The Path to Resiliency: Microgrid Policy & Commercialization

Allie Detrio
Manager of Policy, ENGIE
IDEA Conference Workshop
June 24, 2019

ENGIE's 3D Mission

- **Decarbonization**
  - GHG emissions reduction
  - Environmental and public health benefits
- **Decentralization (Diversification)**
  - Physical and societal risk mitigation
  - Financial risk management
  - Demand reduction and peak load management
- **Digitization**
  - Incentivize and encourage innovation and technological advancement
  - Integration of new technologies into the grid for greater efficiency and cost reduction

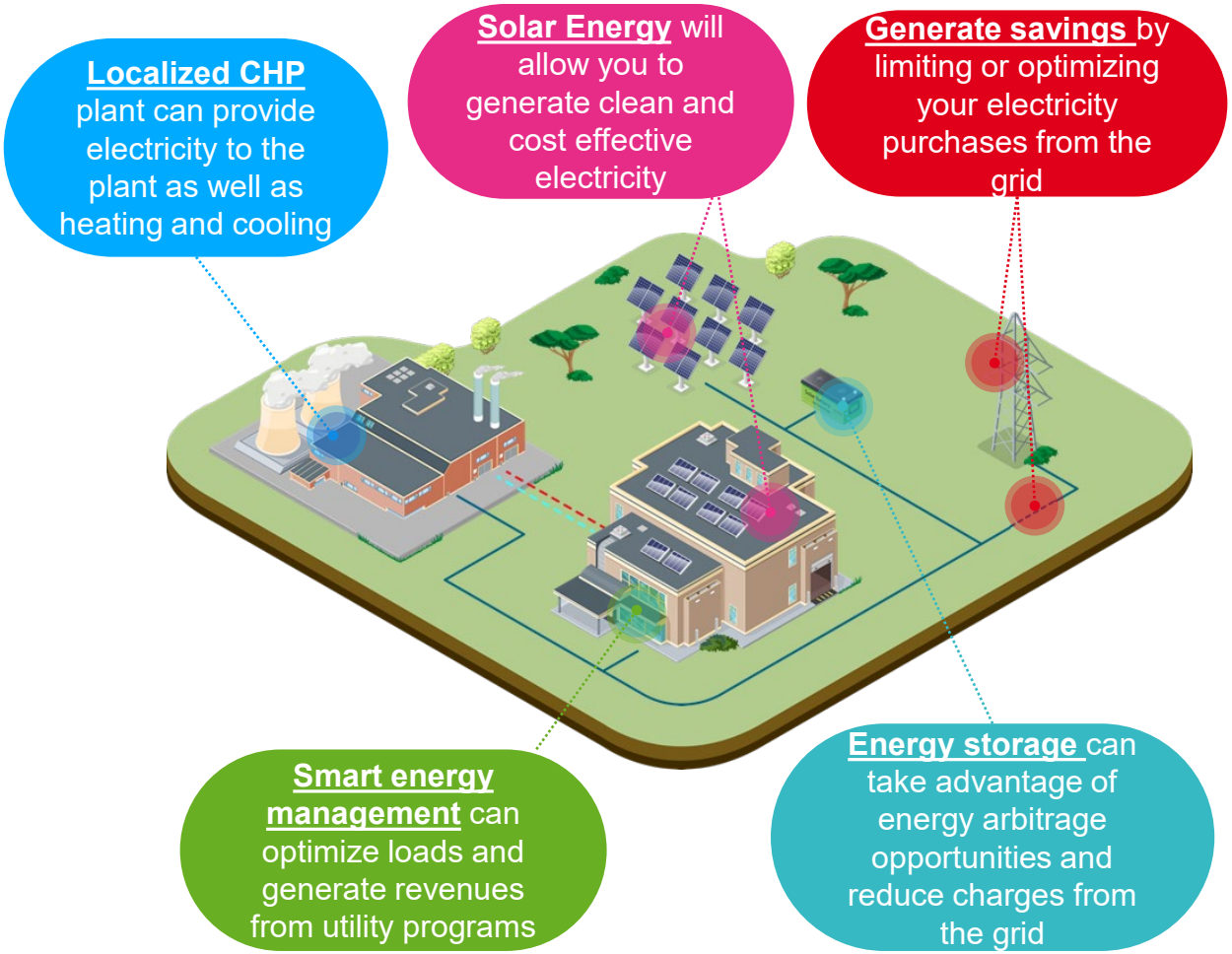
*Distributed energy resources (DERs) deployment at scale is paramount to **mitigating risk, ensuring safety, and increasing climate resiliency** for our local communities and constituents.*

Demystifying Resiliency

- **Resiliency** is a hot topic for policymakers and utilities nationwide
  - Microgrids, critical infrastructure, grid security, emergency preparedness
  - How to commercialize advanced DER, controls, and protection technology at scale?
- **Elements** of resiliency as it related to the electric grid:
  - Prevention
  - Recovery
  - Survivability
- **Challenge:** ***How do we value resiliency?***
  - Microgrids require comprehensive valuation and streamlined interconnection processes to realize full system potential and public benefits

A microgrid is an energy supply network built around local power and heat generation facilities

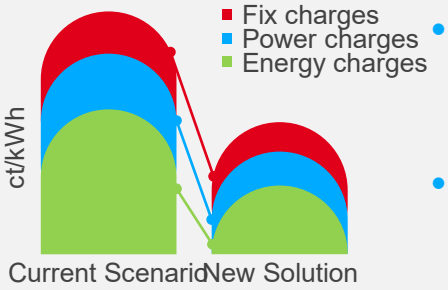
- **Designed to operate autonomously or in synchronization with a larger grid within a clearly defined area and typically include:**
- Renewable energy sources (solar, wind or biomass)
- Fossil fuel energy sources to ensure grid stability
- Energy storage solutions (batteries, hydrogen storage, mechanical storage, etc.)
- A low-voltage supply grid regulated by a smart control system



Microgrid Value Drivers

Microgrids can address various challenges/opportunities

Ensure predictable costs and savings

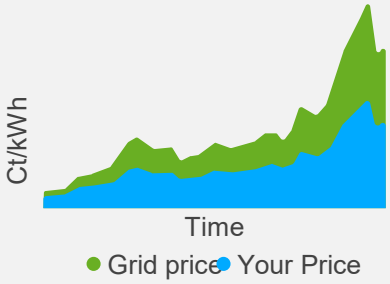


- In many cases distributed energy sources will be **cheaper** than buying electricity from the grid
- Flexible resources can **reduce the power component of your bill**

Increase reliability and enhance power quality

- **Energy storage** and **advanced control systems** allow you to ride through blackouts and brownouts, allowing for enhanced system reliability
- Advanced control systems will improve your **power quality**, deferring associated capital investments

Limit exposure to energy tariff fluctuations



- Generating energy on-site can limit your **exposure to variable electricity prices or tariff structures**

Improve environmental performance

620* ton$_{coal}$/year

1,183* ton CO_2/year

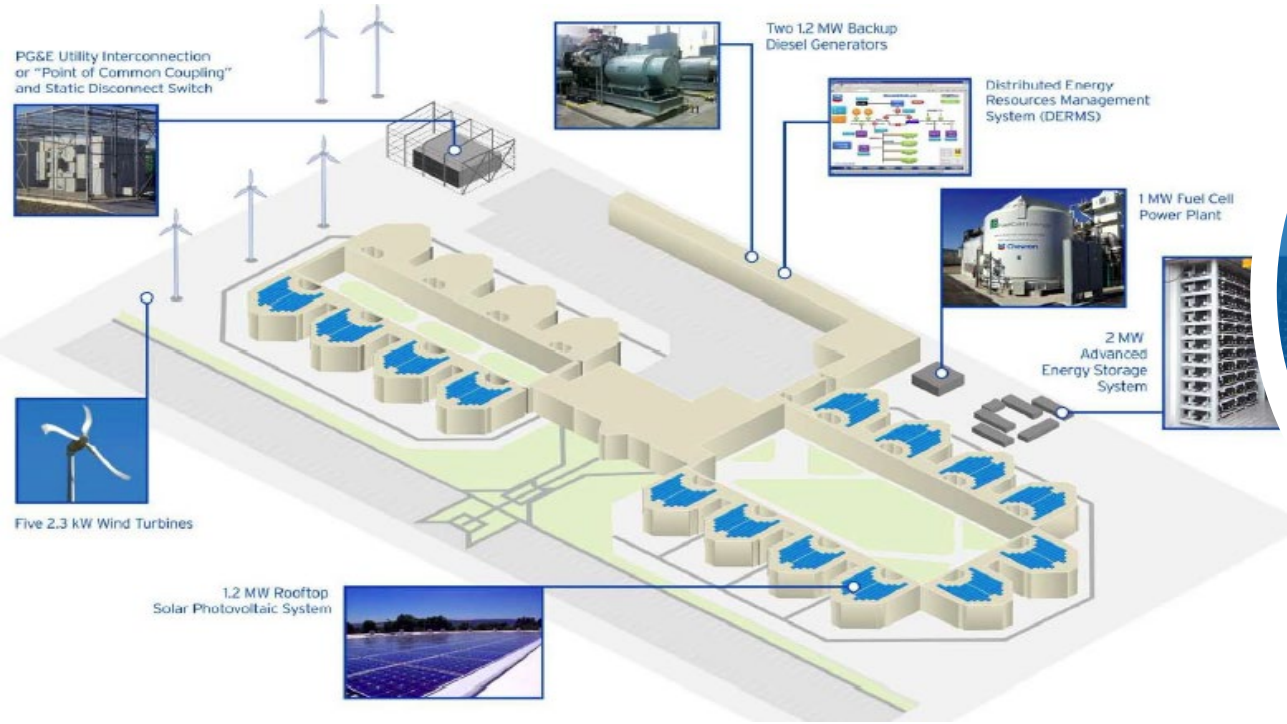
**Environmental benefit of a 15% renewable energy solution for a 1 MW average load industrial client*

- Achieve **environmental compliance** requirements
- Integrating renewable energy into your system allows you to **meet sustainability targets**

Alameda County Santa Rita Jail Microgrid

Project Highlights

- Integrates renewable, distributed generation to provide improved site resilience, lower emissions and reduce costs
- Reduced electricity spend by approx. 70%
- Reduced water / sewage spend by approx. 50%



$2.5MM
in annual energy / water savings

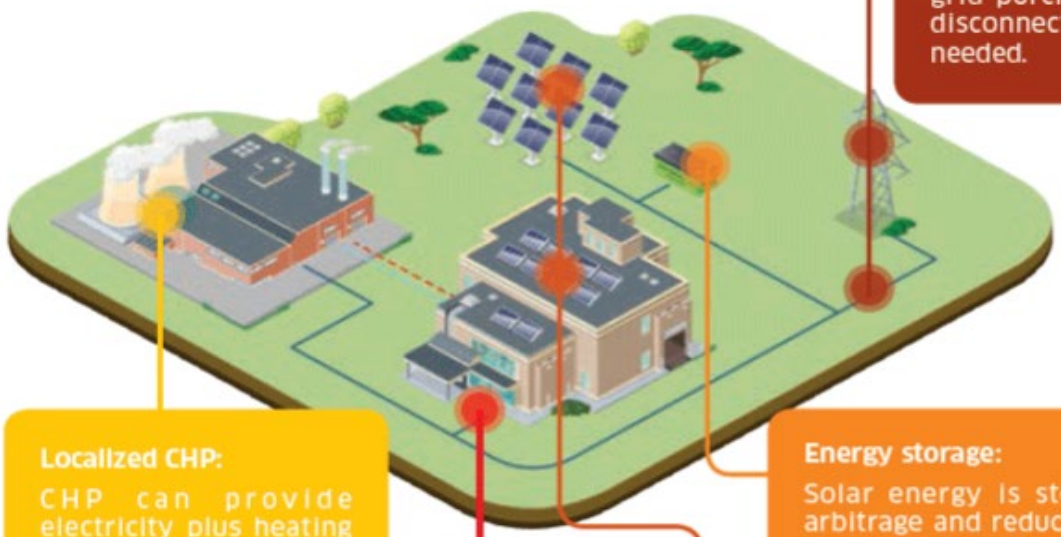
1.2 MW of solar PV

1 MW fuel cell

2 MW / 4 MWh BESS

Hot Water Boiler Plant Renovations

How to make the 3D-Resilient energy future a reality?



The grid:
Generate savings by limiting your grid purchases and possibility of disconnecting from the grid when needed.

Localized CHP:
CHP can provide electricity plus heating and cooling for the site.

Energy storage:
Solar energy is stored to provide energy arbitrage and reduce customer peak demand charges.

Energy management system:
Smart management systems can schedule loads and generate revenues from demand response.

Solar PV:
Rooftop and ground mounted PV allow you to generate solar electricity.

We have the technology to address clean energy and resiliency needs in our communities

Commercializing microgrids at scale requires developing new policies, market designs, and business models

… and the political will to do so

Market-based policy solutions for commercialization

- **Develop strong price signals** for customer and third-party owned microgrids
  - Will direct private sector investment and innovation in solutions that align with public policy goals
- **Encourage wide market participation** with a diversity of participants
  - Minimize single entity ownership/management of non-monopolistic functions and infrastructure
- **Provide flexibility** in regulatory process and administrative guidelines
  - Reduce time-consuming project approval processes
  - Minimize onerous customer and developer requirements, interconnection and construction guidelines while maintaining public safety
- **Capture full value** of microgrid capabilities and benefits
  - Grid support services
    - Address interconnection PCC, voltage support services, data communications and remote controls, comprehensive system optimization
  - Societal and non-energy benefits
    - GHG reduction, public health and safety, resiliency and sustainability

Achieving Market Transformation

- **To truly evolve as a market,** state policies and regulations should embrace DERs and microgrids as ***enhancing*** **and upgrading the grid**, not fragmenting it.
- **Embracing distributed resources** will foster a more dynamic and interactive 21st century electric grid that encourages a diversity of resources and market participants
  - Spurs innovation and drives down cost
  - Saves ratepayers $ and increases sustainable economic development
- **Encourage public-private partnerships**
  - Collaboration with local governments, communities, and businesses
- **Manage financial risk**
  - Leverage multiple sources of capital and grid infrastructure financing – diversified portfolio
    - Venture capital, private equity, tax-exempt financing for public agencies
- **Mitigate environmental, physical and insurance risk**
  - Diversify, decentralize, and downsize large infrastructure
  - Large, centralized infrastructure poses safety hazards
- ***Our 20th century grid was not built for the severe effects of climate change – we need our infrastructure and business models to EVOLVE***

Hawaii – The postcard from the future

- **Microgrid Services Tariff (Docket 2018-0163)**
  - Hawaii passed HB 2110 in July 2018
  - Directs HPUC to open docket to develop a microgrid services tariff
    - Microgrid Resources Coalition active participant in proceeding
  - Developing standardized interconnection processes and requirements for microgrids
  - Valuation of microgrid services to create appropriate price signals that incentivize the development of third party microgrids
- **Timeline**
  - HPUC technical workshop held in January
  - Comments filed in February and March
  - Proceeding ongoing in 2019, possibly through 2020
- **Advocacy**
  - Develop price signals for customer and third-party owned microgrids; avoid utility ownership and onerous customer requirements
  - Interconnection guidelines should provide flexibility to developer and customer
  - Tariffs should fully value grid support services and provide appropriate customer compensation to spur commercialization of microgrids at scale
    - Address interconnection PCC, voltage support services, data communications and remote controls, comprehensive system optimization

California – Postcards received from the islands

- **2018 Legislation – SB 1339 (Stern)**
  - Originally written to create a microgrid services tariff as part of the NEM 3.0 proceeding in 2019 that would provide NEM credit for systems that have islanding capabilities.
    - Pushback from TURN, IOUs, CPUC on cost-shifting concerns and prescriptive language
  - Amended to direct CPUC to create standardized microgrid interconnection process and *consideration* of microgrid tariff
  - Passed CA legislature at 11:30pm on 8/31
- **2019 Implementation** (R. 19-XX-XXX)
  - Advocacy for the development of a microgrid services tariff similar to HI in wake of wildfires that incentivizes greater commercialization of microgrids
  - Proceeding expected to open Q3/Q4 2019
  - Commission has accelerated staffing for this proceeding
  - MRC's work in Hawaii will serve as foundational work for this proceeding

California – More resiliency policy needed

- **Increased urgency for resiliency solutions needed in response to more devastating wildfires and anticipated de-energization events in CA**
- **Public Safety Power Shutoffs (PSPS)**
  - IOUs now authorized to de-energize transmission lines in time of high fire threat conditions as part of SB 901 wildfire mitigation plans
  - Last resort measure but will be utilized much more frequently
    - PSPS events have already occurred in CA this month!
  - Both at-risk rural communities and urban areas will be affected
    - 100,000-150,000+ customers could be affected at any given time
- **2019 Legislation**
  - SB 774 (Stern)
    - Bill intended to accelerate development of microgrids in CA
    - Passed Senate 29-7 in May 2019
    - Currently in Assembly Utilities & Energy Committee; Hearing scheduled July 10th
  - AB 1144 (Friedman)
    - Bill intended to leverage existing incentives to provide critical facilities with funding for backup power systems in high fire threat areas
    - Passed Assembly floor 74-0 in April 2019
    - Passed Senate Energy Committee June 18th; Currently in Senate Appropriations
- ***The value of resiliency question looms large – Can California crack the code?***

Q&A – Thank You!

Longwood Medical Center Energy System

PROJECT HIGHLIGHTS

- Microgrid and District Energy system serving a campus with 74 buildings occupying 12 million sq. ft
- Delivers efficient and reliable energy to six Harvard-affiliated healthcare institutions

Eastern Michigan University, MI

PROJECT HIGHLIGHTS

- Construction Management Internship program gave students direct, real-world access to cogeneration technology while shadowing ENGIE engineers and construction managers
- Created 50 local jobs
- Increased campus efficiency from 68% to 83% from the upgrades at the Central Heating Plant
- Reduces annual CO_2 emissions by 48,791 metric tons, the equivalent to removing more than 10,300 passenger vehicles from the road

$2.8MM
in annual savings from cogeneration modernizations

Phase I - Comprehensive Facility Upgrades: 727 new windows, energy management systems, new thermostats and appliances, water upgrades

Phase II - Cogeneration Facility Modernizations: New Natural Gas-Fired Turbine (7.8 MW) and 90 MMBtu Heat Recovery Steam Generator

Watch the Video:
Eastern Michigan University's
New Cogeneration Plant and Energy Center
http://bit.ly/2BauHZR

Maldives Hybrid Power Project

PROJECT HIGHLIGHTS

- Microgrid for two resorts (2,000 people) on an island in the Maldives
- Reduced diesel consumption by 423,000 liters/year
- Reduced CO_2 emissions by 460 tons/year

Garowe Hybrid Power Project

PROJECT HIGHLIGHTS

- Microgrid powers Garowe, Somalia, a community of 50,000 people
- Reduced CO2 emissions by 600 tons/year
- Reduced the cost of energy by 17%

5.9 MW
microgrid

1 MW solar PV

750 kW wind

1 MW / 1.8 MWh BESS

3.2 MW diesel generation

1 MW PCS

The Republic of Palau – Armonia (operational by end of 2019)

PROJECT HIGHLIGHTS

- Project to transform Palau into a resilient, low carbon energy country
- Achieve Palau's 2025 target of 45% renewable energy more than 5 years early

Atacama Desert Hybrid Power Project

PROJECT HIGHLIGHTS

- Project located at 4000m above sea level in the Atacama Desert
- Provides diesel free electricity to 600 technicians constructing a power plant

Fort Hays State University, KS

PROJECT HIGHLIGHTS

- Reduces emissions of 27,090 metric tons of CO_2, the equivalent to removing 5,722 cars from the road for one year
- Peak shaving generators used during the high energy-demand summer months and beyond allows FHSU significant flexibility to manage campus loads and control electricity usage

$8.4 MM
in total savings over the project life

1.66 MW diesel generator system with parallel switchgear

Lighting upgrades on over 9200 fixtures across 25 buildings

Heating and cooling improvements

Water conservation and treatment