



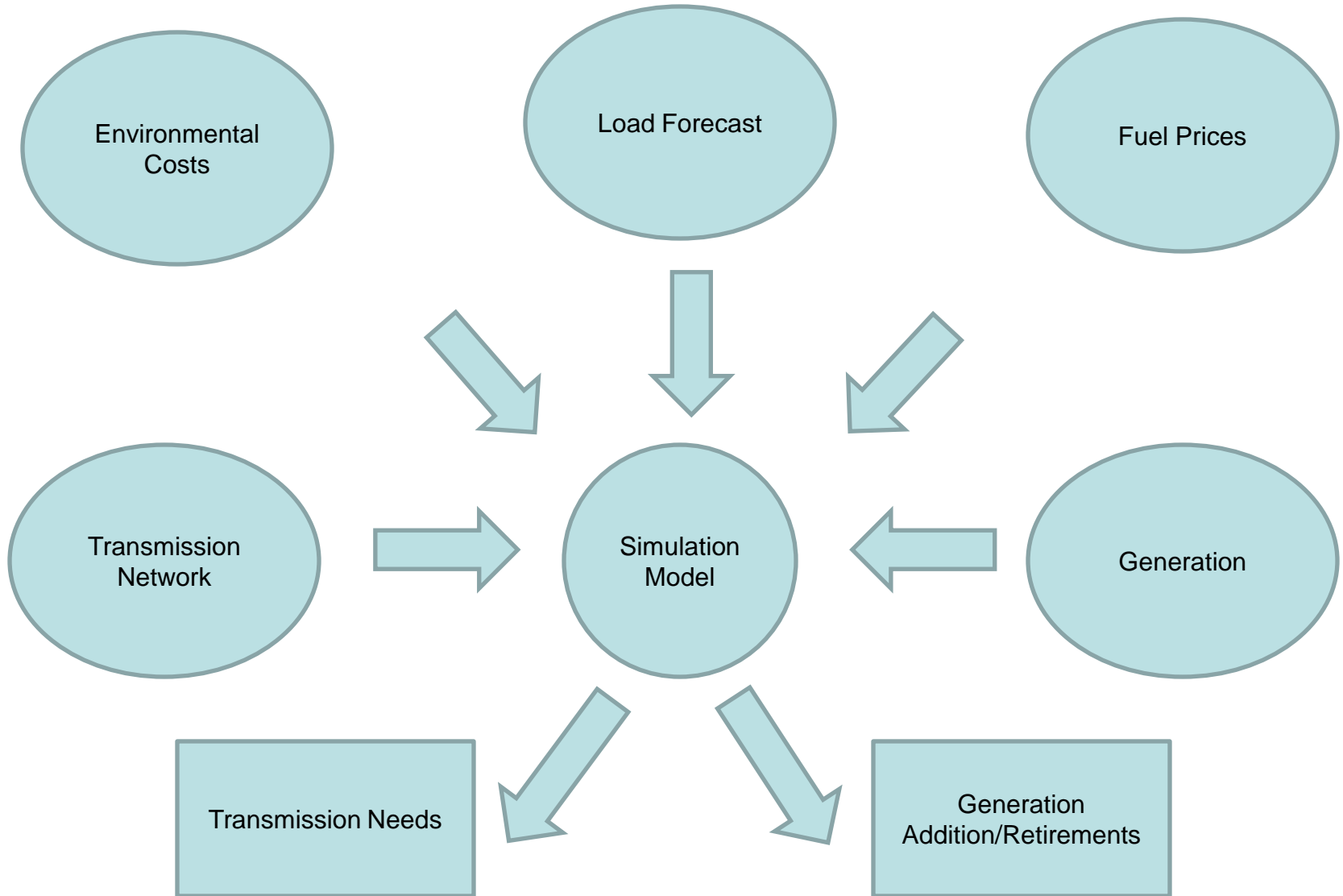
Data Necessary for Scenario Development and SDWG Update

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- **How do you eat an elephant?**
 - One bite at a time
- **Developing the scenarios is one major task, but there are many other issues**
- **Multiple items to tackle**
- **Market participation in developing assumptions is important**
- **Expertise from ERCOT staff and market participants will help this process along**

Model Inputs and Outputs



- **Base Load Forecast**
 - Less
 - Energy Efficiency
 - Demand Response
 - Distributed Generation (Solar PV, wind, etc.)
 - Plus
 - Plug In Electric Vehicles
 - Shapes will have to be developed for these different components
- **Different forecasts for different economic and weather scenarios**

Fuel Prices

- **Natural gas prices**
 - LNG impact (both imports and exports)
 - Shale gas impacts
- **Coal prices**
 - PRB
 - Lignite
 - International Effect
- **Crude oil prices**
- **Interaction/substitution of the three commodities**
- **Capturing “Black Swans”**
 - Peak Coal (Patzek and Croft)
 - <http://xa.yimg.com/kq/groups/20593576/885722944/name/Patzek+and+Croft+2010+-+Peak+Coal+2011.pdf>
 - Peak Oil
 - Shale Gas Water Contamination Concerns
- **Possible stochastic approach to inputs**
- **Possible external experts to provide assistance**

- **What will be the rules and/or standards?**
- **Renewable Portfolio Standards**
 - Will we see 25% renewable by 2025?
 - What is included in that mix?
- **Transport Rule Impact**
 - NOX
 - SO2
- **Will we see mandated requirements for Best Available Control Technology (BACT) for all the pieces (SCR, FGD, etc.)?**
- **Will we see Greenhouse gas legislation in the U.S.?**
 - CO2

- **Existing Resource Base**
 - Coal
 - Natural Gas (CC and Peaking)
 - Nuclear
 - Wind
 - Other
- **Expansion Resource Additions and Retirements**
- **Resource Characteristics**
- **Economic assumptions**
 - Capitol Costs
 - Weighted Average Cost of Capital
 - Tax rates

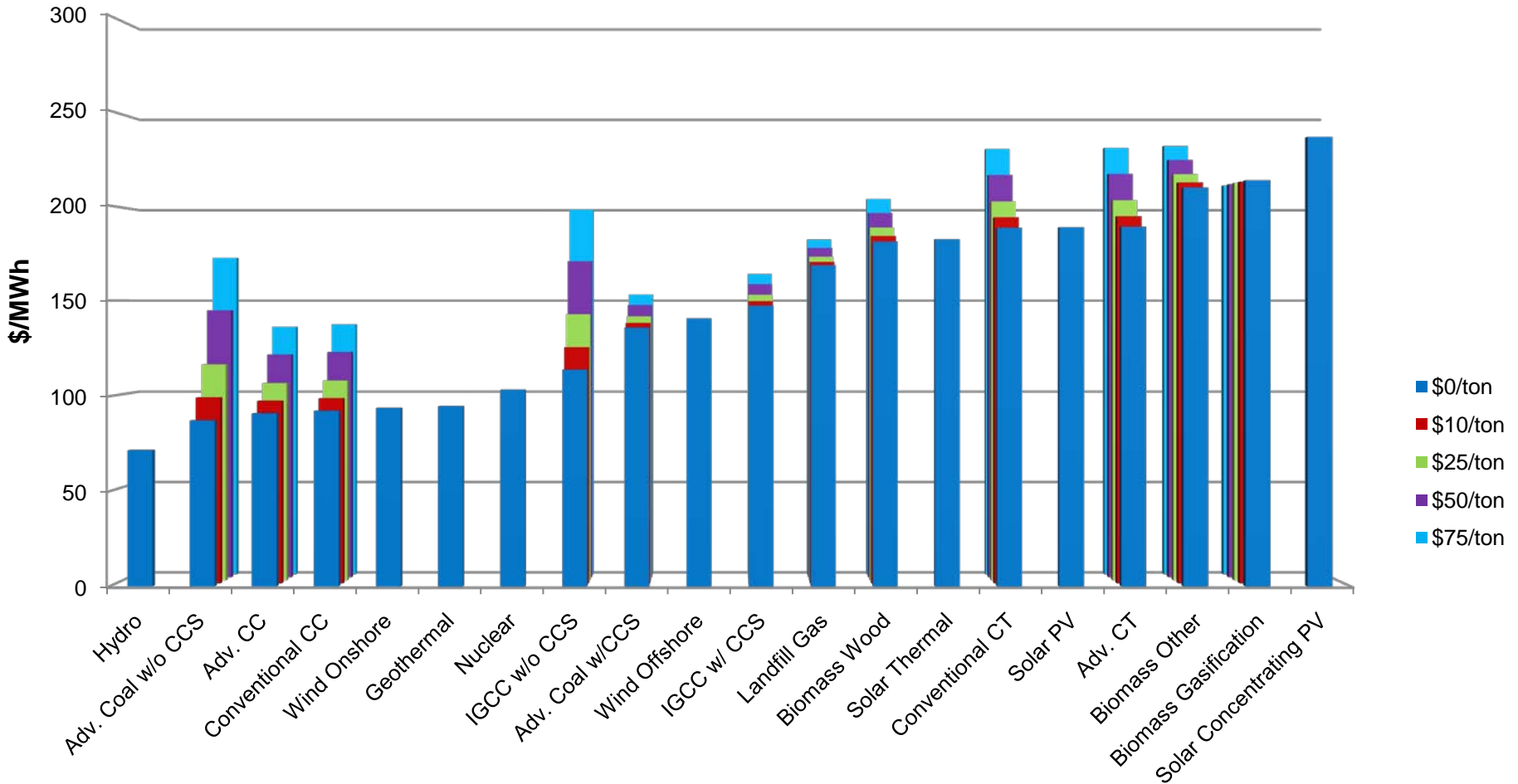
- **Developing “simplified” representation from the most current “Five Year Plan”**

- **RFP was issued in late August**
- **Three respondents by due date (9/16/2010)**
- **Presentations to the ERCOT selection committee next week**
- **Decision will be made by early October**
- **Anticipated date of software being at ERCOT is early November**

SDWG UPDATE

- **Resource Levelized Costs Assumptions**
 - Charts and data with assumptions and results
 - Generic Generating Resource Assumptions
- **Load Forecasting Methodology (Calvin Opheim)**
- **Historical Assumptions (Jenell Katheiser)**
 - Where the economy has been from 1930 to present
- **Draft Scenario Planning Assumptions (Doug Murray)**
 - First draft of data assumptions for 20 years by year
- **Data and presentations are at**
<http://www.ercot.com/calendar/2010/09/20100910-SDWG>

Levelized Cost of Energy: Sensitivity to Carbon Costs



Generic Generating Resource Assumptions

- **Operating characteristics for major generating resources**
- **Characteristics of other resources to still be added**

Technology	Capacity	Heat Rate	Min Capacity	Min up time	Min down time	Variable O&M	Start Cost
	(MW)	(BTU/kWh)	(MW)	(HRs)	(HRs)	(\$/MWh)	(\$)
Conventional CC (F type)	500	7,200	200	6	8	2.65	10,000
Advanced CC (H type)	400	6,700	250	6	8	2.90	15,000
Conventional CT (F type)	170	10,500	130	2	3	8.00	7,500
Advanced CT (LMS100)	100	9,200	70	2	3	13.00	10,000
Supercritical Coal	600	9,000	250	24	12	3.95	5,000
Supercritical Coal W/ CCS	625	11,950	250	24	12	7.35	7,000
IGCC	625	9,000	250	24	12	5.75	5,000
IGCC W/ CCS	539	10,700	250	24	12	7.00	7,000
Nuclear	1,100	10,300	600	168	48	4.00	-
On shore Wind	100	-	-	-	-	-	-
Off Shore Wind	100	-	-	-	-	-	-
Geothermal	40	11,000	20	8	8	10.00	-
Biomass - wood	40	13,000	15	8	8	9.50	2,500
Biomass - other	1	17,500	3	8	8	15.00	1,000
Solar PV	10	-	-	-	-	-	-
Solar Thermal	100	-	-	-	-	-	-

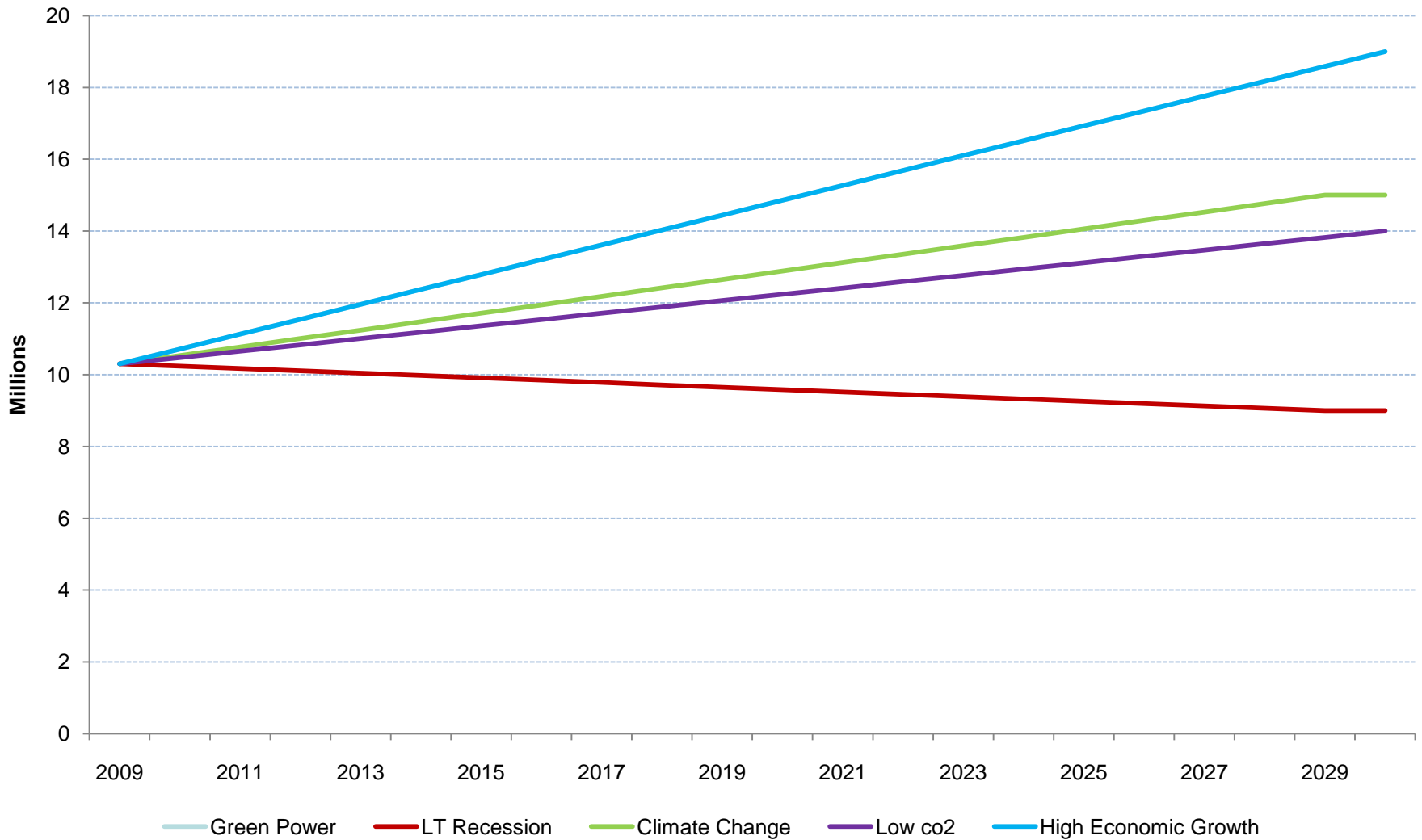
Long-Term Load Forecast Model Description

- **Each weather zone has its own independent model (there are eight weather zones in ERCOT).**
- **The eight weather zone forecasts are summed to create the ERCOT load forecast.**
- **Each model forecasts monthly MWh per one thousand jobs (based on non-farm employment)**
- **Selected this modeling approach due to concerns of heteroscedasticity**
 - Heteroscedasticity occurs when the variance of the error terms differ across observations

What are the draft scenarios

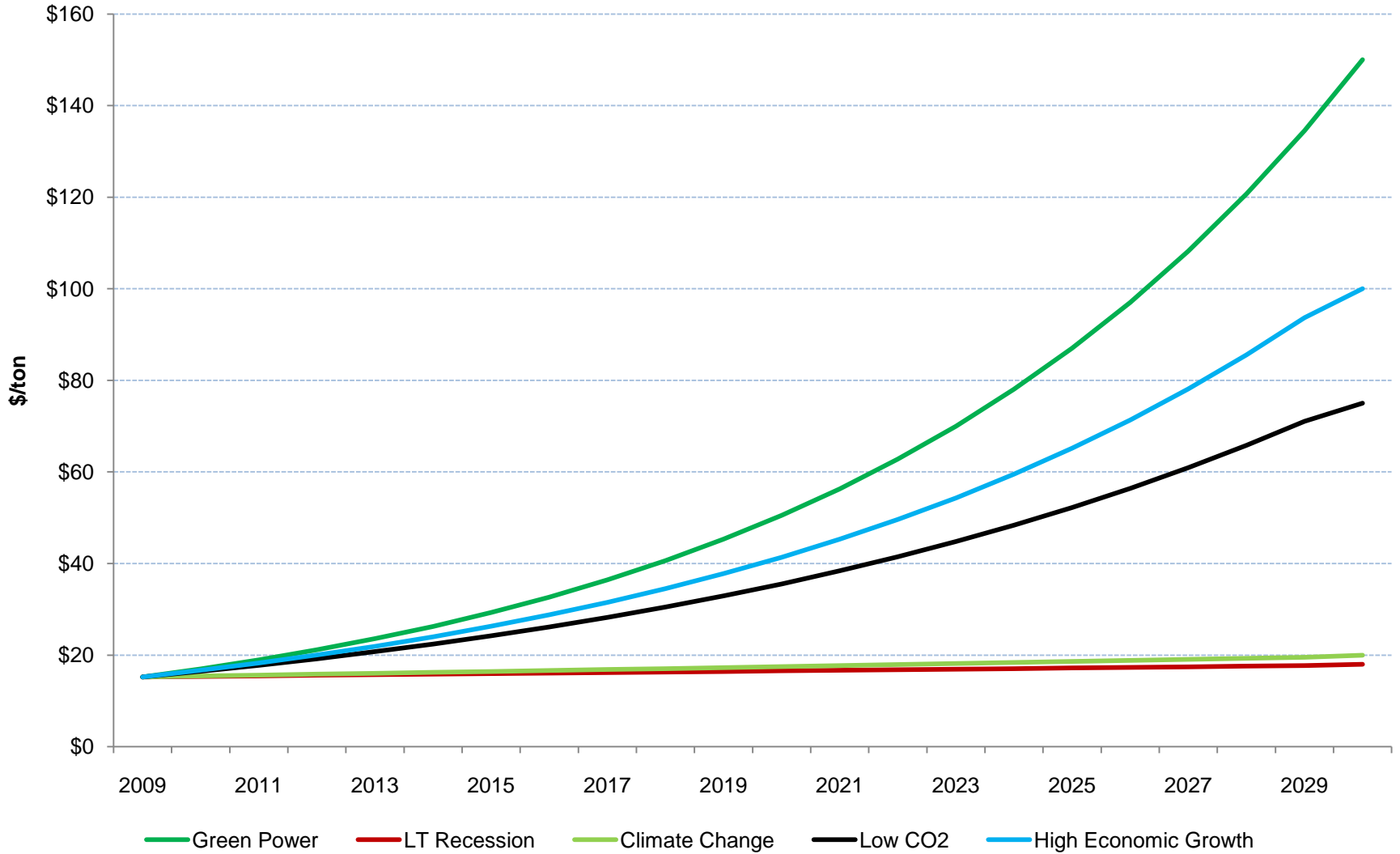
- **Green Power**
- **Long Term Recession**
- **Climate Change**
- **Low CO2**
- **High Economic Growth**
- **For more details about the scenarios see the presentation from last meeting:**
http://www.ercot.com/content/meetings/lts/keydocs/2010/0820/Scenario_Development_20AUG2010.pdf

Texas Non-Farm Employment

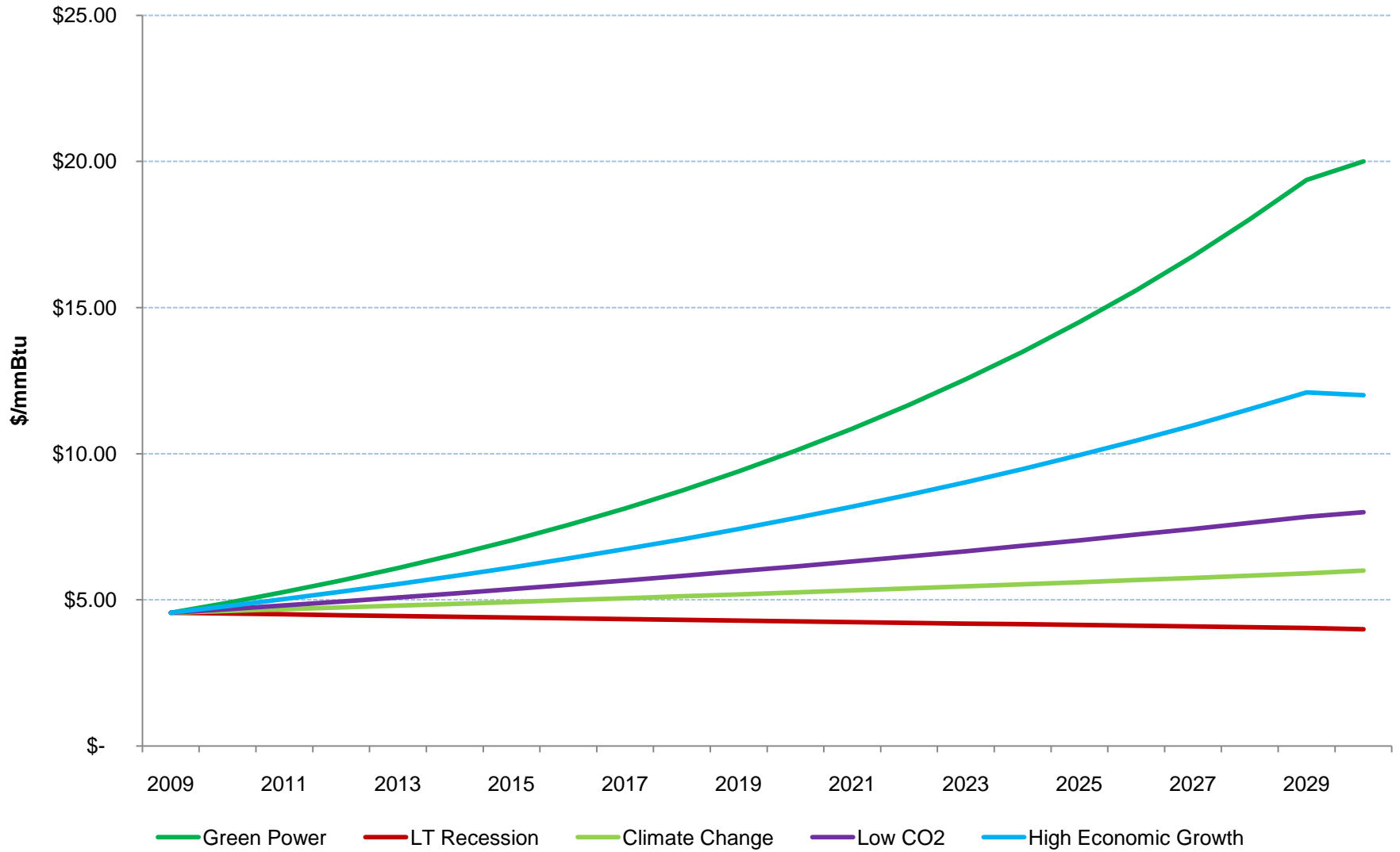


Green Power and high growth have the same employment values

Fuel Price Comparison (PRB)

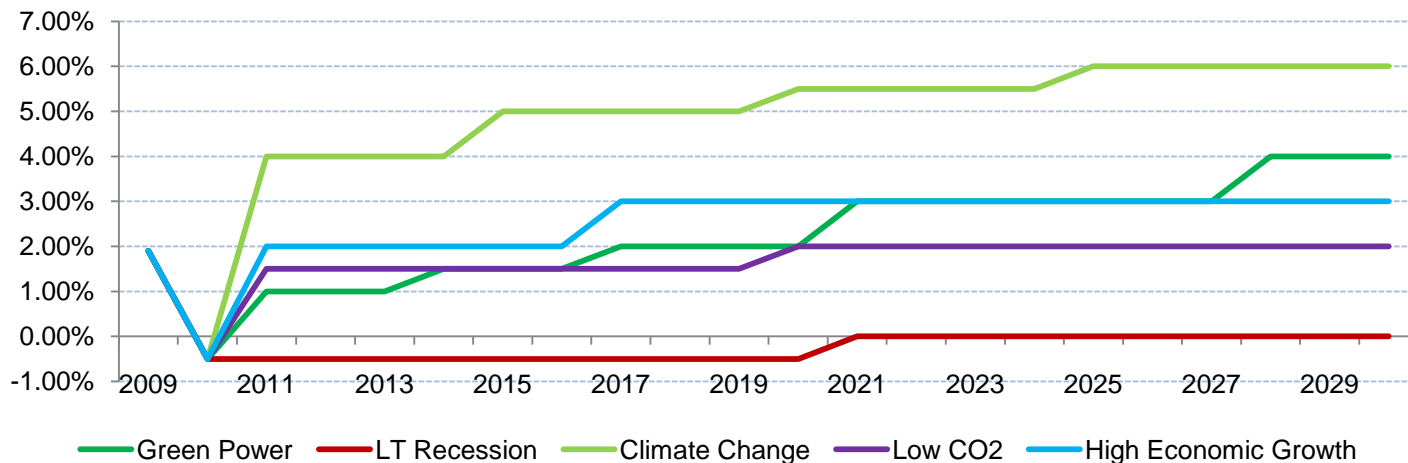


Fuel Price Comparison (Natural Gas)

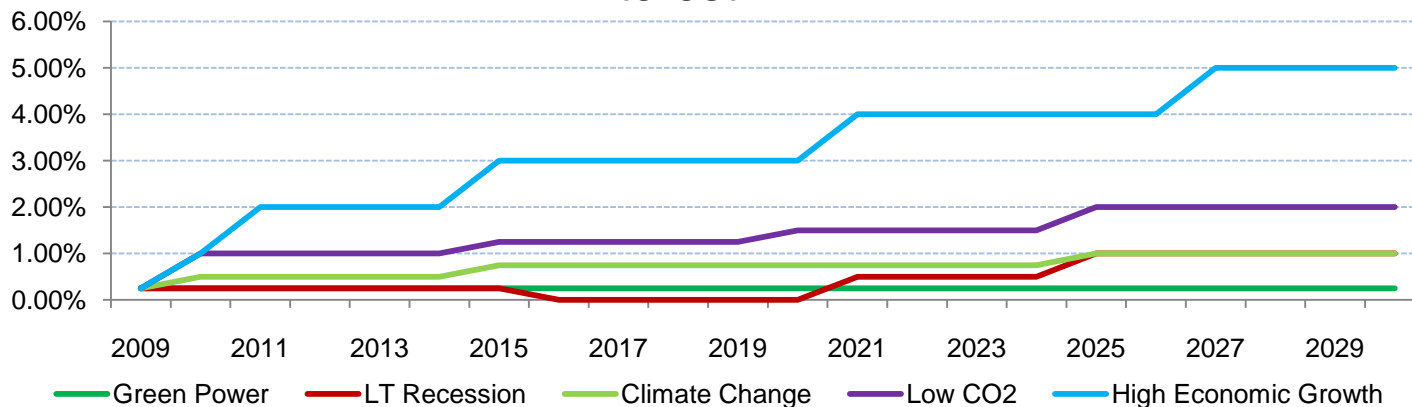


Inflation and Interest Rates Comparison

Inflation

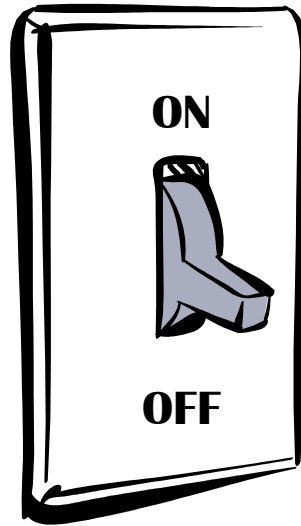


Interest



- **Participants review and comments/suggestions are necessary**
 - The data for the scenarios can be located at:
<http://www.ercot.com/calendar/2010/09/20100910-SDWG>
 - Comments have been received on the Long Term Recession scenario being “too bleak for too long”

Questions



For additional information:

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