

Developing and Financing Microgrids

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Overview – Microgrid Development

DEVELOPING A MICROGRID

- Who are the developers and sponsors of microgrids?
- What drives development of a microgrid?
- What impedes development of a microgrid?



Overview

Financing Microgrids

- Who provides financing?
- What financing tools and incentives are available?



Developing a Microgrid

Who are the Developers and Sponsors?

- Economically motivated Sponsors include owners of campus-type real estate complexes:
 - universities
 - large health care facilities
 - large public institutions (housing authorities, military, municipalities, convention centers)



Who are the Developers and Sponsors?

Who is developing microgrid projects?

- Integrated developers of energy projects:
Today's case study presenters are NRG,
Constellation and Clark
- Energy efficiency system providers:
Honeywell, Johnson Controls, Siemens,
Ameresco
- Specialized microgrid providers

What Drives Development and Motivates Sponsors?

- Economics: reducing the cost of energy for a large facility or community
- Reliability of power supply – hardening against future crises
- National security: military bases are in the forefront

What Drives Development and Motivates Sponsors?

- Sometimes the economic motive is buttressed by “sustainability” motives for green energy and waste reduction.
- Another economic motive is modernization of old infrastructure and building stock on an aging campus: windows, HVAC, even roofs.
- “Political” sponsors are the state programs and agencies charged with encouraging the “hardening” of the electric power system (reaction to Superstorm Sandy)
- Compliance with environmental regulations – Bob McKinstry will discuss this

What Impedes Microgrid Development?

- Some technology is unfamiliar even if it is not brand new (*e.g.*, microturbines)
- Regulatory frameworks vary from state to state – Howard Shafferman will talk about New Jersey and Pennsylvania
- Interface with the local utility: demand charges when off the grid; cost of interconnection.
- BUT Some regions reward demand reduction as an energy product that has value just like power generation.

Financing Microgrids

What are we financing?

- Power and energy generation systems – equipment and operating costs
 - = electricity or steam production
- Energy efficiency retrofits and upgrades / can include building upgrades and modernization
 - = reducing energy usage
- Distribution systems and connections
 - = demand management, optimizing load” throughout the microgrid, in the buildings, storage, etc.

Financing Generation Systems

Generally financeable on a “project” basis off of guaranteed or highly predictable revenue streams

- Energy sales
- Ancillary services

Many owners have tax-driven motives

- Tax credits for renewable energy like solar and wind
- Tax credits for cogeneration, fuel cells and microturbines

Energy Incentives

Energy Bonding Options

- QECCBs (qualified energy conservation bonds)
- Taxable bonds
- Tax-exempt bonds (energy efficiency tax-exempt lease)

Tax Deductions

- Commercial energy efficiency deduction on capital costs
- Accelerated depreciation on capital cost of energy projects
- Sales / Property Tax Exemption from Taxable Basis

Tax Credits

- Investment tax credit (“ITC” - capital cost for solar, wind, biomass, co-gen, geothermal)
- Production tax credit (“PTC” - large scale wind, biomass, etc.)

Credit Enhancements

- Dept. of Energy Loan Guarantees
- USDA Loan Guarantees

Direct Cash Payments

- 1603 Cash Grant in Lieu of ITC (mostly expired)
- REC Payments / Rebates
- Other federal / local grants or incentives

Summary of Federal Energy Tax Credits

Property	Credit Amount (% of installed cost)	PTC Amount (per kW/hr)	Expiration
Qualified Fuel Cell	30% (ITC or Grant)	NA	12/31/16
Solar (Electricity and Fiber Optic)	30% (ITC or Grant)	NA	12/31/16
Small Wind	30% (ITC or Grant)	NA	12/31/16
Wind	30% (ITC election / Grant)	2.3¢	12/31/13*
Open Loop Biomass	30% (ITC election / Grant)	1.1¢	12/31/13*
Closed Loop Biomass	30% (ITC election / Grant)	2.3¢	12/31/13*
Geothermal	10% ITC 30% ITC Election / Grant	2.3¢	12/31/16 ITC 12/31/13* PTC/election/grant
Qualified Microturbine	10% (ITC or Grant)	NA	12/31/16
Combined Heat & Power Systems	10% (ITC or Grant)	NA	12/31/16
Thermal Pump Systems	10% (ITC or grant)	NA	12/31/16
Municipal Solid Waste (Trash / Landfill Gas)	30% (ITC election / Grant)	1.1¢	12/31/13*
Hydropower	30% (ITC election / Grant)	1.1¢	12/31/13*
Marine & Hydrokinetic	30% (ITC election / Grant)	1.1¢	12/31/13*

*Note: The 12/31/13 deadlines are generally the date by which construction must commence. 12/31/16 deadlines are the date by which the projects must be placed in service.

Financing Energy Efficiency Retrofits and Upgrades

- Financed on energy savings the host/sponsor experiences
- “Shared Savings” has two types of deal:
 - The Sponsor can put up the capital and share more of the savings OR
 - The Developer puts up the capital and shares more of the savings
- Many utilities offer demand-side and efficiency incentive rebate and reward programs, as Howard will discuss

Financing the Whole Nine Yards

- Developers see a business opportunity in providing a total finance package that has to include:
 - Appetite for tax credits (of no use to non-profits)
 - Appetite to invest capital in a core business
 - Sophisticated interface with utility programs, ability to optimize demand-side management
 - Savvy use of government programs
 - Incorporating integrated project finance structures

**It is a lot to pull together if you don't do it every day!
Fortunately, our case study presenters are ready to help.**

Questions?

