

Clean Renewable Power



Benefits of The Northern Pass

As we have seen with other large construction projects in New Hampshire over the years, nearby communities enjoy numerous direct and indirect economic benefits as a result of the project. The Northern Pass is no exception. In addition to bringing up to 1,200 megawatts of clean, renewable energy into our power grid, the project will also offer many other advantages to local communities and our state as a whole. Here is a brief look at some of the significant energy, economic, and environmental benefits of The Northern Pass:

Energy Benefits: Fuel Diversity and Increased Reliability

Our region is becoming increasingly dependent on natural gas as the fuel to generate electricity. This heavy reliance on a single type of fuel, combined with the potential retirement of several existing power plants in New England, leaves the region vulnerable to price volatility and reliability risks.

Adding 1,200 megawatts of reliable, competitively priced hydropower from The Northern Pass will help resolve this over-dependence on natural gas. In addition, the new Northern Pass transmission line will boost electricity reliability by reducing transmission congestion between Quebec and the New England electric system. Having a new supply of energy will be especially important for reliability during periods of high electricity demand.

Economic Benefits: New Jobs and Revenue, Lower Energy Costs

The Northern Pass project will:

- Create more than 1,200 total jobs over a
- (continued on page 2)



Landowner Newsletter

Welcome to the fourth issue of The Northern Pass Landowner Newsletter. The June newsletter includes articles on data collection, project benefits, and direct current (DC) power.

If you would like to meet with the project team, please call your landowner specialists (listed on page 2) to discuss specifics about your property. For more information about the project, please visit www.northernpass.us or call 1-800-286-7305.

Data Collection Yields Valuable Resource Information

Where are bobcat, lynx, and marten roaming about in New Hampshire? How healthy are our streams and fisheries? Where are clusters of important vernal pools or rare plants?

These are some of the questions that scientists engaged in data collection as part of The Northern Pass project will be helping to answer. Up to 60 experts, including wildlife biologists, wetland ecologists, and archaeologists, are gathering information regarding the presence of certain plants and animals, wetlands, wildlife habitats, and areas of archaeological and/or historic sensitivity. This data will provide valuable information to the federal and state agencies tasked with both evaluating The Northern Pass project and protecting New Hampshire's natural and cultural resources.

Agencies such as the New Hampshire Natural Heritage Bureau, the New Hampshire Fish and Game Department, the U.S. Fish and Wildlife Service, the U.S. Forest Service, and the New Hampshire Division of Historical Resources will receive information that will expand and improve their existing databases, thereby helping them protect and manage our state's important resources.



In New England, bobcats prefer young forest stands with very dense undergrowth, rock ledges, and swampy wetlands.

Of particular use, in addition to those listed above, will be the following types of data:

- Field studies for species or communities of conservation concern, including certain reptiles, birds, bats, deer and moose wintering areas, and "exemplary natural communities" (those designated by the New Hampshire Natural Heritage Bureau as representing the best remaining examples of the state's biological diversity).
- Archeological data.
- Habitat modeling data, to identify wildlife and fisheries habitats for further field evaluation. These include cold water streams, wildlife corridors, and mast yards (clusters of trees, such as oak and beech, that produce mast—nuts and acorns that are an important food for many wildlife species).

The collection of environmental data for The Northern Pass project will significantly add to the knowledge base of natural and cultural resources along the project corridor.

Landowner Newsletter

What is Direct Current and Why is it Part of The Northern Pass?

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three-year construction process, many of them in construction trades and supplier industries.

- Generate more than \$25 million annually in new property taxes that will benefit the state, counties, and communities.
- Increase New Hampshire's economic output by \$259 to \$316 million during the project's construction process.
- Save New Hampshire's electricity customers \$25 to \$30 million a year.

Environmental Benefits

- Will replace a significant amount of higher-priced, less-clean electricity generated by plants burning fossil fuels.
- Will bring 1,200 megawatts of hydroelectric energy into New England—reducing carbon dioxide emissions by up to five million tons a year—equivalent to the annual emissions of nearly 900,000 cars.
- Hydropower is beneficial as a complement to other energy sources in New Hampshire and New England, such as wind and solar power, which only produce energy under certain weather conditions and need a flexible energy base.

For a full discussion of the benefits of The Northern Pass, please visit www.northernpass.us.

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The basic technology is as old as the light bulb itself, and now direct current (DC) power is playing a vital role in the plan to add a substantial new supply of energy to New England's power grid through the proposed Northern Pass transmission project.

DC technology, wherein electrical current flows through a conductor (wire) in one direction, has a colorful history. Thomas Edison developed the system in the late 1800s to distribute electricity generated at his power stations. When competitor Nikola Tesla began promoting alternating current (AC), a system where current flowing through a conductor constantly reverses direction, Edison went to great lengths to try to discredit the rival technology. Despite Edison's efforts, the lower cost of AC and its need for less infrastructure ultimately proved decisive, and it beat out DC to become the standard for electrical devices and electricity transmission in the U.S. and most of the world.

Notwithstanding AC's dominance, DC continued to evolve over the years. Today, thanks to its efficiency and stabilizing characteristics, high-voltage direct current (HVDC) has carved out an important niche as a complement to AC in certain transmission design applications.

The Northern Pass offers a great example of HVDC's unique advantages. Carrying hydroelectric power from Canada to the United States, The Northern Pass will create a new connection between the two countries' electrical grids. Although they will be connected, the two systems must remain independent of one another in order for each to maintain its stability. The DC system solves this issue, using converters that allow the two systems to remain separate yet connected for the transfer of power. Because of its ability to safely connect large grids, HVDC is used extensively throughout Europe, South America, and at other border areas in the U.S. There is a DC converter installation along the New England/Quebec border. One HVDC line, installed in 1988, begins at the Quebec border in Vermont and runs through New Hampshire to Ayer, Massachusetts.

In addition to increasing system stability, HVDC lines can transmit a large amount of electricity over a longer distance more efficiently than AC. Whenever electricity is transmitted, some of its energy is lost to heat. In the case of The Northern Pass project, there would be approximately the same energy losses over its 140-mile HVDC line as there would be over 40 miles of AC line. In other words, with DC, you get more "miles per gallon."

AC and DC power systems may have different characteristics and functions, but they have at least one thing in common: any U.S. power line installation must adhere to the *National Electric Safety Code* during installation, operation, and maintenance of the line.

Source: Wolf, Gene. "War of the Currents: An Update." *Transmission & Distribution World* April 2012.
www.tdworld.com/overhead_transmission/power_war_currents_update

Q & A

Where will the electricity flowing over the line be delivered to (i.e., who are the eventual customers)?

Power from The Northern Pass transmission project will be used by electricity consumers in New Hampshire and other New England States.