

Market Based Approaches to  
Renewable Energy and Climate Change

February 7, 2005

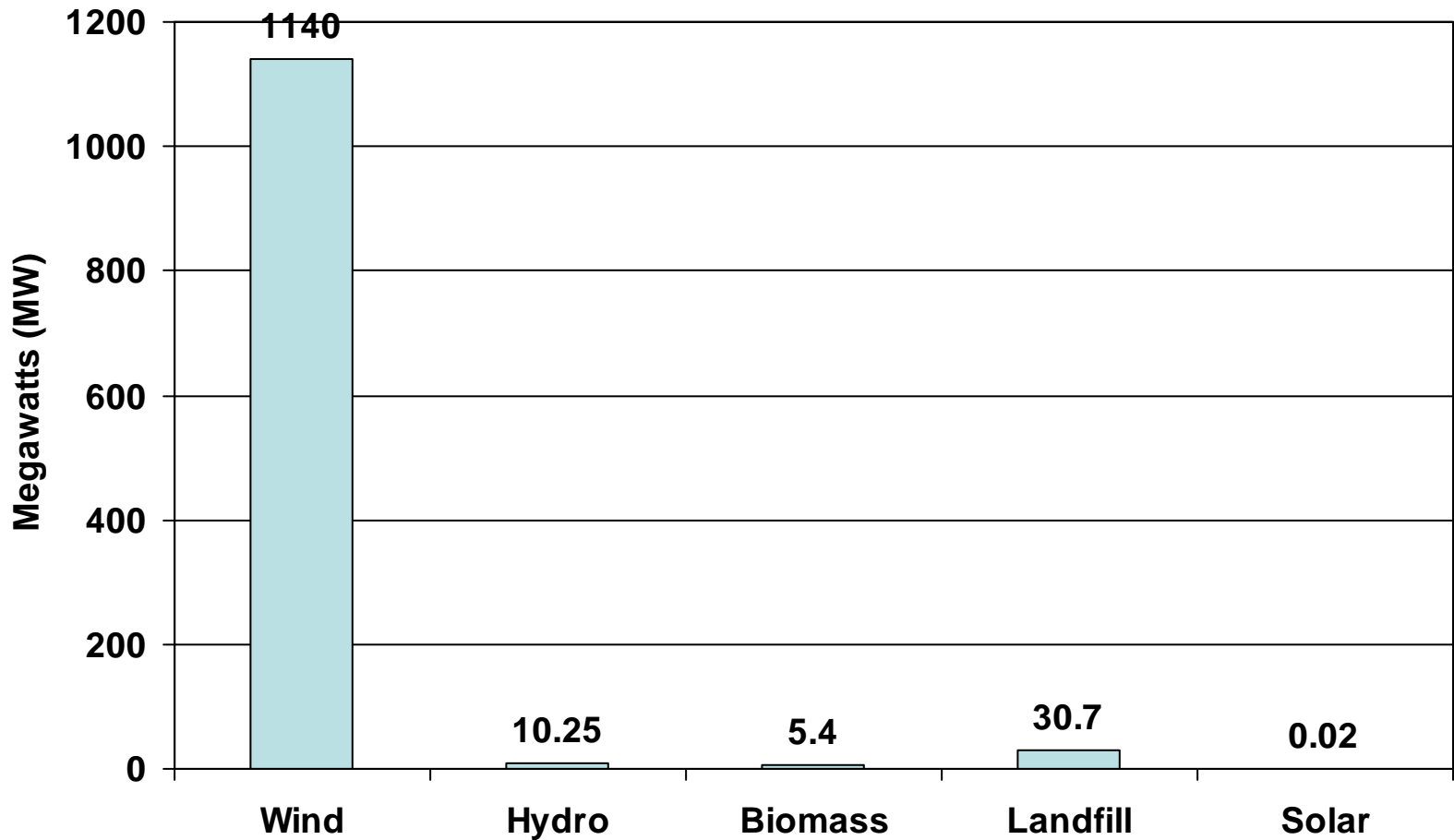
# Renewable Energy Opportunities

- ❑ **Texas' commitment to creating renewable opportunities has four components:**
  - Instituting electric choice.
  - Adding 2000 new MW of renewable generating capacity to the 880 MW that existed in 1999 (PURA §39.904).
  - Creating a simple and effective Renewable Energy Credit (REC) trading program.
  - Crafting a transmission system that encourages the development of renewable resources while providing certainty in both transmission rates and interconnection terms.
- ❑ **The result has been emission reductions, economic development, and rapid expansion of Texas' renewable fleet**

# This Commitment Relies Exclusively on Naturally Re-generated Sources...

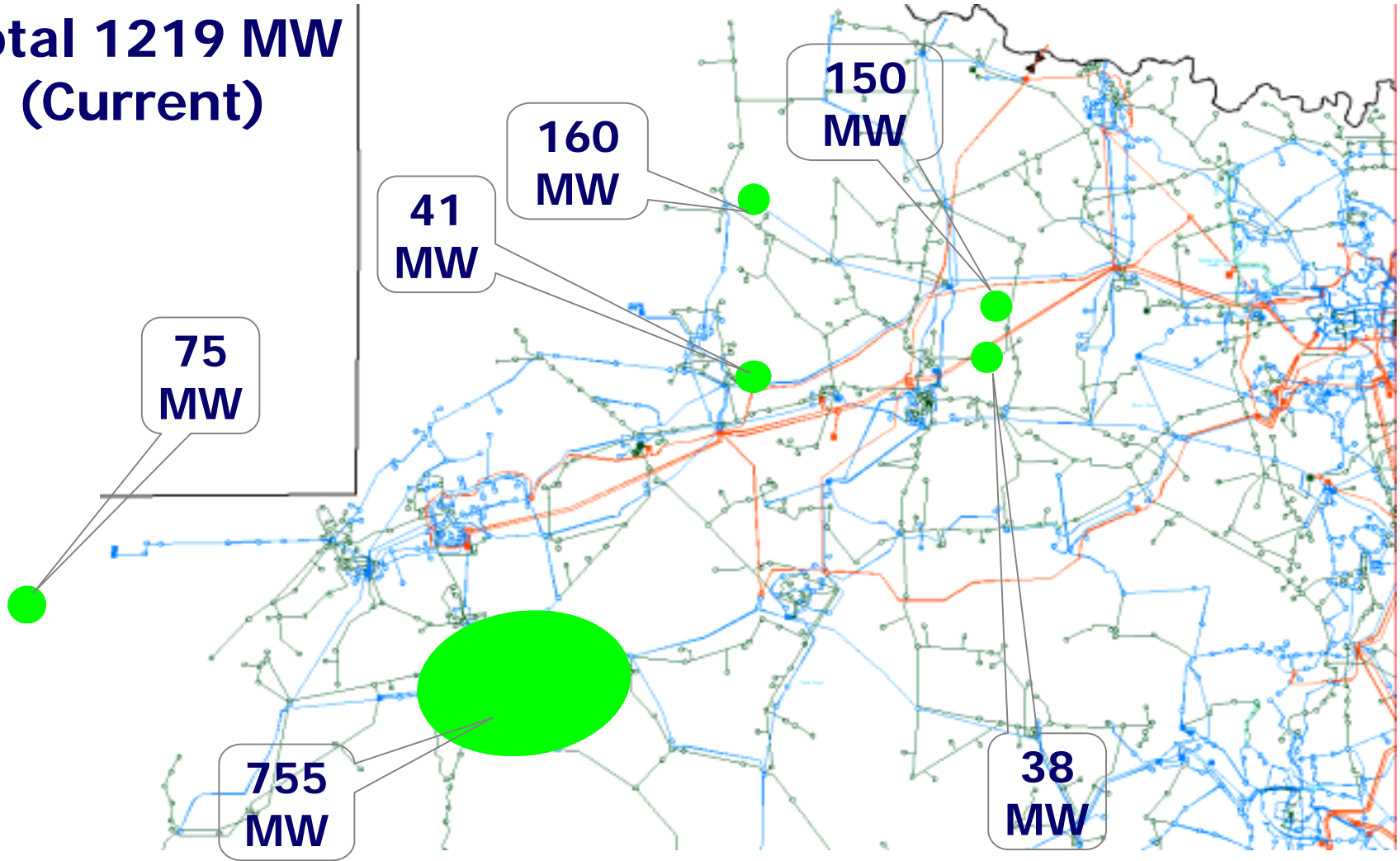
- ❑ Sun
  - ❑ Wind
  - ❑ Geothermal
  - ❑ Hydro
  - ❑ Tidal Activity
  - ❑ Biomass
- **Since 1999, about 1190 MW of new renewable capacity has been installed—more than half of the 1999-2009 goal**
- ❑ Not derived from fossil fuels, waste products from fossil fuels, or waste products from inorganic sources. Does not include clean coal or advanced natural gas technology.

# Though as You Can See, a Single Resource Has Dominated...



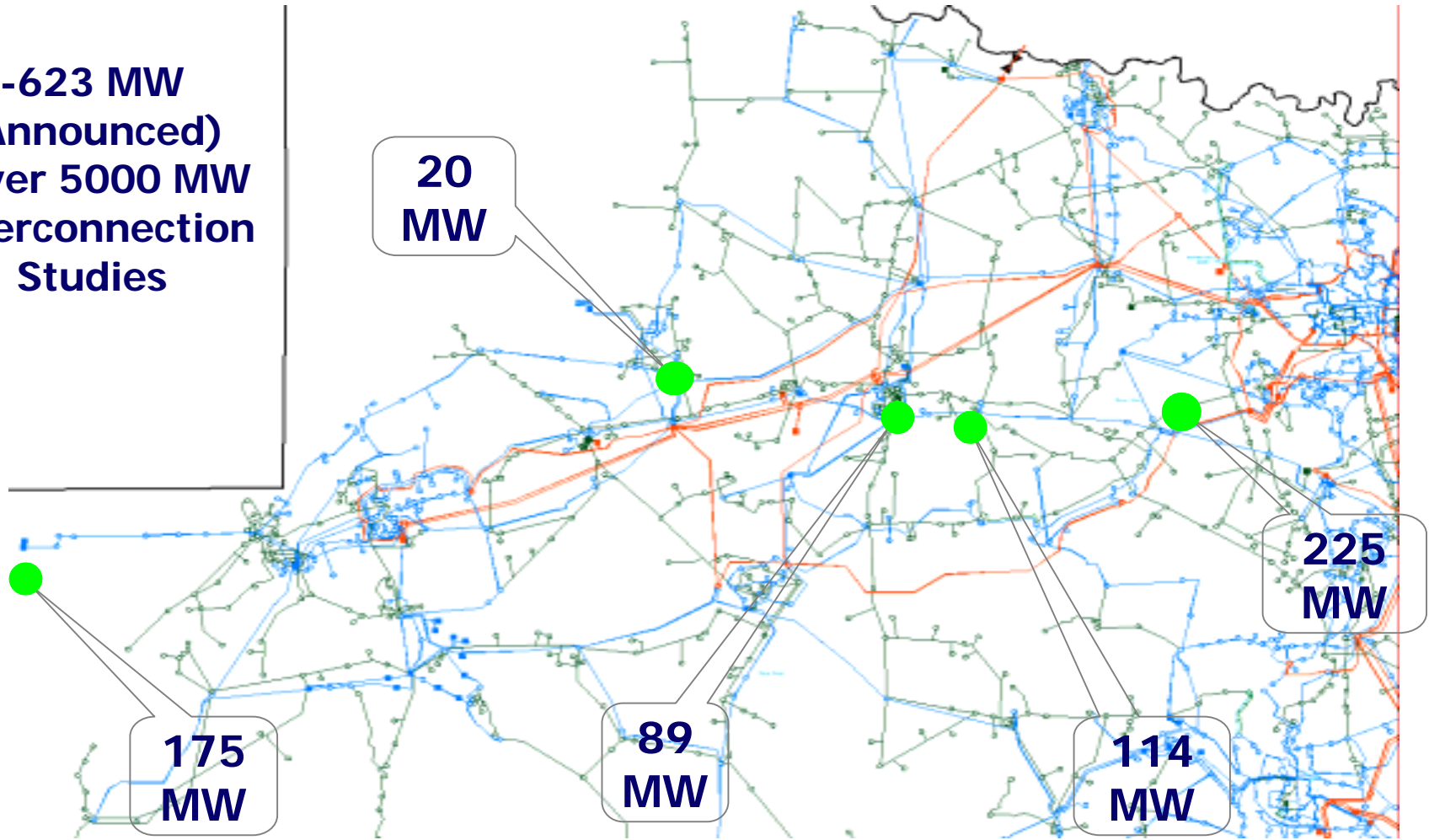
# ...West Texas Wind

**Total 1219 MW  
(Current)**

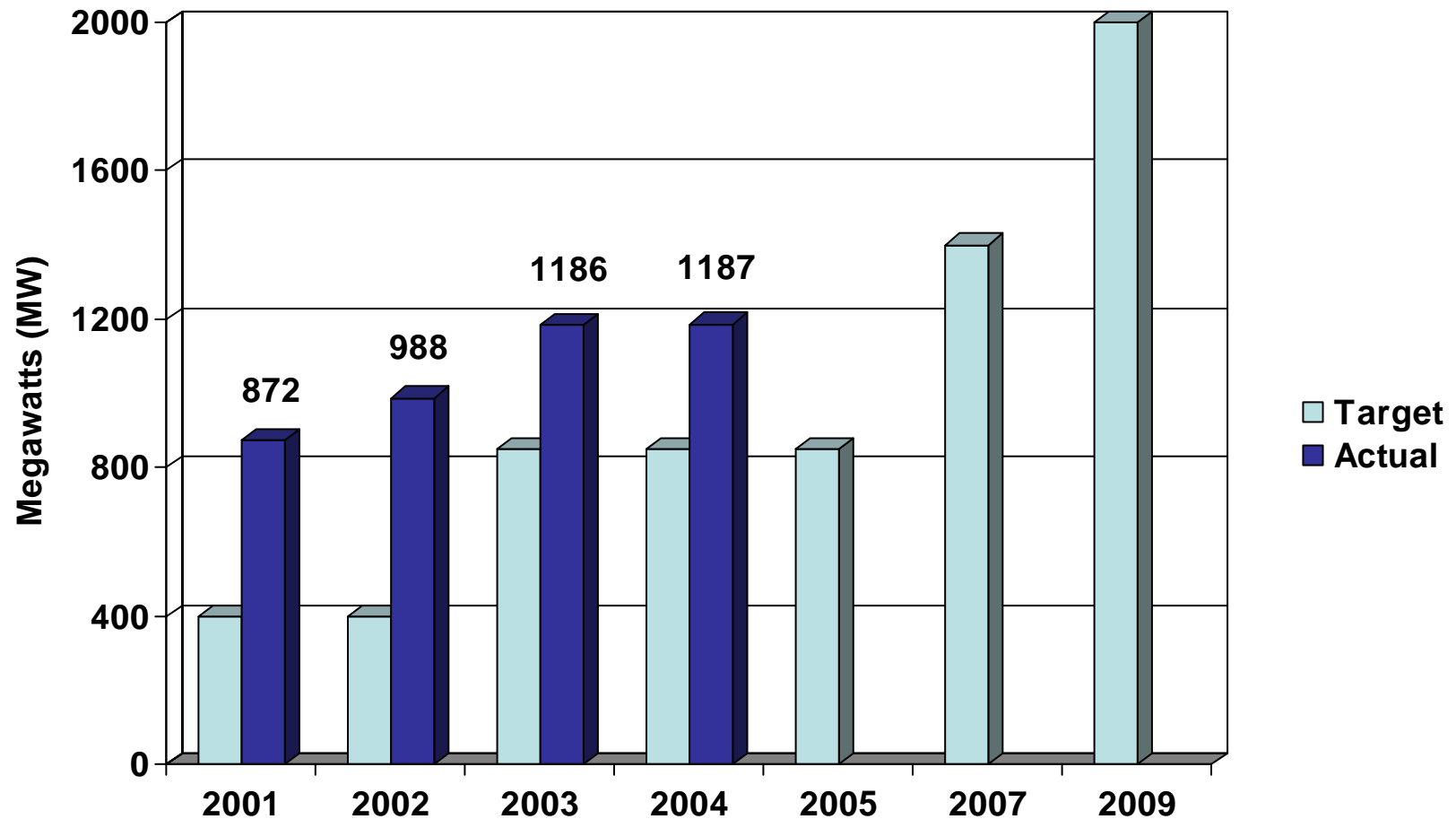


# ...And, We See No Reversal of This Trend

**-623 MW  
(Announced)  
-Over 5000 MW  
Interconnection  
Studies**



# So Far This Has Resulted in Construction Ahead of SB 7 Targets...



# ...Though Movement of That Power Has Presented Obstacles

## ❑ Local constraints

- Transfers out of McCamey Area
- Thermal and voltage limits
- Construction and maintenance limits

## ❑ Regional constraints

- Transfers out of West Texas to Dallas, Austin, Houston or San Antonio
- Stability (transient and voltage) limits
  - Currently about 1,400 MW to 2,000 MW
  - Dependent on other generation online (PB 6, TIE Odessa & Morgan 6)
  - Wind stability models being applied by DWG
- Thermal limits
- Voltage limits
  - High voltages problematic during light load conditions
  - Results in taking 345 kV circuits out of service

# Green Power Choices Are Helping to Drive This Forward As Well...

- ❑ Texas retail market has now been open for over 3 years
- ❑ 55 REPs currently active (About 85 certified)
  - 19 REPs serving at least 500 residential customers
  - Wide range of market differentiation/evolving product offerings
  - Continue to see new entrants w/ limited exit
- ❑ Over 1.1 million retail customers switched (Over 900,000 residential)

<b>Utility</b>	<b># of REPs (inc. AREP)</b>	<b># of products (inc. PTB)</b>	<b>Renewable Products</b>
<b>TXU Elec. Del. (DFW)</b>	<b>12</b>	<b>14</b>	<b>4</b>
<b>CenterPoint (Houston)</b>	<b>11</b>	<b>12</b>	<b>3</b>
<b>TNMP</b>	<b>8</b>	<b>11</b>	<b>4</b>
<b>CPL (Corpus Christi)</b>	<b>10</b>	<b>13</b>	<b>4</b>
<b>WTU (Abilene)</b>	<b>7</b>	<b>9</b>	<b>0</b>

# SB 7 Mandated A REC Trading Program in Support of RPS Goal

**Kickoff:**

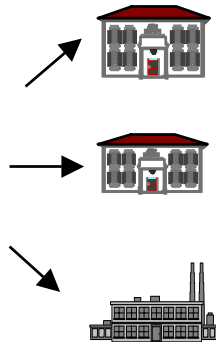
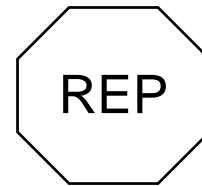
Full Program began on January 1, 2002



**Renewable  
generators earn  
RECs for every MWh  
produced**



**1 REC = 1 MWh**



**REPs must buy RECs  
equal to a percentage  
of their retail sales**

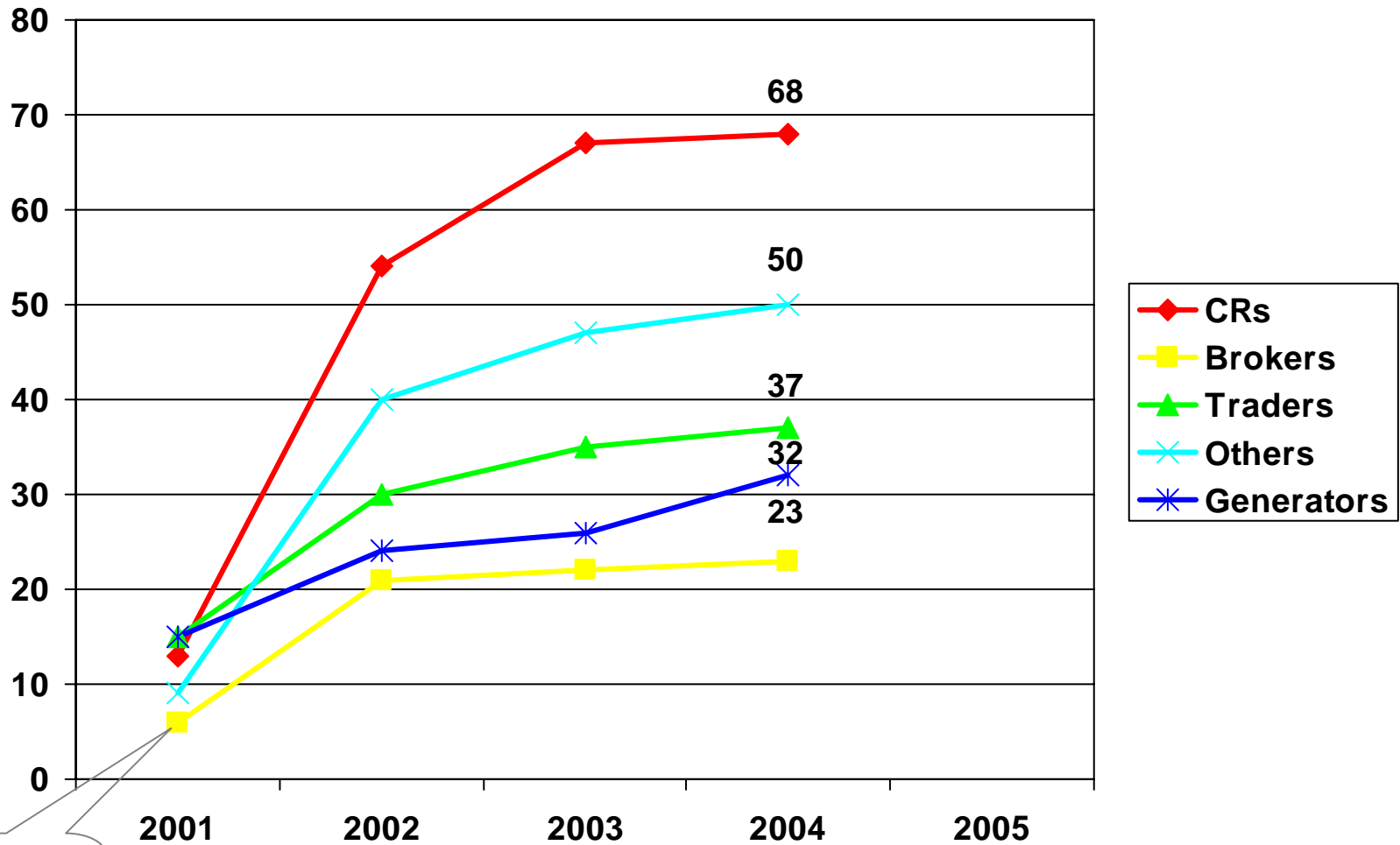
# REC Overview...

- ❑ A REC is a tradable instrument that represents all the renewable attributes associated with one MWh of production from a certified generator
  - RECs may trade separately from energy
  - RECs are issued based on calendar-year dates and have a useful life of three years
  - Currently trading in the \$12 – 15 dollar range
- ❑ Each Retail Electric Provider (REP) in Texas is assigned a specific number of REC requirements to retire each year based on the amount of load served
  - 2004 mandate expected to equal 1% to 1.2% of retail sales

# ...Program Participants have Specific Responsibilities

- ❑ **Public Utility Commission –**
  - Certifies appropriate REC generators and REPS, provides oversight.
- ❑ **ERCOT (Program Administrator) –**
  - Registers and creates accounts for REC generators, retailers.
  - Assigns RECs to generator accounts on quarterly basis.
  - Determines the annual REC requirement for each competitive retailer.
  - Retires RECs as directed and maintains REC program website with required information.
- ❑ **Competitive Retailers –**
  - Register with ERCOT and Report MWh load.
  - Retire annual requirement of RECs.
- ❑ **Renewable Resource Generators –**
  - Register and receive REC generator certification and report MWh prod.
  - Produce qualifying electricity to earn RECs.

# And, As You Can See, Numbers of Participants Have Increased...



**Program  
Start**

# ...And, For Those of You Playing at Home, Calculations

## □ Statewide REC Requirement Example for 2004:

2004 Target Capacity	850 MW
x Hours In Year	8,760
x Current CCF	35%
REC Requirement =	2,606,100 RECs

## □ Annual REC Requirement

$$\text{PRR} = \text{SRR} \times (\text{CRS} / \text{TCS})$$

$$\text{ARR} = \text{PRR} - \text{AO} \quad (\text{not} < 0)$$

$$\text{TUO} = \text{SRR} - \text{SARR}$$

$$\text{FRR} = \text{ARR} + (\text{TUO} \times (\text{CRS} / \text{TCS}))$$

$$\text{+/- (CARRYOVERS/ADJUSTMENTS)}$$

## □ Example Load - 13,000,000 MWh and 15,000 Allocated Offsets

$$\text{PRR} = 2,606,100 \times (13,000,000 / 239,500,000) = 141,459$$

$$\text{ARR} = 141,459 - 15,000 = 126,459$$

$$\text{TUO} = 2,606,100 - 2,591,100 = 15,000$$

$$\text{FRR} = 126,459 + (15,000 \times (13,000,000 / 239,500,000)) = \underline{127,273}$$

REC = Renewable Energy Credit  
CCF = Capacity Conversion Factor  
PRR = Preliminary REC Requirement  
SRR = Statewide REC Requirement  
CRS = Competitive Retailer Sales  
TCS = Total Texas Competitive Sales

ARR = Adjusted REC Requirement  
AO = Allocated Offsets  
TUO = Total Usable Offsets  
SARR = Sum of Adjusted REC Requirements  
FRR = Final REC Requirement

# Finally, Texas Next Steps...

- ❑ 79<sup>th</sup> Texas Legislature currently considering the appropriateness of an extension to RPS beyond the current goal
- ❑ Building transmission sufficient to move additional wind to load
- ❑ Continuing to create climate attractive to renewable resources

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Questions?