40% Drop in Solar PV Cost is Brightest Spot of Global Energy Picture

$44 Trillion is needed to make the transition to clean energy, IEA expert tells ICN, but will yield $115 trillion in savings.

By Elizabeth Douglass, InsideClimate News

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The Boundary Dam project is the world's first large-scale use of carbon capture and storage technology. It involved retrofitting SaskPower's Boundary Dam coal-fired power plant with equipment to trap 1 million metric tons of carbon dioxide emissions per year. Overall on CCS, "what we're really concerned about is that we're not seeing the progress that we need to see in terms of the early-stage research, development and demonstration," says IEA expert David Elzinga. Credit: SaskPower

In a world wrestling with climate change and the need to phase out fossil fuels, nothing is more critical than making sure there are reliable and cost-effective clean energy technologies ready to fill the void.

Keeping track of the pitfalls and possibilities is the Paris-basedInternational Energy Agency, an autonomous organization that has been analyzing energy for 40 years. In 2006, the influential agency began publishing Energy Technology Perspectives, a report that examines energy technologies and their potential for transforming the way the world uses power.

Because the agency is viewed as being above the fray of climate change politics, the ETP's detailed technology reports have become a must-read for policymakers and anyone else seeking guidance on what's possible and what's not in clean energy. The reports influence the UN climate treaty negotiations—talks meant to produce a climate accord in Paris late next year.

David Elzinga/Credit: IEA

Each year, about 30 analysts evaluate the costs, development, deployment and potential of 500 technologies, according to David Elzinga, an IEA senior project manager and lead author of the ETP reports. Working with so many energy experts, Elzinga said, is "like having a live Google two offices over who can answer any question you have on their respective topic, giving you context, history and depth."

Elzinga, a mechanical engineer, joined the IEA in 2009 and has led the agency's work on smart grids and other topics. We interviewed him recently about his perspective on the readiness of various clean energy technologies to solve the climate crisis.

ICN: Where do we stand today on tackling climate change versus where we need to be?

Elzinga: One thing that's very clear, is that we are not on track. One of the key technologies, the deployment of renewables, is the one bright area where we are seeing good progress. That's on target at this stage, and progressing at a rate we think is sufficient to meet 2050 goals. But all other major technology areas are in what we qualify as either in the red or yellow—we use a stoplight analogy—in terms of progress right now.

ICN: How do you feel about the backward steps being taken lately on climate change—Australia's repeal of their carbon tax, for instance?

Elzinga: Well, I'm not going to comment too much on Australia. It's a little bit disheartening to see a real change in course away from a

strong climate ambition to much less strong. So that is discouraging. And we also see that around 60 percent of global coal technology deployed in the last 10 years was [built with wasteful technology]. It's more cost-effective to deploy more efficient coal technologies, even at generally accepted coal prices. So why isn't that happening instead?

ICN: The latest Energy Technology Perspectives says carbon capture and storage (CCS) and nuclear, once touted as being a critical part of the climate solution, are behind. What happened?

Elzinga: When we look at CCS technology, what we're really concerned about is that we're not seeing the progress that we need to see in terms of the early-stage research, development and demonstration. When we look back to our ETP 2012 edition, we estimated that we would see about 16 gigawatts of deployed CCS technology by 2020 (in the scenario where global warming is limited to 2 degrees Celsius above pre-industrial levels). In the 2014 edition, we had to reduce that to around 4 gigawatts.

With most technologies, we need to learn by doing. If we don't do that with CCS, we're not going to see the technology cost reductions that we need in the future to really make it a cost-effective and practical technology. One example is that when we look at the Boundary Dam project out in Saskatchewan, Canada, what we see is that...already, the technology developers are saying they can see ways to significantly reduce the costs. That's the result of demonstration and learning-by-doing.

Editor's note: The Boundary Dam project formally launched

operations at the beginning of October, and it is being hailed as the world's first large-scale use of carbon capture and storage technology. It involved retrofitting SaskPower's Boundary Dam coal-fired power plant with equipment to trap 1 million metric tons of carbon dioxide emissions per year. The CO2 is being injected into nearby oilfields to help tease out oil.

ICN: What happened with nuclear?

Elzinga: With nuclear, it's a little bit of a different story. When we look at 2025, we think nuclear will be anywhere from 5 percent to 25 percent behind the levels needed to meet 2050 targets. What that wide range indicates is that there's tremendous uncertainty in terms of what is going to be deployed. That's largely a reaction to Fukushima, especially in developed countries. But we are seeing nuclear programs moving forward in China and other emerging economies, and that's one of the reasons we're doing a nuclear road map to be released this year. We are taking a really hard look at what things need to be done to see this technology progress to meet long-term climate goals.

ICN: Is concentrating solar (which uses mirrors or lenses to concentrate sunlight) behind too?

Elzinga: Concentrating solar has not progressed as we had hoped it would, but we are seeing that solar photovoltaic is progressing much faster. This is actually a piece of encouraging news. We start each year by estimating the cost of technology, and then we run our models to look out to the future. The cost in ETP 2014 is actually 40 percent lower for photovoltaics than it was in ETP 2012. So

tremendous progress was made.

Concentrating solar power is progressing slower than photovoltaics, but there has been some good progress. We see [concentrating solar] as an essential technology because it really is an appropriate technology in countries with direct solar radiation. It can operate efficiently, and it also is typically combined with storage. It doesn't have as much variability as photovoltaics, and you can combine the technologies together to have much more even power generation.

ICN: Your 2012 report said the transition to clean energy would cost $36 trillion above what would otherwise be necessary by 2050. Why did that figure rise to $44 trillion in the 2014?

Elzinga: It's a big jump in two years, but a big chunk of that is because we changed the currency benchmark. We used 2010 dollar values in the 2012 report and switched to 2012 dollars for ETP 2014, so that has a big impact on all the numbers. But even without that, the cost has gone up. The one message that’s absolutely clear is that the less progress we make in the early stages, the more expensive it's going to get over the long term because you can't necessarily rush the learning. You have to put the time in. You have to install the gigawatts or the megawatts in order to bring those costs down.

ICN: It seems like a huge amount of money.

Elzinga: Yes, the investments are huge, but they're going to be huge no matter what we do. I think everybody understands an investment, and that sometimes it will cost money up front, but if it saves you money in the future, it can be a good move. You focused on the $44 trillion, but what about the other part of that, which is the $115 trillion

in savings? That's a lot of savings through increased efficiency, and through the use of renewables, for example. We're trying to make it clear to people, look, energy is part of your daily life, it's part of our economies, it's part of our industry, but we have a choice. We don't have to do things the way we've been doing them.

ICN: You said the IEA is researching how technological innovation can help encourage world leaders to take bolder steps in Paris climate treaty talks in 2015. Will IEA's work on that play a role in the talks themselves?

Elzinga: Yes. We're engaging with the various committees in the [United Nations Framework Convention on Climate Change] now, because by the time we publish [ETP 2015] in April, the negotiations will be pretty much done. We're increasing our engagement over this year, partly through this project, partly through other initiatives at the IEA to see how we can help answer the questions that people need answered so they can hopefully get some strong ambition in 2015.