

County of San Diego



ZERO NET ENERGY

Portfolio Plan

The Department of General Services (DGS) of County of San Diego, California • October 2017

What is Zero Net Energy?

Zero Net Energy (ZNE) describes a building that replaces the energy it buys from the utility company with an equal amount of renewable energy it creates.

Modern construction techniques, smart monitoring systems, and equipment like solar panels allow a structure to generate as much energy as it uses over the course of a year.

The terms Zero Net Energy, Net Zero Energy, and Zero Energy are essentially the same.



A Plan for Zero Net Energy (ZNE)

The State of California has an ambitious goal to reduce by half the overall energy consumption of its existing commercial buildings by the year 2030. The County of San Diego believes it can accomplish this objective for its facilities with improved efficiency and renewable energy, with some sites going all the way to ZNE.

By deploying the plan in prioritized stages, the County can reach its ZNE target with a minimal budget impact. Over ten years, an annual savings of \$1 million yields \$10 million in total savings. These energy improvements lead to a reduction in expenses, resulting in accrued savings that the County could use to implement additional reductions.

Various endeavors across the state have made progress toward realizing zero net energy with new technologies and promising pilot projects, but few have truly attained that ideal level. The County is a pioneer in this area by developing a comprehensive ZNE plan for its wide portfolio of buildings.

The ZNE Portfolio Plan helps our environment and saves money

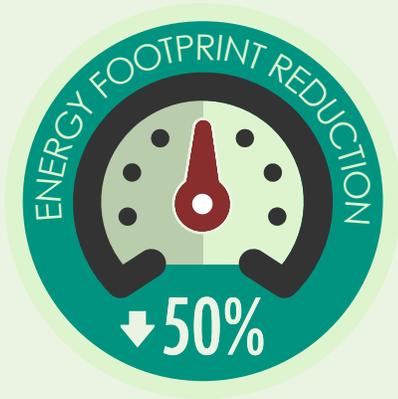
In addition to a positive environmental impact, reaching this goal will result in significant savings for San Diego County taxpayers. This display of decisive leadership may also encourage similar efforts in local government agencies and private businesses.



<http://www.sandiegocounty.gov>



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The County currently pays utility bills for 8.2 million sq. ft. of building space, totaling about \$21 million in FY15-16 for electric and gas services. Better energy efficiency means lower County energy expenditures, potentially saving millions of dollars per year.

Reducing the County's current energy footprint by half from 1.6 billion kBtu/yr requires a combination of reducing energy use and providing on-site renewable energy production totaling about 0.8 billion kBtu/yr (enough to power about 13,000 San Diego households each year).¹

What does kBtu mean?

kBtu is a measure of energy consumption. It refers to one thousand British Thermal Units (BTU), and is a common term for energy used in buildings.



A wooden kitchen match produces about 1 BTU as it burns.

So one billion kBtu requires about a trillion matches, or 50,000 tons of coal.²

A smart plan using six phased strategies

The County plans to reduce the total energy footprint of its facilities by using six strategies phased in over the next 13 years. The County will focus first on the approaches that are the least expensive and easiest to implement. Later strategies will require more effort (and money), but are necessary to reach the goal.

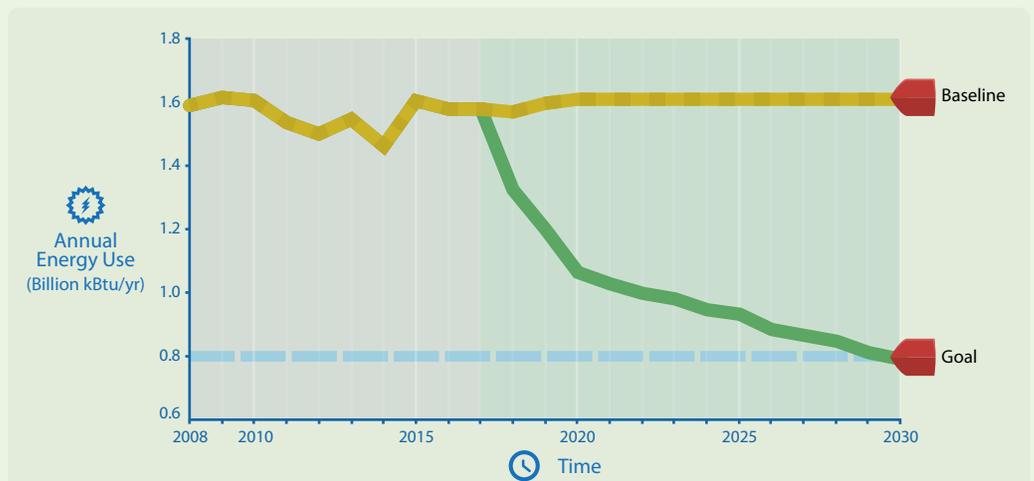
The County will closely monitor each strategy to gauge its performance, and make adjustments accordingly.

These solutions are realistic and attainable, even for a portfolio of facilities as expansive and diverse as that of the County.

Timeline:



Unused energy is saved money!



1: <https://www.eia.gov/consumption/residential/>
2: <http://www.energy-101.org/units-of-measurement>



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The County plans to cut its energy footprint in half by 2030 with six strategies:



1



Closely monitor energy use to find opportunities for savings

Continuous measurement and analysis are relatively easy, cost-effective means to identify and manage potential energy issues. Staff training and smart technology like a centralized energy management solution allow the County to more effectively monitor energy consumption and direct the majority of its energy efficiency efforts.

This strategy anticipates a minimum of **5%** overall savings (0.11 billion kBtu/yr). Greater savings are possible, perhaps up to 10% (0.16 billion kBtu/yr), and could reduce the effort required for subsequent strategies.



2



Install on-site renewable energy

Installing large-scale photovoltaics (PV) at seven County facility sites reduces the need to rely on electricity from utility companies. These 13 MW renewable energy systems will not be an upfront capital expense, but will be paid for over time from the renewable power they produce.

This strategy will achieve a **12%** reduction from baseline (0.19 billion kBtu/yr) after implementation.



3



Require ZNE for all new facilities and major renovations

Build in modern efficiency and renewable energy characteristics right from the start. Ensure that the design, construction, and operations of new facilities meet these standards for annual zero net energy use.

This strategy will achieve a **6%** reduction from baseline (0.1 billion kBtu/yr) by 2030.





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4



Harness solar electricity generated locally

At small facilities that cannot produce their own solar power, the County can purchase solar electricity produced within the region specifically to help these kinds of properties attain ZNE. SDG&E offers purchase plans for customers called EcoChoice and EcoShare.

Purchasing such community-sourced solar electricity for all eligible facilities will achieve a **5%** reduction from baseline (0.08 billion kBtu/yr).



5



Implement energy reduction projects at selected sites

Detention, Office, Health, and Court are the primary energy users, accounting for 70% of the County's portfolio.

Reducing the energy consumption for these buildings and across the entire portfolio offers great potential to save money. But it is also a complex strategy that involves many different measures.

Efficiency alone has the potential for a large reduction in total energy, a minimum of **17%** (0.264 billion kBtu/yr). With additional investment 22% is possible.



6



Increase on-site renewable energy by 6 MW: phase 2

Install large-scale photovoltaics by engaging in Power Purchase Agreements (PPAs). This strategy is the same as outlined in Strategy 2, but the schedule for these PV systems would be for a later date, for example, in 2021.

This strategy can achieve a minimum of **5%** reduction from baseline (0.09 billion kBtu/yr), but the full potential reduction could be 22% (0.35 billion kBtu/yr).





Frequently asked questions (FAQ)



Does the ZNE Portfolio Plan raise taxes?

No. If fully implemented, this plan will actually generate significant cost savings to County taxpayers.

These methods include the use of Power Purchase Agreements (PPAs) to avoid upfront costs and generate big utility costs savings over the 20 to 25-year term of the agreements.

The County chooses efficiency projects which are cost-effective, ultimately leading to a notable return on investment.



Why tell residents all of this?

Saving energy, reducing pollution, and preserving our quality of life is everyone's job. The County is leading the way with this ZNE portfolio plan, and all residents of San Diego County can help by practicing energy savings at home and at work.



What happens if the County misses the goal?

While the County would not incur a direct penalty, failure to meet the ZNE objective would be a significant missed opportunity to contribute to the global effort to reduce the harmful effects of climate change.



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Are more details available?

Yes! Some resources for learning more and getting involved include:



County of San Diego Department of General Service: Zero Net Energy Portfolio Plan:

 http://www.sandiegocounty.gov/content/sdc/zne_plan.pdf (Pending Finalization)

San Diego County Energy Management Program:

 http://www.sandiegocounty.gov/content/sdc/general_services/Energy/Energy.html

San Diego, 2050 is Calling:

 <http://www.sandiego.edu/2050/about/>

 <http://catcher.sandiego.edu/items/usd/2050.pdf>

San Diego Gas & Electric EcoChoice and EcoShare programs:

 <https://www.sdge.com/environment/>

Current energy and climate change projects:

 <http://www.sandag.org/index.asp?subclassid=46&fuseaction=home.subclasshome>

Go Solar California:

 <http://www.gosolarcalifornia.ca.gov/about/>

Yale E360 - short visualization of global warming:

 <https://vimeo.com/228086906>

