

**Visualization Demonstration with oral discussion**  
**"Earth at Night features Prosperity, Pollution and Opportunity"**

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The Earth at Night Map from NASA provides the starting point. The lights of the world identify populations that have electricity. However, all lights are not the same, and 1.6 billion people remain in the dark.

In successive layers, we highlight:

- a. A population map showing population density, featuring the distinctions between our urban and rural world. Then showing population growth to 8.5 billion in 2050.
- b. Shading each region/nation per their level of development: developed, transitional, underdeveloped. This is defined by several quality of life indicators: life expectancy, safe drinking water, literacy, infant mortality rate.
- c. A map that reveals kilowatt-hours per capita, correlating electricity and quality of life.
- d. Beneath the lights are interconnected transmission grids, which send that power to 99.9% of all lights
- e. Then, we colorize the generation source: nuclear, fossil, biomass and hydro.
- f. Subsequent visual shows pollution levels in each region from burning of fossil fuels: CO<sub>2</sub> per capita.
- f. Next, a visual of wind, solar and geothermal development, which remains less than 2% of global total.
- g. Finally, we view the renewable energy potential of each region and aggregate those into a total renewable resource potential. This is then compared to existing electrical demand of that region.

A final analysis poses the following:

What if we tapped the renewable energy resources and fed them into the transmission grids that already exist? How would we get lights to the 1.6 billion people in an ecologically sustainable manner?

Topic/Session area: Earth Observation and/or Virtual Globe

Note: this work is being done in partnership with John Graham of the SDSU Viz Center using GeoFusion