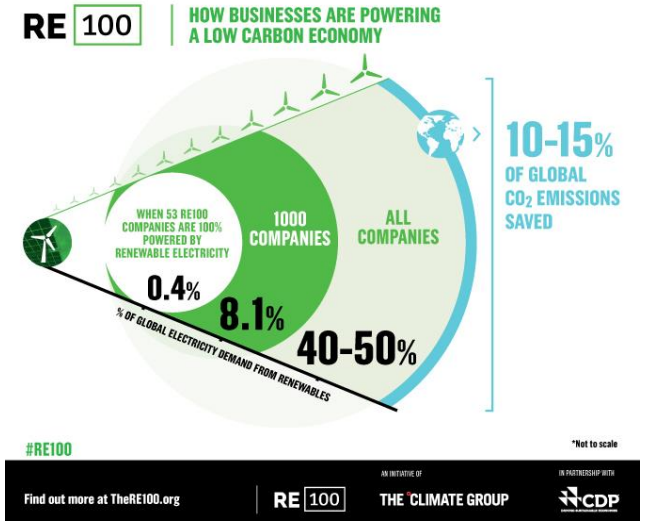
100% RENEWABLE ENERGY BY 2030



100% renewable energy %

100% Renewables?

Marilyn Brown

Georgia Institute of Technology

August 3, 2016

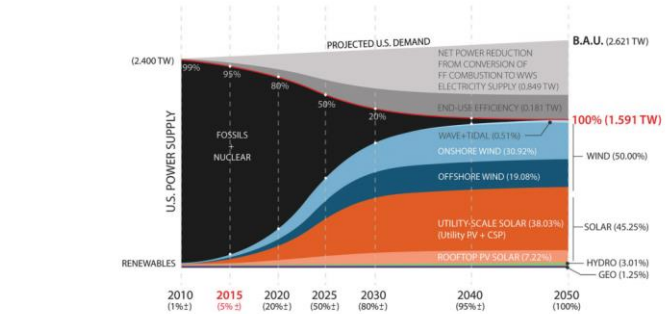
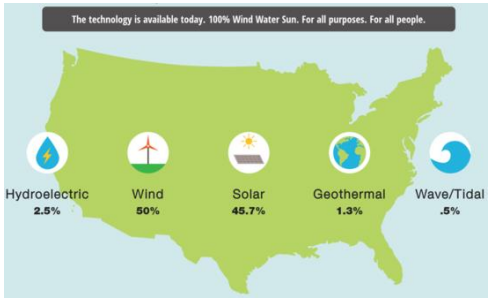
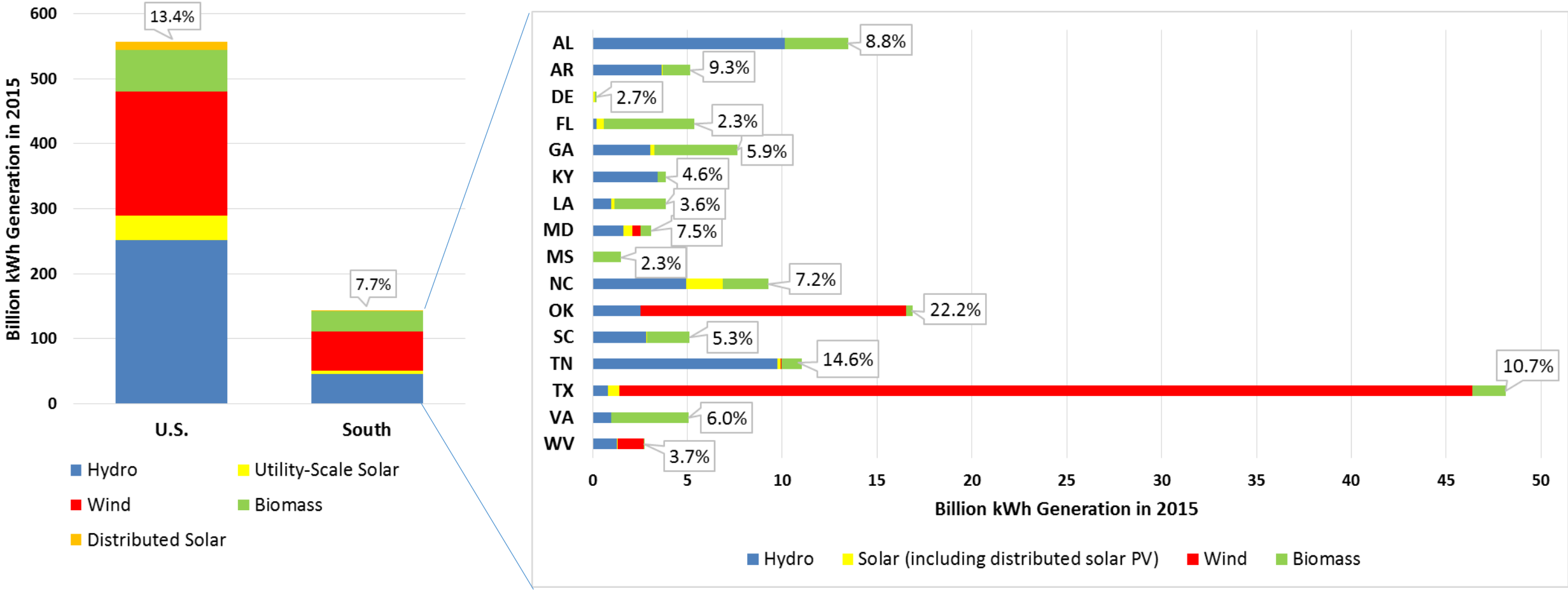


Fig. 5 Time-dependent change in U.S. end-use power demand for all purposes (electricity, transportation, heating/cooling, and industry) and its supply by conventional fuels and WWS generators based on the state roadmaps proposed here. Total power demand decreases upon conversion to WWS due to the efficiency of electricity over combustion and end-use energy efficiency measures. The percentages on the horizontal date axis are the percent conversion to WWS that has occurred by that year. The percentages next to each WWS source are the final estimated penetration of the source. The 100% demarcation in 2050 indicates that 100% of all-purpose power is provided by WWS technologies by 2050, and the power demand by that time has decreased. Karl Burkart, personal communication.



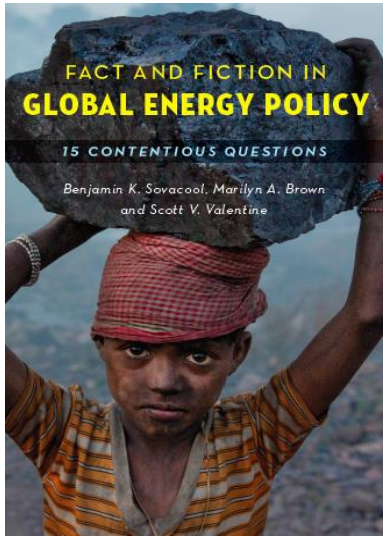
100% renewables

How Close are We to 100% Renewables?



Source: *U.S. Energy Information Administration, [Electric Power Monthly](), Table 1.1A, 1.2C-E, 6.2B.*
State level data is also available at https://www.eia.gov/electricity/data/state/
Note: *Distributed generations are estimated. Utility-scale generations are based on reported generation data.*

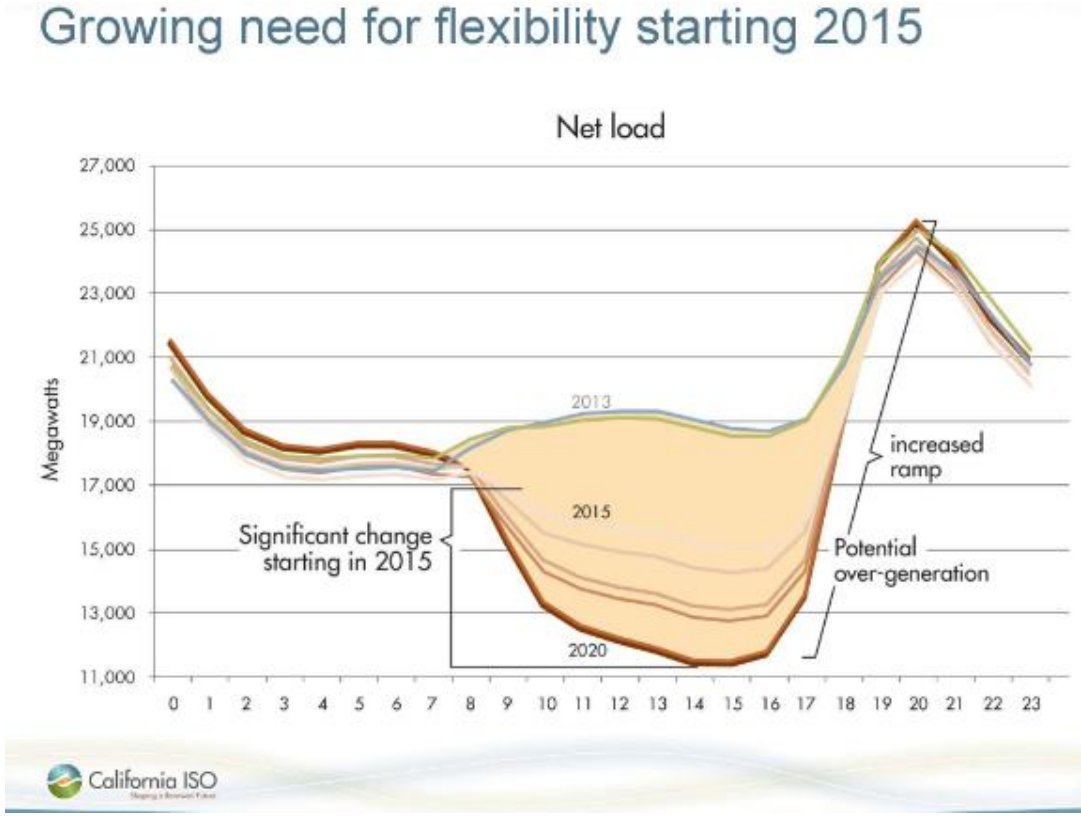
Let's Look at the "Pros" and "Cons"—The Facts and Fiction



Fact and Fiction in Global Energy Policy by B. K. Sovacool, M.A. Brown, & S. Valentine, Johns Hopkins University Press, 2016.

The "Cons"

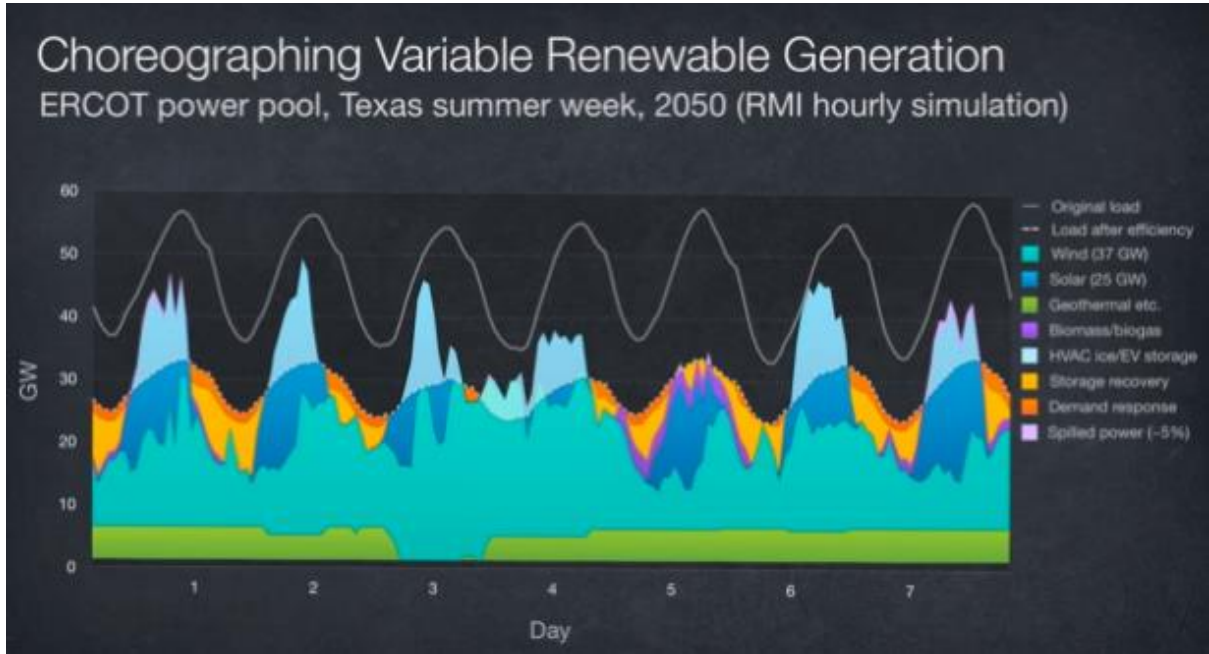
- RE requires substantial baseload power backup
- Renewable energy facilities require far more land than nuclear or fossil fuel power plants (NIMBY >> BANANA)
- RE is plagued by other environmental issues
- Renewables are expensive



Source: California ISO

Pros

- The cost advantage of fossil fuel technologies is artificial.
- There is sufficient renewable energy potential to meet demand
- The cost profiles of renewable and conventional energy technologies are converging
- Over the past decade, management of stochastic flows has improved



http://cleantechnica.com/2014/08/08/rmi-blows-lid-baseload-power-myth-video/

Synthesis: Systems Integration and Diversification

- Viewing RE technologies as elements of a diverse energy mix portfolio offers numerous benefits.
  - E.g., diet first with EE, then enjoy the RE dessert
  - Integration with transportation for frequency support, ramping capability, and voltage control
- A diverse portfolio of technologies helps attenuate load imbalances
- Portfolio diversification allows states and nations to weather unexpected disruptions and exploit local geographical competencies.
- Spreading out the supply of energy across a number of technological platforms minimizes the damage that can be caused by sole reliance on a single technology.

For More Information

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