



## BACKGROUND

### *-A Comparison: Land Use by Energy Source - Nuclear, Wind and Solar*

Different energy sources require different fuels to generate the electricity that powers our homes, schools, hospitals and businesses. Power plants need coal, natural gas, wind, solar, biomass, uranium, oil or other fuels to generate electricity. Each of these different power sources requires different amounts of land to make it a practical part of meeting the everyday demands of electricity customers.

This document presents a comparison of how much land would be needed to produce 1,800 Megawatts of solar or wind energy compared to the amount of land currently in use at the Arkansas Nuclear One Station. One thousand eight-hundred Megawatts is enough electricity to power approximately 1.8 million average Arkansas homes.

#### Arkansas Nuclear One Station

- Power Output: ~1,800 Megawatts
- Number of Reactors: 2
- Land Use: 1,100 acres<sup>1</sup> (1.7 square miles)

Nuclear energy is a base load energy source that generates power more than 90 percent of the time, 24 hours a day, 365 days a year on average.<sup>2</sup> Wind and solar energy sources run average capacity factors of 33 percent<sup>3</sup> and 25 percent,<sup>4</sup> respectively. A 100 percent capacity factor would mean that the energy source was producing at 100 percent power output every hour of every day of the year.

Assuming the wind and sun were able to generate electricity at a 90 percent capacity factor (of course the sun cannot shine 22 hours, or 90 percent of each day), land requirements necessary to generate 1,800 MW of electricity, the equivalent of Arkansas Nuclear One, would be as follows:

#### Modern Wind Power

- Power Output: Above Average Wind Turbine Generates 2.5 Megawatts/turbine
- Number of 2.5 MW Turbines Needed to Generate 1,800 Megawatts: 720
- Average Acres Per Megawatt<sup>5</sup>: 60
- Land Use: 108,000 acres (169 square miles)

#### Modern Solar Power

- Power Output: 1 Megawatt per 7.4 acres of photovoltaic solar panels<sup>6</sup>
- Land Use: 13,320 acres (21 square miles)

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<sup>1</sup> One acre is approximately the size of a football field.

<sup>2</sup> U.S. Energy Information Association. [http://www.eia.doe.gov/cneaf/electricity/epa/epa\\_sum.html](http://www.eia.doe.gov/cneaf/electricity/epa/epa_sum.html)

<sup>3</sup> American Wind Energy Association. [http://www.awea.org/faq/wwt\\_basics.html](http://www.awea.org/faq/wwt_basics.html)

<sup>4</sup> U.S. Energy Information Association. <http://www.eia.doe.gov/oiaf/archive/aeo06/assumption/renewable.html>

<sup>5</sup> American Wind Energy Association: [http://www.awea.org/faq/wwt\\_environment.html](http://www.awea.org/faq/wwt_environment.html) .

<sup>6</sup> Sunpower® Tracker Solar Systems: <http://www.progress-energy.com/aboutus/news/article.asp?id=18882>  
<http://www.sunpowercorp.com/>