



ACE NY

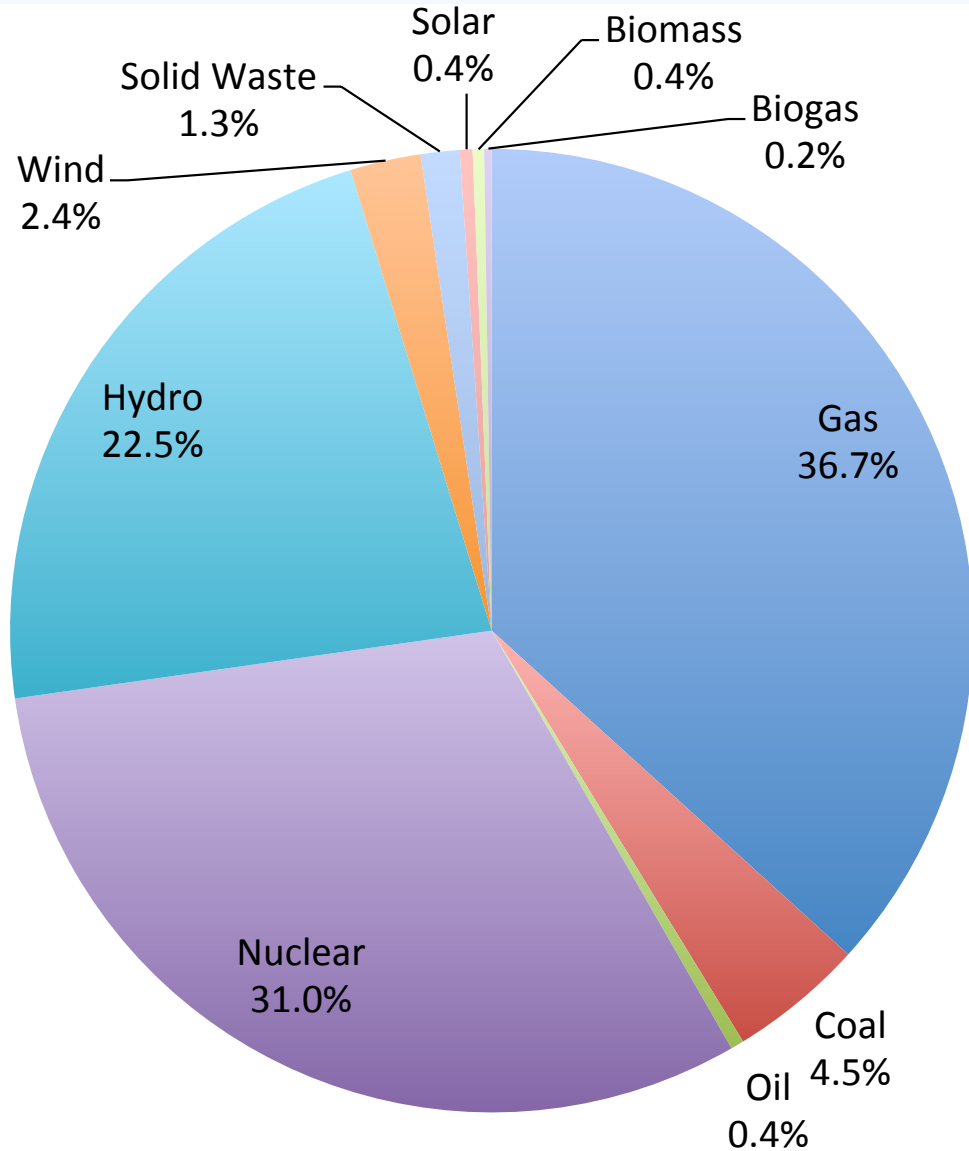
ALLIANCE FOR CLEAN ENERGY NEW YORK, INC.

NY's New 50% Renewable Energy Standard

What will it take to get there?

Scenic Hudson, March 27, 2018

Electricity Mix in NY: 2014 Snapshot; 25.9% renewables



What is Required to get to 50%?



“Distributed” Renewable Energy



Rooftop Solar = traditional distributed renewable project. **Community Solar** projects are larger, and start to blur the lines between small, distributed solar and large, grid-scale solar.

Distributed renewable energy resources = smaller sized projects located at a customer's site



“Grid-scale” Renewable Energy

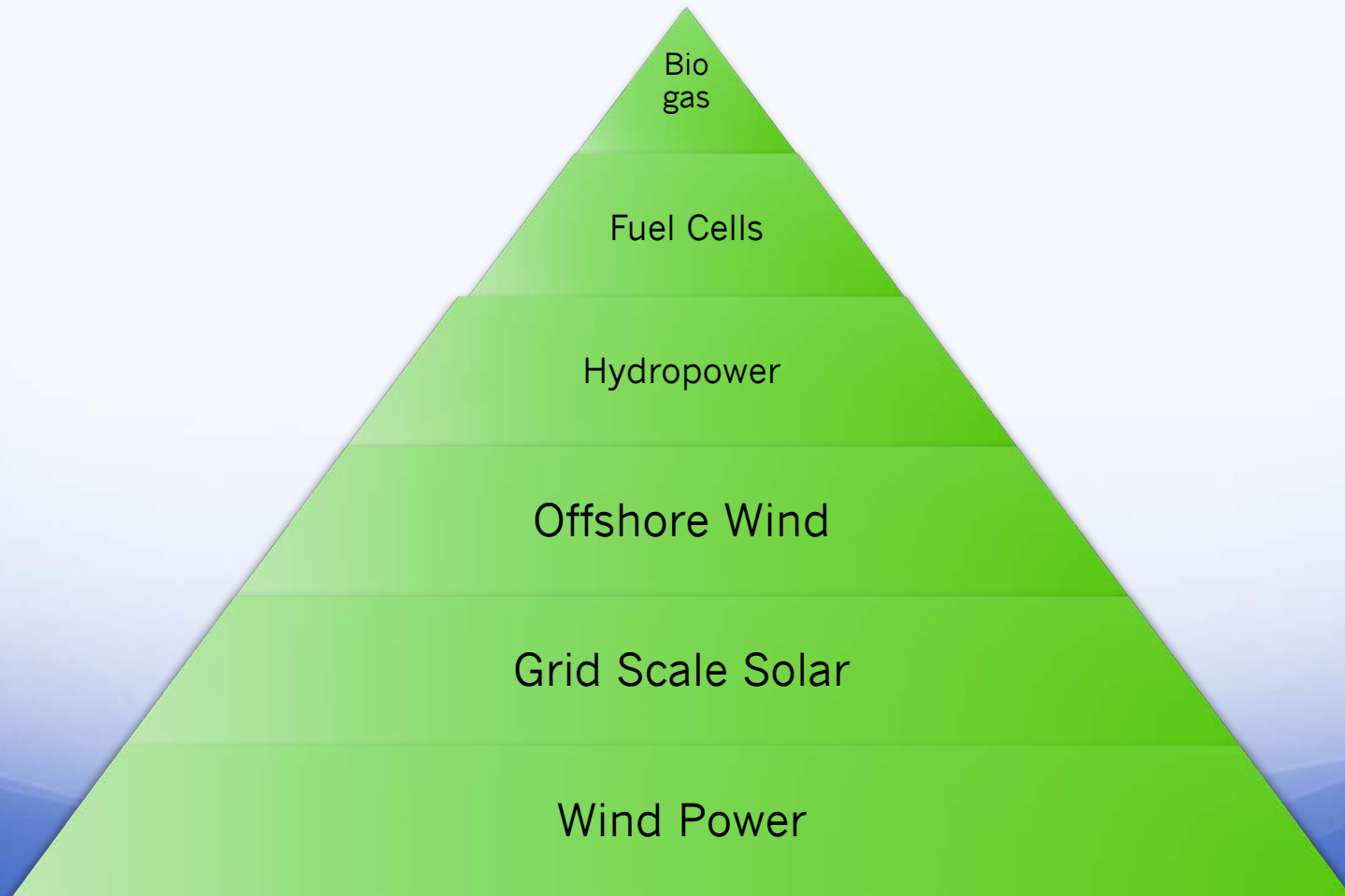
Power plants that use renewable technologies & sell wholesale power on to the transmission grid.



- Wind Turbines
- Hydropower
- Solar
- Biomass or Biogas
- Offshore Wind
- Fuel Cells **

Tier I Clean Energy Technologies

- We need 29,200,000 MWh of new Tier I renewable energy.



Reaching 50% Requires Significant Energy Efficiency for NY

(29.2 million MWh of new RE vs. 35.6 million MWh of Energy Efficiency)

***If more efficiency or distributed generation occurs, Tier 1 need is reduced.**

Annual Electricity Use in New York State, as Assumed in CES Planning

Statewide Energy Need after Energy Efficiency (GWh)



Building Towards 50% by 2030

What will it take to get 29.2 million MWh?

- NYSERDA has awarded contracts in recent years that have not been built yet.
- Governor Cuomo announced solicitations for offshore wind for 2018, 2019 for 800 MW total.
- NYSERDA published a solicitation schedule for 2018 – 2021 for REC contracts.
- This covers roughly half of the Tier 1 Need, and would leave ~ 7 years for more procurement.

The 50% Vision for 2030

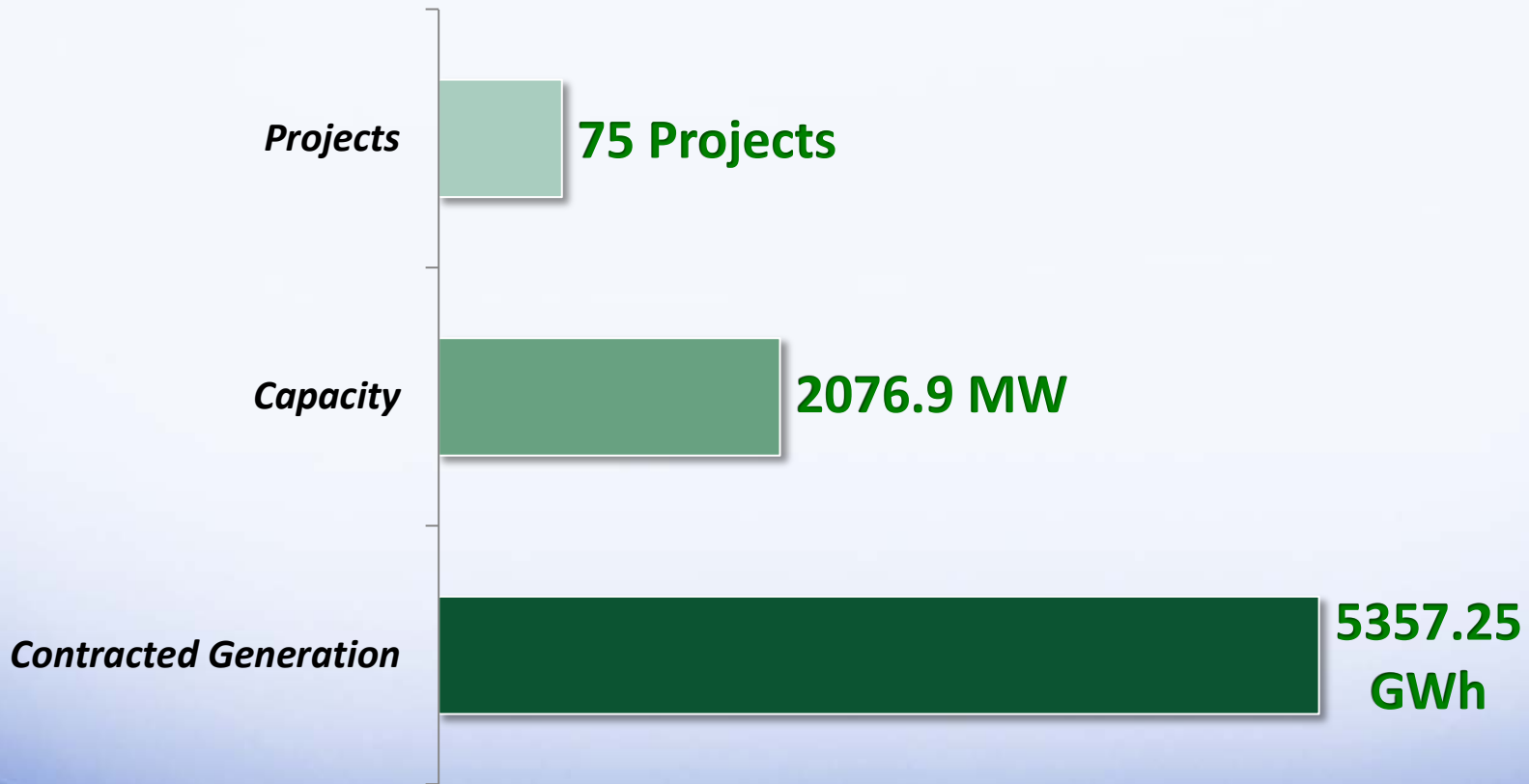
What Technologies will get us there?

Technology	I. 2030 Cost Study Projected Mix (%) of Tier 1	II. Cost Study w/ 2400 MW OSW (%)	III. Cost Study w/ 2400 MW OSW & 1000 MW Hydro Imports	MW of each Technology in Scenario I	MW of each Technology in Scenario III
Land Based Wind	50%	35%	25%	4,483	1,828
Utility Scale Solar	15%	11%	9%	3,855	1,905
Hydropower	9%	7%	5%	600	245
Bioenergy/Other	4%	3%	2%	189	77
Offshore Wind	14%	40%	41%	1,000	2,400
Imports	7%	5%	19%	516	1,000

The actual mix of technologies will depend on which will best compete. Note: This is for illustration of the range only; my method for scaling back the non-OSW and non-Imports was very rough!

NY Renewable Portfolio Standard

RPS MainTier Progress between 2004 and 2016



**** To achieve 50%, NY needs to procure roughly 4.5X annually during 14 CES years as compared to 14 RPS years.**



What does that look like?

- 2400 MW of offshore wind = 400 6-MW turbines; or 300 8-MW turbines
- 1000 MW of hydro imports from Canada means significant new transmission investments (e.g. TDI)
- 1 MW grid-scale solar = 5.9-7.2 acres
 - NYS is 30.2 million acres
 - 3855 MW solar = 25,846 acres = .09% of NYS land (25846/30.2 million)
- 4483 MW of new wind power = 2600 towers if all 1.7 MW or 1500 if 3 MW
 - Wind projects have direct land use, temporary land use, and total land area of project.

What is proposed in NY now?

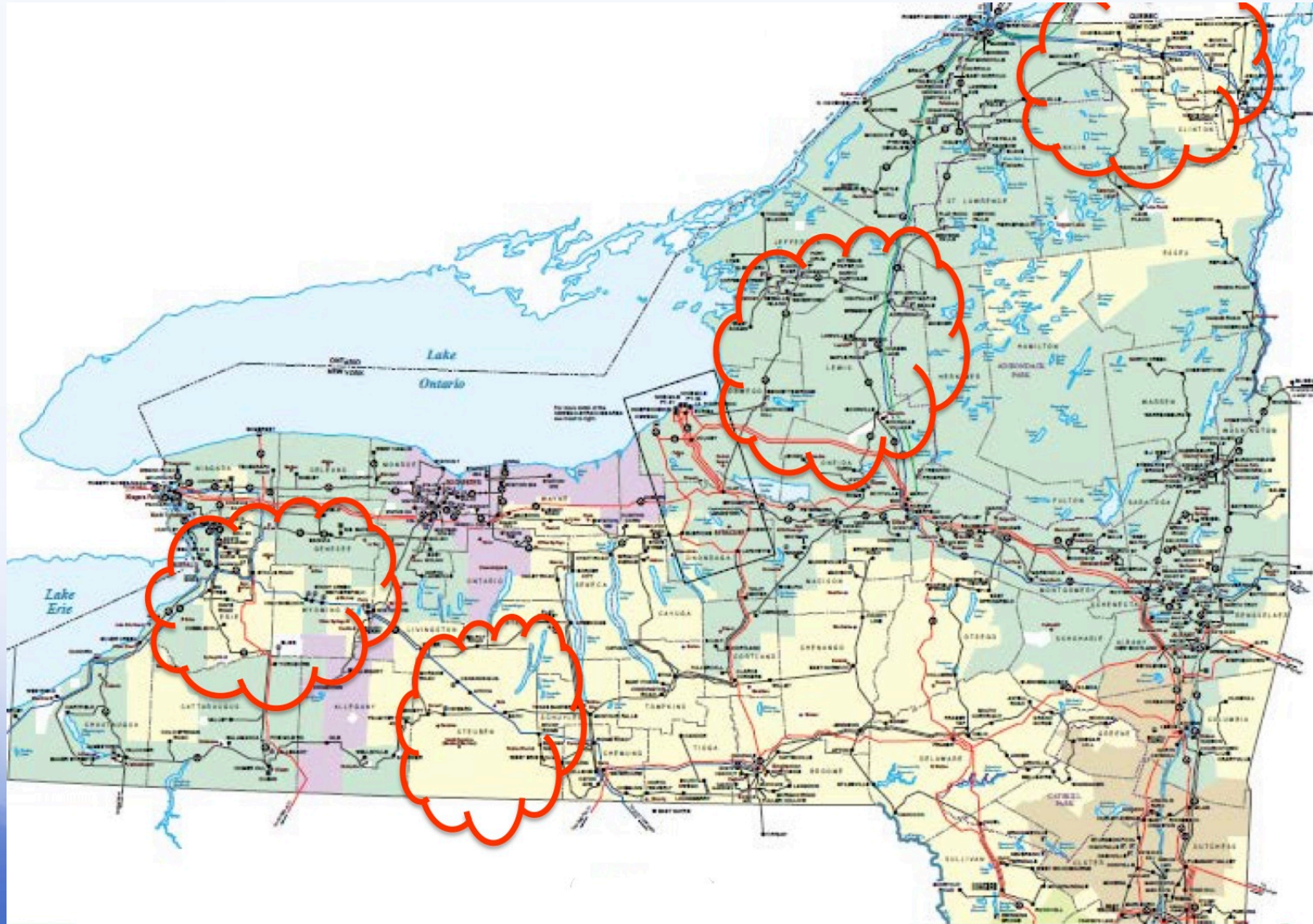
NYISO Queue as of April 17, 2017

Renewable Technology	Number of Proposed Projects	Proposed Capacity (MW)
Wind	33	4480
Solar	63	2002
Hydro	3	21.7

One wind project is for offshore wind.

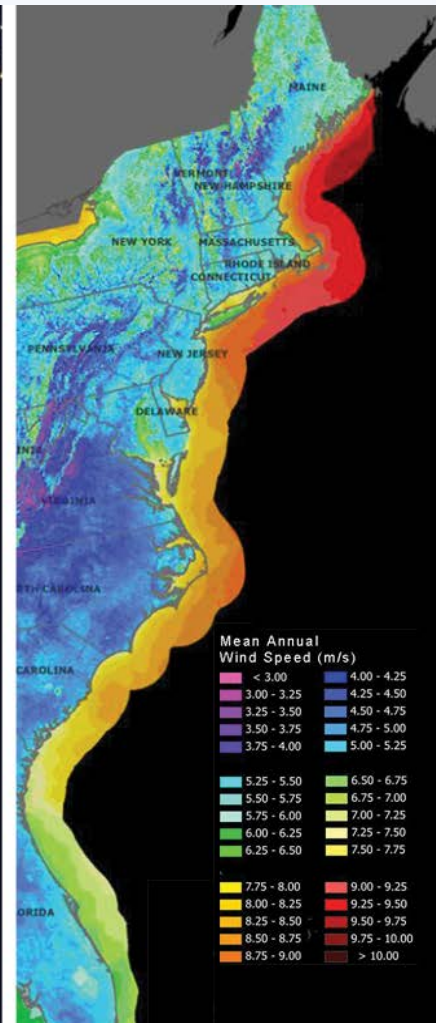
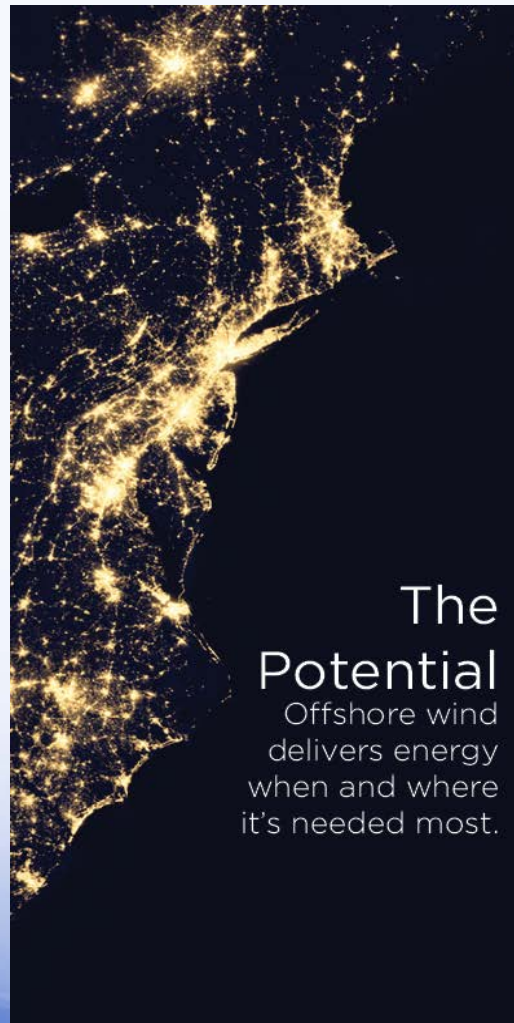
Most solar projects are 20 MW.

Where will land-based wind power go?



WHY NEW YORK? WHY NOW?

- ✓ **Power hungry populace**
- ✓ **It's really windy**
- ✓ **Shallow offshore**





NEW YORK ACTION

**2,400 MW
Commitment**

**NY Wind Energy
Area**

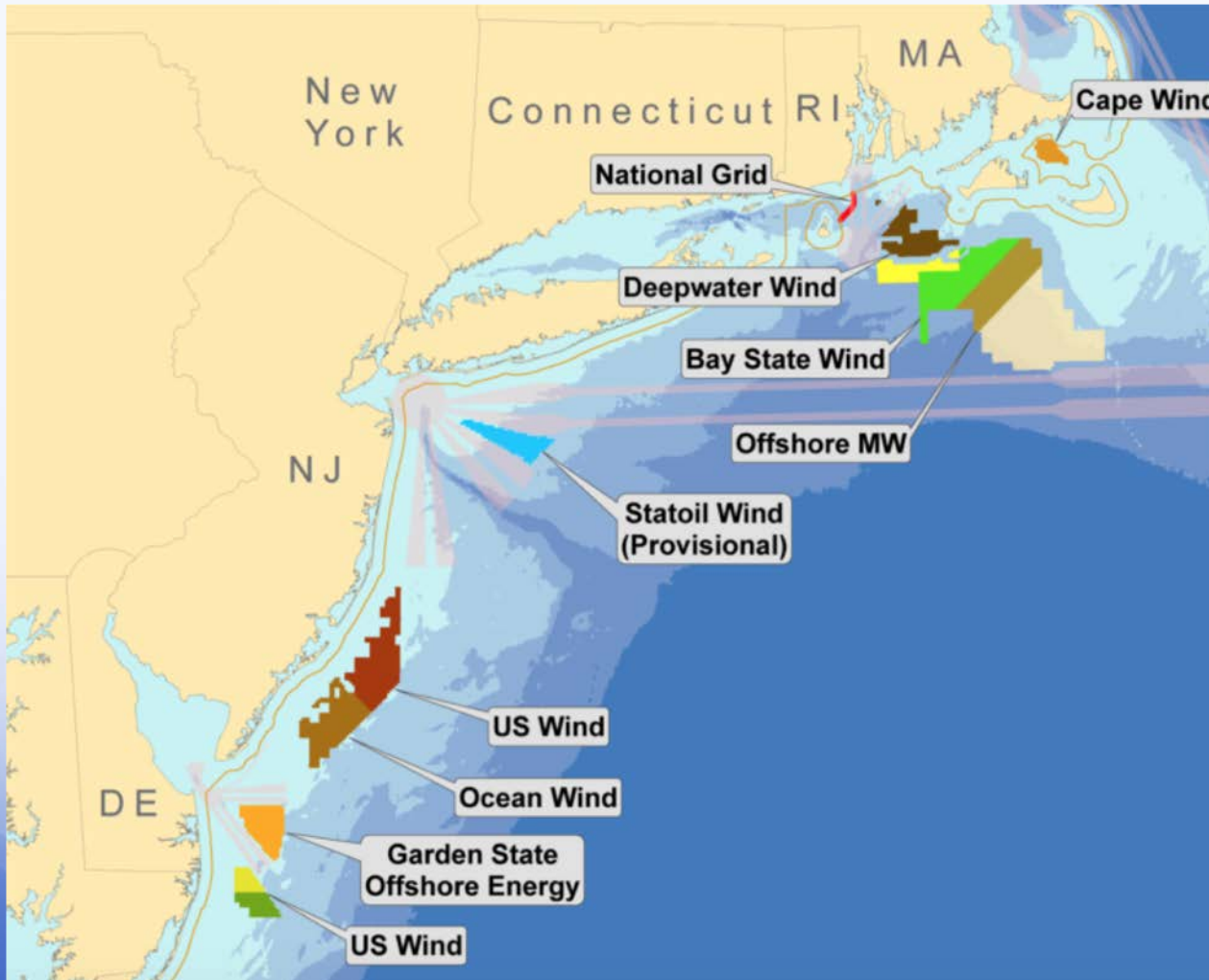
LIPA South Fork

**LIPA Renewables
RFP**

**Clean Energy
Standard**

**800 MW RFP for
2018-19**

**Offshore Wind
Master Plan**



What is required for Renewables to be Developed in NY?

- **Developers get long-term contracts so they can get projects financed and built.**
 - NYSERDA planning annual solicitations for 20 year REC contracts for (at least) 5 years.
 - Bundled power purchase agreements (energy + RECs) would be more cost-effective.
- **The permitting and interconnection processes are predictable and manageable**
 - Permitting is and will be long and expensive
 - Interconnection process is and will be long and expensive
 - But both need to improve
- **Communities support project development.**
 - Environmental community support is needed!

Thank you!

- Anne Reynolds, areynolds@aceny.org



Land Use of Projected Land-based Wind (2,638 MW)

Permanent Direct Land: 1,956 acres

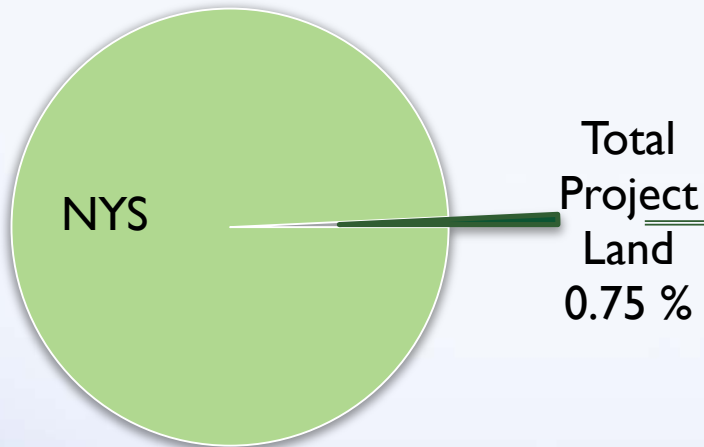
0.006% Of the total land of NYS

Temporary Direct Land: 4,563 acres

0.014% Of the total land of NYS

Total Project Land: 224,892 acres

0.75% Of the total land of NYS



The installed capacity of land-based wind comes from scenario IV.

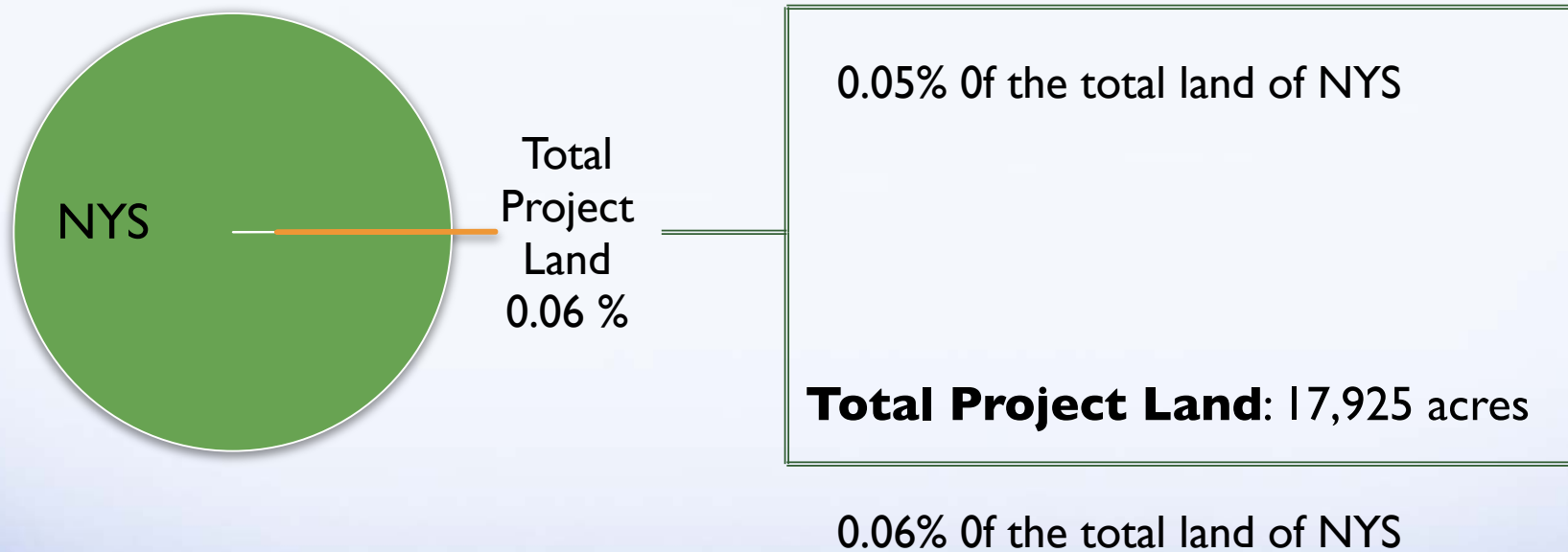
Land Requirement for Wind Power: Permanent Direct Land: 0.3 hectare/MW

Temporary Direct Land: 0.7 hectare/MW

Total Project Area: 34.5 hectare/MW

Source: NREL, Land-Use Requirements of Modern Wind Power Plants in the United States.

Land Use of Projected Utility-Scale Solar (2,213 MW)



The installed capacity of Utility-Scale Solar comes from scenario IV.

Land Requirement for Solar Power: Direct Land: 5.9-7.2 hectare/MW

Total Project Area: 7.9-8.3 hectare/MW

Source: NREL, Land-Use Requirements of Solar Power Plants in the United States.

Comparison of Land Use Between Land-Based Wind and Utility-Scale Solar



The calculation is based on scenario IV.

Source: NREL, Land-Use Requirements of Solar Power Plants in the United States.

NREL, Land-Use Requirements of Modern Wind Power Plants in the United States.