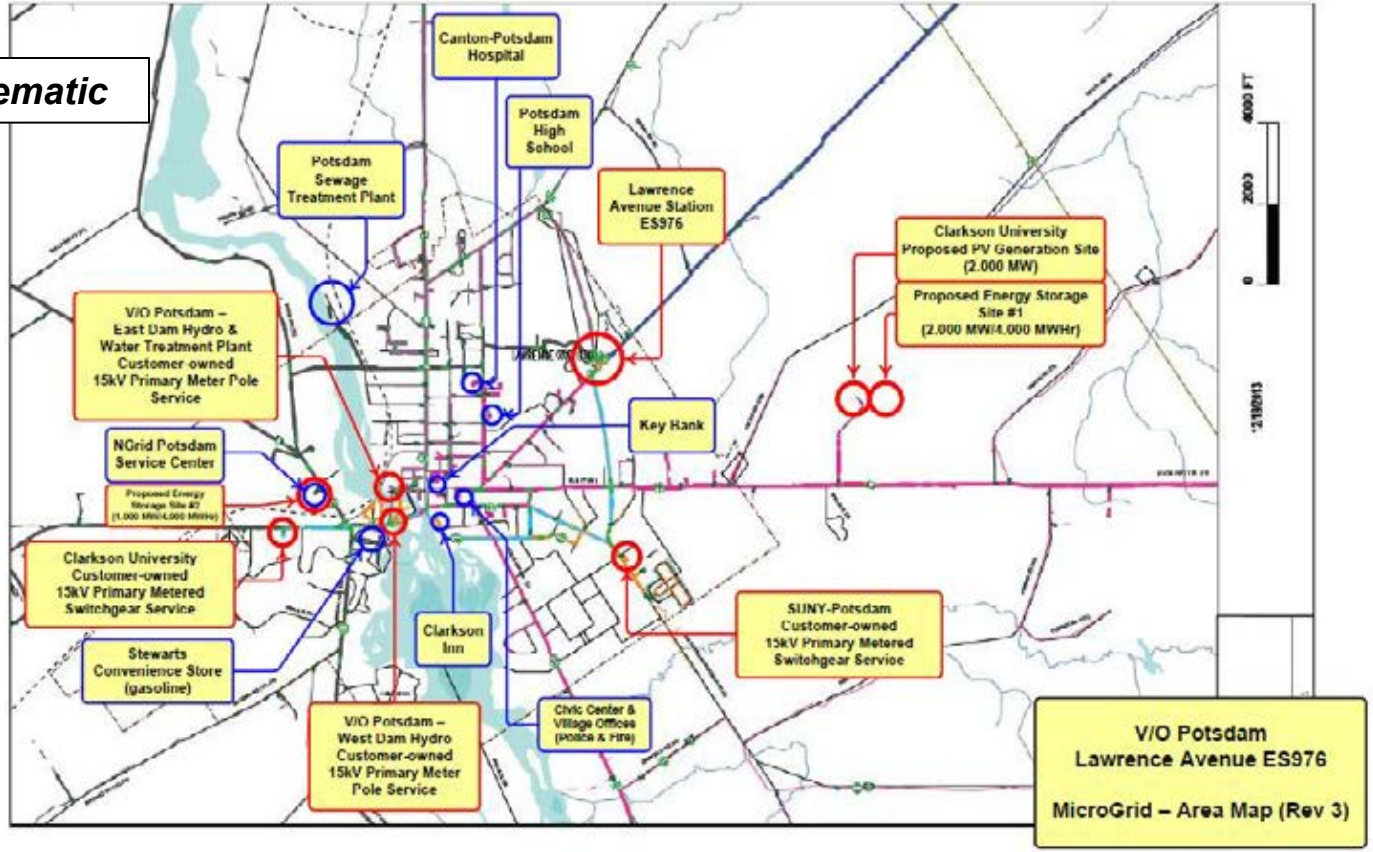
Microgrid Preliminary Design

Potsdam City Center Schematic



NY Prize –Benefit-Cost Model

- ✓ Benefit - Cost model applied uniformly across community assessments by NYSERDA
- ✓ Model includes two worksheets that facilitate data entry from the NY Prize applicant

  Microgrid Questionnaire
  Facility Questionnaire

- ✓ Analyzes project impacts over a 20-year operating period
- ✓ Model and user guide can be found on NY Prize site:

http://www.nyserda.ny.gov/All-Programs/Programs/NY-Prize

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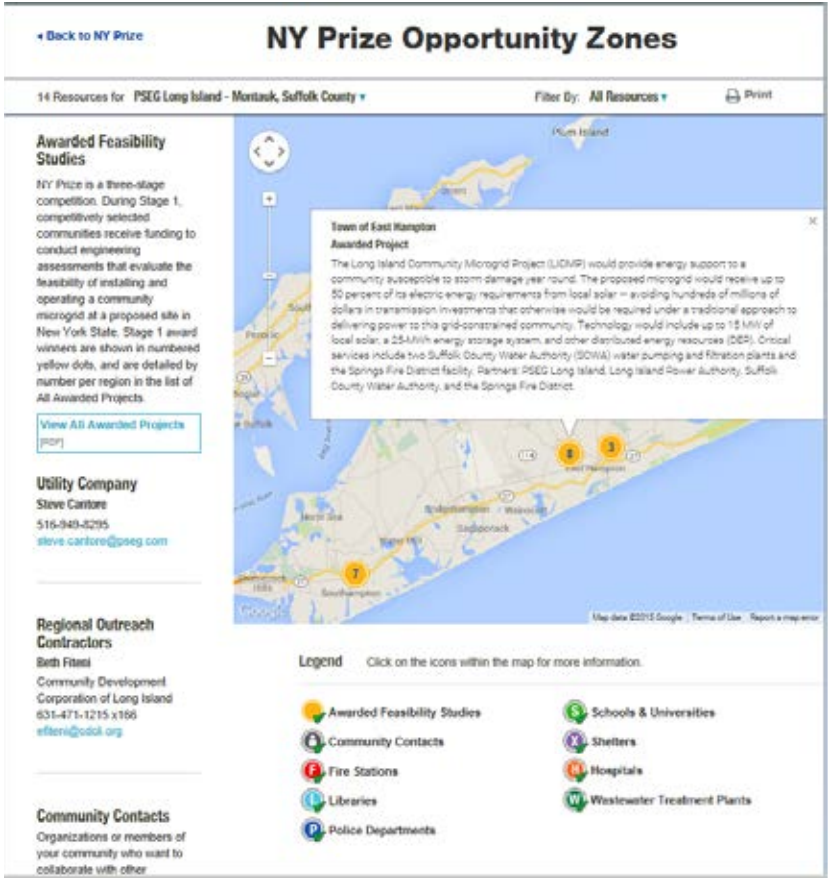
Get Involved

- ✓ Contact the lead applicant in your community; get informed on their proposal and project status
- ✓ Add your contact info to your local community on the map: prize.ny.gov
- ✓ Engage + educate local electeds, planning boards, CBOs, BIDs, etc.

Opportunity Zone Map



Information/Assistance

prize.ny.gov

Michael Razanousky @ michael.razanousky@nyserda.ny.gov
John Saintcross @ john.saintcross@nyserda.ny.gov
Micah Kotch @ micah.kotch@ nyserda.ny.org

Microgrid Assessment (2010)
http://on.ny.gov/1ukZOa8
Microgrids for Critical Facilities (2014)(includes case studies)
http://www.nyserda.ny.gov/-/media/Files/Publications/Research/Electic-Power-Delivery/Microgrids-for-Critical-Facility-NYS.pdf

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Community-Based Microgrids

- John Moynihan, Managing Director

COGEN
POWER TECHNOLOGIES

SEPTEMBER 10, 2015

About Cogen Power Technologies

- Providing Comprehensive Cogeneration Services
- Designing, Permitting, Building, Testing, and Connecting CHP Plants to the Utility System
- Cogeneration Feasibility Studies
- Development of CHP Project Budgets
- Design-Build/EPC Turnkey Power Solutions
- Engaging Third-Party Financing
- Plant Operations Services

NECHPI
NORTHEAST COMBINED HEAT & POWER INITIATIVE
2014 CHP CHAMPION

Projects:

4.6 MW Gas Turbine Plant

ALBANY MEDICAL CENTER, ALBANY, NY

OPERATIONAL MARCH 2013

3.6 MW Gas Engine Microgrid

BURRSTONE ENERGY CENTER, UTICA, NY

OPERATIONAL AUGUST 2009

4.6 MW Gas Turbine Plant

ST. JOSEPH'S HOSPITAL, SYRACUSE, NY

BROKE GROUND JULY 2013,
OPERATIONAL SEPTEMBER 2014

1.8 MW Gas Turbine Plant

UNION COLLEGE, SCHENECTADY, NY

BREAK GROUND - MARCH 2015
OPERATIONAL - JULY 2016

40,000 lbs/hr - 1 MW Biomass

GRIFFIS UTILITY SERVICES CORP., ROME, NY

BROKE GROUND MAY 2012,
OPERATIONAL OCTOBER 2013

700 kW Gas Engine Plant

AVILA RETIREMENT CENTER, ALBANY, NY

OPERATIONAL SINCE NOVEMBER 2006

Projects in Development

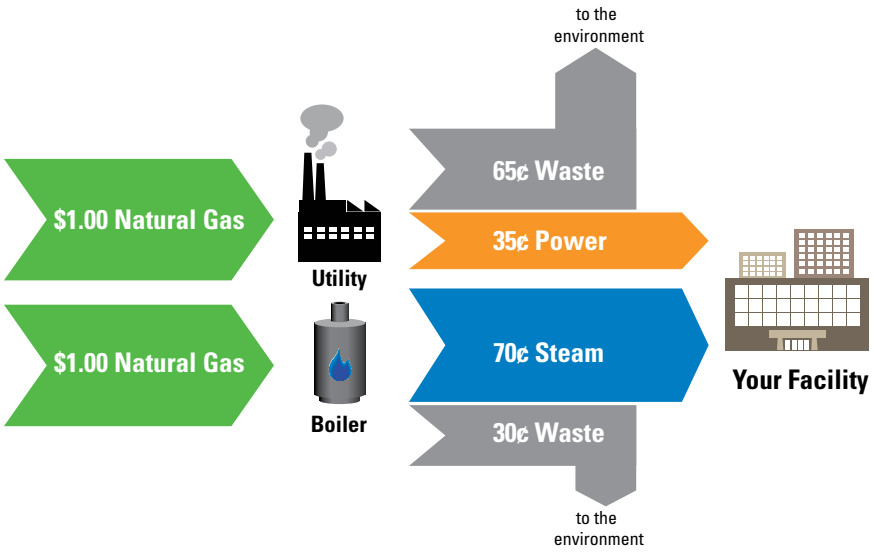
CHP FEASIBILITY STUDIES (LEVEL III)

- 15 MW - EMPIRE STATE PLAZA COGENERATION PLANT
- 8 MW - RENSSELAER POLYTECHNIC INSTITUTE CHP PLANT
- 8 MW - CAYUGA COUNTY IDA COGENERATION PLANT
- 7 MW - CENTRAL PENNSYLVANIA MANUFACTURER

What is Cogeneration or "CHP"?

ENERGY GENERATION COMPARISON

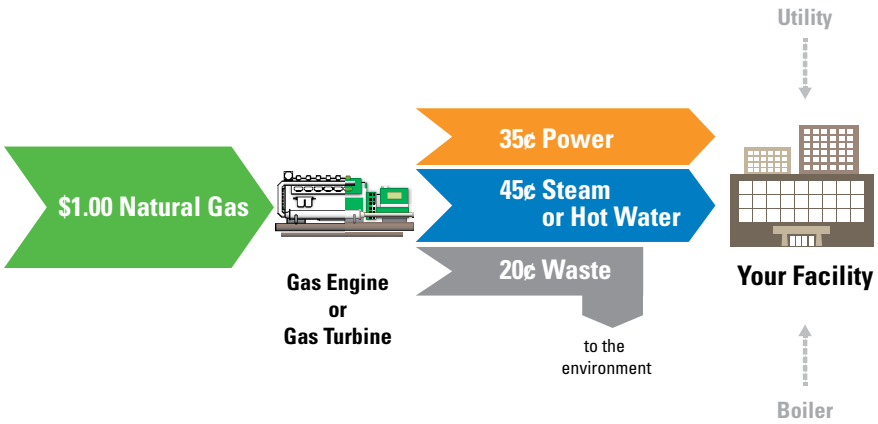
Traditional Generation



Investment	$1.00
Useable Energy	$ .50
Waste	$ .50

50% EFFICIENT

Cogeneration



Investment	$1.00
Useable Energy	$ .80
Waste	$ .20

80% EFFICIENT

COGEN POWER TECHNOLOGIES

Benefits of Cogeneration

RELIABILITY OF POWER, STEAM, CHILL WATER & HOT WATER

REDUCE ANNUAL UTILITY COSTS

PREDICTABLE ENERGY COSTS

PROLONG EXISTING EQUIPMENT LIFE

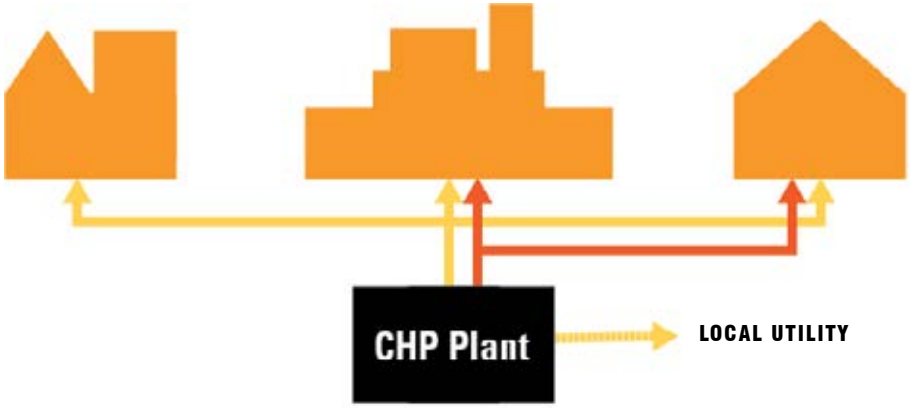
REDUCE CARBON FOOTPRINT BY 30-80%

ADDRESS ELECTRICAL CAPACITY ISSUES

INVESTMENT TAX CREDITS

Microgrids - What are they?

A Distributed Energy Resource (DER) are localized, small-scale, and acts as a central energy grid to service multiple customers.



- Could be a mix of DER technologies
- Could generate up to 3 forms of thermal energy (steam, hot water, and chill water)
- Provides electricity to multiple customers
- Can export power back to the utility
- Can operate on multiple fuel sources
- Can operate when Utility Power is not available

Case Study - Burrstone Energy Microgrid

UTICA, NY

Faxton St. Luke's Healthcare system - St. Luke's Campus

- St. Luke's Hospital
  - 372 beds
  - General Medical and Surgical Hospital
- St. Luke's Home
  - 202 beds
  - 40 beds - Subacute Rehabilitation Unit

Understanding & Common Goals

IDENTIFIED OBJECTIVES

- Provide more reliable services
- Reduce operational costs
- Lessen demand on the local utility grid
- Reduce greenhouse gas emissions

Utica College

- 3000+ Students
- Over 20 Buildings

Site Layout

Commercial Operations commenced August 2009

Project Details

WE FINANCED, OWN & OPERATE

Project Overview

- New 5,400 SF Building
- $15 Million Design-Build Project
- Start - Nov 2007 | Operational - Aug 2009

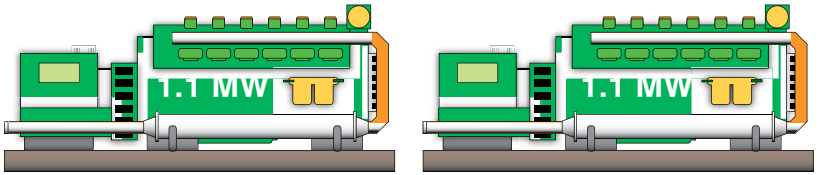
Output

- 3.6 MW of 13.2 kV electricity,
- 7000 lbs/hr of 85 psig Steam
- 700 gpm of 200 degree hot water
- Output to Date:
  - Generated over 100 M kWh of Electricity
  - Exported over 10 M kWh of Electricity
  - Produced over 120 M lbs of Steam

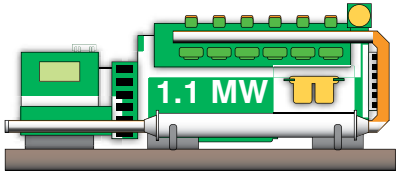
Technology

- Three 1.1 MW and One 334 kW Lean Burn Natural Gas Reciprocating Engines
- 300 Ton Double Effect Steam Absorption Chiller, One 100 Ton Hot Water Absorption Chiller
- 125 kW Black Start Generator

3.6 MW NATURAL GAS PLANT

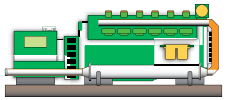


ST. LUKE'S HOSPITAL



UTICA COLLEGE

334 kW

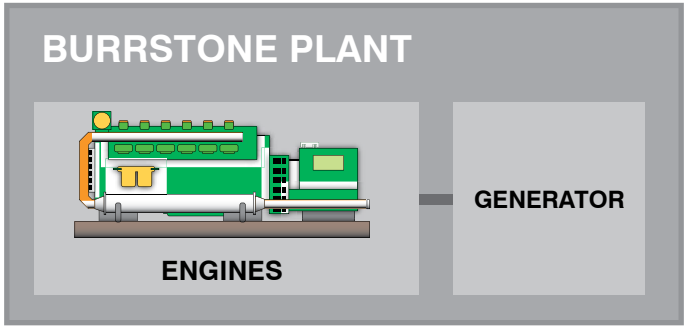


ST. LUKE'S NURSING HOME

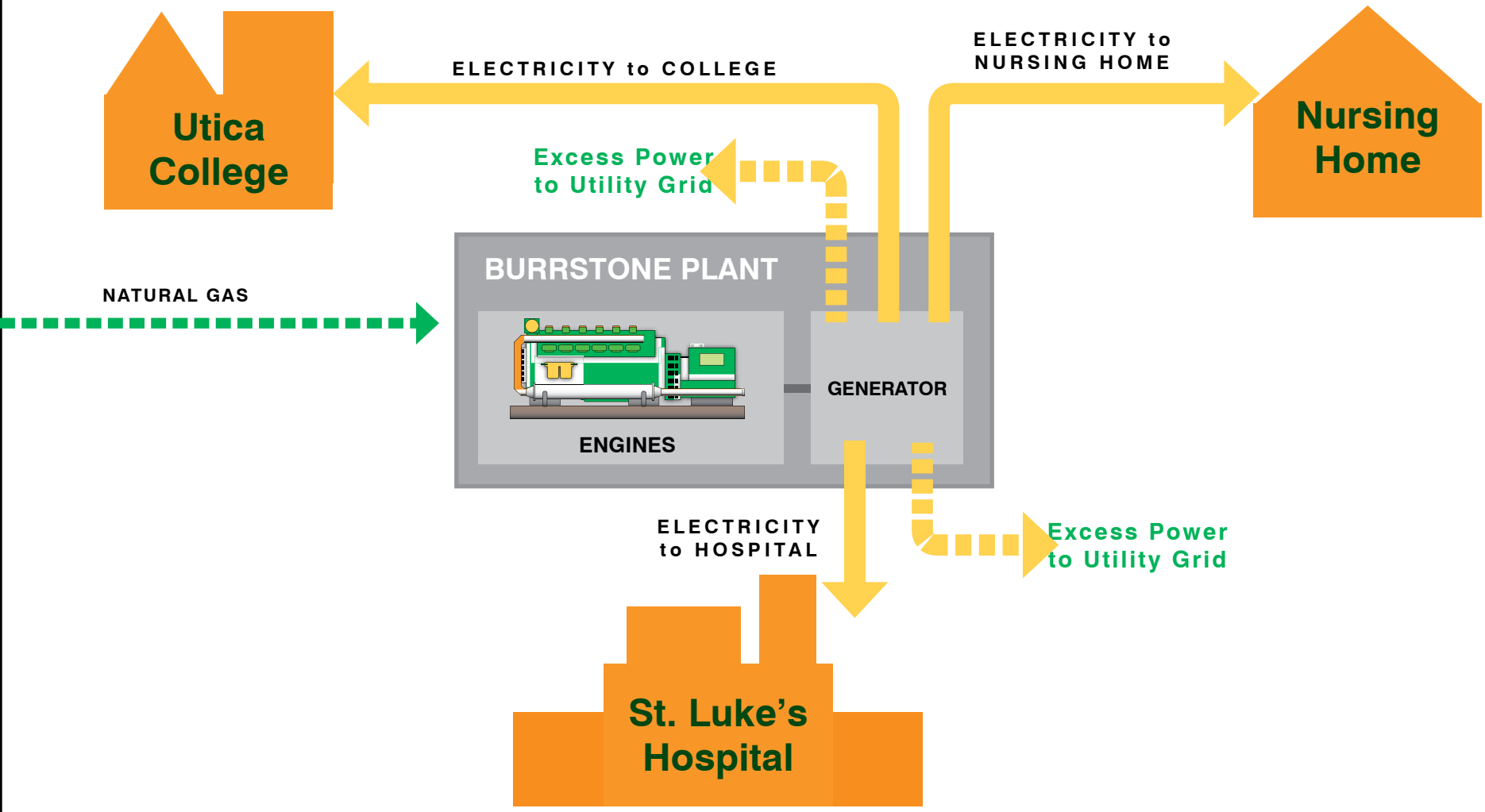
STEAM ABSORPTION CHILLER

HOT WATER ABSORPTION CHILLER

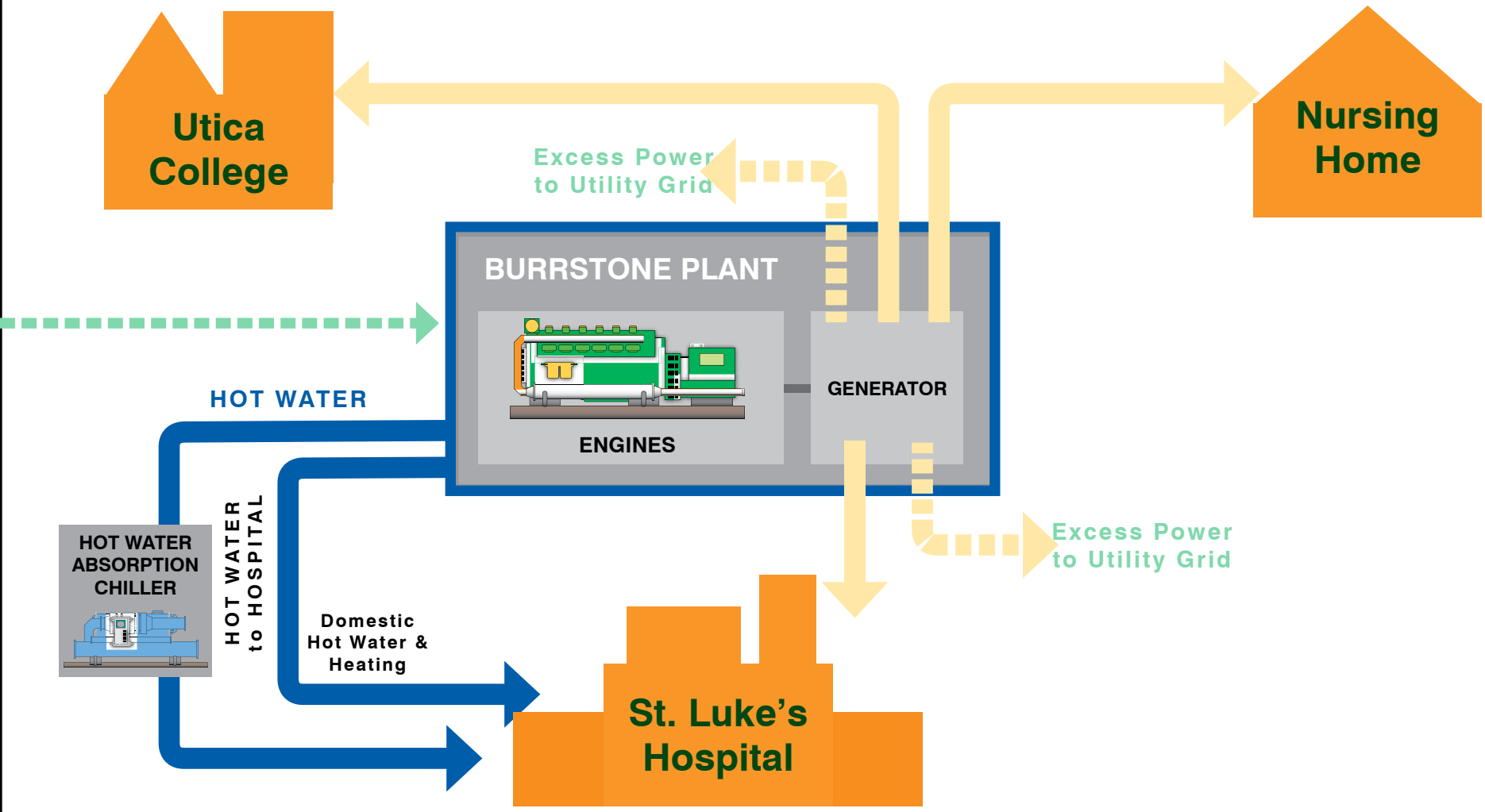
Community-Based Microgrid



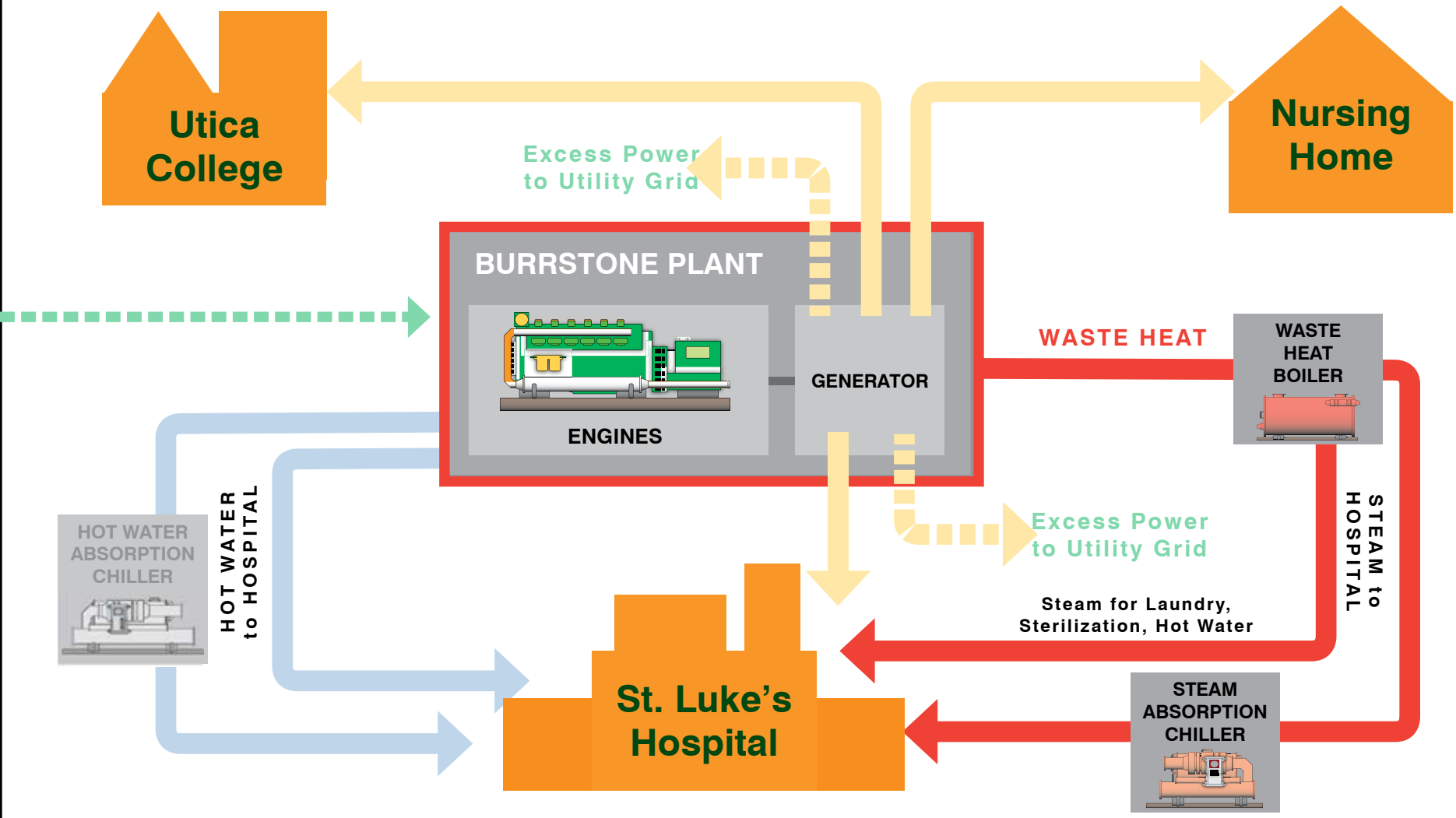
Community-Based Microgrid



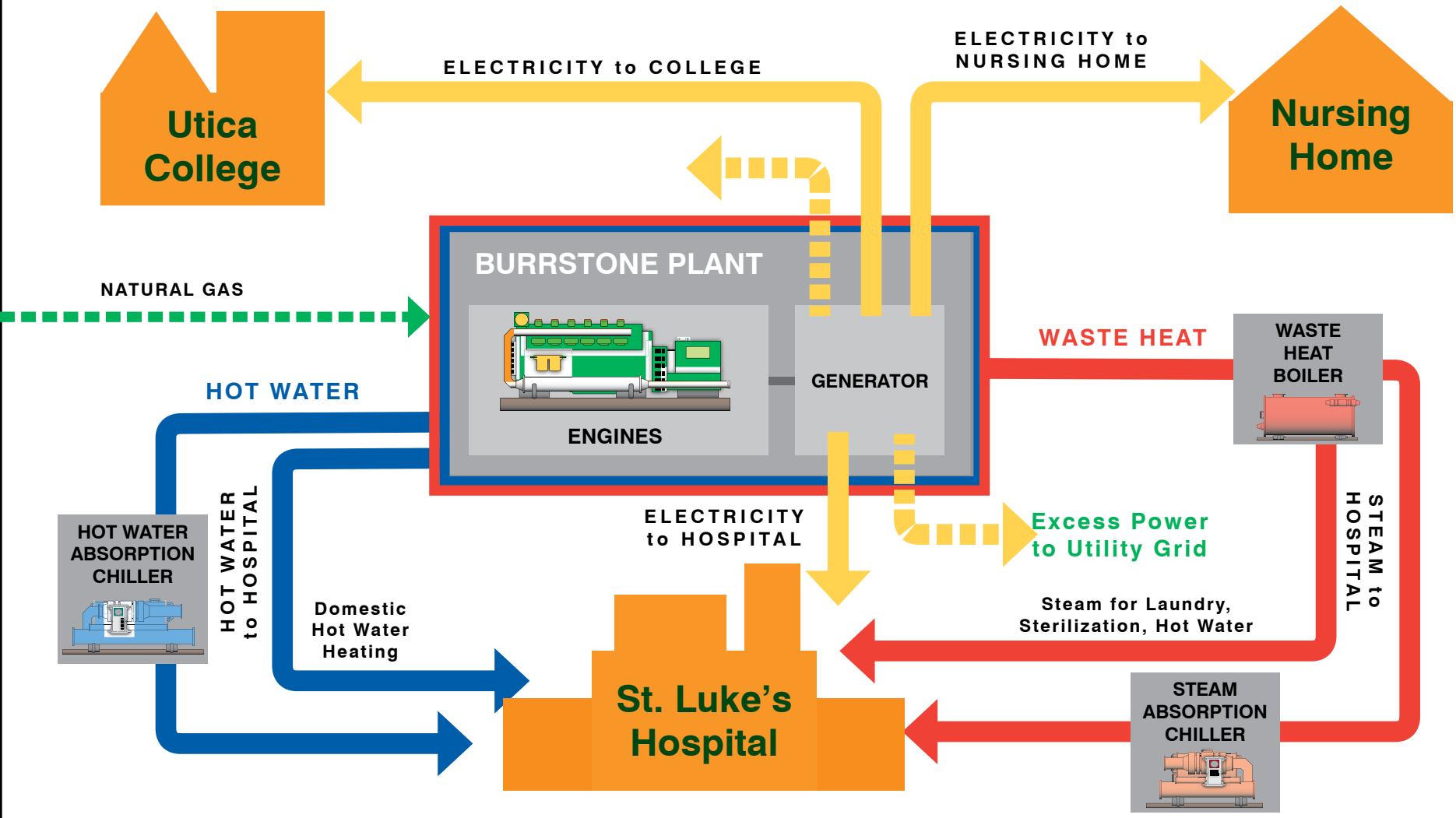
Community-Based Microgrid



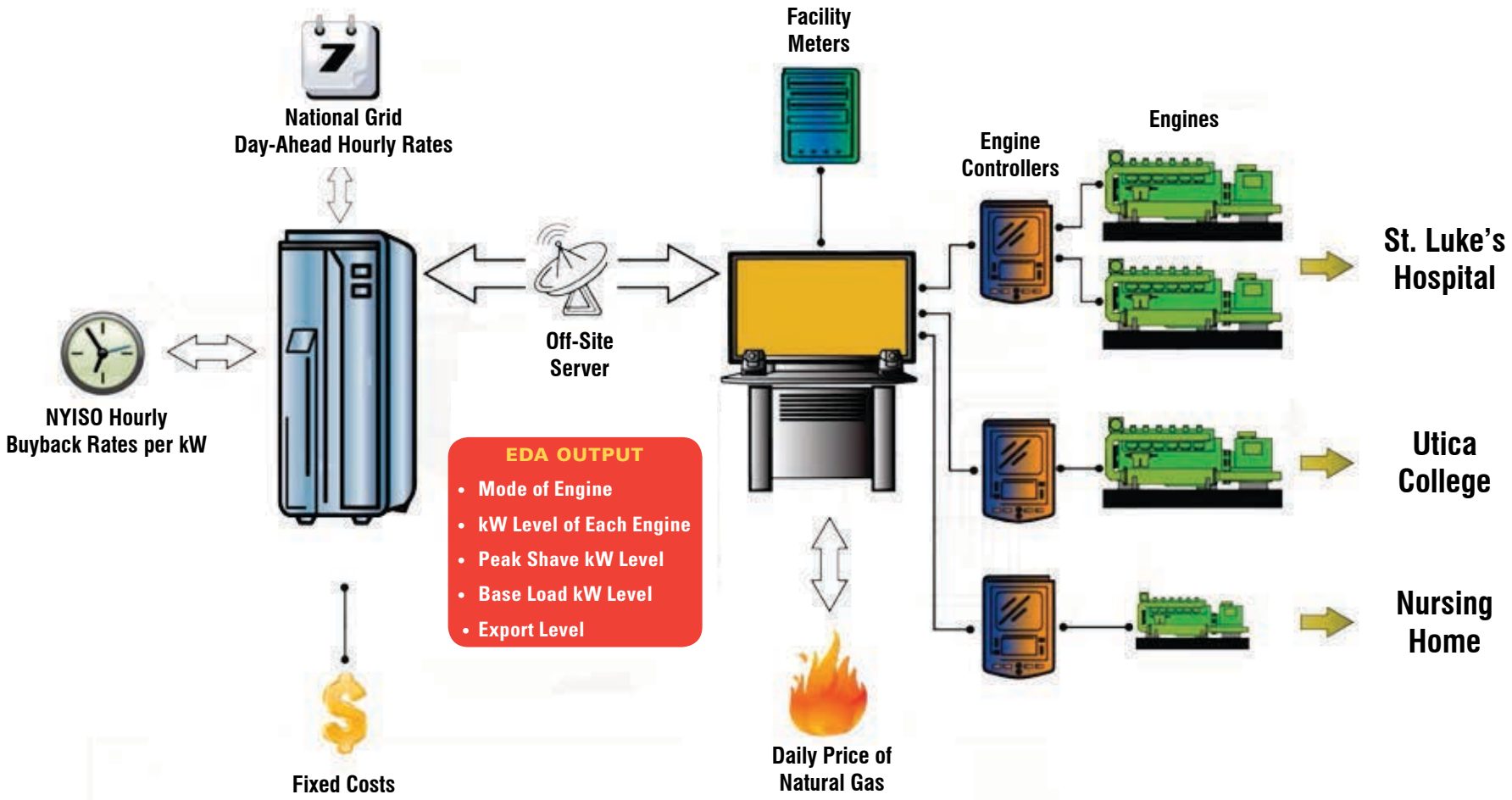
Community-Based Microgrid



Community-Based Microgrid



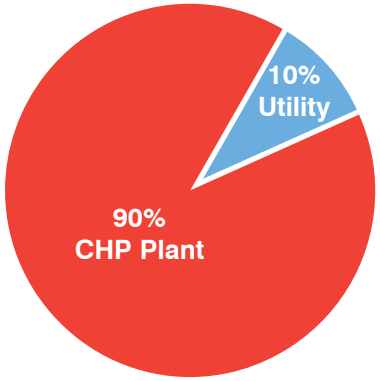
Economic Dispatch System



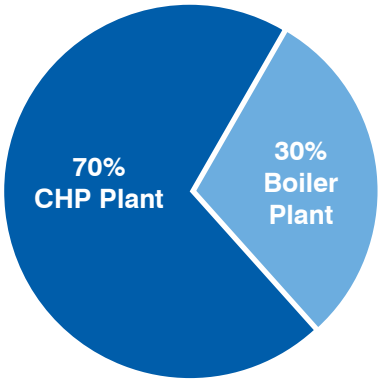
Annual Customer Energy Provided by Burrstone Plant

St. Luke's Hospital

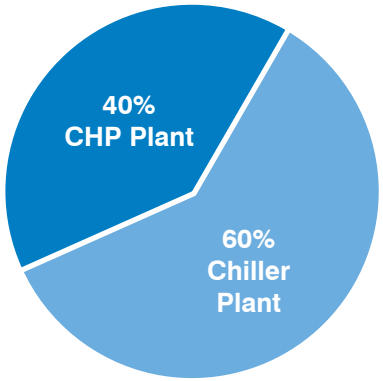
ELECTRICITY



STEAM/HOT WATER

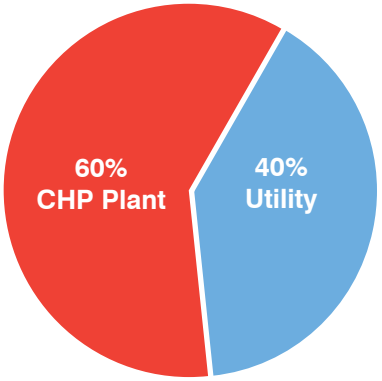


CHILL WATER



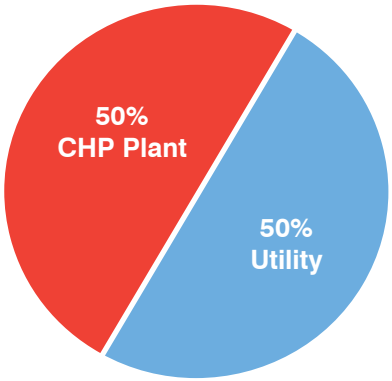
Utica College

ELECTRICITY



Nursing Home

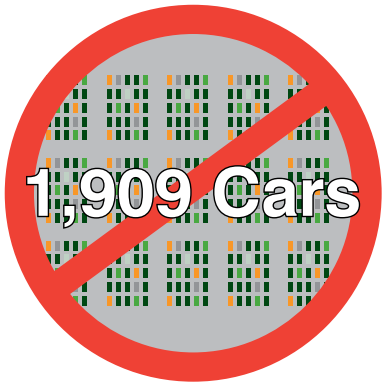
ELECTRICITY



Environmental Benefits

ANNUALLY REDUCES EMISSIONS OF CARBON DIOXIDE (CO^2) BY 4,000 TONS PER YEAR

EQUAL TO:



- Taking 1,909 Cars off the Road

- OR -

- Planting 823 Acres of Forest

NY Prize STAGE 1 - "Successes"

Empire State Plaza MICROGRID

15 MW

RPI MICRO GRID SAMARITAN

8 MW

COGENERATION CAYUGA MICROGRID

8 MW

Aerial View of Microgrid Locale

Microgrids - Key Issues for Success

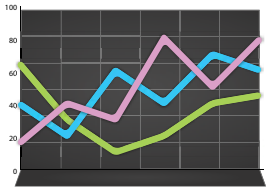
- Utility Regulation preventing multiple unrelated customers from being electrically connected to one prime mover

- Utility Regulation preventing crossing public roads to supply power from one site to another

- Physical distance between customers – increase in energy distribution costs

- Real Estate Easements, land leases, etc

- Thermal and Electrical Energy consumption patterns of multiple customers



- Gestation Period to put contracts in place with multiple customers

- Getting agreement between customers on cost sharing of project capital cost

- Determination of how each customer will be billed

Issues affecting clients building CHP plants in New York State

- **Payback period too long**

  INCREASE TAX CREDITS AND/OR ALLOW GRANTS IN LIEU OF

  MAKE "INDUSTRY-SPECIFIC" GRANTS AVAILABLE

  ELIMINATE SALES TAX ON NATURAL GAS FOR CHP PLANTS

- **Barriers to selling excess power back to the grid, net metering not available**

  EXPORTED POWER FROM NATURAL GAS FIRED CHP SHOULD RECEIVE SAME REIMBURSEMENTS AS SOLAR AND WIND

- **Difficulty putting a green value on this power**

  GREEN CREDITS FOR CARBON REDUCTION

- **High cost of interconnection to utility**

  LOWER THE COST TO INTERCONNECT TO THE UTILITY

- **Higher costs of power used from the utility grid as backup**

  DRIVE UTILITIES TO LOWER THEIR RATES CHARGED BY THEIR STANDBY POWER TARIFFS

  ELIMINATE 18A TAX - CHP HOST SITE PAYS MORE ON STANDBY RATE

- **Limited access to the range of wholesale markets**

  MODIFY THE NYISO DEMAND RESPONSE PROGRAM

Renewables

THEN (10 Years Ago)

- **In the past, the financial aspects of these projects was prohibitive**
  - ✓ Lengthy payback
  - ✓ Lower internal rates of return
  - ✓ Few tax breaks or incentives (non-existent of or programs) in infancy
- **Financial Decision-Makers were unlikely to invest in projects with these barriers**
- **"Go to" choice for fuel source:**
  - ✓ NATURAL GAS

NOW (and upcoming)

- **Net metering rules have been changed to enhance the performance of renewables**
  - ✓ Shorter payback
  - ✓ Higher internal rates of return
  - ✓ More tax breaks and incentives
- **Most plants have a Blend of Technologies**
  - ✓ NATURAL GAS
  - ✓ SOLAR PANELS
  - ✓ WIND FARM
  - ✓ MICRO HYDROELECTRIC
  - ✓ THERMAL & ELECTRICITY STORAGE

Get Involved!

Roles the Local Government Can Play

- **Provide support**
  - ✓ Planning Board
  - ✓ Zoning
  - ✓ Building Permits
- **Incentives**
  - ✓ Sales Tax abatement
  - ✓ Payment in leiu of taxes

Roles Community Members Can Play

- **Outreach and Education**
- **Support Legislation**

Questions?

COGEN
POWER TECHNOLOGIES

Contact:

John Moynihan

jmoynihan@powerbycogen.com

(518) 213-1090

Climate Smart Communities Webinar

Thanks for joining us!

Website for webinar slides and recordings:

http://www.dec.ny.gov/energy/84359.html

Contact Email: Dazzle Ekblad

dazzle.ekblad@dec.ny.gov

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