Scenario Development for the Long Term Study

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Scenarios are a way to examine different thoughts about the future. They provide context to resource and assumptions development.

- A process to identify, discuss and prepare for an uncertain future
- Helps take a long view in a world of uncertainty
- It is meant to stretch the imagination
- Results in better decisions about the future

They are not:

- About predicting the future
- A science

Some Key Drivers

- **Economy** – GDP growth, consumer spending, employment levels, etc
- **Regulation** – What is the state of state/federal policies
- **Environmental** – What will be the policies as they relate to GHG, NO_x, SO_x, etc
- **Technology** – What technologies will be available, what will they cost, are there tax or other incentives
- **Public Perception** – What is the public's attitude toward the environment, economy, markets, regulation, etc

Initial thoughts on the development of future scenarios for potential use in the long-term study…

- **Attempt to capture a broad range of possible futures**
- **Given specific forecasts of market drivers scenarios developed will create an internally consistent view of the future**
- **Each future scenario contains a view of the world markets and developments, as well as a specific focus on the impacts to/for Texas**
- **The futures attempt to describe potential impacts over the next 20 years for:**
  - Interest and inflation rates
  - Non-farm employment in Texas
  - Environmental costs
  - Fuel costs
  - Capital costs for generation expansion
  - Other market drivers

“Green Power” Scenario

- **US / World Impact**
  - Concerns about the environment are beginning to take center stage
  - "Kyoto 2" has been signed by all countries
  - Strong CO_2 legislation and EE / renewable requirements have been set at high levels worldwide
  - General pace of economic growth is strong

- **Texas Impact**
  - Texas continues to lead wind development
  - Renewable build out rate increases
  - Demand response and energy efficiency programs see significant growth
  - Increase in combined cycle and combustion turbine activity as production from coal plants decreases and reliability issues mount

“Long-Term Recession” Scenario

- **US / World Impact**
  - The world economy is in decline
  - Environmental regulations are eased as economic issues are paramount
  - Fuel prices are low as demand for energy declines
  - Inflation rates are low and interest rates are held at historically low levels to support fragile economies

- **Texas Impact**
  - Texas is the boom town in this future. Even so, there is no economic growth which results in no load growth
  - Actual load growth turns negative as industries continue to close
  - Public funded solar PV programs are in place for job creation
  - Generation build out is generally based on economics
    - Some wind and renewables but new technologies mature at a slower pace
    - Coal and NG resources are primary choice
    - Potential for substantial retirements for older units

“High Carbon Price” Scenario

- **US / World Impact**
  - Environmental concerns mount worldwide
  - World wide droughts grow or persist in generally dry regions and crops failing in some regions
  - Reduction of GHG emissions by any means possible is becoming the norm
    - Carbon prices climb causing fossil fuel use to decline and fuel prices to drop
    - Nuclear and solar is subsidized to encourage its development
    - Natural gas demand grows as a substitute for coal
  - Economic disparities become pronounced between countries based on reliance on fossil fuels

- **Texas Impact**
  - Availability of water begins to tighten
  - Water is at premium and some areas consider rationing
  - Desalination projects are being built
  - All low water usage technologies are being built
    - More wind and solar
    - Energy efficiency and demand response being implemented quickly
    - Dry cooled combined cycles and combustion turbines being built

"Low CO_2 Concerns" Scenario

- **US / World Impact**
  - World concern for the environment declines
  - No or limited national CO_2 program
  - Coal prices increase due to demand both internally and externally
  - US exports of coal increase significantly

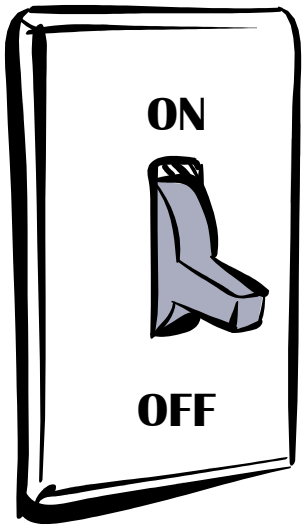
- **Texas Impact**
  - Texas continues building wind but also adds more coal generation.
  - Development of all renewables slows down
  - Demand growth continues at recent historic levels
  - Future mix of resources will look like today
    - Coal and natural gas resources will be primary

“High Economic Growth” Scenario

- **US / World Impact**
  - World economy is booming
  - This will be marked by high GDP in the US for 4 to 5 years then returning to 3% to 4% range thereafter
  - All fuel prices will rise due to demand
  - Development of renewable energy as well as conventional resources will be strong to meet demand growth

- **Texas Impact**
  - Texas growth is strong on all fronts
  - Continued reduction in prices for all renewables
  - Growth in demand for all generating types due to load growth
  - Increase in quick start capability or other reliability measures due to increase intermittent generation
    - Batteries
    - Flywheels
    - Other storage technologies

Questions



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