Houston Import Study

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Houston Import Background

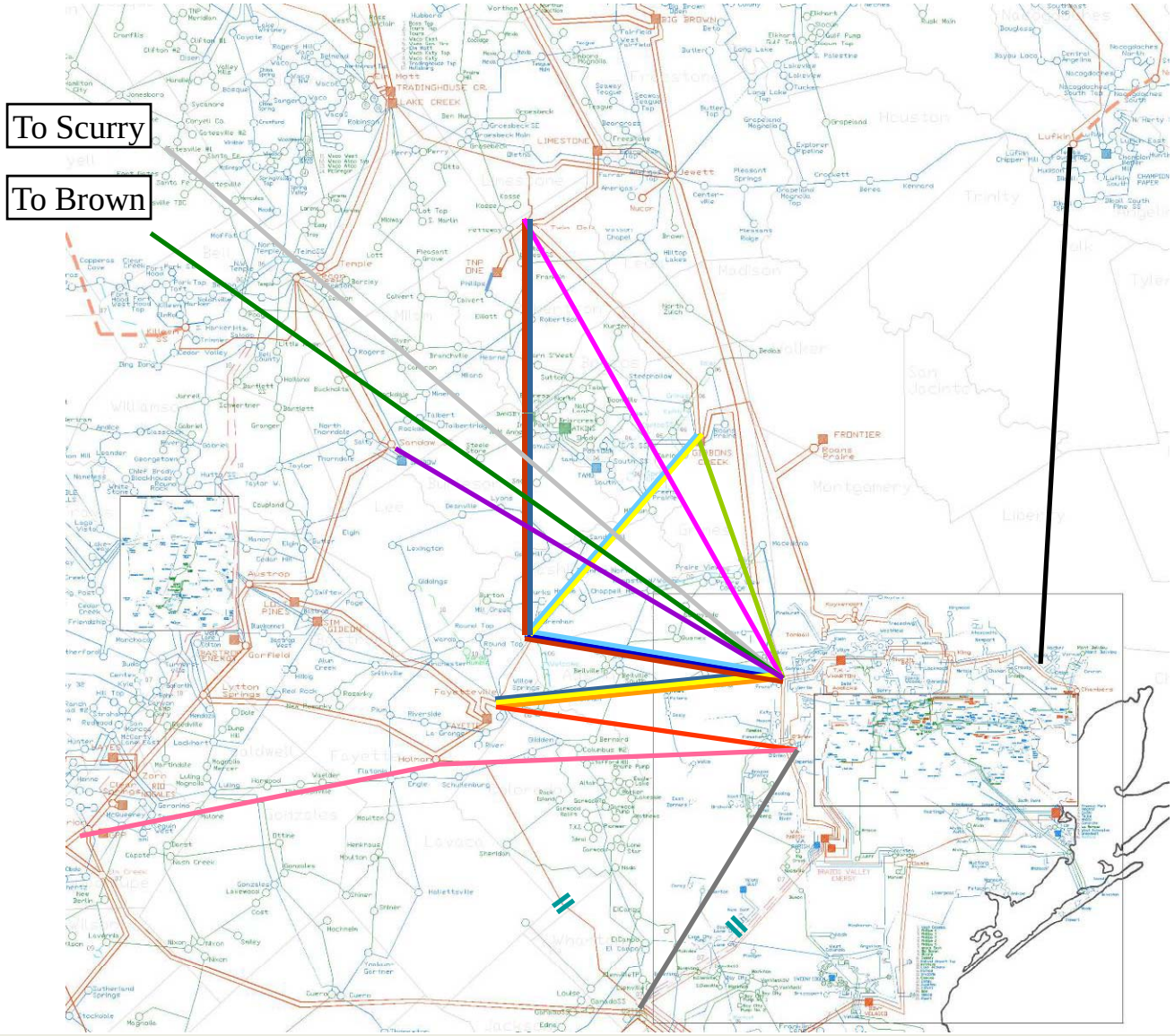
- **ERCOT's December 2008 Long-Term Study identified potential need for additional import capacity into Houston**
- **North to Houston congestion continues to be experienced in real-time operations**
- **Two Market Participants (CenterPoint Energy and Sharyland Utilities) submitted RPG proposals for two different Tier 1 projects**
  - Each project received stakeholder comments on the relative merits of the individual proposals
- **ERCOT performed Independent Review of these projects and analyzed approximately 20 other options under a variety of scenarios**

- **Analysis focused on economic benefit of additional import capacity into the Houston area**
  - Import restrictions not considered to be a NERC-criteria reliability need in the timeframe of the study (2014)
  - Recent unit mothballing at SR Bertron and Greens Bayou plants not taken into account
- **Used 2009 Five-Year Transmission Plan economic model for the year 2014 to perform the analysis**
- **Three phase approach:**
  1. Base case – use standard RPG review assumptions to determine which options pass planning criteria
  2. Alternative scenarios – evaluate each of the options that pass phase 1 under a variety of scenarios to determine “best” option
  3. Sensitivity scenarios – evaluate preferred option in additional scenarios to determine robustness

Houston Import Project Options Studied

Option	Cost	Description
1	$333M	Lufkin-Canal 345-kV double circuit
2	$222M	Salem-Zenith 345-kV double circuit
3	$175M	Fayetteville-Zenith 345-kV double circuit
3A	$225M	Fayetteville-Zenith 345-kV double circuit w/ 30% series comp
4	$173M	Gibbons Creek-Zenith 345-kV double circuit
6	$189M	Fayetteville-Obrien 345-kV double circuit
6A	$239M	Fayetteville-Obrien 345-kV double circuit w/ 30% series comp
9	$278M	Gibbons Creek-Salem-Zenith 345-kV double circuit
12	$306M	Gibbons Creek-Salem/ Fayetteville-Zenith 345-kV double circuit
19	$62M	Add series comp to existing Hillje-WAP and Hillje-Holman 345-kV
22	$226M	Fayetteville-Zenith 345-kV double circuit w/ 50% series comp
24	$300M	Option 19 + Option 22
J1	$253M	Sandow-Zenith 345-kV double circuit
J1A	$304M	Sandow-Zenith 345-kV double circuit w/ 30% series comp
J2	$420M	Marion-Holman-Obrien 345-kV double circuit
J3	$174M	Hillje-Obrien 345-kV double circuit
DC1	$787M	Brown-Zenith 3000 MW HVDC line
DC2	$923M	Scurry-Zenith 2000 MW HVDC line
E1	$379M	Twin Oaks-Salem 345-kV double ckt and Fayetteville-Zenith 345-kV double ckt
E4	$286M	Twin Oaks-Zenith 345-kV double circuit
E4A	$336M	Twin Oaks-Zenith 345-kV double circuit with 30% series comp
E5	$328M	Twin Oaks-Salem-Zenith 345-kV double circuit

Houston Import Project Options Studied



- Option 1
- Option 2
- Option 3/ 3A/ 22
- Option 4
- Option 6/ 6A
- Option 9
- Option 12
- Option 19
- Option J1/ J1A
- Option J2
- Option J3
- Option DC1
- Option DC2
- Option E1
- Option E4/ E4A
- Option E5

ERCOT Independent Review Results

- **Seven options passed the economic planning criteria in the base scenario based on generator revenue savings (consumer benefit test); none passed using production cost savings (societal benefit test)**
  - Majority of economic projects recommended by ERCOT are due to the production cost savings of the projects – "societal benefit"
  - Houston Import project is justified based on generator revenue savings – "consumer benefit"
    - Per ERCOT RPG Planning Charter and Procedures Section 3.3
  - Study indicates that increasing the import capacity for Houston will result in lower LMPs in the Houston area

ERCOT Independent Review Results

- **Option 3 (Fayetteville-Zenith 345-kV double circuit line) was the only option that met the economic criteria in the base case and all of the alternative scenarios besides the STP 3 & 4 scenario**
  - STP 3 & 4 scenario was run on 2014 model because a later year model was not available at the time of analysis

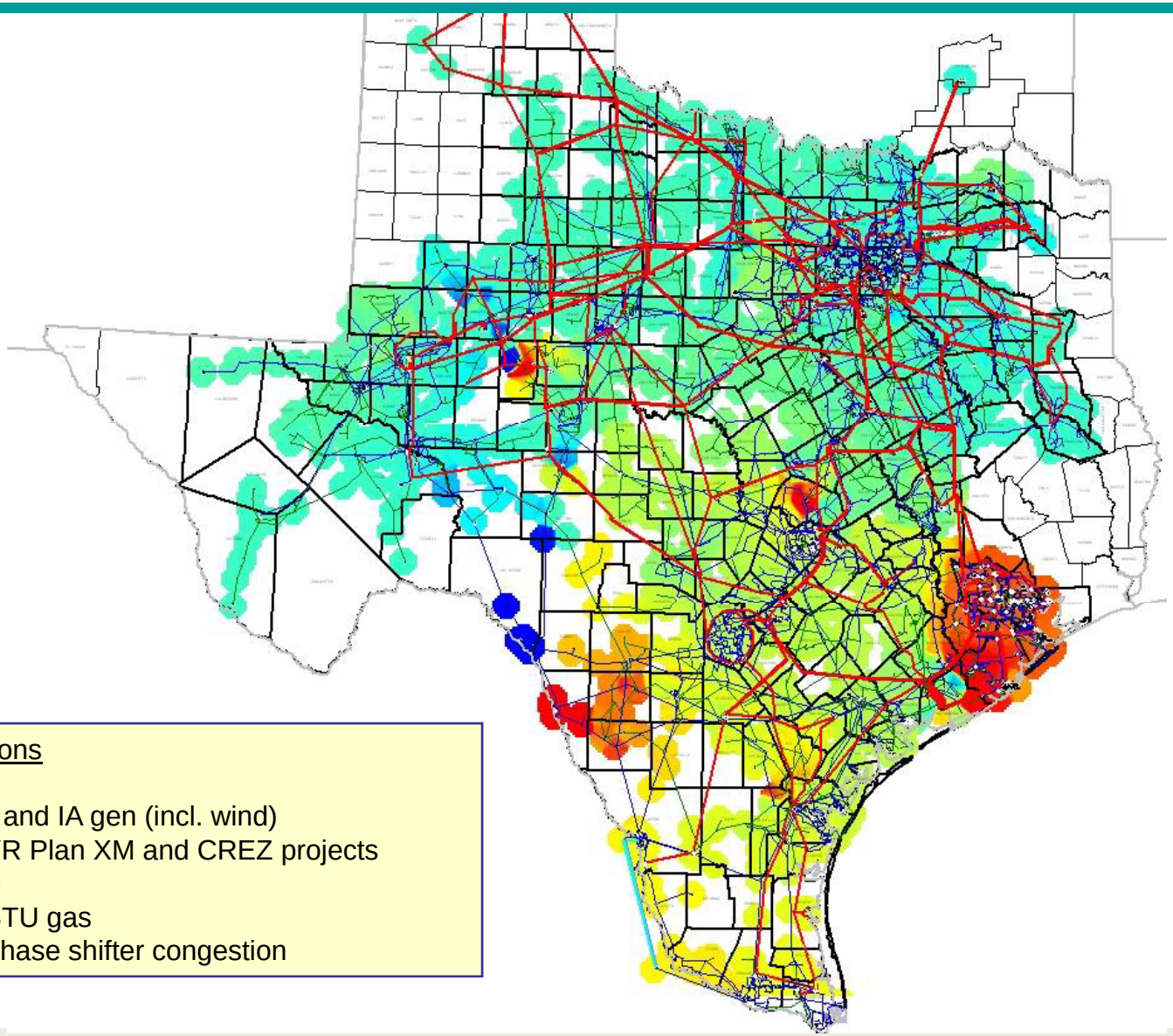
Study Results for Option 3	$M
Cost	175
Savings Required For Economic Justification	29.2
Base Case Production Cost Savings	13.3
Base Case GR Savings	45.4
CREZ Generation Scenario GR Savings	87.5
High Coastal Load Scenario GR Savings	114.0
Low Coastal Load Scenario GR Savings	55.0
$4 Gas Price Scenario GR Savings	31.6
$10 Gas Price Scenario GR Savings	42.3
STP 3&4 Scenario GR Savings	4.0
Houston Gas Plant Addition Scenario GR Savings	55.4
Generator Assumptions Update Scenario GR Savings	50.4
Savings Required for High Transmission Cost Scenario	37.7
GR = Generator Revenue; Savings are annual	

Phase 1

Phase 2

Phase 3

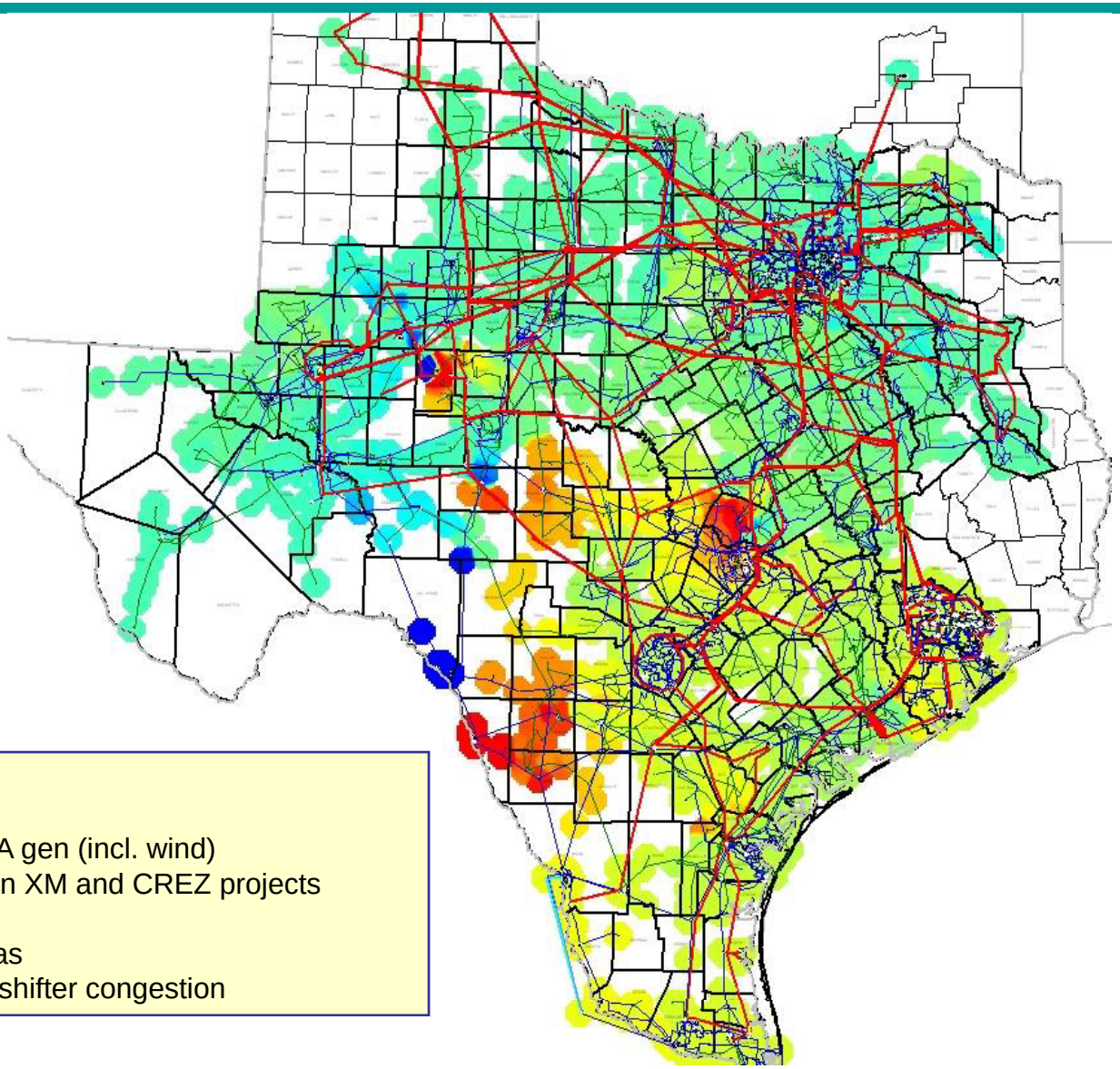
Benchmark case – Relative Avg Annual LMPs



Key Assumptions

- 2014
- Existing and IA gen (incl. wind)
- 2009 5YR Plan XM and CREZ projects included
- $7/MMBTU gas
- Ignore phase shifter congestion

Option 3 – Relative Avg Annual LMPs



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Conclusions

- **ERCOT is requesting the ERCOT BOD endorse the following improvements associated with Option 3:**
  - Build Fayetteville – Zenith 345 kV double circuit line (approx. 60 miles on a new ROW) so that each circuit Rate B is approximately 2800 MVA
  - Loop Fayette Power Project – Salem 345 kV line into Fayetteville 345 kV substation
  - Upgrade Fayette Power Project – Fayetteville 345 kV double circuit lines so that the Rate B of each circuit is approximately 1900 MVA
  - Expand the Fayetteville Substation with four new line terminations and Zenith Substation with two new line terminations
  - Upgrade the Bellaire – Brays – H.O. Clarke Plant 138 kV line terminal equipment so that the circuit Rate B for the two 138 kV sections is 893 MVA and 561 MVA, respectively
- **Estimated Capital Cost = $175M**
- **2014 Annual Generator Revenue Savings = $45.4M**

Questions?