

2023 Meteorology and Market Design for Grid Services Workshop



Denver, CO
June 13-15, 2023

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Workshop Agenda Overview



Tuesday, June 13th

- Introduction and Opening Comments
- Session 1: Ancillary Services Markets and Ramping Products for Renewable Energy
- Session 2: DER Forecasting for Operations
- Session 3: Aligning Retail Rates and Grid Needs for Flexibility and Balancing Considerations
- Session 4: Progress in the Use of Probabilistic Forecasts: A Panel Discussion
- Networking Reception 6:30 pm – 8:00 pm

Wednesday am, June 14th

- Session 5: Market Design for 100% Renewable Markets
- Session 6: State of the Art and Outlook for Renewable Energy Forecasting

Workshop Agenda Overview



Wednesday pm, June 14th

- Session 7: Electricity Market Performance under Extreme Events
- Session 8: Data Sets for Future System Planning and Extreme Weather Events

Thursday, June 15th

- Session 9: Incorporating Risk into Power Systems and Markets
- Session 10: Closing Plenary - Where Have We Been and Where Are We Going

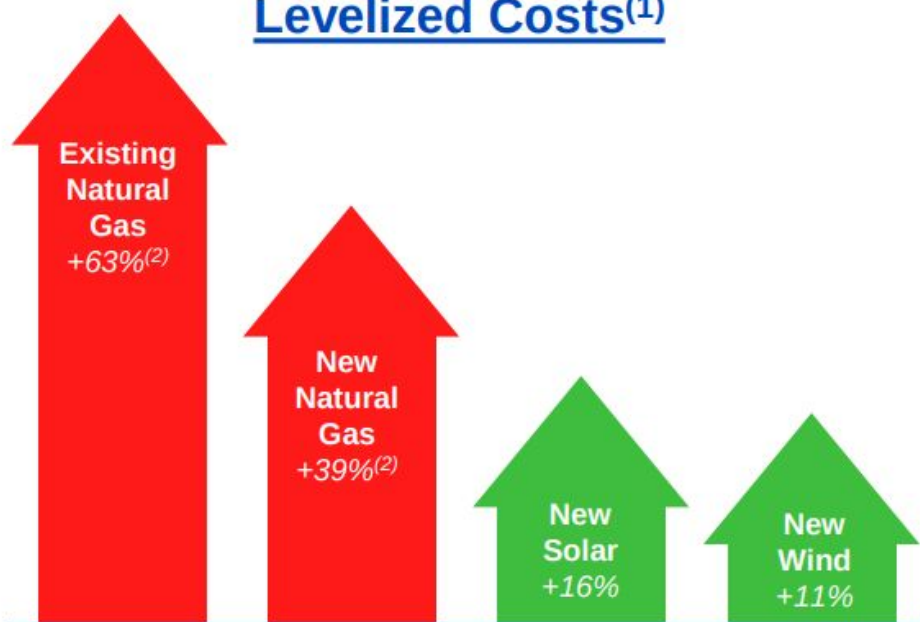
View of Difference in Energy Cost from New Renewables and New Natural Gas CCGT



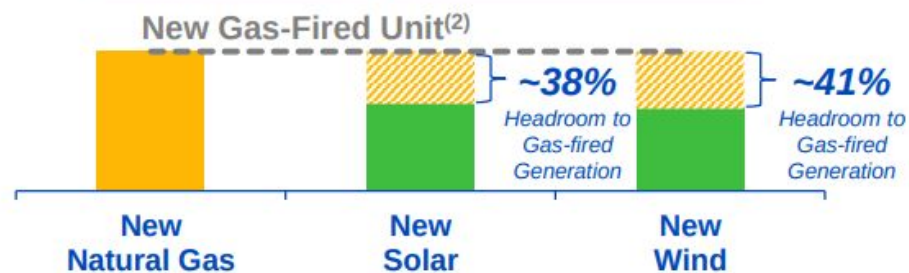
On a relative basis, renewables are now even cheaper than new gas fired generation after accounting for the impacts of the circumvention investigation and inflation

Prevailing Inflation Impacts on Levelized Costs⁽¹⁾

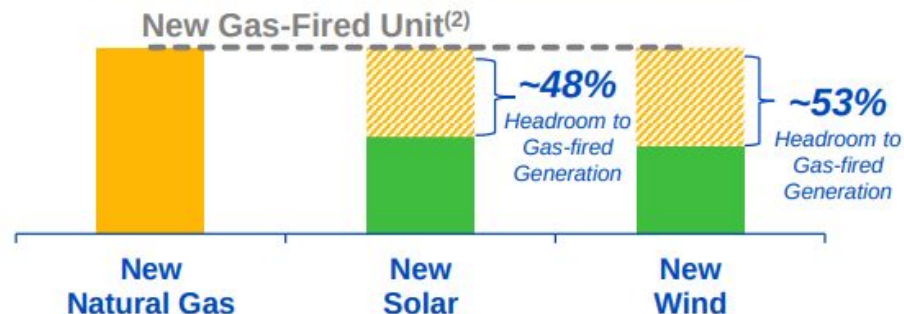
Impacts of Inflation on Levelized Costs⁽¹⁾



\$/MWh Comparison in 2021⁽³⁾



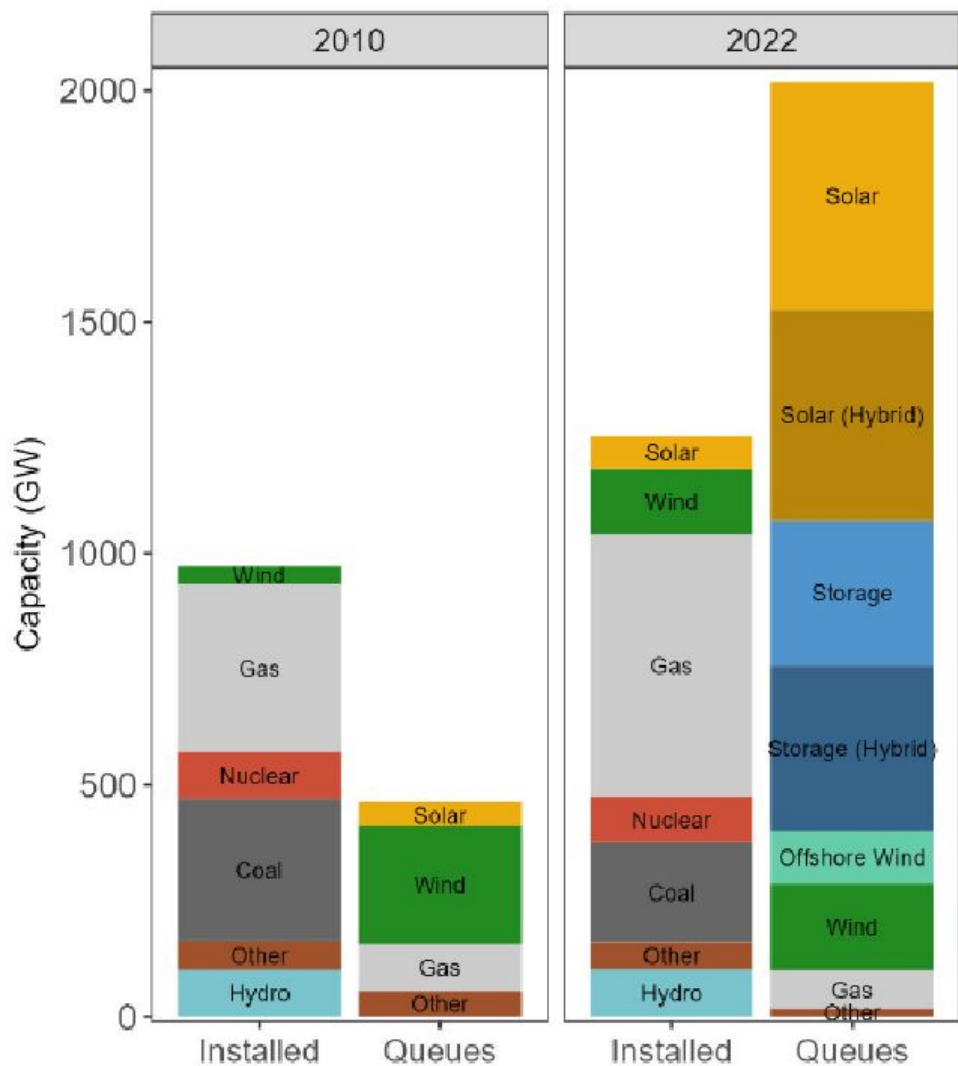
\$/MWh Comparison in 2022⁽³⁾



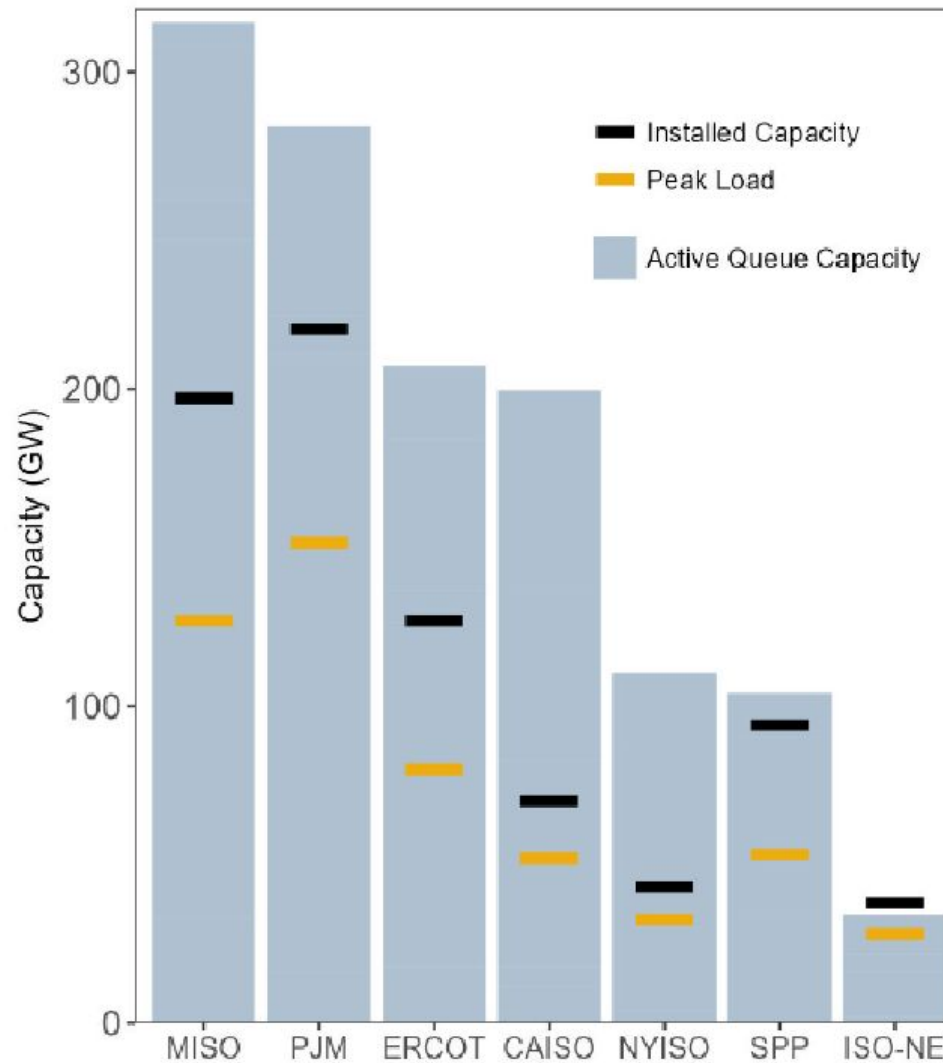
Source: from NextEra June 14 analyst presentation
Retrieved from [NextEra Energy](#) on June 14, 2022 6

Generating Capacity and Queues – Then and Now

Entire U.S. Installed Capacity vs. Active Queues



RTO Installed Capacity & Peak Load vs. Active Queues



Source: Lawrence Berkeley National Laboratory

An Industry Maturing – Globally



- Global wind capacity end of 2022 (various): 950 GW
- Global PV capacity end of 2022 (various): 1100 GW
- Variously Estimated Global VG installations in 2023
 - Wind 100 GW
 - PV 250 - 300 GW

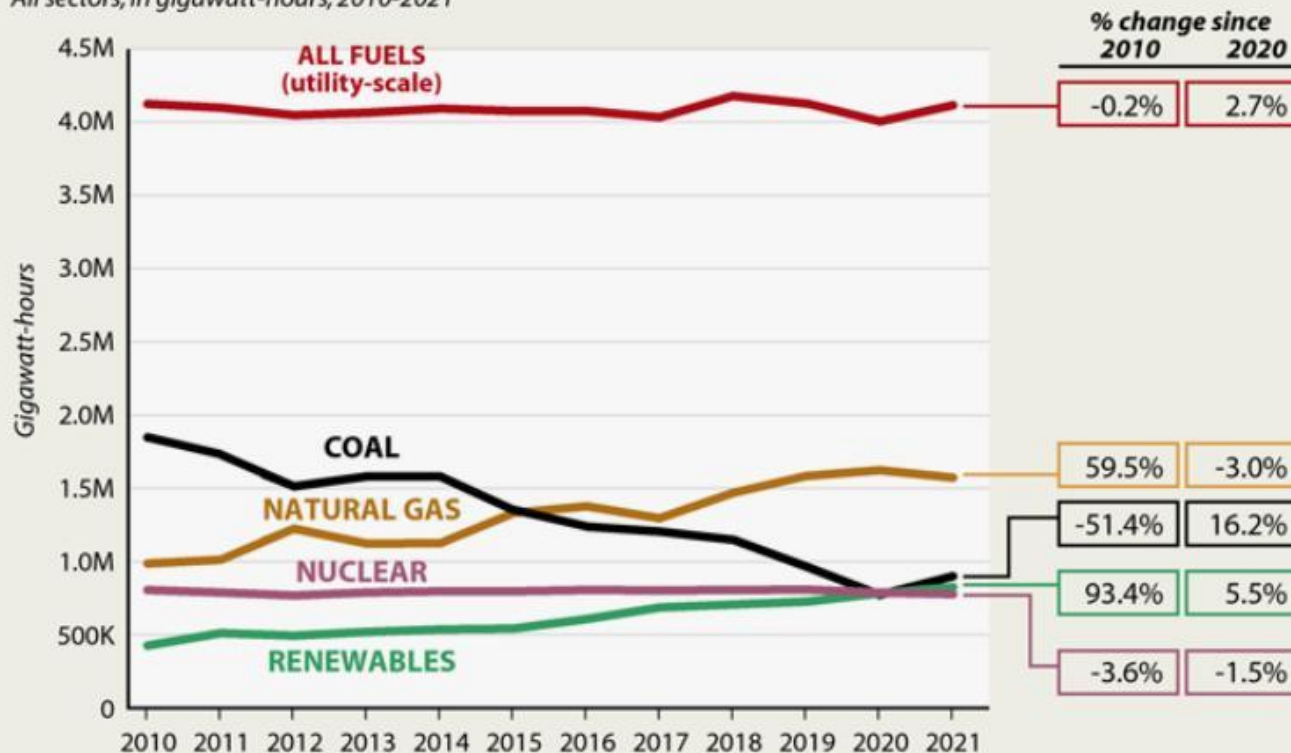
Still a Ways to Go in the US

Renewables, Coal on the Rise

Renewable energy gained ground in 2021, but it was still passed by coal, which had a comeback after a major decline in 2020. Natural gas and nuclear each lost ground.

U.S. NET POWER GENERATION

All sectors, in gigawatt-hours, 2010-2021



NOTE: Renewables includes the EIA categories of "conventional hydroelectric" and "other renewables."

ESIG User Group Expansion



Operations &
Maintenance

Ninochska Bosworth & Stanton Peterson

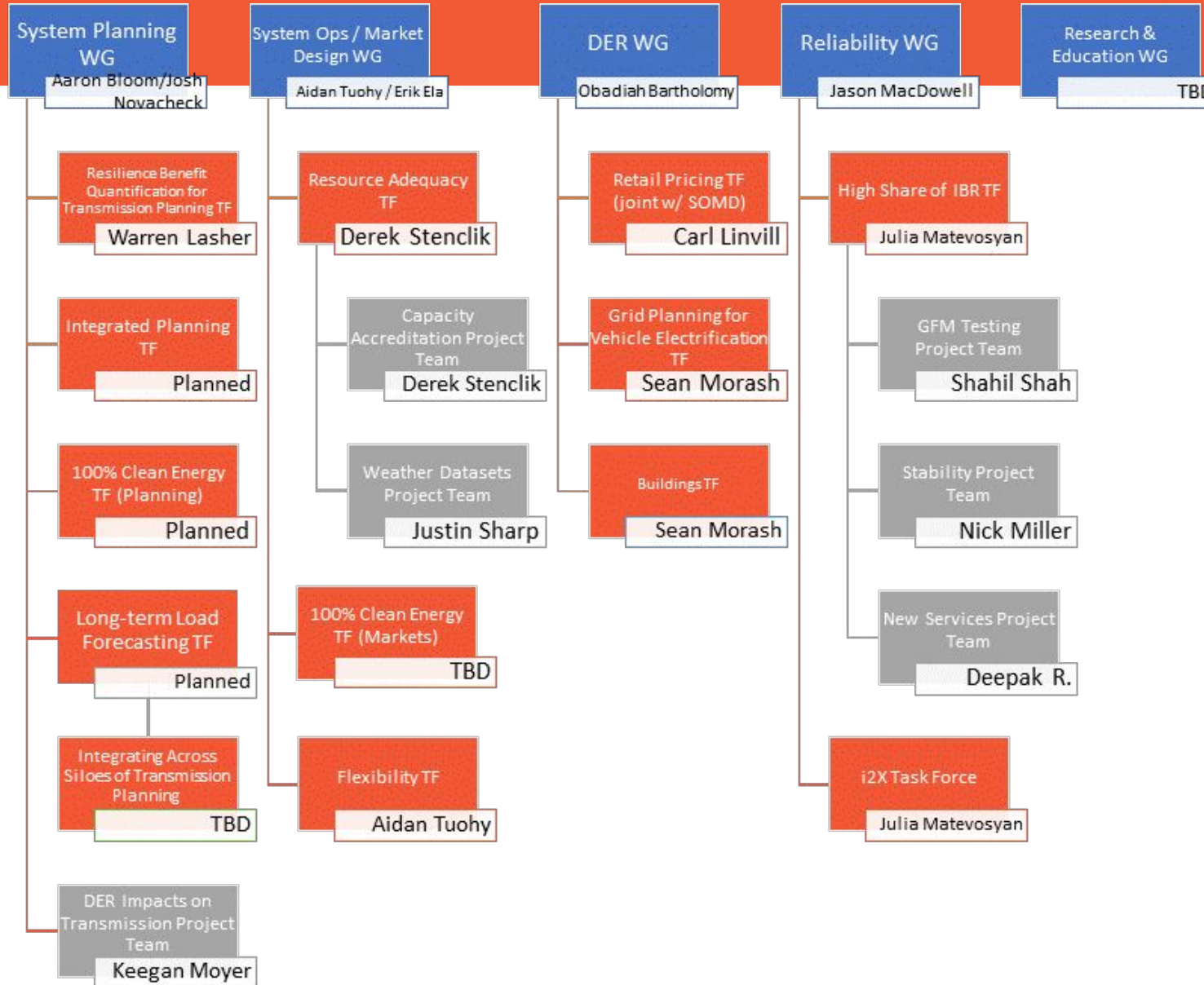
Probabilistic Forecasts in
Planning & Operations

Nitika Mago

GETs

Ken Donohoo

ESIG Working Group/Task Force Structure



Upcoming Meetings – 2023 and 2024



2023 Meteorology and Markets Workshop

2023 Load Forecasting Workshop

June 13 – 15, 2023

Denver, CO

2023 Fall Technical Workshop

October 23 - 26, 2023

San Diego, CA

2024 Spring Technical Workshop and Annual Meeting

March 25 – 28, 2024

Tucson, AZ

Onward and Upward

- New IEEE P&E magazine integration issue is out
- A warm welcome to visitors from afar:
 - Australia
 - Chile
 - Germany
 - Canada
 - Japan
 - Texas
- Take the time to make some new friends!
- Looking forward to another great meeting!





THANK YOU

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