

What to do about Oahu?

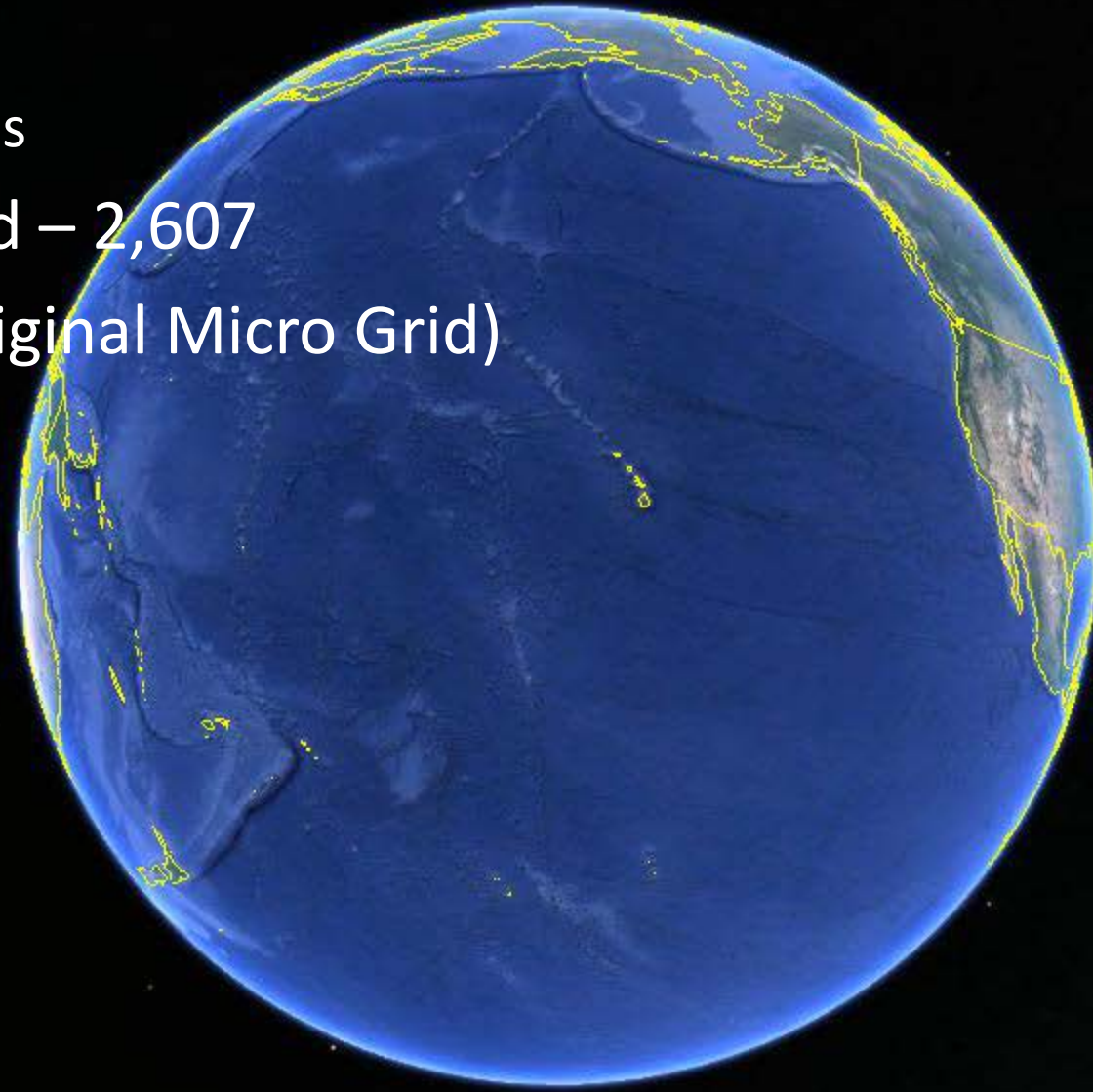
**Group 3**

Gurudatta Belavadi

Jari Miettinen

Tony Thomas

- Population – 953,207 People
- 2013 Peak Demand – 1141MW
  - 25% Residential sales
  - 75% Commercial sales
- Miles to the Mainland – 2,607
- Island System (the original Micro Grid)

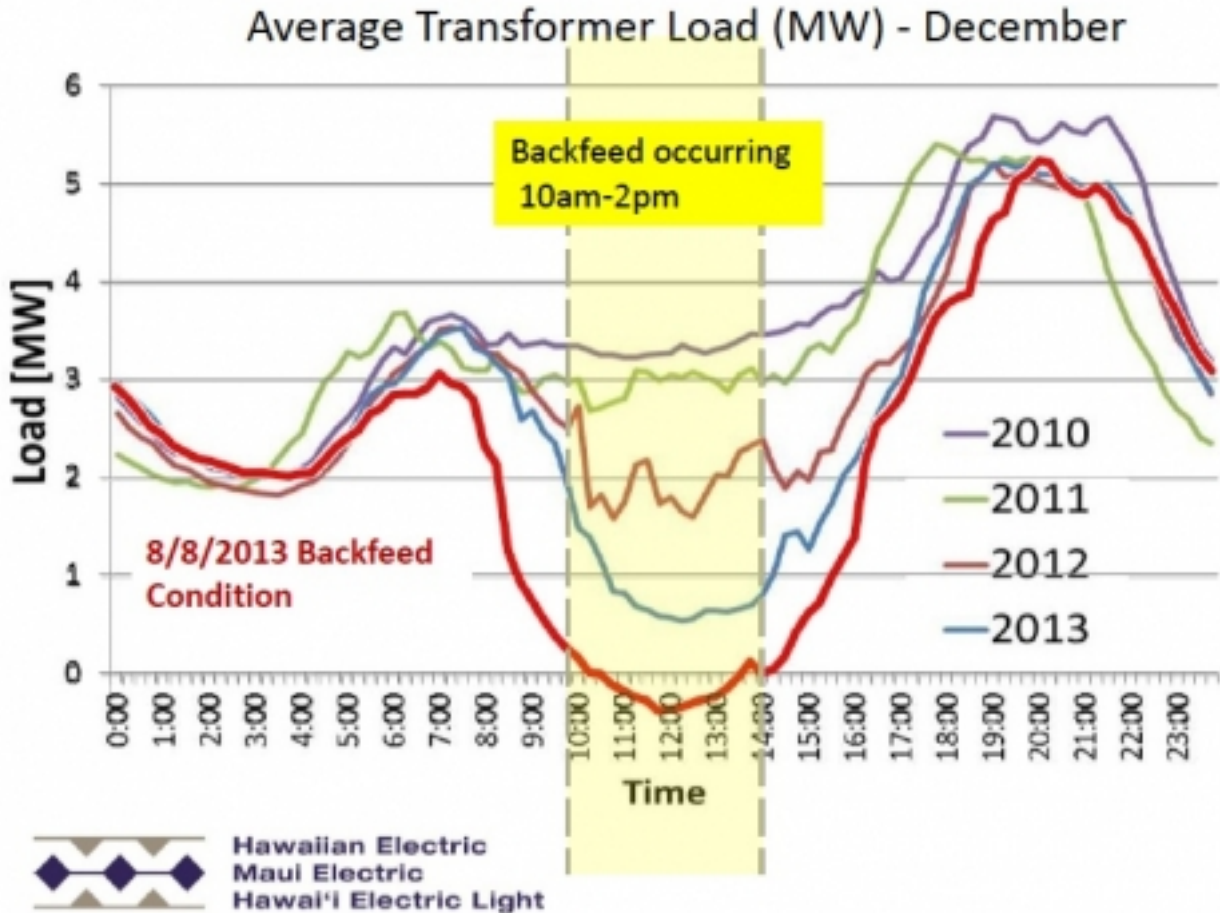


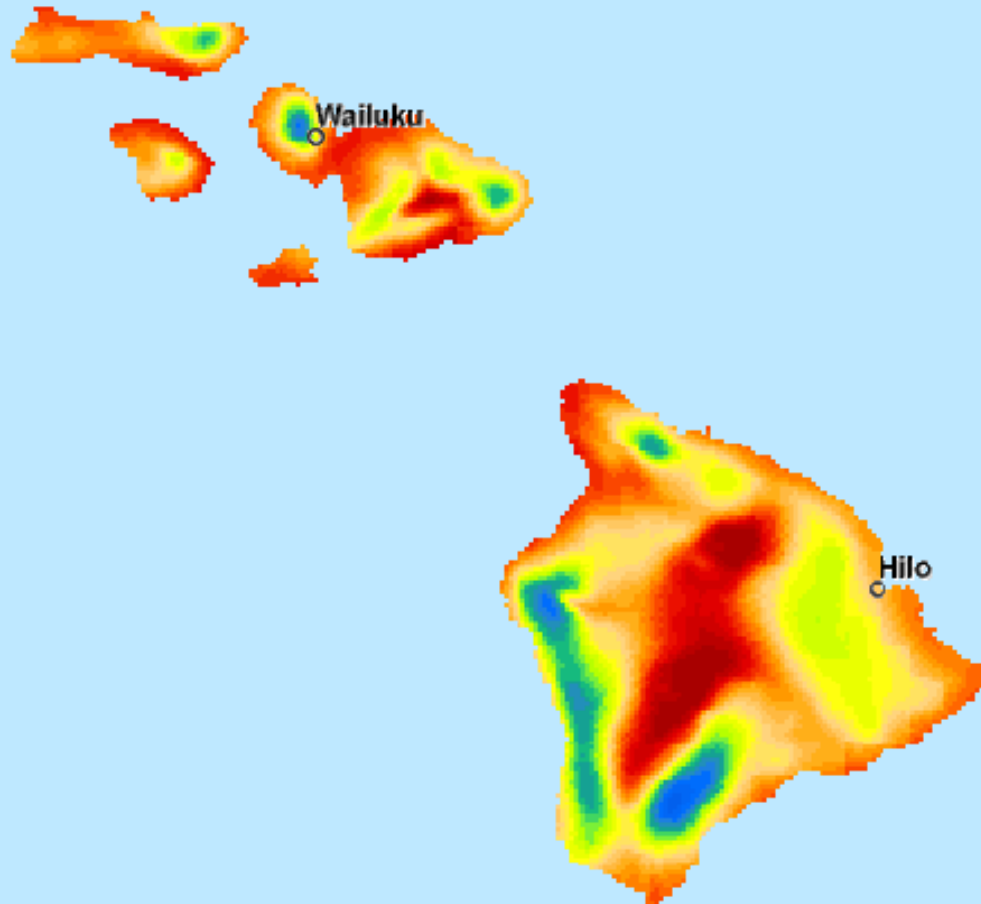
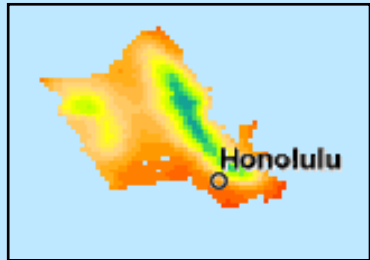
# Challenges:

- **HURRICANES**
- Solar irradiation and wind speed correlation
- Loch ness curve.
- Increasing dependence on non-synchronous generation.
- Island system, no inertias for balancing.
- Land constrained.
- Sea bird regulation limits wind generation.
- Transportation of materials is both difficult and expensive.

# Meet Nessie!

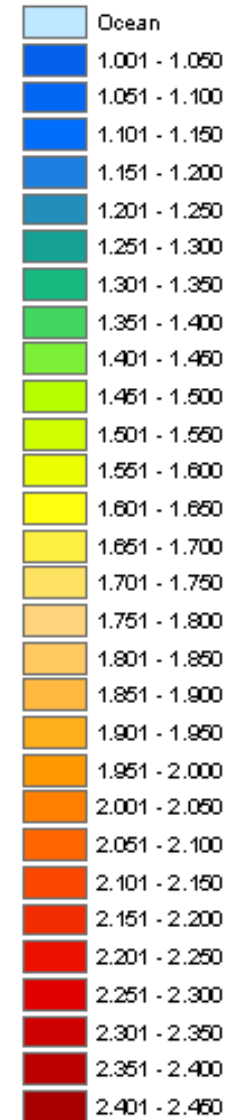
## Tracking Change – 46kV Level





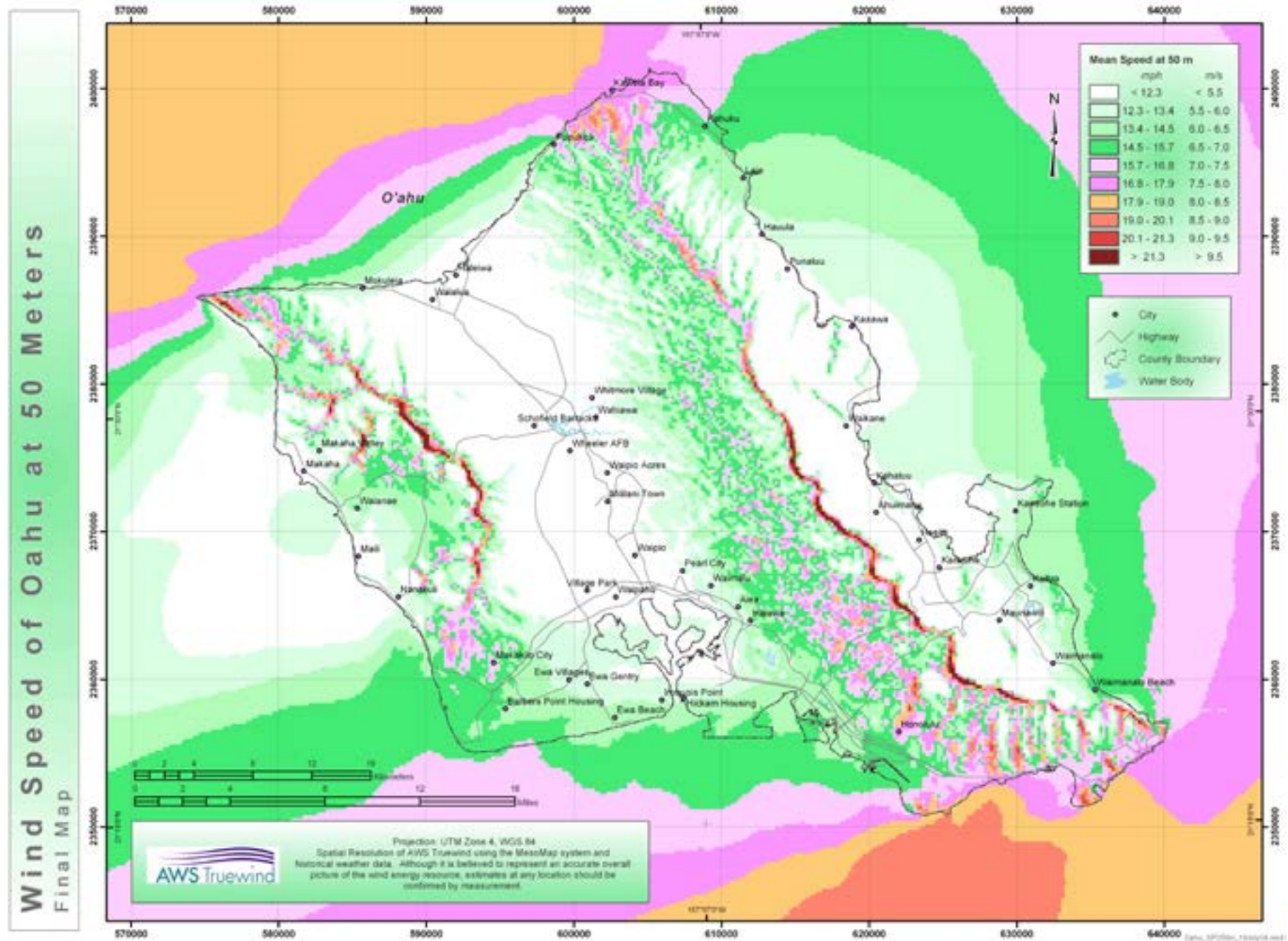
### Solar Radiation Hawaii

kWh/m<sup>2</sup>

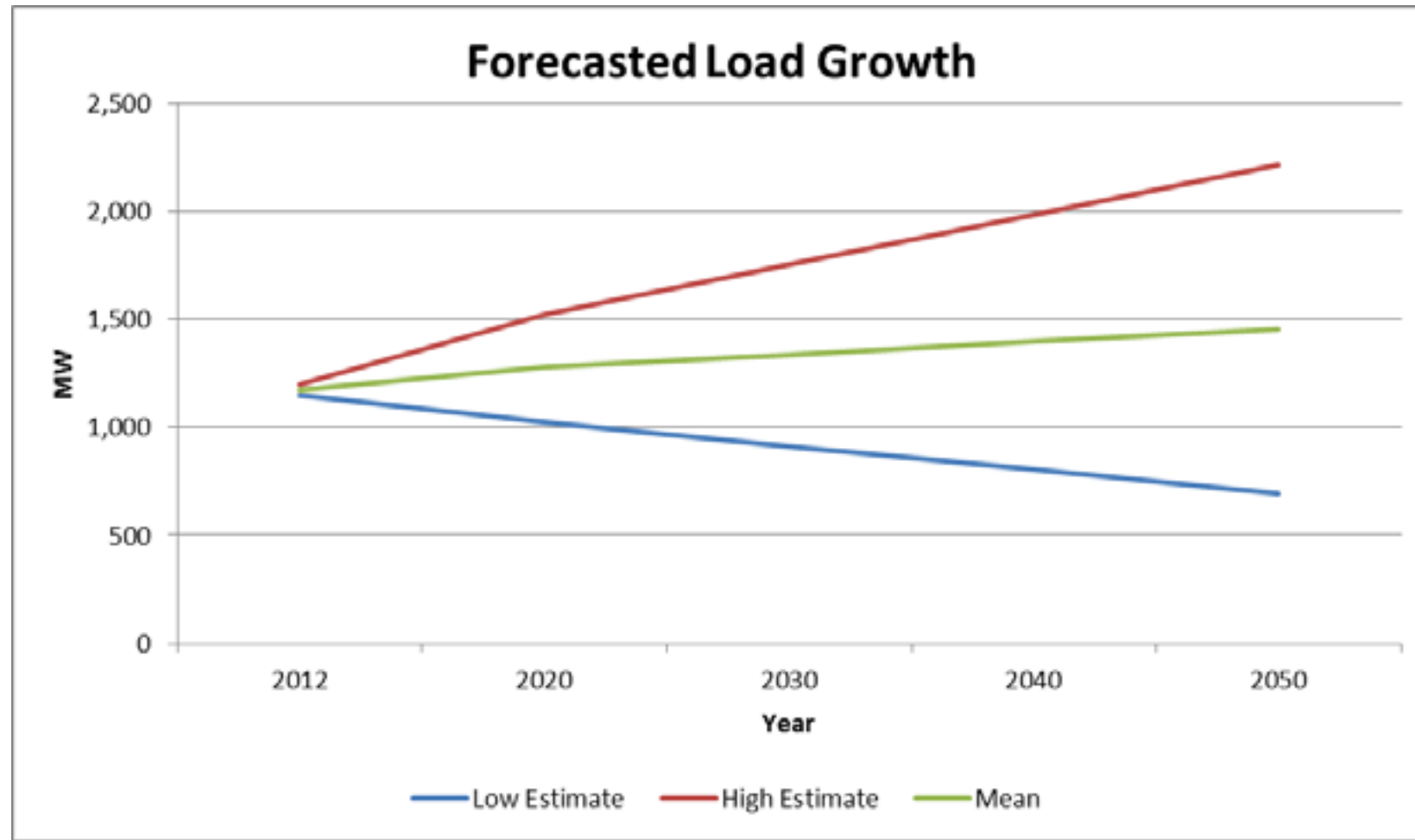


# Renewable assets Solar energy

# Renewable assets: Wind energy



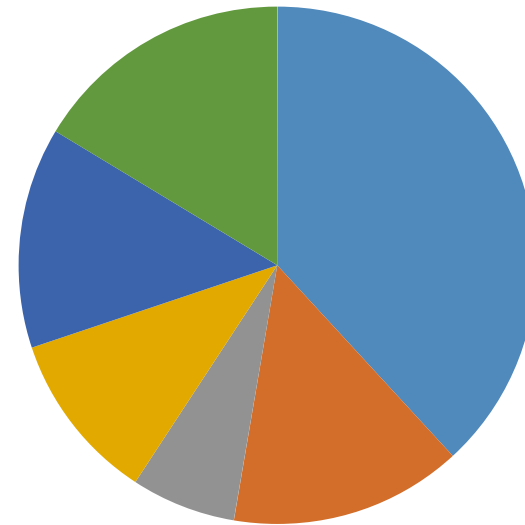
# Projections



# 2030 Projections

## 2030 Fuel Mix

Gen Type	MW	%	$\Delta$ MW
oil	525	25%	-861
biofuel	200	12%	80
coal	90	9%	-90
w-to-e	146	7%	73
wind	190	24%	91
solar	225	24%	4
<b>Pumped Hydro</b>	<b>520</b>		



### Notes:

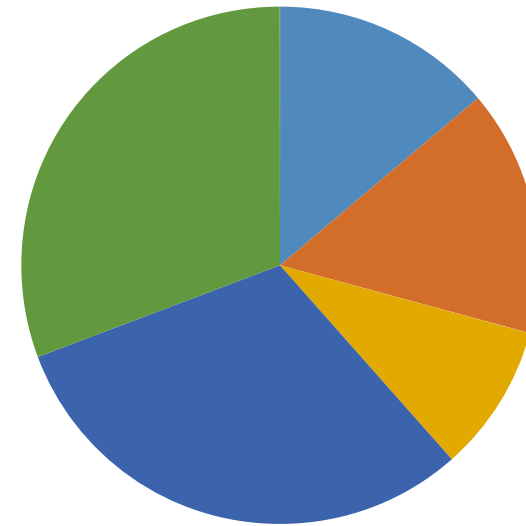
Pumped Hydro serves both as a sink for excess generation and peak support.  
Total Oil Generation is 1386 MW in emergency situations.



# 2050 Projections

## 2050 Fuel Mix

Gen Type	MW	%	$\Delta$ MW
oil	225	15%	-1161
biofuel	250	17%	130
coal	0	0%	-180
w-to-e	150	10%	77
wind	500	34%	401
solar	500	34%	279
<b>Pumped Hydro</b>	<b>1000</b>		



## Notes:

Pumped Hydro serves both as a sink for excess generation and peak support.  
Total Oil Generation is 1386 MW in emergency situations.

# Innovations/policies

- Support for pumped storage
- Improvement in solar and wind tech
- May have caverns available for compressed air storage.
- DC intertie between islands
- Offshore wind
- Thermal Storage in water heaters
- Building cooling through absorption chillers.
- Support for IPPs.

**Questions?**