

# San Antonio Energy Efficiency Potential: Preliminary Assessment

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# Key Findings

- With visionary and determined leadership, San Antonio can meet its increasing electricity demand by relying on energy efficiency and renewable energy between now and 2020 and beyond.
- The economical potential for efficiency in the stock of existing and new buildings out to the year 2020 in the CPS Energy service area is estimated to be about 2,000 megawatts (MW). With strong and committed policies and vigorous program implementation, about half of this potential can be achieved by 2020.
- Relying on efficiency and renewables will lower costs, reduce financial risks, and make San Antonio a more attractive place to do business. It will also help meet air quality goals. It will put in place a flexible infrastructure that will be able to maintain reasonable costs even in the face of a tax on carbon dioxide emissions by increasing the pace of efficiency improvements.
- Using efficiency and renewables to meet demand growth will save roughly one-and-a-half to three billion dollars compared to the nuclear power reactors (present value of capital cost), depending on the cost of the nuclear power plant.

# Anderson Sargent Custom Builder

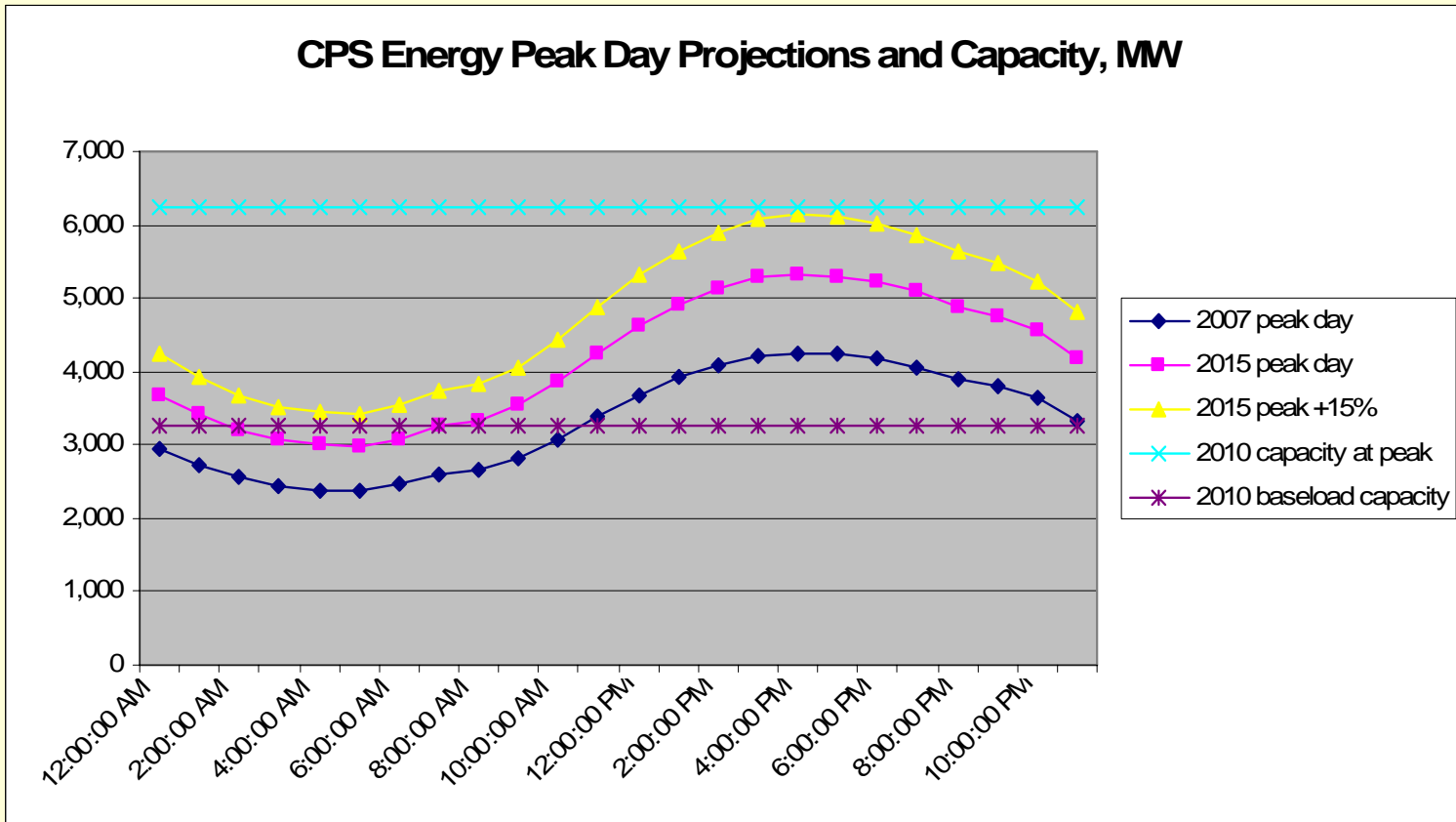
## 21<sup>st</sup> Century Energy and Energy Management



Home in Frisco, TX -  
produces power equal to use

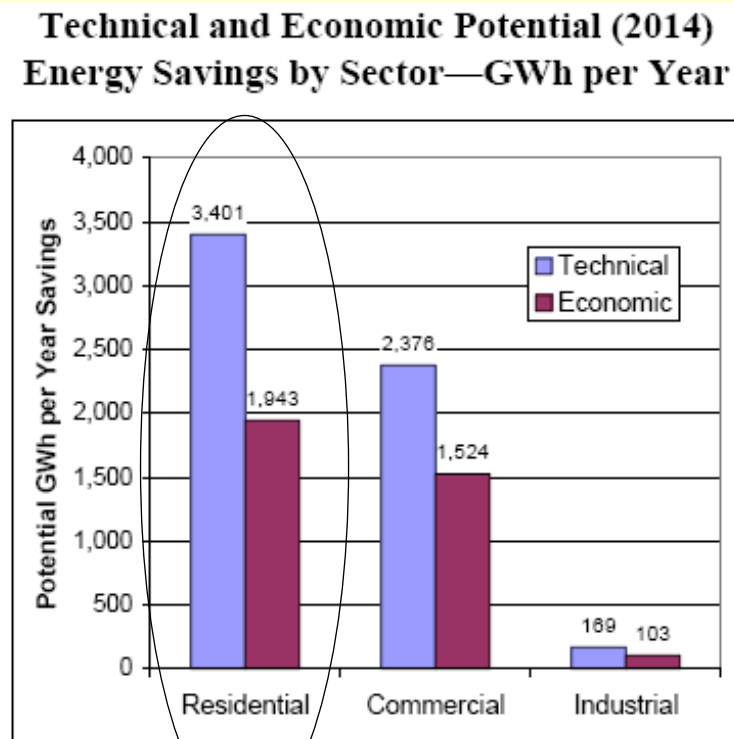
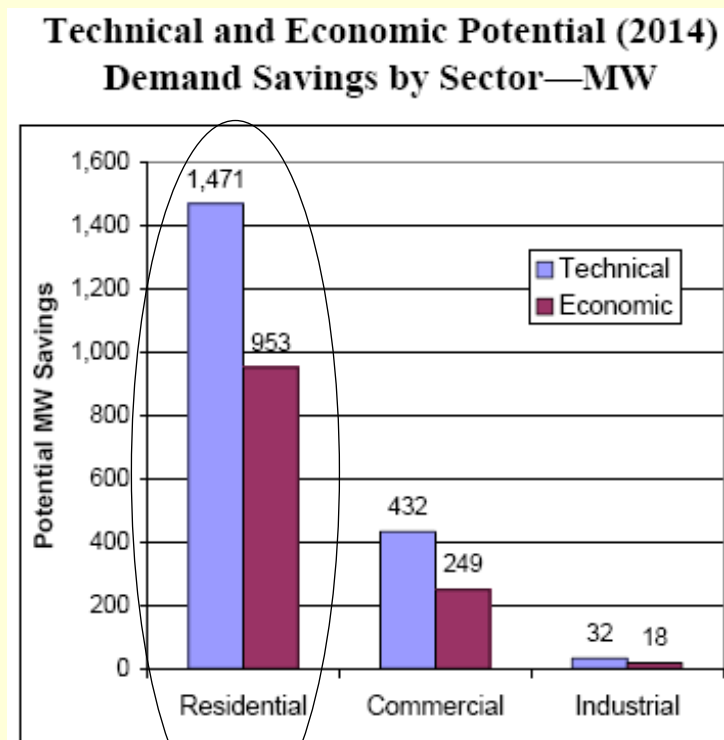


# San Antonio Peak Day Demand Projection (based on ERCOT)

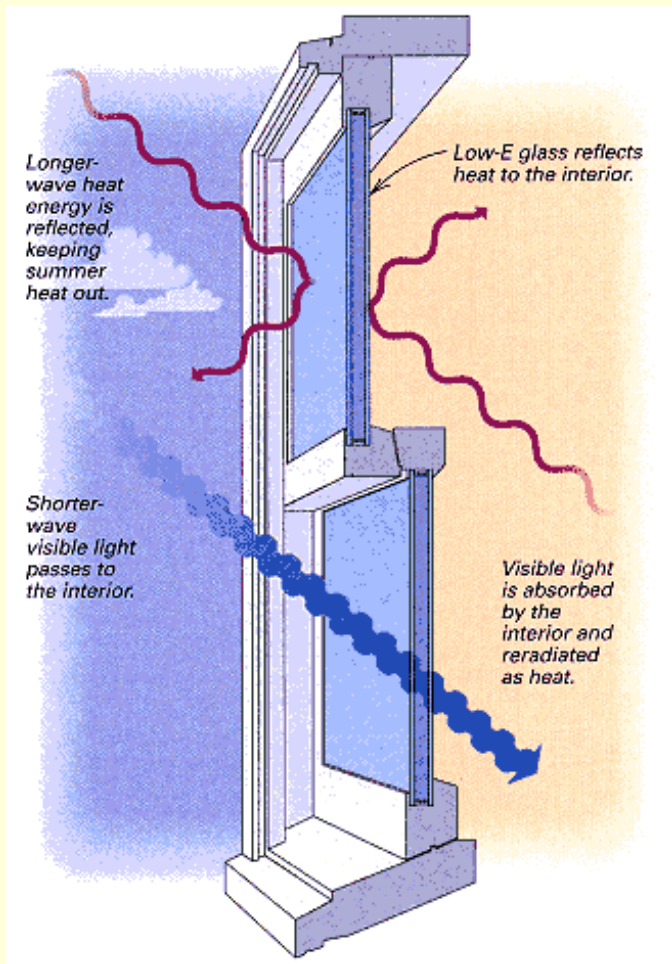


# KEMA Study 2014 Savings Estimate

- Air conditioning measures represent largest residential efficiency potential.
- Demand response not considered



Source: KEMA, Inc. 2004

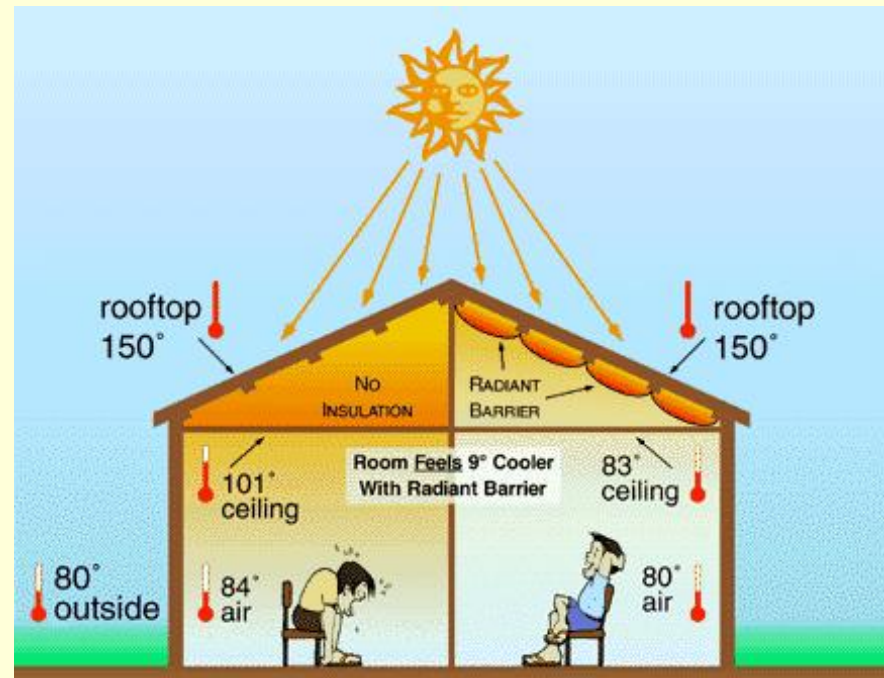


Low-e windows

Programmable Thermostats: 1 kW of peak demand saved per device.

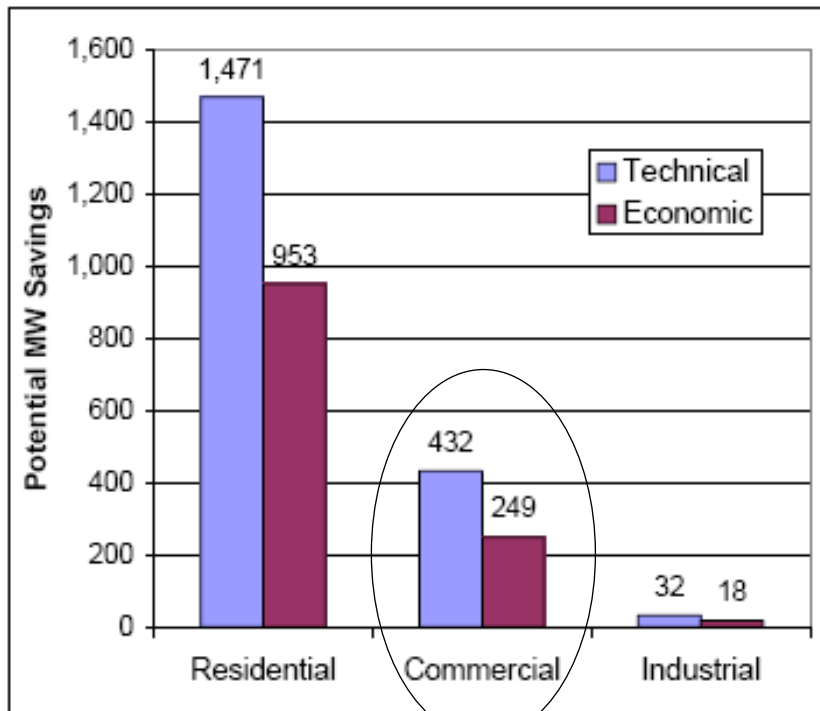


## Radiant Barriers

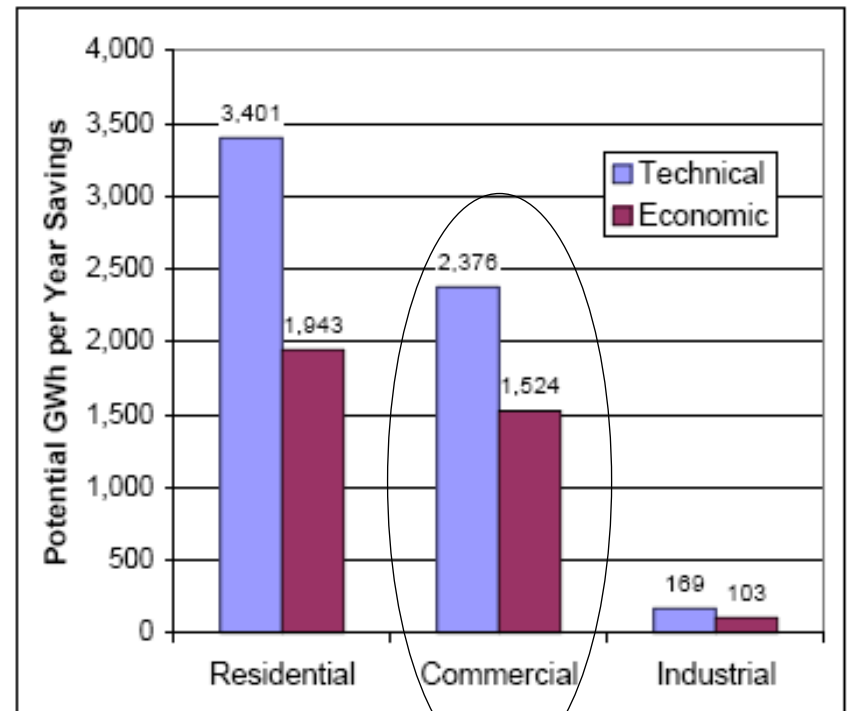


# KEMA Study Commercial Sector 2014 Savings (no CHP) – Lighting and then A/C

Technical and Economic Potential (2014)  
Demand Savings by Sector—MW

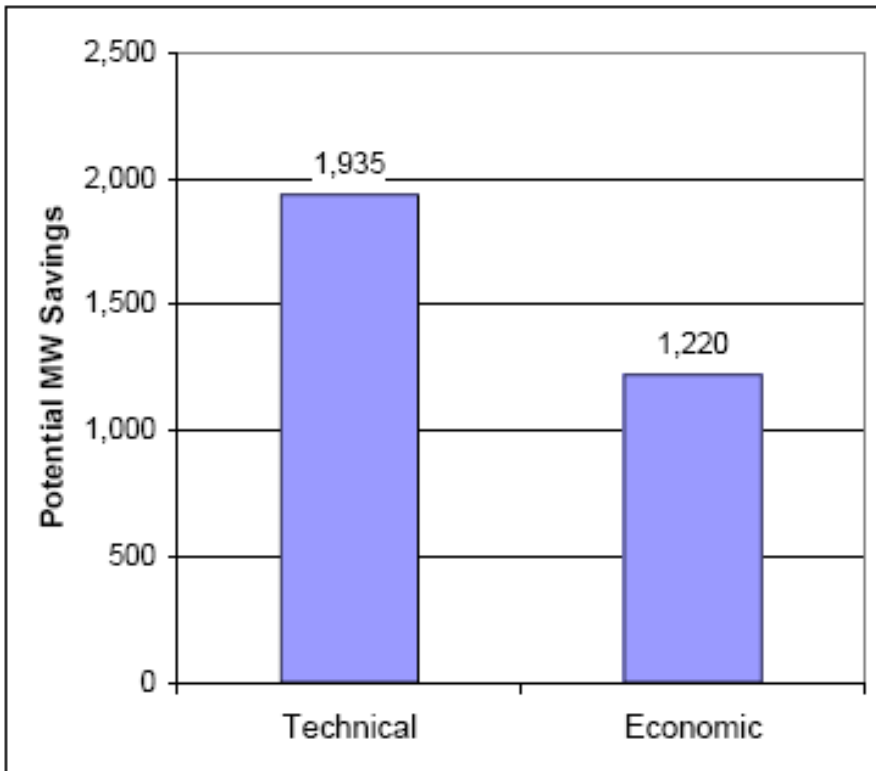


Technical and Economic Potential (2014)  
Energy Savings by Sector—GWh per Year

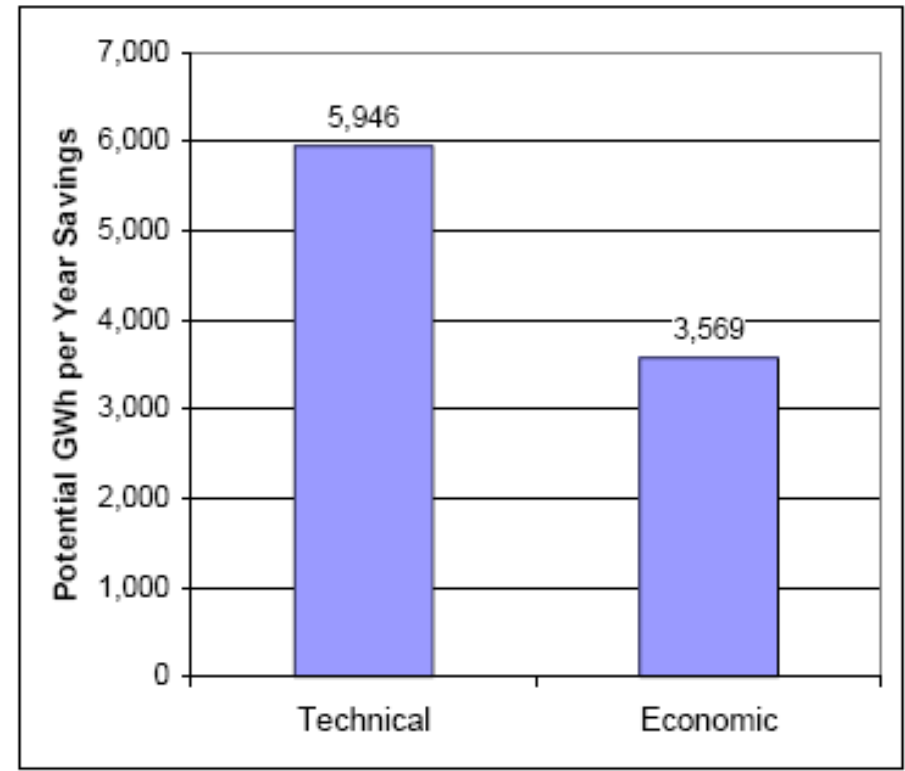


# KEMA 2014 Summary

**Technical and Economic Potential  
Demand Savings, 2014**



**Technical and Economic Potential  
Energy Savings, 2014**





# Total Potential, 2020

- KEMA Potential Extrapolated to 2020 (more buildings, more years): ~1,700 MW efficiency measures
- CHP Potential needs to be added. Preliminary recommendation for total by 2020: 100 MW. Goal needs San Antonio specific study
- Demand Response (based on ACEEE March 2007 Texas Report): ~500 MW.
- Total potential (all buildings): ~2,300 MW
- Projected peak load in 2020 (business-as-usual): ~6,400 MW

# Key findings - #1

- With visionary and determined leadership, San Antonio can meet its increasing electricity requirements by relying on energy efficiency and renewable energy between now and 2020 and beyond.

# Key Findings - #2

- The economical potential for efficiency in the stock of existing and new buildings out to the year 2020 in the CPS Energy service area is estimated to be about 2,000 megawatts (MW), possibly more.
- With strong and committed policies and vigorous program implementation, about half of this potential can be achieved by 2020.

# Key Findings - #3

- Relying on efficiency and renewables will lower costs, reduce financial risks, and make San Antonio a more attractive place to do business.
- It will also help meet air quality goals.
- It will put in place a flexible infrastructure that will be able to maintain reasonable costs even in the face of a tax on carbon dioxide emissions by increasing the pace of efficiency improvements.

# Key Findings - #4

- Using efficiency and renewables to meet demand growth will save roughly one-and-a-half to three billion dollars compared to the nuclear reactors (present value of capital cost), depending on the cost of the nuclear power plant.

# Costs

- Most existing building demand reduction can be achieved at \$1,000 per kW or less initial investment
- New residential buildings can achieve up to 50 percent energy use reduction at little or no cost, with bottom up site-specific design (Jim Sargent, of Anderson Sargent Custom Builder)
- Very efficient homes can even be built for less than \$100 per square foot (Jim Sargent, of Anderson Sargent Custom Builder)
- Local builders are now building efficient homes

# Solar

- Concentrating Solar Power Plants
- Onsite Solar (PV and water heating)
- Parking Lots

# Advantages of Solar

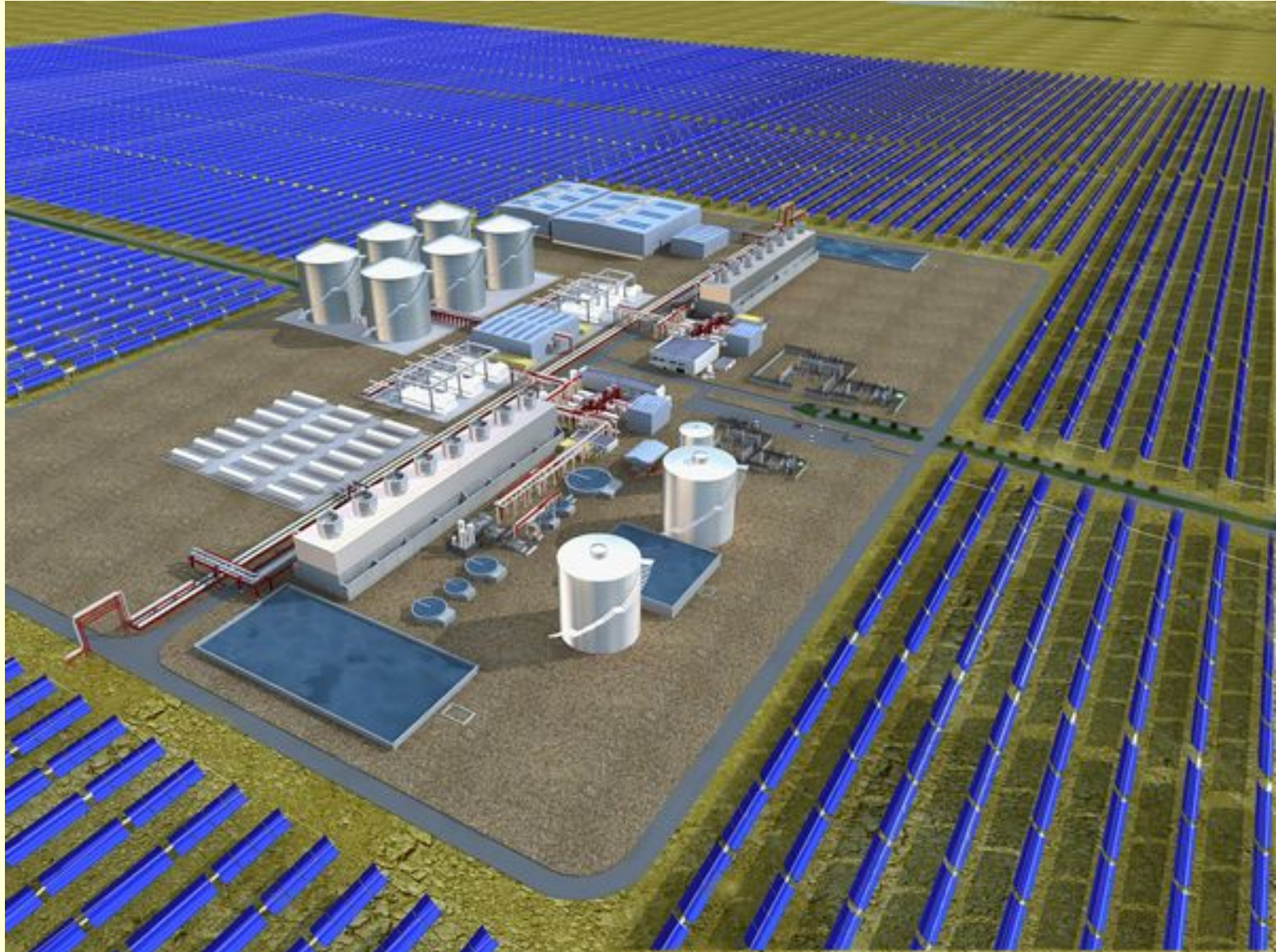
- Supply power during summer peak hours
- Higher capacity fraction available reliably at peak
- Replaces expensive peak gas plant operation
- Predictable costs
- Solar PV costs are declining for intermediate and large-scale installations
- Concentrating Solar Power with heat storage now commercializing rapidly – can be available 90 percent on peak days in sunny areas
- Solar Water Heater May Reduce Peak Load



# Solar Parking Lots Provide Shade



# Solana Generating System: 280 Megawatts Arizona Public Service (Planned for 2011)

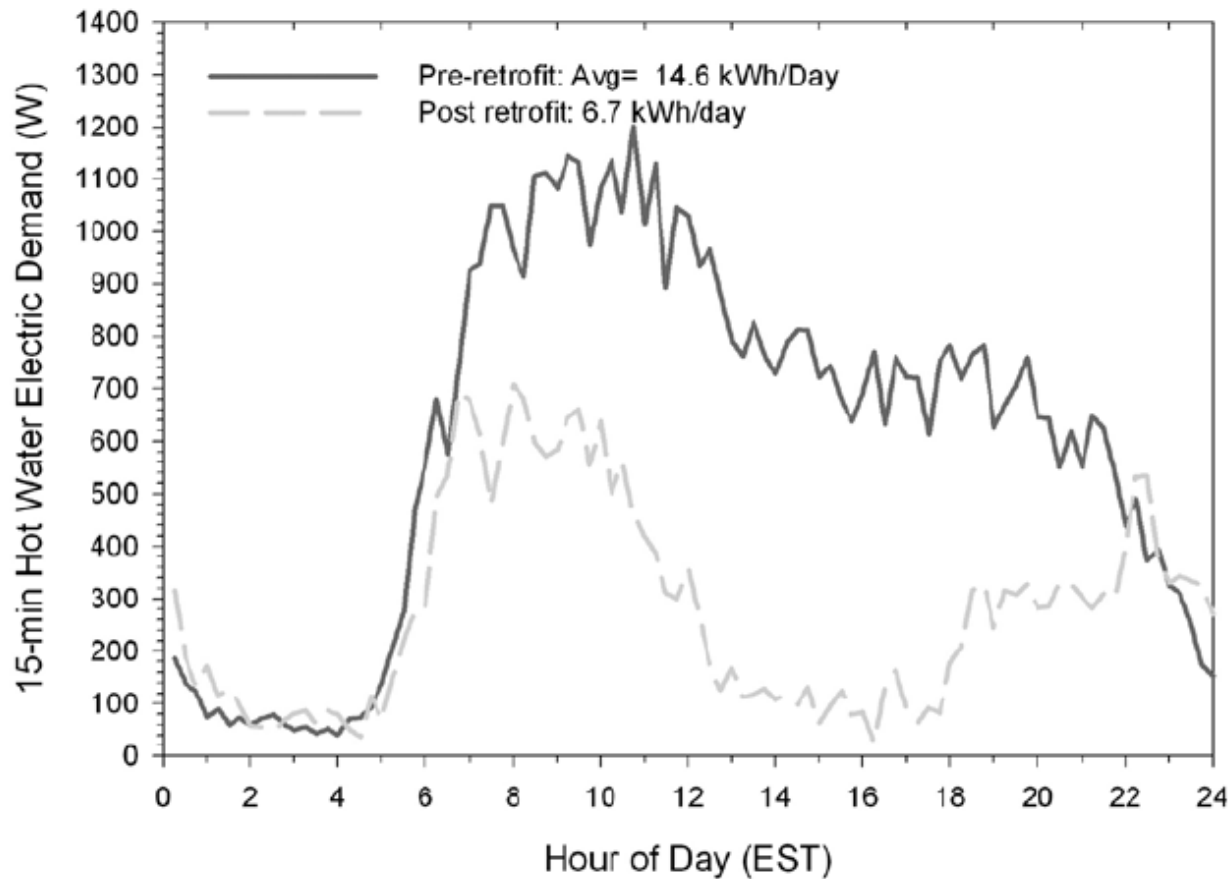




# Solar Panels



# Solar Water Heater – Measured Demand Data - Florida



Courtesy of Florida Solar Energy Center. Source: Parker, Sherwin, and Floyd 1998

# Commercial Rooftop Parking Lot Solar PV Advantages

- Total area is very large –can supply much or most of U.S. electricity requirements
- Can yield economies of scale without requiring new transmission corridors
- No new land required
- Compatible with vehicle-to-grid system

## Parking lot installations

- Require no roof penetrations
- Provide shade for parked vehicles
- Could allow water collection and reduce run off and associated pollution

# Policies – Overall

- Exciting, determined direction that involves the public, business and political leaders, and CPS Energy
- Build on CPS Energy's leadership in Texas and nationally in wind energy
- Ambitious and achievable efficiency goals
- Create financial mechanisms in efficiency to maintain City revenue flow from CPS Energy
- Permanent Task Force on Efficiency and Renewables – builders, architects, citizens, CPS Energy.
- A larger mix for solar technologies in CPS Energy Portfolio
- Smart meters (CPS Energy plans to install them) and time-of-use pricing

# Policies – New Buildings

- Set a goal of average electricity production at least equal to use for residential and low rise commercial developments by 2020. Multi-building solar (parking lots and commercial rooftops) and CHP systems can be part of meeting this goal
- Develop steadily improving building codes and guidelines to make progress towards 2020 goal, including Btu/square foot/year guidelines (by type of building)
- Guidelines and new codes for new buildings. Cities are strengthening codes – e.g. Dallas, 15 percent better than international code for efficient buildings, could be a good baseline code to start with.
- Volume builders can learn from advanced customer builders, but need codes and rules to get a level playing field.
- Awards and other events that can provide third party credibility for builders and architects. Publicity is critical – even more than award money

# Policies - Existing Buildings

- Voluntary guidelines and education for mortgage loan qualification to include energy costs
- Develop voluntary green building measures above the code, matched with utility based incentives
- Target retrofits neighborhood by neighborhood



# Policies – Existing Buildings

- Set a goal of 30 to 40 percent percent of total economic potential in existing buildings by 2020 and 100 percent by 2030
- Solar PV on suitable commercial rooftops and parking lots – CPS Energy could do Power Purchase Agreements
- Bring builders and real estate agents on board to help develop programs for efficiency improvements prior to or just after the sale of existing homes and commercial buildings
- Create CPS Energy Service Provider unit to provide loans for existing building improvements (include City revenue component)
- CPS could own CHP systems, multi-building chillers and provide the technical services – revenue for City can be added

# Policies - Rentals

- CPS Energy loan unit to provide loans to landlords (with revenue component to city)
- Landlords and renters share benefits – lower renter energy bills could help pay part of loan
- Awards and publicity for exemplary improvements
- Well maintained and updated website that shows products, applications of products, installations, service providers
- Education sessions for landlords on economic benefits and increased rental revenue potential of efficient properties – evaluating by adding rental and energy costs

# Summary

- Setting out on an efficiency and renewable energy path will mean that San Antonio can meet its energy needs economically and be a clean, affordable, attractive place to live and do business
- Efficiency and solar energy at the right scale and increments will save money and be less risky than new nuclear power.