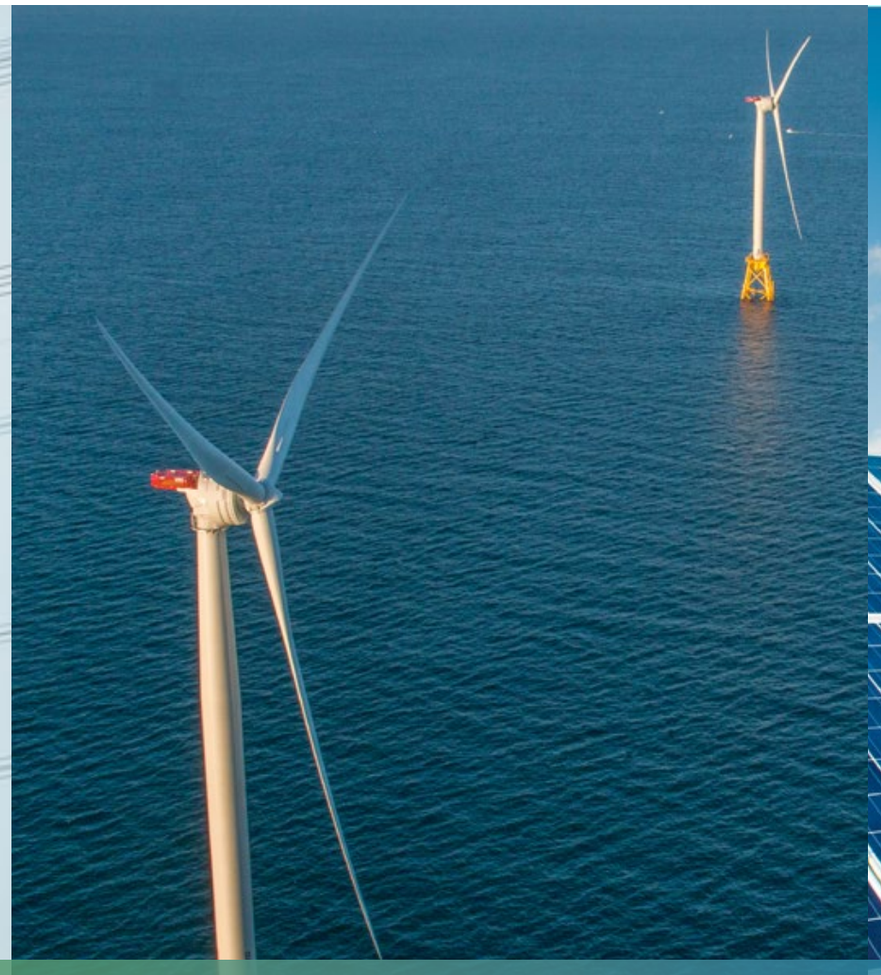


LONG ISLAND POWER AUTHORITY

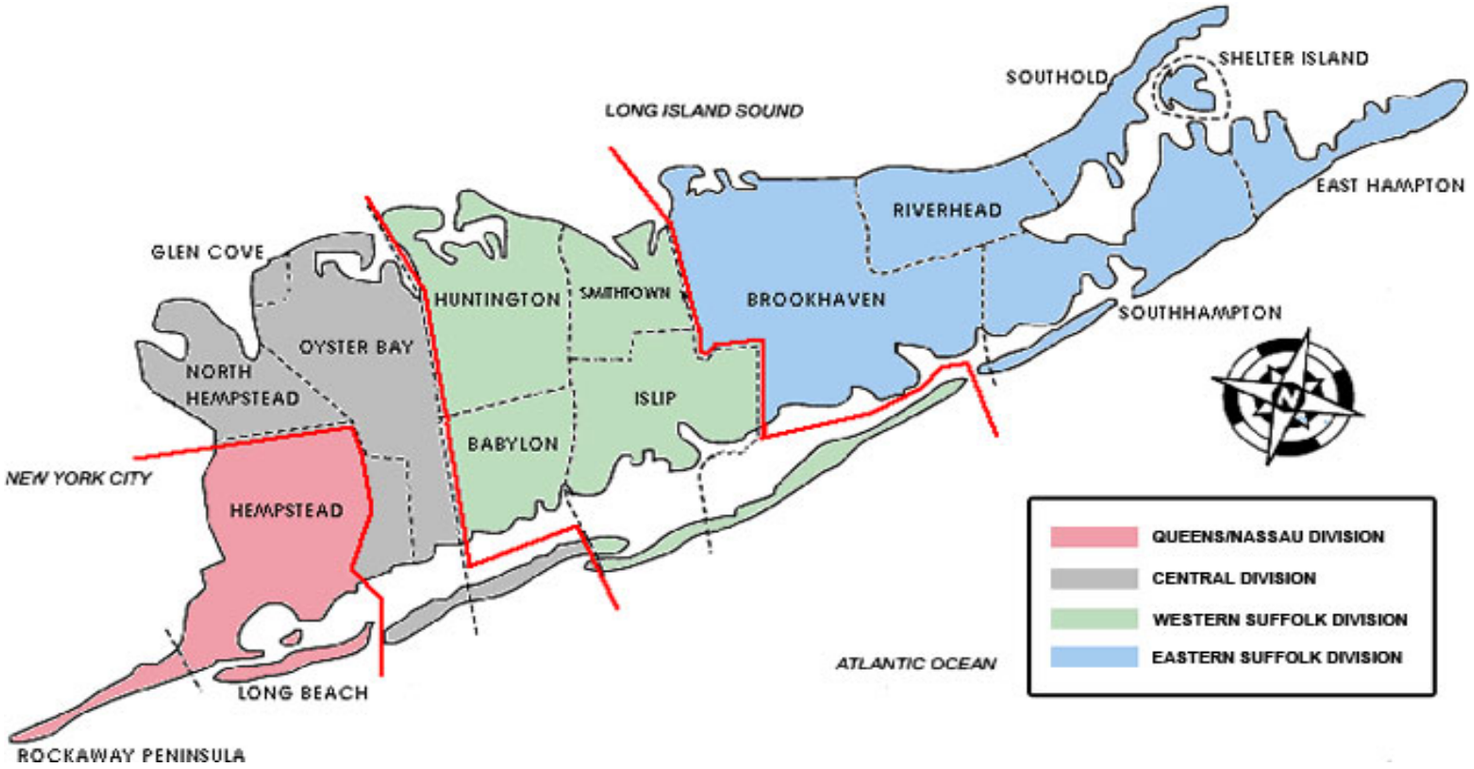
POWERING LONG ISLAND'S CLEAN, RELIABLE, AFFORDABLE ENERGY FUTURE

MUNICIPAL BOND ANALYSTS SOCIETY

JANUARY 18, 2018

Tom Falcone, CEO

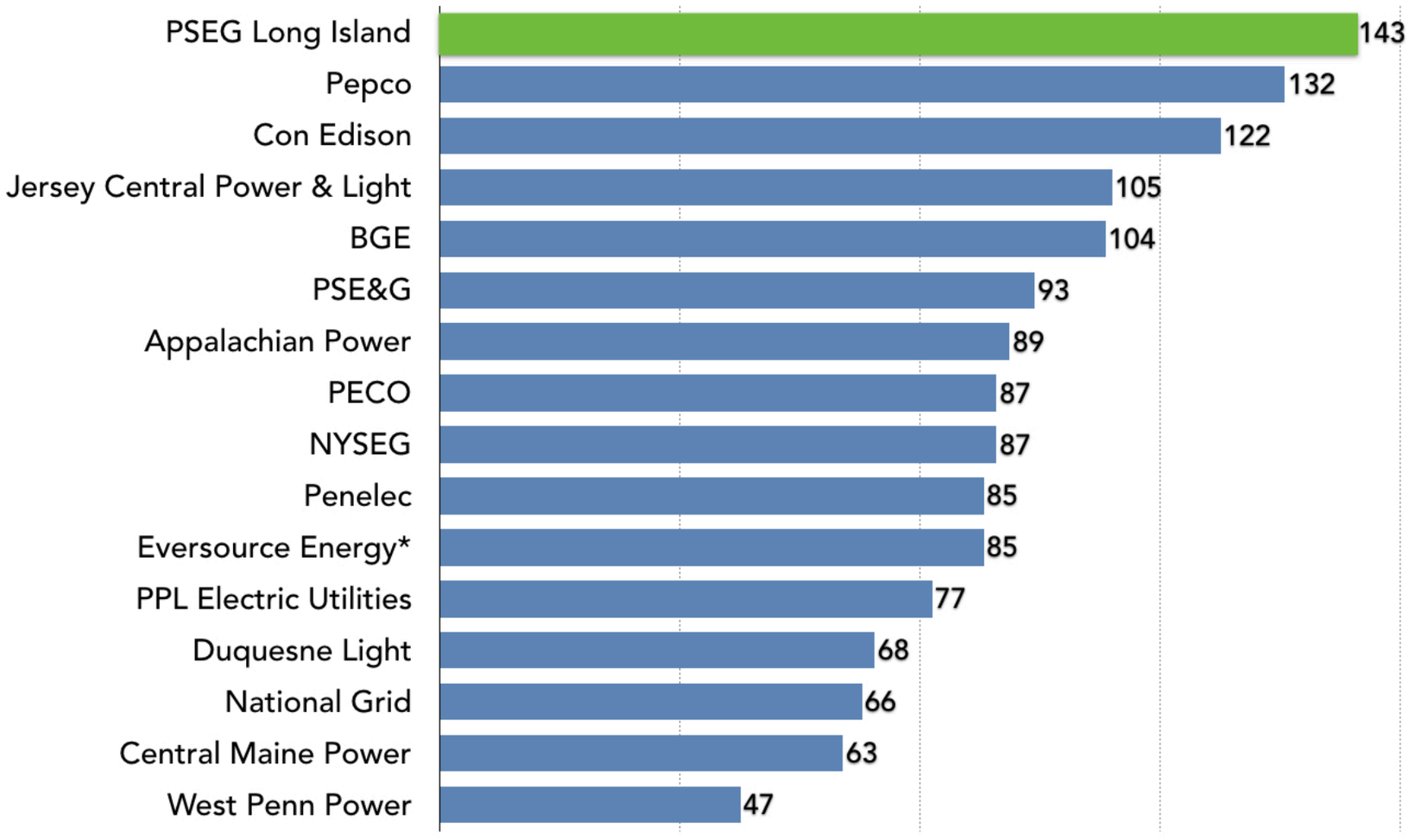
- **LIPA serves 2.9 million people in suburban New York**
- **$3.5 billion in revenues**
- **5,800MW of generation**
- **15,000 miles of transmission and distribution**
- **Public-private partnership business model**
- **Provides service under PSEG Long Island brand name**

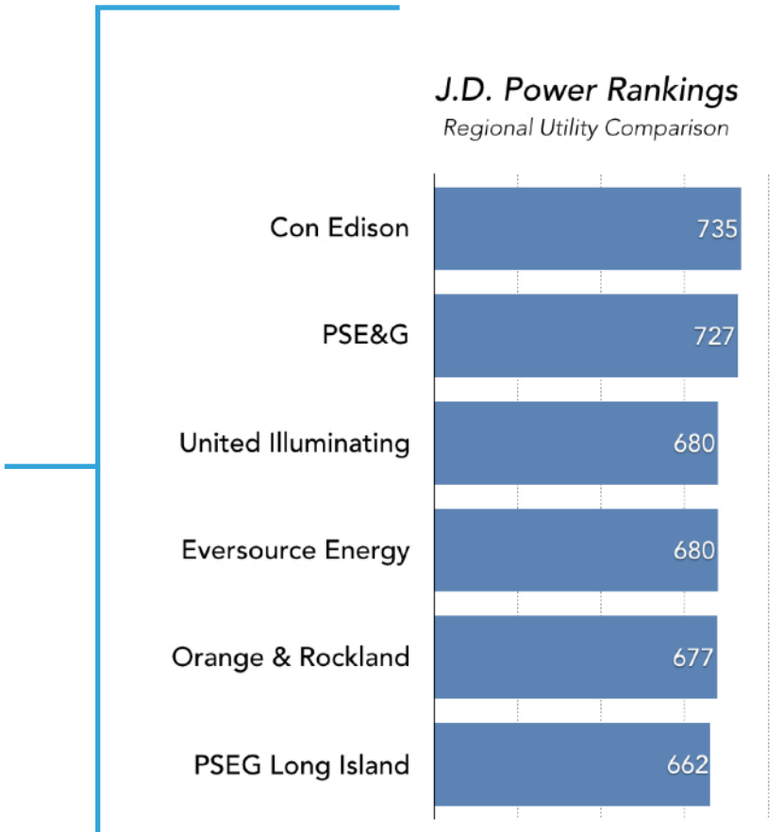


LIPA is a not-for-profit public utility with a mission to enable clean, reliable, and affordable electric service for our customers on Long Island and the Rockaways

MOST IMPROVED UTILITY IN THE NATION

Change in JD Power & Associates Residential Customer Satisfaction Scores (2013 vs 2017)





**2013 Eversource Energy is the average of NSTAR (611) and Connecticut Light & Power (580)*

LONG ISLAND'S $730 MILLION STORM HARDENING PROGRAM

Funding Secured via an Agreement between Governor Andrew M. Cuomo and the Federal Emergency Management Agency (FEMA)

SMARTER SYSTEMS

Automated Switching Equipment

9 Projects | 33 Circuit Miles
GLEN COVE

49 Projects | 178 Circuit Miles

24 Projects | 81 Circuit Miles
HUNTINGTON

16 Projects | 54 Circuit Miles
SMITHTOWN

73 Projects | 226 Circuit Miles
BROOKHAVEN

6 Projects | 33 Circuit Miles
RIVERHEAD

15 Projects | 14 Circuit Miles
SOUTHOLD

2 Projects | 3 Circuit Miles
SHELTER ISLAND

EAST HAMPTON

SOUTHAMPTON

28 Projects | 85 Circuit Miles
NORTH HEMPSTEAD

OYSTER BAY

HEMPSTEAD

BABYLON

ISLIP

ROCKAWAY

8 Projects | 7 Circuit Miles

51 Projects | 151 Circuit Miles

13 Projects | 27 Circuit Miles

14 Projects | 141 Circuit Miles

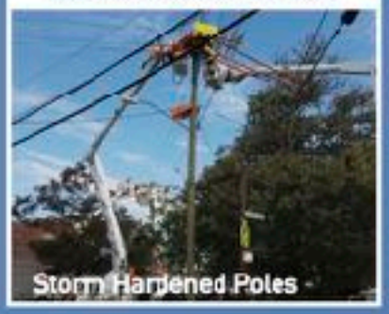
11 Projects | 48 Circuit Miles

9 Projects | 54 Circuit Miles

FLOOD MITIGATION

Raised Substations

STRONGER INFRASTRUCTURE



Storm Hardened Poles

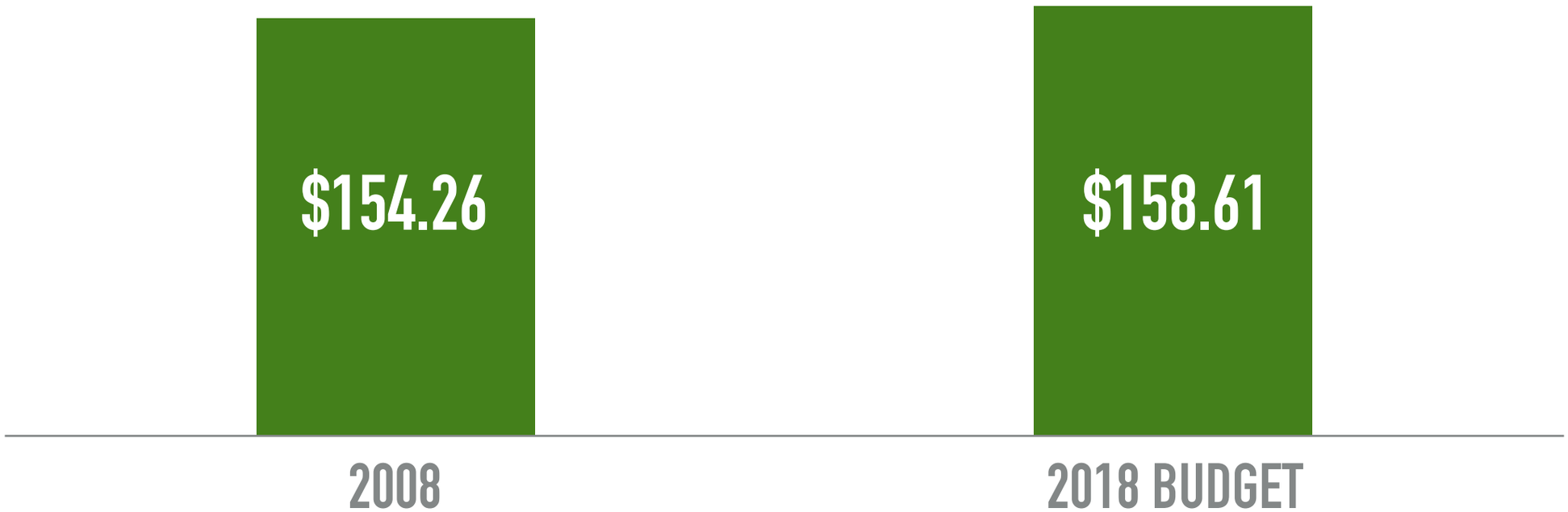
VEGETATION MANAGEMENT

Tree Trimming

NEW CONSTRUCTION STANDARDS

Hurricane-Resistant Substations

CUSTOMERS' ELECTRIC BILLS ARE FLAT OVER LAST 10 YEARS



3% Increase Over 10 Years

INCREASE IN COST OF LIVING OVER 10 YEARS

2008 $400 — **iPhone** — **2017 $1,000**

150% Increase

2008 $0.50 — **Newsday** — **2017 $2.00**

300% Increase

2008 $3.57 — **Big Mac** — **2017 $5.30**

48% Increase

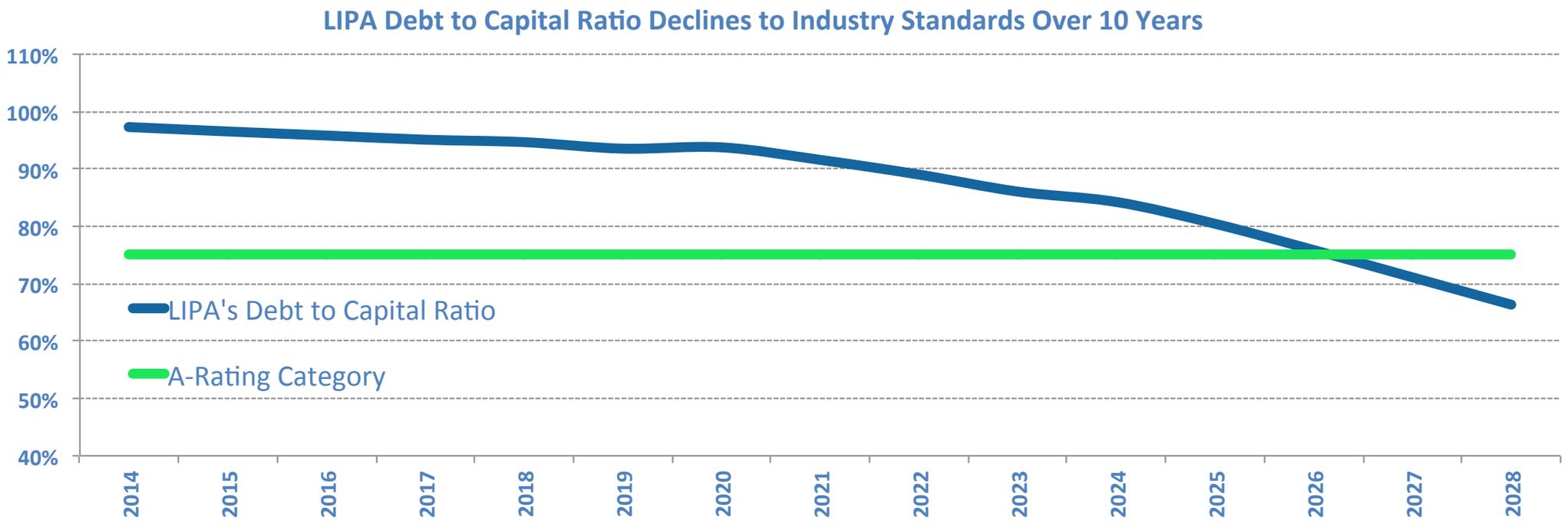
REDUCING DEBT

"They have positive momentum and have the possibility of additional credit rating upgrades in two to three years. LIPA management has done a great job displaying vision for the company and keeping rates low for ratepayers. The management team is laser focused." - Moody's - May 5, 2017

NEW FINANCIAL PLAN REDUCES BORROWING & INCREASES CREDIT RATINGS OVER FIVE YEARS

- FIRST CREDIT RATING UPGRADE BY MOODY'S IN 11 YEARS
- S&P OUTLOOK UPGRADE TO POSITIVE IN 2017

$492 MILLION SAVINGS FROM DEBT REFINANCING PROGRAM REINVESTED INTO RELIABILITY & CUSTOMER SERVICE



FUTURE OF BATTERY STORAGE ON THE GRID

- **Higher Renewable Penetration**
- **Declining Cost of Renewables & Storage**
- **Deferring Transmission & Distribution Projects**
- **Pricing in Retail & Wholesale Markets**
- **Co2 Reduction through Electrification**

NEW YORK CLIMATE GOALS

50 X 30

50% OF ELECTRICITY GENERATED IN NEW YORK TO COME FROM RENEWABLE ENERGY SOURCES BY 2030

1.25 MILLION

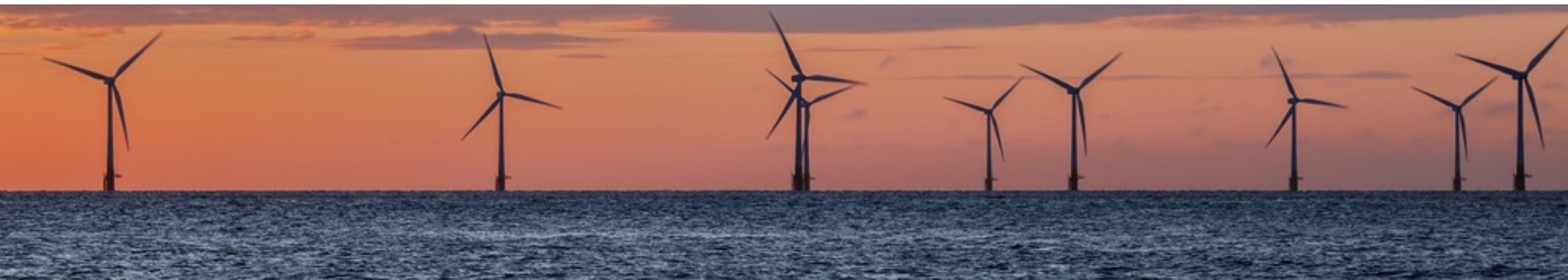
NEW YORK AIMS TO DEVELOP 2.4 GIGAWATTS OF OFFSHORE WIND BY 2030 – ENOUGH TO POWER 1.25 MILLION HOMES

40 X 30

REDUCING GREENHOUSE GAS EMISSIONS BY 40 PERCENT BY 2030 AND 80 PERCENT BY 2050

1,500MW X 25

ENERGY STORAGE TARGET OF 1,500 MEGAWATTS BY 2025 TO STORE CLEAN & RENEWABLE ENERGY



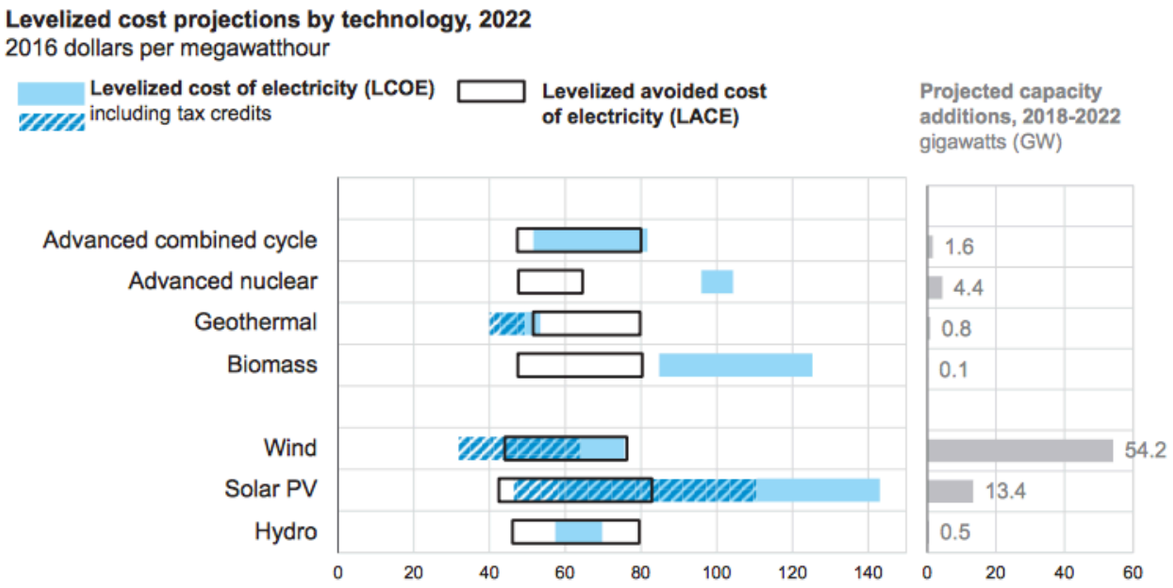
COST OF CLEAN ENERGY & STORAGE RAPIDLY DECLINING

BLOOMBERG'S NEW ENERGY OUTLOOK – JUNE 2017

"BY 2023 ONSHORE WIND & SOLAR ARE COMPETITIVE WITH NEW-BUILD GAS PLANTS"

- OFF-SHORE WIND: PROJECTED COST DECLINE 71% BY 2040
- SOLAR: PROJECTED COST DECLINE OF 66% BY 2040
- BATTERY STORAGE: PROJECTED COST DECLINE OF 70% BY 2030

ANNUAL ENERGY OUTLOOK 2017 – U.S. ENERGY INFORMATION ADMINISTRATION



Source: *U.S. Energy Information Administration, Levelized Cost and Levelized Avoided Cost of New Generation Resources in the Annual Energy Outlook 2017*

Note: *Capacity additions include planned and unplanned additions.*

COST OF OFF-SHORE WIND

EUROPEAN MARKETS SHOW STEADY DECLINE IN THE PRICE OF OFF-SHORE WIND

US PRICES ARE EXPECTED TO FOLLOW A DOWNWARD TREND DUE TO DECLINING TECHNOLOGY COSTS AND GROWING SCALE

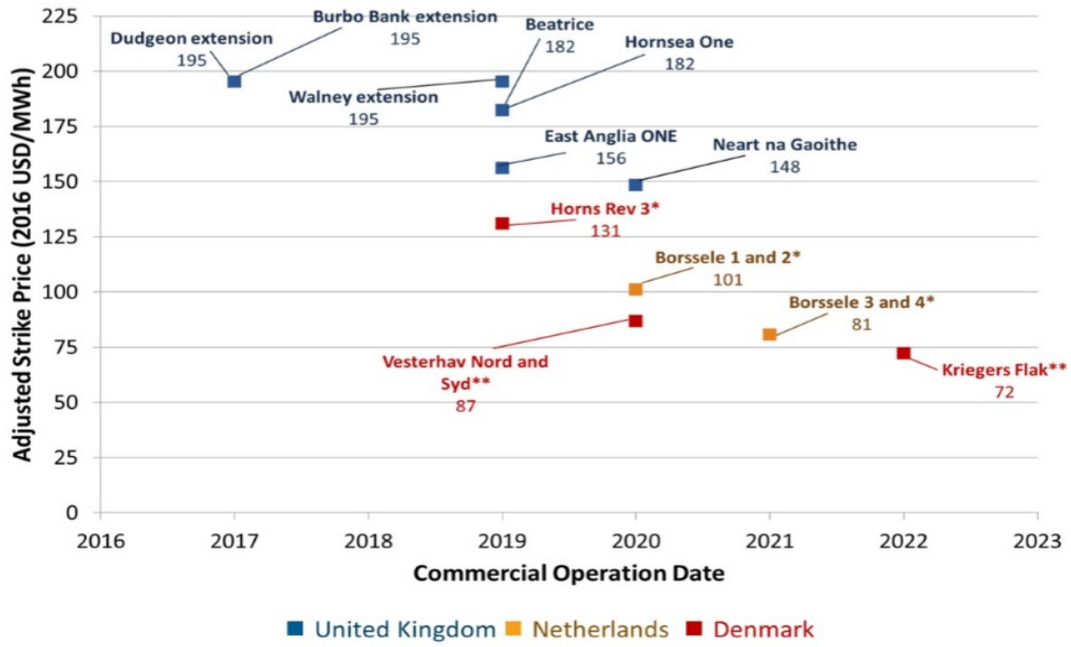
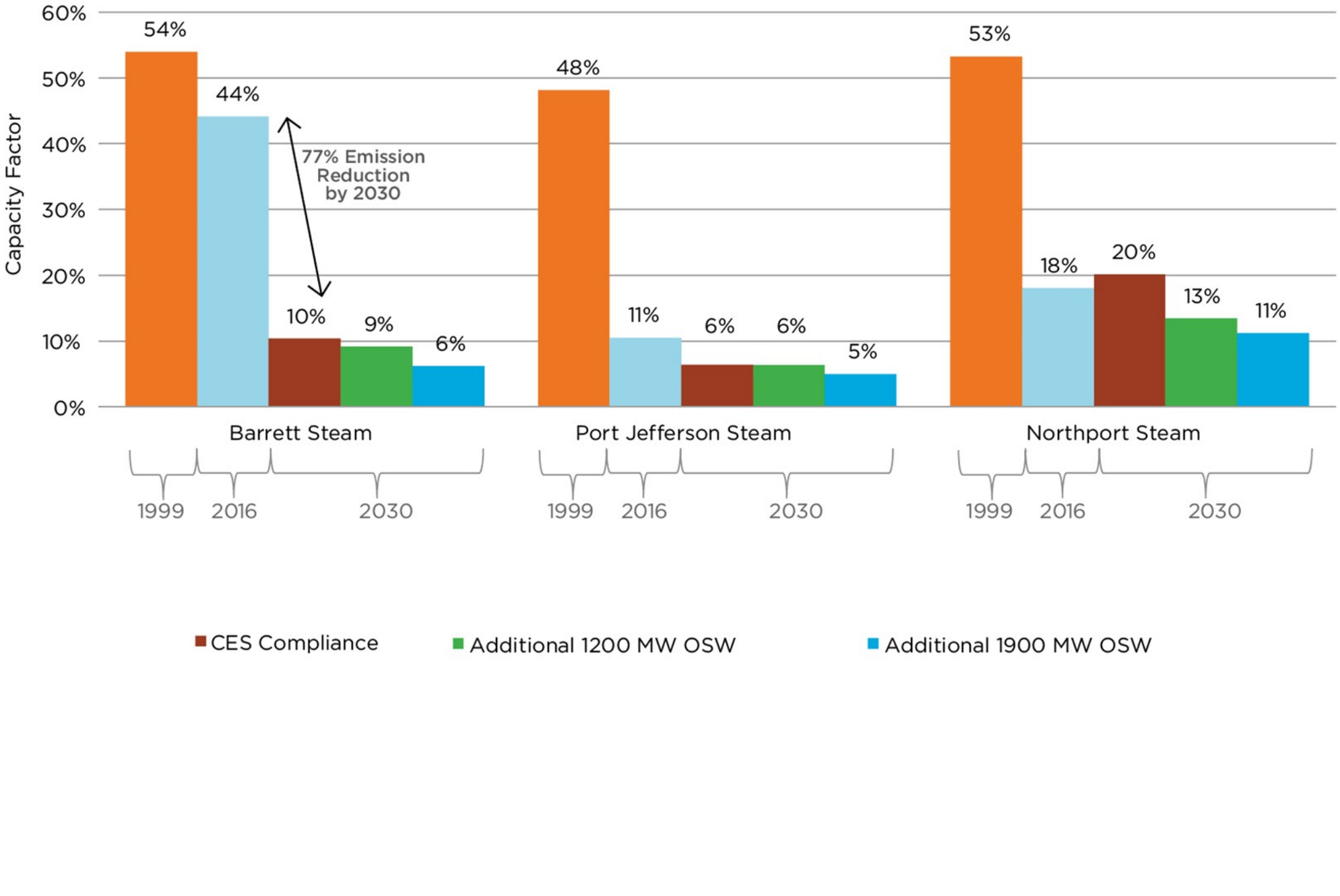
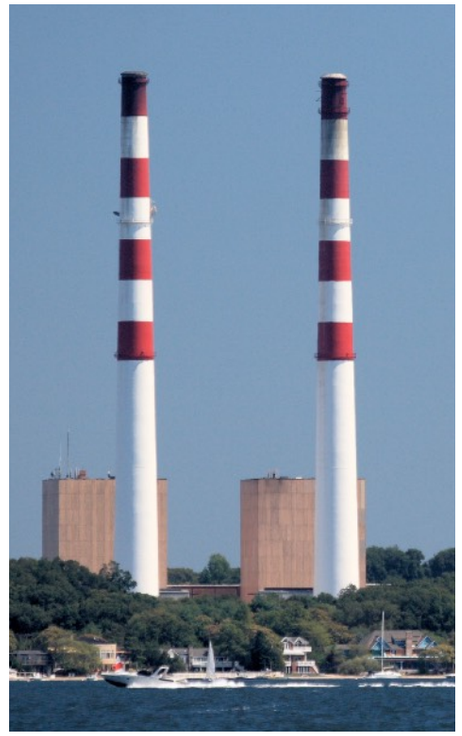


Figure 1. Recent strike prices of European offshore wind winning tenders adjusted to U.S. dollars, with grid cost, development cost, and contract length adders

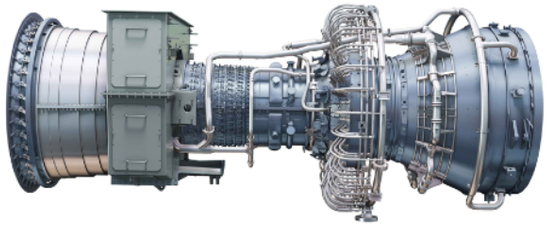
RUN-TIME OF LIPA STEAM PLANTS TO DECLINE





NEW GENERATION FLEET FOR LI'S FUTURE ENERGY GRID

Characteristic	Existing PSA Units		New Units			
	Steam Units	Combustion Turbines	Combined Cycle	Peaking Units (Simple Cycle)		
				Large Frame	Small Frame	Areo
Cold Start Time	26 – 30 hours	10-30 minutes	3 – 4 hours	10 min	10 min	≤ 10 min
Time (hours)	16	1	4	No technical minimum limit		
Ramp Rate (MWs/min)	2 - 4	NA	15 - 40	50 – 100+	25	25
Heat rate (Btu/ kWh)	10,000 – 11,300	13,000-16,500	6,600 – 6,800	8,000 – 8,200	9,700	8,900 – 9,500



- MODERN PEAKING UNITS, BATTERIES & DEMAND RESPONSE PROVIDE MORE FLEXIBLE RESOURCES AND SUPPORT RENEWABLES

- NEW POWER PLANTS ON LONG ISLAND WILL BE SMALLER, MORE FLEXIBLE & MORE DISTRIBUTED

DEFER TRANSMISSION & DISTRIBUTION PROJECTS

- Least cost option to meet increasing electricity demand while at the same time meeting NY & LIPA's clean energy goals

- Evaluation considered multiple values of storage (e.g. T&D deferral, capacity, balancing renewables)

90MW OFF-SHORE WIND 2022

- RIGHT SIZE AT RIGHT LOCATION
- BEGINS TO DEVELOP THE FEDERAL OFFSHORE WIND LEASE AREA
- GROUNDWORK FOR OFF-SHORE WIND INDUSTRY

10MW BATTERY STORAGE 2018

- CHARGES BY DRAWING ENERGY FROM GRID AND PROVIDES UP TO 8 HOURS OF PEAK POWER
- BALANCES INTERMITTENCY FROM WIND FARM

8MW DEMAND RESPONSE

- DEMAND RESPONSE ALLOWS THE UTILITY TO MAKE MINOR, SHORT-TERM ADJUSTMENTS TO REDUCE POWER DURING PERIODS OF HIGH DEMAND

ELECTRIC PRICING

ELECTRIC PRICING & STORAGE

Viewpoint:

- **Declining storage cost could allow utilities to shave generation and T & D peaks and balance renewables leading to a more efficient electric grid**

- **Declining storage costs could open up arbitrage opportunities in poorly designed retail electric prices & wholesale markets**

ELECTRIC PRICING & STORAGE

Opportunities & LIPA Initiatives:

- Smart meters enable new pricing
- T & D demand response tariffs provide price signals
- VDER tariff to replace net metering with location, time and capacity values
- Rate design for large commercial customers with real time pricing & demand charges (50% sales)
- Artificial intelligence (e.g. Nest)
- Utilities have scale and finance advantages and the electric grid will continue to be valuable
- In a changing environment consider range of options and outcomes before major investments

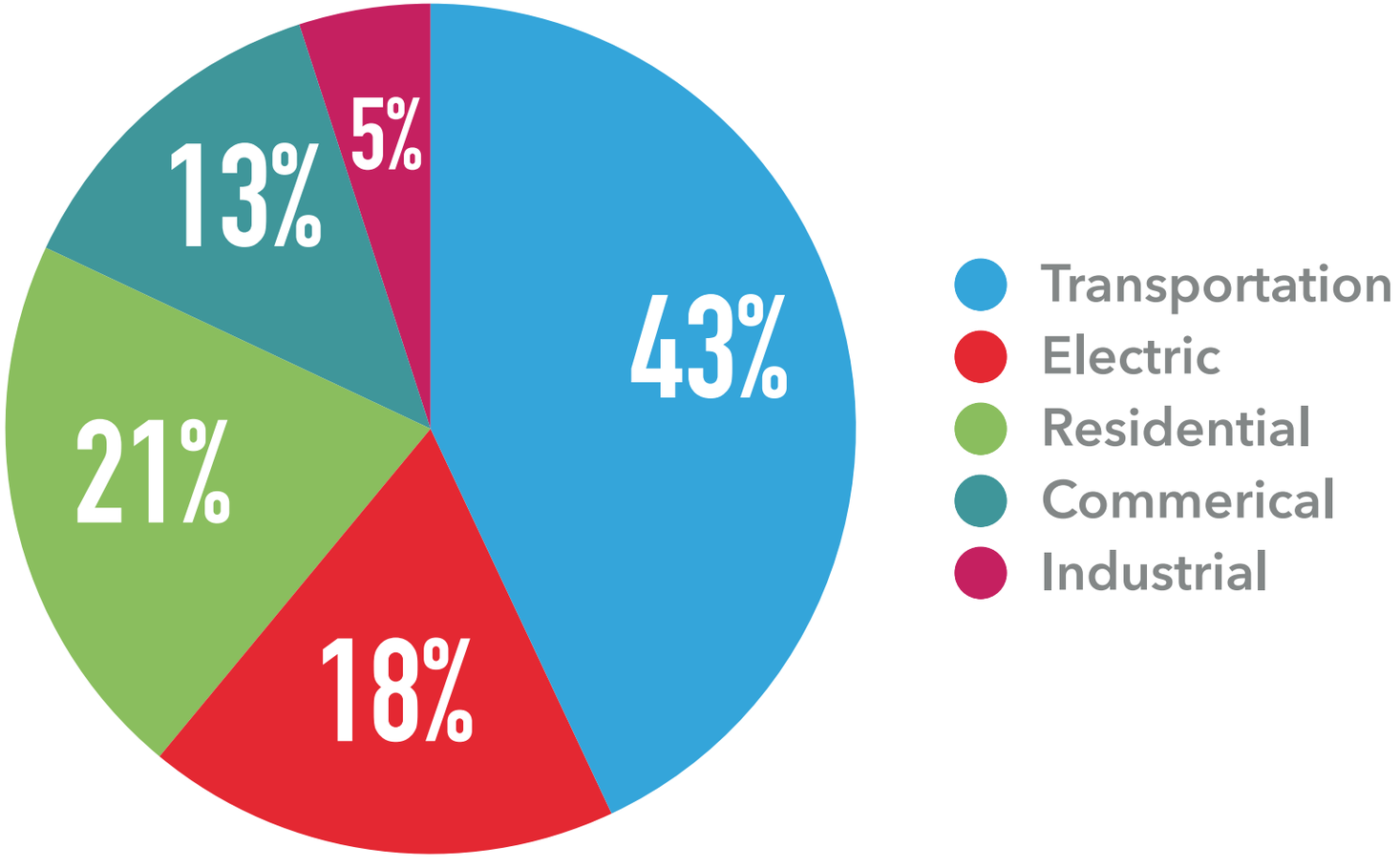
Challenges:

- Complexity, especially for retail customers
- Pricing partial grid defection customers at cost of service
- Wholesale markets need to transition to greater share of capacity revenues (e.g. CAISO ramping product)

BATTERIES ON WHEELS

With rapidly falling battery prices, the electrification of transportation may be among New York's most cost-effective carbon reduction strategies

New York's Carbon Dioxide Emissions



Electric vehicles in New York today emit the same carbon as cars traveling 125 miles a gallon, roughly five times the average new car.

- Electric Power Research Institute & the Natural Resources Defense Council

QUESTIONS?