

Micro-CHP Can Meet New York's Efficiency Goals

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Combined Heat and Power

- Should be part of basic energy efficiency goal/approach - not an afterthought in EEPS
- In 2003, there were a total of 3,548,785 smaller residences in NYS offering micro-CHP opportunities. Approx. 62% heat with NG.
- Each residence can meet 25-30% combined efficiency reduction with micro-CHP compared to grid electricity and older conv. NG furnace.

Small Residences in NYS(2003)

Serv.Area	One Unit	2-4 Units	Total
CHG&E	151,790	6,904	158,694
Con Edison	378,053	298,517	676,569
NMPC	908,124	65,026	974,150
NYSEG	552,685	33,933	586,618
O&R	117,974	7,175	125,148
RG&E	217,685	13,212	230,897
LIPA -TRW	764,146	33,561	797,707
Total Bldgs	3,090,457	458,328	3,548,785 ³

Residential Combined Heat and Power Levers for Change

- Consider the potential of adding micro-CHP to 2.2 million homes that use natural gas.
- “Normal” Home renovation can leverage change in existing stock. Incentives can prompt innovation.
- 3.4 - 5.5% renovated each yr, Avg. of 155,000 homes, 22.7% of those renovate space heating. (62%) of those or 22,000 use NG. As per 2005 SBC Evaluation Report (adjusted to include LI)

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- However, natural gas furnace/boiler replacement rate in NYS (industry sources) is over 168,000 units per year suggesting much larger opportunity than shown in SBC data.
- The real opportunity for micro-CHP is somewhere in between.
- If 20% of turnover is met by micro-CHP, then annual efficiency benefits by 2015 could be 200-300 MW and 1,000,000 MWH.
- Residential Micro-CHP should be advanced by EEPS goals and means.

Compute Efficiency (Old Way)

- Old Way - Typical home heating fuel use about 100,000,000 Btu/yr (2500 ft. sq.)
- 70,000,000 Btu delivered at 70% efficiency
- Typical annual electricity consumption in NY's single family homes is about 9,000 kWhrs
- Net avg delivered efficiency of grid of 30% with line losses, etc., total energy needed for electricity is about $9,000 \times 3412$ Btu/kWhr divided by 3 which equates to another 102,360,000 Btu/yr
- Total Old way is 200,000,000 Btu/Yr.

Compute Efficiency (New Way)

- Generate 5,000 kWhr/yr. by replacing old heating system at 70% efficiency with a Freewatt™ micro-CHP
- No actual increase in gas consumption due to increase in total efficiency to 90% (70% for heating with added 20% for electricity for a total of 90%.)
- 5,000 kWhr is 55% of total electricity needed per year.
- Now consuming 145,000,000 Btu/yr, I.e. 100,000,000 Btu/yr for heating and 45,000,000 Btu/yr for electricity. 55 M Btu/yr saved.
- Percentage reduction in total home energy use is $55/200 = 28\%$ which is nearly double the Governor's objective.

Micro-CHP is here in US ! **POWERED by HONDA**

An economic and practical new tool for:

Superior Residential Efficiency

Primary Energy Conservation

Grid Capacity Support

Large Carbon Footprint Reduction



Micro-CHP: Exactly what is it?

DEFINITION: Grid-connected, professionally-installed home space and water heating appliances operating on natural gas that

1) generate significant electric power as a byproduct of normal operation (~ 5,000 kWh/year)

+

2) provide self-powering, emergency backup power, and grid support capability

What Can Micro-CHP do?

80% of the energy and environmental benefit of residential solar electric power at 20% of the cost

Neutralize Residential Peak Demand from Grid

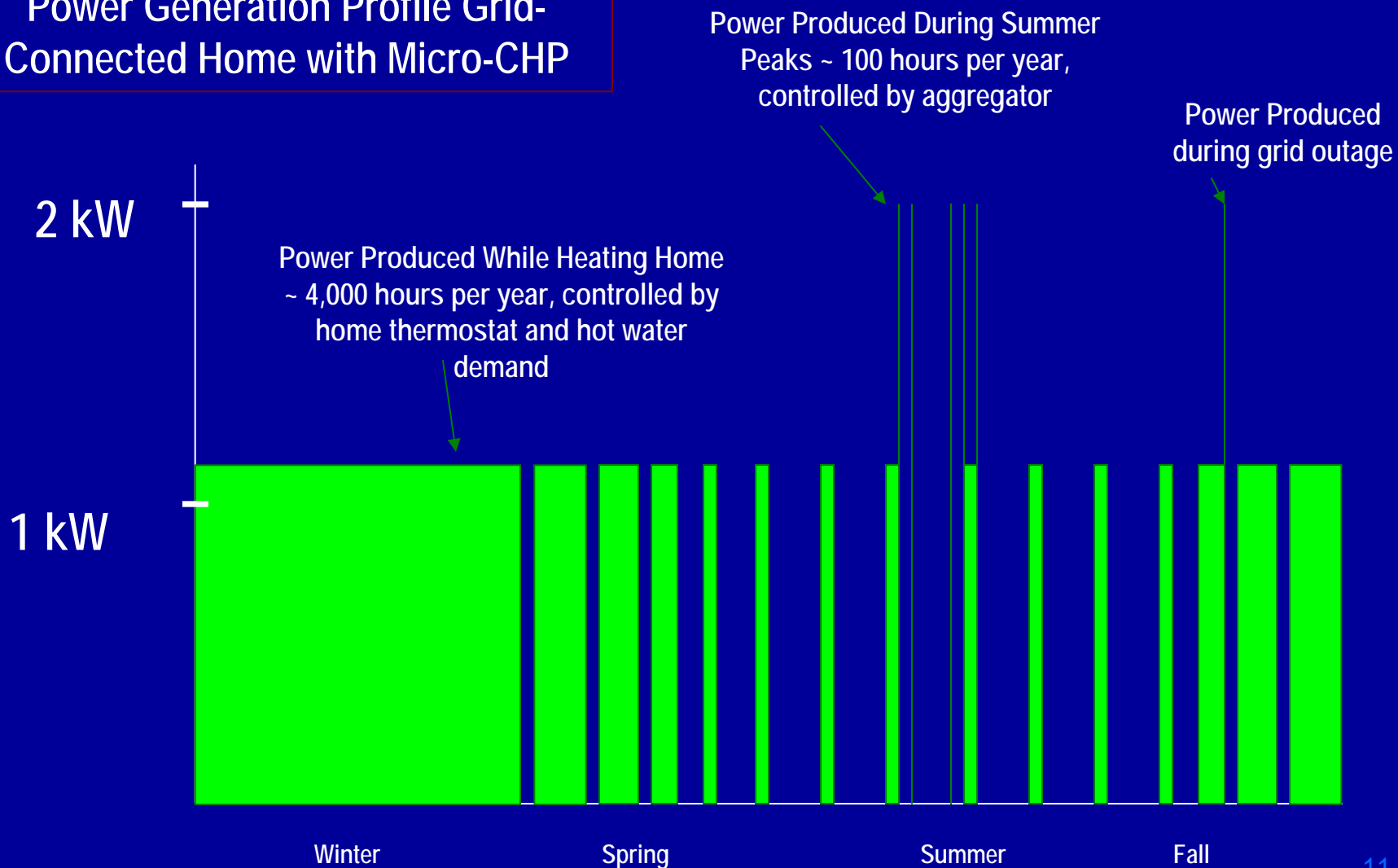
Produce significant amounts of on-site electric power at total costs comparable to residential utility rates

Provide back-up power during grid outages

Widely deployable: Over 25 million candidate home sites

Siting challenges: None

Power Generation Profile Grid-Connected Home with Micro-CHP



Micro-CHP: Why now?

World-class manufacturers of energy appliances see and understand the opportunity and market gap for a high-performance, plug-and-play product, and can produce it at an affordable price

Underlying power technology is proven in over 50,000 homes in Japan: ultra-endurance, ultra-quiet small internal combustion engine technology married with catalytic emissions, control, solid-state power inverter electronics and digital communications technology meets all the challenges.

Investment in product has been made: No need to wait any longer.

What will help fulfill the promise of Micro-CHP?

- Net metering: Keep it simple and low cost to interconnect and measure
- Capacity Aggregation: Allow thousands of homes to combine to provide dispatchable Megawatts.
- Incentive parity with “renewable” energy
- Education

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