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We should look at energy storage technology

Author: Carlos Guerra

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Planning for San Antonio's future energy needs is a tricky proposition. Texas' electrical grid is almost completely self-contained, so almost all electricity must be generated in-state. And our system was built when natural gas was dirt-cheap and pollution, even from coal, wasn't a worry. Almost half of Texas' energy still comes from burning gas that is likely to cost more in the coming years. And CPS Energy isn't likely to build more coal plants.

Assuming that our city keeps growing rapidly, and that future residents keep using lots of energy, CPS wants to add two new nuclear reactors to the South Texas Project. Whether we invest in a 40 percent stake in the project, get a smaller share or even participate in the expansion remains to be decided.

But we should consider another factor about our electrical grid: It assumed that energy would be generated as it was consumed. Texas also requires providers to have 12.5 percent extra energy to meet wildly fluctuating demands.

So, except during peak hours, we have more generating and transmission capacity than is needed. And unused electricity can't be stored on the grid, so this capacity sits idle until people crank up air conditioners on hot days.

Since 2006, Texas has also been the nation's largest wind-energy producer, and we are likely to become a big solar producer, too.

But while we can predict how much wind farms and solar projects will generate over the long term, we can't predict if the sun will shine or the wind will blow next week with any degree of certainty.

And most wind generation peaks before dawn, when energy demand is lowest and cost is cheapest.

That is why, globally, energy storage strategies are rapidly being developed.

Thermal cold storage facilities chill water or make ice at night in 6,000 locations, nationally, with cheap night-time energy for cooling during the day.

Concentrating solar energy to boil water to turn generators is also a proven technology. But it doesn't work at night. If the heat is used to melt salt or pressurize steam tanks, however, it can generate electricity for up to 12 dark hours.

New battery types are also making it practical to store cheap off-peak energy to fulfill demand peaks. Recently, 7-megawatt sodium-sulfur battery systems were installed in Ohio, Indiana and West Virginia, and a 270-megawatt system has been in use in Japan for a number of years.

Compressing air in underground salt domes during non-peak hours and using it - with a bit of natural gas - to turn generators at peak hours has been used in Germany since 1978 and in McIntosh, Ala., since 1991.

Perhaps the most exciting of several projects pairing wind farms with compressed air storage that are now in development was announced last year by Shell and Luminant. Details are sketchy and could be affected by Texas state agencies' decisions. But the general plan is to erect 1,500 two-megawatt wind turbines around Briscoe County and pump compressed air into underground salt beds at night.

Then the energy of the predawn Panhandle winds will be stored and turned into electricity when it is most needed, during those scorchers when it will sell for top dollar to providers who didn't plan ahead - or embrace new technologies.

cguerra@express-news.net

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