



Impact of Planned Transmission Projects on Marginal Costs in ERCOT

Project No. 28500
*Activities Related to the Implementation of a Nodal Market
For the Electric Reliability Council of Texas*

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Overview

- Projects planned prior to 2005
- Projects recently recommended in 2005
- Ongoing studies



Previously Planned Projects

• Many projects were planned prior to 2005 for in-service by 2009, including the following major 345kV lines:

- Jacksboro-West Denton* (12/2006)
- West Levee-Norwood * (05/2006)
- Cagnon-Kendall* (06/2006)
- Venus-Liggett* (05/2006)
- Paris-Anna (12/2006)
- Clear Springs-Salado* (06/2010)

• Significant other upgrades are also planned, such as autotransformer additions in DFW, the tie with CFE at Laredo and construction to relieve need for RMR

* = CCN Required

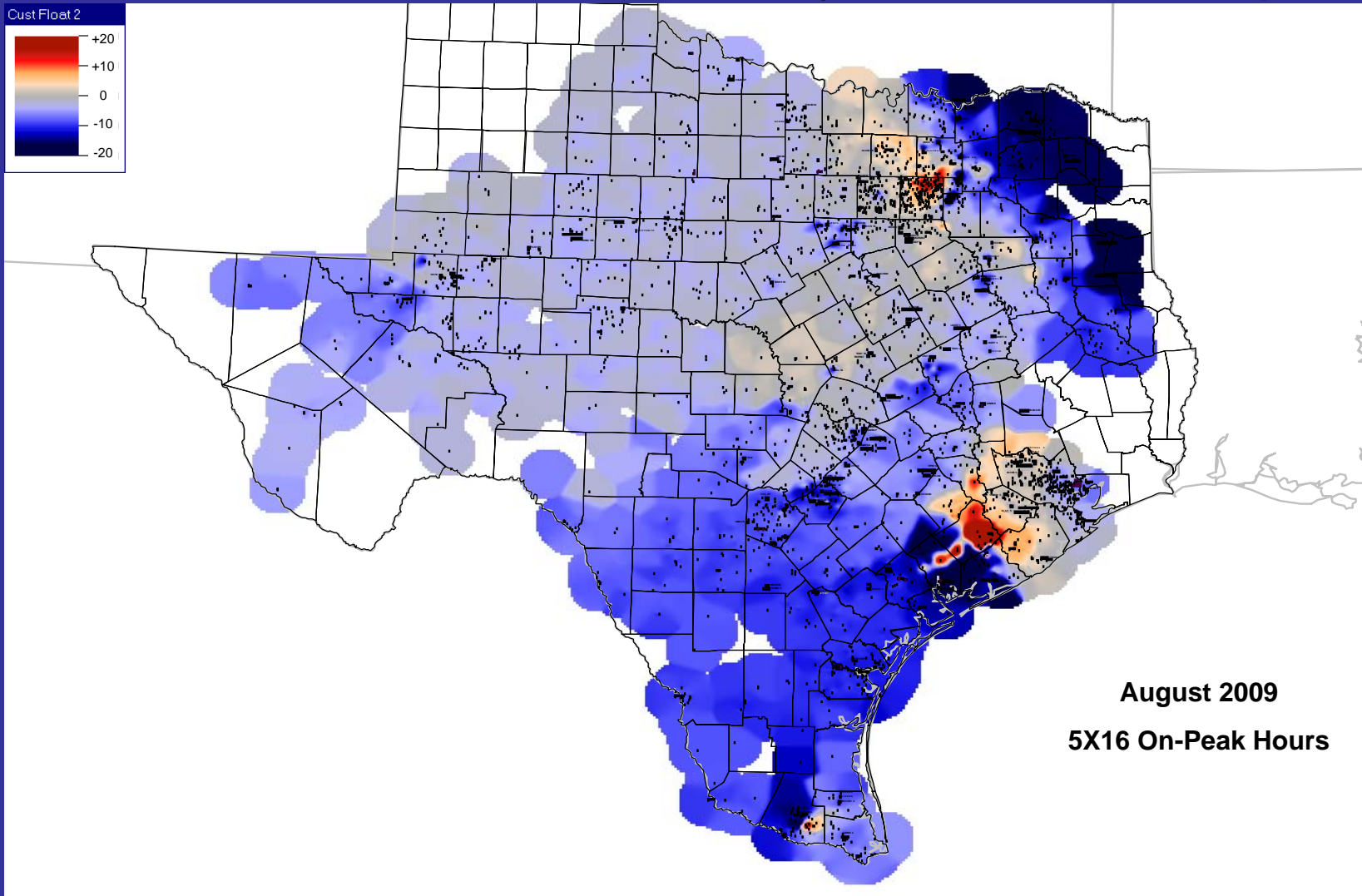


Effects of Previously Planned Transmission

- Used UPlan model to project the marginal costs at each bus relative to the other buses in the system
- Values are based on marginal cost-based security constrained commitment and dispatch
- Bidding behavior and mitigation are not modeled
- Outages will result in additional congestion not modeled



Relative Marginal Costs with Previously Planned Projects



Based on calculated load weighted average marginal costs at each bus



2005 Planned Projects

In 2005, ERCOT has recommended the construction of two major sets of transmission projects and several individual projects, primarily:

- Houston Import Projects
 - STP-Hillje-Parish 345kV Line Addition*
 - Jewett-Tomball/TH Wharton 345kV Upgrade
 - Other Transformer and Equipment Upgrades
- DFW 2006 Congestion Reduction Upgrades
 - Ben Davis – Royse 345-kV Line Upgrade
 - Johnson Switch – Venus 345-kV Line Upgrade
 - Centerville Switch – Parkdale 138-kV Line Rebuild
 - Everman - DeCordova 345-kV Line Upgrade
- Blessing-Lane City Reactor

* = CCN Required

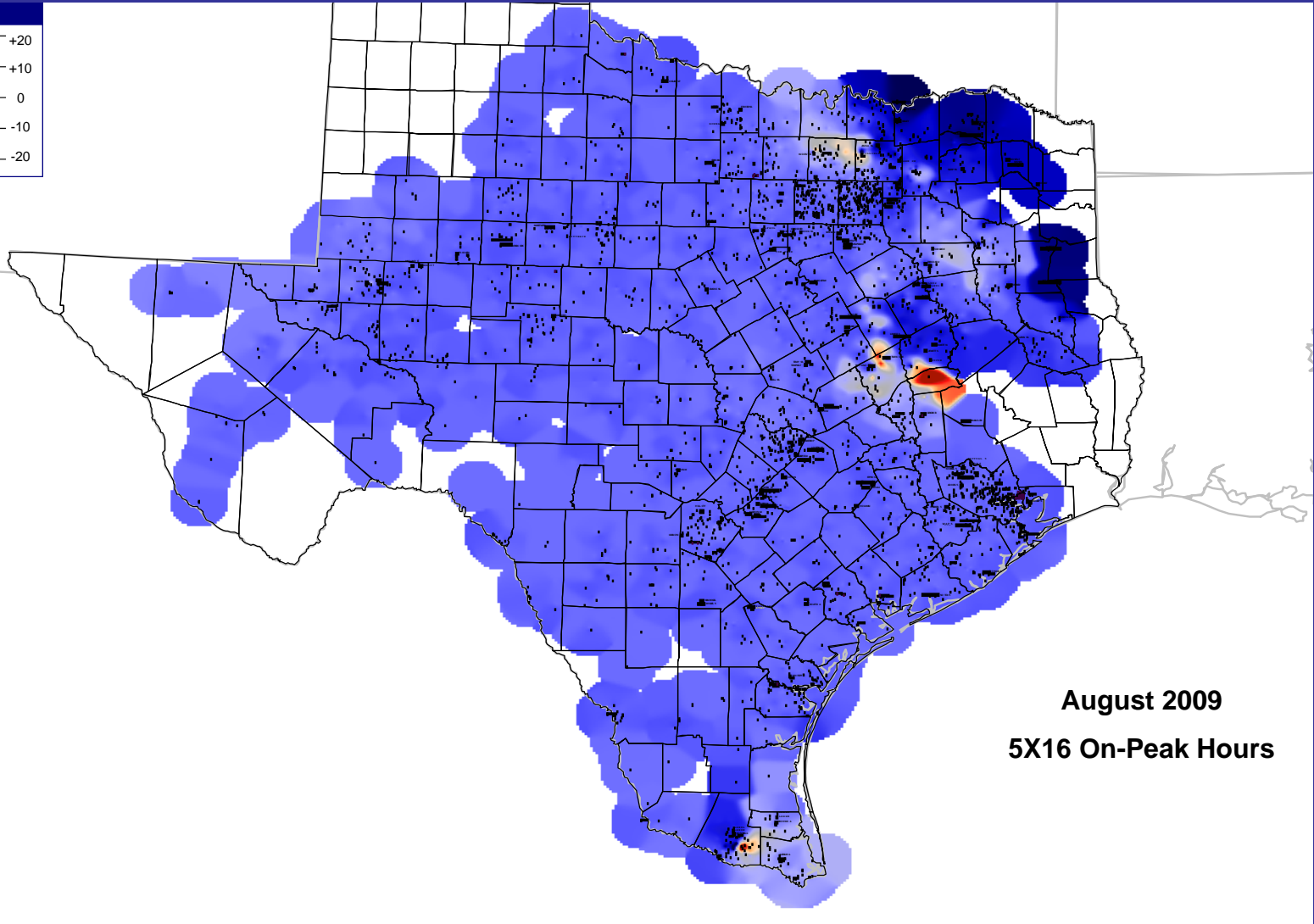
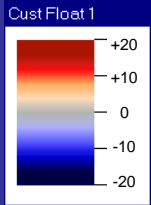


2005 Planned Projects - Criteria

- These projects were recommended based on their resulting reduction in production costs (societal benefit)
- However, these particular projects also have the benefit of reducing high marginal cost differentials



Relative Marginal Costs with 2005 Planned Projects



August 2009
5X16 On-Peak Hours

Based on calculated load weighted average marginal costs at each bus

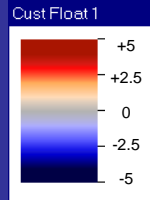


On-Going Planning

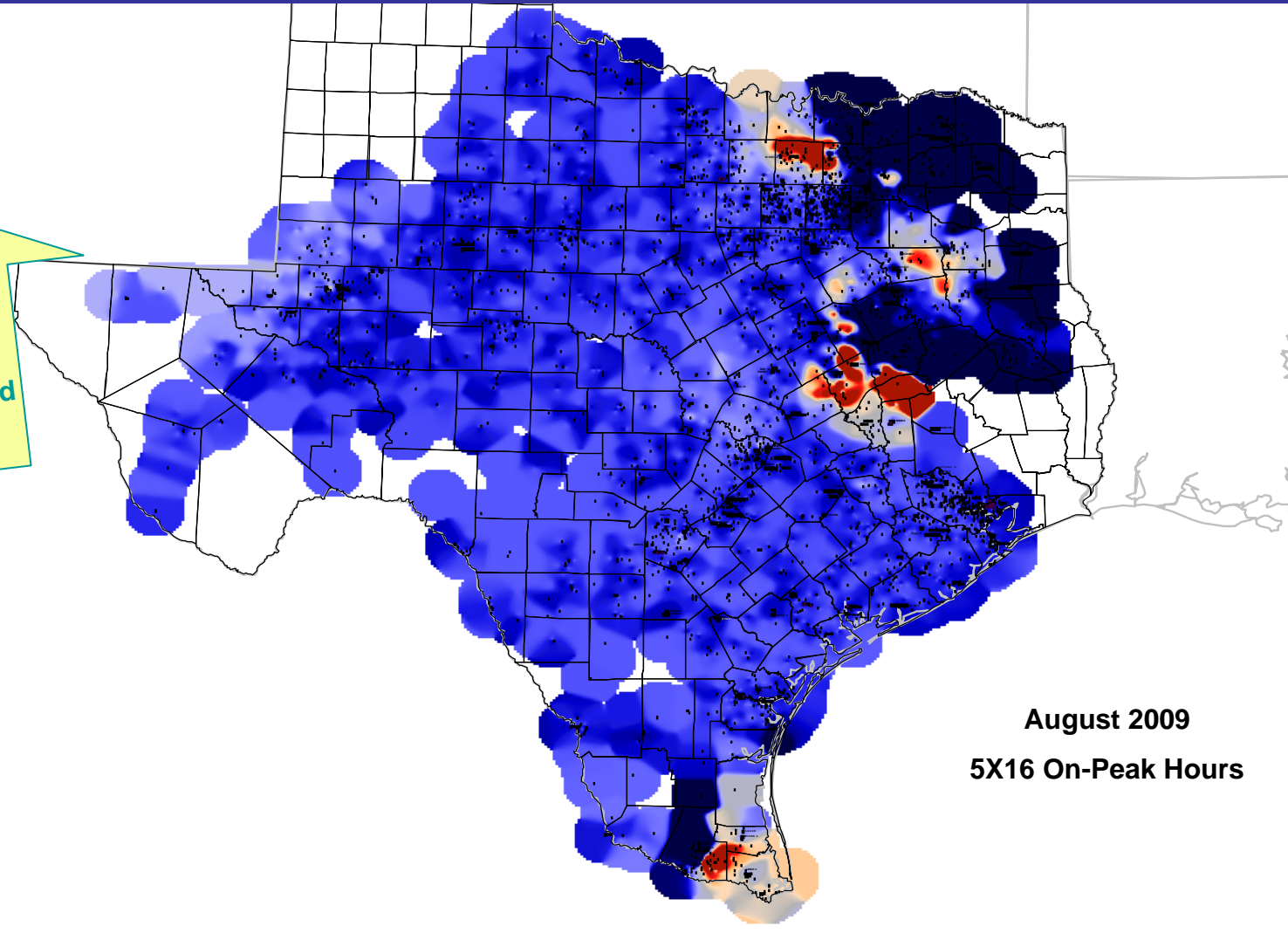
- Are we finished?
- No, we still need to look at the “inner layers of the onion” – the places where congestion is still projected to occur, but at a lower level of impact



Relative Marginal Costs with 2005 Planned Projects



Same
Numbers
with
Decreased
Scale



August 2009
5X16 On-Peak Hours

Based on calculated load weighted average marginal costs at each bus

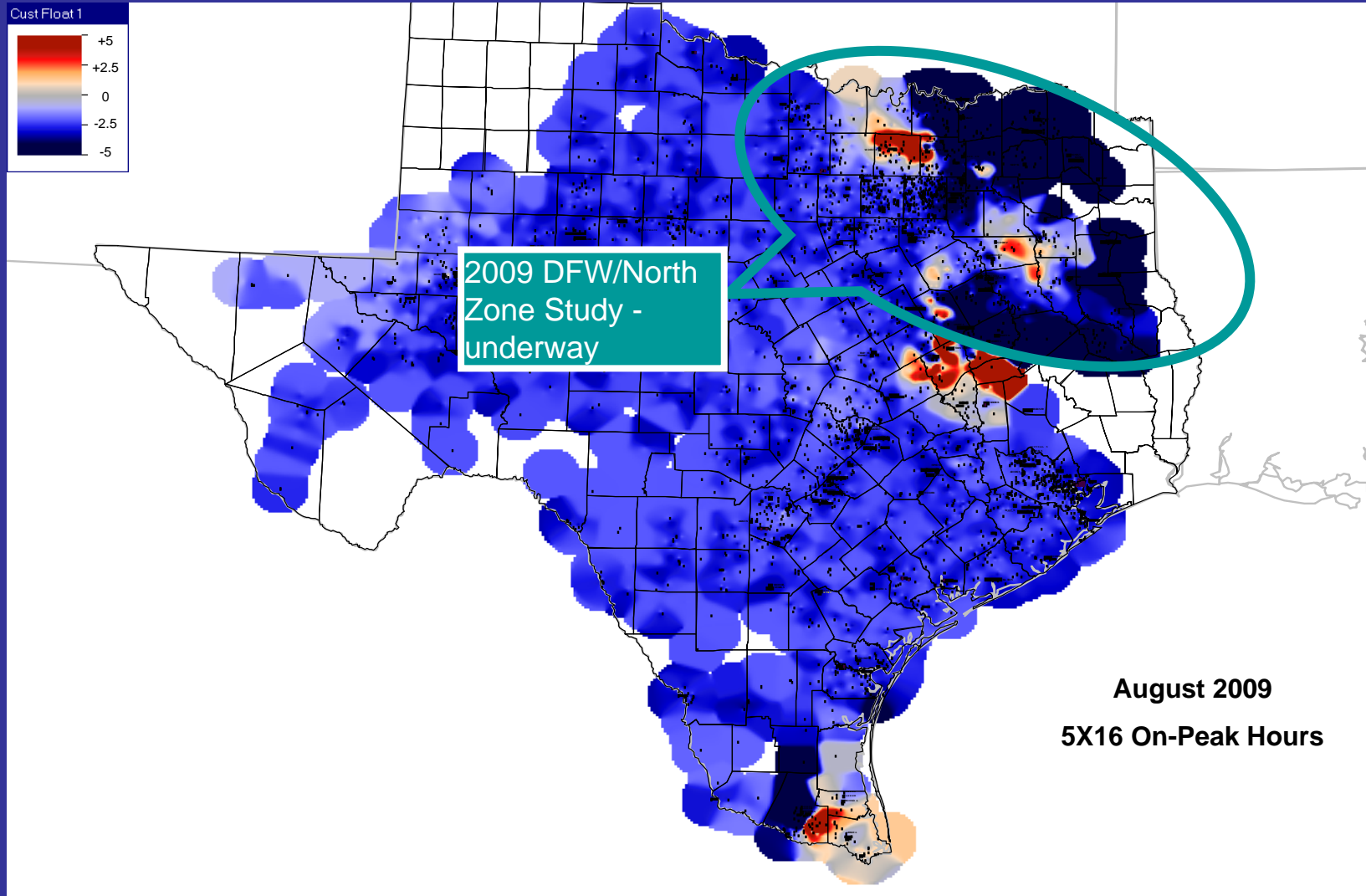


On-Going Planning 2

- Several studies are currently underway that will address the congested areas shown on the preceding map



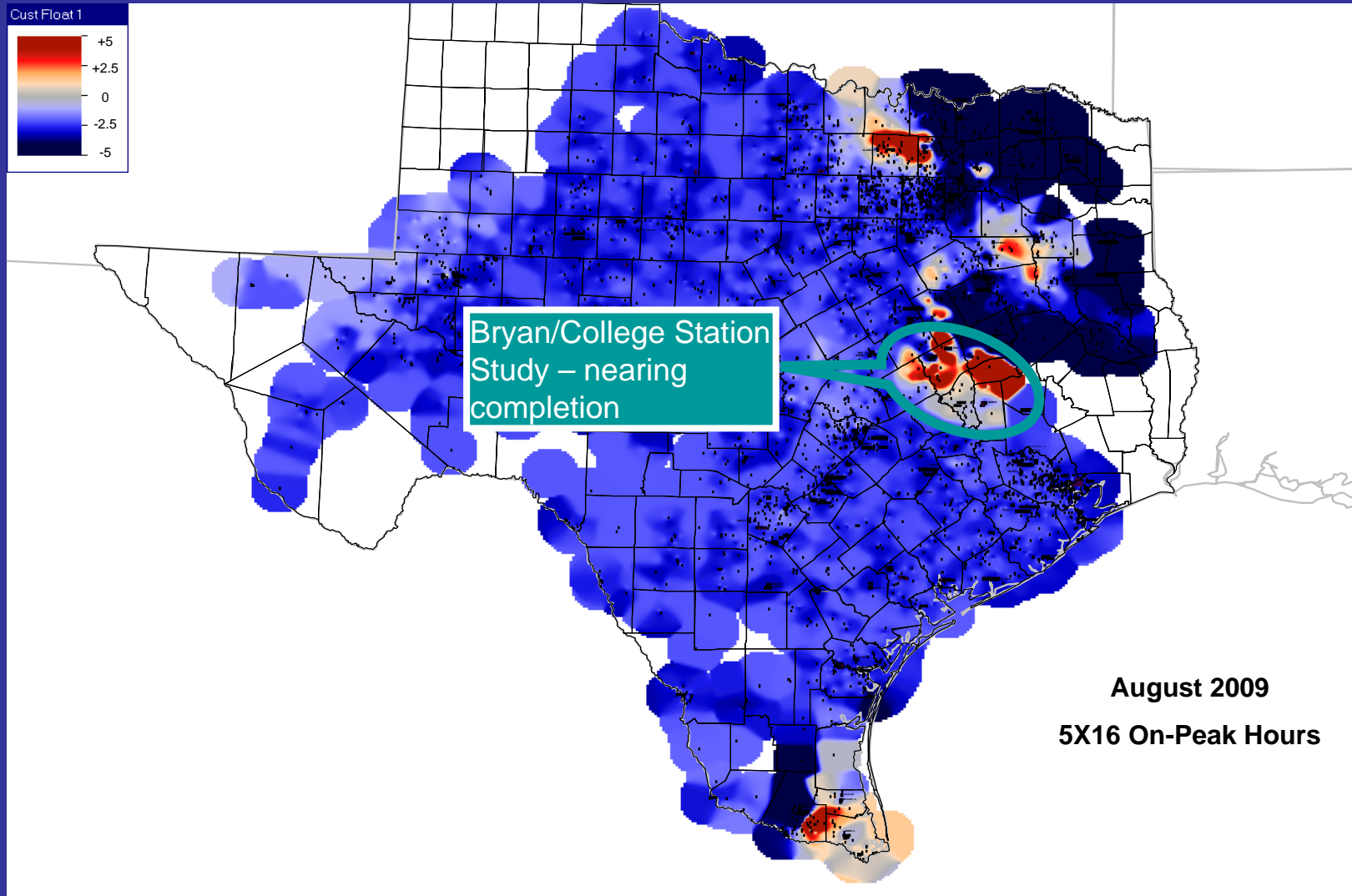
Relative Marginal Costs with 2005 Planned Projects



Based on calculated load weighted average marginal costs at each bus



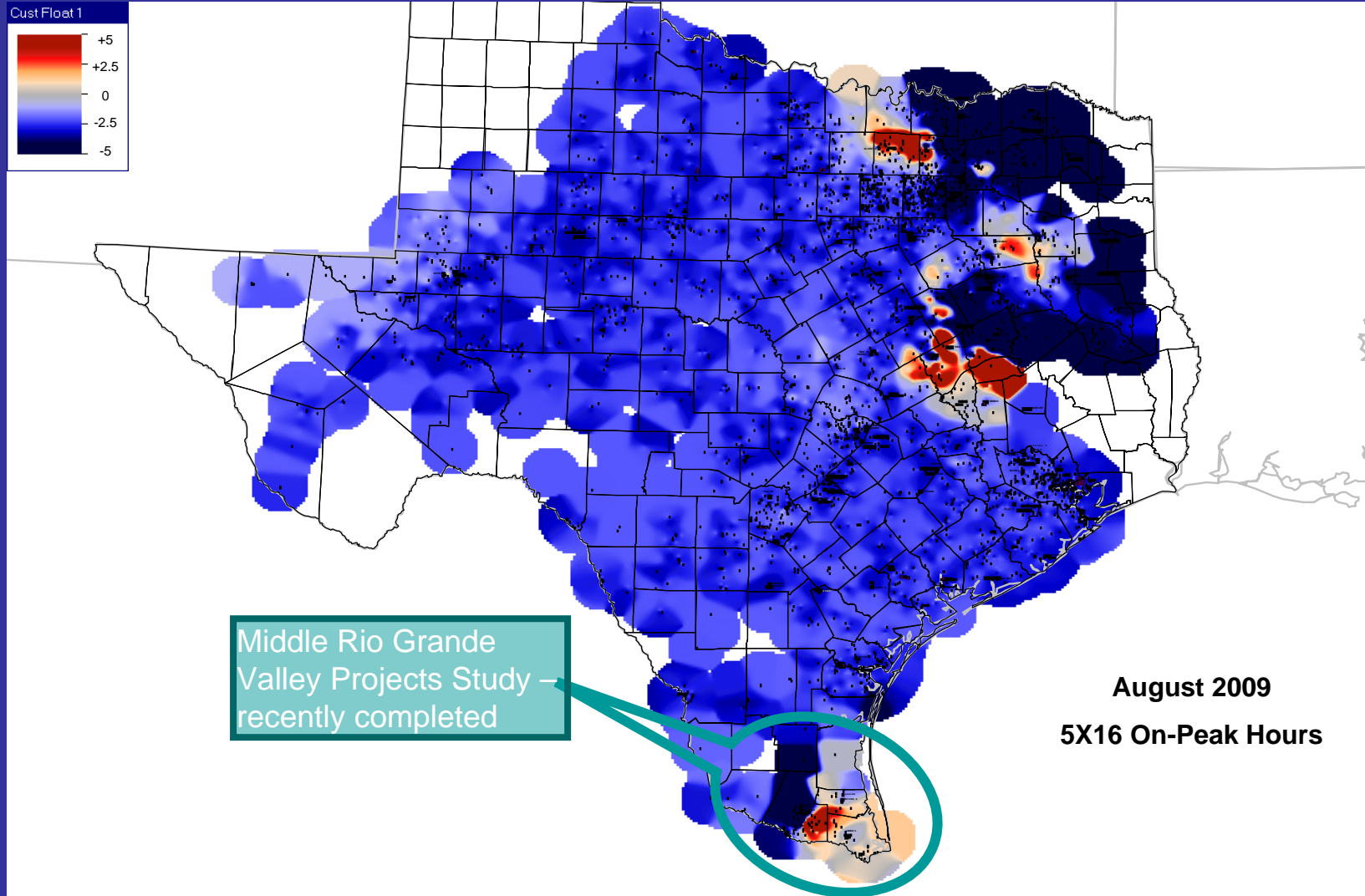
Relative Marginal Costs with 2005 Planned Projects



Based on calculated load weighted average marginal costs at each bus



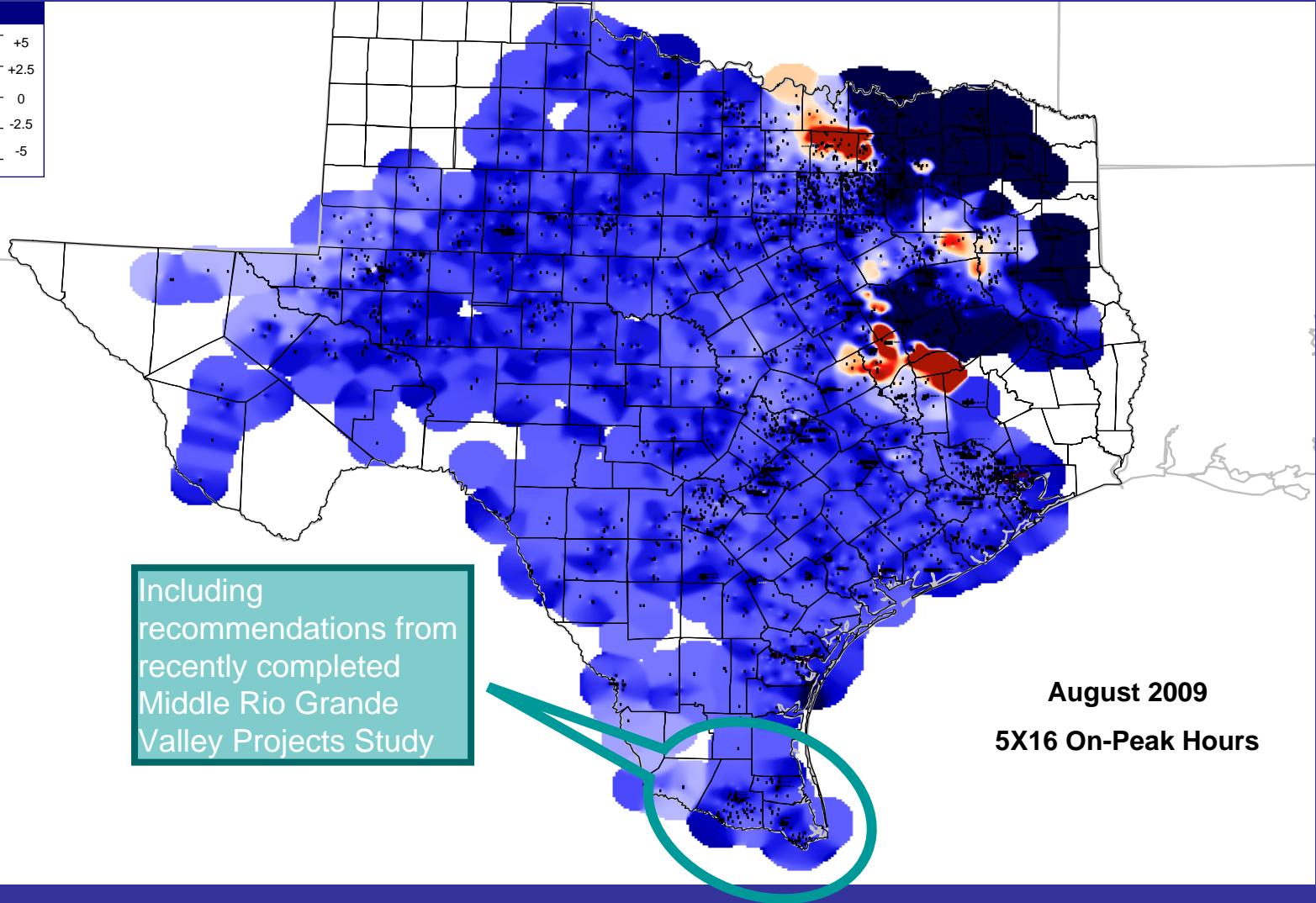
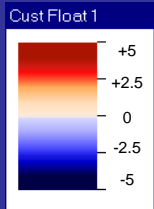
Relative Marginal Costs with 2005 Planned Projects



Based on calculated load weighted average marginal costs at each bus



2009 Nodal Prices with 2005 Planned Projects



Including
recommendations from
recently completed
Middle Rio Grande
Valley Projects Study

August 2009
5X16 On-Peak Hours

Based on calculated load weighted average marginal costs at each bus



- Planning is an on-going process
 - Congestion patterns may differ in years prior to 2009, due to construction timeframes
 - Generation additions/retirements, changes in fuel forecast, differential load growth, etc. may change results for 2009
 - Load growth and new generation additions/ retirements will require continuing planning and transmission upgrades

Study is based on best knowledge available today and reasonable assumptions



Top Planned Lines

- Clear Springs-Salado
- Jacksboro-West Denton
- West Levee-Norwood
- Cagnon-Kendall
- Venus-Liggett
- Paris-Anna
- **Houston Import Projects**
 - STP-Hillje-Parish 345kV Line Addition
 - Jewett-Tomball/TH Wharton 345kV Upgrade
 - Other Transformer and Equipment Upgrades
 - Blessing-Lane City Reactor
- **DFW 2006 Congestion Reduction Projects**
 - Ben Davis – Royse 345-kV Line Upgrade
 - Johnson Switch – Venus 345-kV Line Upgrade
 - Centerville Switch – Parkdale 138-kV Line Rebuild
 - Everman - DeCordova 345-kV Line Upgrade
- **San Miguel-Laredo**
- **Miscellaneous RMR Exit Upgrades**

AND - Additional lines to be determined in DFW/North Zone 2009, Bryan/College Station and Middle Rio Grande Valley Area studies

The order of the projects above is not intended to indicate importance



Questions?