

July 25, 2008

VIA E-MAIL AND US MAIL

Ms. Kristi Izzo, Secretary  
New Jersey Board of Public Utilities  
Two Gateway Center  
Newark, New Jersey 07102

Re: Written Comments of CALMAC Mfg. Corp. Regarding New Jersey's Draft Energy Master Plan

Dear Secretary Izzo:

CALMAC Manufacturing Corporation, with over 60 years of innovation and manufacturing in New Jersey, respectfully submits the following written comments regarding New Jersey's Draft Energy Master Plan ("Draft EMP"). In the past 30 years CALMAC's business has focused exactly on what the EMP is addressing, namely reductions in energy consumption through energy efficiency, reduce peak demand for electricity, closing the gap between the supply and demand of electricity, and develop "Green Collar" jobs. CALMAC's products are installed in over 3500 projects in 36 countries around the world, reducing peak demand by close to 2 gigawatts, with its ICEBANK Cool Storage systems.

Cool Storage, in the form of Ice or chilled water, when coupled with the cooling systems in buildings, can dramatically help reduce load on the Grid during the critical peak hours, in a cost effective manner. CALMAC, along with TRANE, a multi-billion dollar company also based in New Jersey, have thousands of installations around the world including, in the past 3 years in NYC, installations for Credit Suisse, Morgan Stanley, The Durst Organization, Goldman Sachs, Bank of America and Rockefeller Center. These installations were done on a completely economic basis for the customers however there are much larger implications for our energy future that this technology delivers: Consider the following three points:

1. Solar and Wind are forms of pure energy. You might say coal, oil and natural gas are energy but you would be only partially correct. If you touch coal it is not hot, and oil in the barrel is not moving. Fossil fuels are actually forms of STORED Energy. If our society is going to successfully reduce our dependence on fossil fuels, we cannot ignore the "STORAGE" aspect of what we are replacing.

2. Mainly because of the need for air-conditioning, our electric Grid is stressed almost to the breaking point; however this only occurs for a short period of time. For the New England Power Pool, 21% of its peak load occurs for less than 2% of the hours in a year<sup>[1]</sup>. The Load Factor in our country (average yearly electric production divided by Peak production) is about 54%. This means we have almost twice as much electric capacity installed as we need IF we used electricity at a level rate day and night. The peak load on summer days is almost double the load of the previous evening. Much of this peak load is met with inefficient, fossil fuel based, peaking plants because they need to be dispatchable, since there is essentially no "Storage" (capacitance) on the Grid. Installing Renewable Energy Resources doesn't help this problem because only a fraction of Solar

and Wind's peak capacity (20% for California's 1000 MW of wind) can only be counted on to help with peak demand.<sup>[2]</sup>

3. The CEO of PSEG stated during the NJ Association of Energy Engineers meeting on April 23<sup>rd</sup>, 2008, that the generational Heat Rate for On-Peak electricity is 15,000 Btus/kWh and the Off-Peak Heat Rate is about 10,000 Btus/kWh. This means that for every kW-h you shift from daytime use to nighttime is saving a large amount of source energy.

**These three points highlight the fact that if we could STORE Energy effectively we could move towards sustainable energy in a more cost effective way, reduce infrastructure requirements, save energy, reduce customer's energy bills, all while creating "Green Collar" jobs in New Jersey.** The fact is that Cool Storage is doing just that in many states around the country and countries around the world but has gotten almost no support in the state where it creates the green manufacturing jobs, namely New Jersey.

**Justification**

There are a number of forms of Energy Storage (see Figure 1) (batteries, pumped hydro, compressed air) that could be used on our Grid or in buildings however Cool Storage is a practical and proven technology and the most widely applicable and by far the least expensive. It is extremely expensive to store electrons (batteries) however it is not expensive to store what most of the electrons are needed for, namely cooling (Figure 2).

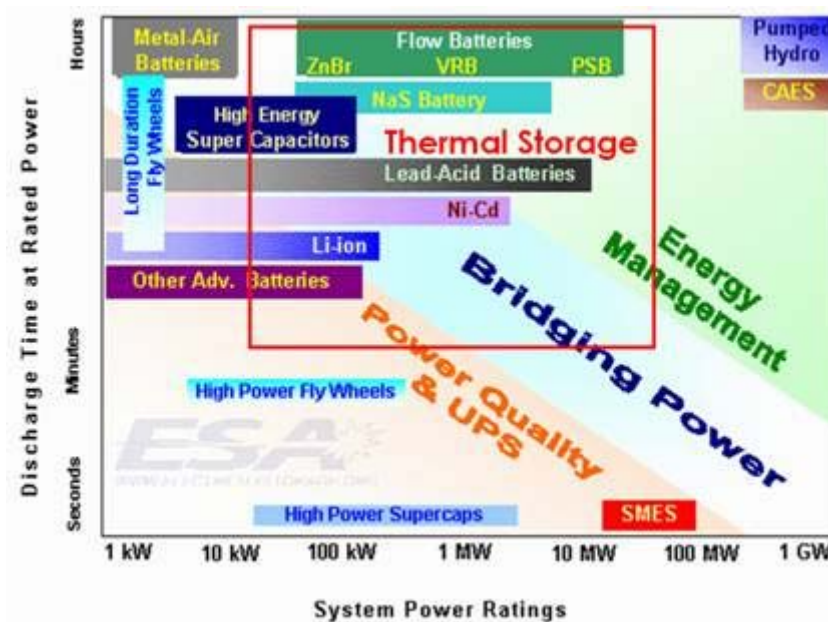


Figure 1

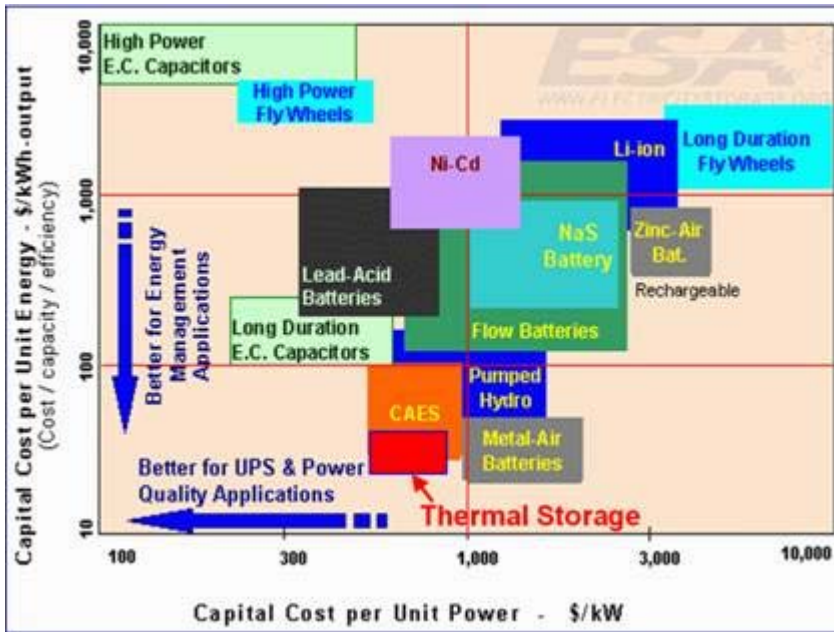


Figure 2

I spoke at the NARUC (Nation Association of Regulatory Utility Commissioners) summer meeting last year because the Commissioners are becoming more and more aware of peak load issues. Commissioner Clifton Below's (NH), graphs (Figures 3 and 4) show that for the New England Power pool, the overall Load Factor for the territory dropped from 64%, in the years from 1991-2000, to under 54% in 2006.

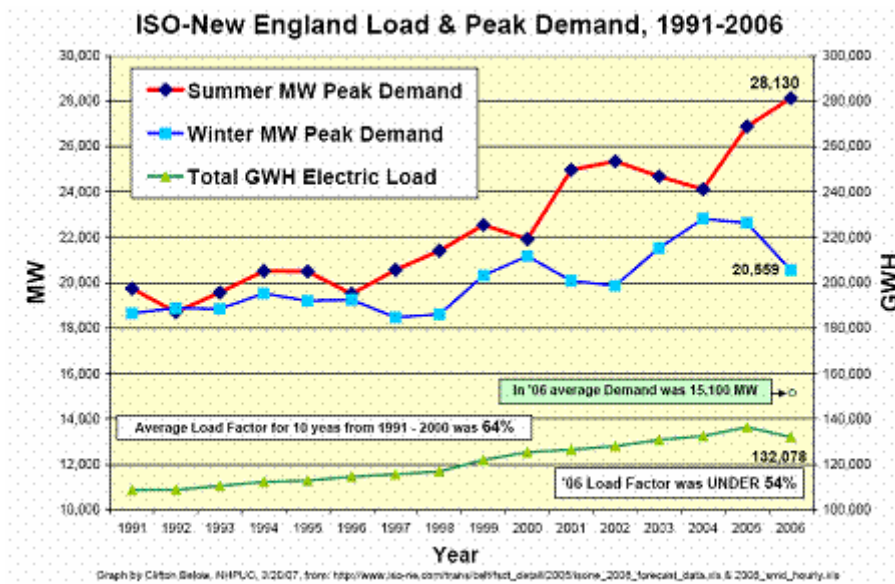


Figure 3

He also showed that 21% of total peak demand occurred for only 1.9% of the year. (I believe these numbers are similar to the PJM power pool). EPRI numbers I have from a

decade ago showed the National Load Factor as being under 53%, and that is when NE was at 64%, so we could be very close to 50% now.

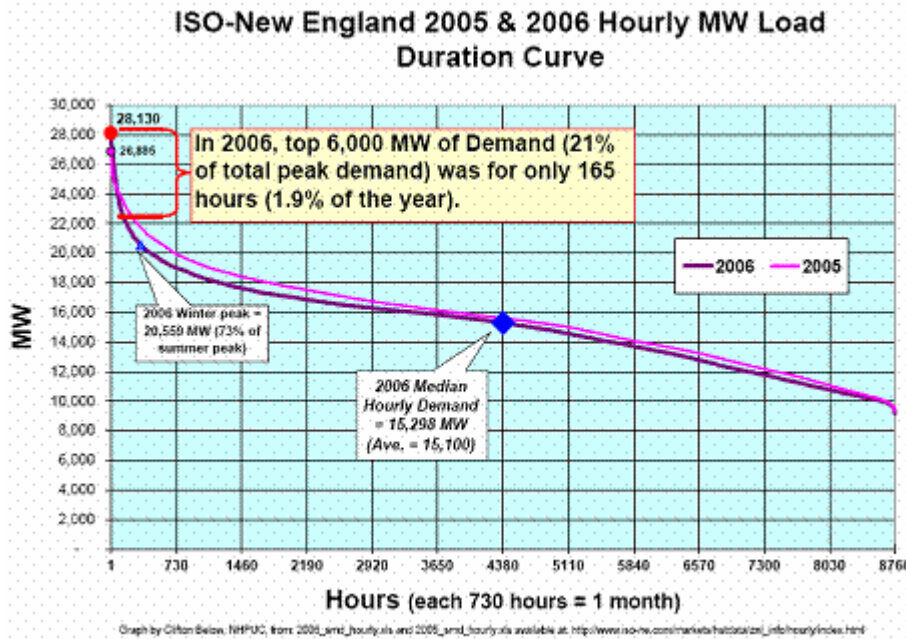


Figure 4

The reasons the Load Factors for the Grid and Buildings will be so vitally important in the “Sustainable” future are two fold:

1. Buildings that produce Renewable Energy, for instance PV or Wind, have worse load factors than today’s designs. (These systems reduce the overall energy drawn from the Grid however their peak demand does not get reduced because of intermittent availability during peak hours, hence lower Load Factors [3].)
2. Creating “Green” buildings with WORSE Load Factors will dramatically increase the strain on the Grid and just as dramatically increase the cost of adding Renewable Energy Resources to the Grid. (PV and Wind have only 30% Capacity Factors and can only be counted on for about 20% to 30% of their peak capacity during the Grids peak hours, and can be very expensive (Figure 5). Even adding low/no CO2 power sources (Clean Coal or Nuclear) to the Grid is going to be very expensive and a worse Load Factor increases how much waste, excess capacity, we will need in both Generation and Transmission and Distribution.

With a trillion Watts of generation (it’s actually a little less but easier to round up) and the range of cleaner power generation costs being anywhere from \$1.60 to \$7.50 a Watt, the worsening Grid Load Factor will be trillion(s) dollar issues and a huge impediment to moving toward sustainability.

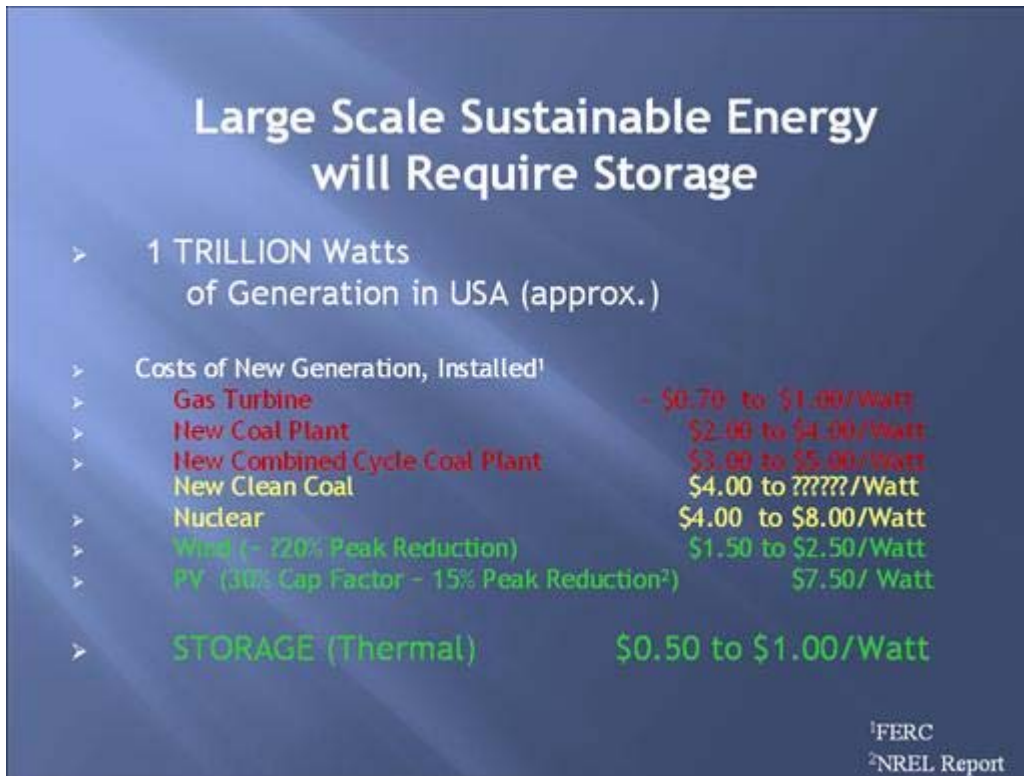


Figure 5

### Costs

The value that storage brings to the grid, society and the customers are huge especially when compared to its cost. In new construction adding storage to a building as minimal costs. However most of the buildings that will be consuming energy are already built and in retrofit application there is a cost to adding storage however it is almost an order of magnitude lower than the cost of Photovoltaic. The State of NY thru NYSERDA has a peak load reduction plan as part of their energy efficiency plan for existing buildings. For “downstate” they have a \$600/kW reduction incentive (was \$475 for past 3 years) which has ignited the use of Ice Storage. This type of incentive will be critical to get the market moving and preparing the Grid for more renewable resources.

### Conclusion

CALMAC applauds the efforts of the BPU, the Governor’s office, and the numerous coordinated agencies that have taken the lead in creating a Draft Energy Master Plan for the State. The CALMAC has decades of experience in the area of peak load reduction and thousands of installations and has work with utilities and governments across the country with peak reduction and energy efficiency programs. We would be happy to help in whatever way we can on the final version of the EMP.

Sincerely,

*Mark M MacCracken*

Mark M. MacCracken, PE, LEED-AP  
CEO, CALMAC Mfg. Corp.  
3-00 Banta Pl.  
Fair Lawn, NJ 07410  
Ph. (201) 797-1511  
Fax. (201) 797-1522  
Mobile (201) 906-8020  
MMacCracken@calmac.com  
www.calmac.com

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<sup>[1]</sup> NARUC Conference July, 2007

<sup>[2]</sup> CA ISO

<sup>[3]</sup> (NREL study produced for ASHRAE's Standard 189.1P Committee).