



Renewable Electricity Production & Nuclear Power: A Climate-Saving Comparison

INTRODUCTION

To curb the threat of climate change, humanity must change the way it produces and uses energy. Renewable energies including wind, solar, geothermal and certain forms of biomass can completely replace both fossil fuel and nuclear power. According to a 2007 study, “a reliable U.S. electricity sector with zero-CO₂ emissions can be achieved without the use of nuclear power or fossil fuels.”¹

Low or no-carbon energy sources are competitive with nuclear power

- Worldwide, in both generating capacity and electrical output, low-or no-carbon sources (excluding large hydropower) have surpassed nuclear sources and this increase continues. In 2010, the International Atomic Energy Agency projects that nuclear power will add only 1/177th of what these low- or no-carbon sources will add.²
- “Renewables have a very large potential on a global scale. Even under restrictive solar power assumptions, the International Energy Agency’s *World Energy Outlook 2004* (pp. 229–232) foresees a potential of ~30,000 TWh/y [TerraWatt hours per year] in 2030—roughly 2030 world demand.”³
- “About 15 percent of total generation (not far short of the contribution of nuclear *electricity* today) can come from wind and solar without serious cost or technical difficulty with available technology...”⁴ [*emphasis added*]
- Despite huge federal subsidies, nuclear power only generates about 19 percent of U.S. electricity at great cost. It only provides 6 percent of world total *energy* use.⁵ Nuclear power currently does nothing to help curb automobile fuel use since it only generates electricity.

2. Renewable energy is fast and economical

- Between 1947 and 1999 \$150 billion in subsidies were divided between nuclear power and wind and solar. Nuclear power received over 95% of these subsidies-- renewables (solar and wind) received the remainder.⁶
- While renewable energy is now receiving more subsidies than historically, this basic subsidy imbalance has not changed. In 2005, Congress and President Bush granted the nuclear power industry over \$13 billion in subsidies and tax breaks. In late 2007, it added another \$20.5 billion in federal loan guarantees and was asking to receive at over 100 billion more, in part by gobbling up the lion’s share of “low carbon” energy subsidies.^{7,8}
- Nuclear power currently costs about 14 cents per kilowatt hour (kWh) and could increase to an average cost of 17 cents for new reactors.
- In the first year of commercial operation a new reactor could cost as much as 29 cents per kWh⁹ while wind costs 4-6¹⁰ cents and cogeneration (using waste heat from energy production) costs about 1-2 cents¹¹.
- Even solar photovoltaic is projected by the US Department of Energy to cost the same or less than nuclear within five years’ time, attaining a cost between 5 and 10 cents per kWh.¹²
- With an investment of one billion dollars total over 15 years, (a fraction of the cost of one 1000 megawatt [MW] nuclear reactor) 100 gigawatts (GW) - the equivalent of 100,000 MW-- of geothermal electricity or more could be installed

by 2050 and cost as low as 3.9 cents per kWh depending on resource temperature and system efficiency.¹³

- Construction time¹⁴ and cost¹⁵ for most renewable energy production plants is nominal compared to that of nuclear power reactors.
- While this cost difference should make renewable energies the obvious investment choice, it also points to the perilous nature of making the *wrong* choice—considering the immediacy and danger of climate change, society may very well have one chance at a solution. Nuclear power is clearly not the choice.

3. Funding for nuclear power, will deprive better options

- In addressing the climate crisis, we cannot afford to have all options remain on the table because not only is nuclear power more expensive, it is the slowest option to deploy and the most costly CO2 abatement option per dollar spent.¹⁶
- Switching from current energy sources, including nuclear, to alternatives and efficiency is absolutely necessary to address the climate crisis.
- Keeping nuclear power on taxpayer-subsidized life support means diverting investment from cheaper choices of cogeneration, renewables and efficiency, to the costlier nuclear choice.¹⁷
- “For all these reasons, a portfolio of least-cost investments in efficient use and in decentralized generation will beat nuclear power in cost *and* speed *and* size by a large and rising margin. This isn’t hypothetical; it’s what today’s market is proving decisively.”¹⁸

4. Experts express concern about nuclear power

- Peter Darbee, Chairman and CEO of Pacific Gas & Electric, one of the nation’s largest utilities, says: “I have concerns about the lack of consensus in California around nuclear power and therefore...I’d rather push on energy efficiency and renewables...”¹⁹
- S. David Freeman, a former Tennessee Valley Authority chairman, is appalled that the Authority is seriously considering going back to nuclear power- “the federal agency still has more than 20 billion dollars in debt on its books due largely to that previous nuclear push and Freeman worries ratepayers will be facing billions of dollars more...”²⁰

Endnotes

¹ Makhijani, Arjun. Carbon-Free and Nuclear-Free: A Roadmap for U.S. Energy Policy. IEER Press and RDR Books. 2007. p 168. See www.ieer.org/carbonfree/CarbonFreeNuclearFree.pdf

² Lovins, AB. Nuclear Power: economics and climate-protection potential. Rocky Mountain Institute. September 11 2005 pp 3 &4.

³ Ibid.

⁴ Ibid. Makhijani. p 168.

⁵ [Key World Energy Statistics 2007](#) AND [International Energy Agency](#) (2007).

⁶ Goldberg M. Federal Energy Subsidies: Not all Technologies are Created Equal. Renewable Energy Policy Project Research Report. July 2000. No. 11. p 7.

⁷ Friends of the Earth. Lieberman-Warner Substitute Amendment Charts: Funding Distribution in Lieberman-Warner (S. 3036) 2021-2050. May 29, 2008. see http://action.foe.org/t/3877/content.jsp?content_KEY=4232

⁸ Friends of the Earth. The Lieberman-Warner Global Warming Bill. 2008. see http://action.foe.org/content.jsp?content_KEY=3820&t=2007_Global-Warming.dwt

⁹ Romm, Joseph. The High Cost of Nuclear Power. Testimony before the United States Senate. July 16, 2008. Find at: http://www.americanprogressaction.org/issues/2008/romm_testimony.html

¹⁰ Makhijani, A. 2007. p 36.

¹¹ Lovins AB et al. Forget Nuclear. Rocky Mountain Institute. Appended April 2008. at <http://www.rmi.org/sitepages/pid467.php>

¹² Makhijani, A. 2007. p 38.

¹³ Ibid. MIT. 2007.

¹⁴ Johnson, Toni. *Challenges for Nuclear Power Expansion*. Council on Foreign Relations. August 11, 2008. Watts Bar Nuclear Reactor went online twenty three years after construction began.

¹⁵ Ibid. Scroggs.

¹⁶ Lovins. Nuclear power: economics and climate-protection potential. Rocky Mountain Institute. September 11, 2005, updated January 6, 2006 at http://www.rmi.org/images/other/Energy/E05-14_NukePwrEcon.pdf

¹⁷ Ibid. Lovins. Nuclear Power. p ii.

¹⁸ Ibid. Lovins. Nuclear Power. p 12

¹⁹ Woody, T. PG&E chief's green crusade. Fortune. May 1, 2008 at <http://greenwombat.blogs.fortune.cnn.com/2008/05/01/pge-ceos-green-crusade/>

²⁰ Mansfield, D. Former TVA chairman rips agency's nuclear plans. Forbes.com June 12, 2008. at <http://www.forbes.com/feeds/ap/2008/06/12/ap5111776.html>