CALIFORNIA GRID TO ADD ALMOST 100% SOLAR POWER IN 2H 2013

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Herman Trabish of *Greentech Media* has happened across a pretty interesting find — 97% of new electricity generation capacity in line to be added to the California grid in the second half (2H) of 2012 is from solar power projects.

This is according to the California Independent System Operator (the ISO), as published in the *2012 Annual Report on Market Issues and Performance*. In total, 1,633 megawatts of generation capacity are in line to be added to the grid in 2H 2013. A whopping 1,581 megawatts (MW) are from solar projects. 52 MW are from biomass projects.

That's a big shift from the first half of the year (and, well, all of previous history). Herman writes: "By the end of the first half of the year, the ISO will have added 3,391 megawatts of nameplate capacity, of which 2,296 megawatts will be natural gas, 565 megawatts will be wind and 530 megawatts will be solar." Here's a chart for a visual display of these points and the situation in 2012:

Figure E.10 Generation additions by resource type (summer peak capacity)

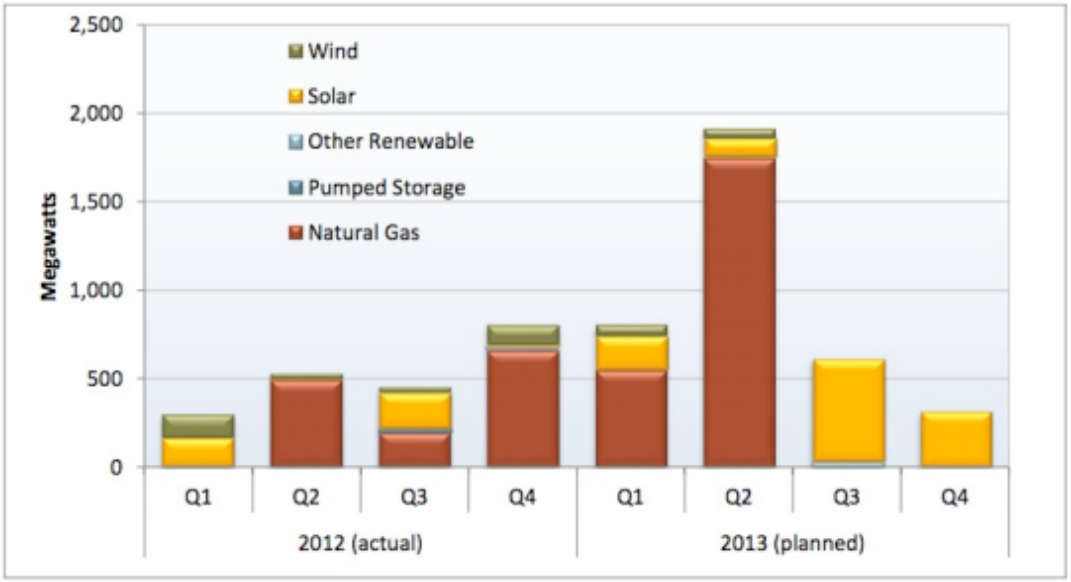


Image Credit: California ISO

Herman spent a lot of time discussing various factors related to natural gas in his post (I'd recommend checking it out). A few key points I'd pull out of it are as follows (images added):

Figure 1.24 Estimated net revenue of hypothetical combined cycle unit

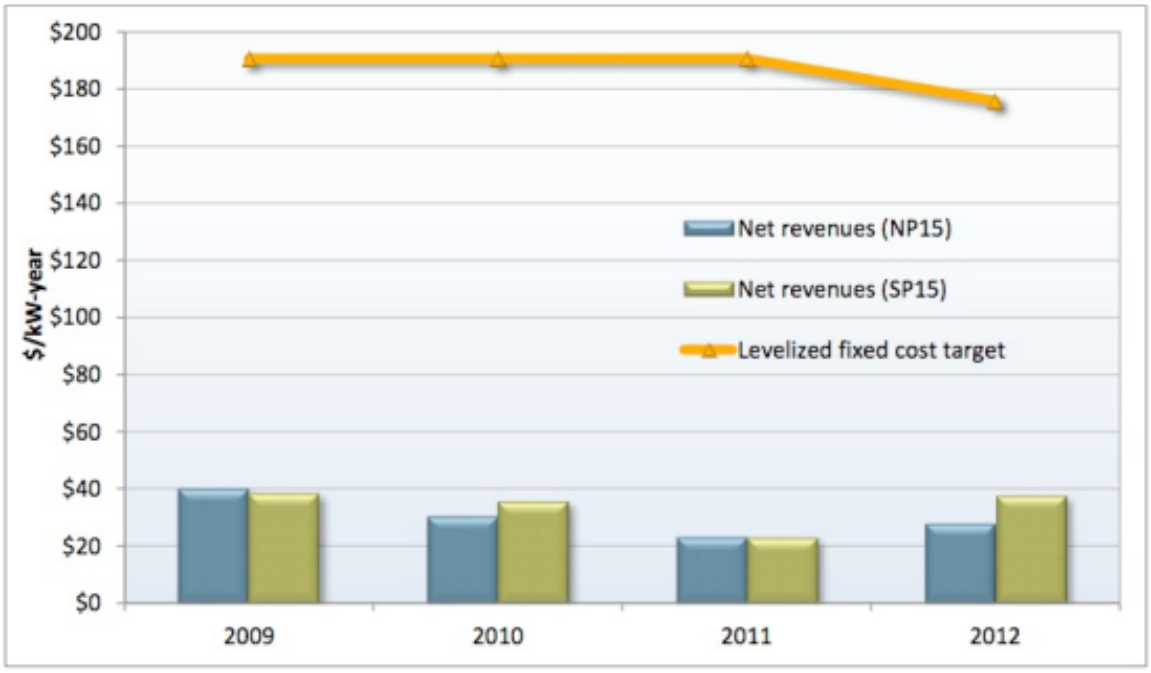


Figure 1.25 Estimated net revenues of new combustion turbine

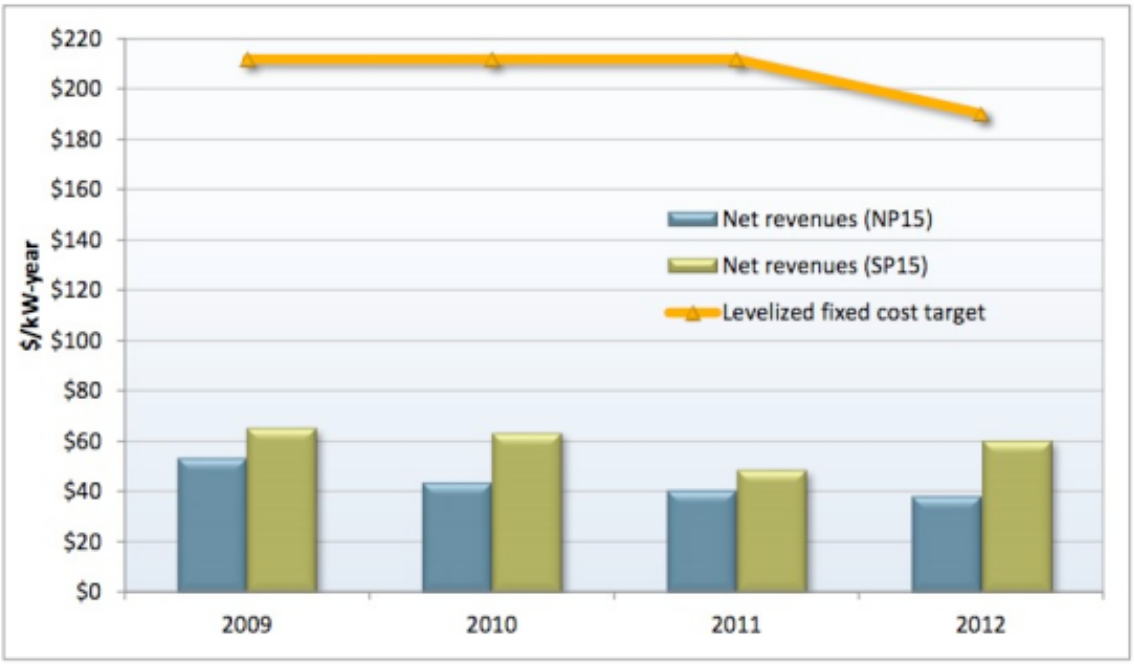
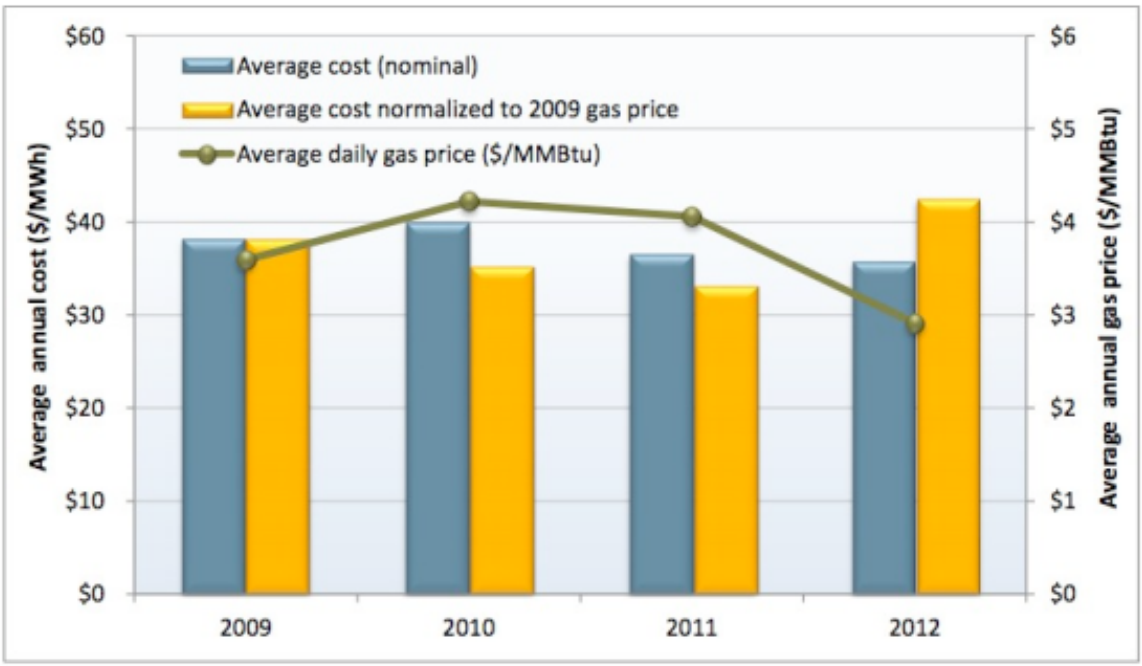


Figure 2.1 Total annual wholesale costs per MWh of load (2009-2012)



1. **Natural gas prices seem to have gotten too low to warrant investment in new natural gas projects**. From the report: "The 2012 net revenue estimates for hypothetical combined-cycle and combustion-turbine units continued to fall substantially below the estimates of the annualized fixed costs for these technologies. For a new combined-cycle unit, net operating revenues earned from the markets in 2012 are estimated to be about $38 per kilowatt-year in Southern California, compared to potential annualized fixed costs of $176 per kilowatt-year." (See 3 charts above.)
2. **More periods like 2H 2013 to come — this is the future**. V. John White, executive director of the Center for Energy Efficiency and Renewable Technologies (CEERT), stated: "This is the shape of things to come." Naturally, with solar hitting grid parity in parts of California, and combined with renewable energy targets, solar is set to keep growing at a fast clip.
3. **Clearly, there needs to be a little more balance than in 2H 2013**. Technically, that could be achieved with a broad mix of renewables, demand response solutions, energy efficiency, energy storage, and/or natural gas technologies of the right kind. "What we want is a diverse renewables portfolio that includes solar PV, wind, geothermal and CSP with storage," White said. "As time goes on, we need to smooth this out and include demand response, energy efficiency, storage, and even out-of-state resources."
4. **Old natural gas technology not a good fit**. Older/conventional natural gas plants take about 90 minutes to ramp up, which is not a good match for renewables. Furthermore, to warrant their cost, they have to run at 40% capacity, but they can't compete with renewables on a

> merit order system. And as solar cuts off peak demand and cuts into peak pricing, the situation will get even more difficult.

I think the overall trend is pretty clear. Solar power is growing fast, and it will continue growing at a strong pace. Beyond that, the specifics of California's future grid are not entirely clear.

Solar still needs a lot of support to reach its potential, especially rooftop solar. And making sure that what fills in around solar as it grows is also clean and renewable is a complementary challenge on which we need to put a strong focus