Perspectives on Paris

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The Paris agreement is a major and frankly unexpected development. The much-heralded meeting achieved more than I had expected, which is encouraging. Good news on the climate is scarce. But we should not be carried away by our enthusiasm: under the Paris agreement all countries agree in principle to reduce their greenhouse gas emissions, or reduce the rate at which they are increasing, but the targets they talk about are not legally binding, and even if they were, would not be sufficient to solve the problem. However we are all agreed on the goal and are moving towards it, which is real progress.

There is further good news, actually much more important than the Paris agreement. This is that here in the US we can now produce electricity from wind at between 3 and 4 cents/kWh, and from the sun for between 4 and 5 cents. This compares with 5 cents and up for natural gas and 6 cents and up for coal.[2] In the right locations, renewable energy is now less costly than fossil fuels. Many politicians in Paris spoke of the financial burden of using renewable energy rather than coal: they clearly had not seen these figures. The cost burden is with coal now, not renewables, particularly when we take into account the external costs, the devastating impacts of coal pollution on health. This is why so many utilities in the US are using wind and solar power for much of their new capacity, and even before the Clean Power Plan none were using coal: it just makes good business sense.

Of course there is a catch: renewables are intermittent, so we need something to back them up and provide electricity on windless nights. Fortunately we are seeing striking progress there too: electricity storage is a fast-moving field, with nearly $20 billion of venture capital money invested recently. Batteries big enough and cheap enough to store electricity for use in the grid will be available within years. Meanwhile we can continue what we are doing today, which is using gas-fired plants to back up our intermittent clean energy sources.

The competitive position of solar power is even greater than these number suggest in developing countries, as most of them don't have a national electricity grid, or have one that is at best vestigial. Solar electricity doesn't need a grid: it can be generated on the demand site and is perfect for distributed power generation. This cuts out the massive capital costs of the grid, which run about $3 million per mile and can easily double the capital costs of a conventional fossil fuel system.

The transition to renewable energy will not result in higher electricity costs, as the cost figures above show, but it will require massive investment in new generating plants. Replacing our fossil fuel plants by sources of clean energy will take investments of between two and three trillion dollars, and then in addition we will need to invest in storage capacity, possibly about the same sum again.[3] Such a

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[2] https://www.lazard.com/media/2390/lazards-levelized-cost-of-energy-analysis-90.pdf
[3] Author's calculations.

massive mobilization of capital will surely require supportive government policies, which brings us back to the Paris agreement. This is a signal of governmental support for renewable energy, though governments will still need to enact policies that provide concrete incentives.

It isn't just electricity generation that produces greenhouse gases: it's transportation and also deforestation. There's good news on these fronts too. The progress in battery technologies that I referred to above has also made electric vehicles more competitive. Battery costs are down from $500 per kWh to $150,[4] and battery charge times down from hours to minutes.[5] New vehicles reflecting these new realities will be on the market in 2017, perhaps in 2016. Their prices will be comparable to vehicles with internal combustion engines (ICEs), their running costs lower, and they will be vastly superior in performance and reliability, because electric motors are so much simpler than ICEs. Electric vehicles powered by clean electricity hold out real hopes for a stable climate.

Deforestation contributes about 12-15% of greenhouse gases, and has other acute environmental costs – it is the major driver of extinctions. The Paris agreement has something to say about this too: it[6] "*Recognizes the importance of adequate and predictable financial resources .. as .. incentives for reducing emissions from deforestation and forest degradation.*" It supports a system of financial incentives for maintaining the integrity of forests, which stabilizes the climate and also stabilizes the habitat of many threatened species. I am personally particularly pleased with this, as I and two graduates of Columbia Business School (Kevin Conrad and Federica Bietta EMBA 05) have for the last decade been running the Coalition for Rainforest Nations,[7] arguing for support for forest conservation to be built into the successor to the Kyoto Protocol. A decade of hard work has paid off.

Taking all of this together, we can see that there are reasons for real optimism over and above the undoubted diplomatic coup in Paris. We have an agreement on the need for action just as that action becomes economically attractive.

[4] http://ecomento.com/2015/10/06/chevy-bolt-battery-to-cost-less-than-145-per-kwh/.
[5] http://www.bloomberg.com/news/articles/2015-12-04/porsche-plans-tesla-car-rival-in-push-to-move-beyond-vw-scandal.
[6] At paragraph 55 of http://unfccc.int/resource/docs/2015/cop21/eng/l09r01.pdf
[7] www.rainforestcoalition.org