



# Power Markets, Regulation, and Utility Scale Solar in the U.S.

Colin Meehan



# About First Solar

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“ We are very proud to be working with First Solar, who has a reputation for the delivery of **world class renewable energy projects internationally**. ”

*Michael Librizzi, General Manager Midwest for WBHO Civil*



Track record of delivering to leading utilities and energy investors

# Advancing the Entire Solar Value Chain



**GRID INTEGRATION  
& PLANT CONTROL  
SYSTEMS**



**ENGINEERING &  
PLANT OPTIMIZATION**



**PROJECT DEVELOPMENT**



**PROJECT FINANCE**



**OPERATIONS  
&  
MAINTENANCE**



**PROCUREMENT &  
CONSTRUCTION  
ADVISEMENT**



**BALANCE OF  
SYSTEMS  
TECHNOLOGIES**



**ADVANCED PV  
MODULES**



# Industry Trends

# Utility Scale Solar: Increasingly Cost-Competitive with Conventional Generation Resources

LAZARD'S LEVELIZED COST OF ENERGY ANALYSIS—VERSION 9.0

## Unsubsidized Levelized Cost of Energy Comparison

Certain Alternative Energy generation technologies are cost-competitive with conventional generation technologies under some scenarios; such observation does not take into account potential social and environmental externalities (e.g., social costs of distributed generation, environmental consequences of certain conventional generation technologies, etc.) or reliability-related considerations (e.g., transmission and back-up generation costs associated with certain Alternative Energy technologies)



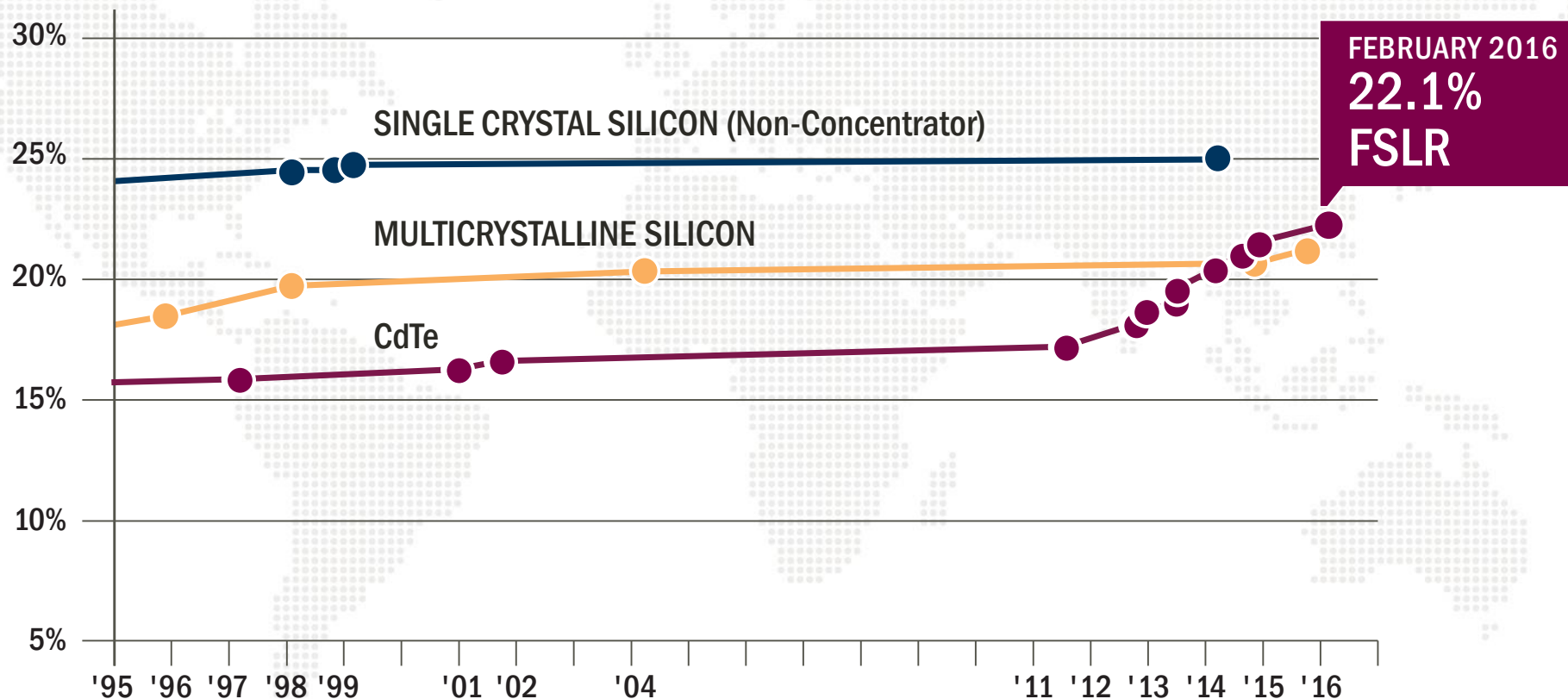
# Module pricing has fallen by 33.8% from 1H 2016



Source: GTM Research

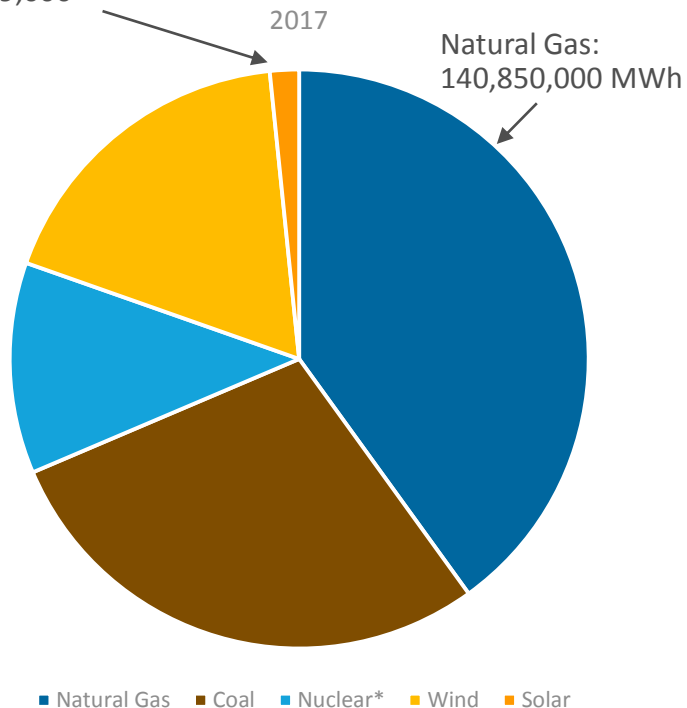
Source: GTM Research, "[U.S. PV System Pricing H2 2016: System Pricing, Breakdowns and Forecasts](#)"

# RESEARCH CELL EFFICIENCY: Fastest Innovation Rate in the Industry

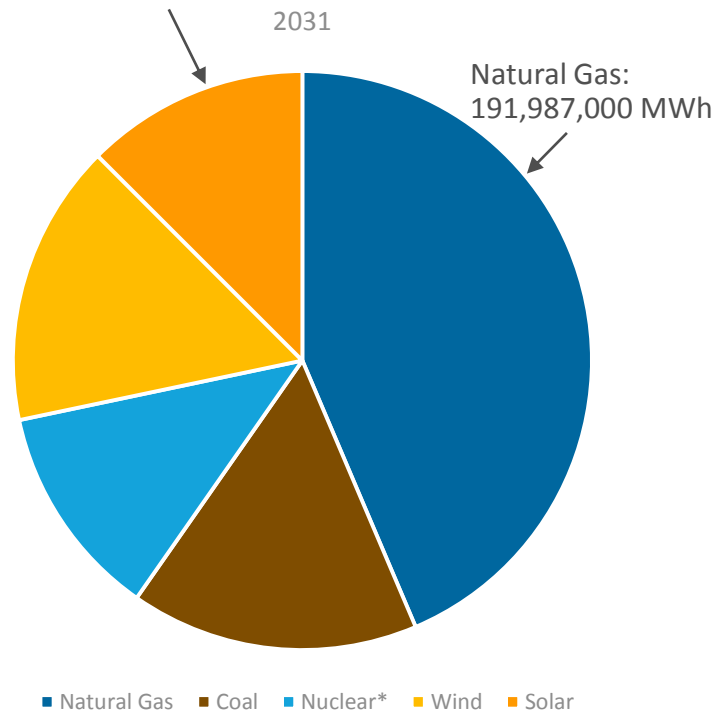


# ERCOT Projected Future Fuel Mix Changes

Solar: 5,719,000  
MWh

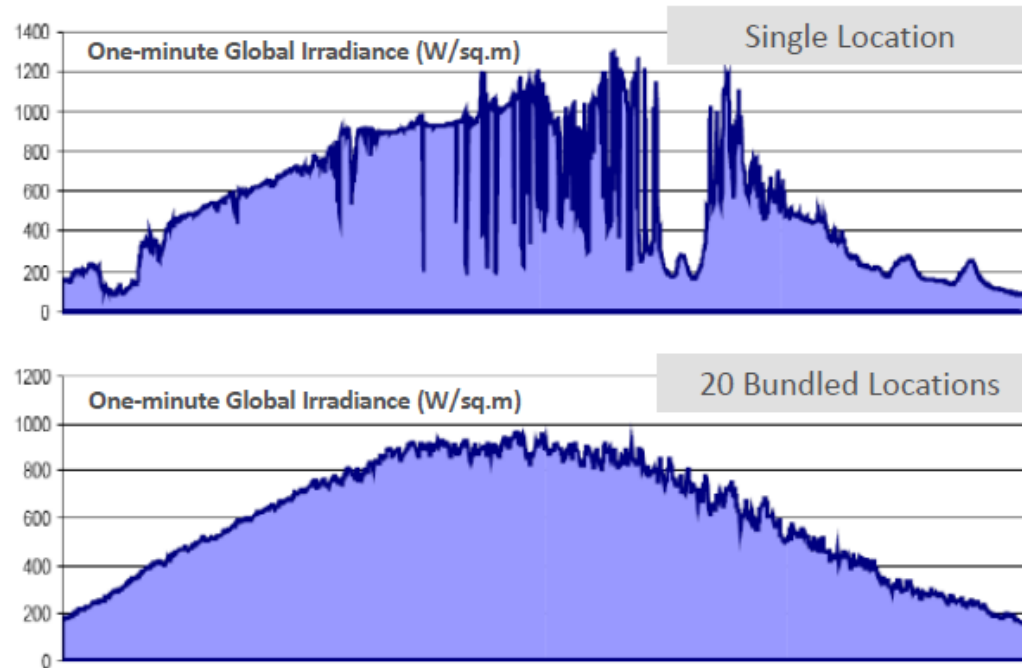


Solar: 55,042,000  
MWh



Source: ERCOT, Quick Facts 2015, 2016 Long Term System Assessment

# Increased Renewable Energy Levels Improves Reliability



Mathematically, if the short-term output time series of  $N$  locations experiencing a similar level of variability are uncorrelated (i.e., if they vary independently from each other), the resulting variability of the ensemble should be  $1/\sqrt{N}$  times that of a single location

**Spatial diversity of solar plants reduces aggregated variability... minimizing grid impact as the number of solar plants increase**



# TAKING ENERGY FORWARD

partnering with you to uncover solutions to your energy needs.

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