



# **Long Island Offshore Wind Export PPTN New York Renewable Connect**

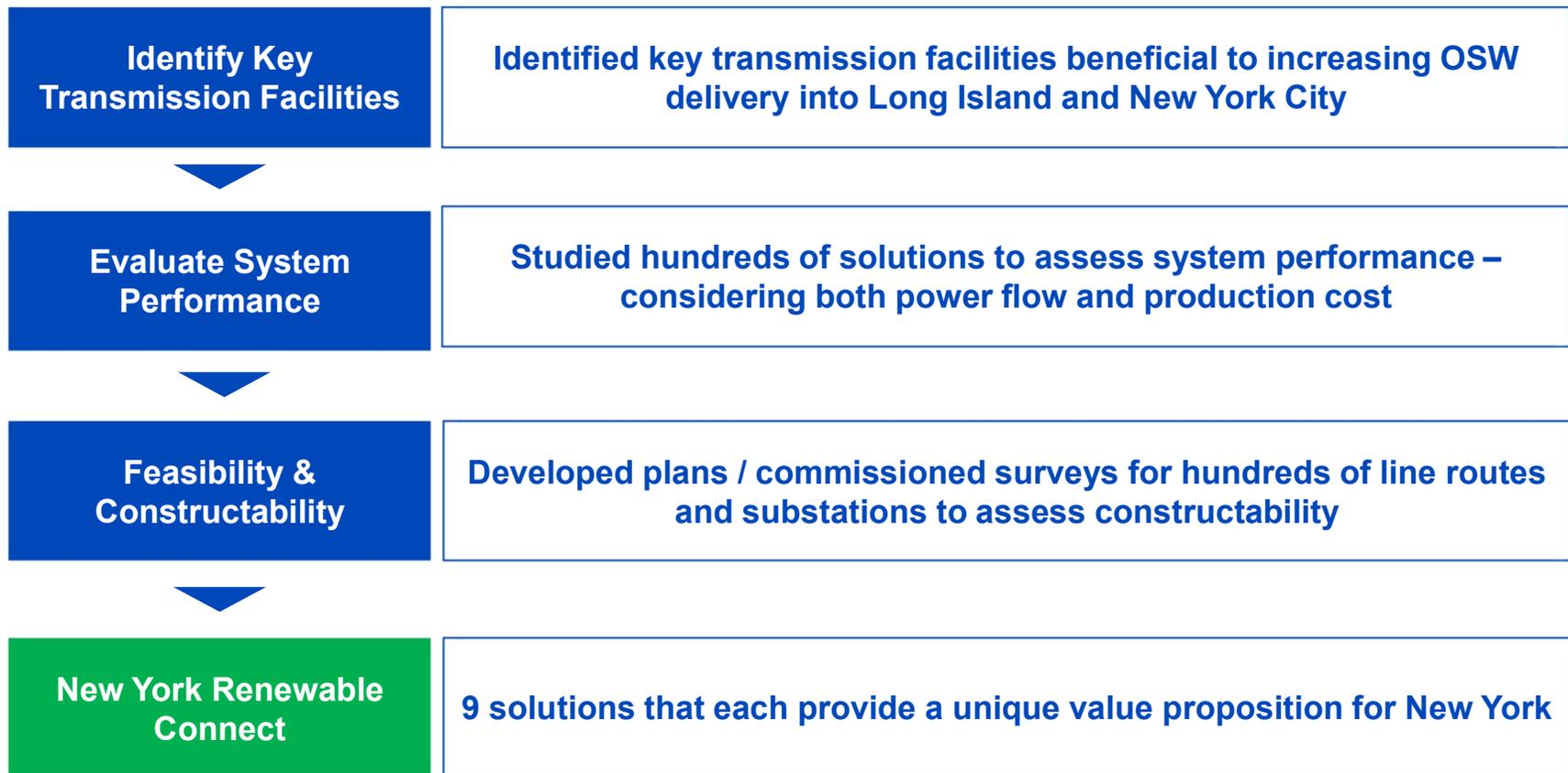
**NextEra Energy Transmission New York**

**October 24, 2022**

# NEETNY designed the New York Renewable Connect solutions for the current and future needs of Long Island and New York

## New York Renewable Connect

- The New York Renewable Connect consists of nine options that have been honed after extensive system analysis

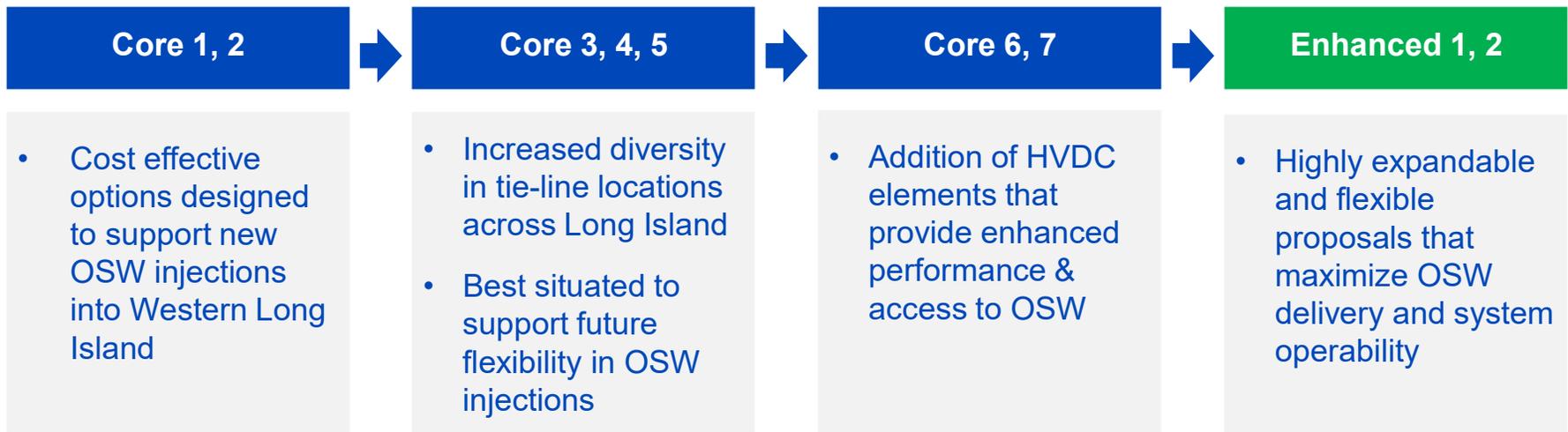


# The New York Renewable Connect solutions, while unique, were developed with a consistent overarching philosophy

## New York Renewable Connect

### NEETNY's Design Philosophy

- Strong reinforcement of the Long Island system, not “band-aid” fixes
- New, diverse corridors that support unexpected or maintenance outages
- Significant increase in Long Island import and export capabilities
- Highly expandable for increased Long Island OSW deliveries



# Core 1

A highly cost-effective solution designed to support OSW into Western Long Island. A new LIPA 345 kV “backbone” and multiple PAR controlled tie-lines to Zones I/J.

## Overall In-Service Date

03/2029

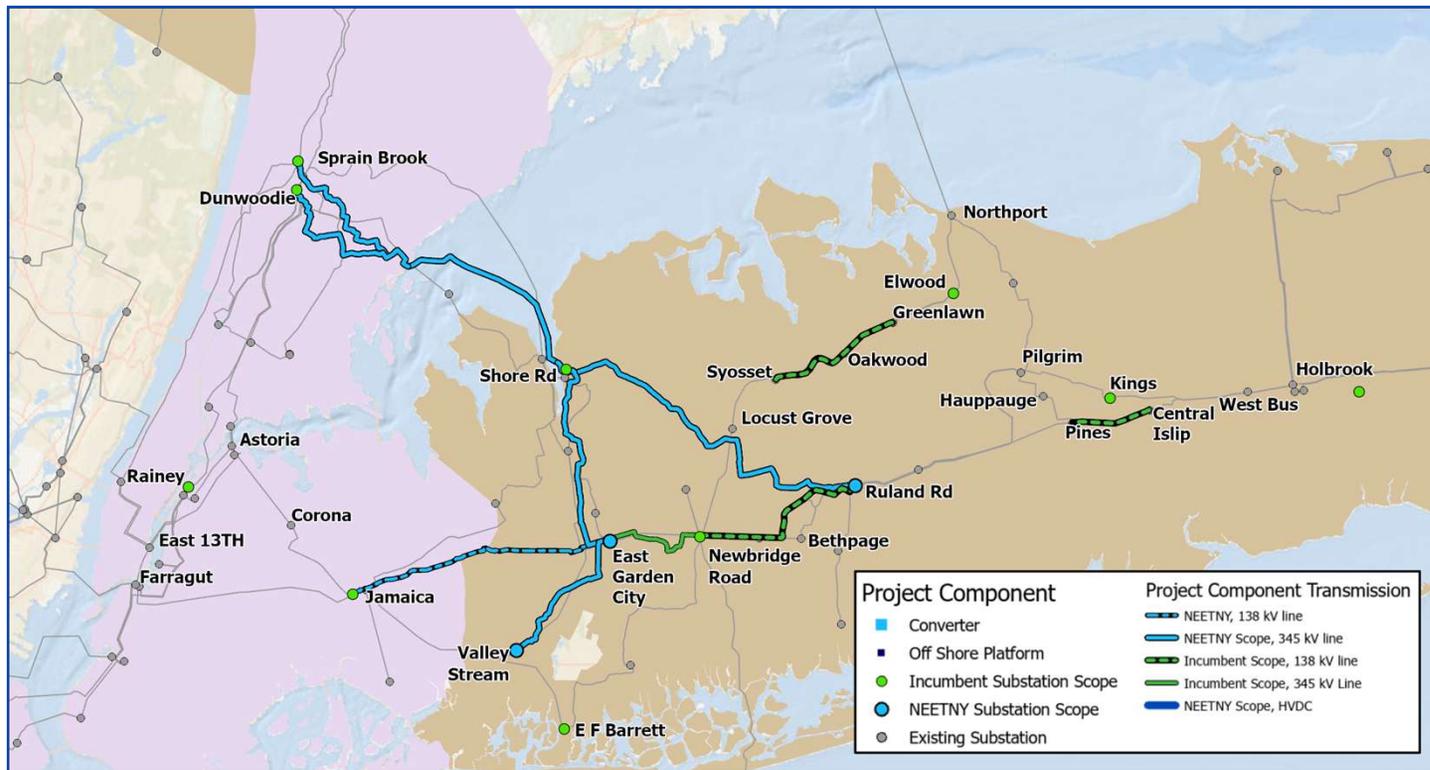
## LI OSW Delivery

4,300<sup>(1)</sup>

## New Ties

Zone J-K Ties	1
Zone I-K Ties	3

- Schedule includes significant float
- Many project elements completed in 2028



# Core 2

Builds upon Core 1, with an additional PAR controlled 345 kV tie-line between Zones J/K to increase operability and controllability

## Overall In-Service Date

06/2030

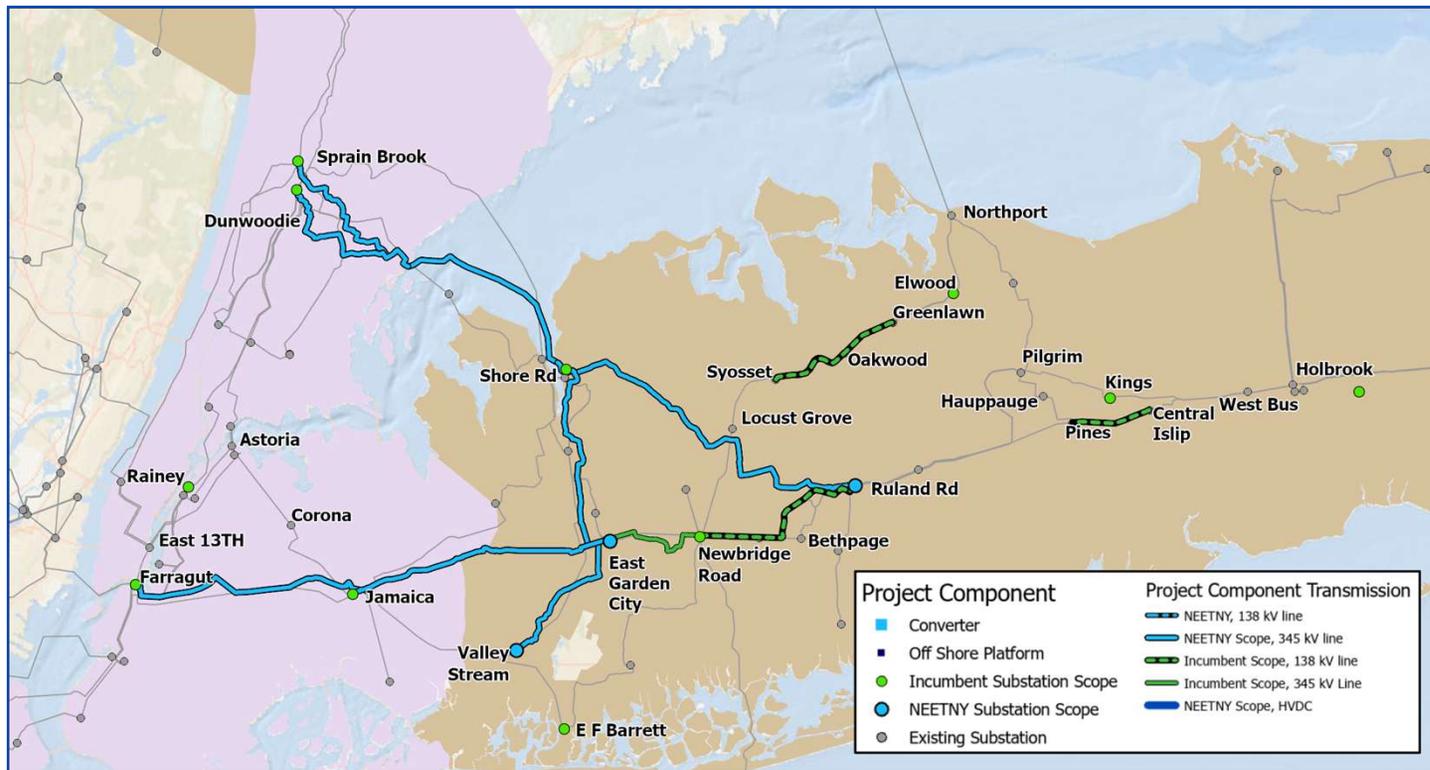
## LI OSW Delivery

4,300<sup>(1)</sup>

## New Ties

Zone J-K Ties	2
Zone I-K Ties	3

- Schedule includes significant float
- Many project elements completed in 2028



1) Long Island OSW Delivery is representative of an average across multiple OSW injection scenarios/sites across Long Island.

# Core 3

Highly geographically diverse and controllable solution to provide significant flexibility wherever new OSW injects. A new Northport tie to support Eastern BOEM lease areas.

## Overall In-Service Date

06/2030

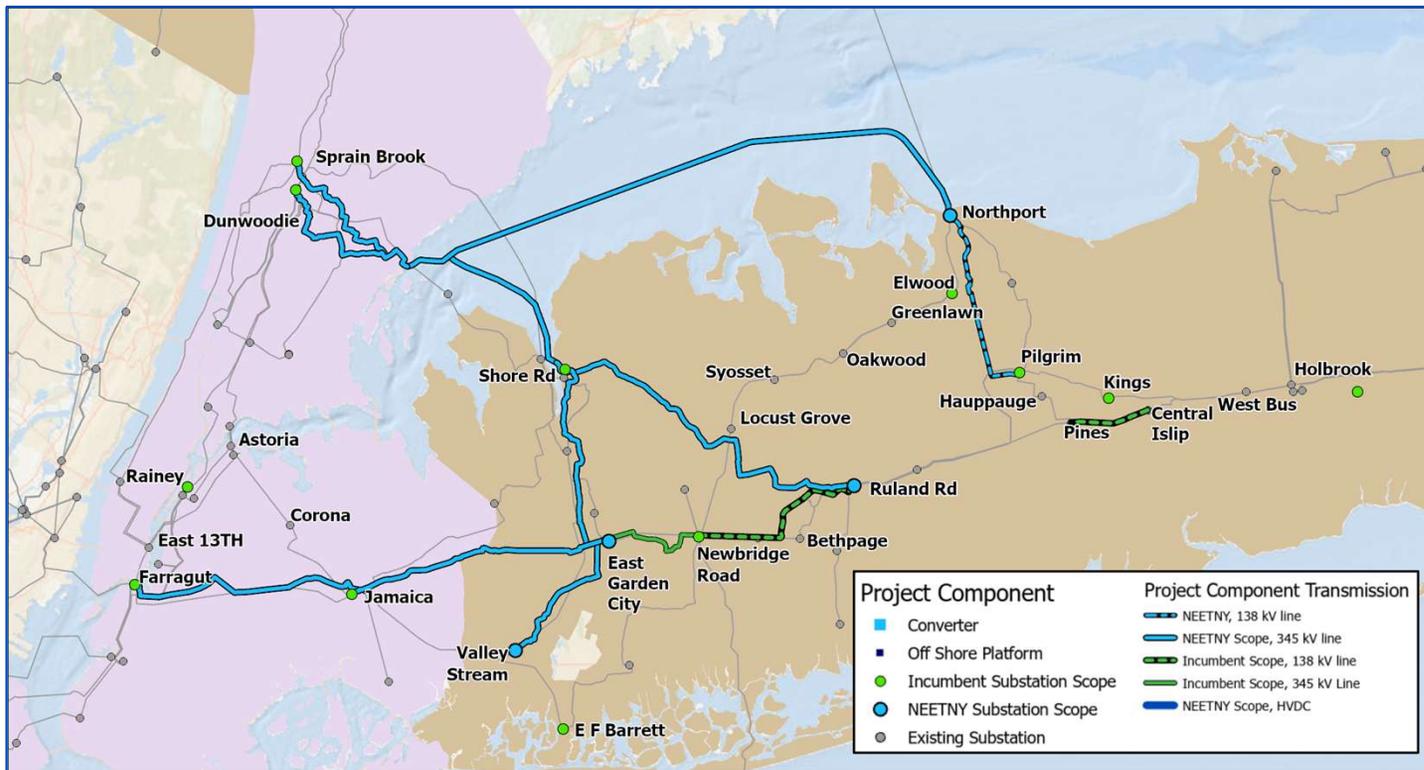
## LI OSW Delivery

4,500<sup>(1)</sup>

## New Ties

Zone J-K Ties	2
Zone I-K Ties	3

- Schedule includes significant float
- Many project elements completed in 2028



1) Long Island OSW Delivery is representative of an average across multiple OSW injection scenarios/sites across Long Island.

# Core 4

Similar to Core 3, but with a new 345 kV tie between Zones I and J to support further OSW injections near Farragut

## Overall In-Service Date

06/2030

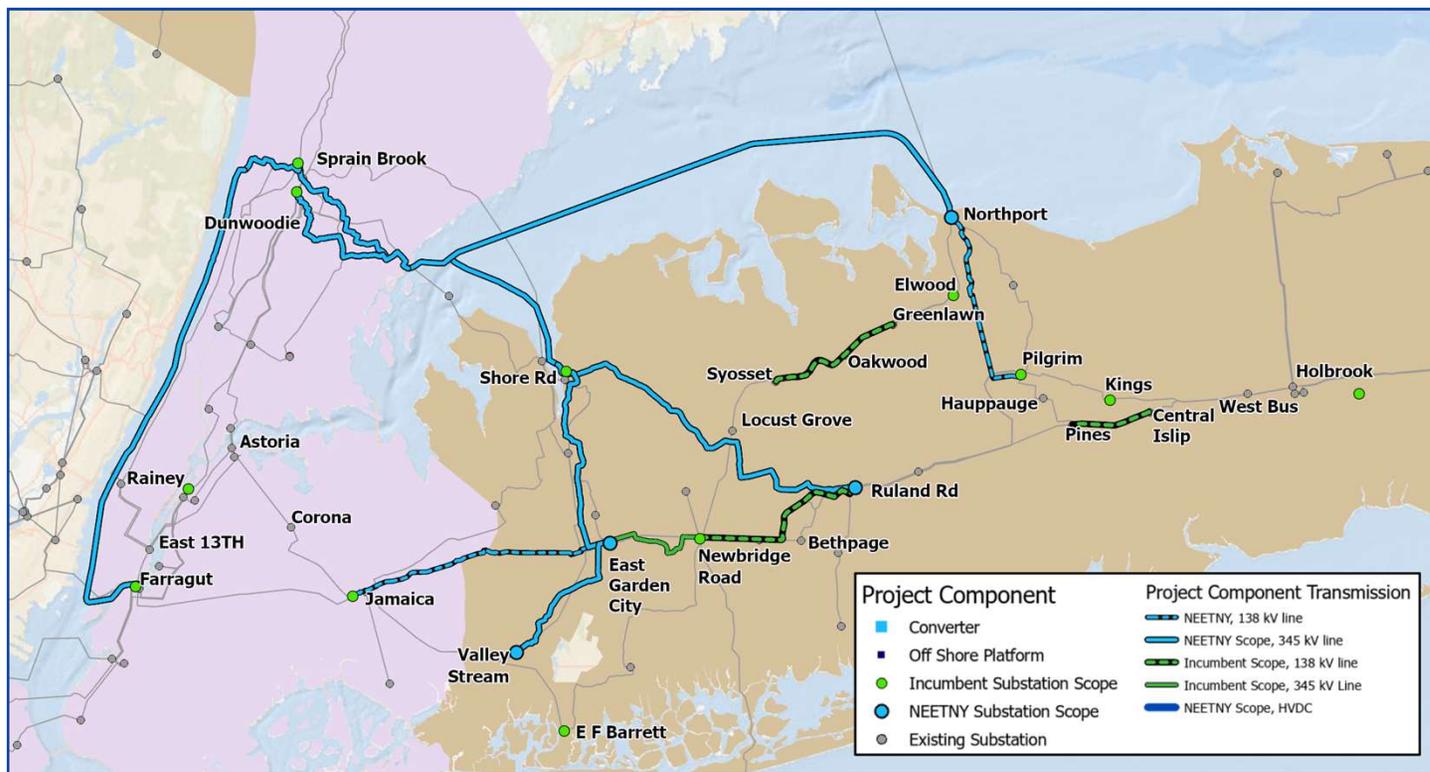
## LI OSW Delivery

4,400<sup>(1)</sup>

## New Ties

Zone J-K Ties	1
Zone I-K Ties	3
Zone I-J Ties	1

- Schedule includes significant float
- Many project elements completed in 2028



# Core 5

A highly cost-effective solution designed with geographic and electrical diversity to support flexible OSW injections, including from Eastern BOEM lease areas

## Overall In-Service Date

03/2029

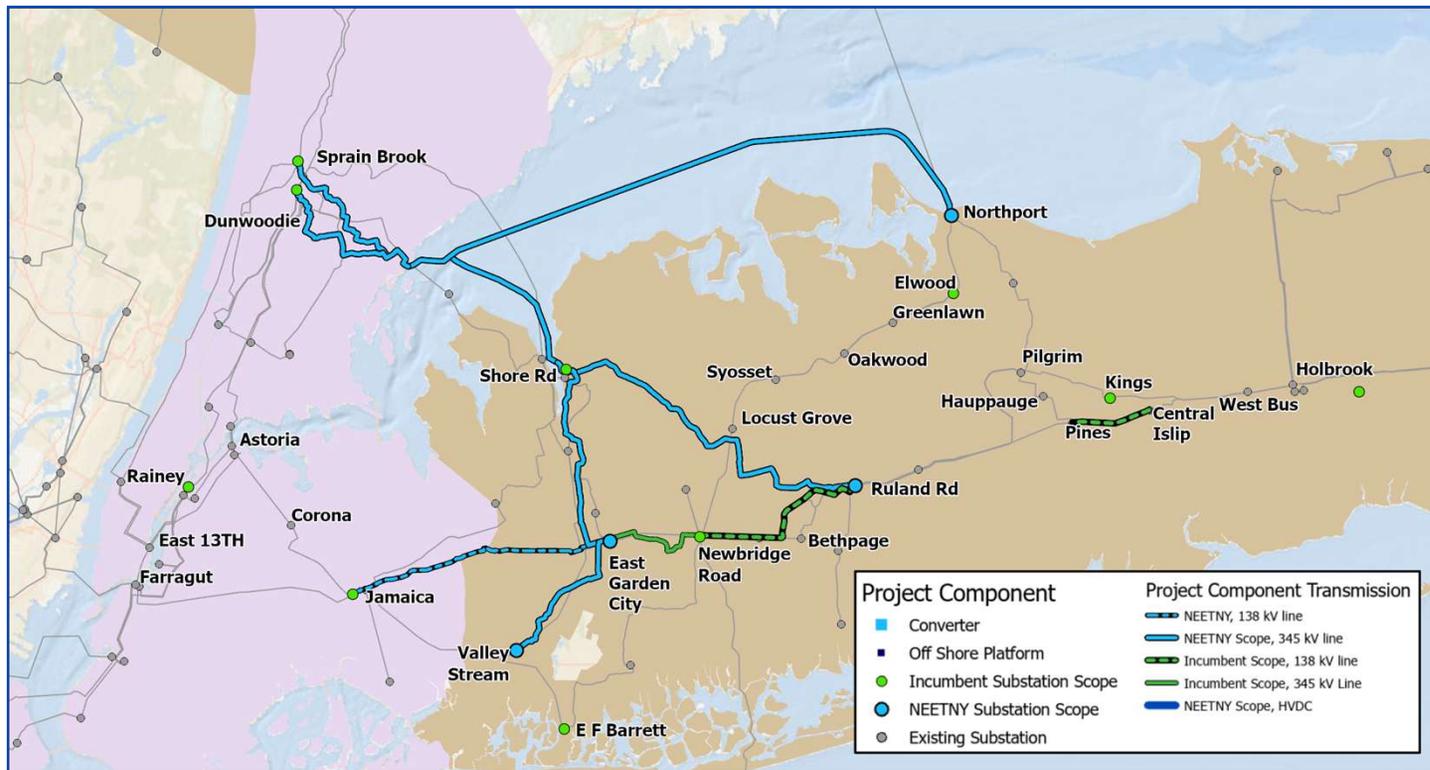
## LI OSW Delivery

4,400<sup>(1)</sup>

## New Ties

Zone J-K Ties	1
Zone I-K Ties	3

- Schedule includes significant float
- Many project elements completed in 2028



# Core 6

Builds upon Core 5 with an HVDC tie-line from Northport, increasing operability and overall performance

## Overall In-Service Date

03/2029

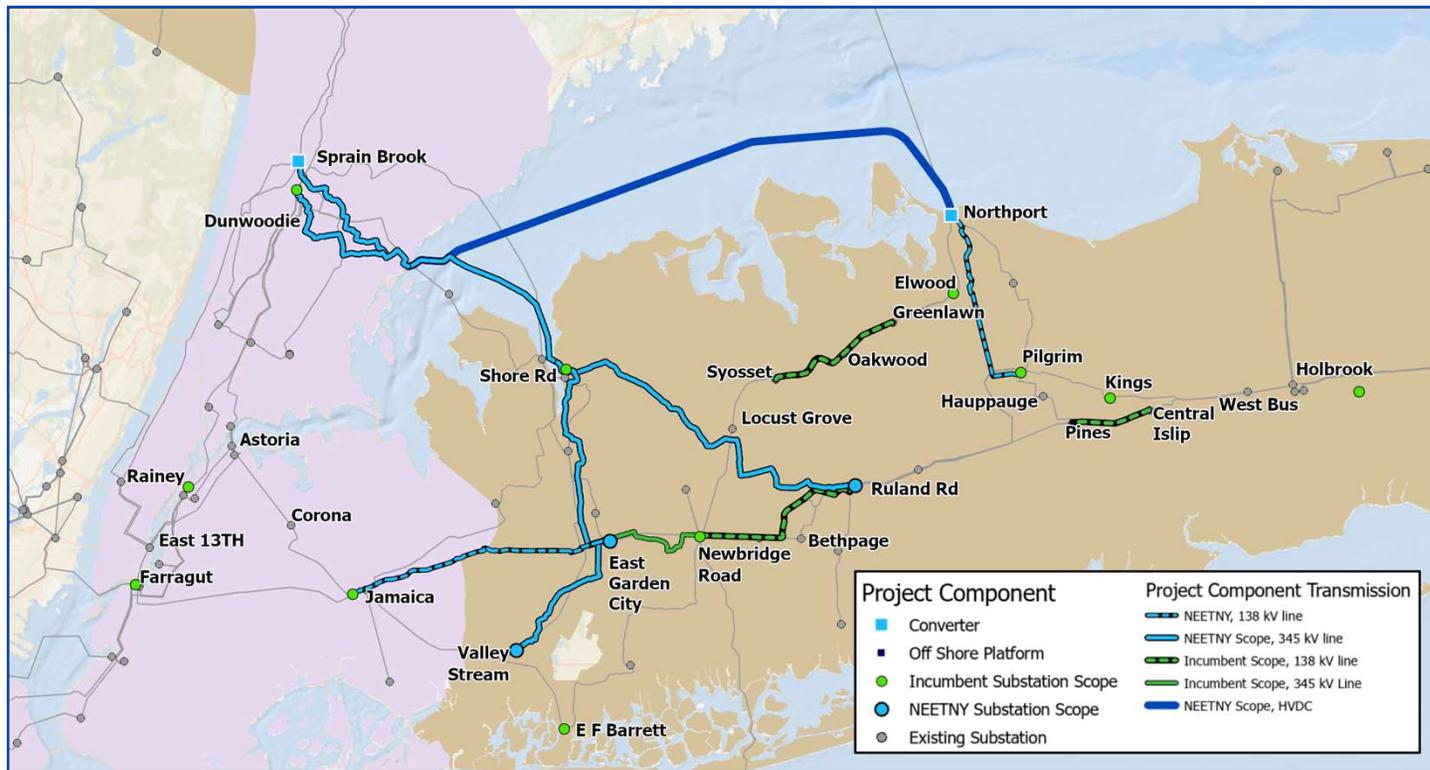
## LI OSW Delivery

4,400<sup>(1)</sup>

## New Ties

Zone J-K Ties	1
Zone I-K Ties	3

- Schedule includes significant float
- Many project elements completed in 2028



1) Long Island OSW Delivery is representative of an average across multiple OSW injection scenarios/sites across Long Island.

# Core 7

**Builds upon Core 6, with two new 1,200 MW HVDC OSW platform connections into existing transmission capacity at Buchanan to provide even further OSW expandability**

## Overall In-Service Date

10/2030

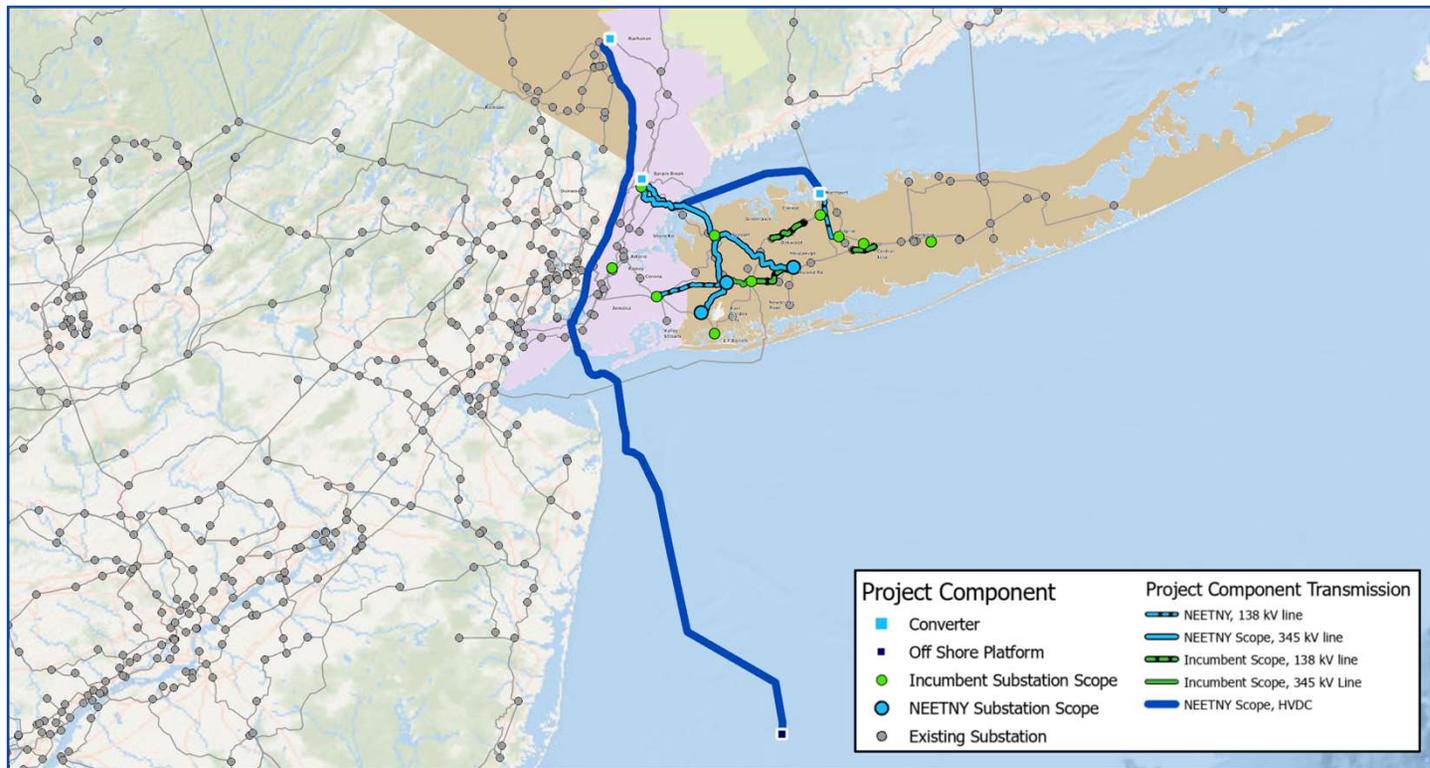
## LI OSW Delivery

4,400<sup>(1)</sup>

## New Ties

Zone J-K Ties	1
Zone I-K Ties	3
Zone H OSW HVDC	2

- **Schedule includes significant float**
- **Many project elements completed in 2028**



# Enhanced 1

Highly expandable to meet NY's future OSW needs. Optimal operability with two HVDC tie-lines on North/South of LIPA system. Highest injection capability into Long Island.

## Overall In-Service Date

06/2030

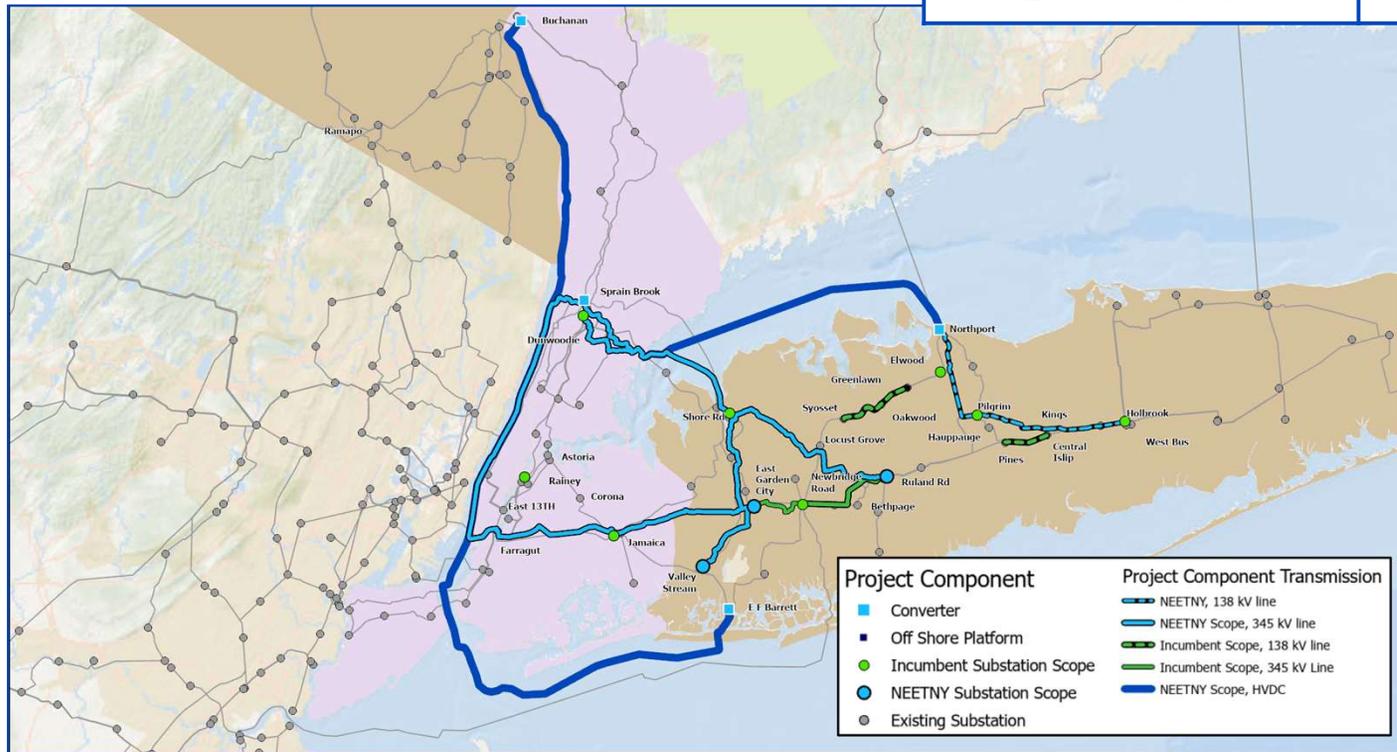
## LI OSW Delivery

5,000+(1)

## New Ties

Zone J-K Ties	2
Zone I-K Ties	4
Zone I-J Ties	1
Zone H-K Ties	1

- Schedule includes significant float
- Many project elements completed in 2028
- Intended to support 12+ GW into New York



# Enhanced 2

Similar to Enhanced 1, but with two new 1,200 MW HVDC OSW platform connections into existing transmission capacity at Buchanan

## Overall In-Service Date

10/2030

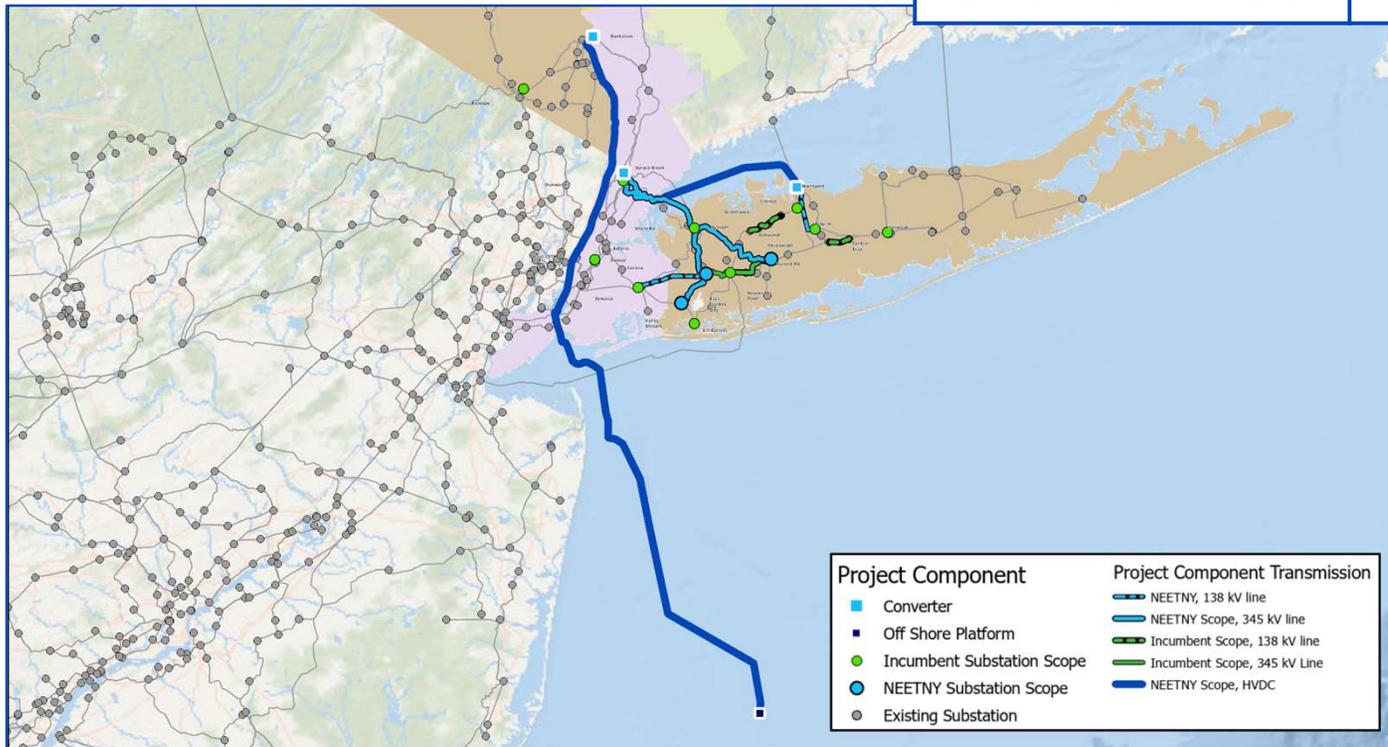
## LI OSW Delivery

5,000+<sup>(1)</sup>

## New Ties

Zone J-K Ties	2
Zone I-K Ties	4
Zone I-J Ties	1
Zone H OSW HVDC	2

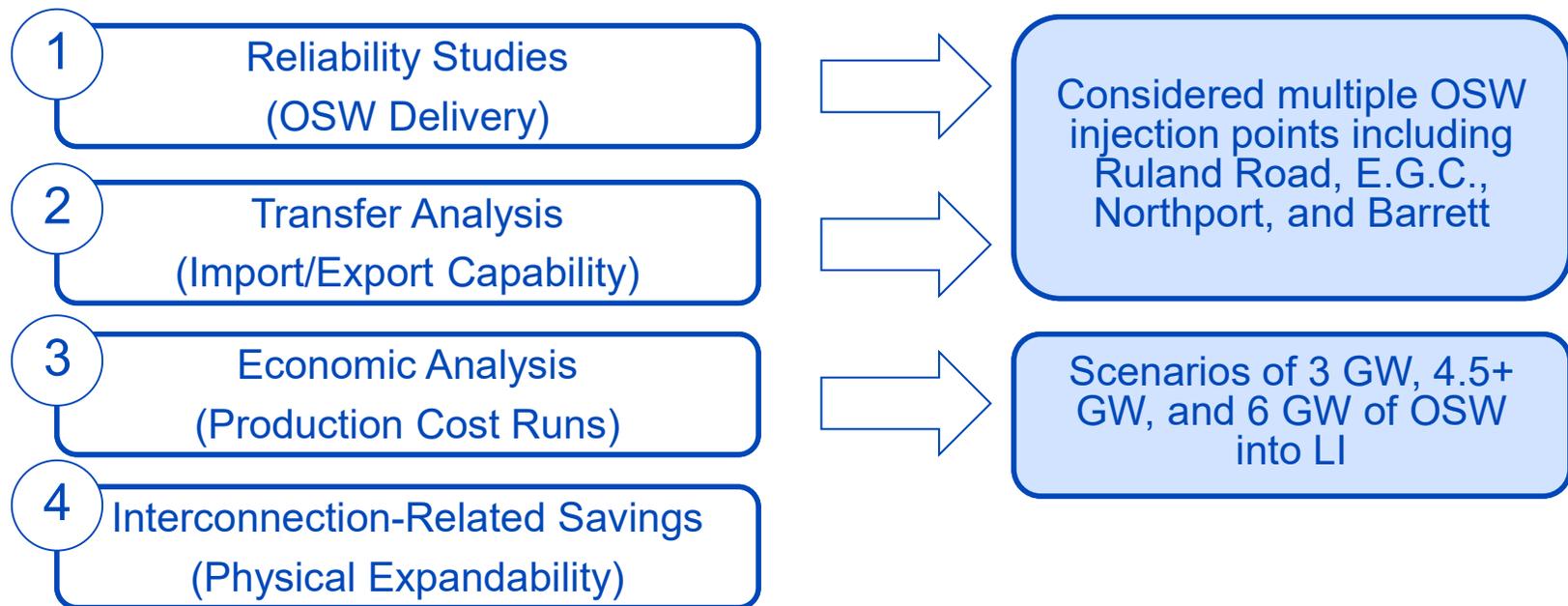
- Schedule includes significant float
- Many project elements completed in 2028
- Intended to support 12+ GW into New York



# NEETNY evaluated all LI PPTN proposals across a range of scenarios to assess system performance

## System Performance Evaluation

- NEETNY assessed the performance of LI PPTN proposals in four key areas:

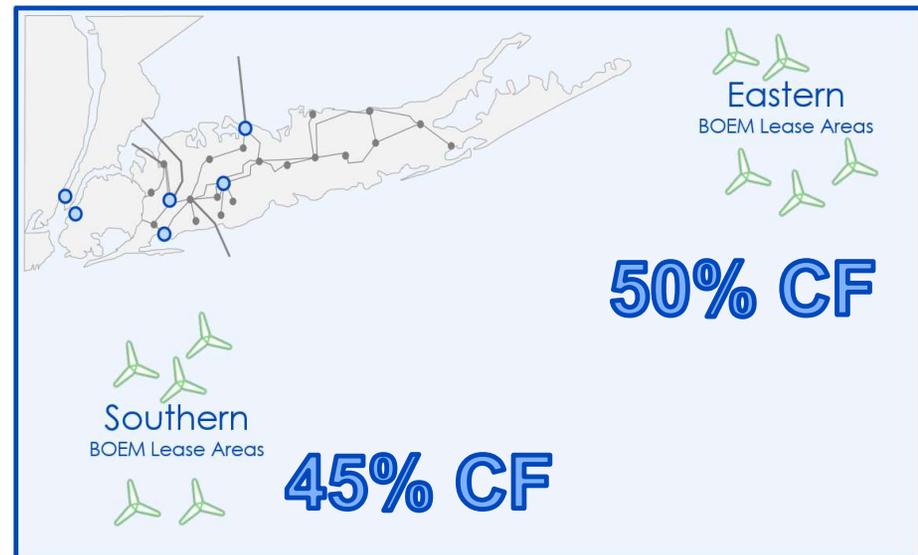


# Scenarios that involve at least 4,500 MW of OSW into Long Island are best situated to meet New York's climate goals

## NEETNY's 4.5+ GW Scenario

- NEETNY's recommended scenarios with 4.5 GW into Long Island are constructable, feasible, and likely<sup>(1)</sup>

- 2,200+ MW already is procured in Long Island
- Future OSW likely procured in 1,000+ MW increments with HVDC technology
- Long Island best supports competitive procurements from multiple lease areas
- Long Island can reduce total interconnection cost with more cost-effective locations for converters and AC ties



- Increased injection levels into Long Island also best support New York if OSW targets exceed 12,000 MW in the future

**All NYRC “Core” solutions deliver significant levels of OSW delivery and transfer capability performance. Enhanced solutions perform even better.**

## OSW Delivery & Transfer Capabilities

- **NEETNY’s solutions consistently reliably deliver ~4,500 MW or more across a range of OSW injection scenarios**
  - Sized for the needs of tomorrow to prevent increased delays, costs, interconnection study logjam, and community impacts down the road

<b>New York Renewable Connect – System Performance</b>			
<b>Proposal</b>	<b>Avg. LI OSW Delivery</b>	<b>Avg. LI Export Capability</b>	<b>LI Import Capability</b>
Core 1	4,300	2,800	3,000
Core 2	4,300	2,800	3,900
Core 3	4,500	3,500	3,700
Core 4	4,400	3,300	3,100
Core 5	4,400	3,300	3,100
Core 6	4,400	3,200	3,600

**NEETNY’s solutions reliably deliver large amounts of OSW into Long Island**

**NEETNY’s most geographically diverse solutions improve export capability even more**

**All of NEETNY’s solutions increase the LI import capability above 3,000+ MW<sup>(1)</sup>**

# NEETNY's solutions provide excellent system improvements across Long Island and NYC to accelerate New York's achievement of its clean energy goals

## Economic & Climate Goal Performance

- NYRC substantially reduces congestion, production costs, and net load payments
- Additionally, NYRC is optimally designed to deliver OSW energy with low curtailment and reduce annual CO2 emissions
- NEETNY's more geographically diverse solutions perform consistently regardless of where OSW interconnects

Scenario	Performance Metric	Core 1	Core 2	Core 3	Core 4	Core 5	Core 6
VSA (3 GW LI)	Adjusted Production Cost Savings	Light Green					
	CO2 Emissions Reduction	Light Green					
	OSW Energy Delivered	Light Green					
NEETNY Alt (4.5 GW LI)	Adjusted Production Cost Savings	Light Green					
	CO2 Emissions Reduction	Light Green					
	OSW Energy Delivered	Light Green					
NYISO Alt (6 GW LI)	Adjusted Production Cost Savings	Light Green					
	CO2 Emissions Reduction	Light Green					
	OSW Energy Delivered	Light Green					

# NEETNY's solutions position Long Island and New York City effectively for future system expansion needs

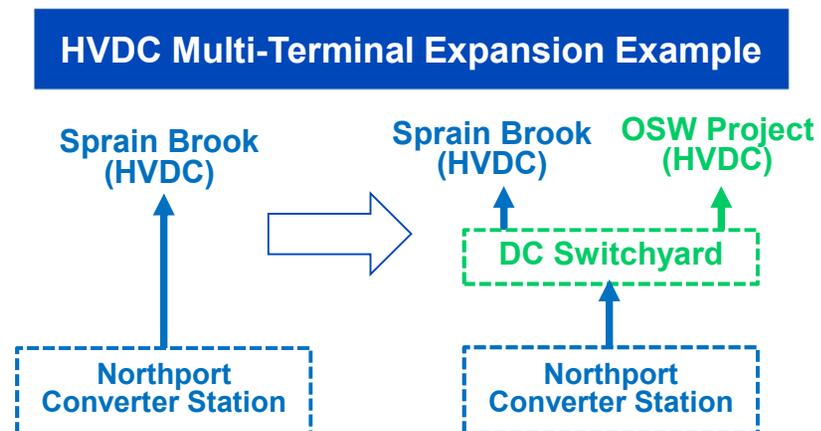
## Physical Expandability

- **NEETNY solutions create many expandable new stations across the LIPA and Con Edison systems**
  - These new stations provide enhanced OSW access, reducing total interconnection costs and encouraging generation competition

New Stations Added with Spare Terminals and Physical Expandability								
Proposal	Barrett	Valley Str	EGC	Newbridge Rd	Ruland Rd	Dunwoodie	Farragut	Northport
Core 1	✓	✓	✓	✓	✓	✓		
Core 2	✓	✓	✓	✓	✓	✓	✓	
Core 3-4	✓	✓	✓	✓	✓	✓	✓	✓
Core 5-6	✓	✓	✓	✓	✓	✓		✓

- **Proposals with land-based HVDC converter stations can be expanded into a multi-terminal HVDC hub**

- Further avoids the cost and environmental impacts of an additional converter station



# The NYRC solutions fully integrate Zones I, J and K and provide controllability to enhance system operability

## Operability

- The New York Renewable Connect provides new controllable tie-lines to both Zones I and J to enhance system operability

New <u>Controllable</u> Ties	Core 1	Core 2	Core 3	Core 4	Core 5	Core 6	Core 7	Enh 1	Enh 2
Zone J-K Ties	1	2	2	1	1	1	1	2	2
Zone I-K Ties	2	1	2	1	1	2	2	3	3
Zone H-K Ties	--	--	--	--	--	--	--	1	--

- The geographic and electrical diversity of the NYRC also enhances system resiliency & security for unexpected outages
- All of NEETNY’s solutions can:
  - Readily and reliably support key outages such as the 901 & 903 (Zone J-K ties) or the Y49 & Y50 (Zone I-K ties)
  - Deliver high Long Island transfer capabilities across a large bandwidth of PAR/HVDC setpoints
  - Increase the internal Long Island transfer capabilities to the Central Load region

# NYRC provides the NYISO with outstanding options to meet CLCPA goals and future OSW transmission needs

## New York Renewable Connect Benefit Summary

### The Time to Expand LI OSW is Now

- State Competition for OSW is increasing (New England / NJ)
- NYC has significant construction challenges
- Delaying expansion will compound future delays and costs

### “Minimalistic” Solutions won’t meet future needs

- **“Band-Aid” fixes hinder operability and expandability**
  - Likely result in imprudent investment with more OSW
- **Low LI OSW deliverability will add delays, costs, and community impacts as more OSW is needed**
  - Generation costs will also increase with less access

### NEETNY’s Renewable Connect is designed for today and tomorrow

- **Excellent Performance**
  - Low energy costs and very low OSW curtailment
  - Substantial CO2 emission reductions
  - Diverse benefits to Long island
- **Remarkable Capability to Deliver OSW**
  - Provide the needed 4.5+ GW into LI and more
- **Highly Flexible and Expandable**
  - Enhanced solutions provide a framework for future needs



# Appendix

# NEETNY selected two alternate scenarios with 4.5+ GW of OSW into Long Island due to their lower expected interconnection costs compared to the VSA

## Alternate Long Island Injection Scenarios

- Alternate scenarios can provide lower cost and increased feasibility as compared to the proposed VSA assumptions
  - Scenarios incorporate NYSERDA’s recent HVDC technology guidance on future OSW solicitations

OSW Points of Injection		VSA (MW)	9A (MW)	9B (MW)	9C (MW)	9D (MW)	9E (MW)	9F (MW)
NYC & Other	NYC Awarded	2,046	2,046	2,046	2,046	2,046	2,046	2,046
	W 49th	1,310	--	--	--	--	--	--
	Farragut	2,620	2,400	2,400	2,400	2,400	2,400	2,400
	SubTotal	5,976	4,446	4,446	4,446	4,446	4,446	4,446
LI	LI Awarded	2,279	2,279	2,279	2,279	2,279	2,279	2,279
	Ruland	800	--	1,200	--	1,200	--	1,200
	Northport	--	1,200	1,200	1,200	--	--	--
	East Garden City	--	--	--	1,200	--	1,200	1,200
	Barrett/ Valley Stream	--	1,200	--	--	1,200	1,200	--
	SubTotal	3,079	4,679	4,679	4,679	4,679	4,679	4,679
<b>Total OSW Injection (MW):</b>		<b>9,055</b>	<b>9,125</b>	<b>9,125</b>	<b>9,125</b>	<b>9,125</b>	<b>9,125</b>	<b>9,125</b>
<b>Incremental Interconnection Costs (\$M)</b>		<b>\$8,750</b>	<b>\$7,960</b>	<b>\$8,390</b>	<b>\$8,430</b>	<b>\$8,500</b>	<b>\$8,720</b>	<b>\$8,970</b>

# All NYRC proposals provide the import capability needed to economically and reliably serve Long Island

## Long Island Import Capability

- Long Island will still depend heavily on imports, even with significant OSW injections
- Supports reliability during storms, and outages of coastal units
- Even more critical with potential future system retirements

