

The Current Market Environment and Outlook

Pacific Region CHP Application Center

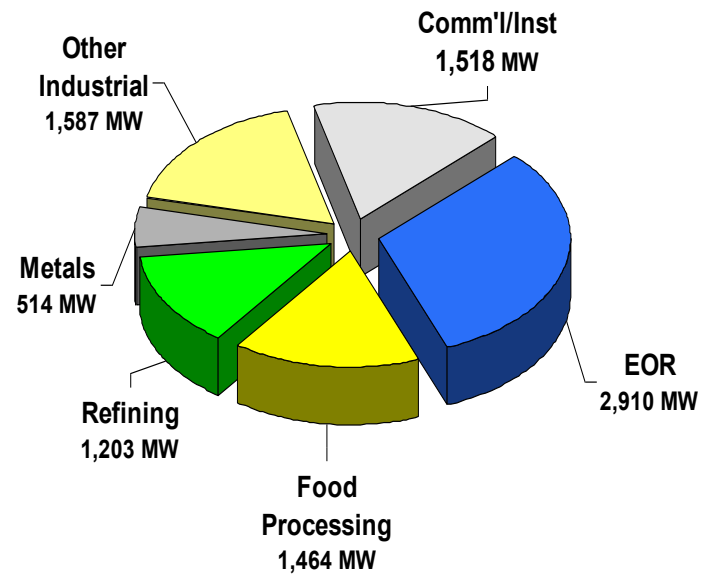
Efficient and Clean Combined Heat & Power Technologies for Industry

May 7, 2008

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Existing CHP in California

- 9,200 MW of CHP capacity installed at over 900 sites
- Average capacity is 10 MW
- 88% of installed capacity is in systems greater than 20 MW
- Existing CHP saves over 300 TBtu of fuel each year (~ 14% of total gas use in CA)
- Existing CHP eliminates over 20 million tons of CO₂ emissions each year



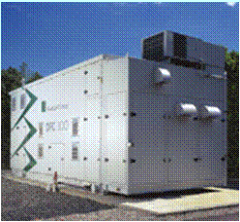
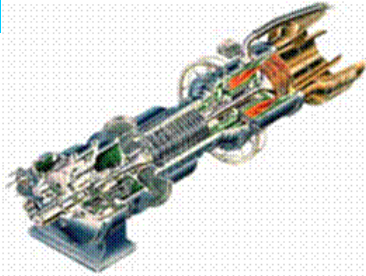
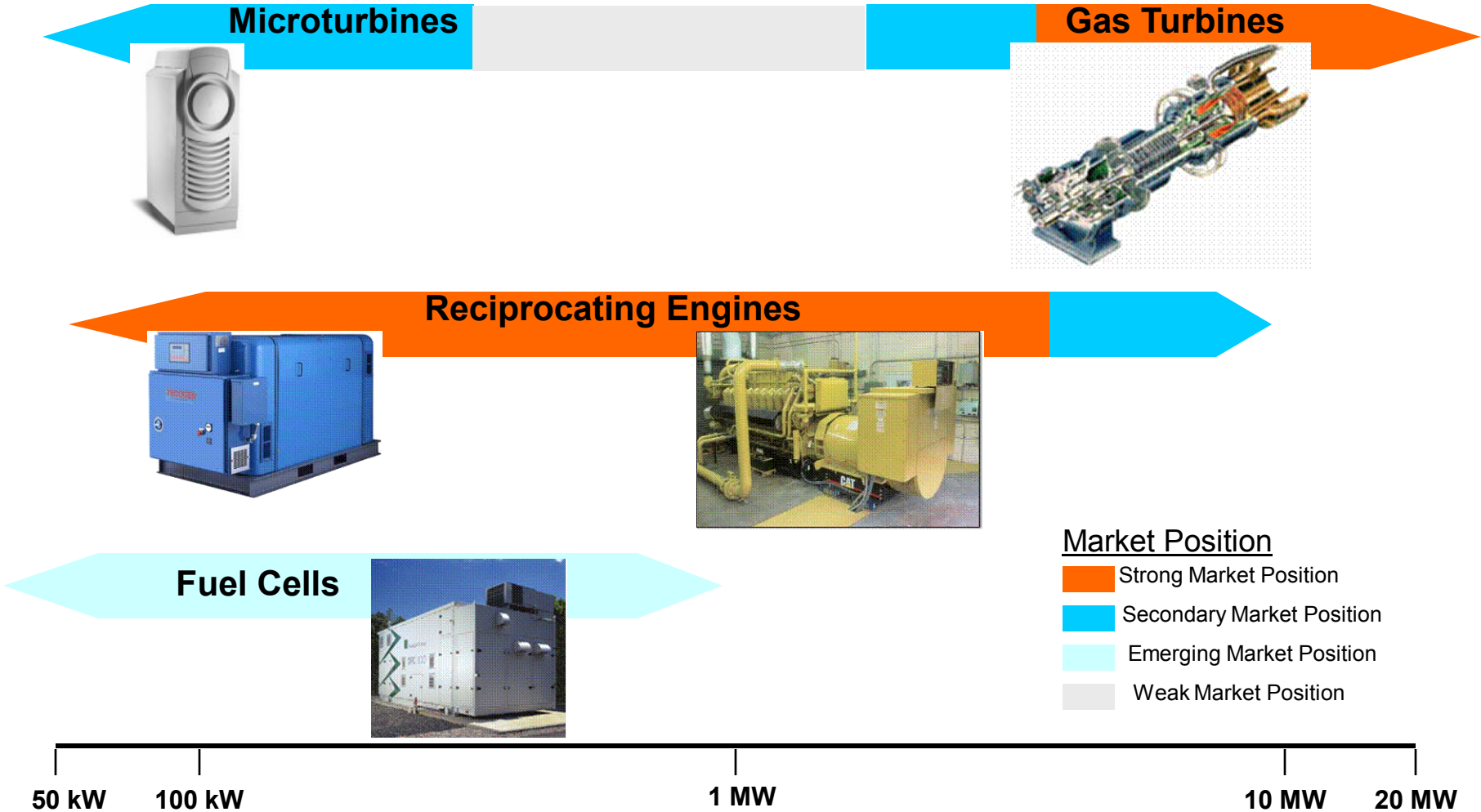
Source: CEC CHP Market Assessment, 2005

Remaining CHP Opportunity in California

- Technical potential of over 30,000 MW at industrial and commercial facilities - significant resource for California
- Two-thirds of the opportunity is in commercial and institutional applications
- Primary opportunity is within-the-fence systems sized for thermal loads
- 90% of the potential is in systems below 20 MW
 - Industrial - fabrication and assembly
 - Commercial - hotels, schools, office buildings

Source: CEC CHP Market Assessment, 2005

CHP Prime Movers



CHP Rendition - The Good, The Bad and The Ugly



CHP Rendition - The Good, The Bad and The Ugly



THE BAD

CA Legislation and Regulations Sideline CHP

- AB2778 kicked fossil CHP (excluding fuel cells) out of Self-generation Incentive Program beginning in 2008
- CA Investor Owned Utility rate structures discourage CHP
 - High demand, facility & standby charges
 - Steep non-by-passable surcharges (exit fees)
 - No feed-in tariffs
 - No monetary recognition for T&D and/or capacity benefits
- CARB regulations do not recognize tradeoffs between GHG emissions & criteria air pollutant regulations for natural gas CHP unlike the balanced treatment given for landfill gas and digester gas systems

CHP vs. Renewables - Regulatory Treatment

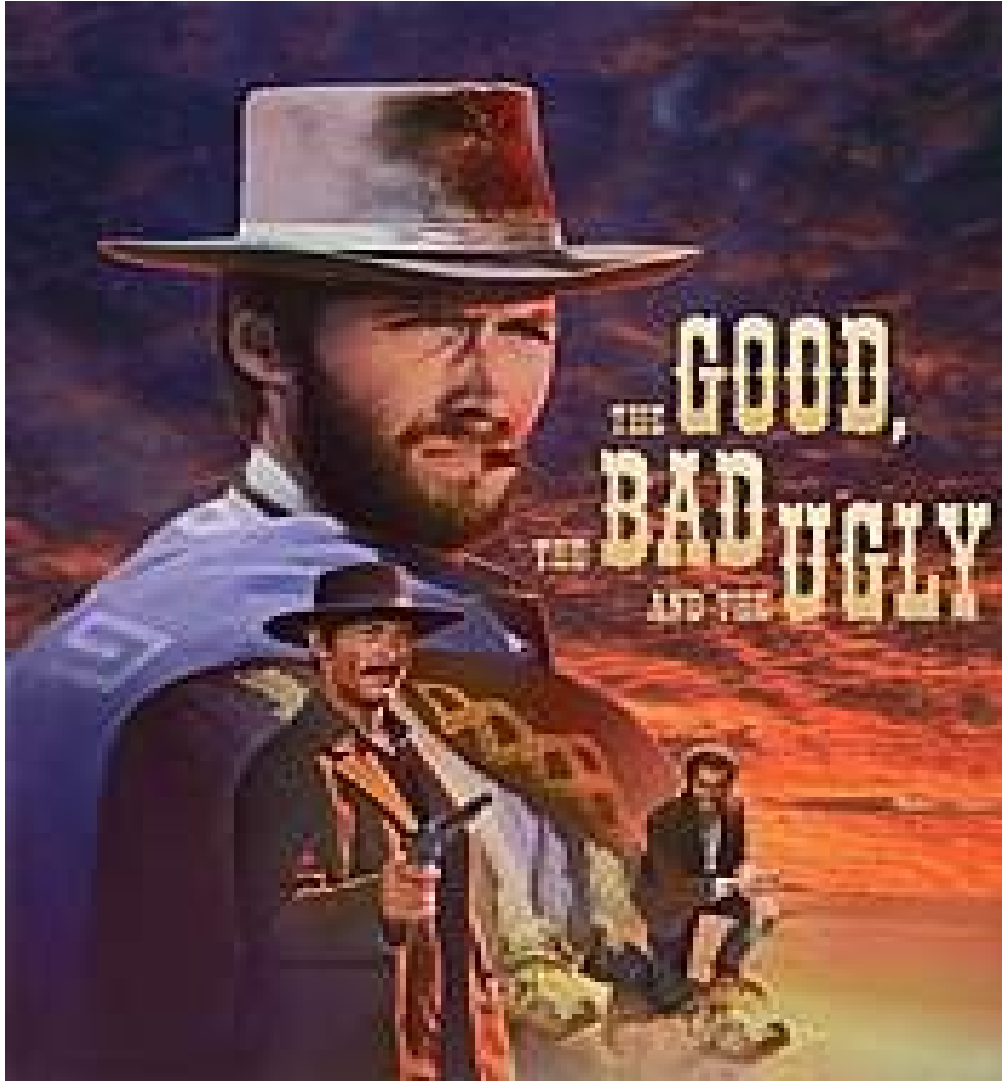
EXAMPLES OF HOW RENEWABLE AND CHP GENERATION TECHNOLOGIES ARE TREATED DIFFERENTLY UNDER CPUC REGULATIONS:

	Renewables (Solar PV, Wind, Hydro)	Biogas-Fired Fuel Cells, Turbines, or IC Engines	Natural Gas- Fired Fuel Cells	Natural Gas- Fired CHP (Engines/ Turbines with Heat Recovery)
Exemption from stand-by charge < 5 MW	YES	YES ¹	YES ¹	YES ¹
Exemption from certain “ departing load ” charges (including “DWR Bond Charge”, “Regulatory Asset Charge”, “Competition Transition Charge”, “Power Charge Indifference Adjustment”, and “Energy Cost Recovery Amount”) < 1 MW	YES	YES	YES	YES
Exemption from certain “ departing load ” charges (including “Public Purpose Program Charge”, “Nuclear Decommissioning Charge”, and “Trust Transfer Amount”) < 1 MW	YES	YES	NO	NO
“ Net Generation Output Meter ” not required	YES	YES	YES	NO
“ Net Metering ” allowed	YES	YES	YES	NO
Utility interconnection study fees waived (for “initial”, “supplemental”, and “detailed” reviews)	YES ²	YES ²	YES ²	NO
Eligible for incentive after 1/08 under either Self Gen Incentive Program or California Solar Initiative	YES	YES	YES	NO

¹ exemption has expired, but may be extended in pending CPUC DG rulemaking

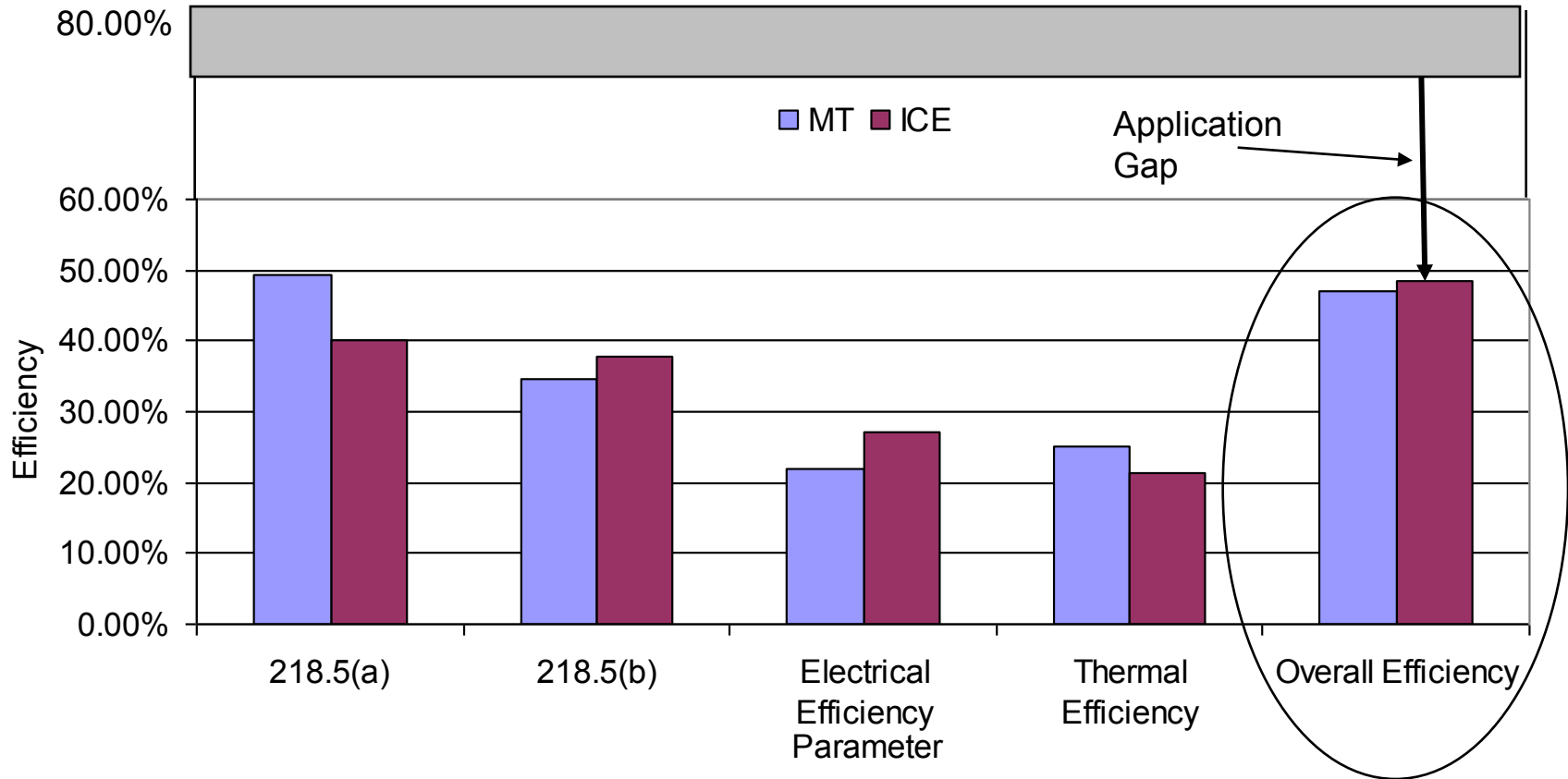
² exempt from study fees under Rule 21, because eligible for net metering

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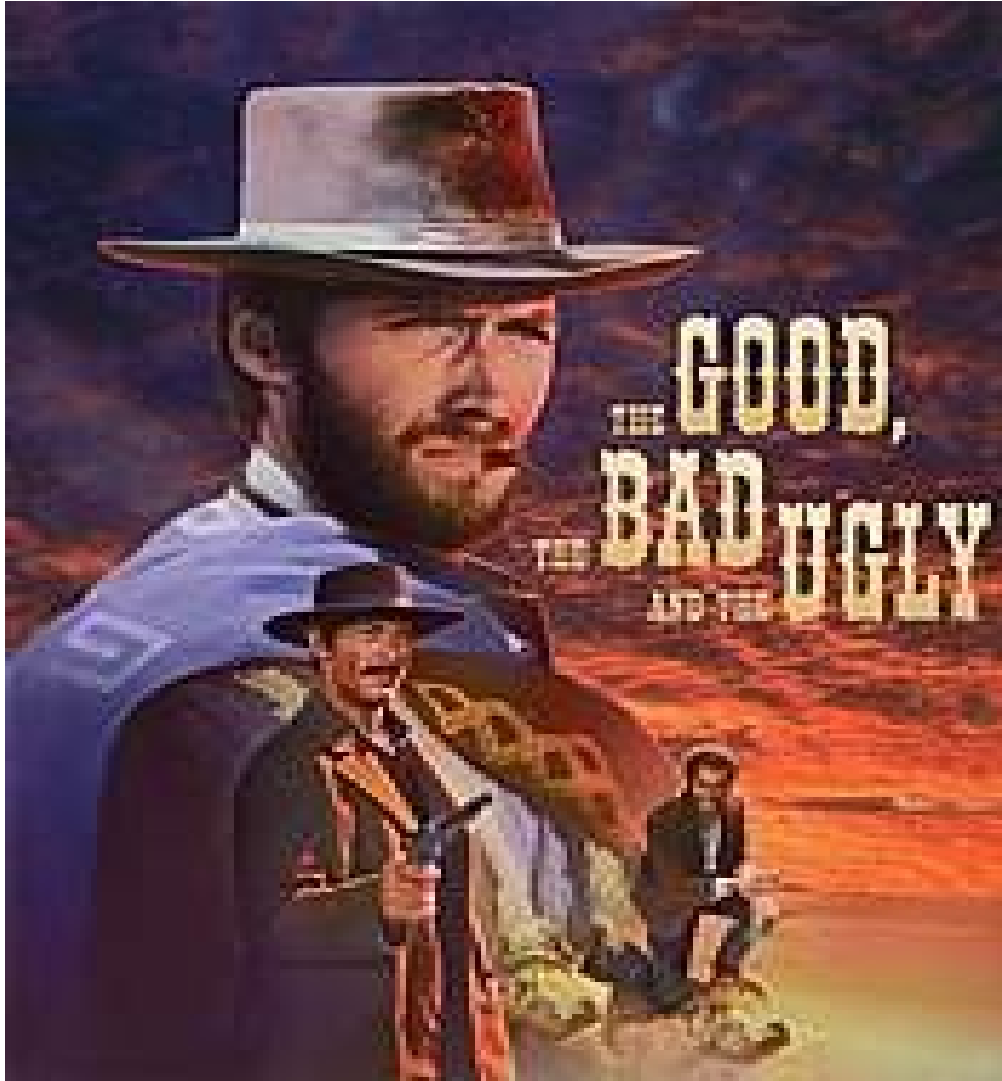


THE UGLY

SGIP Experience - Microturbines and Engines



Source: Itron, Analysis of useful Heat Recovery, Feb 07



THE GOOD

CHP Benefits

- Highly efficient use of natural gas
- Reduces gas consumption in California
- Lowers operating cost for adopters
- Cuts emissions of all pollutants, including CO₂ (GHG), NO_x, CO
- Decreases grid congestion and need for transmission & distribution expansion
- Offsets power capacity procurement
- Increases power reliability and enhances power quality
- Environmental stewardship - LEED points

CHP is Key Element of CA Energy Policy

- Deemed most cost-effective form of DG in CEC 2005 Integrated Energy Policy Report (IEPR)
 - Established realistic target of 5,400 MW CHP by 2020
 - Recommended a consistent set of State policies be adopted
- CEC 2007 IEPR
 - Eliminate all non-bypassable surcharges for DG & CHP
 - Explore utility gas procurement option for CHP users to moderate gas price volatility and transaction costs
- CA Energy Action Plan (EAP) ranks CHP high in loading order behind efficiency, demand response and renewables
- CA Climate Action Team Report targets CHP for 2.7% of 2020 GHG reduction goals
 - 5 million metric tons CO₂ Equivalent annual reduction by 2020

California CHP Momentum on the Rise

- Awareness of CHP growing among Legislature
 - AB 1613 (Blakeslee) directs the establishment of CHP procurement targets, excess generation sell back to the utility, and a pilot utility finance program
 - SB 1012 (Kehoe) would reinstate SGIP for CHP in 2009
- CARB Climate Action Team - Economic and Technology Advancement Advisory Committee (ETAAC) Report very favorable toward CHP
 - Establish State target for qualifying CHP
 - Reduce/eliminate departing load charges
 - Sellback of excess electricity production
- CHP back on CPUC radar - DG OIR back on table after 3 year hiatus

Broad Support For CHP Outside the State

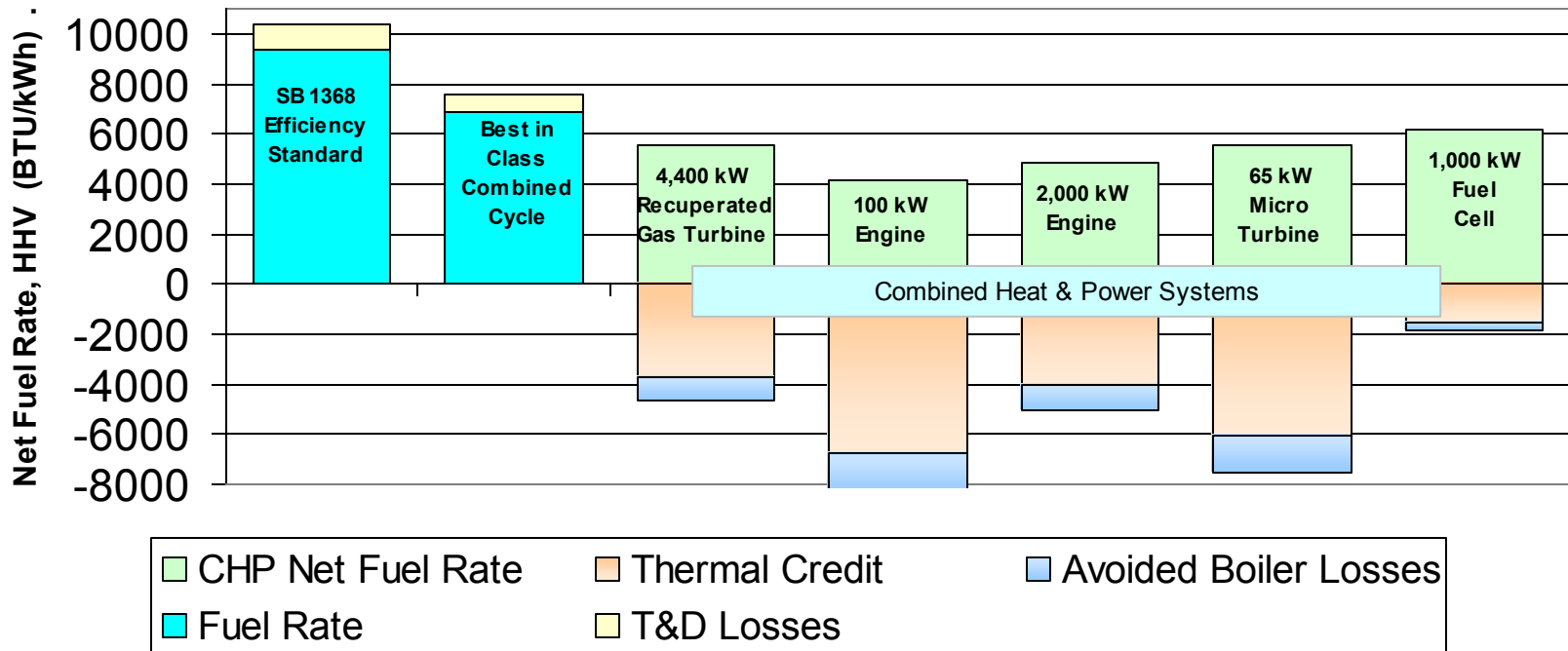
- The EPA CHP Partnership seeks to reduce the environmental impact of power generation by fostering the use of highly-efficient CHP
- Connecticut provides incentives, favorable rate treatment, & low interest loans for efficient CHP, renewables and efficiency up to 65 MW in size*
 - Utilities are provided incentives to support implementation
- Sierra Club recommends CHP as a preferred resource for the transition to a Clean Energy future, along with wind & solar.
 - These preferred resources have greatest potential to decrease GHG emissions, contribute to a stronger economy and reduce environmental damage.

*Connecticut Energy Independence Act 2005

CHP Net Heat Rate Advantage

100% Heat Utilization

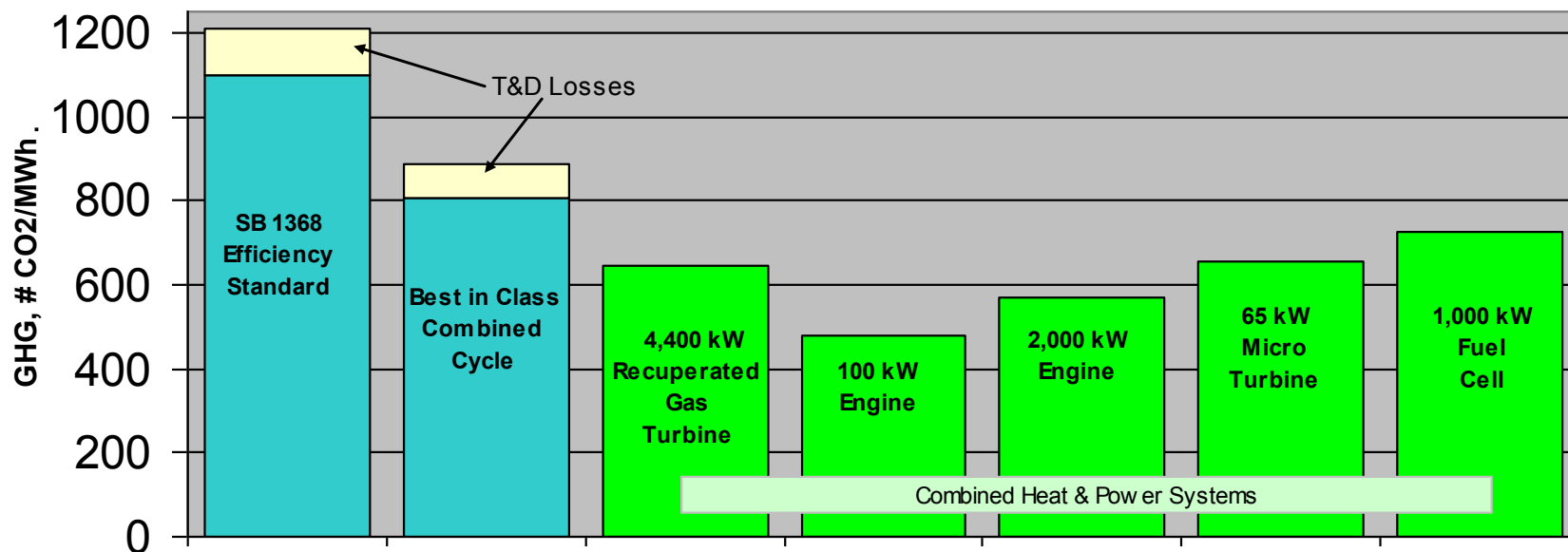
Net Fuel Rate



CHP GHG Emission Advantage

100% Heat Utilization

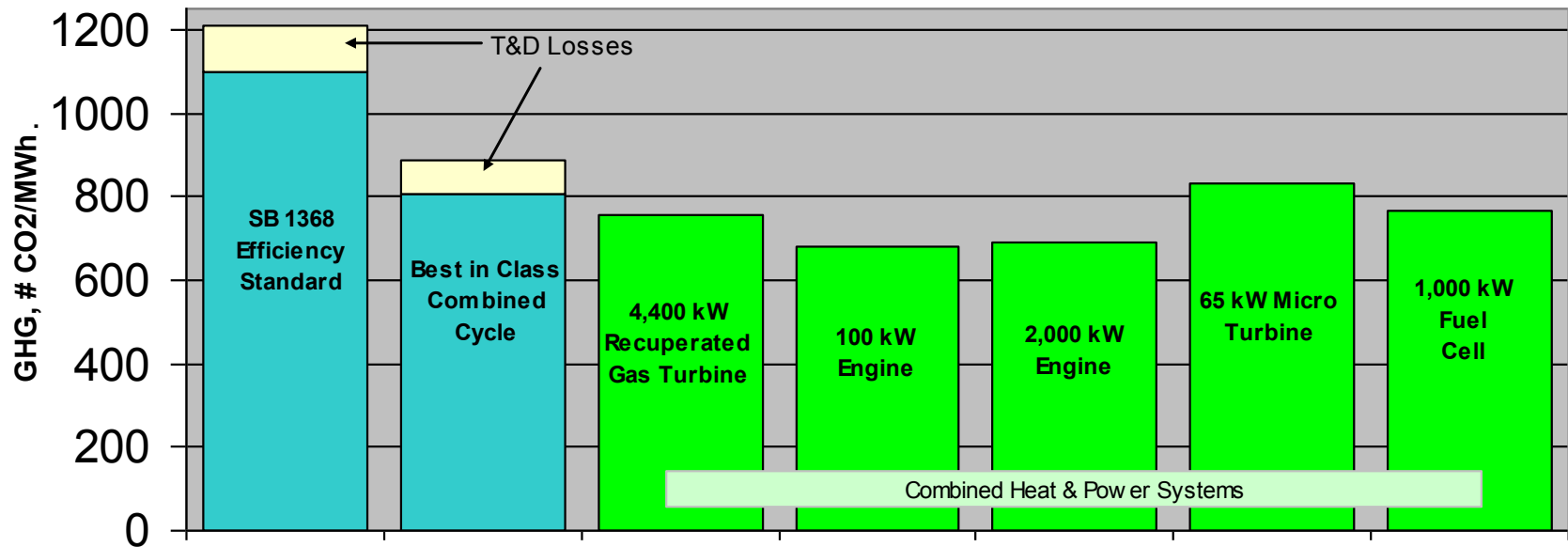
GHG Emission Profiles
Central CC plants vs. CHP



CHP GHG Emission Advantage

80% Heat Utilization

**GHG Emission Profiles
Central CC Plants vs. CHP
At 80% Heat Utilization**





THE End

Policies to Enable Robust CHP Implementation

- Adopt a statewide CHP portfolio standard*
- Recognize CHP as an efficiency measure -
 - CHP should be explicitly included along with energy efficiency first in California's Loading Order
 - As currently practiced with efficiency, exempt CHP from departing load charges
 - Reward CHP GHG performance - GHG credits from CHP should be kept by facility for trading in California's cap and trade program
- Restore combustion technologies to the Self Generation Incentive Program
- Provide incentives to utilities to participate in CHP solution
- Payments for T&D and generation capacity value
- Shift weight in tariffs from fixed and demand charges to energy charges as is being done for renewables
- Promote acceptance and awareness of CHP technologies and benefits

*2007 Integrated Energy Policy Report, California Energy Commission

Key Messages

- California needs robust implementation of CHP to realize energy and environmental policy objectives
- Barriers continue to slow market progress of CHP
- Incentives are vital, particularly for robust market adoption of smaller systems (< 5 MW), where the greatest remaining CHP potential resides
 - Until CHP is fully integrated into utility resource planning & procurement process
- Outlook for CHP is encouraging - but proactive CHP legislation and regulations that enables state energy policy is critical

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