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# New York's Win-Win-Win Energy Future: The Role of Clean CHP

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# Rationale for Supporting CHP

## **Economic Benefits**

- Competitiveness, productivity, growth
- Create new jobs in a state or region
- Promote/nurture a new industry (“infant industry”)

## **Environmental Benefits**

- Reduce criteria pollutant emissions (NO<sub>x</sub>, SO<sub>x</sub>, Hg, PM)
- Reduce greenhouse gases (primarily CO<sub>2</sub> and CH<sub>4</sub>)

## **System Benefits**

- Reduced reliance on imported fossil fuels
- Reducing grid congestion
- Lowering peak demands & impacts on prices
- Improving the diversity of energy supplies in a region

## **Security**

- National security arguments
- Reliability during outages/disasters (“safe havens”)

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## Inventory of Incentives: all are different, and work differently

- ✓ **Installed Capacity Payments** (fixed \$/kW of nameplate)
- ✓ **Project Grants** (XX% of project costs, capped at \$X Million)
- ✓ **Peer Reviewed Project Grants** (NYSERDA PONs)
- ✓ **Production Tax Credits (PTC)**
- ✓ **Investment Tax Credits (ITC)**
- ✓ **Low-Interest Loan Programs**
- ✓ **Net Metering** (Payments for “excess” production)
- ✓ **Renewable or Efficiency Portfolio Standards (RPS) / (EEPS) Utility Purchase Obligations**
- ✓ **Special Gas Purchase Rates** (Fuel Discount)
- ✓ **Locational Payments or Time Specific Payments**
- ✓ **Carbon Cap and Trade** (RGGI, CA)
- ✓ **Carbon Tax** (price on emitted carbon increases spark spread)



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## Promoting Clean DE: Do We Consider Incentive Design?

A broad range of mechanisms are available for promoting clean DE

Each mechanism offers the grantor (the state) and the grantee (the end-user) some advantages, and some disadvantages

Grantor wants: maximum clean MWh produced, demand reduced, emissions avoided, per \$ granted

Grantee wants: more \$'s, received sooner, less transaction costs (M&V, contracting)



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## Mapping Goals/Objectives to Technologies

Goal \ Technology	PV	Wind	Fuel Cells (bio)	CHP (bio)	Fuel Cells (gas)	CHP (gas)
<b>Energy</b>	*	**	***	***	***	***
<b>Capacity</b>	*	*	***	***	***	***
<b>Reduced criteria pollutants (NO<sub>x</sub>, SO<sub>x</sub>, Hg, PM)</b>	***	***	**	**	**	**
<b>Reduced GHG emissions</b>	***	***	***	***	**	**
<b>Economic (jobs)</b>	?	*	?	?	?	*
<b>Economic (new industry)</b>	***	**	*	--	*	--
<b>Economic (growth/competitiveness/)</b>	---	-	--	?	-	*
<b>Economic (energy cost benefits)</b>	---	--	--	*	--	**
<b>Reliability</b>	-	-	***	*	***	*
<b>Energy supply diversity</b>	***	***	***	***	-	-
<b>Reduced reliance on imported fossil fuels</b>	***	***	***	***	*	*
<b>Security / disaster response</b>	?	?	***	***	**	**

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# What CHP Is and Is NOT

## CHP is NOT...

Renewable (typically)

Infant Industry

Zero Emissions

## CHP IS.....

GHG mitigation measure (typically)

Air emissions reduction measure (typically)

Cost-effective relative to many alternatives

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# CHP IS a Cost-Effective GHG Mitigation Measure

## GHG Reductions per Incentive \$

	GHG Reduction Potential (tons of CO <sub>2</sub> per MWh)	Incentive \$'s per MWh	Incentive \$'s per Ton Reduction
<b>Solar PV</b>	0.60	\$3,089	\$5,148
<b>Wind</b>	0.61	\$1,521	\$2,493
<b>Engines/Microturbines (Renewable &amp; Non)</b>	0.11	\$ 145	\$1,318

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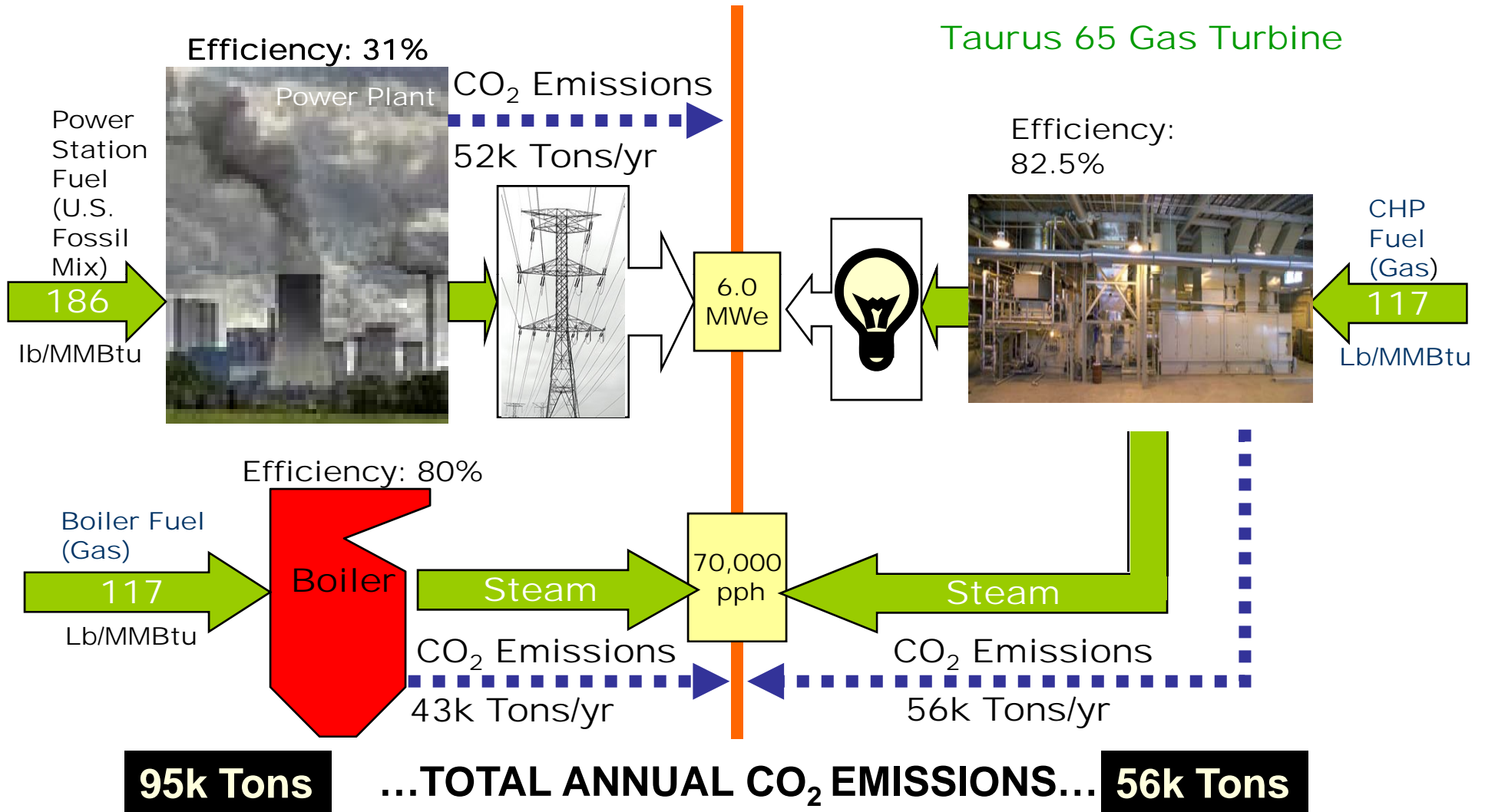
**Source** SGIP 2005 Impact Evaluation, ITRON Corporation

([www.socalgas.com/business/selfgen/docs2007/2007\\_SGIP\\_FifthYearImpactEvaluation\\_2005.pdf](http://www.socalgas.com/business/selfgen/docs2007/2007_SGIP_FifthYearImpactEvaluation_2005.pdf))

# CO<sub>2</sub> Emissions Reductions from CHP

## Conventional Generation

## Combined Heat & Power: Taurus 65 Gas Turbine





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# Wringing GHG Reductions from CHP

Need a good thermal application, and the system must make use of it for a large number of hours per year (i.e., the overall efficiency must be in the exemplary range)

**\*\* Renewable-fueled CHP obtained the overwhelming share of GHG reductions (among engines/turbines) in a detailed impact analysis**

Policy Implications:

- *Incremental rewards for biomass based applications*
- *Incremental rewards for top decile of efficiency*

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# Capitalizing on Opportunities in CO2 Programs

## Regional Greenhouse Gas Emissions (RGGI) Programs in the States

The Northeast CHP Initiative (NE-CHPI) submitted extensive comments in Massachusetts and will do so in other states

*Submitted to the Massachusetts Department of Environmental Protection and the Massachusetts Department of Energy Resources*

On Proposed Rules:

310 CMR 7.70 - CO2 Budget Trading Program

310 CMR 7.29 - Emissions Standards for Power Plants

310 CMR 7.00 Appendix B(7) - Emission Banking, Trading, and Averaging

225 CMR 13.00 - DOER CO2 Budget Trading Program Auction Regulation

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# Clean CHP Can Significantly Reduce Criteria Pollutants

Prior NYS-ERDA Studies have shown marked  
reductions in NO<sub>x</sub>, Particulates, SO<sub>2</sub>

When Comparing a Higher CHP Penetration Scenario  
versus the “*Business as Usual*” Case

Real world opportunities exist in abundance in New  
York, particularly when high efficiency, clean CHP  
replaces aged, inefficient, Nos 4 or Nos 6 Oil Boilers

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## CHP Could Play a Larger Role in Market Based Pollution Trading Programs

CHP creates value by reducing criteria pollutants (and greenhouse gasses) ..... How can very clean, high efficiency systems get **COMPENSATED** for value creation?

### Inclusion in Existing & Proposed Pollution Trading Regimes

- \* Emission Reduction Credits,
- \* Emission Allowances,
- \* CAIR,
- \* RGGI

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## **Emission Allowances (CAIR Allowances) and ERC's**

All states may create an EE/RE Set-Aside for the Allowance Program;

CT, NY, MA all have Energy Efficiency Set-Asides

Emission Allowances can be distributed to EE/RE resources under EPA Guidance. Could credit Clean DG for as much as 1.5 lbs/MWH of displaced electricity

Illustrative Example: large Multi-Building, Multi-family complex in NYC

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## **ERCs & NO<sub>x</sub> Allowances Contribution to Project Economics**

Assume 7.5 Tons of ERCs Certified & sold at \$10,000/Ton

Assume 2,500 MWH's Generated at the Site

Formula for Awarding Allowances for Displaced Electric NO<sub>x</sub> credits  
this site with 3,750 lbs (1.875 Tons) of NO<sub>x</sub>:  
Allowances at \$2,750/ton \* 1.875 tons =  
\$5,156 per year (for 5 Years)

### **NPV of Emissions Credits (ERCs + EAs):**

ERC at \$75,000 + NPV of \$5,156 per year for 5 years  
= **\$75,000 + \$19,547**  
= **\$94,547**

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## WHAT SITES MIGHT QUALIFY FOR ERCs

- Introducing natural gas fired microturbines to generate electricity, hot water and space heating as a replacement for number 6, 4 or number 2 oil fired boilers;
- Introducing natural gas fired engines to generate electricity, hot water and space heating as a replacement for number 6, 4 or number 2 oil fired boilers;
- Introducing natural gas fired combustion turbines to generate electricity, hot water and space heating as a replacement for number 6, 4 or number 2 oil fired boilers; and
- fuel cells to generate electricity, hot water and space heating replacing gas, number 6, 4 or number 2 oil fired boilers.

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## ADDITIONAL CLEAN CHP BENEFITS;

At Hospitals / Colleges / Multi-family Buildings

- Improve reliability
- Lower costs
- Safe haven during emergencies

NOTE: DASNY's Tax Advantaged Loan Programs have Financed Clean Energy ... Norwalk (CT) Hospital Financed via CT-HFA,

MA Housing Finance Agency has 19 CHP Projects in its Multifamily portfolio

OTHER CHP BENEFITS....

- Improving Brownfield Sites / Industrial Parks
- Within Economic Development Zones

(Project Planned using Maine's Pinetree Development Zones)

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# **Brownfields Cleanup Tax Credits**

## New York Example

- An ITC ranging from 10% to as much as 22% for capital equipment & structures (including CHP systems)
- Credits are increased by 8% for location in “ENV-Zones”
- Credits are further increased by 2% for cleanup to the highest level (“Track 1”)
- Credits are fully refundable – if taxpayer liability < tax credit, the Tax Dept will write a check for the difference



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## Potential Brownfields Incentives for CHP Investment

Assume a 1,000 kW CHP project with total installed costs of \$1,500/kW or, a \$1.5 Million project

A taxpayer holding a COC will reduce the total project cost by \$180,000 to \$1.32 Mil.

A taxpayer building on an EnZone can reduce total project cost by \$330,000 to \$1.170 Mil.  
a marked improvement in project payback!!

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## Other Emerging Opportunities

### REVENUE DE-COUPLING --- CHANGING THE UTILITY INCENTIVES WITH RESPECT TO CHP

New York is beginning decoupling proceedings

Current New England decoupling proceedings are:

Connecticut: DPCU Docket No. 07-07-01 (CL&P  
Rate Case)

Maine: PA/PUC Investigation (invited group)

Massachusetts: DPU Docket No. 07-50

New Hampshire: PUC Docket No. DE 07-064

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# Objectives of Energy Incentives Observations

No one technology / application meets all of the stated objectives

Some objectives are conflicting at least in the short-to-medium term  
(e.g. supporting an “infant industry...., AND providing lower prices)

Some objectives are complimentary  
(e.g. greater efficiency...., AND CO<sub>2</sub> reductions)

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## Final Thoughts

**Our Premise – Clean, high efficiency CHP Can create many Win-Win-Win Opportunities... for the environment, for economic development, for energy reliability & security**

**CHP is sometimes overlooked when EE legislation is written, same is true of RE legislative incentives**

**New York State has been a real leader promoting viable CHP applications that create significant end-user and society wide benefits.**

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