

World Reached 25% Renewable Energy Capacity

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ISIS Report 25/10/10 - World Reached 25% Renewable Energy Capacity

Renewable energies continued to climb in 2009, bucking the plummeting economic trend
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The unstoppable rise of renewables

Despite the severe downturn of the global economy in 2009, renewable energy continued its meteoric rise. At the end of 2009, fully one quarter of global power capacity (1230 GW) is renewable, delivering 18 percent of global electricity supply, according to the report issued by the Renewable Energy Network for the 21 Century (REN21) [1-3]. This is more than three times the global nuclear generating capacity and about 38 percent the capacity of fossil fuel-burning power plants worldwide. Renewable energy is [3] "hitting a tipping point", said Christopher Flavin of Worldwatch Institute, one of the seven authors of the report, "there is now good reason to be optimistic."

Despite lower oil prices, the lack of progress with climate talks, and other economic sectors declining around the world, renewable capacity continued to climb at rates close to those in the past years [4] (see Green Energies - 100% Renewable by 2050, ISIS Publication). Investment in new renewable power capacity in both 2008 and 2009 represented over half of total global investment in new power generation [2]. As Mohammed AlAshry, Chair of REN21 remarks [3]: "In 2009, governments stepped up efforts to steer their countries out of recession by transforming industries and creating jobs. This gave a boost to the renewable energy sector."

Grid-connected solar photovoltaic (PV) rose 53 percent, wind power 32 percent, solar hot water heating 21 percent, geothermal power 4 percent, and hydropower 3 percent. Production of ethanol and biodiesel increased by 10 and 9 percent respectively, even as layoffs and ethanol plant closures occurred in the United States and Brazil [1].

For the second year running in both US and Europe, more renewable power capacity was added than conventional (coal, gas, nuclear). Renewables accounted for 60 percent of newly installed power capacity in Europe in 2009, and nearly 20 percent of annual power production.

China came top of the world with 37 GW renewable power capacity added to reach 226 GW of total renewable energy capacity. Global renewable energy capacity increased by nearly 80 GW; 31 GW hydro and 48 GW non-hydro, of which 38 GW was wind power.

China was top market for wind power with 13.8 GW added, up from just 2 percent market share in 2004. The US was second with 10 GW added. The share of wind power reached new heights of 6.5 percent in Germany and 14 percent in Spain

Solar PV additions totalled 7 GW, reaching a total of 24 GW worldwide (of which 4 GW is non-grid connected [4]). Germany was top market with 3.8 GW. Other large markets were Italy, Japan, US, Czech Republic and Belgium. Nearly 11 GW solar PV was produced; a 50 percent increase over 2008.

Biomass power plants exist in over 50 countries around the world and supply a growing share of electricity. Several European countries are expanding their total share of power from biomass, including Austria (7 percent), Finland (20 percent), and Germany (5 percent).

Biogas for power generation is also a growing trend in several countries especially China, Sweden, and Germany [2], and now the UK [5].

Diversification of geography and sources of renewables

The main advantages of renewables sources of energy such as solar, wind, anaerobic digestion, small hydroelectric, is that they are less capital intensive, easier to install and maintain than conventional non-renewable power plants such as nuclear, coal, and gas [2]. Consequently, developing countries can leap-frog to low or zero-carbon economies by improving energy efficiency, adopting organic agriculture, and installing affordable off-grid renewable power for the people [6] (Green Growth for Developing Nations, SiS 46).

Indeed, developing countries have more than half of global renewable power capacity [3], though much dominated by China and India. China leads in several indicators of market growth (see Table 1), while India is fifth in total wind power capacity, and rapidly expanding many forms of rural renewables such as biogas and solar PV. Brazil produces virtually all of the world's sugar-derived ethanol and has been adding new biomass and wind power plants.

A new geographic diversity (and dominance) in renewable energies is emerging. Wind power existed in just a handful of countries in the 1990s, but is now found in over 82 countries. Manufacturing leadership is shifting from Europe to Asia as countries like China, India, and South Korea continue to increase their commitments to renewable energy.

In 2009, China produced 40 percent of the world's solar PV supply, 30 percent of the world's wind turbines, up from 10 percent in 2007, and 77 percent of the world's solar hot water collectors.

Latin America is seeing many new biofuels producers in countries like Argentina, Brazil, Colombia, Ecuador, and Peru, as well as expansion in many other renewable technologies, though biofuels are not a sustainable option in countries where food production competes with fuel for land (see [7] Land Rush' as Threats to Food Security Intensify, SiS 46). In fact, investment in new biofuel plants declined, as corn ethanol production capacity was not fully utilized in the US, and several firms went bankrupt. The Brazilian sugar ethanol industry similarly saw no growth. Europe faced similar decline in biodiesel, with low utilization in production capacity [3].

At least 20 countries in the Middle East, North Africa, and sub-Saharan Africa have active renewable energy markets. Many renewables markets are growing at rapid rates in countries such as Argentina, Costa Rica, Egypt, Indonesia, Kenya, Tanzania, Thailand, Tunisia, and Uruguay. Developing countries now make up over half of all countries with policy targets (45 out of 85 countries) and also make up half of all countries with some type of renewable energy promotion policy (42 out of 83 countries).

Apart from Europe and the United States, other developed countries like Australia, Canada, and Japan are seeing recent gains and broader technology diversification. The REN21 report comments [3]: "The increasing geographic diversity is boosting confidence that renewables are less vulnerable to policy or market dislocations in any specific country."

Solar still tops renewables growth

Solar still tops the growth in renewables, its global capacity comes behind small hydroelectric, ahead of wind (see Table 1). Worldwide, households with solar-heated water continued to expand in 2009, and now estimated at 70 million. Grid-connected solar PV has been rising by an average of 60 percent every year for the past decade, increasing 100-fold since 2000 [3].

Thin-film PV has experienced a rapidly growing market share in recent years, reaching 25 percent; no doubt due to lower costs and ease of manufacture [2]; in addition, they appear to have better green credentials ([8] How Green is Solar? SiS 49). A growing number of solar PV "utility scale" plants of 200-kW and larger now account for one-quarter of total grid-connected solar PV capacity.

China continues to dominate the world market for solar hot water collectors, with some 70 percent of the existing global capacity. Europe is a distant second with 12 percent.

Nearly 11 GW of solar PV was produced in 2009, a 50 percent increase over 2008. First Solar (USA) became the first company ever to produce over 1 GW in a single year. Major crystalline module price dropped from highs of \$3.50 per watt in 2008 to lows approaching \$2 per watt.

Policies for renewables

Policies for stimulating the growth of renewables have played a key role in kick starting and maintaining the industry, as demonstrated most clearly in Germany [2], where feed-in tariffs were a primary driver; and this was emulated in a number of countries around the world.

At least 83 countries have some policy to promote renewable power generation, feed-in tariff being the most common. By early 2010, 50 countries and 25 states/provinces had feed-in tariffs, and strong momentum for feed-in tariffs is maintained around the world.

Renewable portfolio standards (RPS), renewable obligations or quotas, have been enacted by 10 national governments and 46 states/provinces; most require renewable power shares in the range of 5 to 20 percent, with many targets extending to 2020 and beyond.

In 2009, a growing number of countries, states, and cities mandate solar hot water in new building construction, spanning all continents and economic development levels.

In Europe, a new crop of policies supporting renewable heating has emerged in recent years, such as Germany's Renewable Heating Law, which requires 20 percent minimum heating from renewables in new residential buildings. And at least 20 countries provide capital grants, rebates, VAT exemptions, or investment tax credits for solar hot water/heating investments.

But beware biofuels

Blending biofuels into fossil vehicle fuels have been mandated in 41 states/provinces and 24 countries, most require blending 10-15 percent ethanol with gasoline or blending 2-5 percent biodiesel with diesel fuel. In addition, biofuels targets in more than 10 countries and the EU call for specific shares of transport energy from biofuels (10 percent by 2020 in the EU), or total annual biofuels production, for example, 130 billion litres/year by 2020 in the US.

UK's Environment Audit Committee has joined many civil society organisations calling for a moratorium on biofuel targets on ground that they lead to unsustainable biofuel production in third world countries [9]. The only sustainable biofuels are those produced on small scale and used locally, especially from wastes, and the first report from UK's Renewable Fuels Agency [10] confirms critics' charge that far from reducing carbon emissions, many biofuels are directly or indirectly responsible for emissions by driving demand for agricultural land and accelerating deforestation [7, 11] (Biofuels: Biodevastation, Hunger & False Carbon Credits, SiS 33). In February 2010, ActionAid released a damning report blaming EU's biofuel targets for up to 17.5 million ha of land taken out of food production, causing a 100 million people to go hungry from increased food prices and landlessness [12].

A most important role is played by city and local governments around the world (see [13] Cities and Climate, SiS 45), which are not paralyzed by the lack of progress of their national representatives at the climate talks, and have consistently taken local initiative and action to exceed national targets.

Rural Renewable Energy

Renewable energy plays a pivotal role in providing modern energy access to the billions of people in developing countries [5]. Some 1.5 billion people worldwide still lack access to electricity; and approximately 2.6 billion rely on wood, straw, charcoal, or dung for cooking their daily meals [3], which entail much hardship and respiratory distress. Renewable energies are a boon to rural households and small industries in many countries.

In even the most remote areas, renewable energy technologies such as solar PV household systems, micro-hydro minigrids, biogas digesters, biofuels engines, solar- and wind powered water pumps, and solar water heaters are providing basic necessities of modern life, including lighting, cooking, communications, motive power, irrigation, and water. Anaerobic digestion plays a key role in providing sanitation, heating and off-grid electricity to rural China [4].

Greatly increased investments from both public and private sectors

Greatly increased investment from both public-sector and development banks is also driving renewable development [3]. Development banks based in Europe, Asia, and South America are involved, notably the European Investment Bank and the Brazilian Development Bank. A number of development banks have increased development assistance flows, which jumped to over US\$5 billion in 2009, compared with \$2 billion in 2008. The largest providers are the World Bank Group, Germany's KfW, the Inter-American Development Bank, and the Asian Development Bank. Dozens of other development agencies are providing growing amounts of loans, grants, and technical assistance for renewables.

A summary of selected indicators and top five countries are given in Table 1.

In 2009, the world invested a record US\$ 150 billion in renewable energies, US\$20 billion increase on 2008. This is not surprising, as all the evidence is that renewables are cheaper ([14] Renewable Energies Cost Less, SiS 49) as well as cleaner than conventional sources. Nevertheless, the total investment is but a very modest 0.26 percent of the global GDP of US\$58 trillion [15]. Just think what doubling the investment to US\$300 billion a year could do to bring us towards the goal of '100% renewables'; there is no longer any doubt that we can do it, and well before 2050!

Table 1 Selected indicators of renewable energy status and top five countries [3]

<http://www.i-sis.org.uk/graphics/worldRenewableEnergyCapacity.gif>

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