



California Energy Commission

Natural Gas Modeling: Developing a Monthly Model

Natural Gas Working Group Stakeholders Meeting
Hearing Room A

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Leon D. Brathwaite
Electricity Analysis Office
Electricity Supply Analysis Division
Leon.brathwaite@energy.ca.gov / 916-654-4771

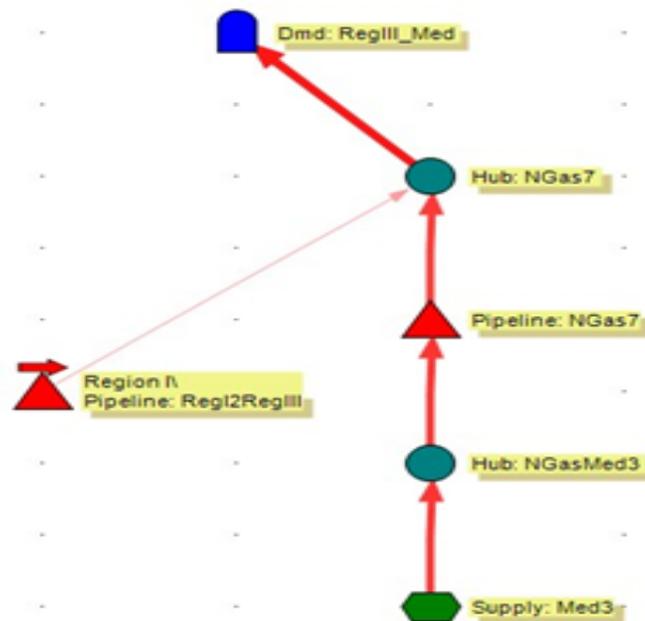


Natural Gas Modeling: Brief Background

- **What is MarketBuilder?**
 - A platform with specific object tools (“tinker toys”):
 - Supply tools;
 - Transportation tools;
 - Processing tools;
 - Demand tools;
 - Allocation tools.
- Each tool serves a specific purpose
- Tools used to construct models within the platform
 - Example: the North American Market Gas-trade (NAMGas) model



Natural Gas Modeling: Brief Background (Sample Structure)



Connected tools represent the different components of the natural gas market



Natural Gas Modeling: The Issue

- **The North American Market Gas-trade (NAMGas) model:**
 - **Constructed in MarketBuilder**
 - **Utilizes annual timepoints**
 - **2011, 2012, 2013.....2070**
 - **Provides *inter-year* variations of model output**
 - **Produces annual values**
 - **Demand and Supply**
 - **Price and Price differentials**



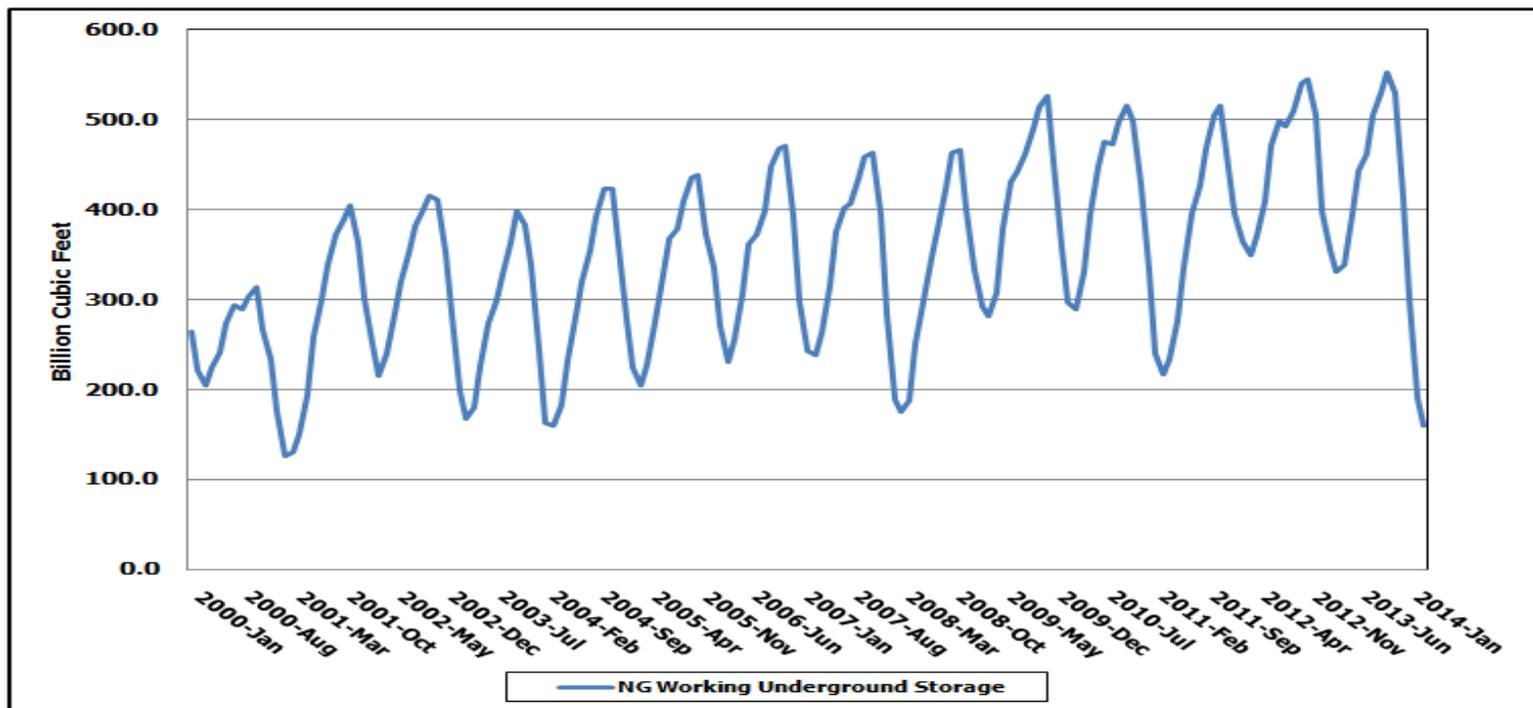
Natural Gas Modeling: The Issue (cont'd)

- **The North American Market Gas-trade (NAMGas) model:**
 - **Cannot address the *intra-year* dynamic of storage**
 - **Model assumes net injections of zero**
 - **Cannot fully answer questions about short-term phenomena**
 - **The on-going drought in California?**
 - **Monthly flows into California?**
 - **What happens to storage under these conditions?**



Natural Gas Modeling: The Issue (cont'd)

End-of-Month Working Gas Storage Volume (Western)



- Non-zero year-to-year storage variation
- Intra-year storage dynamic not captured



Natural Gas Modeling: The Next Phase

- **The North American Market Gas-trade (NAMGas) model:**
 - **Constructed in MarketBuilder**
 - **Utilizes monthly sub-timepoints**
 - **Each year broken into twelve sub-timepoints**
 - **January**
 - **February ...**
 - **December**
 - **Model output will provide *intra-year* variations**

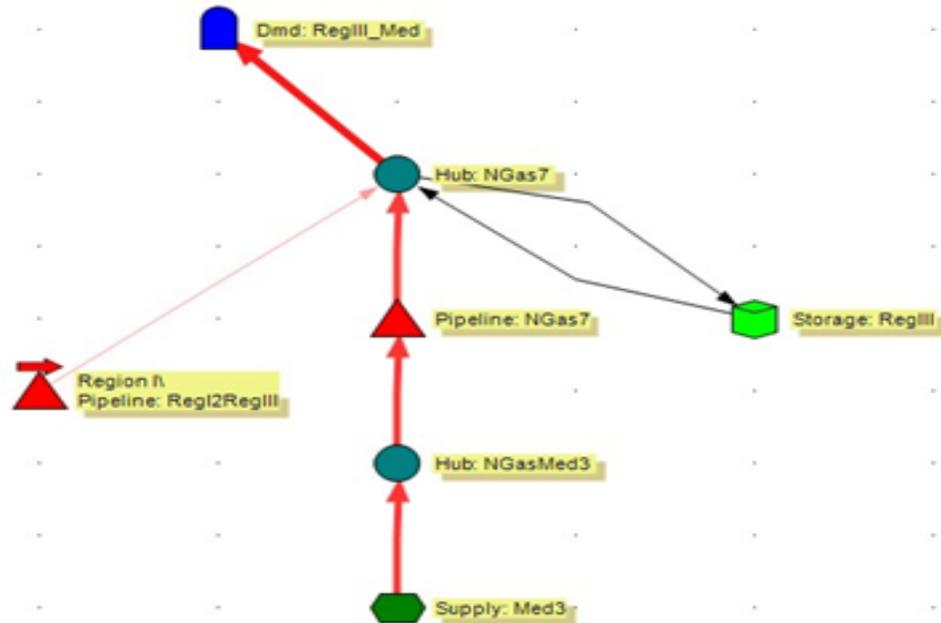


Natural Gas Modeling: The Next Phase (Cont'd)

- **The North American Market Gas-trade (NAMGas) model:**
 - **Produces monthly values**
 - Demand and Supply
 - Price and Price differentials
 - **Addresses the *intra-year* dynamic of storage**
 - Model no longer assumes net injections of zero
 - **Operates with shorten time horizon**
 - Greater number of sub-timepoints
 - Increased calculations as a result of added storage nodes



Natural Gas Modeling: New Structure



Green cube simulates the behavior of natural gas storage



Natural Gas Modeling: What Added Value?

- **The new North American Market Gas-trade (NAMGas) model:**
 - **Produce monthly values**
 - **Demand and Supply**
 - **Price and Price differentials**
 - **Produce monthly storage injections and withdrawals**
 - **Produce an improved gas balance with the inclusion of storage**
- **Better model short-term variations in the natural gas market.**



Natural Gas Modeling: Conclusion

Questions & Comments