Decarbonizing the Palo Alto Electricity Supply
A Citizen's Policy Brief

Executive Summary

Carbon Free Palo Alto (CFPA) is a grassroots citizen activism organization. CFPA advocates a carbon free electricity supply for Palo Alto by Jan. 1, 2015 or sooner.

Palo Alto owns and operates its own municipal utility, which has already made significant steps towards this goal. City Council members and Utility Advisory commissioners are generally supportive, and a final policy decision to proceed may occur by the end of 2012.

Introduction

Carbon Free Palo Alto (CFPA) was formed in May 2011 as a grassroots citizen activism organization. Its mission is to articulate a vision of carbon neutrality for Palo Alto's electricity supply and to make that vision a reality. CFPA grew out of earlier activities, including the Green Ribbon Task Force started by former Mayor Judy Kleinberg and later the Sierra Club's Cool Cities campaign. CFPA's website is http://CarbonFreePaloAlto.org.

CFPA advocates a carbon free electricity supply for Palo Alto by Jan. 1, 2015 or sooner.

Milestones to Date

Since its formation, CFPA has celebrated several significant milestones.

- The City of Palo Alto Utilities (CPAU) recommends that it be allowed to develop a plan for decarbonizing Palo Alto's electricity supply.
  - Utility Advisory Commission (UAC) approves unanimously in Nov. 2011
  - City Council approves unanimously in May 2012

- CPAU proposes a definition of carbon neutrality based on the industry standard Greenhouse Gas (GHG) protocol defined by the World Resources Institute.
  - UAC approves unanimously in July 2012
  - City Council refers matter to Finance committee in July 2012
  - Finance committee approves unanimously in Oct 2012

Why Pursue Carbon-Neutral Electricity?

The climate situation is critical. The timeline is short. Local action is key.
The climate crisis is real. The timeline for action is increasingly short: think years, not decades. Our actions today will form the basis of our climate—and our lives—for generations to come. It is becoming increasingly apparent that local, regional and state initiatives will be the primary drivers of change. The solutions will often need to be tailored to the specifics of each locality. Compared to other carbon reduction strategies, implementing carbon free electricity in Palo Alto would have a greater impact, could be done very quickly and cheaply, and would provide a basis for further reductions.

Palo Alto is in a unique position and is only 20% shy of carbon neutral electricity.
The City of Palo Alto is in a unique position with respect to the carbon content of its electricity supply. It owns its own utility and therefore has great discretion over how the utility procures electricity. Due to wise planning and a decades-long environmental focus, Palo Alto is on track to have an 80% carbon neutral electricity supply in place by 2015. In other words, Palo Alto is only 20% shy of having a totally carbon neutral electricity supply. [1] [2]

The cost is modest.
CFPA estimates that achieving carbon neutral electricity could add $2 to $4 per month to the average residential electricity bill, or about 2 to 4% more than current residential rates. Even with this increase, rates will remain substantially below PG&E rates.

Furthermore, it became apparent earlier this year that revenues from the sales of allowances from the California cap-and-trade program (authorized by AB32, see below) might substantially fund the implementation of Palo Alto's carbon-free electricity supply for the next seven years. [3][4] Of course, the projected revenues are dependent on the cap-and-trade program continuing and functioning as currently envisioned.

Electricity is a key enabler for future cuts in carbon emissions.
A recent paper analyzing California's path to large emission reductions emphasizes the "pivotal role" that electricity will play in a new energy infrastructure. [5] By moving to a carbon neutral electricity supply, Palo Alto will cement a crucial building block in this new infrastructure. Features of this infrastructure are likely to include a focus on distributed energy generation, a smart grid, technologies to measure and manage energy usage, and new efficient energy technologies.

The State of California helps to enable Palo Alto's efforts.
Palo Alto is fortunate to be located in the State of California, which has been a leader in energy and climate issues for years. The passage of the historic Global Warming Solutions Act (AB32) in 2006 has had far reaching implications and will provide

funding to Palo Alto to implement carbon reduction strategies. [6] Another key enabler is the California Renewables Portfolio Standard (RPS), which requires utilities to have electricity portfolios that contain at least 33% renewable energy by 2020. [7] Palo Alto is on track to meet the RPS goal five years ahead of schedule.

Palo Alto can spur similar efforts both nationally and internationally.
Palo Alto has acquired a cachet as a center of learning, technology and innovation. The city will be able to take pride in its accomplishment, and news of Palo Alto's successful effort will likely spur others around the nation and the world to step up their efforts. It is also likely that this accomplishment will spur new interest and ideas for real solutions for transitioning to a new energy infrastructure.

Palo Alto can do it!
In short, if Palo Alto can't do this, what city can?

Benefits – Immediate and Future

Electricity with negligible climate impact
The largest immediate benefit to Palo Alto is the beginning of a new era where electricity consumed by Palo Alto residents and businesses has almost no impact upon the climate.

Carbon free electricity enables deep reductions in transportation emissions.
More than half of Palo Alto's carbon footprint is due to transportation. If Palo Alto replaces gasoline and diesel powered vehicles with electric powered vehicles charged using carbon free electricity, Palo Altans will be able to make a huge reduction in their transportation carbon footprint.

An extensive and state-of-the-art recharging network in Palo Alto would make it easy to use clean electric-powered vehicles and could prove to be a model for other communities.

Enables reduction in natural gas emissions
Natural gas usage in Palo Alto accounts for almost a quarter of greenhouse gas emissions. A carbon-free electricity infrastructure lays the foundation for a switch from natural gas to electricity to heat water and buildings.

Implementation

Fortunately, CPAU is already pursuing the same activities that will be necessary for a carbon neutral electric supply. CPAU will need to continue to run demand reduction programs, find ways to supply power during low hydro generation periods (when runoff from the Sierra slackens and generates less electricity), and use more renewable energy sources such as wind and solar. It should also pursue

the deployment of local distributed power, which will likely occur through the new Palo Alto Clean program. The Appendix of this document provides more detail.

Conclusion

The reasons for Palo Alto to switch to carbon neutral electricity are more compelling than ever. The local benefits are clear, and the costs are minimal. The time for approval by the City Council is now.

Palo Alto's actions will send a clear signal to electricity customers and utilities across the state and the nation that a new landscape of carbon free electricity is emerging.

Appendix - Implementation details and cost

CPAU is already on a course of increased renewable energy and demand reduction
Fortunately, CPAU is already pursuing the same activities that will be necessary for a carbon neutral electric supply. The State of California already mandates that CPAU follow a "loading order" when acquiring new generation assets. CPAU must pursue conservation and efficiency strategies first (also known as demand reduction), then renewable sources such as wind and solar, and fossil fuel generated electricity only when the first two options are exhausted.

CPAU already has demand reduction programs in place, but those programs are probably worth revisiting. In particular, CPAU must focus on commercial consumption, since that sector consumes approximately 85% of Palo Alto's electricity.

Next, CPAU will need to look at putting into place more power purchase agreements (PPAs) that utilize renewable energy sources. CPAU should place a preference on longer-term contracts and propose a timeline for deployment.

CPAU has initiated the Palo Alto Clean program
CPAU has already initiated a feed-in-tariff program called Palo Alto Clean. This program could help increase the amount of solar energy generated within Palo Alto. However, rate incentives will likely need to be increased in order to achieve the desired participation targets. It's a great concept; it just needs some minor adjustments in the next few months. **[8]**

The role of large hydro electricity generation

Roughly half of Palo Alto's electricity comes from carbon neutral power generated by large hydro projects. Hydroelectric power has very low carbon content, but also poses challenges because of the fact that large hydro projects generate a large amount of power during the spring and summer months, but much less during the fall and winter months. CPAU currently uses brown power acquired from the California ISO (Cal-ISO) grid to cover the deficit during these slack months.

The most reasonable approach in the short term to deal with the hydro shortfall situation is to purchase renewable energy certificates (RECs) to correspond with Cal-ISO grid purchases. The RECs should meet certain qualifications to be determined by CPAU. Presumably the RECs would be Green-e certified, evaluated by a performance-based criteria to verify that they in fact increase renewable energy production (i.e. additionality) and are associated with newer generation facilities. **[9]**

The longer-term goal of CPAU should be to increase the percentage of renewable energy supplies in the portfolio and to decrease our reliance upon large hydro, thus reducing the need for using RECs and possibly eliminating the need to use them in the future. It's also conceivable that it may become possible in the future to ensure that some percentage of power purchases from Cal-ISO are from renewable sources.

Palo Alto Green program

Under a carbon neutral regime, the Palo Alto Green program makes no sense since subscribers are motivated to participate by the idea that by paying a bit more, they can receive carbon-free electricity. Rather than losing the revenue generated through the program, CPAU should try to repurpose the program with different goals.

One possibility would be to offer a natural gas offset program that would allow customers to offset the GHG emissions from their natural gas usage. The challenge with this approach would be in identifying offset projects that result in real and certifiable reductions.

Another possibility for Palo Alto Green would be to implement a Community Solar program – which would allow individuals to become investors in a community solar project and share the clean energy generated from it. Colorado's recently started a community solar program that sold out in 30 minutes. **[10]** In California, a pending bill, SB 843, would allow the same. **[11]**

Fiscal objectives

CPAU should set a cap for the cost of implementing carbon neutrality. CFPA estimates that a cap of 0.5¢/kWh would be sufficient. Again, Palo Alto is extremely fortunate to be eligible to receive allowances from the cap-and-trade program that will likely fund the implementation for the first seven years.

Having a portfolio of renewables is more likely to be fiscally prudent than continuing to use fossil fuels. Fossil fuels have a well-known price volatility that is likely to increase over time. In contrast, the "fuel" for solar and wind energy is free, and ongoing maintenance is low. The largest risk is the initial investment.

An evolving approach

Finally, CPAU should revisit the parameters of the carbon neutrality implementation on an ongoing basis, and provide transparent access of its strategies and decisions to the public. Carbon neutrality is not a static decision, but a process that will evolve over time in response to changing conditions.

Notes

1. "Plan to Achieve Carbon Neutrality for the Electric Portfolio" www.cityofpaloalto.org/civicax/filebank/documents/30093

2. Almost 50% of the Palo Alto electricity supply comes from large hydro. At the direction of the City Council, CPAU has been procuring renewable electricity that meets the state's RPS requirement of 33% renewable energy, but by 2015. The state's deadline is 2020. The large hydro contribution fluctuates from year to year and does not count towards the RPS requirements.

3. Carbon Cap-and-Trade Overview www.cityofpaloalto.org/civicax/filebank/documents/30127

4. UAC Recommendation that Council Adopt a Resolution Approving the Cap-and-Trade Revenue Utilization Policy for the Use of Revenues from the Sale of Allocated Allowances in California's Greenhouse Gas Cap-and-Trade Auctions http://www.cityofpaloalto.org/civicax/filebank/documents/31292

5. The Technology Path to Deep Greenhouse Gas Emissions Cuts by 2050: The Pivotal Role of Electricity http://www.sciencemag.org/content/335/6064/53

6. Assembly Bill 32: Global Warming Solutions Act http://www.arb.ca.gov/cc/ab32/ab32.htm

7. California Renewables Portfolio Standard (RPS) http://www.cpuc.ca.gov/PUC/energy/Renewables/index.htm

8. Palo Alto CLEAN (Feed In Tariff)
   http://www.cityofpaloalto.org/gov/depts/utl/business/sustainability/clean.asp

9. Renewable Energy Certificates (RECs)
   http://www.epa.gov/greenpower/gpmarket/rec.htm

10. Community Solar Gardens
    http://www.ilsr.org/first-look-colorados-community-solar-gardens/

11. California Shared Solar Bill
    http://votesolar.org/2012/08/racing-against-for-ca-shared-solar/

Further reading

- Ceres: The-21st-Century-Electric-Utility
  https://www.ceres.org/resources/reports/the-21st-century-electric-utility-positioning-for-a-low-carbon-future-1/view

- Union of Concerned Scientists: The Clean Energy Race: How Do California's Public Utilities Measure Up?
  http://www.ucsusa.org/clean_energy/smart-energy-solutions/increase-renewables/california-renewable-energy-and-public-utilities.html

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