THE ENERGY CHALLENGE
The Energy Challenge: A Generation Decision Game

• Duke Energy faces a challenging future. We must continue to meet our customers’ growing demand for energy, plus reduce the carbon emissions our power plants release.

• The Energy Challenge is an educational tool to demonstrate the tradeoffs and cost implications of choosing an energy generation mix to meet that challenge.
Your mission: Meet the energy demands of 2050 while reducing Duke Energy's carbon footprint.

Develop a plan that strikes a balance between the:

- Amount of electricity customers need
- Expense to build or upgrade plants
- Cost to produce electricity
- CO2 emissions the plants release
Energy Demand Meter

- The Energy Demand meter displays the amount of energy currently needed to power Duke Energy’s customers, as well as how much energy we predict customers will need in 2050.
- The gold bar displays the amount of energy in your proposed plan that’s created by traditional power sources, like coal, natural gas and nuclear plants.
- The green bar shows the output from the renewable portion of your energy portfolio (solar, wind and biomass).
- Finally, the blue segment of the Energy Demand meter shows the amount of energy use you’ve curtailed through energy efficiency programs.
- You must generate enough power to meet the Energy Demand of 2050.
**CO₂ Emissions**

- CO₂ is short for carbon dioxide, a colorless, odorless gas that is formed in many ways, including burning natural gas and coal to create electricity.
- CO₂ emissions do not benefit our environment and climate change policy will likely result in CO₂ emission limits.
- The CO₂ emission gauge starts at the maximum level (red). Users must reduce the emissions level to meet the target area (gray).
Energy Challenge Score

- The score appears in the top-left corner of the screen and represents cost.
- The total cost is calculated by factoring in the following:
  - Types of new power sources selected
  - Decisions to retrofit or upgrade older plants with technologies
  - Types of older, less-efficient plants that are retired
  - The number of energy efficiency programs implemented
- The score is based on the cost of meeting the energy demand of 2050 while reducing CO₂ emissions. The goal is to keep costs low, but users must balance this with the other goals.
Energy Challenge Data

• The data reflects Duke Energy’s U.S. service territory and facilities and is aggregated across Duke Energy’s entire service footprint.
• Public, external data (i.e., EPRI, Department of Energy) is used for all external parameters, and certain assumptions and limitations have been made (e.g. renewables are limited based on factors such as geography and climate).
• The time frame of the data is from 2006 to 2050 because that is the time period that was used nationally in international and national CO₂ legislation conversations and proposals.
• Sources Include:
  • energy.gov/energyefficiency/index.htm
  • www.seia.org/cs/solar_technology_and_products
  • www.windpoweringamerica.gov/wind_maps_none.asp
  • www.energy.gov/energysources/wind.htm
  • www.energy.gov/energysources/bioenergy.htm
  • www.nrel.gov/gis/biomass.html
  • www.energy.gov/energysources/nuclear.htm
  • energy.gov/energysources/coal.htm
  • energy.gov/energysources/naturalgas.htm
Let the Game Begin!

• We’ll play as one big team with volunteers suggesting actions
• Remember that we must meet energy demand AND carbon reduction before we can “win” and log our cost score

http://energychallenge.duke-energy.com/
Debrief and Some Questions to Ponder.....

• Over the long-term, is it better to build large, emissions free, base load nuclear power that lasts 60 years? Or is it better to build solar and wind farms with life expectancies of 20-25 years? Which has the biggest environmental footprint in terms of its entire life cycle? Resources used?

• MIT study – wind turbines create increased temps on local level and decreased temps away from the farms.

• Wind power impact on bird populations – less than cats. Correct, for now.....what happens as more and more farms are built.

• Solar farms – give off lots of energy as heat. Birds think they are water and die landing on them. Take a lot of land per MWH
THANK YOU!