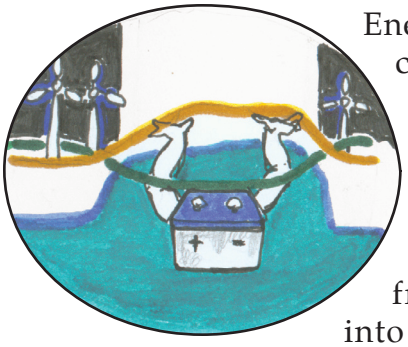
An Energy Storage Standard for Texas Will Save Money and Stop Pollution

By requiring storage on the Texas electric system, Texas can:

- *Save money for ratepayers*
- *Reduce pollution from power plants*
- *Reduce stress on the electric* **sytem**
- *Turn renewable energy into a 24-hour-a-day power source*

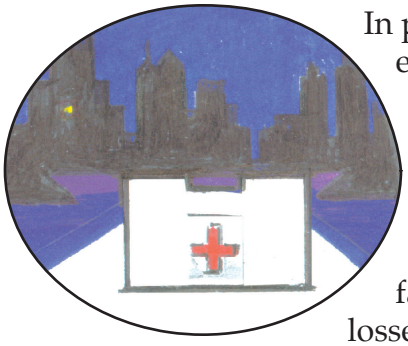
Requiring 5% of Texas electricity to be stored actually saves 16% of the state's peak demand on the system, our highest-priced power.

Energy Storage for Renewables



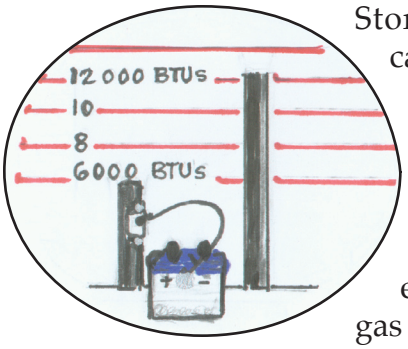
Energy storage will change wind power from a night-time energy source to a peak performer. Storage will turn renewable energy from a fuel-saver into a virtual power plant because it can be dispatched on demand.

Energy Storage for Security



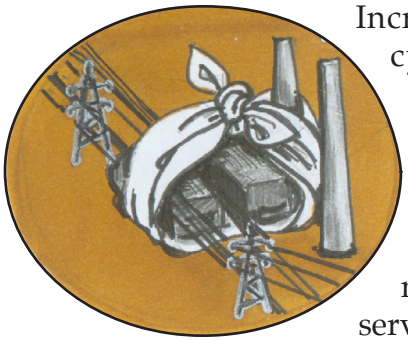
In power outages and emergencies such as hurricanes, an onsite energy sources can mean all the difference in limiting manufacturing and retail losses. In hospitals, it can be the difference between life and death.

Energy Storage for Energy Efficiency



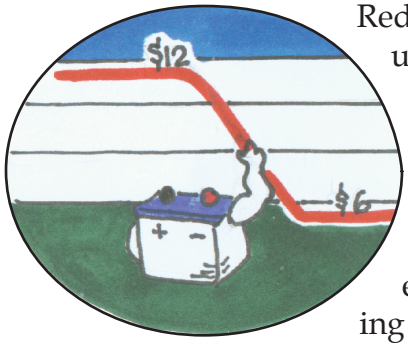
Storage technologies can save energy by displacing peak power plants and allowing conventional power plants to operate efficiently. A peak gas plant can use more than twice the energy of a baseload plant.

Energy Storage for Power Plant Life



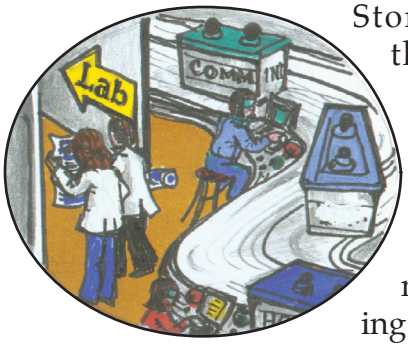
Increased on-and-off cycling of power plants leads to higher generator failure rates and expensive power plant maintenance. Storage conserves energy used in power plants and the energy used to make them.

Energy Storage for Costs Savings



Reducing peak power use will save money as well as energy. Peak power on summer days can easily be double the cost of average electricity. Preventing new transmission lines also lowers the electric prices.

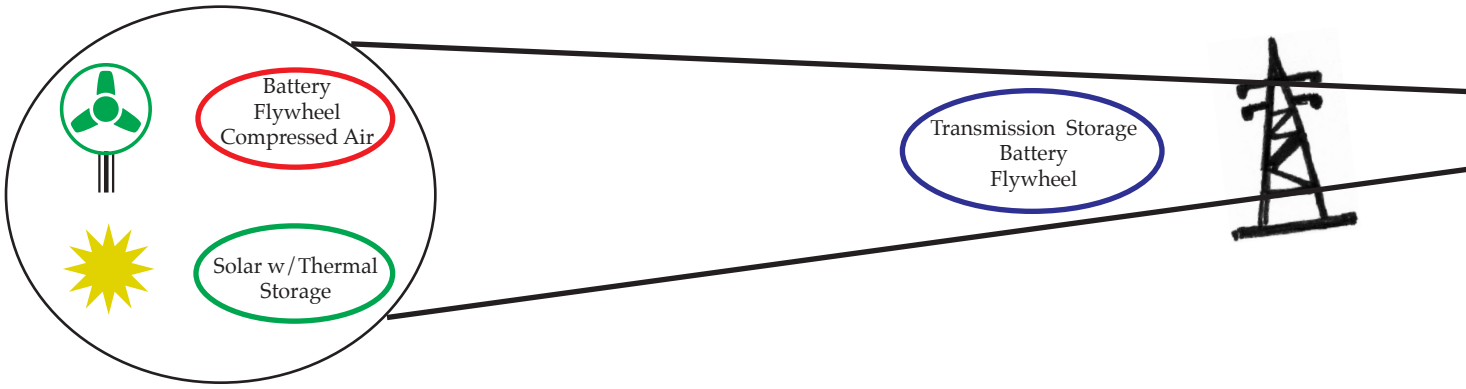
Energy Storage for Job Creation



Storage will create thousands of local jobs installing equipment. The guaranteed market also would be an incentive for new manufacturing plants, as well as Research & Development of new technology.

Storage and the Texas Electric Grid

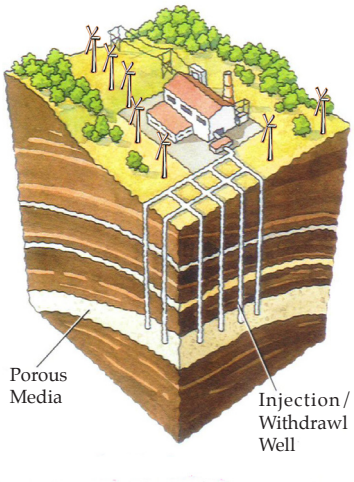
Energy storage is a way to turn the conventional electric grid into one that is more efficient, more reliable, less expensive, and supportive of increasing levels of renewable energy.



SUPPLY-SIDE: Centralized Renewable Energy and off-peak power can be stored for dispatch.

TRANSMISSION: Storing electric energy reduces the need for new power lines and ensures increased reliability in outages.

Compressed Air Energy Storage

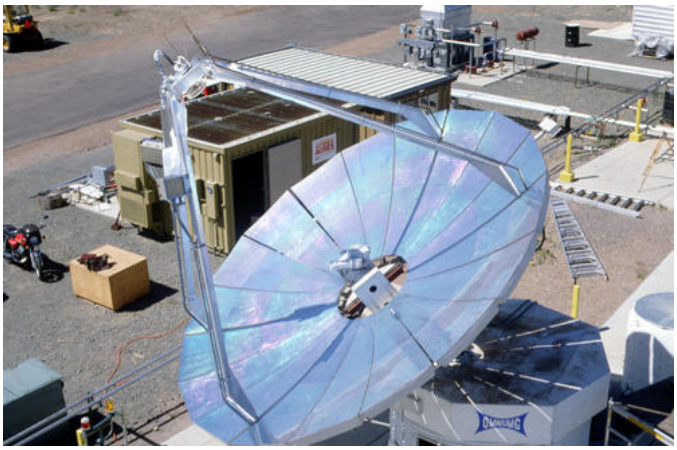


Compressed Air Energy Storage (CAES) uses an air compressor located next to a geologic formation such as a salt dome, aquifer, or abandoned mine or oil well. Electricity from renewable energy or cheap off-peak generation drives compressed air into the geological formation at 100 times atmospheric pressure. When power is needed, the compressed air is heated (generally with natural gas) and run through a turbine to create electricity. Turbines using compressed air operate much more efficiently.

Since the CAES unit is only used to level power output when the wind is not blowing, a Wind/CAES plant will only use a small fraction of fossil fuel. And it is feasible to use *biofuels or solar heat* to run the turbines.

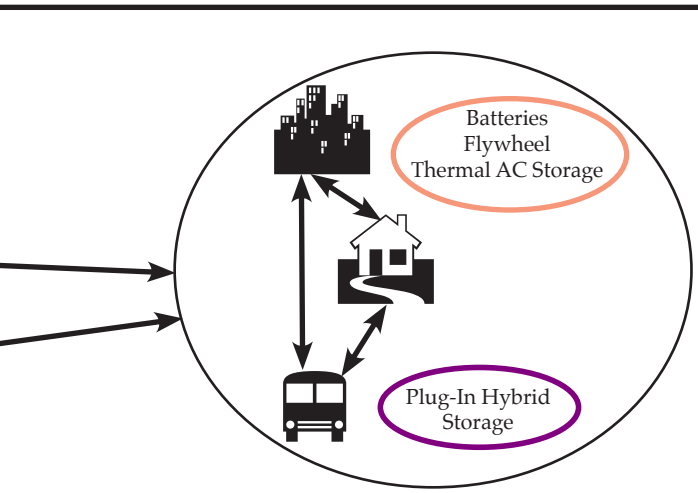
CAES plants have been operating in Huntorf, Germany since 1978 and McIntosh, AL since 1991. Another is planned in Iowa that will store wind power. There are also CAES proposals in Ohio and Texas.

Thermal Storage for Solar Power



Concentrating Solar Power (CSP), using focused heat from the sun to boil water or gas to run a generator, is a proven technology. CSP in West Texas has enough potential to provide most of the state's current electric needs. But it doesn't run at night.

Using heat stored in molten salt or high pressure steam tanks allows CSP to generate electricity 6–12 hours after sunset. It will also make CSP more cost effective by allowing the generator that is already being paid for to operate longer.



DEMAND-SIDE: Onsite renewable energy and off-peak power can be stored for later use. In the next decade, storage will include batteries in Plug-In Hybrid Electric Vehicles.

Thermal Storage for Air Conditioning

Thermal energy storage for air conditioning and refrigeration has been employed commercially for several decades. Energy from night-time wind can be used to create chilled water or ice, which is used by the cooling system on hot summer days. There are an estimated 6,000 thermal installations around the U.S., including several hundred in Texas. Despite the time-tested use of thermal storage, its untapped potential is enormous.

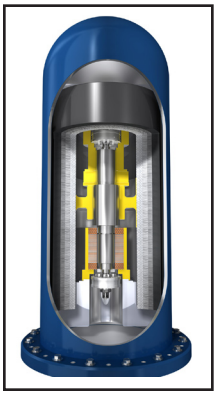
Many of these installations save energy as well as peak demand. They cool at night, when outside temperatures are less extreme. And they are generally sized to operate at a steady state, while conventional air conditioning operates inefficiently at partial load much of the year.

Thermal Energy Storage System at the University of Texas at Edinburg

Electric Storage – Batteries & Flywheels

Several types of electric storage devices are beginning to be installed by utilities as a substitute for new transmission capacity, as a back-up for renewable energy, and as a "shock absorber" to make electric systems more reliable.

American Electric Power has installed 7 MW of sodium sulfur batteries in Ohio, Indiana, and West Virginia, and is planning a 4 MW installation in West Texas. In Japan, which has pioneered the battery's commercialization, there are already 270 MW installed, with 34 MW (17 batteries) used as backup for a wind farm (photo above).



Energy can also be stored in energy-retaining flywheels. These are 3-feet wide, weigh 2,500 pounds, and are suspended by magnetized bearings in a vacuum cylinder that spins at twice the speed of sound. A motor at its base allows it to store or give up energy on demand. A 20 MW "flywheel farm" has been proposed in New York state.

Electric Storage From Plug-In Hybrids

Plug-In Hybrid Electric Vehicles (PHEVs) can store energy at night when demand is low. In the next decade, PHEVs with lithium batteries will supply the electric grid in on-peak hours when parked. Money paid to car owners will make these low-pollution automobiles more affordable.

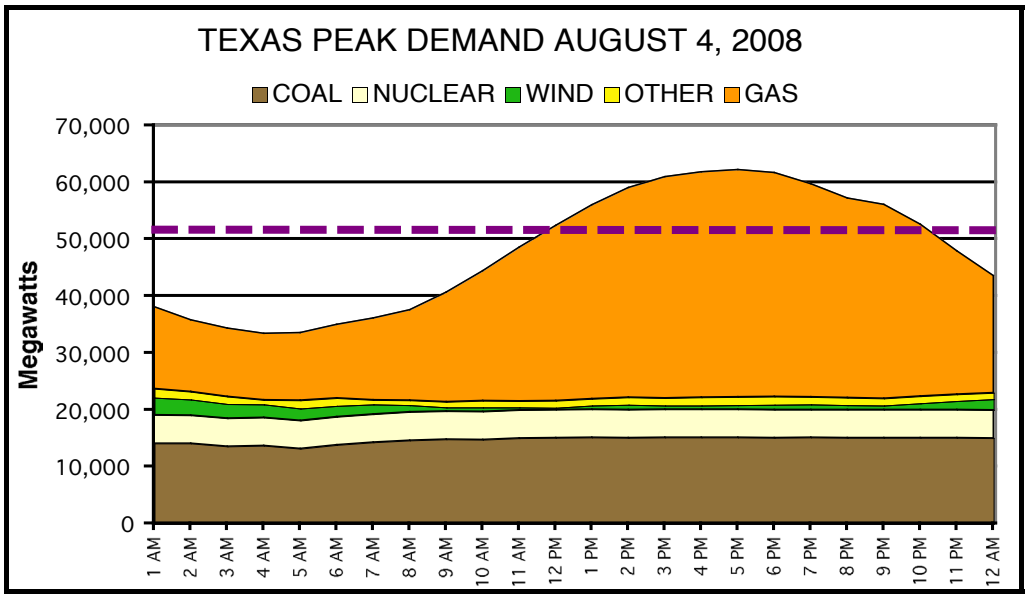
POLICIES TO REDUCE COST AND POLLUTION THROUGH A RENEWABLE ENERGY STORAGE PORTFOLIO

1. Retail Electric Providers should be required to store at least 1,000 Megawatts of the renewable energy they purchase if deemed cost effective by the Public Utility Commission of Texas (PUCT).

2. Transmission and Distribution providers (T&Ds) should save 5% of their energy with storage, both by owning regulated central facilities, and by giving incentives through their energy-efficiency programs for onsite storage.

3. The PUCT should adopt rules to assure energy storage reduces overall electricity costs, and reduces smog and carbon dioxide.

4. The Texas Emission Reduction Program should create incentives for Plug-In Hybrid Electric Vehicles. The PUCT should establish fair buy-back rates.



The Pay-Off

A 5% energy storage requirement for the Texas electric system would reduce high-priced peak demand by 16%.

For more information on our energy storage plan, see: CleanEnergyForTexas.org

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