

# Written Testimony

## Draft “Establishing a Commercial and Industrial Renewable Energy Rebate Program

**PUBLIC HEARINGS ON Referenced Program  
DE 10-212 – Hearing August 30,2010**

### **Comments Under *Section 6. Other Program Considerations* re “whether the proposed program should be limited to PV and SWH systems”**

My name is Carl D., Orio, Chairman of Water Energy Distributors Inc , Hampstead NH 03841( WED). We are a woman owned, three generation family business consisting of distributors and designers of geothermal heat pumps throughout New England and nearby New York. I am a Nationally Certified GeoExchange Designer ( CGD) and an Accredited Geothermal Installer ( AI). Our geothermal heat pump involvement traces back to 1974-1981, manufacturing in Andover MA approximately 2,000 geothermal heat pumps. Since that time we have distributed or designed over 14,000, nationwide, geothermal heat pump systems. We are not installers of geothermal systems.

#### IMPACT ON NEW HAMPSHIRE JOBS

WED actively distributes geothermal heat pumps and technical design to 145 heating, ventilation and air conditioning (HVAC) organizations in New Hampshire.

We have carefully reviewed the proposed Plan. We have received written and verbal comments from sixteen installing contractors, designers and engineers in support of this testimony for:

requests that geothermal heat pumps be included in the subject plan on an equal basis with solar and wind.

#### GEOHERMAL HVAC RECOGNITION AS AN ENERGY SAVING RESOURCE

The Federal Internal Revenue Code section 48(a) recognizes geothermal heat pumps on an equal par with solar and wind. We respectfully request New Hampshire to recognize the nationally recognized sustainable conservation and renewable value of this significant energy saving technology.

#### GEOHERMAL PRACTICAL ENERGY CONSERVATION

Approximately 50% of all solar energy is absorbed into the earth. The geothermal heat pump provides a practical technology to harvest that renewable energy.

The largest energy use in the typical New Hampshire commercial or industrial building is air conditioning, with heating a close second. Neither solar nor wind provide efficient

air conditioning. A properly designed and installed geothermal heat pump can reduce this largest energy use by 50% to 70% - every year for the life of the building. Geothermal heat pumps provide **the largest single source of energy savings** in the typical commercial or industrial buildings and homes.

Field monitoring by PSNH of 110 homes have demonstrated a mean of 4.3 kW/ per square foot per year for heating , cooling and domestic hot water.<sup>1</sup>

Geothermal combined with short payback “low hanging fruit” energy savings as lighting, solar water heating, limited photovoltaic provides the maximum energy savings and is most beneficial to New Hampshire. **–large long term energy savings are more beneficial than small short term energy savings**

#### PRACTICAL COMPANION TO SOLAR & WIND

A geothermal heat pump can harvest that solar or wind energy with **400% - 500% efficiency**<sup>2</sup>. Every one single unit of solar photovoltaic or thermal or wind power can drive a geothermal heat pump to harvest three (3) to four (4) units of stored solar energy in the earth.

#### ENVIRONMENTAL BENEFIT ACCRUED BY GEOTHERMAL

Properly sized for a home or commercial building the geothermal heat pump provides 100% of all heating and cooling requirements. The geothermal heat pump inhibits the burning of fossil fuels at residential, industrial and commercial facilities. Space conditioning with geothermal achieves reduction of oil burning emissions by 21 pounds of carbon dioxide for each gallon of fuel oil and 10 pounds of carbon dioxide emissions reduction for each gas therm (~CCF).

An *additional* 11.6 pounds of carbon dioxide, per units of measure, is emitted to deliver the fossil fuel to the combustion site<sup>3</sup>. Burning emissions combined with this transportation factor, allow geothermal heat pumps to **inhibit emissions** of

:

32 pounds of CO<sub>2</sub> per gallon of oil burned  
21 pounds of CO<sub>2</sub> per CCF of gas burned

As above, energy to drive the geothermal heat pump can be derived from solar or wind power, amplifying the contribution of the solar electric or wind power.

---

<sup>1</sup> Public Service of NH “Heat Smart” metering results 2006-2007

<sup>2</sup> International Standards Organization ISO 13256 – includes pumping & pressure drop penalties

<sup>3</sup> US Energy Information Administration, November 2009

## COMMUNITY HEALTH BENEFITS REALIZED BY GEOTHERMAL

The Federal Energy Information Administration (EIA), The Conservation Law Foundation, US EPA<sup>4</sup> and other concerned organizations have recognized and quantified community health and economic benefits by fossil burning emission reductions. The average office, burning 10,000 gallons of fuel oil tons generates approximately sixteen tons of CO<sub>2</sub><sup>5</sup>.

The marginalized health benefit cost of carbon dioxide on the local community has been identified as \$104 per ton of CO<sub>2</sub><sup>6</sup>. The impact is then an **estimated reduction of \$16,500 in community health costs per each typical NH office building**, employing geothermal heating.

## GEOTHERMAL HEAT PUMPS IN NEW HAMPSHIRE

With the recent on-rush of geothermal heat pump projects there have been problem installations. The pariah often is usually more news-worthy than the successful system. New Hampshire has had a large and successful residential geothermal program. The New Hampshire commercial and industrial geothermal has lagged behind neighboring states.

Some properly designed and installed large facilities in New Hampshire:

:

	<u>NH City</u>	<u>Installed</u>	<u>Size<sup>7</sup></u>
Nursing Home	- Boscowen	- 2007	615 tons
Industrial Plant	- Nashua	- 2008	250 tons
NH Social Service Office	- Nashua	- 2010	89 tons
Dormitory for UNH	- Durham	- 2009	103 tons
Hotel	- Hanover	- 2010	50 tons
Water Treatment Plant	- Madbury	- 2010	58 tons
Local Government Cntr	- Concord	- 2008	31 tons

Some properly designed and installed large facilities in nearby Massachusetts:

Condo Facility	-Winchester	- 1970	250 tons
Hasting School	- Westborough	- 1996	200 tons
Trinity Church	- Boston	- 2006	130 tons
Middle School	- Great Barrington	- 2006	200 tons
Public Library	- North Adams	- 2005	90 tons
Harvard, 5 buildings	- Cambridge	- 2005-09	320 tons+

<sup>4</sup> "Space Conditioning the Next Frontier" EPA Report 430\_R-93-004

<sup>5</sup> 10,000 gallons x 32 # CO<sub>2</sub>/gal = 320,000 # CO<sub>2</sub> = 160 tons CO<sub>2</sub>

<sup>6</sup> Richard Tol, Center for Climate Research Hamburg University & Carnegie Mellon University, FNU-19 2003,

<sup>7</sup> Dates and dominant loads in tons (12,000 btu/hr) are approximate

Properly designed and installed commercial and industrial **geothermal systems are successfully operating in New Hampshire** and neighboring states.

#### NEW HAMPSHIRE INTEREST

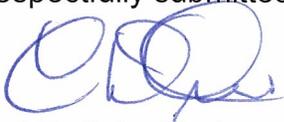
From New Hampshire, alone, since January of this year to August 26<sup>th</sup>, we are pleased to note that our web site [www.northeastgeo.com](http://www.northeastgeo.com) has received 22,106 hits, requesting geothermal information. New Hampshire demonstrates a deep awareness and interest in geothermal. We estimate there are approximately 4,000 geothermal heat pumps which we have distributed and or designed since 1974 in NH. **Geothermal is a key part of New Hampshire's energy management responsibility.**

**GEOTHERMAL heating and cooling is the most practical implementation of New Hampshire's contribution to solving the national energy concerns, it should be recognized and integrated into the New Hampshire Commercial and Industrial; Renewable Energy Rebate Program.**

**Geothermal amplifies solar and wind investments by a factor of four to five....**

Thank you for the opportunity to provide this testimony. We would be pleased to answer any questions or provide more detailed discussions or comments as you may require.

Respectfully submitted,



Carl D. Orio, Chairman, CGD, AI  
Water Energy Distributors Inc.  
2 Starwood Drive  
Hampstead NH 03841  
o. 603-329-9122  
f. 603-320-0285  
c. 603-234-8393  
A woman owned business