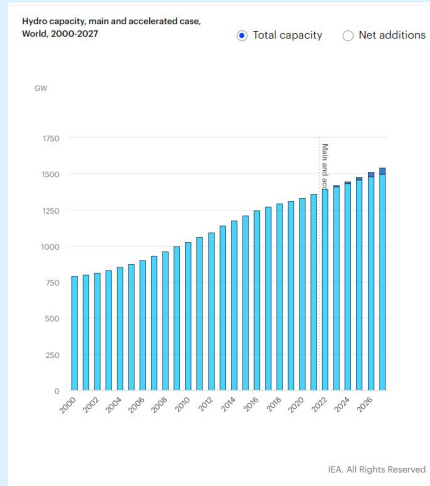


WOW! Wind Energy Investment Analysis

Conner, Camille, Joseph, Esther

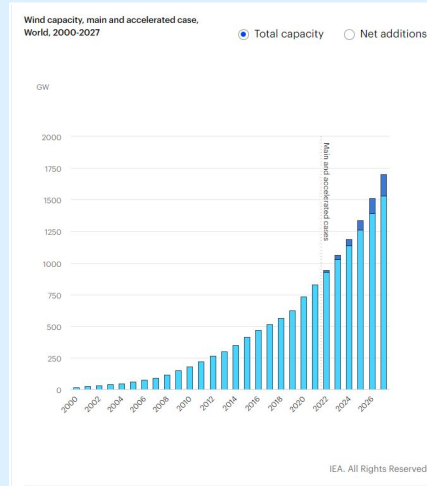


Global Energy Market



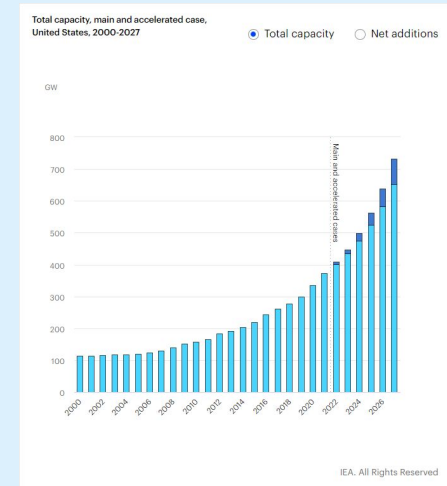
Hydro

Largest Renewable
Energy



Wind

Rapidly Growing
Renewable Energy



US Wind

587 Operators
1071 Plants

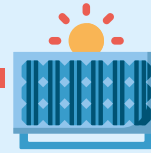
Trends of Wind Energy Market

Types

Onshore v Offshore

Future

Larger Turbines



Market Size

127.2 billion by 2027

Trends

- OffShore
- Energy Storage
- Corporations

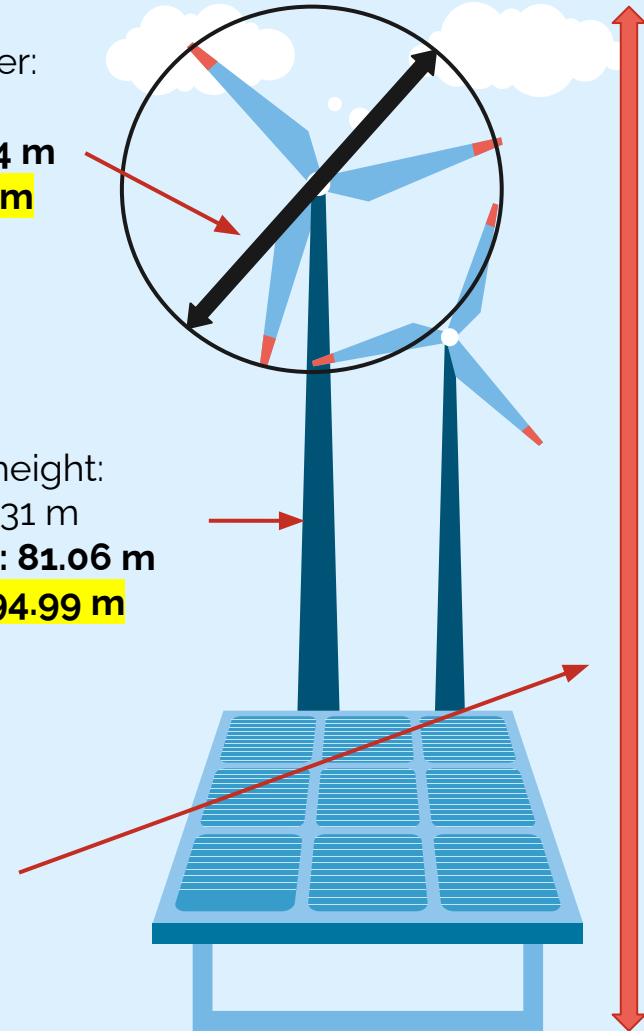
Wind Turbines

- The larger the hub height, rotor diameter, and turbine total height, the more energy generated

Rotor diameter:
14-155 m
average: 95.94 m
2021: 126.16 m

Hub height:
19-131 m
average: 81.06 m
2021: 94.99 m

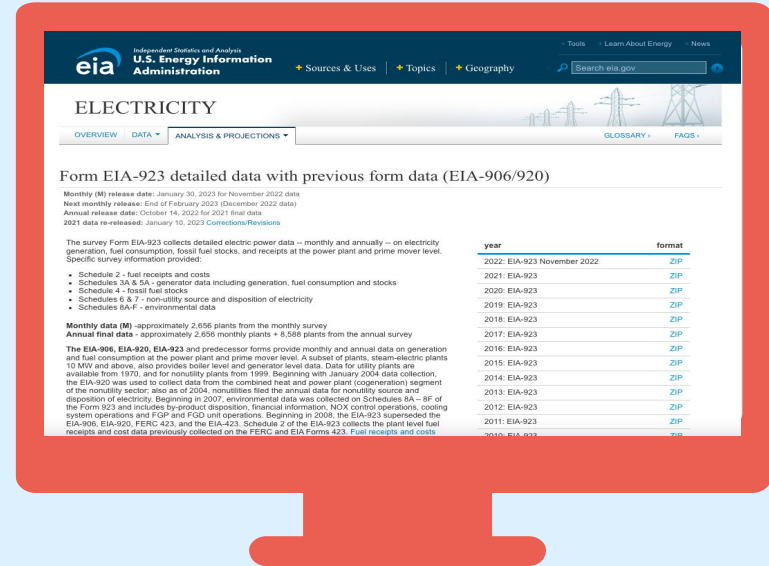
Turbine total height:
30.40-199.60 m
average: 129.05 m
2021: 158.07 m



Forecasting Wind Power Capacity

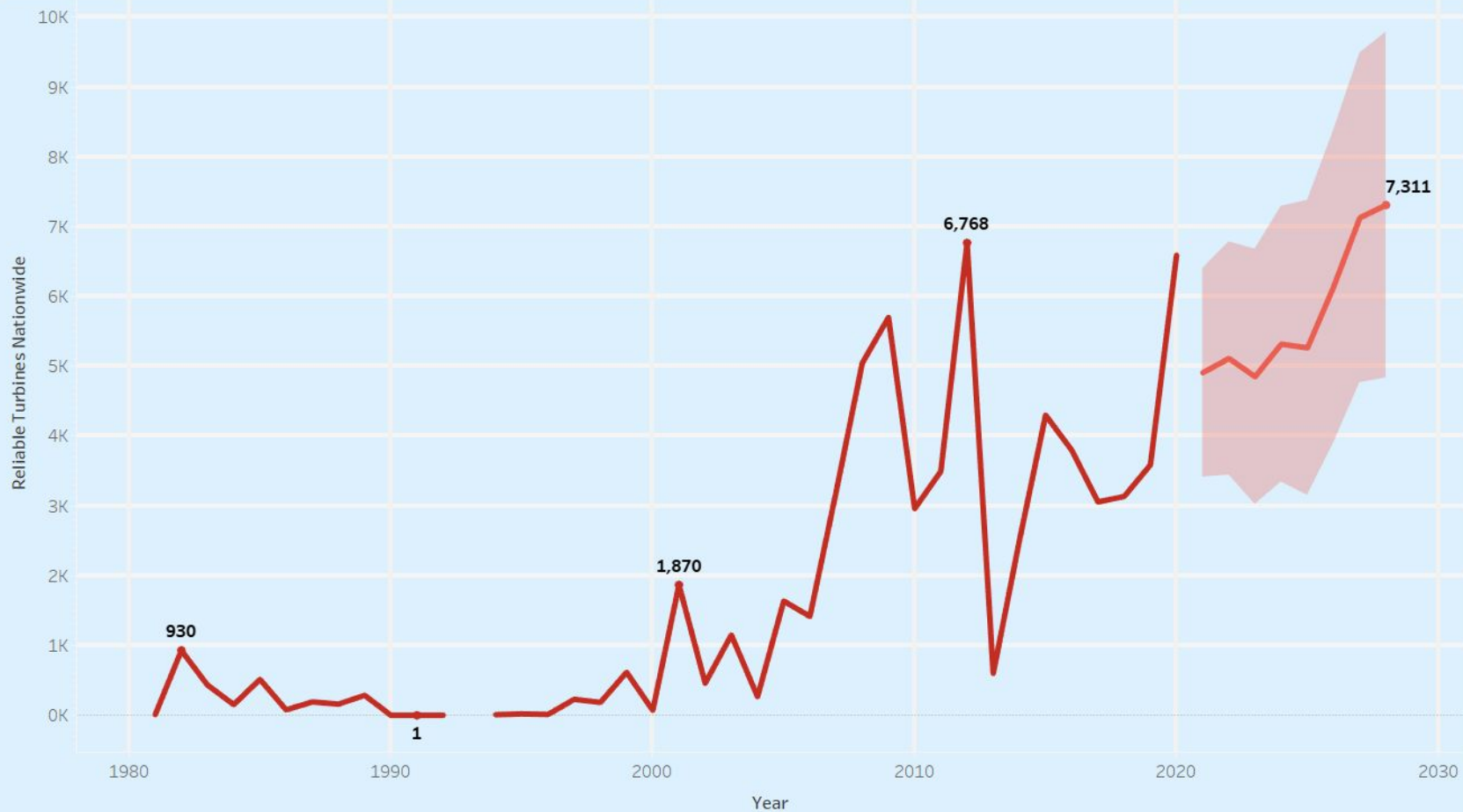
Survey Form EIA-923 (1989-2022) can be used to forecast wind power capacity for different regions of the country

- Maximize wind power that can be generated
- Minimize the amount of electricity that is wasted to produce wind power

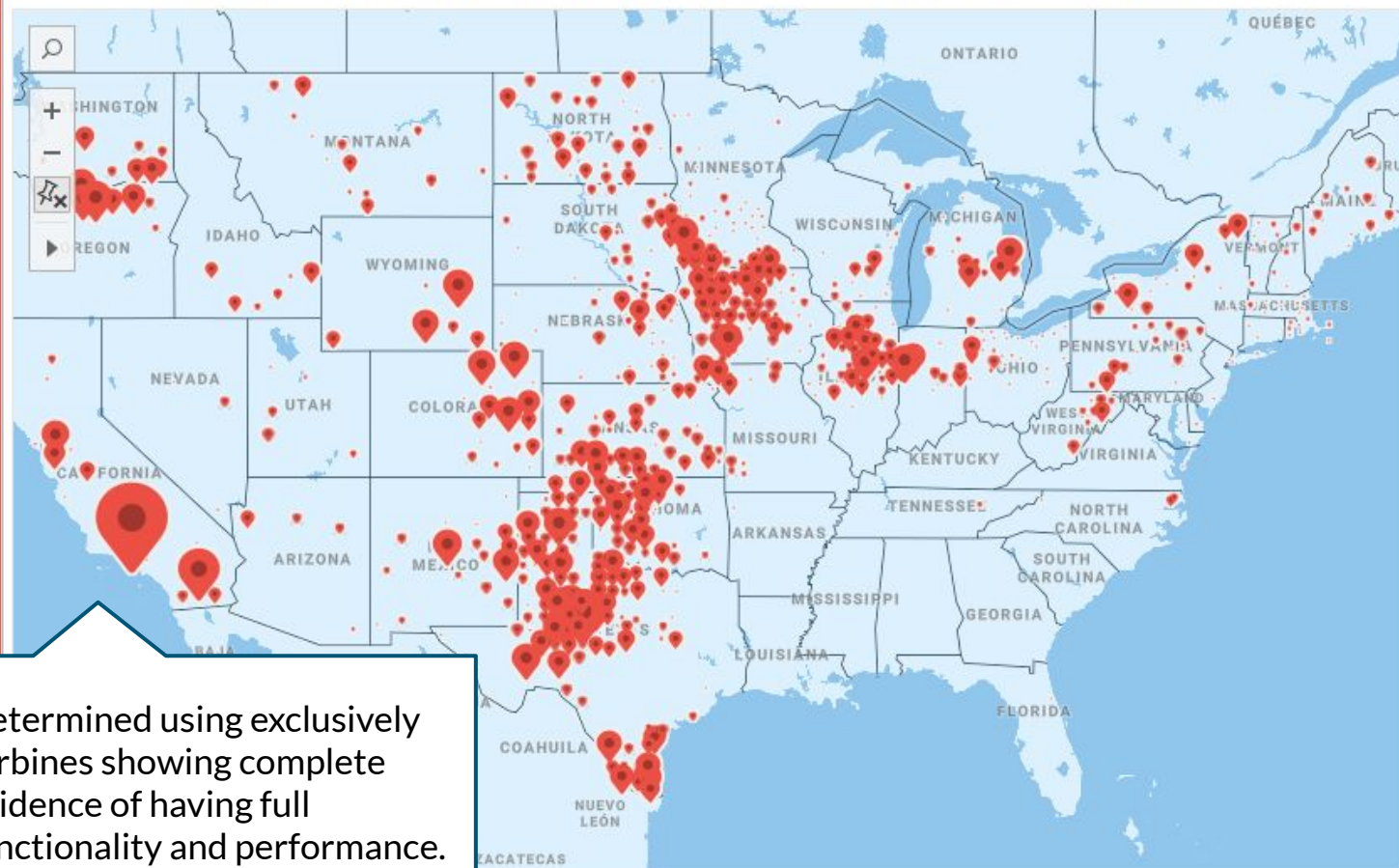


<https://www.eia.gov/electricity/data/eia923/>

CONFIDENCE OVER TIME



CONCENTRATION OF WIND ENERGY



Determined using exclusively turbines showing complete evidence of having full functionality and performance.

Major Players in the Wind Energy Industry



Top Operators by Net Generation

- AE Power Services
- Avangrid Renewables
- RWE Renewables Americas
- Capricorn Ridge Wind LLC
- EDF Renewable Asset Holdings
- FPL Energy Horse Hollow LLC
- Invenergy Services LLC
- Pattern Operators LP
- Leeward Asset Management
- Southern Power Co



Top Operators by Capacity

- Avangrid Renewables
- RWE Renewables Americas
- EDF Renewable Asset Holdings
- Invenergy Services
- Pattern Operators LLC
- AE Power Services
- Southern Power Co
- Engie North America
- Leeward Asset Management
- NRG Energy Gas & Wind Holdings



Top OEMs by Market Share

- GE Wind - **43.03%**
- Vestas - **26.30%**
- Siemens Gamesa Renewable Energy - **17.81%**

Investment Decision Framework

Net Generation

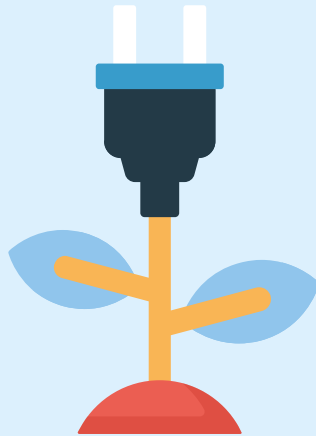
How much are they currently producing?

Market Share

How much of the market do they own?

OEM Usage

What technology are they using?



Capacity

What is their potential to produce?

Turbine Count

How many total turbines do they have in operation?

Total Population

Total populations served to highlight potential demand

Investment Partnership Recommendations

operator_name	net_generation	total_capacity_per_operator_kw	capacity_market_share	total turbine count	% of turbines from top 3
Avangrid Renewables LLC	3,493,860,419	14,769,880	7.44%	7604	82%
RWE Renewables Americas LLC	2,892,624,506	9,535,540	4.80%	5250	73%
EDF Renewable Asset Holdings, Inc.	2,591,843,566	8,635,660	4.35%	4447	87%
Invenergy Services LLC	1,741,802,218	6,425,370	3.24%	3693	100%
Pattern Operators LP	1,358,305,517	5,712,060	2.88%	2673	95%

