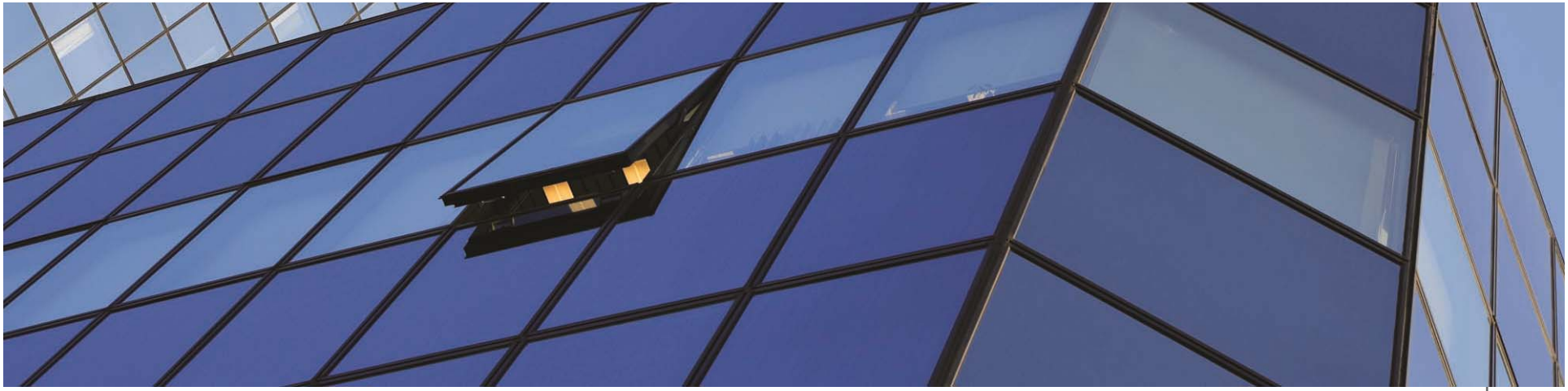


PretiFlaherty

Maine's CHP Interconnection Standards: Lessons and Best Practices

Todd J. Griset
October 18, 2012

Overview

- Maine: context for a case study
- Typical CHP applications in Maine
- Maine's approach to overcoming barriers to CHP
- Connecting CHP projects to the grid
- Lessons for other states

Maine: context for a case study

Maine: context for a case study

- 70% of Maine homes rely primarily on oil for heat
- Natural gas supply and distribution limited
- Low population density across much of state

Maine: context for a case study

- Like rest of New England, Maine electric generation is heavily dependent on natural gas
  - 49% natural gas
  - 1% oil

Maine: context for a case study

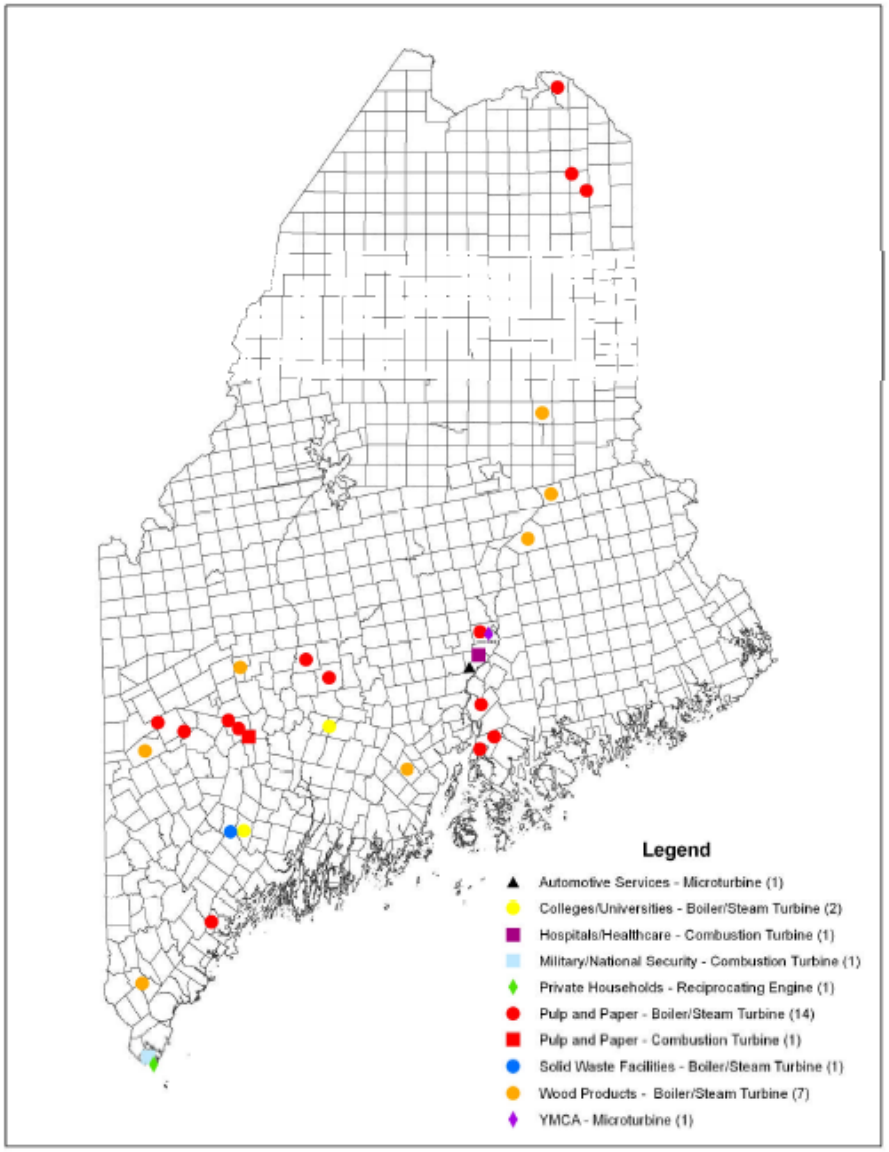
- In 2011, renewables provided 50% of Maine's net electricity generation
  - 25% hydroelectricity
  - 21% wood
  - 4.5% wind
- Maine is a net exporter of electricity
- Electricity prices lowest in New England

Maine: context for a case study

- Manufacturing remains strong
- Industrial activity = 10.6% of Maine's total gross state product
- Industry is the largest energy consuming sector: 34% of energy consumed in 2010
- Industrial processes demand steam and heat

Strong Opportunities for Cogeneration

CHP in Maine



- 30 CHP facilities as of 2011:
  - 24 boiler/steam turbines
  - 3 combustion turbines
  - 2 micro-turbine
  - 1 reciprocating engine
- Total capacity of 1,130 MW

Examples of CHP in Maine

- Paper mill: 250 MW cogeneration, including 190 MW gas-turbine generator with HRSG
- Naval shipyard: 10 MW natural gas combustion turbine
- Waste-to-energy facility: 5 MW boiler/steam turbine
- Hospital: 4.6 MW natural gas combustion turbine
- College: 600 kW oil-fired boiler/steam turbine

CHP in Maine

- 15 pulp and paper
- 7 wood products
- 2 colleges and universities
- Automotive services
- Health care
- Military
- Solid waste
- YMCA
- Private household

Photo courtesy SMRT Inc.

How to encourage CHP?

- Easier interconnection process
- Standardization
- Net metering
- Energy efficiency grants

Connecting CHP to the grid

- Questions:
  - Who regulates interconnection to the grid?
  - How can interconnection policy overcome barriers?

- FERC regulates generator interconnection on transmission lines
- FERC does not generally regulate interconnection to local distribution systems
- Small generators likely to interconnect to utilities' distribution system, subject to state jurisdiction

Overcoming CHP barriers in Maine

- Maine has allowed net metering since early 1980s
- Interest in late 2000s in enhancing CHP, renewables, distributed generation
- 2008 legislative resolve: PUC to study creating statewide standards for small generator interconnection
- 2009 PUC report recommended standardized statewide interconnection procedures

Why standardize?

- Increase the efficiency of the interconnection process = lower costs
- Encourage increased use of CHP, distributed generation, renewables
- Improve business environment for the companies that sell and install small generation systems
- More customer choice with respect to equipment and the professionals who will install it
- Enhanced safety

How to standardize?

- Maine PUC considered 3 models:
  - FERC SGIP
  - Interstate Renewable Energy Council (IREC) model standards
  - Mid-Atlantic Demand Resources Institute's (MADRI) model standards

How to standardize?

- 2 utilities already used SGIP
- Utilities argued SGIP + net metering was sufficient
- Utilities argued PUC should focus on safety, not helping CHP businesses
- PUC said it could do both

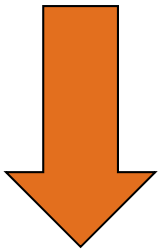
PUC chose IREC model

- 2 utilities already used SGIP, so transition to similar IREC model easier
- IREC model had lower fees, lower initial cost burden to consumers seeking interconnection
- No external disconnect switch needed for inverter-based systems <10 kW meeting IEEE and UL standards

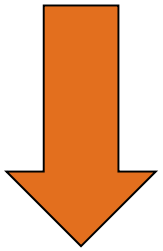
IREC Model = Lowest Cost Approach

Maine's interconnection standards

General technical screening criteria



Four levels of specific standards



Additional protections

General screening criteria examples

- Safety and reliability
- Limits on how the existing + interconnecting generation can load the distribution circuit
- Generator cannot exceed the capacity of the customer's existing electrical service
- Customer cannot require utility to upgrade its system to accommodate generator

Four-level system

- Level 1: inverter-based generators <10 kW
- Level 2: generators <2 MW
- Level 3: non-exporting generators <10 MW
- Level 4: all other generators not subject to FERC jurisdiction

Four-level system

- Fee for Level 1 = $50
- All other levels = $50 + $1/kW
- Fast-tracked timelines
  - Level 1 example:
  - Customer submits application
  - Utility has 5 days to deem application complete
  - +10 days to notify customer of screen passage
  - +5 days to send Level 1 interconnection agreement

Additional protections

- Utility must designate a single point of contact for application process
- Presumption that meeting screens means project complies with technical requirements
- Utility can't require a customer-generator to:
  - install additional controls (e.g. utility accessible disconnect switch)
  - perform or pay for additional tests
  - purchase additional liability insurance

Net metering and grants

- All utilities must offer net energy billing
- Facilities up to 660 kW eligible
- Fuel cells, tidal power, solar, geothermal, hydroelectric, biomass, generators fueled by municipal solid waste in conjunction with recycling, and eligible CHP systems
- Efficiency requirements for CHP
  - micro-CHP 30kW and below must achieve combined electrical and thermal efficiency of 80% or greater
  - micro-CHP 31kW to 660 kW must achieve combined efficiency of 65% or greater
- Grant funding available

Lessons for other states

- “Social infrastructure” matters
- CHP works best with steam/heat demand located near generation sites
- Customer and stakeholder advocacy for better interconnection standards essential
- Legislative interest in encouraging CHP via interconnection reform
- Regulatory interest in standardizing process
- Net metering and grants help

Questions?

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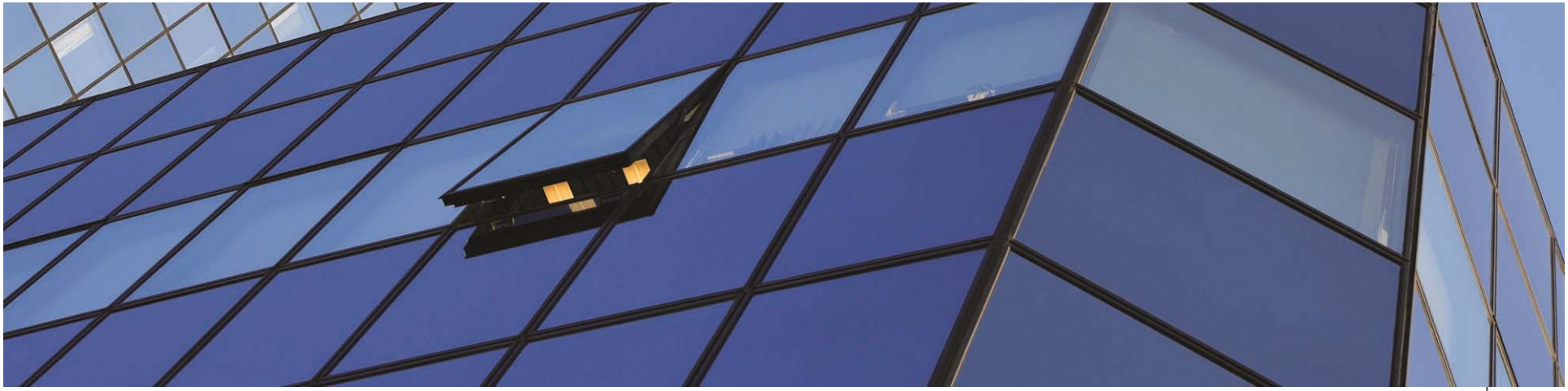

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