SB 390

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Statement of
THEODORE E. LIU
Director
Department of Business, Economic Development, and Tourism
before the

SENATE COMMITTEE ON
WAYS AND MEANS
Monday, March 2, 2009
9:30 a.m.
State Capitol, Conference Room 211

in consideration of
SB390SD1
RELATING TO ENERGY RESOURCES.

Chair Kim, Vice Chair Tsutsui, and Members of the Committee.

The Department of Business, Economic Development, and Tourism (DBEDT) supports SB390SD1, which amends provisions of the mandatory solar water heating measure passed last session. The amendments transfer variance approval to the Public Benefits Fee Administrator (PBFA), clarify variance request procedures and authority, reduce the tax credit for substitute renewable energy systems installed under the mandate, provide guidance for solar water heater system standards, and allow use of demand-side management surcharge moneys for verification inspections.

Following existing statutes, the Public Utilities Commission (PUC) authorized utilities to collect from ratepayers a demand-side management surcharge and has transferred these funds collected to a third-party administrator, known as the PBFA and contracted by the PUC. The moneys transferred, known as the Public Benefits Fee, are used to support

energy-efficiency and demand-side management programs and services, subject to the review and approval of the PUC. Statutes also authorize the PUC to adopt or establish standards for solar water heating systems to include, but not be limited to, specifications for the performance, materials, components, durability, longevity, proper sizing, installation, and quality to promote the objectives for use of the Public Benefits Fee. Therefore, we support transfer of variance approval to the PBFA and offer an amendment to address any utility which collects the demand-side management surcharges but is not affected by the PBFA.

We offer an amendment to clarify administration of the variance by utilities not served by the PBFA for page 1, line 8, with the insertion of the following sentence: "For any utility which has received public utility commission approval to collect a demand side management surcharge from ratepayers, and which is not served by the public benefits fee administrator, the utility shall administer the variance and any standards established for solar water heating systems." Since the surcharge is used to support utility energy-efficiency and demand-side management programs, including solar water heating programs and standards, administration of the variance is in accord with these programs.

We defer to the Department of Taxation on tax matters.

Thank you for the opportunity to offer these comments.

THE GAS COMPANY

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Testimony in Support of SB390, SD1
Relating to Energy Resources

February 27, 2009

Aloha Chair Kim, Vice Chair Tsutsui and Members of the Ways and Means Committee:

My name is Jeffrey Kissel, President and CEO of The Gas Company. Thank you for the opportunity to provide testimony on SB390, SD1, related to Energy Resources.

The Gas Company strongly supports SB390, SD1 which clarifies provisions of Act 204 related to solar water heaters because it proposes to promote more consumer options for energy efficiency in any new construction beginning January 2010.

SB390, SD1 promotes energy efficient choices by allowing among other choices, an energy efficient instantaneous gas water heating system as a variance when solar water heating systems cannot be the only energy technology in a new home. Act 204 (2008) not only requires solar water heating but rightfully recognizes that energy efficient instantaneous gas water heating systems can and should be allowed. SB 390, SD1 recognizes that on-demand gas water heaters are an energy efficient alternative that homeowners should be given the opportunity to select.

Solar is only as good as the sunshine that shines on your roof or immediately outside your home during the daytime, and therefore, solar needs a back-up, at present, most solar water heaters are backed up with electric tank-type storage units. Gas is the best partner to solar for several reasons:

- It is three times more efficient than electricity at delivering heat energy to the home for heating water, cooking food and other domestic uses;
- It is available day and night and even on cloudy and rainy days;

The gas we sell is made from byproducts of oil. It doesn't require us to import one drop of additional oil. Furthermore, the gas we manufacture for the island of Oahu already has a 4-to-6 percent renewable energy component of pure hydrogen with a zero carbon footprint. We are actively taking the necessary steps to increase the renewable content of our gas to 50 percent for the entire state within five years.

Our strategy includes diversifying our feed stock to include gas from renewable resources such as landfill gas and bio-methane, and other renewable sources, including animal fat and plant oils that are locally produced.

It is important to point out that all of these activities are being solely financed by our Company, without government subsidy or an added burden on our rate payers. This confirms our Company's commitment

toward investing in Hawaii's energy future. In fact, we believe that we can successfully replace at least half of our feedstock supply with renewable sources and actually lower our cost of production from present levels.

I would like to call upon my colleagues in the energy business to focus on the greater objectives - those of reducing our dependence on fossil fuel in every possible way - and urge them to join us in collaboration rather than seek to advance one position over another or one technology in favor of another. Gas is not a complete solution to imported oil, but it is an immediate bridge fuel that can be used to reduce our dependence on oil TODAY. By including gas as part of the solution, it buys the State time to develop other renewable technologies that will ultimately replace fossil fuels. In addition allowing gas as a back-up energy source enables us to conserve the electricity we have.

We believe that there is a greater need to move collectively in the right direction especially since no alternative, including solar, has a zero carbon footprint. Thus, we should consider all energy efficiency options in moving Hawaii forward in leading the nation in renewable and sustainable energy solutions in the 21st century.

ACT 204 (2008), as passed last year with the inclusion of energy efficient water heating devices, had broad base support. The final version of the bill addressed global warming, (2) promoted renewable energy, (3) established energy conservation and efficiency in all new residential construction, and (4) recognized that homeowners and builders should have access to a variety of energy saving alternatives. This landmark legislation represents a significant and positive step towards achieving the Legislature's vision of promoting energy security and reducing Hawaii's dependence on petroleum.

We believe Act 204 should be given a chance to work. There are adequate safeguards built into the legislation. With the inclusion of gas in Act 204, the legislature recognized that homeowners and builders should have access to a variety of energy conserving alternatives. We have attached data to our testimony to support these statements.

The Gas Company is proud of its reputation of providing our island residents and businesses with dependable gas energy. Gas has one-third the carbon footprint as electricity and is available day and night. When teamed with solar, it can reduce cost and carbon consumption by more than 80 percent.

Moreover the gas network of pipelines is the only alternative to delivering renewable energy to Hawaii's homes and businesses other than our already stressed electric grid. Our network of pipelines can be expanded at a much lower cost than constructing undersea cables and other grid stabilizing devices. Since 40% of the energy consumed in our homes is for heating water, cooking foods, and drying clothing it makes good sense to deliver it with gas pipelines and solar devices rather than first converting it to electricity and loosing nearly 2/3 of the energy value in the process.

For this reason alone it is important to preserve the integrity of Hawaii's gas resources as ACT 204 rightfully does.

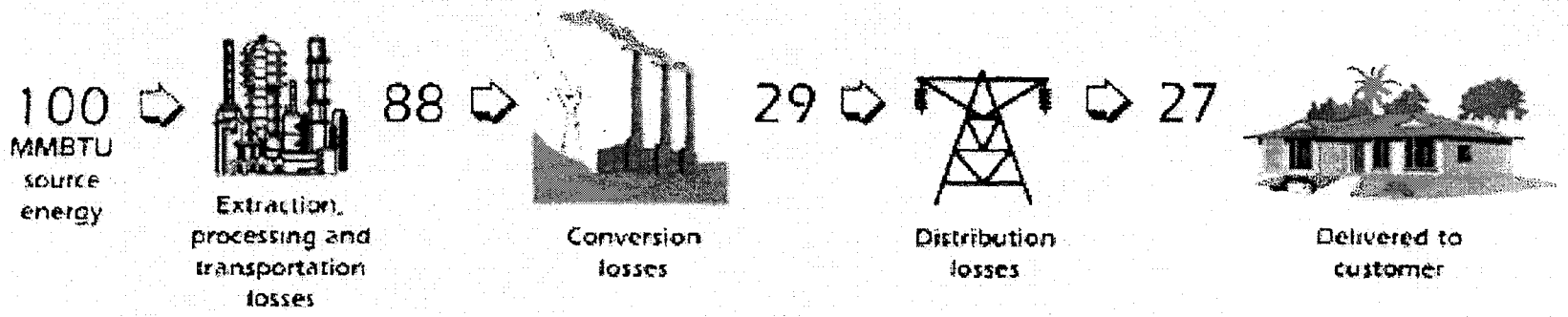
Even after hurricanes, electricity blackouts, and the attack on Pearl Harbor, our customers could always depend on our reliable delivery of gas. It is because of our solid reputation of serving Hawaii as a dean, efficient and reliable energy provider that we believe The Gas Company must continue to have an integral role in Hawaii's sustainable solutions.

We encourage you to pass this bill to allow consumer choice options by including gas as a variance for energy efficiency as provided in Act 204 (2008).

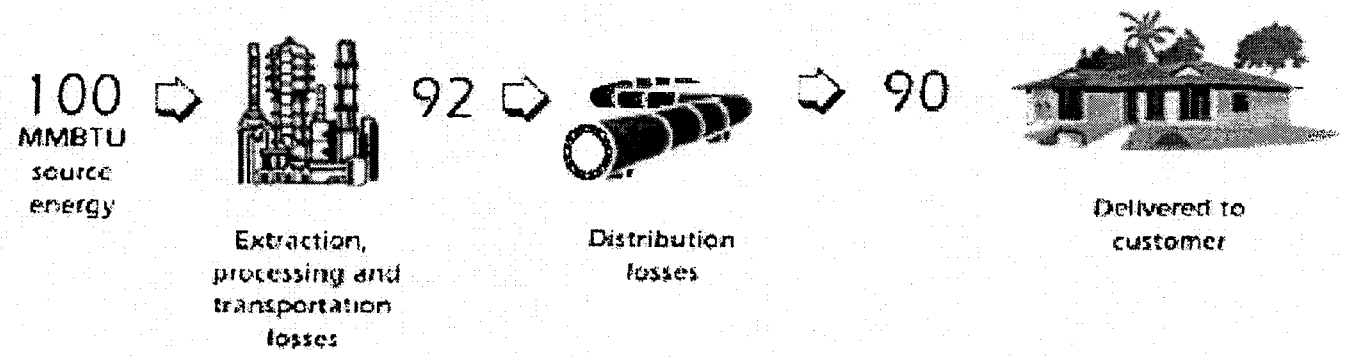
Thank you for allowing The Gas Company to present these comments in support of SB 390, SD1.

Site vs. Source Efficiency

ELECTRICITY



SYNTHETIC NATURAL GAS



Thanks to lower conversion losses, three times more energy reaches the customer with synthetic natural gas than with electricity.

Heating Up: the Debate about Instantaneous Water Heaters

What is an instantaneous water heater? Sometimes called tankless or demand water heaters, instantaneous water heaters (IWHs) don't have storage tanks, and therefore don't have the standby losses of tank-type conventional water heaters (CWHs). Consequently, they must have enough heating capacity to instantly heat water flowing through at various flow rates and temperatures. More sophisticated models modulate electric or gas input to handle widely fluctuating input water temperatures from solar systems.

Are IWHs significantly more efficient than conventional water heaters? IWHs, by avoiding standby losses (heat losses to ambient air from storing hot water), are more efficient than conventional water heaters. The question is how much more efficient. Standby losses depend on water heater design, size of the tank, ambient temperature, set point temperature, and hot water draw rate.

To reduce exaggerated claims, GAMA (Gas Appliance Manufacturers Association) rates residential gas water heaters under a standard test procedure. Based on the results of the testing, each model is assigned an Energy Factor (EF) value. The EF represents the fraction of hot water energy delivered (41,045 BTUs) divided by the total energy consumed, including combustion and standby losses. GAMA then calculates the annual water heating cost (at their assumed gas rate) for a typical family using 64.3 gallons a day of 1 40°F hot water, and publishes the Energy Factor and energy cost information both on their website, www.gamanet.org, and on the yellow "Energy Guide" tags on new residential water heaters. Energy Factors for tank-type water heaters range from .55 to .67, while EFs for instantaneous heaters range from .80 to .92, with the vast majority hanging in the low 80's.

To give a numerical example, let's assume you're comparing energy costs of a conventional water heater model with an Energy Factor of .60 with an IWH which has an EF of .80. Immediately we know the savings will be (.80-.60)/.60, or 33%. In dollars per year at an SDG&E gas rate of $1.20 per therm, this is (41,045/100,000)/.06 x .33 x $1.20 x 365days = $100 per year. Keep in mind that this example is comparing new water heaters, using the GAMA 64.3 GPD (41,045 BTUs a day) profile. If your actual daily draw is much higher or lower than 64.3 GPD, the resulting savings will be somewhat proportional. The savings with higher consumption are not strictly proportional (but close) because higher cold water daily flows through a tank-type heater tend to lower the average tank temperature while it recovers. Therefore the standby losses go down and the Energy Factor goes up.

A large US manufacturer, Bradford White, which makes both tank-type water heaters and tankless water heaters, tested two conventional water heaters versus two instantaneous water heaters. They published the results in PM Engineer Magazine, January 7, 2005. The results showed some interesting conclusions:

- first, tank-type water heaters are becoming more efficient so the savings of tankless models is less,
- second, the constant-burning pilot light on one tankless model nearly wiped out the savings in standby losses,
- third, higher draw rates (107 GPD vs. the GAMA 64 GPD) seemed to raise the Energy Factors of the tank-type water heaters,
- finally (San Diegans take note!) water hardness was more detrimental to tankless water heaters than to tank-type water heaters. The tankless water heaters lost nearly

2% efficiency in only two weeks! This may be explained by higher intensity combustion in the tankless unit, impacting slow-flowing hard water in a constricted passageway. Bradford White recommends periodic de-liming service or water softening in hard water areas.

Is it good to combine IWHs with solar water heating? It's good if your goal is to squeeze out every last bit of savings, such as for a Zero Net Energy home or to fight global warming. But the economic advantages are marginal. The solar system should be sized to save about 70% of water heating energy, which leaves only 30% for the IWH to work on. Given the GAMA example above, with $1.20 per therm, the IWH savings would be reduced from $100 per year to 0.33 x $100 = $33 a year. Given that installed costs for IWHs can be twice those for conventional water heaters ($1600 vs. $850), the payback for the additional investment of $750 would be $750/$33 = 23 years. If you're a serious global warming battler, go for it!

The following chart compares total undiscounted 20-year lifecycle costs for various types of water heaters. It reflects San Diego area gas & electric energy costs, and assumes no inflation of these costs. Note that solar does very well in this comparison because it is highly incentivized through 2008. Also note that if rates rise and if longer periods are evaluated (solar collectors should last 30 years), the comparative benefit of solar is even greater.

Comparing Life Cycle Costs

Water Heater Type	Energy Factor (EF)	Cost	Yearly Energy Cost	Life (Years)	20 Year Total Cost
Conventional Gas Tank-type heater	0.6	$850	$300	13	$7,700
Electric Tank-type heater	0.9	$750	$634	13	$14,180
Gas Demand heater (no pilot)	0.8	$1,600	$225	20	$6,100
Solar with electric heater (1-tank)	3	$2,660	$190	20	$6,460
Solar with gas heater (2-tank)	2	$3,360	$90	20	$5,160

Notes.

1. Costs are installed costs. Solar gross costs: 2-tank gas backup = $6,000 Solar 1-tank electric backup = $5,000
2. Based on 64.3 gallons a day (family of four, 41,045 Btus a day)
3. $1.20 a therm for gas. $.13 a kWh for electric
4. **No fuel price escalation**
5. Solar based on 70% Solar Fraction
6. Solar cost reduced by 30% Federal Tax Credit and CCSE rebate of about $1 ,200*
7. The average electricity cost for large homes can reach$0.20/kWh or more

*** SWH rebates and Federal Tax Credits expire Dec. 31, 2008**

Resources

1. www.aceee.org/consumerguide/waterheating.htm
2. www.gamanet.org
3. www.eere.energy.gov/consumer