CEC Committee Workshop on the Combined Heat and Power Guidelines (AB1613)

DRAFT

October 12, 2009

Pacific Gas and Electric Company

PG&E largely supports the CEC's draft recommendations and proposes changes to help ensure GHG emission reductions

- Combined heat and power (CHP) is important to PG&E's electric supply portfolio and to its customers.
- PG&E sees CHP as an opportunity to reduce GHG emissions and supports efficient CHP that contributes to statewide emission reductions.

PG&E sees clear opportunities for GHG emissions reductions from efficient CHP

1.) Energy efficiency

- On-site efficiency gains will reduce fuel use.

2.) Lower-carbon fuel inputs

- Switching from high carbon fuel (e.g., coal) to lower carbon fuel (e.g., biomass).

3.) Bottoming cycle facilities

- With no additional fuel, GHG emissions are always reduced with bottoming cycle CHP.

4.) Topping cycle facilities

- Good matching of thermal and electric output is criticial to achieving GHG reductions.

The carbon neutral SHP double benchmark is the appropriate measure for GHG emissions reductions

- To ensure GHG emissions reductions, emissions from a CHP installation must be compared to emissions if thermal and electric load were met with separate heat and power (SHP)
- Assumption for meeting thermal load would be emissions from a 80% efficient boiler
- Assumption for meeting electric load would be emissions from portion of utility portfolio that would be backed down with installation of CHP
- This is the Double Benchmark Standard that many parties support – It measures the "null" curve
  - PG&E appreciates that parties' heat rate assumptions for the utility portfolio that is backed down are not at consensus

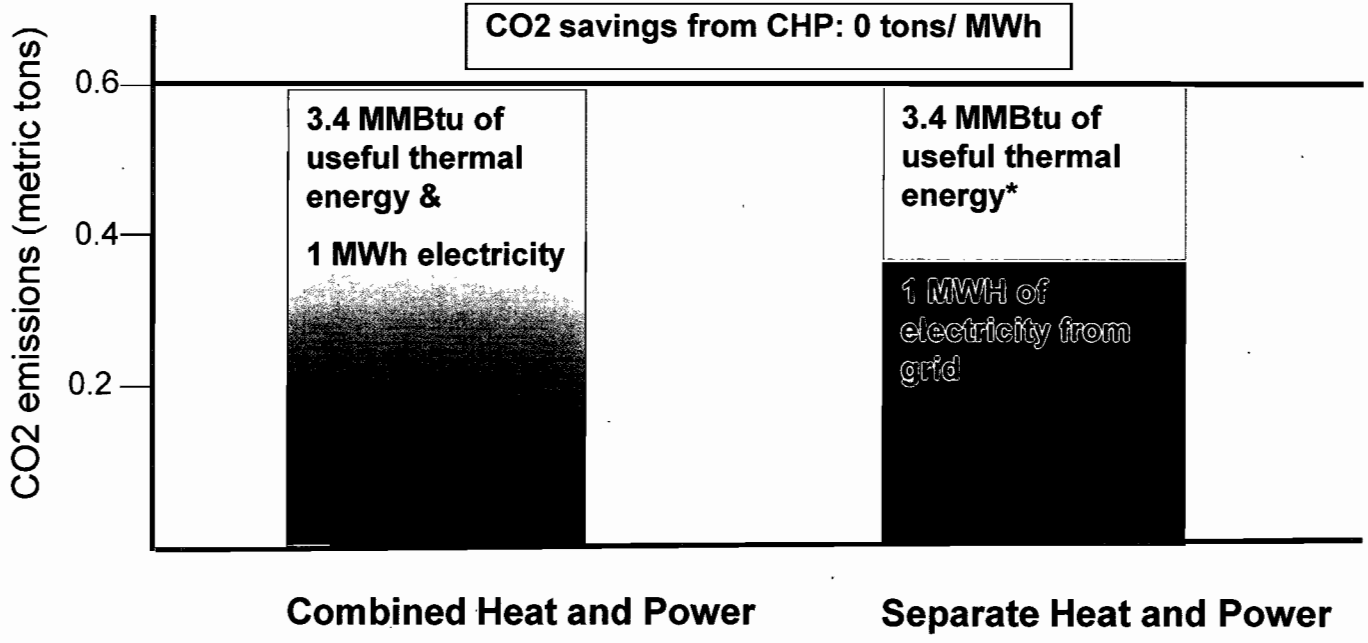
To achieve GHG reductions, CHP must be more efficient than an appropriate Separate Heat and Power (SHP) double benchmark

Assumptions:

- Total CHP efficiency: 60%
- Power-to-Heat ratio: 1:1

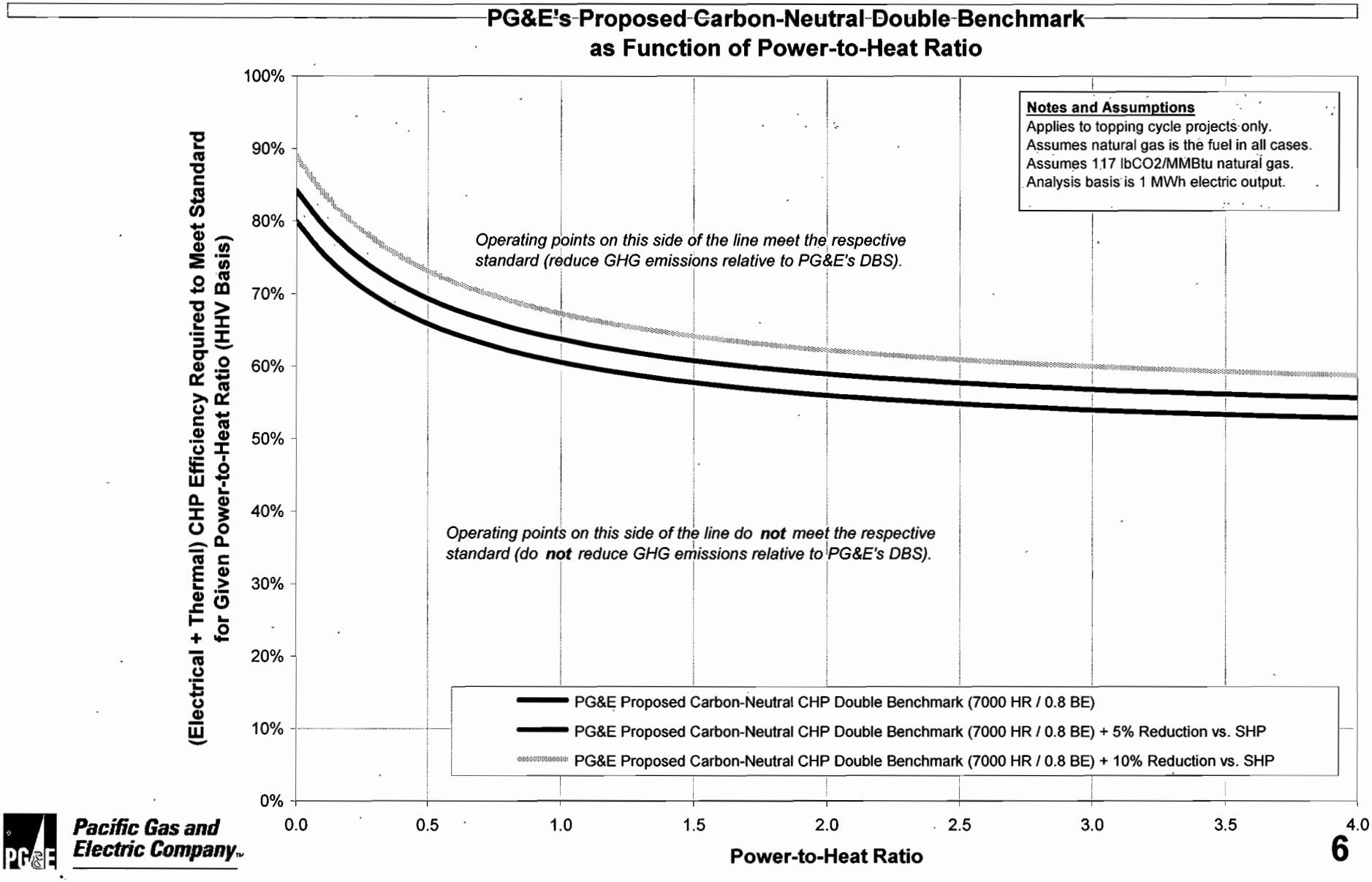
Assumptions:

- Boiler efficiency: 80%
- Electricity portfolio marginal efficiency: 48.7% (Heat rate 7,000 Btu/ kWh)
- Power-to-Heat ratio: 1:1



* equivalent to 1MWh

The Double Benchmark Standard is the appropriate measure for GHG emissions



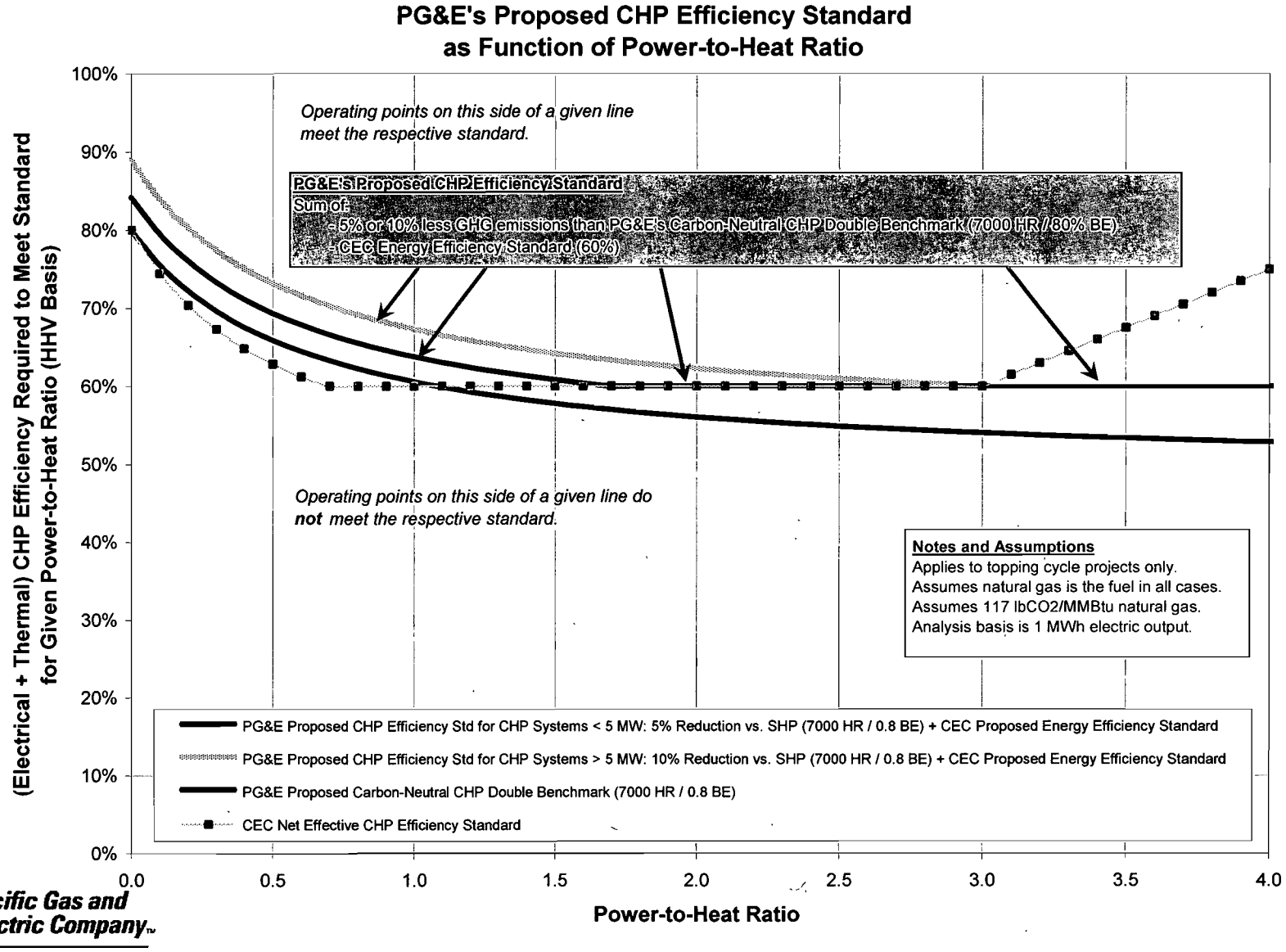
PG&E appreciates the efforts of the CEC

- CEC draft standards incorporate key CHP design considerations and statutory requirement.
- CEC has worked with parties to incorporate comments.
- PG&E recommends a higher efficiency standard to achieve GHG reductions from all CHP facilities.

The CEC efficiency standard can be simplified

- PG&E proposes use of the Double Benchmark Standard with the 60% total efficiency requirement
  - The latter is required by statute (PUC § 2843(e))
- GHG emissions standard can be dropped because it is at all times a lower standard than the Double Benchmark
- The Fuel Savings Standard can be dropped because it is not more efficient than an appropriate Double Benchmark
- Thermal requirement can be dropped because it is less than the Double Benchmark plus 60% except in cases where electric generator is so high as to be unrealistic in today's market
  - The 60% requirement ensures that thermal match will occur, which is the statutory requirement

The CEC efficiency standard can be simplified



Acknowledging operating challenges smaller CHP facilities face, PG&E proposes size-differentiated efficiency requirements

- PG&E proposal
  - 0 MW to 5 MW
    - CHP GHG emissions 5% less than emissions from SHP and
    - 60% total efficiency
  - 5 MW to 20 MW
    - CHP GHG emissions 10% less than emissions from SHP and
    - 60% total efficiency

A higher efficiency standard reduce the additional CHP electric capacity required to reach a defined GHG reduction target

WILL BE SUBMITTED

APPENDIX

The CEC efficiency standard can be simplified