EXECUTIVE SUMMARY:

FirstLight Power's Northfield Mountain pumped-storage hydroelectric plant can play a critical role in making large-scale hydroelectric and solar power operationally and financially feasible for New England. Capable of storing up to 8,725 megawatt-hours of electricity, Northfield Mountain can ensure the viability of utility-scale wind and solar by serving as both a purchaser of surplus renewable energy at times of slack demand and a rapidly dispatchable producer of anywhere from 130 to 1,168 megawatts of on-demand electricity to back up wind and solar during times of intermittent output. With growing interest in energy storage, Northfield Mountain has a proven, 46-year track record as New England's "biggest, cleanest battery" and has substantial available and unutilized capacity for renewable-energy partners.

How FirstLight Power's Northfield Mountain can support and accelerateNew England's offshore wind and clean energy development

In just 2018 alone, Connecticut, Massachusetts, and Rhode Island have contracted for 1,400 megawatts of offshore wind generation capacity off New England's southern coast. Governors, legislators, and energy leaders in all three states are committed to thousands more megawatts of offshore wind in years ahead.

At the same time, Independent System Operator New England forecasts a doubling of solar energy in our region over the next decade, from 2,866 megawatts of installed nameplate solar capacity now to 5,833 megawatts by 2027. (Source: https://www.iso-ne.com/about/what-we-do/in-depth/solar-power-in-new-england-locations-and-impact)

These are positive and exciting developments for all of New England and our transition to an energy future built on clean, renewable sources. But this robust growth of offshore wind and solar will also create operating challenges for New England's power grid–challenges FirstLight Power believes we are uniquely positioned to solve through new partnerships with renewable energy developers.

The biggest impediment to large scale adoption of wind and solar is their intermittency and the resulting grid imbalances. Or, as you hear so often in energy discussions today, what do we do to ensure reliable electric supplies during the times when the sun isn't shining and the wind stops blowing?

FirstLight Power's flagship resource, Northfield Mountain, is a "pumped storage" hydroelectric generation facility that we call the region's biggest, greenest battery. Comprising four independently operable turbines capable of generating up to 1,168 megawatts of power, Northfield Mountain can store up to 8,725 megawatt-hours of electricity, in the form of water in our mountaintop reservoir in Erving and Northfield, Mass., available to produce hydroelectric power on a moment's notice. As all six New England states participate in a unified regional power grid, Northfield Mountain functions as a critical energy resource for all of New England.

Our vision for Northfield Mountain is to explore new partnerships and new ways to use this abundant, renewable resource, with its 46-year track record of operating reliability, to support and fulfill New England's clean energy revolution, in several ways:

1. Purchasing surplus electricity being generated by renewable assets, particularly during the lower-demand "shoulder months" of spring and fall or from offshore wind projects in the middle of the night, to refill the Northfield Mountain reservoir.
2. Through these purchases, ensuring that renewables are "dispatched," or called upon by ISO-New England to operate, during periods when they otherwise would face negative energy prices or be ordered to go on standby because of a surplus of renewable energy.
3. Releasing water from Northfield Mountain to produce electricity to backstop, or firm up, the output of offshore wind and solar projects during times of intermittency and weather variability.
4. Deploying Northfield Mountain for electrical frequency control, real-time reserve power, and other specialized wholesale energy markets that ensure our grid functions reliably and efficiently.
5. Using Northfield Mountain as a lower-emissions alternative to power plants fueled by natural gas, or even oil and coal, during periods of peak electric demand.
6. Improving New England's wintertime electric reliability by reducing demand for natural gas for electric production during periods of extreme cold when

> existing available pipeline and Liquefied Natural Gas (LNG) capacity is inadequate to meet the needs for gas for heating and electricity … such as the the historic 15-day cold snap in December 2017-January 2018 that was estimated to have added more than $1 billion to New Englanders' energy billshttps://www.iso-ne.com/static-assets/documents/2018/02/02272018_pr_remarks_state-of-the-grid.pdf)

FirstLight Power is able to contract scheduling rights for Northfield Mountain's output to third-party power purchasers on a regular, dynamic, or flexible schedule. Northfield Mountain's four turbines are each capable of being "ramped up" to full power at the rate of 30 megawatts per minute and can each produce 130MW to 292MW per unit, allowing the delivery of the precisely calibrated levels of power the New England grid needs at any given minute. Northfield Mountain can also shift, in minutes, from consuming more than 1,000 megawatts of electricity to producing 1,185 megawatts of electricity. This makes the plant a critical asset for maintaining grid reliability during unusual events, transmission or power-plant failures, or extreme weather. (All of these same benefits are available, at smaller scale, from our Rocky River pumped-storage plant in New Milford, Connecticut, on the Housatonic River and Candlewood Lake. Rocky River has total nameplate capacity of 29 megawatts from one 25MW generator and two 2MW generators, a ramp rate of 5 MW per minute, and a dispatch range of 23MW-29MW.)

While chemical battery storage, fly-wheels, and other emerging energy-storage technologies offer valuable, targeted attributes to renewable energy developers and the grid overall, compared to Northfield Mountain, they are orders of magnitude more expensive per mWh delivered. They also have shorter asset lives, unknown disposal costs, and recharge limitations that decrease their effectiveness over time.

Current statutory definitions in both Connecticut and Massachusetts allow for existing energy storage resources, including pumped hydro storage, to be paired with renewables in future contracts or RFP's. FirstLight is continuing to discuss with regulators and other stakeholders ways to clarify specific mechanisms for wind and solar developers throughout New England and neighboring grids to work with us to fully capture the value pumped storage can offer them in these contracts and RFP's.

New England is leading our nation in the transformation to a renewable energy future, particularly through the launch of a major new offshore wind industry in

Rhode Island Sound, Long Island Sound, and other ocean areas. FirstLight Power is eager to fulfill–and accelerate–this historic transformation, with all the benefits that our Northfield Mountain 1-4 plant, New England's "biggest and greenest battery," can offer to all the residents of our region.

Pumped storage is the largest-capacity form of grid energy storage available. As of 2017, the Department of Energy Global Energy Storage Database reports, it accounted for more than 96 percent of all active tracked storage installations worldwide, with a total installed nameplate capacity of over 168,000 megawatts, or 168 gigawatts.

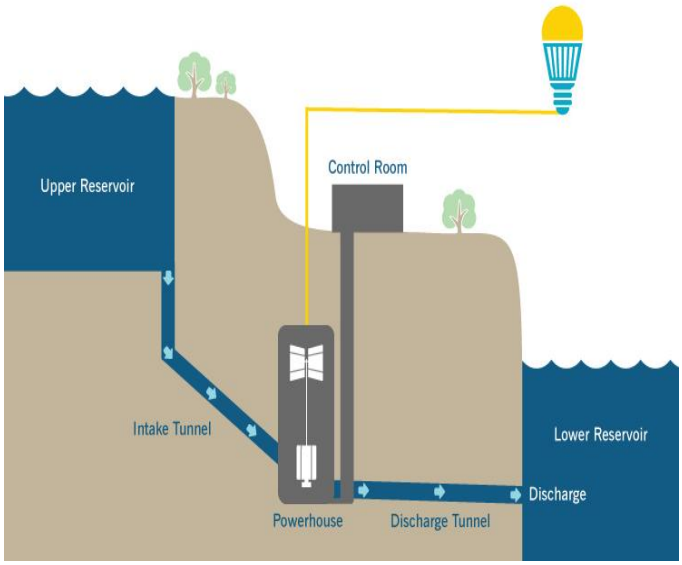
Pumped storage technology is **the only long-term, technically proven, and cost-effective** way of storing energy on a large scale and making it available at short notice

Upper Reservoir: when power from the plant is needed, water stored in the upper reservoir is released into the intake tunnel

Intake Tunnel & Turbines: the force of the water rushing down the intake tunnel drives turbines which are connected to large generators which produce electricity

Discharge Tunnel & Lower Reservoir: the water then flows through a discharge tunnel into the lower reservoir

Recharging: when demand for electricity is low, electricity is purchased to drive the turbines in reverse and pump the water back to the upper reservoir to be available to generate electricity when needed


Upper Reservoir
Control Room
Intake Tunnel
Lower Reservoir
Discharge
Powerhouse
Discharge Tunnel