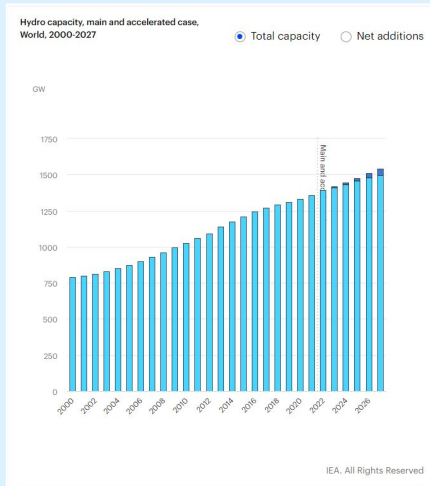


# WOW! Wind Energy Investment Analysis

Conner, Camille, Joseph, Esther

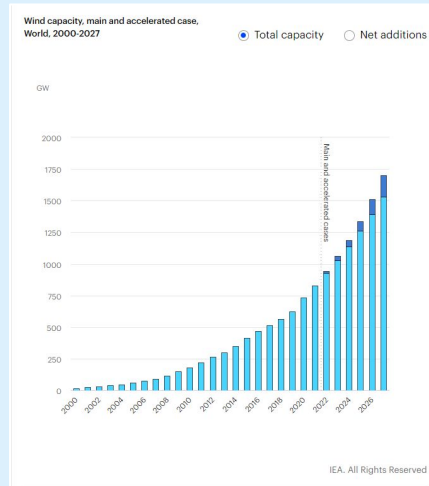


# Global Energy Market



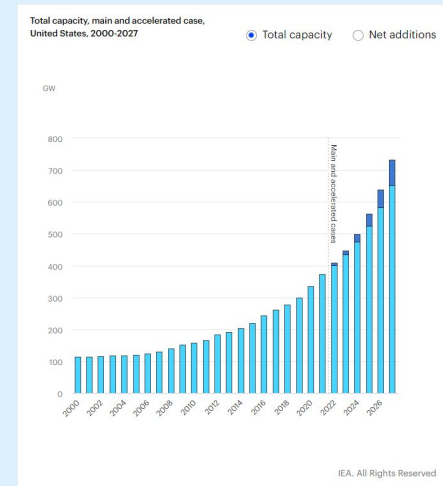
**Hydro**

Largest Renewable  
Energy



**Wind**

Rapidly Growing  
Renewable Energy



**US Wind**

587 Operators  
1071 Plants

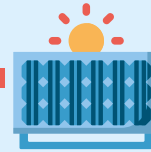
# Trends of Wind Energy Market

## Types

Onshore v Offshore

## Future

Larger Turbines



## Market Size

127.2 billion by 2027

## Trends

- OffShore
- Energy Storage
- Corporations

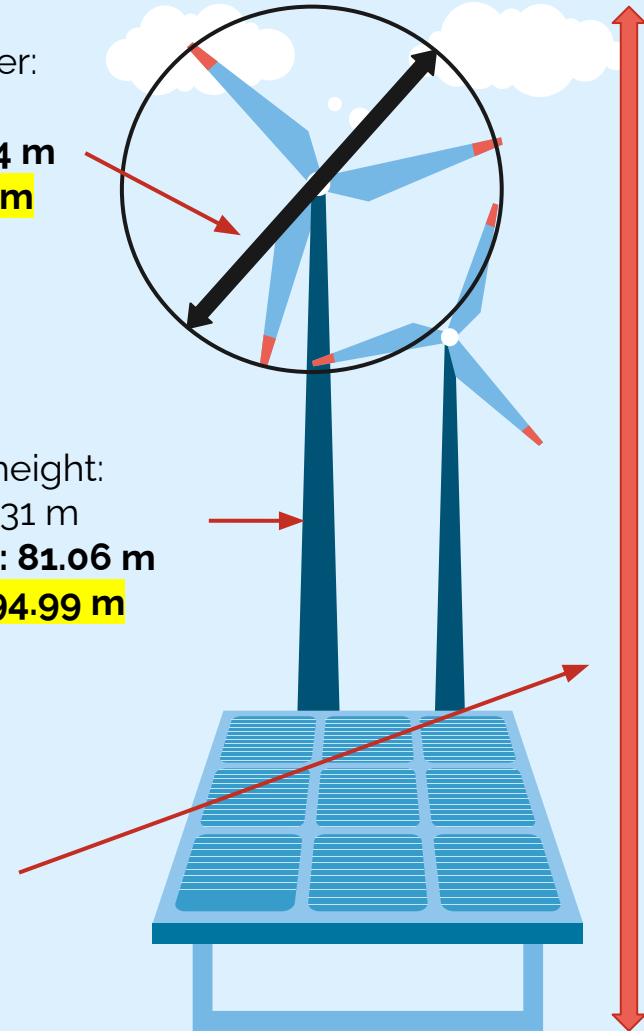
# Wind Turbines

- 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**

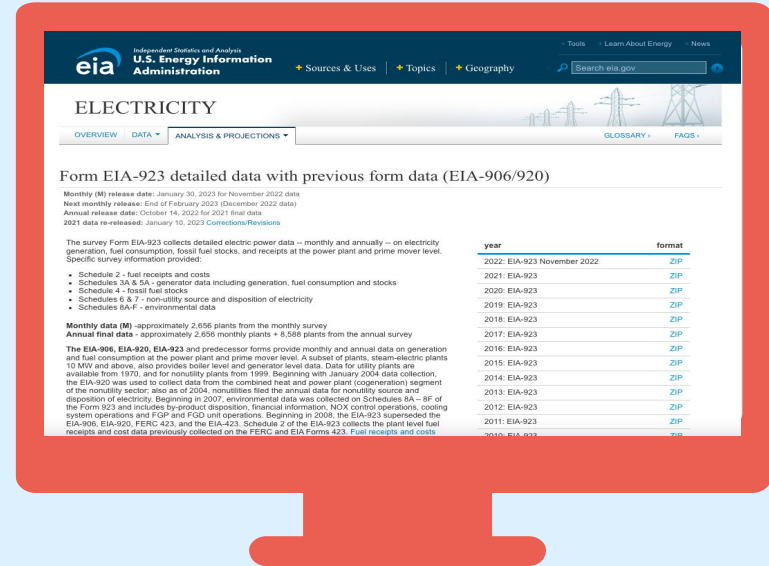
Turbine total height:  
30.40-199.60 m  
**average: 129.05 m**  
**2021: 158.07 m**



# 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/>



63

Distinct OEMs (1982-2021)

# 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%**

# Where to invest?

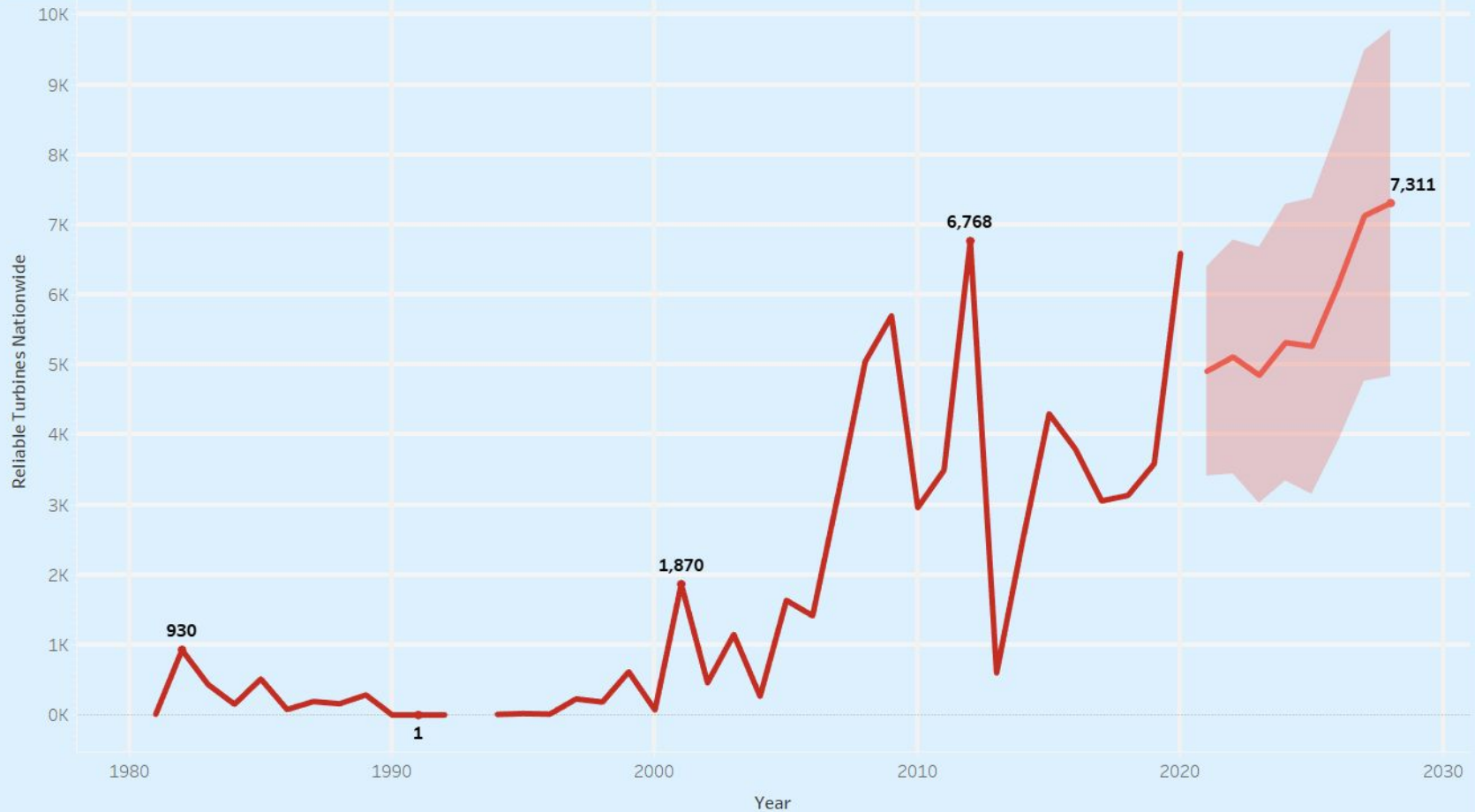
What can history tell us about the Wind Turbine Industry?:

- Trends
- Hotspots
- Demand

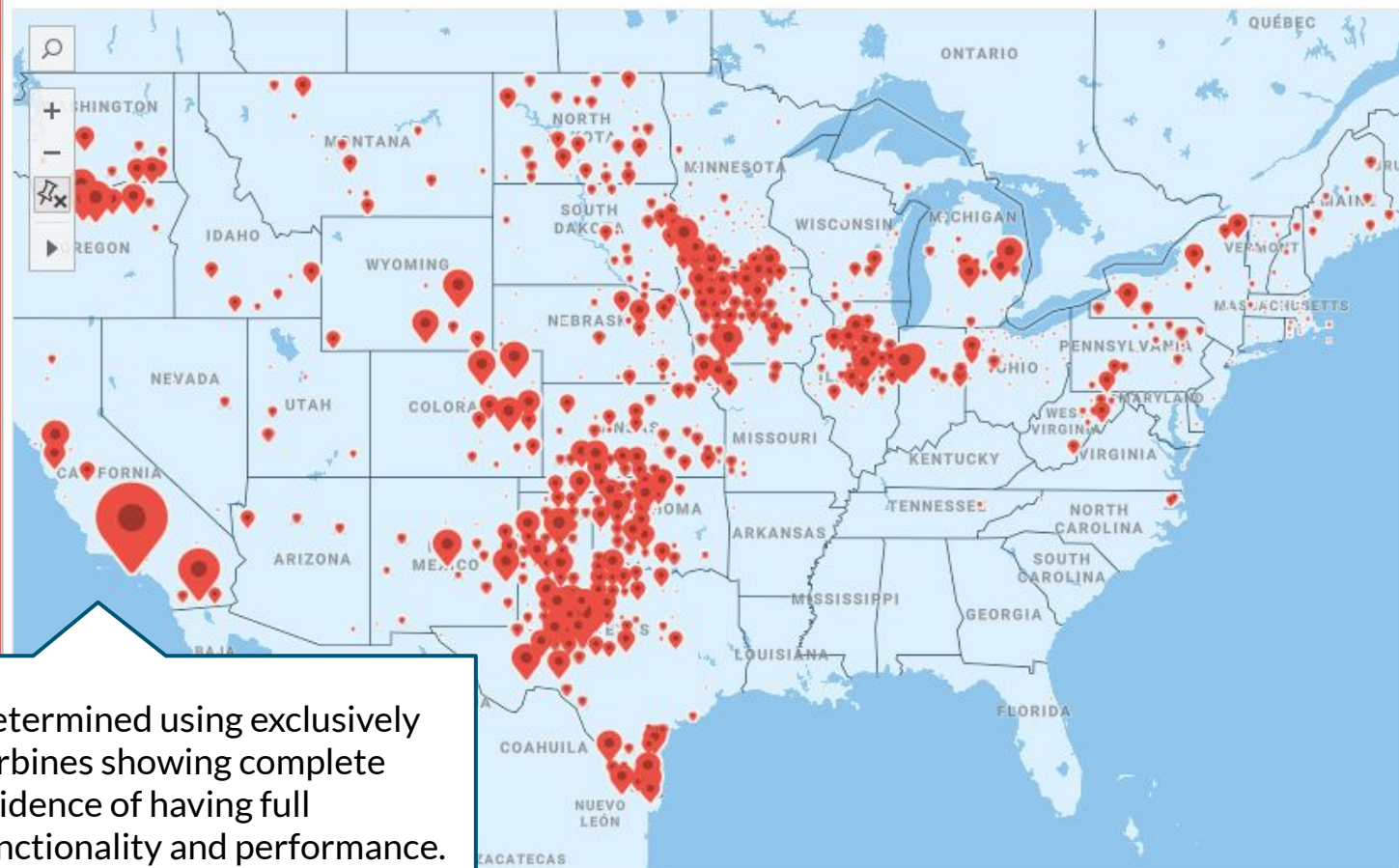




## CONFIDENCE OVER TIME

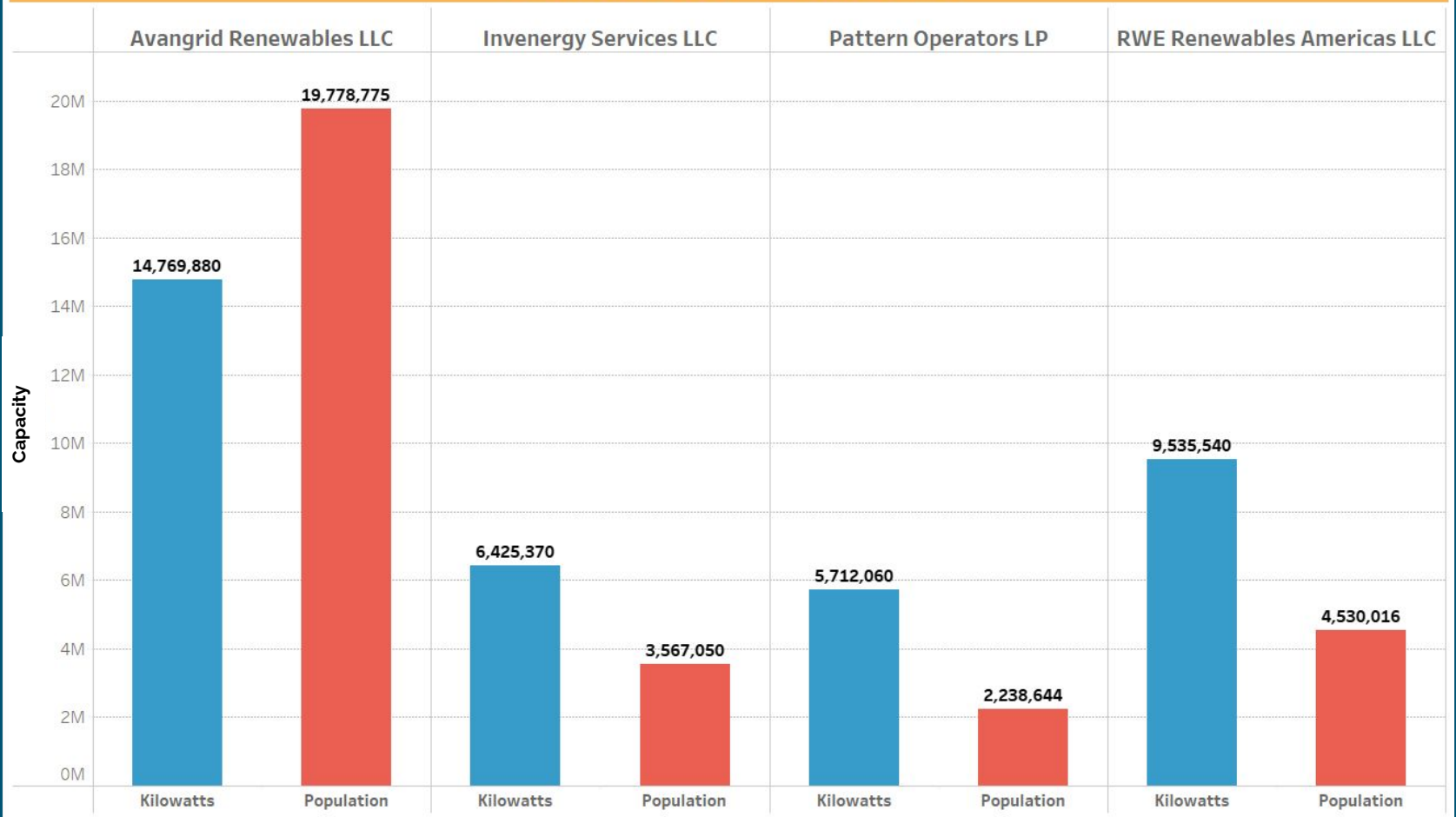


# CONCENTRATION OF WIND ENERGY



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

## COMMUNITY IMPACT



# Investment Decision Framework

## Net Generation

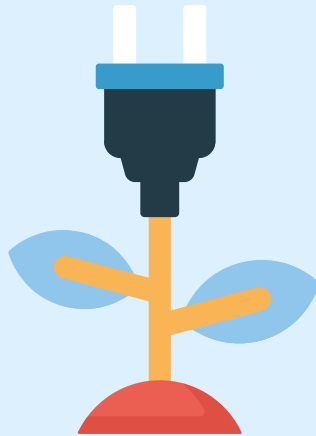
How much are they currently producing?

## 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%
Invenenergy 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%

