DOCKETED			
Docket Number:	19-IEPR-07		
Project Title:	Electricity Sector		
TN #:	229907		
Document Title:	North Coast Offshore Wind Studies		
Description:	Presentation by Mark Severy, Schatz Energy Research Center		
Filer:	Raquel Kravitz		
Organization:	Schatz Energy Research Center		
Submitter Role:	Public		
Submission Date:	10/1/2019 3:58:23 PM		
Docketed Date:	10/1/2019		

North Coast Offshore Wind Studies

Integrated Energy Policy Report Workshop – Offshore Wind October 3, 2019 San Francisco, California

Presented by Mark Severy



3 October 2019 | schatzcenter.org

Photo credit: Maia Cheli

Acknowledgments

Project Funders



Major Partners





Navy

Region

Southwest

Research Topics

Funded by Bureau of Ocean Energy Management (BOEM)



Funded by California Ocean Protection Council (OPC)



Funded by California Governor's Office of Planning and Research (OPR)



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Offshore Wind Resource



Study Assumptions

Studying three possible scales of development:

Wind Farm Size	Description	Turbine Size	Loss Factor
50 MW	Pilot scale	12 MW	9% down time [*] 13% losses [†]
150 MW	Small commercial		
2,100 MW	Full build out	ree meter nub neight	

* Down time for maintenance, availability, weather events, etc.
* Proportional losses for line losses, wake effects, degradation, etc.

Time Series of Power Generation

Example weeks, 144 MW wind farm, Northern California Call Area



Key Takeaways:

- Power generation varies from week to week, even within the same season.
- There are sustained times of max generation and low generation.

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Generation Duration Curve



Key Takeaways:

- Full power for 32% of the year
- No power for 21% of the year

Generation Profile

Legend

Average Power

90th Percentile

75th Percentile

50th Percentile

25th Percentile

10th Percentile

144 MW Wind Farm in Northern California Call Area



Key Takeaways:

- The wind farm produces 46% of its rated capacity (46% capacity factor), and higher in the spring and summer.
- There is a wide spread in power production in all seasons and hours.
- Most of the time, the wind farm would produce either full capacity or no power.
- The 25th percentile in Spring and Summer is 8% of the rated capacity.

Local Power Generation in Humboldt County



Existing Transmission Lines



Scale of Transmission Infrastructure



Transmission Planning Study



Transmission Planning Power Flow Study

PG&E is studying three transmission pathways

- East to Cottonwood or Round Mountain
 - South to Sonoma or Vaca-Dixon
- Hypothetical subsea HVDC line (interconnection TBD)

Results will indicate:

- Infrastructure upgrades required for all wind farm scales
- Cost estimate for transmission upgrades

Further work:

- CAISO interconnection:
 - Technical and contractual constraints and markets
- HVDC challenges and impacts:
 - Geotechnical, interconnection, environmental

Social and Environmental Impacts



Transmission upgrades will also have stakeholder and environmental impacts that must be considered.

Schedule

Final reports available in Spring and Summer 2020

Updates available at www.schatzcenter.org/wind

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Contact Information



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Discussion and Questions

