Before the Public Utilities Commission of the State of California

Order Instituting Rulemaking on the Commission's Proposed Policies and Programs Governing Energy Efficiency, Low-Income Assistance, Renewable Energy and Research Development and Demonstration	Rulemaking 98-07-037

Comments of the Natural Resources Defense Council and the American Council for an Energy Efficient Economy on the Administrative Law Judge's Ruling Requesting Comment on Proposed Heat Recovery Standards

May 9, 2001

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Introduction

The Natural Resources Defense Council (NRDC) and the American Council for an Energy Efficient Economy (ACEEE) appreciate the opportunity to respond to the May 2 Administrative Law Judge's Ruling Requesting Comment on Proposed Heat Recovery Standards. ACEEE and NRDC share the Commission's stated concern that some distributed geenration (DG) technologies are less efficient and more polluting than combined cycle technologies. We agree that waste heat recovery can help mitigate this concern if adequately structured. However, the standards recommended in the Energy Division Staff Report are inadequate. In these comments, NRDC and ACEEE explain why and offer recommendations that will help mitigate the Commission's concerns[1].

ACEEE encourages the adoption of energy-efficient technologies and practices in all sectors of the U.S. economy, and offers a unique perspective that blends engineering, business, and environmental expertise. ACEEE and NRDC both believe that clean distributed generation can be beneficial to both the electricity customer and electricity supplier, while reducing overall air emissions.

NRDC and ACEEE support strongly the Commission's observation in Finding of Fact 16 of D.01-03-073 that "Without waste heat recovery, certain non-renewable technologies may be less efficient and more polluting than combined cycle technologies." However, requiring utilization of waste heat recovery at the customer site will only be effective at mitigating these concerns and consistent with the Commission's "goal of improving the overall efficiency of the electric generation system" if the heat recovery standards are meaningful.

ACEEE and NRDC have two primary concerns with the recommendations made in the Energy Division Staff Report. First, the minimum efficiency and useful thermal energy output are too low and underestimate the efficiency gains that are possible in small combined heat and power systems. In fact, the Energy Division recommendations are weaker than the existing primary state and federal standards. Second, the report does not recognize, or incorporate in due course, the directly relevant standards under development in a California Air Resources Board process mandated by the California Legislature in Senate Bill 1298. In addition to efficiency and heat recovery standards, this process will result in emission standards, which would address the Commission's stated concern that some technologies are more polluting than combined cycle technologies. These standards will take affect on January 1, 2003.

[1] NRDC provided comments on issues addressed in the March 27 Decision (D.01-03-073), but was not a part of the Self Generation Working Group that addressed the heat recovery issues. Therefore, the concerns and recommendations raised here by NRDC and ACEEE are not addressed in the Energy Division Staff Report.

NRDC and ACEEE urge the Commission to make the following findings that will allow the Commission to achieve its goals in this area:

- Units must maintain a minimum efficiency of 55% (useful energy out/fuel in) when operating at more than 50% capacity regardless of the ratio of output energy in terms of heat to power, and the sum of all used thermal energy products must constitute at least 20% of the technology's total used energy output.
- The units must comply with the standards and guidance adopted by the State Air Resources Board pursuant to Sections 41514.9 and 41514.10 of the Health and Safety Code upon adoption.

Response to Proposals

SoCalGas, SDG&E, and SDREO
Under this proposal, a combined heat and power system under 1 MW could qualify for incentive payments if it achieves a minimum energy conversion efficiency of 40%. This efficiency level is too low, and underestimates the efficiency gains that are possible in small combined heat and power systems. In fact, there are several generation technologies in this size class, namely phosphoric acid fuel cells and reciprocating engines that can have efficiencies of 40% or more even without waste heat recovery. If the Commission wants to encourage/require waste heat recovery, this proposed standard is not meaningful.

PG&E
The proposal by Pacific Gas and Electric requires that at least 5% of a facility's total annual energy output be in the form of useful thermal energy and that the useful annual electric power output plus one-half of the useful thermal output of the system must be greater than or equal to 42.5% of the total annual fuel input. Facilities that would qualify for incentives under this proposal would have a total combined fuel conversion efficiency of between 50-60%. While this is an improvement over the SoCalGas, SDG&E, and SDREO proposal, the methodology relied on in this proposal is flawed in that it suggests that usable thermal energy is only half as valuable as electric energy. The PG&E proposal discounts the value of the thermal energy provided by combined heat and power systems. Thermal energy should be valued on a one to one basis with electrical energy (3,412 Btu = 1 kWh).

Southern California Edison
For systems under 50 kW, the Southern California Edison proposal is the same as the proposal from PG&E. For systems over 50 kW, if the useful thermal output of the systems is less than 15% of the total energy output, then the useful electrical output plus one-half of the useful thermal energy must have an efficiency of no less than 45%. This proposal also devalues the useable thermal output of a combined heat and power system.

NRDC and ACEEE Proposal

NRDC and ACEEE support realistic, but meaningful efficiency and performance standards for small combined heat and power systems. ACEEE and NRDC propose that units must maintain a minimum efficiency of 55% when operating at more than 50% capacity regardless of the power to heat ratio, and that the heat recovered must equal at least 20% of the total energy output of the combined heat and power unit. This level would ensure that the efficiency and NO_x, SO_2, PM-10, and CO_2 emission levels for distributed generators operated with heat recovery come closer to the levels for large combined cycle gas turbines.

According to a study released by ACEEE entitled, "*Combined Heat and Power: Capturing Wasted Energy"*, several technologies including fuel cells, reciprocating gas engines, and even diesel engines can easily achieve these standards. Microturbines may be able to achieve these efficiencies under certain conditions, but according to another study released by ACEEE entitled *"Emerging Energy-Efficiency Industrial Technologies"*, they typically achieve approximately 40% fuel conversion efficiency when operated with heat recovery.