Electric Reliability Council of Texas (ERCOT) is an Independent System Operator (ISO) for majority of Texas.

- **Contracts** between power generating companies and load serving entities (LSEs)
- **Schedules** power purchased and reports it through Qualified Scheduling Entities (QSEs)

ERCOT, until December 2010 operated on a **Zonal Market** Model. In this design, the market is divided into **Congestion Management Zones** (CMZs) and these zones are defined by **Commercially Significant Constraints** (CSCs).

- **Zonal Congestion**
  - Congestion costs assigned to zones
  - Shared by participants in a zone
- **Local Congestion**
  - ERCOT resolved congestion with specific generating unit deployment
  - Costs shared by consumers of that electricity
  - Prices only based on zonal congestion

ERCOT now operates on the **Nodal Market** Design. In this design, the market is divided into 4,000 pricing points, points of electricity entry or exit. Congestion costs are essentially assigned to those who caused it known as **Locational Marginal Pricing** (LMP).

### Day-Ahead Market

- **Voluntary** financial market that ensures reliability of the transmission grid
- Allows QSEs to bid/offer energy or Ancillary Services
- Participants can purchase/sell energy Early snapshot of operating day

### Reliability Unit Commitment (RUC)

This ensures there is sufficient generation capacity in the correct locations to service expected load and transmission congestion.

- Day – Ahead RUC: Run daily for the following day
- Hourly RUC: Run hourly

### Real – Time Market

This feature is to balance the system efficiently and it clearly differentiates the zonal and nodal market:

**Zonal Market**

- QSEs report every 15 minutes in each CMZs
- Congestion managed through portfolios

**Nodal Market**

- Security Constrained Economic Dispatch (SCED) report every 5 minutes
- Most economical dispatch
- All congestion is managed using individual resources
- Generation will be settled based on LMP of the node where the generator is located
- Load will be settled based on a load price zone
- Load Price Zone = load weighted average of the LMPs in the load zone

### Congestion Revenue Rights (CRRs)

CRRs are a financial instrument.

- Defined by MW amount, settlement point of injection and settlement point of withdrawal
- CRR owner gets paid or pays the LMP difference between CRR injection and withdrawal points

### Nodal’s Performance

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<tr>
<th>2008 Zonal</th>
<th>vs</th>
<th>2010 Nodal</th>
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### References:

- www.ercot.com (Board Meeting Reports, Understanding Nodal Handout, Nodal Protocols)
- Potomaceconomics.com (Market Monitor Reports)
- Window on State Government: Susan Combs Texas Comptroller of Public Accounts about Electricity Market