

NOAA's Potential to Support Renewable Energy

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The intersection of energy independence, national security, climate, and the economy poses a daunting challenge to the United States and the world. The long-term solutions must include the development of carbon-free renewable energy (RE) sources that are sustainable and economically viable. The current U.S. energy system obtains most of its energy from coal, natural gas, oil, and nuclear plants, with a small contribution from renewable sources (mostly hydropower). Within the next few decades, the U.S. energy system is anticipated to change dramatically. Fossil fuels will have decreased in importance, either through the implementation of climate-oriented policies, or simply because the rate at which we can extract fossil fuels will have decreased, while extraction costs will have risen commensurately. The striking difference between today's U.S. energy system and that for ~2030 is the much greater dependence on renewable energy (RE) production, and the dependence of this production on processes in the atmosphere and ocean. The development of large numbers of wind and solar energy farms depends on a better understanding of the spatial and temporal distribution of wind and solar resources. The integration of wind and solar energy into the electric grid, and demands for transmission and storage, will require very accurate wind and cloud forecasts. On longer time scales, inter-annual and decadal climate variability and change may affect each of these renewable resources. Further, research is needed to determine the inadvertent effect of removing large amounts of atmospheric energy on the environment, weather and climate of varying temporal and spatial scales. Building an efficient and stable national energy supply system in which RE sources contribute significantly will require better meteorological observations, forecasts, analysis tools, and understanding of climate-related issues that are optimized for the renewable energy industry. NOAA's historical responsibility for and expertise in deploying national observing networks, predicting weather and improving forecast models, and understanding and predicting climate, "to meet our nation's economic, social, and environmental needs" is at the nexus of the energy-climate-economy challenge. During the past two years, intensified collaboration with other government agencies, university scientists, and the renewable energy industry, NOAA has identified key steps it can take to support the accelerated development of RE, especially wind and solar energy, in the United States. By hastening the deployment of RE within the United States, NOAA will advance the nation's energy security and independence, boost the economy by the creation of many good jobs that cannot be exported, and reduce emissions of carbon dioxide.

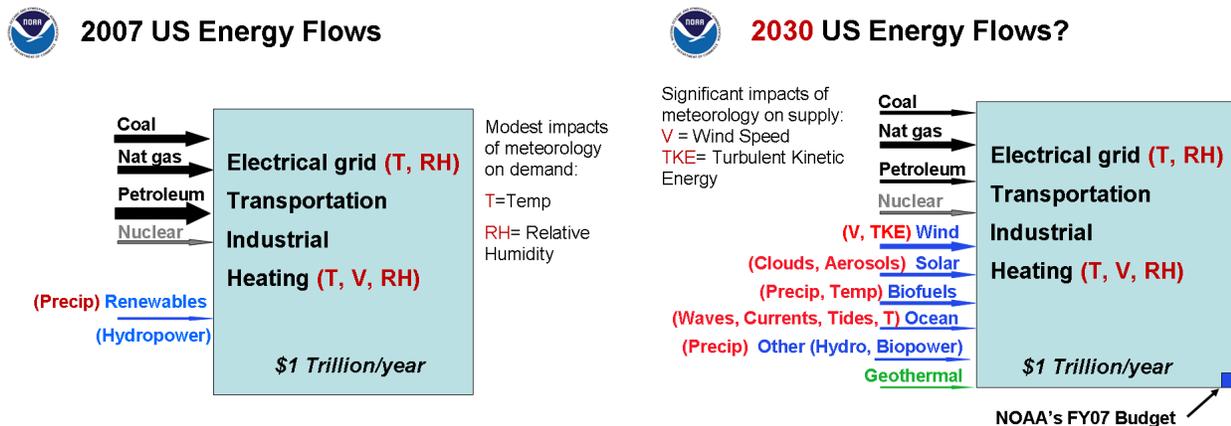


Figure 1. The current U.S. energy system relies primarily on fossil fuel energy sources, and has only a negligible dependence of meteorology on supplying energy.

Figure 2. The U.S. energy system in a few decades (~2030) is expected to incorporate large amounts of renewable energy sources, which are heavily dependent on meteorology.