CHPE CHAMPLAIN HUDSON POWER EXPRESS

REAL. CLEAN. POWER.

See how we're ready to power New York into the future.



CHAMPLAIN HUDSON POWER EXPRESS

A RENEWABLE ENERGY SOLUTION FOR NEW YORK CITY



UNDERGROUND TRANSMISSION CONFERENCE JANUARY 24, 2024 – CHICAGO, IL



Champlain Hudson Power Express ("CHPE") – Background





Project Overview

- 1,250 MW fully buried HVDC transmission project
- Delivering 10.4 TWh/yr. of new clean energy (enough to power +1MM homes)
- Construction commenced Q4 2022

Business Model

- Merchant transmission project selected by NYSERDA through a competitive RFP process to transport Canadian renewable energy directly into NYC
- Host municipalities in New York will receive ~\$1.4 billion in new tax revenue over the first 25 years of the project, benefiting 73 municipalities and 59 school districts

Regulatory & Community Support

- All major permits received (Article VII, Presidential Permit, Army Corps Permit)
- Widespread support (environmental, union, business, host communities)
- Strong local support as evidenced by 36 municipalities passing resolutions of support for the project

Environmental & Economic Benefits, Energy Resiliency

- Estimated to decrease carbon emissions by ~37 MM metric tons over the first 15 years and reduce harmful local air pollutants by ~ $20\%^{(1)}$
- Significant economic benefits in New York project will utilize organized labor and is estimated to create over 1,400 direct jobs during construction and an additional +3,000 secondary jobs⁽²⁾
- Buried infrastructure will make New York's aging energy grid safer, more resilient, and more reliable in climate change related events
- First conversion of fossil generating site to clean energy site in Astoria, Queens



(2) Source: PA Consulting.

⁽¹⁾ Equivalent to removing 44% of passenger vehicles from New York City streets.

CHPE's buried, resilient design mitigates damage from extreme weather events where overhead transmission lines are more susceptible to damage causing large scale power outages.

Here is how CHPE will help:

- CHPE's Canadian hydropower source is geographically distinct from NYC and neighboring states and less likely to experience similar weather conditions at the same time as NYC
- Hydropower from the HQ system would be available on demand around-the-clock, providing clean energy to back up other renewables
- CHPE will be buried, safe, and resilient, and will have blackstart capabilities ensuring firming power is available within minutes of any power shortage allowing for lights, air conditioners, and other vital resources to stay powered

All of New Orleans without power after Hurricane Ida leaves 'catastrophic transmission damage' BY AMIE JUST | STAFF WRITER AUG 29, 2021 - 7:15 PM



A slow-moving Hurricane Ida has left all of Orleans Parish customers without power due to "catastrophic transmission damage," according to Entergy New Orleans.

The intense storm had caused all eight transmission lines into the New Orleans area to go down, spokesman Brandon Scardigli said in an emailed statement. That created a load imbalance that knocked all power generation in the region offline, Scardigli said.



THE WALL STREET JOURNAL Climate Change Lesson From Califor Blackouts: Prepare For Extremes **California Blackouts a Warning for States** n p r **Ramping Up Green Power** State has struggled to keep lights on during heat wave that has energy experts say state officials failed to prepare ratures, despite the fact that California's own a rs have warned that increasingl oom said. "And let me just make this crystal clear, we failed to ne. California has been relying far more heavily on natural-gas-fired p a lines that takes electricity from power om criticized the state's grid operator and utility regulator in a letter uses crent above 110 degrees in some parts of the state over the last we ng that their "failure to predict these shortages is new the end of each day would be the touches the state's fleet of solar farms turn off. With the state's grow an energy mandates, renewables have become a significant source of en ing of the nation's largest and most i ing up to 80 percent of the supply during the day. ing that he was notified just ught flat-footed." he said More Than A Million Still In The Dark m Indiana to northern Maine, affecting residents of some of the most populated citie are were still more than 1.3 million waiting to get back on the grid. The map below displays data from the ight of the outages, as well the current status of each state affected by the storm. 1,000,000 100 000 stage Timeframe





- exposed its difficulties matching power demand with supply Re Katherine Rhot
- California's grid operator called twice for emergency outages ov ate power supplies. Power lines in Carlsbad on Monday
- he state's grid operator called twice for emergency outages over the weekend due to e power supplies, in part because demand peaked as solar production began its ich, unlike wind and solar farms, aren't dependent on the weather to produce

- stched from western Indiana to northern Marne, attectung residence of store of the dark, and as of Morne nation. At the height of the outages, more than 8.5 million were left in the dark, and as of Morne the wide the market of the outages of the store of the stor

CHPE Route

"The Most Powerful Project You'll Never See"



- Located entirely within Canada, originating in La Prairie, Québec and traveling underground/underwater approximately 36 miles (58 km) to the New York-Canadian border
- Will be owned, operated and maintained by Hydro-Québec
- The U.S. portion of the transmission system, traveling underground/underwater ~339 miles (545 km) from the Canadian border to Astoria, Queens
- Will be owned, operated and maintained by CHPE LLC



Right-of-Way Acquisition / Co-Location Approaches

Submarine Route		Terrestrial Route	
Lake Champlain	~97 miles	Railroad ROW	~108 miles
Hudson River	~89.5 miles	NY State / County / Municipal Roads	~34 miles
Harlem River	~6.5 miles	CHPE-Controlled Property	~4 miles
Total Submarine Route	~193 miles	Total Terrestrial Route	~146 miles



CHPE Champlain Hudson Power Express

Mileage subject to change based on final route design.

HVDC Transmission – Proven Technology

HVDC Transmission Cables

- High voltage direct current cable (HVDC) technology is a safe, reliable, time-tested technology -- ideal for transporting electricity over long distances with minimal losses
- Two, five-inch diameter XLPE cables are buried / submerged along the route
- No environmental exposure / shock / magnetic field issues (cables are solidstate with no insulating fluids)

VSC Converter Station

- High voltage direct current converter (HVDC) converter technology is a safe, reliable, time-tested technology used worldwide for nearly 70 years
- Utilizes Voltage Source Converter (VSC) technology to convert power from AC to DC in Quebec and back to AC in Astoria.
- Provides reactive power (voltage support) that stabilizes the electric grid and provides black start capability for New York City's electric system

Installation Overview

- Cables buried ~5 8 feet under the ground within conduits with protections installed to prevent damage and inadvertent intrusion
- Installation closely coordinated with right-of-way owners including, NYSOGS, NYSDOT, municipalities, NYCDOT, and NYC Parks
- Installation impacts deemed minimal by State and Federal Agencies









New York Independent System Operator (NYISO) Interconnection Process

Multi-step process to interconnect to grid:



- Developer files Queue Position (CHPE: Q#631 and Q#887) with NYISO
- NYISO performs System Reliability Impact Study (SRIS) to determine if project can safely and reliably connect to the grid
- Developer enters project into eligible NYISO Class Year
- NYISO models all Class Year participants together to determine what System Upgrade Facilities (SUF) / Connecting Transmission Owner Attachment Facilities (CTOAF) are required for all projects to safely and reliably connect to the grid
- NYISO determines SUF and CTOAF costs and allocates those costs to each project depending on their grid impacts
- Developer decides whether to accept or reject cost allocations:
 - If developer accepts cost allocations, developer posts security to ensure upgrades will be constructed
 - If developer rejects cost allocations, project is withdrawn from the Class Year



CHPE accepted its Class Year 2021 cost allocations for the following SUF and CTOAF:

Item	Allocation	
Astoria Annex Expansion	100% attributable to CHPE	
CTOAF at Astoria Annex	100% attributable to CHPE	
Re-conductor of Existing Line within Astoria Complex	100% attributable to CHPE	
Astoria to Rainey 345kV AC Underground Line	100% attributable to CHPE	
CTOAF at Rainey Substation	100% attributable to CHPE	
Disconnect Switch Upgrades at Rainey Substation	100% attributable to CHPE	
Breaker Upgrades at Valley Stream Substation	1.58% attributable to CHPE	



Regulatory Overview – Fully Permitted with Broad Support

CHPE is the only scale, permitted renewable energy solution that can replace half of Indian Point's power supply while contributing significantly towards NY State's renewable goals and creating substantial jobs.

Permits & Authorizations

NY State Water Quality Certificate



NY State Article VII Certificate

U.S. Department of Energy **Environmental Impact Statement**

Presidential Permit

U.S. Army Corps Permit



Additional Authorizations by National Marine Fisheries, U.S. Fish and Wildlife Service, U.S. Department of State, U.S. Department of Defense, FERC

Substantial outreach, transparency, and partnership building have yielded strong support from stakeholders including towns, environmental groups, elected officials, and labor unions.

recordonline.com

It's now time to keep that energy promise

They know that one of the largest energy sources, the Indian Point nucl-

In the short term, legislators will have to consider if they want to continue

Also on their minds, if not specifically on any agenda yet, is wind power

plants, will be closing meaning that they will have to account for that deficit and fill it quickly. Nobody is suggesting the construction of new nuclear plants, although nuclear is undergoing a newfound surge of interest around the world

subvidining nuclear plants upstate that have become an important element in th quest for carbon-free sources, subsidies that will cost New Yorkers more than \$7 billion over a dozen years.

specially the construction of giant turbines in rural areas to send electricity to

providing them with little direct benefit while producing power that goes to the

Rural areas are familiar with being used in this way, from the development of the reservoir system that drowned towns and imposes restrictions on farming and

development to the towers that solit communities as they carried power from

With the metropolitan area dominating the Albany political nonzer structure, the

serve the interests of New York City and in suburbs.

on for other legislators seems to be what concessions, what payments or tions in rates they can get for their constituents as the state continues to

cities. In a fight reminiscent of one decades ago over large transmission lines, nities object to what they consider a blight on their landscar

Energy will be on the minds of legislators when they return to Albu month. They already are on record promising that the state will be producing all

of its electricity from carbon-free sources in a few decades.

Now, they have to decide how to reach that goal.

metropolitan area

upstate to down.

lohud.

North Rockland mayors: We proudly said 'yes' to the Champlain Hudson Power Express

f y in 🗭 🔐 🗂 Re "CHIPE would zap New York," March 13 Community View

As the mayors of Haverstraw and West Haverstraw two municipalities directly impacted by the Champlain Hudson Power Express, we'd like to talk about the benefits this completely buried clean es North Rockland communities and the number of jobs the

Clear benefits

FOOD & WATER WATCH: Cuomo's energy goals fall flat

NY ENERGY CZAR: Cuomo leads in clean power

rding agreements specifically contain \$31 million to fund capital provements in our communities, and include:

Organized labor powers our energy future ohud.

Mark Longs, Special to the USA TODAY NETWORK Published 2.59 p.m. ET Oct. 23, 2019

ortant topic at the forefront of our statewide discussion has been energy diversity, energy needs and the impact of those pending decis New Yorkers and the greater region.

While this debate continues, there is a project to celebrate where common cround was blotted, cool pavino jobs will be created and addressing New ork City's growing energy demand is the result. That is the Champiain Hudson Power Express (CHPE) project. Accalitockland/2016/02/26/informational meetings set power-line champlain hudson power-line rockland county/373648002/

Of the myriad of positive benefits, the highlight is bringing 1,000 megawatts of clean, reliable and renewable power more than 330 miles to New York Cit as a first step toward its energy diversity goals.

This was made possible by bringing folks from business and labor together to see this to approval. The project, which will be built entirely by the ha working men and women of organized labor, will create more than 1,500 "Green Economy' constructions jobs. In addition, there will be more than 1,000 indirect jobs for suppliers and local busi Hudson Valley and into New York City. ess created by this transmission line beginning in the North County, to the Capital Region, down through the

Members of Operating Engineers, Local 825, will be put to work on some of the most complicated partitions of this project where burying the ti ately 5 inch diameter cables adjacent to road ways and railroad tracks will take the type of skill only they possess. These buried lines hold the mise of maintaining New York's incredible beauty while adding resiliency from storms. This thoughtful approach is one of the many reasons the project received support from municipalities - up and down the project route - that many of our members call home.

> This project would have not been made possible without the commitment from CHPE from the very begin that labor would not only have a seat at the table but would be working on the project and advocating on behalf of the project. Labor has played a key role in every great New York transition. We built the Manhattan skyline. We cons

the railways and roads that span our great state. We built our great parks and ports. We ensure that our worker are safe and that our members make a living wage while helping reinforce infrastructure. Our union -- nearly 7.200 regional members strong that are part of a larger workforce of more than 400,000 --- want to keep the preen economy jobs coming.



A New Opportunity to Expand Hydropower in New York

This past June. New York passed historic legislation to address climate change and se strict clean energy standards. New York must achieve 100% clean energy by 2040, which means we'll need more renewable energy projects on the ground. To achieve these ambitious energy goals, New York will need significant offshore and land based wind, large scale and distributed solar installations, and hydropower. A new project to transmit hydropower can help us reach this goal.

The Champlain Hudson Power Express (CHPE) is a planned transmission cable connecting hydro energy sources to residents in the downstate region. This project will reduce New York's dependence on fossil fuels and provide a projected 1000 meravality

The CHPE project completed the required regulatory reviews by federal, state, and local authorities and will move forward once contracts for its energy are in place.

rting more than a century ago, with the opening of the Niagara Falls hyd dam. New York has relied on hydroelectricity. East of the Rockies. New York is the lartest hydroelectric power producer, taking full advantage of this plentiful and renewable resource. Hydropower is still the largest source of renewable energy in Ne

For years, the state has faced challenges transporting energy f in unstate New York, to the more nonulated metropolitan area, By tanning into an ady-existing hydropower source with a new direct transmission line, we will soon be able to increase clean energy access in the downstate region.

The completion of this project will help the State achieve 100% clean energy. Along with helping New York advance its clean energy goals, this project will also provide significant economic henefits to the state. It is estimated that with construction and operational work, the project will create 3.400 jobs and add \$28.6 billion in economi herefits to the state.

NYLCV supports the Champlain Hudson Power Express and the development of energy sources to power the New York electric grid. By investing in this green resource, we can reduce emissions and fossil fuel use

STATE ENERGY & ENVIRO

How will New York replace Indian Point?

How will New York state re

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mo announced a deal this year to close the Indian Point nuclea will the state generate enough replacement power for the dow Some officials question whether it can be done - or whether the facility's 2,000



se: The project would be online by the time Indi int fully shuts down.





Regulatory Overview – EM&CP Process

- CHPE is permitted by the NYS Department of Public Service (DPS) and the design approval process is to submit Environmental Management and Construction Plans (EM&CP) prior to construction
- An EM&CP is a comprehensive submittal that includes engineering drawings, a Stormwater Pollution Plan, various technical studies, documentation of agency correspondence, wetland delineation reports, etc.
- For making EM&CP submittals, CHPE has subdivided the project into Design "Packages", generally aligning to the primary right-of-way corridor owner
 - Packages are further subdivided into "Construction Segments" that reflect how CHPE intends to build the job
- CHPE will not be making final submittals to the DPS until we have incorporated technical feedback from right-of-way owners, co-located infrastructure (CI) owners (e.g., crossed utilities), and environmental agencies





The Importance of Stakeholder Engagement in the Private Sector

Then

THE WALL STREET JOURNAL. **Power Lines Drawn**

Energy Plan Creates Unusual Alliances

By Joseph De Avila June 18 2012 10:12 nm FT

A proposal to build a power line underneath portions of the Hudson River and Lake Champlain to deliver electricity to New York City has created an unusual alliance: the Sierra Club, energy companies and a bipartisan group of lawmaker

They have emerged as a powerful opposing force to the Champlain Hudson Power Express, a \$2 billion, 333-mile power line that would connect the city to power generated by Canadian wind farms and hydroelectric dams.

The Sierra Club opposes the project because, the group said, it does nothing to improve New York's existing power infrastructure. That stand puts the club on the same side as Entergy Nuclear, the operator of Indian Point Energy Center, a nuclear power plant the Sierra Club has advocated closing.

"Being on the same side of Entergy. I think we have different interests as stakeholders," said Annie Wilson, chairwoman of the group's New York City energy committee.

Entergy spokesman Jim Steets said the company opposed the Hudson power line because "the state needs to upgrade its transmission grid. The problem with this project is that it doesn't really do that."

Meanwhile, lawmakers have co-sponsored a bill to block the transfer of power originating in another country into New York, essentially prohibiting the Hudson power line. The lawmakers include state Sen. George Maziarz, a Buffalo-area Republican, Assemblyman Andrew Heyesi, a Queens Democrat, and others who don't normally team up on legislation.

ed Champlain Hudson Power Line is a Bad Deal for New York State

IPPNY's Brief and Expert Testimony in PSC Hearing Show

Power Line Costs Significantly Trump its Benefits

Albany, N.Y., 9/7/12 - The Independent Power Producers of New York, Inc. (IPPNY) today filed with the New York State Public Service Commission (PSC) its final brief in opposition to Champlain Hudson Powe Express. Inc 's (CHPE) application for a Certificate of Environmental Compatibility and Public Need to construct a proposed transmission line from Canada to New York City. During the Project's Article VII Transmission Line Siting proceeding at the PSC. IPPNY has demonstrated critical pitfalls concerning the economics of the Project and the associated risk to New York State residents and businesses. New York's energy marketplace simply cannot provide sufficient revenues to support the unneeded and unec transmission line, meaning the Project would require significant subsidies to be built and become oerational

Americans aren't just blocking our oil pipelines, now they're fighting Hydro-Ouebec's clean power lines

Renewable energy powerhouse's plan to light up U.S. northeast encounters opposition from local groups, fossil fuel rivals

Gabriel Friedman Sep 29, 2021 • October 1, 2021 • 8 minute read • 🔲 151 Comments

But just as oil and gas companies have encountered opposition to nearly every new pipeline, Hydro-Québec is finding resistance as it seeks to expand its pathways into major export markets, which are all in the U.S. northeast. Indeed, some fossil fuel companies that would be displaced by Hydro-Ouébe are fighting to block the construction of its new transmission lines.

"Linear projects — be it a transmission line or a pipeline or highway or whatever - there's always a certain amount of public opposition," Gary Sutherland, director of strategic affairs and stakeholder relations for Hydro-Québec, told the Financial Post, "which is a good thing because it makes the project developer ask the right questions.

Patch Peekskill-Cortlandt, NY

David vs Goliath - Champlain Hudson Power Express: A Bad Idea

Rob DiFrancesco, Neighbor

The Stony Point hearing attracted about 250 people, the vast majority of whom strongly oppose the project. This included community members whose property would be subject to eminent domain, Sons of the American Revolution who asked to stop the Canadian line from unearthing their ancestors' graves, and other leaders who oppose the project.

The environmental group Scenic Hudson commented that it supported the high voltage transmission line only after CHPE created a \$117 million settlement fund and agreed to move the route from certain sensitive aquatic areas in the Hudson River. This prompted heckling from the crowd calling for the line to "stay in the river" and chants of "people over fish." However, the Sierra Club Atlantic Chapter responded that the line should not be built altogether siting the destruction of natural rivers in Canada to power the line and sacrificing in-state renewable energy solutions.



Letters of Support received from leadership of NYS labor unions including: Laborers, IBEW. NYS. Operating Engineers. ELEC & Building and Construction Trades Council.



advocacy organizations and

One of the largest private investments in NY State history, \$3.5 Billion in direct NY expenditures^{*}

\$1.4 Billion in new Property Taxes for over 150 communities^{*}

1,400 new organized labor construction jobs for New Yorkers with strong Labor Support \$40 Million Green Economy Fund and \$117 Million Enhancement, Restoration, and Research/Habitat Improvement Trust Fund



* Over first 25-year period.

Project Benefits – Jobs and Economic Opportunity

The GEF (Green Economy Fund) is a \$40 million fund for jobs training in frontline communities AND local hiring commitments.

- Will support residents living in disadvantaged and frontline communities by creating access to good paying jobs with organized labor
- Developed in close consultation with local workforce development experts, labor unions, housing authorities, community-based organizations, business groups, environmental NGOs, and academics
- Will serve the needs of communities located along the entire project route
- Will focus on funding relevant proposals from established green jobs training programs and be accessible to residents living in disadvantaged communities, as well as workers transitioning from the fossil fuel industry

Local Hiring

The project is establishing several steps to ensure community outreach and awareness of opportunities.

- Hiring of a dedicated Workforce Development Manager tasked with outreach to frontline communities in NYC and along the route to ensure notification of available jobs
- Work with Community Boards, Chambers of Commerce, and other community organizations to establish a communications plan to ensure notification of available jobs
- Company and labor unions will conduct outreach in communities along the route to discuss possible work opportunities, as well as barriers to work in the community
- Workforce Development Manager to also be responsible for outreach on secondary jobs opportunities such as trucking and food service -- these secondary jobs will be sourced from the communities hosting construction



Project Benefits – Additional Funds

Haverstraw Bay Fund

- \$33M fund designed to offset construction impacts
- \$11M for local communities today with an additional \$11M at project operation
- \$9M for community streetscape upgrades
- \$2M for the North Rockland Central School District
- Funding will provide capital improvements in the communities of Haverstraw, West Haverstraw, Stony Point

Community Engagement Fund

- \$9M fund –divided evenly by HQ and CHPE LLC and for duration of construction period.
- Fund has committed \$1.25M for a STEM Lab with a focus on climate and climate jobs at the Variety Boys and Girls Club of Queens
- Committed \$1.5M for the construction of an educational Nature Center on Randall's Island
- Sponsors community and educational events and programs in DAC communities in NYS.
- Investments are based on community input and stakeholder engagement and isolated to areas in which construction impacts are occurring and must benefit frontline residents and include a focus on education, climate or jobs.

Environmental Trust

- \$117M fund paid over 35 years
- Designed to ensure environment is cleaner than when the project began
- Finance environmental protection programs through a new dedicated fund called the Hudson River and Lake Champlain Habitat Enhancement, Restoration, and Research/Habitat Improvement Trust Fund
- Fund administration committee comprised of state and local regulatory agencies and environmental advocacy groups, ensuring that projects meet local needs and environmental benefits are maximized
- Fund will provide assistance to projects that improve and enhance the aquatic environments in Lake Champlain, the Hudson River, the Bronx, Harlem and East Rivers, and New York Harbor



By injecting firm hydropower directly into NYC, CHPE will provide a clean energy alternative to in-city fossil fuel burning power plants, most of which are located in Environmental Justice Areas. Once operational, CHPE will substantially reduce localized air pollutants. With the recent closure of Indian Point, natural gas (with oil as a back-up fuel) is providing as much as 90% of the electricity production downstate.⁽¹⁾

- By injecting 1,250 MW of continuous renewable power into Zone J, CHPE is estimated to decrease emissions of harmful pollutants from fossil-fueled power plants in NY by nearly 20% in 2026, including 498 tons of nitrogen oxides ("NOx")
 - To put this in perspective, 498 tons of NOx reductions (212-ton reduction specifically within Zone J) would be the equivalent of <u>removing 15 of NYC's 16 peaker plants</u> from service
 - In addition, CHPE will <u>reduce carbon emissions by 3.9 million</u> <u>metric tons</u> per year, or the equivalent of <u>removing 44% of</u> <u>cars from NYC streets</u>
- Only NY State energy regulators can actually *close* peaker plants; however, without the addition of CHPE in the energy mix, they would not have the ability to do so (the team that has developed CHPE does not own any peaker plants)

CHPE is proud that the converter location in the Astoria complex will be the first conversion of a site previously associated with fossil generation into an emissions-free, clean and renewable energy site. This is the first conversion of this sort in both New York City and New York State.





Sources: PA Consulting - Analysis of Economic, Environmental, Resiliency, and Reliability Benefits to the State of New York, May 2021 (1) Source: Preliminary Comments of the City of New York on the NYSERDA White Paper, July 24, 2020, p. 5

Appendix – Construction Progress Photos



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Governor Kathy Hochul 🤣 @GovKathyHochul

Today New York took a huge step towards meeting our nation-leading clean energy goals!

The @CHPExpress transmission line is a transformative project that will power more than one million homes, create nearly 1,400 green jobs, & help build a healthier future for all New Yorkers.











Initial CHPE Terrestrial Cable Loadout in Karlskrona, Sweden











Initial CHPE Submarine Cable Delivery at the Port of Albany, NY





Terrestrial Construction Activity – HDD and Trenching















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