Journal of Fundamentals of Renewable Energy and Applications

Lovins. J Fundam Renewable Energy Appl 2015, 5:5
DOI: 10.4172/2090-4541.1000187

Short Communication Open Access

The Triumph of Solar in the Energy Race

L Hunter Lovins*

President of Natural Capitalism Solutions and Chief Insurgent for the Madrone Project, UK

Abstract

We stand on the cusp of the biggest transformation of our lives.

Humanity is in a horse race against catastrophe. The bad news is all around us from loss of species to global warming, social fragmentation, and growing inequality. The good news is that we're in the race.

And we might just be winning. The speed with which renewable energy, especially solar, is growing means we can solve the climate crisis, create jobs, reinvigorate manufacturing and buy the time needed to do the more fundamental work of implementing the Regenerative Economy – an economy in service to life.

Keywords: Solar; Renewable; Energy; Economy

Solar

In the last year, the chronology of change has been inspiring. In June 2014, Citi Group released its Energy Darwinism report, warning of the alarming fall in the price of solar [1]. Alarming to whom? Citi stated that this was now the Era of renewable, predicting that within 10 years solar, even without subsidies, would be the cheapest way to generate electricity.

The September 2014 report by the Carbon Disclosure Project reaffirmed the business case for sustainability that Natural Capitalism Solutions pioneered. Its "Climate Action and Profitability" study showed that companies that integrate sustainability into their business strategies outperform those who fail to show such leadership [2,3]. Companies that are managing their carbon emissions and are planning for climate change enjoy 18% higher returns on their investment than companies that aren't, and 67% higher than companies that refuse to disclose their emissions.

In January 2015, Deutsche Bank analyst, Vishal Shah, predicted that rooftop solar will be the cheapest electricity option for everyone in the US by 2016 [4].

Only one month later Agora Energiewende, a German think-tank, reported that solar electricity was already a low-cost renewable energy technology in many regions of the world and stated that by 2026 it will be the cheapest form of electricity everywhere. It described how large-scale photovoltaic installations in Germany fell from over 40 cents per kilowatt-hour (c/kWh) in 2005 to 9 c/kWh in 2014, with even lower prices reported in sunnier regions of the world.

Even with no technological breakthroughs, the report concluded that there is no end to cost reduction, with costs of 4-6 c/kWh (competitive with just the running cost of a natural gas plant) expected by 2025, and 2-4 c/kWh by 2050 [5]. At that price, solar will compete with energy efficiency. The study warned, most scenarios underestimate the role of solar power in future energy systems.

That price was achieved for utility scale solar four months later when Austin, Texas, announced that the utility had received offers for 7,976 megawatts of projects after issuing a request for bids in April [6]. Out of those bids, 1,295 megawatts of projects were priced below 4 cents per kilowatt-hour.

Changing is Happening Fast

In March 2015, Bloomberg Business reported that from 2013 to 2014, California went from utility-scale solar installations, supplying 1.9% of its electricity to 5% [7]. The National Bank of Abu Dhabi issued a report stating that solar energy is on track to achieve grid parity in 80% of countries within the next two years.

In April 2015, Michael Liebreich of Bloomberg New Energy announced, Fossil fuel just lost the race with renewable. The world is now adding more capacity for renewable power each year than coal, natural gas, and oil combined. And there's no going back [8].

In June, 2015, The Institute for Energy Economics and Financial Analysis warned of slowing demand for coal and rapidly rising investment in renewable [9]. Tim Buckley, the Institute's Director of Energy Finance stated, Globally, 2014 was the year of the renewable energy installation juggernaut. Wherever you look around the globe, be it China, India, Europe or the US, the trend of a rapidly-expanding renewable energy industry is the same. 2015 will inevitably see this gather pace.

He's right. South Africa is using solar and winds to meet its capacity shortfalls cheaper and faster than new coal or nuclear facilities could. This saved the country $69 million in 2014, created jobs and local industrial capacity [10-12]. With proposed coal plants on hold because of soaring costs, South Africa commissioned 79 renewable energy projects, totaling more than 1GW. That is roughly a nuclear power plant-sized chunk of capacity, but a new nuclear plant would take 10 years to build and cost $6 per watt according to one recent estimate. Coal, long thought of as dirt cheap, comes at $2.30 per watt. Top Chinese manufacturers are producing solar panels for 42 cents per Watt [13].

South Africa's renewable capacity will hit 5.24GW in 2015, up from nothing in 2012, with another 6.3GW to be commissioned in 2015. No fossil technology can scale this quickly [14].

Across the Atlantic, Brazil's commitment to bio-fuels and

***Corresponding author:** Lovons HL, President of Natural Capitalism Solutions and Chief Insurgent for the Madrone Project, United Kingdom, E-mail: hlovins@natcapsolutions.org

Received August 20, 2015; **Accepted** September 01, 2015; **Published** October 10, 2015

Citation: Lovins LH (2015) The Triumph of Solar in the Energy Race. J Fundam Renewable Energy Appl 5: 187. doi:10.4172/20904541.1000187

hydroelectricity made it independent of imported oil in 2006. Since 2009, Brazil has added solar and wind energy, contracting 14GW of wind power at prices below any other option. In 2014, at prices only a bit higher, Brazil also brought on almost 1GW of solar energy [15]. As a severe drought drives Brazil's electricity prices higher, industries eager for access to reliable and affordable power are turning to renewable that do not require dams and abundant rainfall.

The biggest user of energy, China, is becoming the world's renewable energy powerhouse [16]. Growing its installed solar capacity by twenty fold within only four years, China went from a capacity of 0.3GW in 2009 to 13GW by 2013 and is now preparing to install 17.8GW of new solar energy for 2015 [17].

China burns a lot of coal, but its Green Horizons program has committed to clean the air in its cities and cut carbon intensity by 40 to 45% from 2005 levels within the next five years.

The IEEFA study [9] agrees: While real economic growth in China exceeded 7%, electricity demand grew by less than 4%. Rapid supply diversification saw China's coal consumption decline 2% and coal imports fall by 11% in 2014. China's coal demand will permanently peak by 2016 and decline thereafter, the report predicts. In the first three months of 2015, Chinese coal imports fell by 42% from a year before [18].

Profound Global Transformation

The transformation has only begun. The 2015 China 2050 High Renewable Energy Penetration Scenario and Roadmap Study found that renewable energy could economically provide China the majority of its energy by 2050 [19]. In July 2015, Wang Yimin, representing the State Grid Corporation of China, told the United Nations Global Compact meeting on pricing carbon that by 2050 China would be 80% renewable.

Tesla is now valued at half the market capitalization of General Motors, despite selling 300 times fewer cars. Why? Tesla is not a car company; it's a battery company [20]. With cheap ubiquitous batteries, solar and wind become firm power and can replace all fossil power plants. This is, in part, why over100 companies have already committed to go 100% renewably powered [21].

Traditional utility companies face the Death Spiral [22]. Their old business model of building large fossil plants is no longer a viable model. Secretary of Energy Stephen Chu stated, The utilities are in danger of getting 'Fed-Exed' just like the Post office got 'Fed-Exed' as roof-top solar modules drop in price [23].

In Europe, where feed-in tariffs allow farmers, cooperatives, communities and citizens to make money from installing renewable energy, RWE and Eon, two of the biggest European utilities have divested of ownership in fossil and nuclear facilities, declaring themselves to be distributed renewable companies, after losing 60% and 91% profits respectively in the first nine months of 2014 [24].

Most utilities, however, still fight the transition. And fossil energy is still heavily subsidized. The recent IMF figure puts annual support for energy at $5.3 trillion or 6.5% of global GDP. This amounts to $10 million a minute and exceeds all spending in the world for health care [25].

What Can You Do?

Your daily choices say what your values truly are. Have you invested in solar for your home? Companies from Sun Edison to Solar City to Sungevity will install it on your home—no money down. Or if you have the ability to finance it, own your own electricity system. It's what I have done at my ranch.

Get active politically. Although the dramatic progress in renewable energy has required entrepreneurs and companies working in the private sector, good public policy is essential if we are to implement what we know how to do in energy efficiency and renewable energy fast enough to escape the worst ravages of climate change.

Germany, hardly the country you would first think of to be a leader in solar energy, became so because advocates like Hermann Sheer and politicians like Ernst Ulrich von Weizaecker formulated and implemented Germany's feed-in tariff and Energiewende. Without such policy, Germany, the same latitude as Labrador, would not now occasionally get up to half of its energy from the sun [26]. It aims to get 45% from renewables full time by 2050 [27]. Similarly, the Chinese clean energy surge is driven by the government's commitment to clean its air, deliver abundant affordable energy for development, and support domestic industry [28].

Much of the best renewables programs in the United States are run by municipal utilities, with the investor owned utilities having to be dragged kicking and screaming into the solar age [29]. In Boulder, Colorado, the citizen's voted to become their own utility so that they could move away from Xcel Energy's commitment to coal and implement 100% renewable power [30].

Divestment Matters

Perhaps the most powerful thing that you can do personally is to divest. The Boulder, Colorado-based financial advisory company, Principium, has built what may be the first truly fossil fuel free portfolio, using the principles of the Regenerative Economy to pick companies in which people concerned about building a finer future would want to invest [31].

The Union of Concerned Scientists study, The Climate Deception Dossiers, showed that for decades the oil and coal companies have conducted a coordinated campaign to spread climate disinformation and block climate action to protect its profits [32].

How can you fight such power and money? You can take yours out.

As John Fullerton puts it, all investment has impact. His description of the risk of carbon bubbles and stranded assets sets forth fundamentals that should guide investors in the age of climate crisis [33].

How money is invested—whether by companies, by colleges, or by you—determines whether we trash the planet or save it.

The Oxford's Stranded Assets Programme's report concluded, "Divestment outflows, even when relatively meagre in the first wave of divestment, can significantly and permanently depress stock price of a target firm if they trigger a change in market norms [34]."

Peabody Coal's recent filing with the SEC warned that, "Divestment could significantly affect demand for our product." One analyst observed, "Shares in Peabody, the world's biggest private-sector coal company, have sunk 84% since 2010. Its debt has slipped to three rungs below investment grade. The company lost $525 million in 2013 and hemorrhaged $787 million in 2014 [35]."

Bank of America stated in May 2015 that coal mining companies

pose an increasingly risky investment: "Going forward, Bank of America will continue to reduce our credit exposure to coal extraction companies [36]." It also committed to increasing lending to renewable energy, energy efficiency, and carbon capture and storage. The spokeswoman said the bank's renewable energy portfolio was currently more than three times as large as its coal extraction portfolio.

Coal stocks are an increasingly risky investment. Bloomberg New Energy Finance estimates coal stocks have lost 50 – 90% of their value since 2005 [37]. Trading at $60 a share in 2011, Peabody Coal traded 1 July 2015 at $1.68 [38].

"Coal companies' underperformance against the global equity market is unprecedented," said IEEFA's Tim Buckley. "A more than 50% decline in coal prices has seen most listed coal companies globally lose 80-90% of their equity market value in the last four years. While the sun will undoubtedly rise for renewable energy in 2015, for coal, there remains a lot further to fall [9]."

Oil has not performed much better. A Financial Times article from 2013 described the performance of international oil and gas companies as "lamentable from a shareholder perspective" over the last decade [39]. Since June 2014, big oil has lost $200bn.

Not surprisingly, evidence is pouring in that fossil-free portfolios have been outperforming fossil heavy ones [40]. FTSE's North American fossil fuel-free index has consistently outperformed the conventional benchmark index [41]. In an analysis earlier this month, the stock market index company MSCI found that fossil-free funds have earned a higher return than conventional ones in the last five years [42].

Ellen Dorsey, founder of the divestment movement hits it on the head when she says "if you own fossil, you own climate change."

That also means you own all of its impacts—from fires and floods, melting glaciers and droughts, rising sea levels and acidifying oceans, to failing crops. Investors now realize that they stand to lose trillions of dollars from the value of their holdings if climate change continues unchecked [43].

Lead, Follow, or Get Out of The Way

Whatever you do, understand that getting involved are key to crafting a finer future. The International Energy Agency reported in early 2015 that the world's effort to limit carbon emissions has begun to work. For the first time in 40 years, global carbon emissions from the energy sector stalled and began to decline [44].

We can save the planet from the scourge of climate chaos, but only if we act. What will you do?

References

1. https://www.citivelocity.com/citigps/ReportSeries.action?recordId=21
2. https://www.cdp.net/CDPResults/CDP-SP500-leaders-report-2014.pdf
3. http://www.natcapsolutions.org/
4. http://cleantechnica.com/2015/01/14/deutsche-bank-predicts-solar-grid-parity-80-global-market-2017/
5. http://www.agora-energiewende.org/topics/optimisation-of-the-overall-system/detail-view/article/solar-energy-emerging-as-cheapest-power-source-in-many-parts-of-the-world/
6. http://www.greentechmedia.com/articles/read/cheapest-solar-ever-austin-energy-gets-1.2-gigawatts-of-solar-bids-for-less
7. http://www.bloomberg.com/news/articles/2015-03-26/california-just-had-a-stunning-increase-in-solar
8. http://www.bloomberg.com/news/articles/2015-04-14/fossil-fuels-just-lost-the-race-against-renewables
9. http://ieefa.org/global-energy-markets/
10. http://reneweconomy.com.au/2015/south-africa-doubles-down-on-renewables-with-plans-for-6-3gw-auction-49192
11. http://cleantechnica.com/2015/02/17/south-africa-saved-69-million-solar-wind-energy-2014/
12. http://www.ukerc.ac.uk/news/green-jobs-debate-should-look-beyond-short-term-benefits-says-ukerc-report.html
13. http://www.solarreviews.com/news/top-chinese-manufacturers-will-produce-solar-panels-for-42-cents-per-watt-in-2015/
14. http://www.rechargenews.com/wind/1397249/south-africa-plans-to-procure-63gw-more-re-in-future-rounds
15. http://www.rechargenews.com/solar/1387554/2015-OUTLOOK-Brazil-gets-serious-about-solar
16. http://www-03.ibm.com/press/us/en/pressrelease/44202.wss
17. http://about.bnef.com/landing-pages/china-approve-17-8gw-pv-2015/
18. http://www.theguardian.com/world/2015/apr/13/chinas-coal-imports-fall-nearly-half-in-12-months-as-anti-pollution-drive-bites%20%5Barticle%20removed%20from%20Guardian%20site%20%E2%80%93%20try%20Reuters%5D%20or%20http:/thehill.com/policy/energy-environment/238583-chinas-coal-imports-drop-by-nearly-half
19. http://www.rff.org/Documents/Events/150420-Zhongying-ChinaEnergyRoadmap-Slides.pdf
20. http://www.teslamotors.com/gigafactory
21. http://www.sierraclub.org/sierra/2015-2-march-april/feature/100-club
22. http://www.natcapsolutions.org/publications_files/brittlepower.htm
23. http://www.forbes.com/sites/jeffmcmahon/2014/03/21/steven-chu-solves-utility-companies-death-spiral/
24. https://global.handelsblatt.com/edition/53/ressort/companies-markets/article/power-struggle
25. http://www.imf.org/external/np/fad/subsidies/
26. http://theweek.com/speedreads/451299/germany-gets-50-percent-electricity-from-solar-first-time
27. http://www.bloomberg.com/news/articles/2015-04-15/german-power-grid-expects-a-season-of-record-solar-output
28. http://thinkprogress.org/climate/2014/11/12/3591433/china-renewable-energy-commitment/
29. http://cleanenergyaction.org/learn-more/municipalization/
30. https://bouldercolorado.gov/lead/climate-action-ramp-up-renewables-focus-area
31. http://www.principium.co/
32. http://www.ucsusa.org/sites/default/files/attach/2015/07/The-Climate-Deception-Dossiers.pdf
33. http://capitalinstitute.org/wp-content/uploads/2014/09/FINANCIAL-OVERSHOOTread.pdf
34. http://www.smithschool.ox.ac.uk/research-programmes/stranded-assets/SAP-divestment-report-final.pdf
35. http://otherwords.org/king-coal-catches-black-lung/?utm_source=feedly&utm_reader=feedly&utm_medium=rss&utm_campaign=king-coal-catches-black-lung
36. http://www.theguardian.com/environment/2015/may/07/coal-investments-are-increasingly-risky-say-bank-of-america
37. http://about.bnef.com/content/uploads/sites/4/2014/08/BNEF_DOC_2014-08-25-Fossil-Fuel-Divestment.pdf

38. http://www.reuters.com/finance/stocks/overview?symbol=BTU

39. http://money.cnn.com/2015/01/07/investing/big-oil-price-energy-stocks/

40. http://sustainability.thomsonreuters.com/2015/03/03/executive-perspective-the-smart-way-to-divest-fossil-fuels/

41. http://switchboard.nrdc.org/blogs/plehner/divestment_outperforms_convent.html

42. http://www.theguardian.com/environment/2015/apr/10/fossil-fuel-free-funds-out-performed-conventional-ones-analysis-shows

43. http://www.theguardian.com/environment/2015/jul/24/investors-could-lose-42tn-due-to-impact-of-climate-change-report-warns

44. http://www.theguardian.com/environment/2015/mar/13/global-emissions-stall-in-2014-following-slowdown-in-chinas-economy