



Vision 2020 and Beyond

*Presentation to the CPS Energy Board
October 5, 2009*

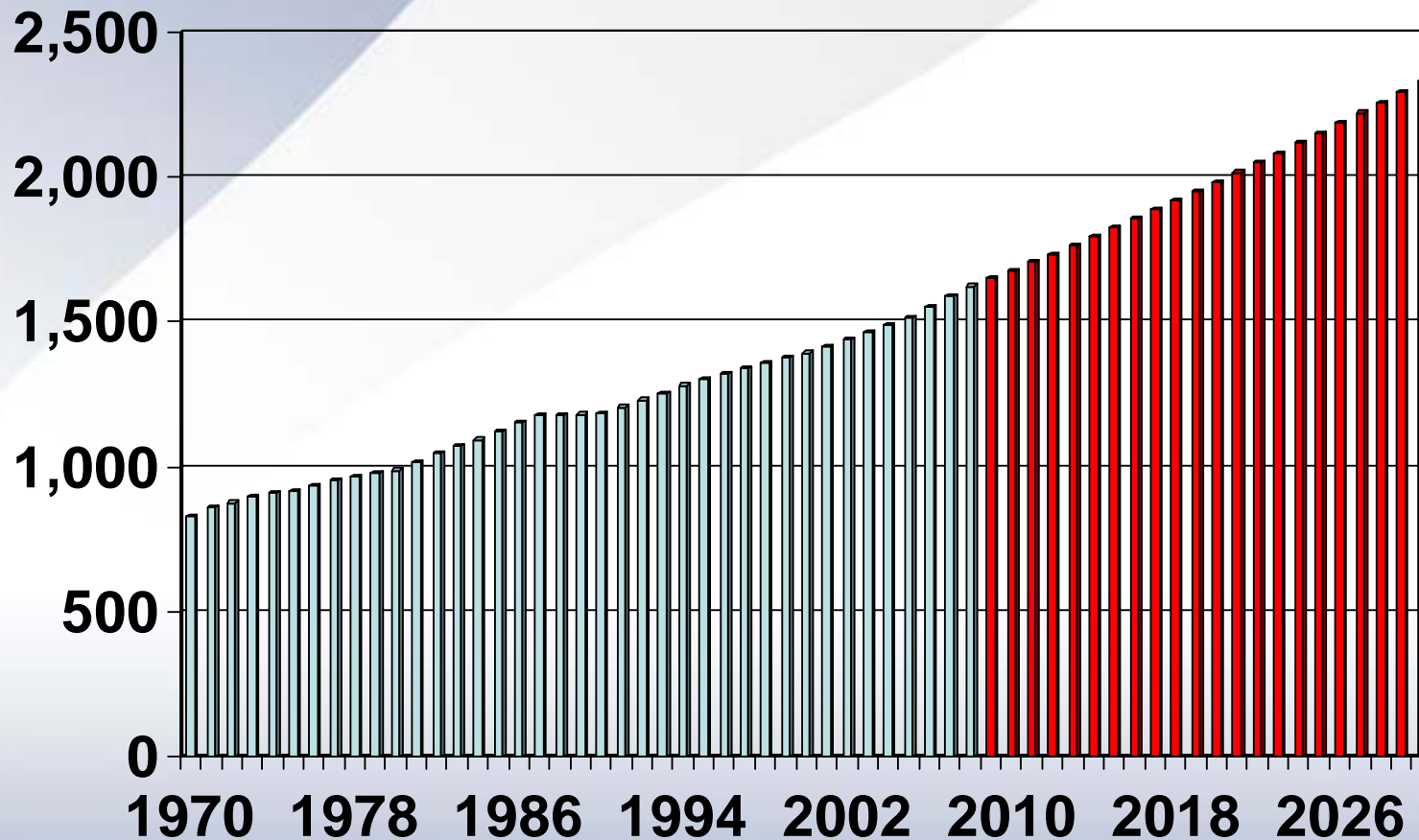
Sustainable Growth Office



San Antonio Region is Growing - Bexar County Population

"Census' newest population estimates show the Alamo City added more people than all but four other U.S. cities, growing by about 1.9 percent" Express News July 2009

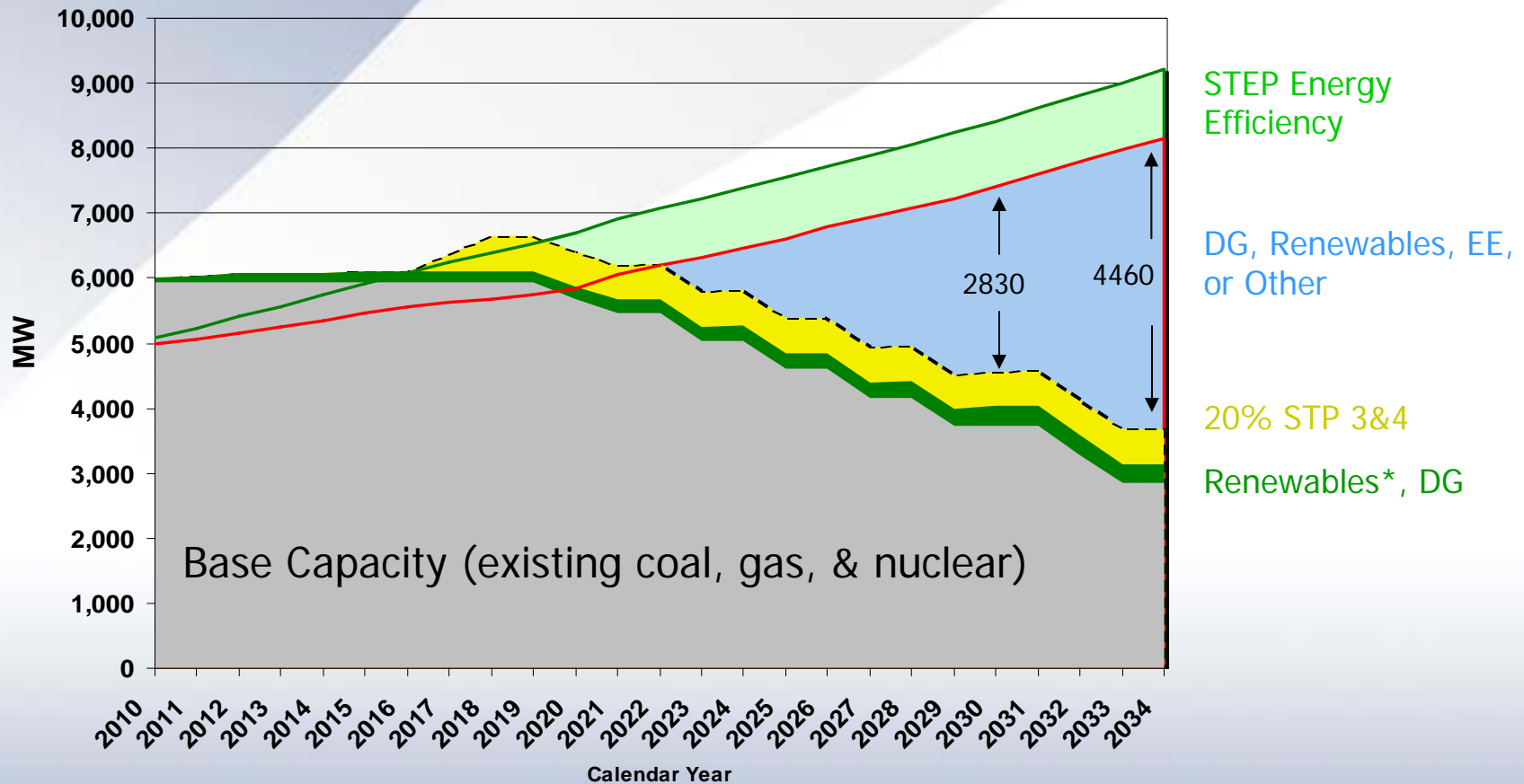
Thousands



Source: Census data, Perryman report



Decade of 2020 and beyond Significant Power Gap



*Renewables shown as contribution to system peak demand



CPS Energy Anticipates Retiring 2300 MW of Gas Plants by 2030

DATE	PLANT (On-Line Dates)	MW	FUEL TYPE
2009/ 2010	Tuttle/LCP (1953-1963)	580	GAS STEAM TURBINE
2021	Braunig 1 (1966)	220	GAS STEAM TURBINE
2023	Braunig 2 (1968)	230	GAS STEAM TURBINE
2025	Braunig 3 (1970)	412	GAS STEAM TURBINE
2027	Sommers 1 (1972)	430	GAS STEAM TURBINE
2029	Sommers 2 (1974)	420	GAS STEAM TURBINE
Total		2292	



Sustainability Directive to Fill Power Gap starting in 2020

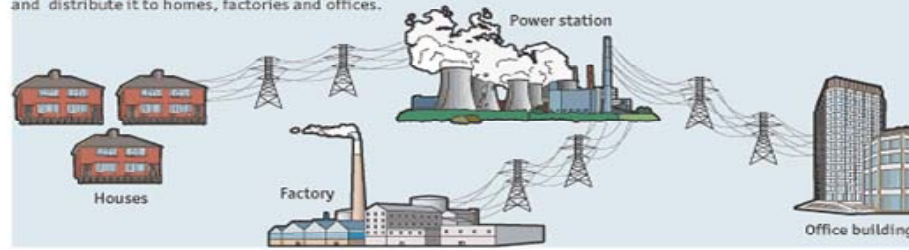
- *CPS Energy Board Sustainability Policy*
- *Vision 2020*
- *Mission Verde*

All support a long term vision of utilization of renewable, distributed resources coupled with storage in a “smart” infrastructure.

The shape of grids to come?

Conventional electrical grid

Centralised power stations generate electricity and distribute it to homes, factories and offices.

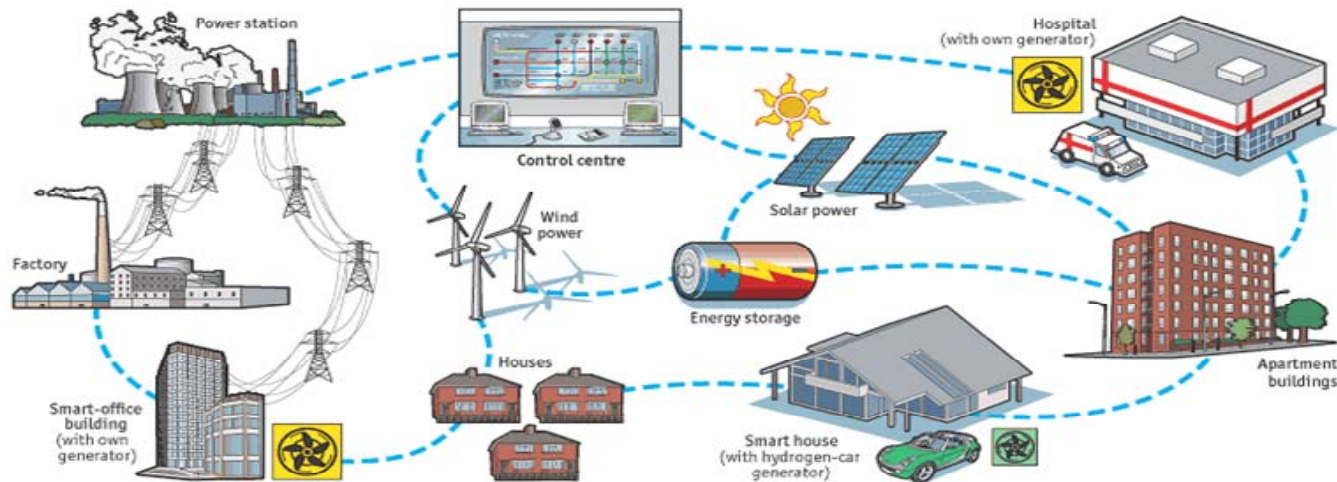


Energy internet

Many small generating facilities, including those based on alternative energy sources such as wind and solar power, are orchestrated using real-time monitoring and control systems.

Offices or hospitals generate their own power and sell the excess back to the grid. Hydrogen-powered cars can act as generators when not in use. Energy-storage technologies smooth out fluctuations in supply from wind and solar power.

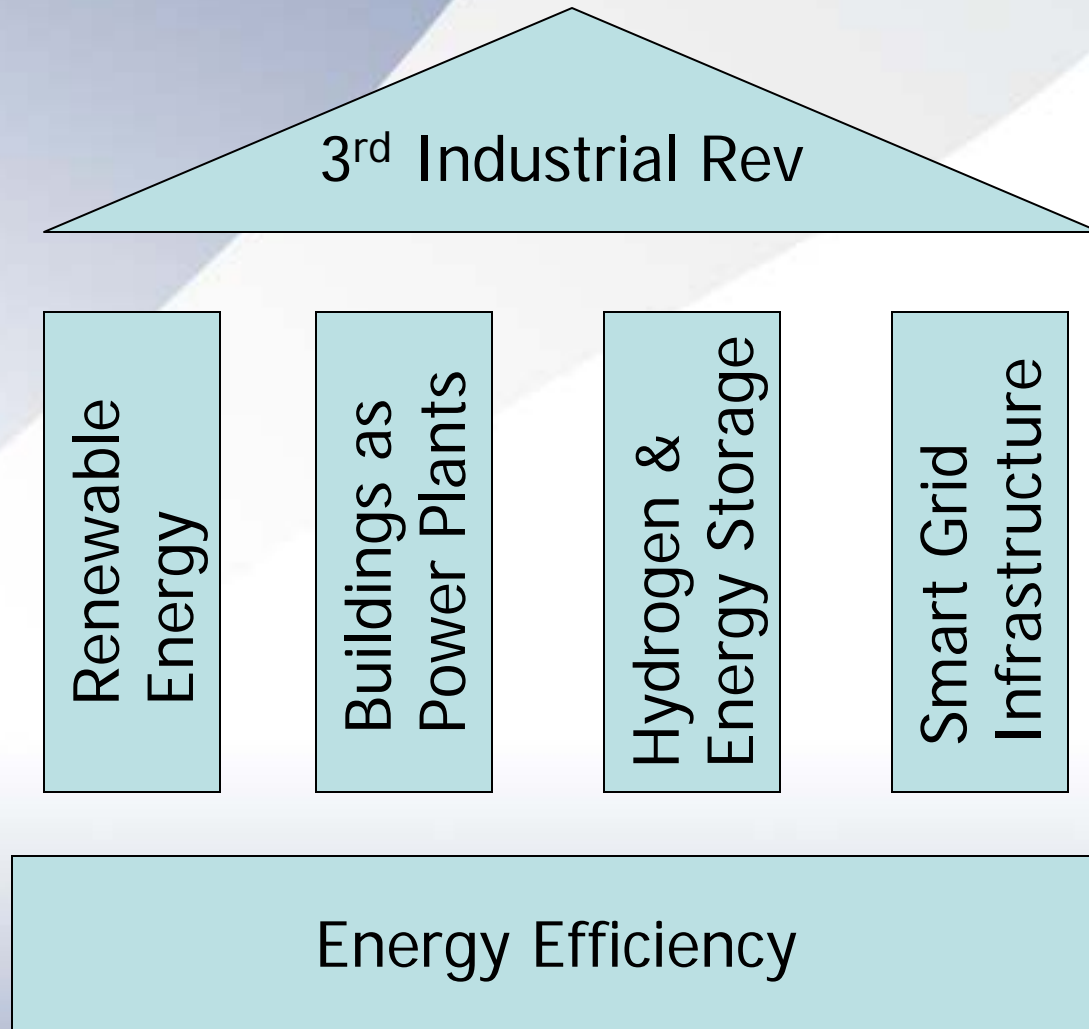
Distributing power generation in this way reduces transmission losses, operating costs and the environmental impact of overhead power lines.



Sources: The Economist; ABB



Leveraging Ideas from Sustainability Report



- Reduce Bexar County GHG by 50% through EE and RE
- Requires \$15-20B of investment
- \$800 M per year over next two decades
- Initial new jobs of 1000 in 2010
- Net gain in new jobs growing to 16,000



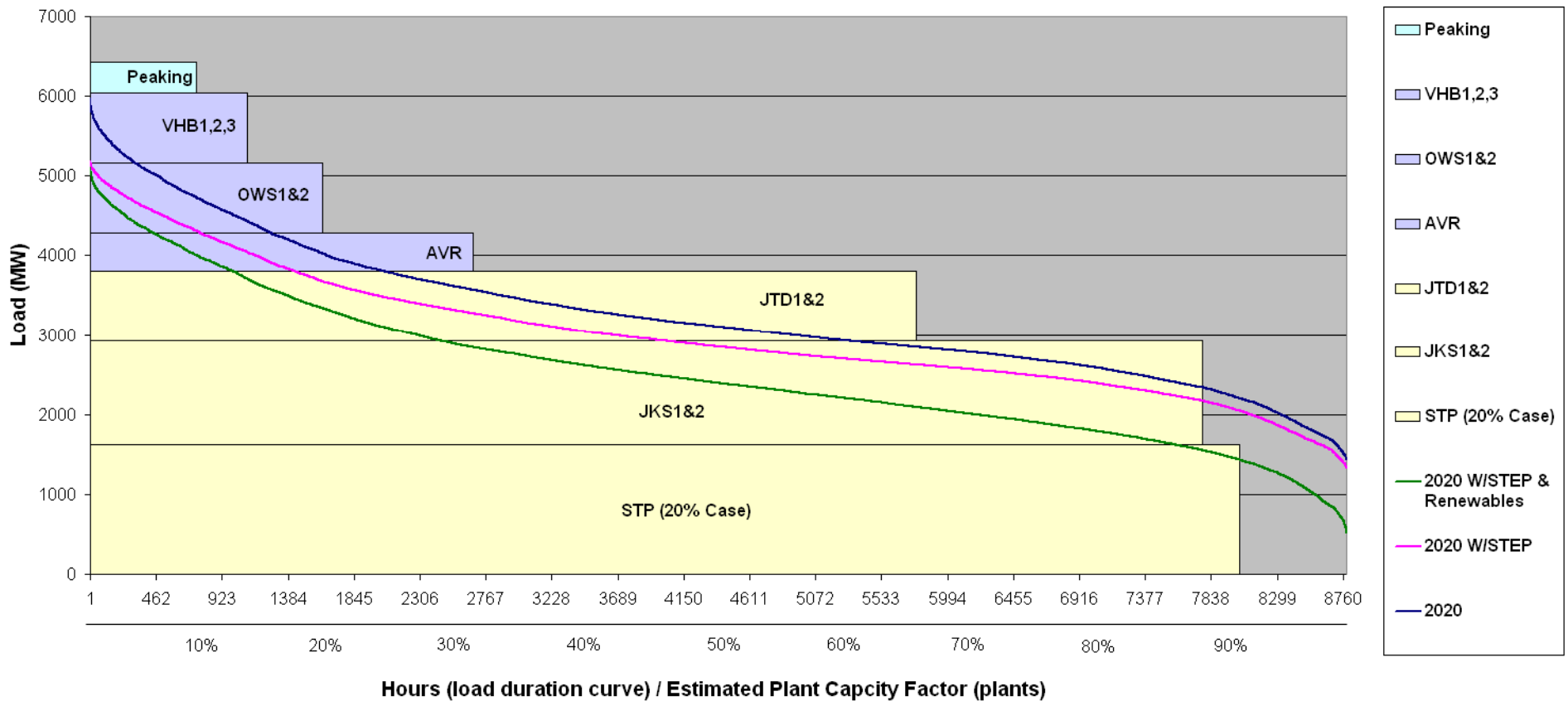
CPS Energy's Current Initiatives

<i>Pillar</i>	<i>Programs</i>	<i>Vision 2020 Goals</i>
<i>Energy Efficiency</i>	<i>STEP program</i>	<i>771 MW</i>
<i>Renewable Energy</i>	<i>Wind Solar</i> <i>Biomass</i>	<i>1200 MW</i>
<i>Buildings as Power Plants</i>	<i>Solartricity Producer program (10MW 2010 -</i>	
<i>Storage</i>	<i>2011) of 500kW, 2.8 MWh Zn-Br Flow Battery</i>	<i>No specific goals at this time</i>
<i>Smart Grid</i>	<i>AMI and Smart Grid</i>	<i>~700,000 electric meters by 2015</i>



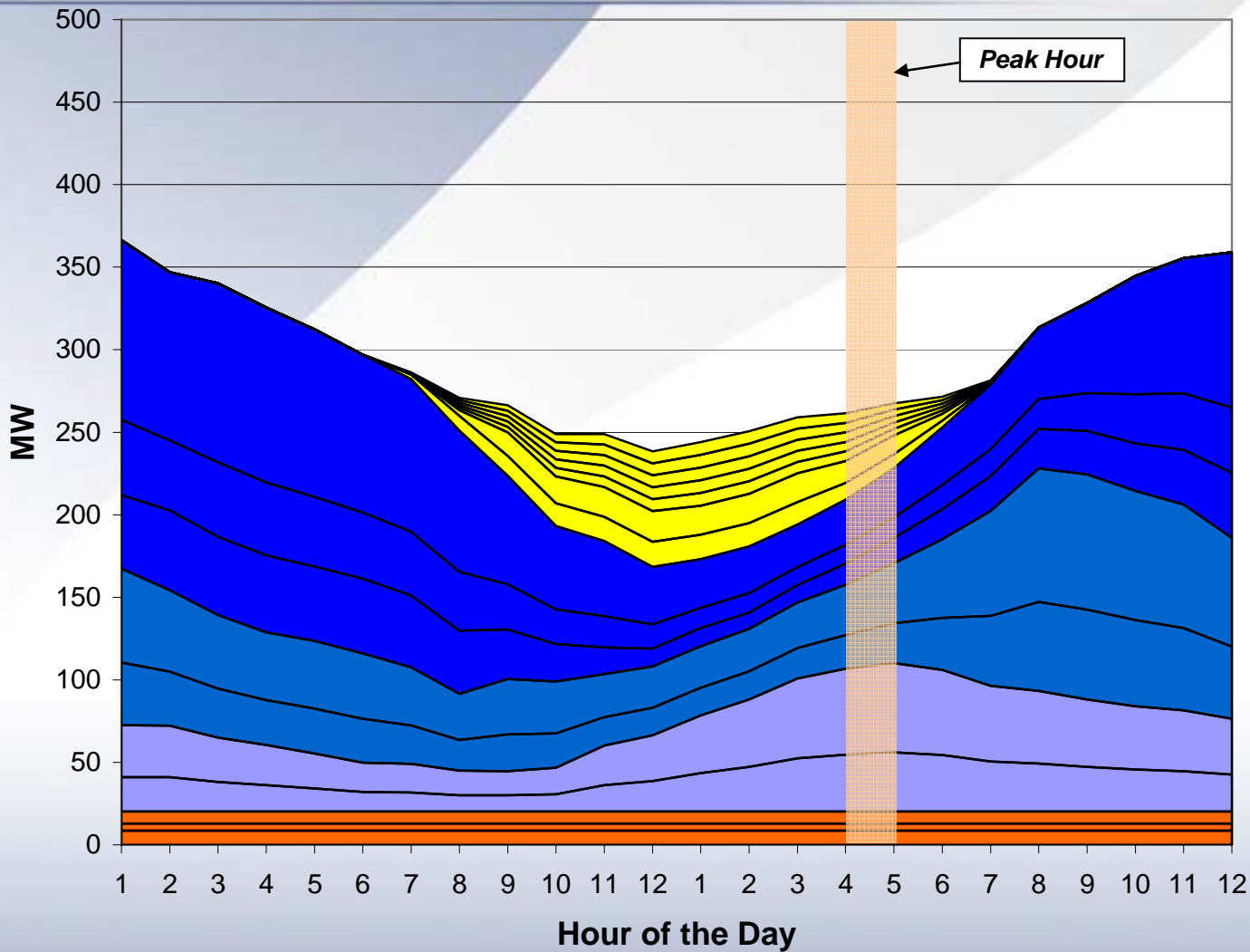
2020 Load Duration Curves

2020 Load Duration Curve & Capacity Blocks





Renewable Plan 2020 August Hourly Output



Meets Board 2020 Goals :
 - 20% of Peak Demand
 - 100 MW Solar

- SA PV 10 MW (2019)
- SA PV 10 MW (2017)
- SA PV 10 MW (2015)
- SA PV 10 MW (2013)
- SA PV 10 MW (2011)
- West TX Trough - 40 MW (2012)
- Marfa Dish - 25 MW (2011)
- Sweetw 240.8 MW (2007)
- CW Creek 100.5 MW (2005)
- D Sky - 160.5 MW (2002)
- Cedro 150 MW (2010)
- South TX 100 MW (2015)
- Papalote 115.5 MW (2010)
- Penascal 76.8 MW (2009)
- LFG B 8.0 MW (2012)
- LFG A 4.8 MW (2012)
- Covel 9.6 MW (2005)



Challenges for Scaling DG

Over the next decade, many issues need to be addressed to prepare for further expansion of Distributed Generation

System Reliability

- *Integrate advanced meters and smart grid technologies*
- *Managing power flow & transmission for 1000s generation/storage*
- *Generation and storage sources could reach 100,000s w plug-ins*

Affordability and Community Participation

- *Keep bills and rates affordable relative to other cities*
- *Get customer participation in green programs*
- *How to address the up-front costs, even as bills get lower*

Technology Risk

- *Which technologies will be utility scale and cost competitive*
- *When will utility scale energy storage be viable*



Distributed Generation and Storage Technologies

Generation Sources:

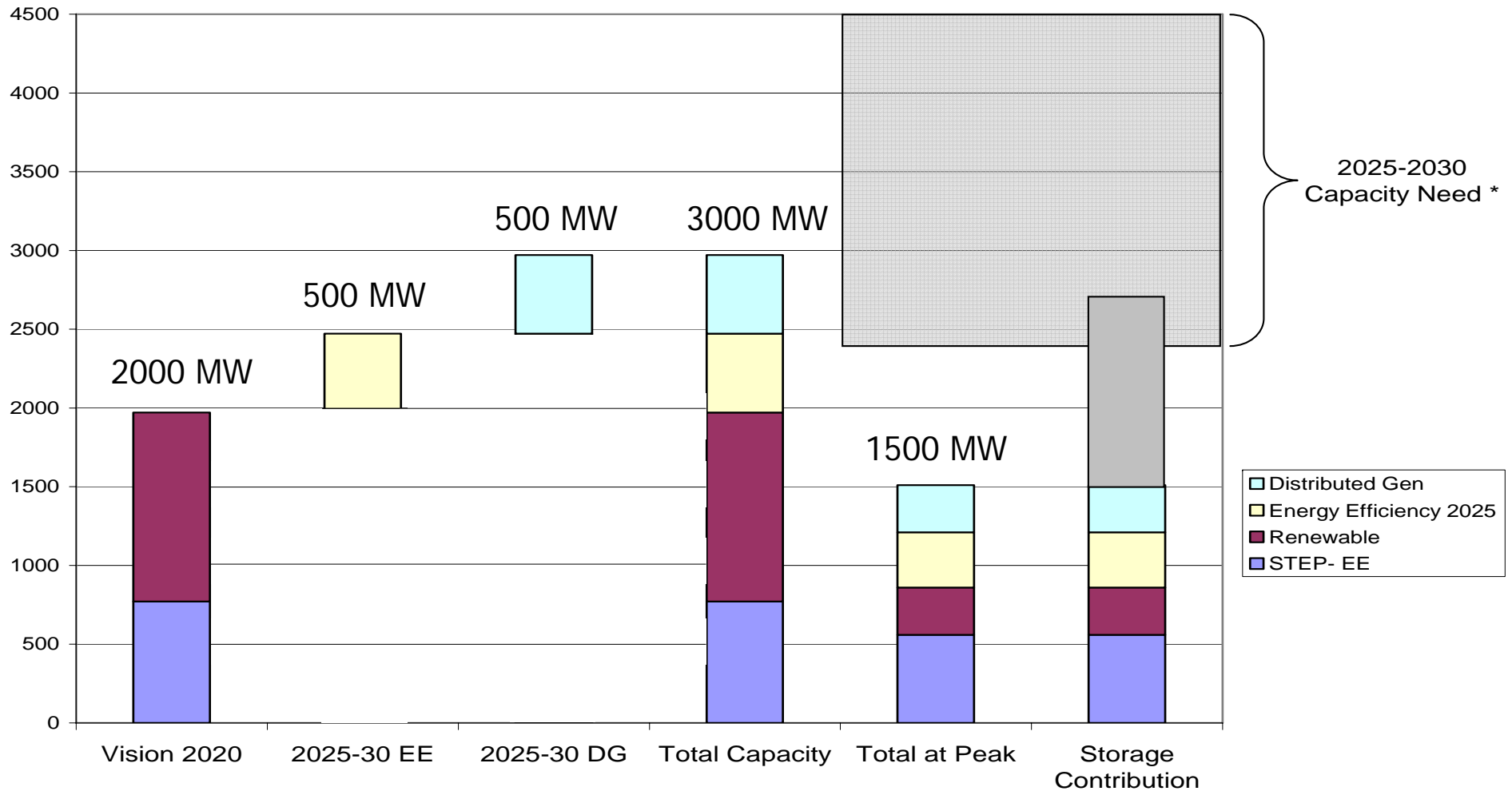
- Roof-top solar PV
- Ground mounted solar PV
- Solar Thermal
- Combined Heat and Power
- Geothermal
- Waste to Energy
- Local Wind
- River
- Hydro
- Algae

Storage Solutions:

- Ice Storage
- CAES
- Battery
- Pumped Hydro
- Fly Wheel
- Super Capacitors
- Hydrogen



Filling the Gap Beyond 2020



* Capacity need shown assuming 20% STP 3&4, current STEP and renewable plans



Estimated Spend on Sustainability thru 2030

- *Vision 2020* \$5.7B*
- *Additional Energy Efficiency* \$1.9B**
- *Distributed Generation* ~ \$2B
- *Energy Storage* TBD
- *Total* ~ 9.6B

*Includes STEP, Renewable Energy spend thru 2030, AMI

**Nexant 2009 Analysis (likely to be lower if spread out through 2030 vs 2020)



Process Moving Forward

- *Reach out to Partners*
- *Finalize Sustainability Plan*
- *Community Workshops*
- *Energy Summit*
- *Set firm goals, funding mechanisms, and bill impact*
- *Strategic Plans and Budgets*