

Analysis of Ice Energy, Inc. Proposal Compared to
Connecticut Energy Advisory Board's
Preferential Criteria for Evaluation of Energy Proposals

I. Energy

CEAB prefers proposal(s) that:

A. Meet identified energy needs.

The CEAB will evaluate the consistency of a proposal with forecasted resource needs as identified by the Regional System Operator, the Connecticut Siting Council, the State Energy Plan and other resources that it deems to be relevant and appropriate

B. Enhance system reliability.

1 Promote reasonable levels of self-sufficiency that is sufficiently independent of or not wholly dependent upon exterior fuel sources to the extent feasible given regional considerations.

The Ice Bear Distributed Energy Resource enhances the value of intermittent renewable energy generation resources such as Solar PV and wind. The assets shift thermally sensitive summer peak day load to existing off-peak base load resources that have better heat rates and transmits and distributes the energy when line losses are reduced significantly. The result is a reduction in source fuel and an increase in the ability for the grid to effectively use intermittent generation resources and the opportunity to avoid the dispatch of very poor heat rate plants on ultra peak requirement days.

2 Engage in the deployment of proven technologies & engineering and design techniques to minimize risks of failure or unsatisfactory performance.

The Ice Energy Solution has over two million hours of operational history detailing specific success in provisioning the first truly cost effective, distributed energy storage for the electric grid. Ice Bear distributed energy storage resource is approved by the DPUC for use in managing peak load, supported through the findings of the Energy Conservation Management Board and described in Final Decision dated June 4, 2008, in Docket No. 07-06-59 DPUC Review Of The Connecticut Electric Efficiency Partners Program, 1. Standard Grants for Eligible Technologies, Ice Based Thermal Storage; Ice Energy was an active participant in this proceeding and numerous reference filings are available through the archives of the proceeding.

3 Maximize the level of protection of facilities from direct physical risk (includes whether the risk is accidental or intentional; and natural or man made).

The Ice Energy Solution is distributed making it inherently safer from physical risk due to the sheer diversity in location across the grid.

4 Develop portions of state's electric system with high quality uninterrupted power (reliability attribute) through use of strategies such as distributed generation.

The Ice Energy Solution consumes energy off peak from highly efficient central station assets and delivers this energy on peak to reduce the overall stress on the generation, transmission & distribution system. Relieving this stress leads to an inherently more efficient and reliable grid.

5 Ensure appropriate diversity of system types (transmission, generation and conservation and load management).

The Ice Bear Distributed Energy Storage resource does not require additional infrastructure modifications or

additions to the grid. In fact, due to the distributed nature of the Solution, it is likely and possible to relieve stress on individual distribution feeders, substations, etc, to postpone or potentially eliminate the need for upgrade. A clear example is a distribution feeder re-conductor project. Assuming there is a 10MVA rated feeder that experiences potential overload for 50-200 hours per year. Significant expenses are incurred to provision a larger wires size with very small increase in capacity. With the Ice Bear Distributed Energy Storage resource solution, it is possible for planners to have a dependable, dispatchable asset on this feeder that relieves this constraint in a more cost effective and dramatically less intrusive fashion for the community and the utility. In addition, this creates the opportunity to defer high cost capital infrastructure upgrades thus freeing up capital for the utility to continue to invest in other new and smart technologies for their grids.

C. Promote diversity of fuel supply (oil, natural gas, nuclear, renewable etc.).

1 Enhance state's ability to meet statutory Renewable Portfolio Standards, Section 16-245a of the Connecticut General Statutes (CGS), (encourage use of "clean energy resources").

The Ice Bear Distributed Energy Storage resource is eligible for classification as a Type III Renewable Portfolio Resource in Connecticut.

2 Electric generation facilities should, if technologically feasible, utilize dual fuel capability and have all required authorizations necessary to operate on short notice.
Not applicable

D. Capitalize on use of existing infrastructure (generation or transmission/distribution) including substitution of newer, more efficient technologies for older systems.

The Ice Bear Distributed Energy Storage resource does not require the addition or modification of the grid. In fact, due to the distributed nature of the solution, it is possible to relieve stress on individual distribution feeders, substations, etc, to postpone or potentially eliminate the need for upgrade. During the deployment of the Project, 25-50% of existing old and relatively inefficient roof top air conditioning units will be replaced with new, higher efficient units and therefore, additional site efficiency savings are realized. This will create the opportunity to defer high cost capital infrastructure upgrades thus freeing up capital for the utility to continue to invest in other new and smart technologies for their grids.

E. Provide a long-term system benefit (minimize use of short-term/ stop gap measures except for emergencies).

The Ice Energy Solution is a 20 year asset that can be fully deployed in months instead of years with no significant permitting, community, or environmental processes or concerns.

F. Ensure consistency with the State Energy Plan.

The Ice Bear Distributed Energy Storage resource permanently shifts load from on-peak to off-peak. In addition, due to the nature of the robust control platform, the asset is dispatchable to help meet needs for ancillary services. Perhaps more importantly, this revolutionary storage technology that has been certified as smart grid interoperable, provides the needed storage resource to help firm and balance intermittent renewables such as wind and solar.

G. Address consistency with policies of relevant regional entities such as Regional System Operator, Regional

State Committee and Regional Transmission Organization among others.

The Ice Bear Distributed Energy Storage resource, subject to approval by the DPUC, should be a rate based, dispatchable asset for the electric distribution company. It can be deployed rapidly in a targeted and specific fashion to help address and relieve the short term constraint issues that exist while creating a very powerful and unique long-term asset for all owners and operators of different grid systems to utilize to help meet the goals for the entire grid.

II. Economics

CEAB prefers proposals that:

A. Encourage competitive energy market development (including investment in identified short-term needs of the market).

B. Provide cost effective benefits to state's energy consumers (short-term and long-term evaluation-including examination of life-cycle cost).

The Ice Bear Distributed Energy Storage resource has been shown to be cost effective and competitive as compared to other gas peaking facilities on a strictly energy and capacity basis. When the additional value streams are recognized, the Ice Energy Solution becomes the most cost effective and efficient solution. For example, it is rare that any peaking resource can be added without significant incremental cost of transmission and distribution facilities and can, in fact, defer or eliminate some capital expenditures. When Ice Energy works closely with the each of the distribution and transmission entities, significant incremental value propositions are always identified.

C. Seek to lower or at least minimize the increase in energy costs to the state's energy consumers thereby enhancing the state's economic competitiveness.

The Ice Bear Distributed Energy Storage resource creates a new and unique resource for the grid that has the ability to increase the overall efficiency of the entire energy value chain from energy production to energy consumption. This new resource will help the jurisdictional utility entities to more effectively plan and manager their systems.

D. Develop portions of state's electric system with high quality uninterrupted power (economic development tool) through the use of strategies such as distributed generation.

E. Serve to enhance government revenues (local and/or state tax impacts).

III. Energy Efficiency & Demand and Load Management Response

CEAB prefers proposals that:

A. Implement demand-side strategies that reduce electric generation/gas delivery capacity requirements by implementing programs to encourage customers to reduce their energy consumption.

The Ice Bear Distributed Energy Storage resource creates potential site efficiencies through the replacement of aging HVAC plant, but more importantly, it shifts as much as 50% of the buildings load to off peak periods. With the time of use rates implemented in Connecticut, this will provide incentives for consumers to embrace this new technology.

B. Implement the management of energy load patterns to better utilize system facilities by shifting load from peak use periods to other periods of the day or year.

See attached proposal and detailed descriptions.

C. Implement demand-side strategies that result in the more efficient use of energy resources to perform tasks.

IV. Environment

See attached proposal and detailed descriptions.

Upon submittal to the CEAB, the proposal(s) must at a macro-level identify and purport at a minimum to meet statutory and regulatory environmental standards applicable to such proposals. As is presently the case, through subsequent regulatory proceedings before the Department of Environmental Protection (DEP), the proposal(s) will be required to receive the applicable statutory and regulatory approvals. The CEAB review process is not a replacement for or otherwise in lieu of the applicable statutory and regulatory approval process.

The evaluation of the proposals utilizing the criteria listed below shall be conducted according to the concepts of **avoidance**, **minimization** and **mitigation in that respective order**. First, either an identified area or environmental impact should be avoided. Then, where a reasonable and sensible alternative that would avoid the environmental impacts does not exist, impacts should be minimized. Finally, any adverse environmental impacts that cannot be minimized should be mitigated. CEAB prefers proposals that: **Ensure that the natural resource/land-use management impacts allow for protecting and sustaining the health of people, communities and ecosystems**. Includes specific guidance provided for both A) Long Island Sound and other Estuarine Waters and Submerged Lands of the State; and B) Upland and Freshwater.

Consistent with the CEAB's preference of avoiding environmental impacts wherever possible, the Ice Energy Solution avoids any new emissions of pollutants to the air or water resources of the State of Connecticut and, significantly, helps to mitigate existing peak day emissions of air pollutants by reducing peak demand. The permanent load shifting technology described in the attached proposal materials provide a significant environmental benefit to the environmental resources of Connecticut.

A. Long Island Sound and other Estuarine Waters and Submerged Lands of the State

Avoid:

- 1 Impacting Long Island Sound¹ when a reasonable and sensible alternative exists.
- 2 If a reasonable and sensible alternative does not exist, locate, design, construct, operate and maintain facilities and infrastructure in a manner that protects living marine resources and coastal resources as defined in Section 22a-93(7) of the CGS and protects water quality and designated uses consistent with Section 22a-426 and Connecticut's Water Quality Standards.
- 3 More specifically, if Long Island Sound cannot be avoided then:
 - a. the following areas should be avoided:
 - sensitive coastal resources and habitats (i.e., beaches and dunes, intertidal flats, tidal wetlands, bluffs and escarpments, submerged aquatic vegetation², and other sensitive habitat once classified or determined.³);
 - habitats of federal and state threatened or endangered species;
 - critical habitats and natural area preserves;
 - designated recreational, commercial, and natural shellfish beds;
 - significant geological or archaeological sites;
 - significant long-term research areas; and
 - waterfront parcels unless the proposal is a water-dependent use (CGS Section 22a-93(16)).
 - adverse impacts that have the following effect should be avoided: significant degradation of water quality; wind patterns as needed to sustain existing recreational uses; sediment quality; wildlife, finfish or shellfish habitat; existing circulation patterns of coastal waters; natural patterns of erosion and sedimentation; and drainage patterns;
 - increasing the hazard of coastal flooding;
 - siting a non-water dependent use on a site suited for a water-dependent use (CGS Section 22a-93(16));
 - siting a non-water dependent use on the waterfront that would reduce or inhibit access to the shore or coastal waters; and

¹ Hereinafter the reference to Long Island Sound shall include Long Island Sound and other estuarine waters and submerged lands of the state. ² Submerged aquatic vegetation means rooted vascular plants such as eelgrass (*Zostera marina* in LIS), kelp beds and approximately 25 species such as pondweeds and tapegrass of brackish and tidal freshwaters. ³ As highlighted at the Long Island Sound Bottomlands Symposium, it is possible to develop a classification of LIS habitats, their distribution and abundance. Funding is required for such efforts that could identify an expanded list of sensitive/important submerged habitat types.

- reducing navigational opportunities, recreation activities and commercial fishing activities.

Minimize:

- 1 Adverse environmental impacts attributable to size, length, number, installation method and timing of construction of energy infrastructure.
- 2 Adverse environmental impacts to near shore environments by using less impacting techniques or technology such as horizontal drilling.
- 3 Installation in areas where geologic or other subsurface constraints would result in adverse environmental impacts associated with either larger energy infrastructure or more intrusive installation techniques.
- 4 Adverse environmental impacts of proposals by giving careful consideration to utilization of/upgrades to existing energy infrastructure as an alternative to totally new construction.
- 5 To the extent consistent with surroundings, minimize impacts on shoreline through reuse of already developed areas, such as brownfields, existing generating or substation sites and existing rights-of-way, particularly where doing so enables the reuse, conversion and upgrading of existing facilities.
- 6 Support of development inconsistent with the State Plan of Conservation and Development and the Coastal Management Act
- 7 Establishment and spread of plant species identified by the Connecticut Invasive Plant Council as non-native invasive plants.

Mitigate:

Any adverse environmental impact that cannot be minimized should be mitigated. Impact should be mitigated to the extent practicable to replace lost resource functions and values impacted.

B. Upland and Freshwater

Avoid:

- 1 Locating, designing, constructing, operating and maintaining facilities and infrastructure in a manner that adversely impacts natural resources (fish, wildlife, wetlands, surface waters, groundwater, soil, agricultural lands, forests and other wildlife habitats and endangered-threatened-special concern species), notable archeological and historic sites and areas recognized as significant natural communities by the Connecticut Geologic and Natural History Survey, Natural Diversity Database when a reasonable and sensible alternative exists.
- 2 Fragmenting of existing blocks of habitat and other undeveloped lands.
- 3 Direct impacts to wetlands and watercourses.
- 4 Impacts to the quality and quantity of surface and ground waters, public water supply sources and aquifer protection areas; protect the designated uses of these waters as required under Connecticut Water Quality Standards. More specifically, reduce demand or consumption of potable water supply and encourage the use of technologies that maximize opportunity to recycle water to minimize demands on water resources.
- 5 Diversions or withdrawals from surface waters or ground waters from over-allocated basins or that are identified in Connecticut's List of Impaired Waters.
- 6 Activities that individually or cumulatively will cause unacceptable alteration to stream flows or impede

movement of aquatic life.

7 Degradation of the riparian buffer zone along each side of perennial and intermittent watercourses in accordance with the DEP Riparian Corridor Protection Policy.

8 Impacts affecting floodplains, flood flows, flood storage or flood velocities.

9 Except for facilities following existing utility or road corridors, avoid adversely impacting any area designated as a Natural Area Preserve or the Appalachian National Scenic Trail.

10 Hydroelectric generation facilities that do not operate in run-of-river mode (instantaneous, real-time). Avoid block loading modes of reservoir operation except in instances where DEP determines that the block loading is appropriate.

Minimize:

- 1 Impacts to the resources identified in subsection 1. above.
- 2 Soil erosion and control sedimentation.
- 3 Impacts to the visual, biological, geological and recreational qualities of ridgelines and summits.
- 4 Adverse environmental impacts of proposals by carefully considering the utilization of/upgrades to existing infrastructure as an alternative to new construction.
- 5 To the extent consistent with surroundings, minimize sprawl as well as impacts on areas through reuse of already developed areas, such as brownfields, existing generating or substation sites, already impacted shorefronts or riparian areas, and existing rights-of-way, particularly where doing so enables the reuse, conversion or upgrading of existing facilities.
- 6 Creation of field conditions conducive to the establishment and spread of plant species identified by the Connecticut Invasive Plant Council as non-native invasive plants.
- 7 Adverse impacts upon and actively manage lands, wetland and aquatic habitats within rights-of-ways to maximize their value to fish and wildlife, to prevent the establishment and spread of non-native and invasive plant species, and to reduce or eliminate established populations of non-native and invasive plant species.
- 8 Disruption of the operation of the State's transportation system, (i.e. highway, lane closures, transit, rail, etc.). If disruption is necessary, provide mitigation plan to address transportation impacts. Any disruption shall be minimized by coordinating planning and construction in existing rights-of-way in a joint-use fashion where practicable in accordance with the policies of the Department of Transportation as well as the policies of other agencies of cognizance.

Mitigate:

Proposal(s) should mitigate any adverse environmental impact that cannot be minimized. Impact should be mitigated to the extent practicable to replace lost resource functions and values impacts.

V. Quality of Life/Community Interests

The listing below outlines local quality of life values and concerns that are not otherwise the primary focus of state statutes and regulations. As part of its review process, the CEAB will give preference to proposals that avoid or minimize (in that respective order) adverse impacts on the following types of community interests:

- Local public health concerns (e.g. exposure to electro-magnetic fields)
- Property values
- Operation of electronic devices
- Economically disadvantaged populations
- Traffic and transportation systems
- Local land use standards
- Aesthetic and visual concerns
- Sensitive public facilities (schools, hospitals, nursing homes, daycare centers, playgrounds)
- Levels of ambient noise or light trespass