

GLOBAL STATUS REPORT 2012

Key Findings

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**Webinar focussing on
Asia - Pacific**



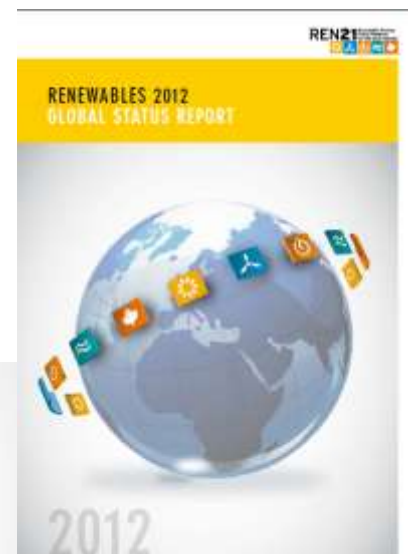
- **Multi-stakeholder Policy Network grouping:**
 - **National governments:** Brazil, Germany, Denmark, UK, Spain, Norway, India, UAE, US, Uganda, Morocco, etc.
 - **International organisations:** EC, IEA, IRENA, UNEP, UNIDO, UNDP, ADB, GEF, etc.
 - **Industry associations:** RENAlliance (WWEA, WBA, IGA, ISES, IHA), ARE, GWEC, EREC, etc.
 - **Science & Academia:** SANEDI, IIASA, TERI, etc.
 - **NGOs:** WWF, Greenpeace, ICLEI, CURES, WRI, etc.
- **Objective:** enable a **rapid global transition to renewable energy**
- **REN21 Secretariat** based at UNEP in Paris/France

REN21 Renewables Global Status Report

- Launched on **June 11, 2012** along with UNEP's Global trends in RE investment
- Team of over 400 Contributors, researchers & reviewers worldwide
 - Lead author (Janet Sawin) & Chapter authors
 - Regional Contributors , Technology contributors & Rural energy contributors
 - REN21 Secretariat research support team

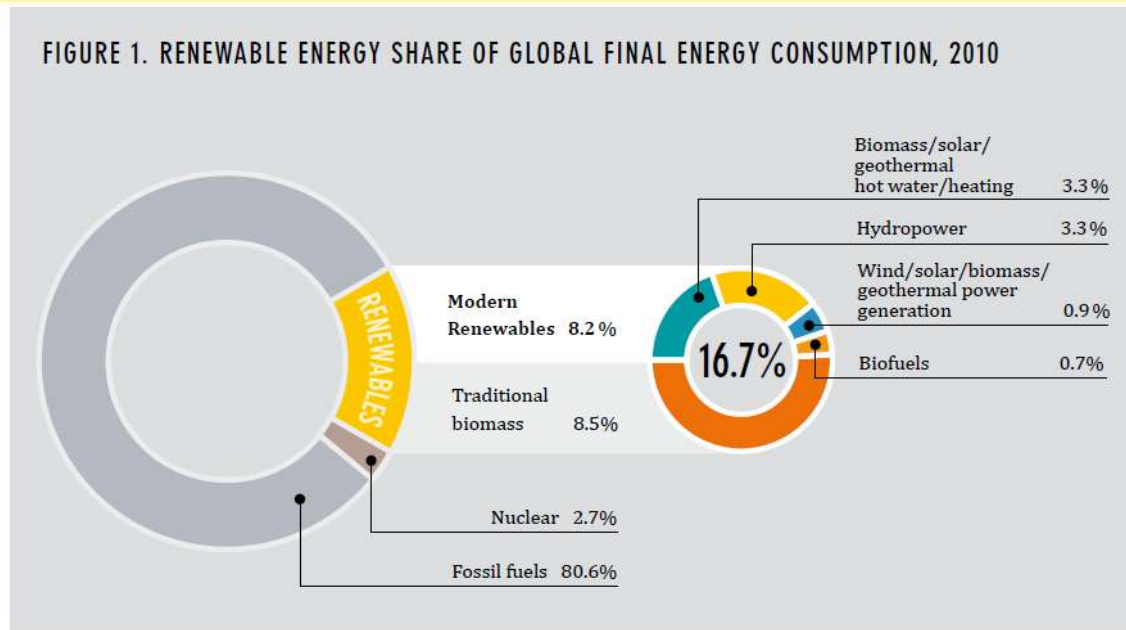
The report features:

- Global Market Overview, Investment Flows, Industry Trends, Policy Landscape, Rural Renewable Energy
- All renewable energy technologies
- Sectors: power, heating/cooling, transport
- New elements in 2012:
 - Rural renewable energy
 - Renewable energy & energy efficiency



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Renewable Energy in the World



- RE supplied an estimated **17% of global final energy consumption**
- **UN Secretary General's goal : doubling the share of renewable energy in the global energy mix by 2030**
- Renewable energy continued to grow strongly despite policy uncertainty in some countries, the geography of renewables is expanding as prices fall and policies spread

TOP 5 in 2012

ANNUAL ADDITIONS/PRODUCTION IN 2011

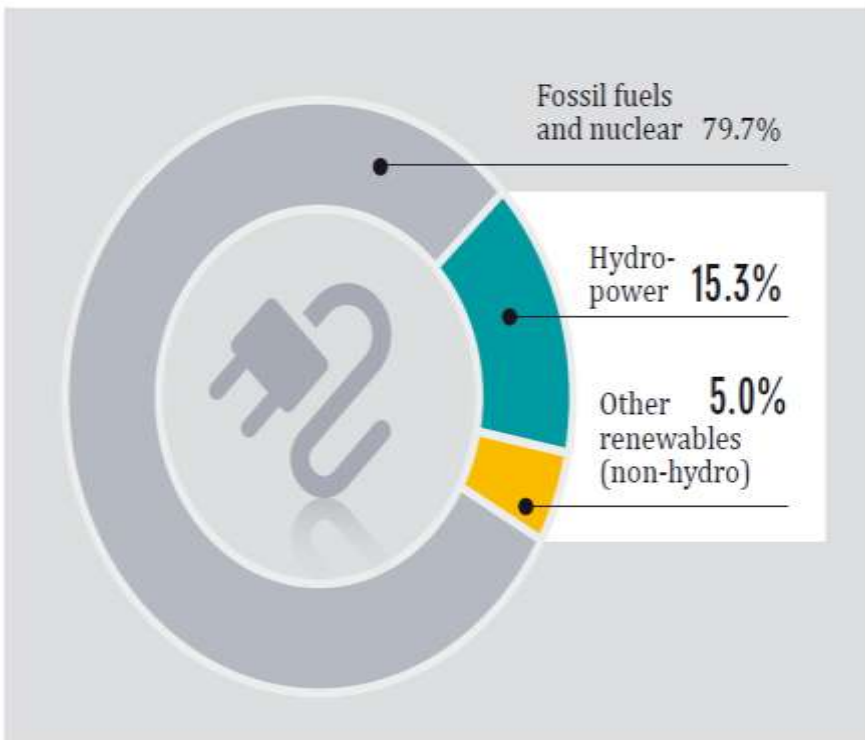
	New capacity investment	Hydropower capacity	Solar PV capacity	Wind power capacity	Solar hot water/heat capacity ¹	Biodiesel production	Ethanol production
1	China	China	Italy	China	China	United States	United States
2	United States	Vietnam	Germany	United States	Turkey	Germany	Brazil
3	Germany	Brazil	China	India	Germany	Argentina	China
4	Italy	India	United States	Germany	India	Brazil	Canada
5	India	Canada	France	U.K./ Canada	Italy	France	France

TOTAL CAPACITY AS OF END-2011

	Renewable power capacity (incl. hydro)	Renewable power capacity (not incl. hydro) ²	Renewable power capacity per capita (not incl. hydro) ²	Biomass power capacity	Geothermal power capacity	Hydropower capacity
1	China	China	Germany	United States	United States	China
2	United States	United States	Spain	Brazil	Philippines	Brazil
3	Brazil	Germany	Italy	Germany	Indonesia	United States
4	Canada	Spain	United States	China	Mexico	Canada
5	Germany	Italy	Japan	Sweden	Italy	Russia

	Solar PV capacity	Solar PV capacity per capita	Wind power capacity	Solar hot water/heat capacity ¹	Solar hot water/heat capacity per capita ¹	Geothermal heat installed capacity	Geothermal direct heat use ³
1	Germany	Germany	China	China	Cyprus	United States	China
2	Italy	Italy	United States	Turkey	Israel	China	United States
3	Japan	Czech Rep.	Germany	Germany	Austria	Sweden	Sweden
4	Spain	Belgium	Spain	Japan	Barbados	Germany	Turkey
5	United States	Spain	India	Brazil	Greece	Japan	Japan

Global Market Overview – Power Markets

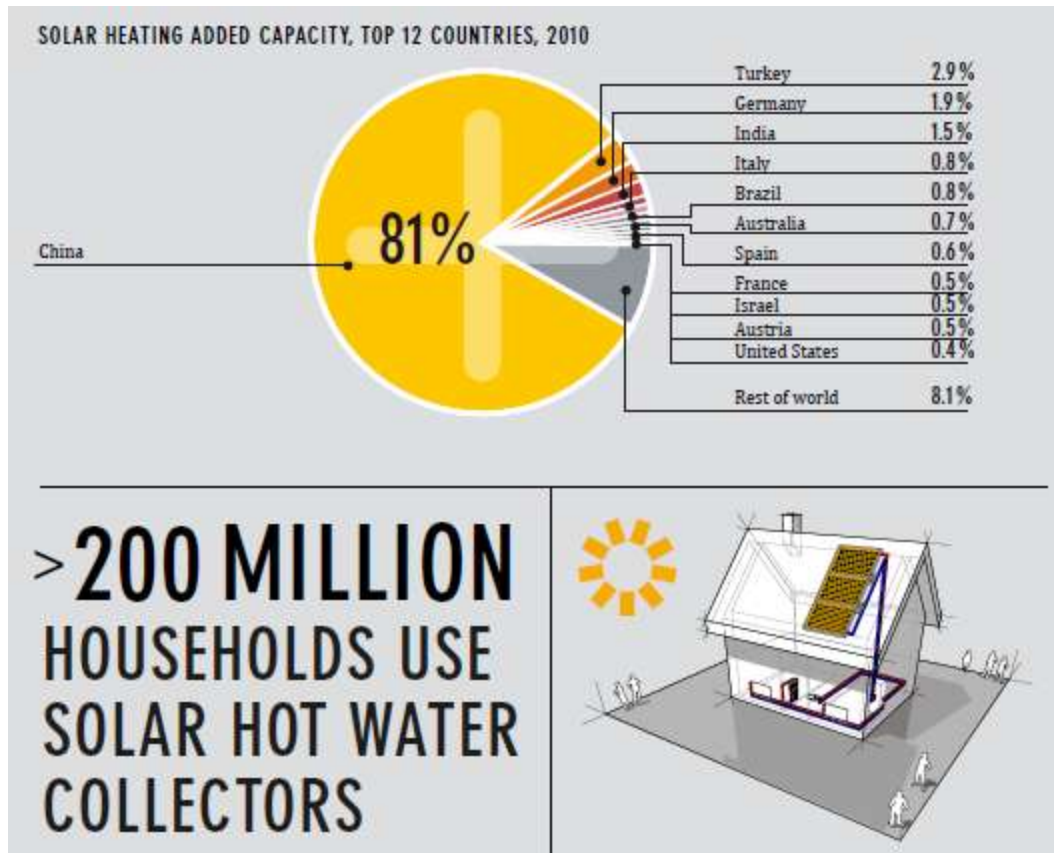


- Renewables accounted for nearly half of the estimated 208GW of new electric capacity installed in 2011
- Renewable electric power capacity worldwide reached **1,360 GW (+8%)** in 2011
- Renewable energy comprised more than **25% of global power generation capacity**
- **20.3% of global electricity** was produced from renewable energy

Figure 3. Renewable Energy Share

Global Market Overview – Heating & Cooling

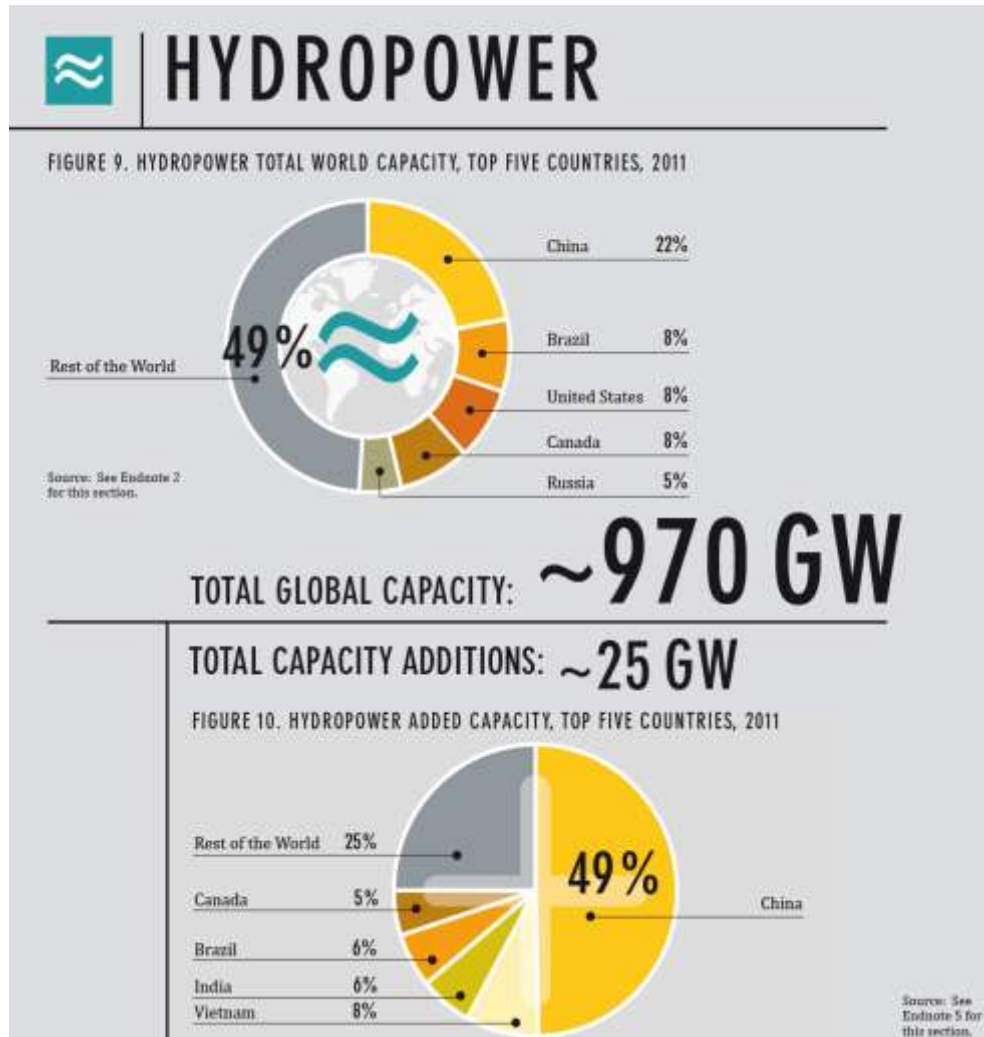
- Transition towards the use of larger systems, increasing use of CHP and district schemes.
- Growing trend to use solar resources to generate process heat for industry.
- Solar hot water used in over 200 million households and commercial buildings.



Global Market Overview – Transport

- RE used in form of electricity, hydrogen, biogas, liquid biofuels. Liquid biofuels provided 3% of global road transport fuel in 2011.
- Electric transport is being tied directly with renewable energy through policy directives in many countries.

Hydropower



- 25GW of new hydropower was added in 2011, increasing capacity by nearly 3%, bringing installed capacity to 970GW
- Globally hydropower generated 3,400TWh of electricity in 2011. China alone produced 663TWh followed by Brazil (450TWh)
- Small, but growing, market is emerging for low capacity hydropower in Asia, Sub Saharan Africa and Latin America

Solar Power

FIGURE 11. SOLAR PV TOTAL WORLD CAPACITY, 1995–2011

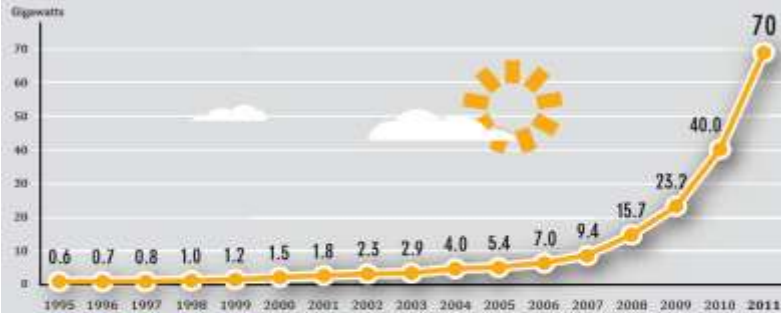
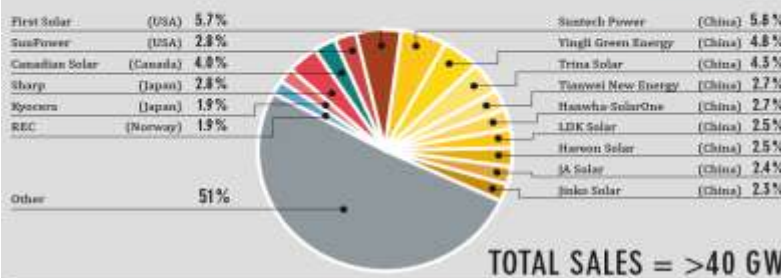


FIGURE 12. SOLAR PV OPERATING CAPACITY, TOP 10 COUNTRIES, 2011

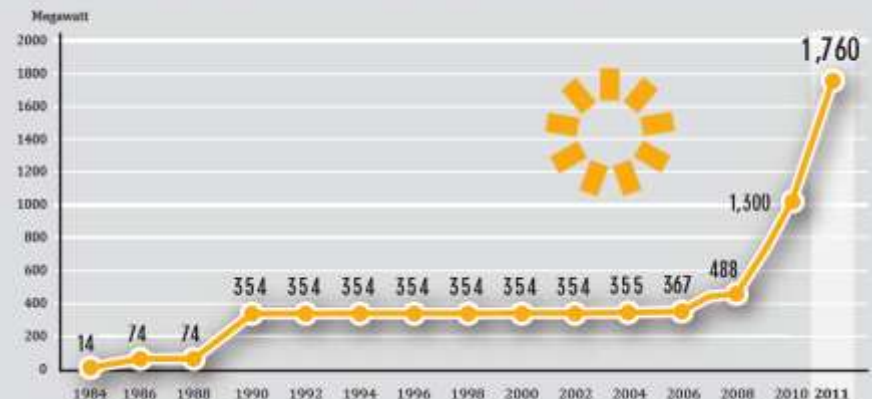


FIGURE 13. MARKET SHARES OF TOP 15 SOLAR PV MODULE MANUFACTURERS, 2011



- 30GW of new solar PV capacity came into being in 2011
- Solar PV capacity in operation in 2011 is about ten times the global total in 2006
- Size of global PV industry exceeds USD 100 billion per year.
- 460 MW of CSP installed in 2011 bringing the total installed capacity to 1.760 MW

FIGURE 14. CONCENTRATING SOLAR THERMAL POWER, TOTAL WORLD CAPACITY, 1984–2011



Wind Power



WIND POWER

FIGURE 17. WIND POWER TOTAL WORLD CAPACITY, 1996-2011

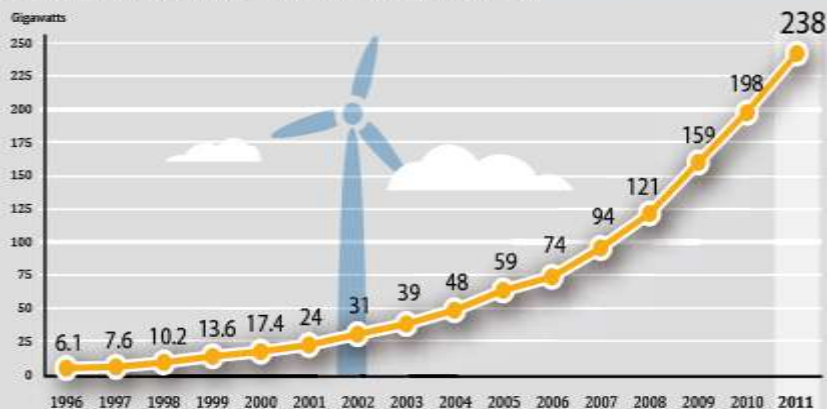
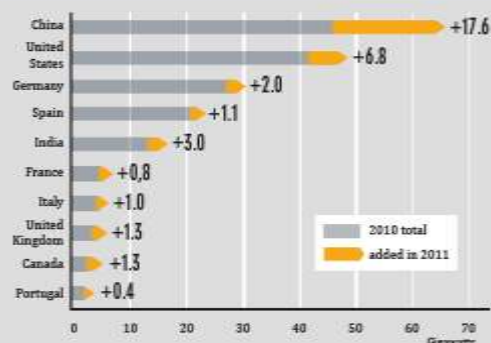
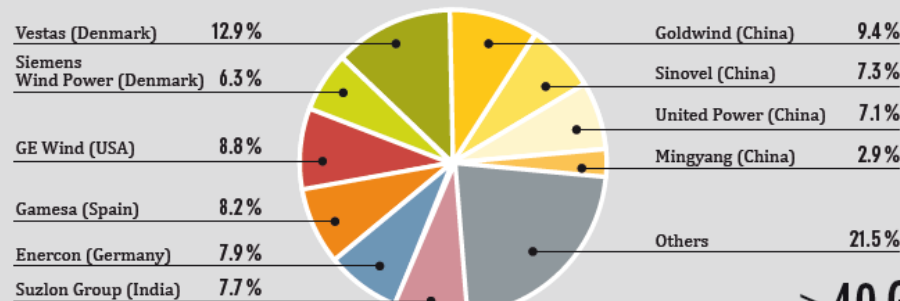


FIGURE 18. WIND POWER CAPACITY, TOP 10 COUNTRIES, 2011



- In 2011, 40GW of wind power capacity was installed, increasing the total to 238GW.
- Annual growth rate of cumulative wind power capacity between 2006-2010 averaged at 26%

FIGURE 19. MARKET SHARES OF TOP 10 WIND TURBINE MANUFACTURERS, 2011



TOTAL SALES: > 40 GW

Biomass Energy

BIOMASS ENERGY

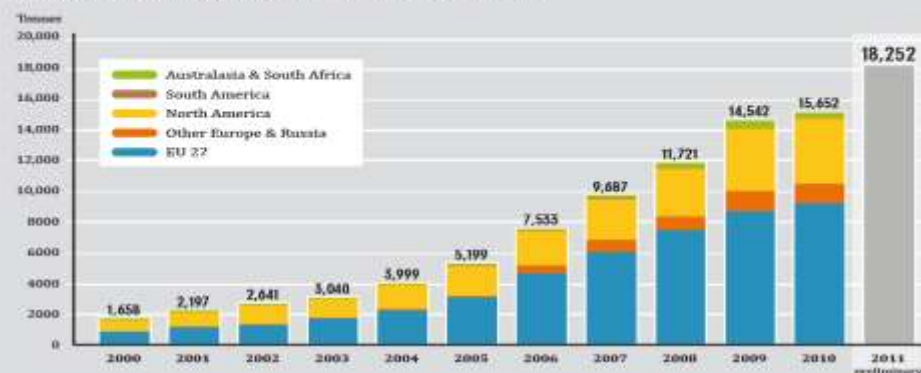
FIGURE 7. ETHANOL AND BIODIESEL PRODUCTION, 2000–2011



BIOMASS MEETS AN ESTIMATED 53 EJ OF GLOBAL ENERGY DEMAND;

~35% IS FOR MODERN ENERGY USES.

FIGURE 8. GLOBAL WOOD PELLET PRODUCTION, 2000–2011



- Biomass energy accounted for over 10% of global primary energy supply in 2011
- The present global demand for biomass is 53EJ, mainly used for heating, cooking and industrial applications
- Liquid biofuels production grew rapidly at 17% for ethanol and 27% for biodiesel
- Europe is the largest market for pellets, biodiesel and biogas.

Geothermal Energy



- 205 TWh (738PJ) of district heat and electricity was provided by geothermal resources in 2011
- Heat output from geothermal sources grew at 100%p.a. from 2005-2010; reaching 489PJ in 2011
- China led in direct geothermal energy use in 2010, followed by the United States, Sweden, Turkey, Japan and Iceland.
- Geothermal power became more attractive due to flexibility offered by new technologies such as flash plants combined with binary bottoming cycles for increased efficiency.

Industry Trends

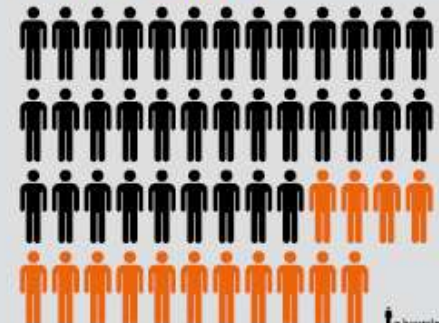
- RE industry saw **continued growth** in manufacturing, sales and installation
- Cost reductions** (especially in PV and onshore wind) contributed to growth
- Changing policy landscape in many countries → industry uncertainties, declining policy support, international financial crisis and barriers to trade
- Worldwide jobs** in renewable energy industries exceeded **5 million** in 2011; clustered primarily in bioenergy and solar industries.

TABLE 1. ESTIMATED JOBS IN RENEWABLE ENERGY WORLDWIDE, BY INDUSTRY

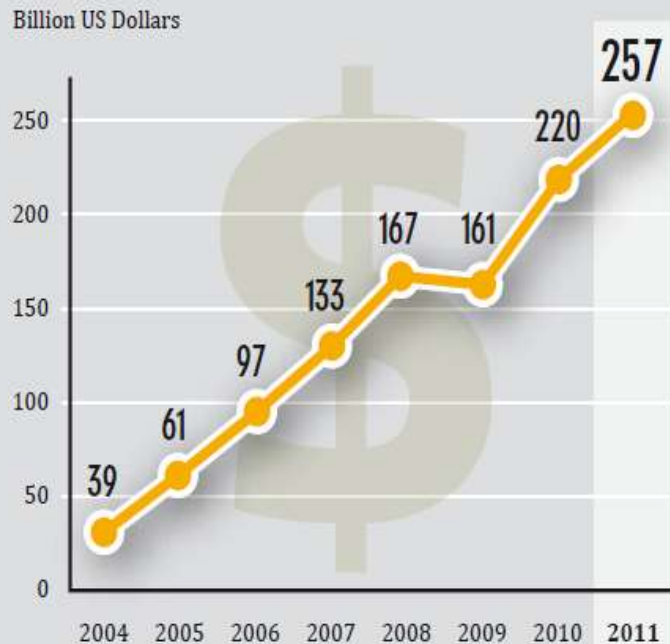
TECHNOLOGIES	Global	China	India	Brazil	USA	EU ²	Germany	Spain	Others
	Thousand jobs								
Biomass ¹	750	266	58		152	273	51	14	2 ⁸
Biofuels	1,500			889 ⁹	47-160	151	23	2	194 ⁸
Biogas	230	90	85			53	51	1.4	
Geothermal ¹	90				10	53	14	0.6	
Hydropower (Small ¹)	40		12		8	16	7	1.6	1 ⁸
Solar PV	820 ⁺	300 ⁺	112		82	268	111	28	60 ¹⁰
CSP	40				9		2	24	
Solar Heating/ Cooling	900	800	41		9	50	12	10	1 ⁸
Wind Power	670 ⁺	150	42	14	75	253	101	55	33 ¹¹
Total²	5,000	1,606	350	889	392-505	1,117	372	137	291



2011 + 2012



Investment Flows



Source: UNEP/Bloomberg: Global Trends in Renewable Energy Investment 2011

- **Total global investment** in RE jumped in 2011 to a **record of \$257 billion**, up **17%** from 2010 (15 % for Asia Oceania region).
- This is **6 times** the level of investment in 2004 and **94% more** than the total investment in RE in 2007.
- Total investment exceeds
 - \$267 billion including estimated \$10 billion (unreported) invested in solar hot water
 - ~\$282 billion including the \$25 billion invested in large hydropower (>50 MW)
- Despite the rise in investment, the rate of growth of investment was below the 37% rise in investment from 2009 to 2010.

Investment Flows

- The top 5 countries for total investment in 2011 were China, USA, Germany, Italy and India.
- Investment in RE in China went up by 17% in 2011
- Investment in RE in USA made a significant leap of 57% in 2011.
- Investment in Germany (excluding R&D) dipped 12% from the 2010 levels
- Investment in RE in India went up by 62% in 2011



Policy Landscape

FIGURE 23. COUNTRIES WITH POLICIES, EARLY 2012



- Targets in at least **118 countries** up from the 96 reported in previous year; **more than half are developing countries.**
- Some setbacks resulting from a lack of long-term policy certainty and stability in many countries
- GSR2012 portrays efforts in systematic linking of energy efficiency and renewable energy in the policy arena.

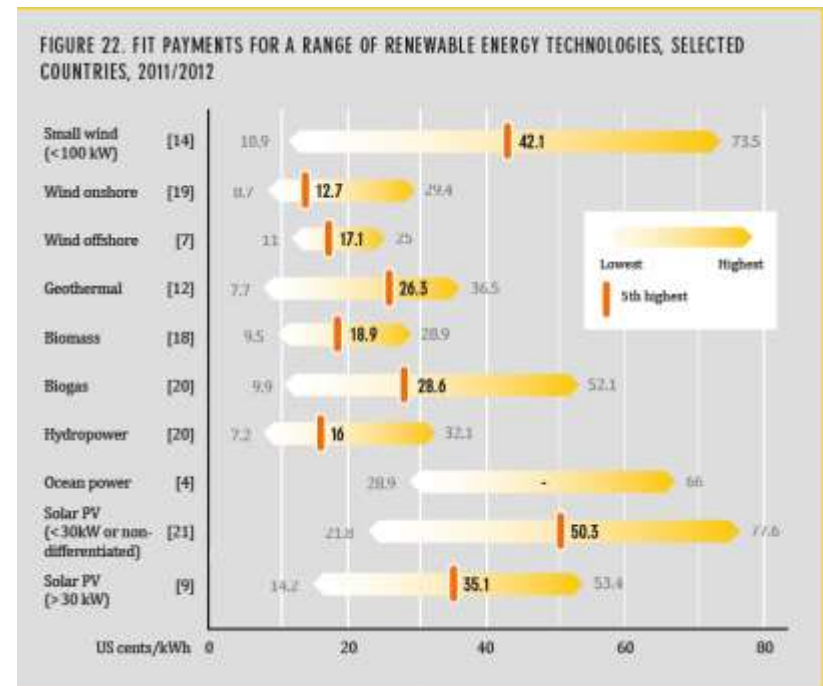
FIGURE 24. COUNTRIES WITH POLICIES, 2005



+9
NEW COUNTRIES
DEFINED RENEWABLE ENERGY
TARGETS IN 2011

Policy Landscape

- Renewable power generation policies remain the most common type of support policy; Feed-in-tariffs (FIT) and renewable portfolio standards (RPS) are the most commonly instruments. FIT policies were in place in at least 65 countries and 27 states worldwide by early 2012.
- Policies to promote renewable heating and cooling expanded.
- Almost two-thirds of the world's largest cities had adopted climate change action plans by the end of 2011, with more than half of them planning to increase their uptake of renewable energy.



Policy Targets for RE in Asia Pacific

Examples of successful policy measures:

- Targets: India targeted the addition of 130MW of off-grid capacity in 2011
- Heating and Cooling: South Korea required all public buildings larger than 3000m² to generate at least 10% of total heat demand through RE
- Transport: China is a significant part of the mandate calling for 220billion liters of biofuel by 2022
- Labelling: Japan introduced the Green heat Certification Programme in 2010 for solar thermal, adding biomass in 2011

TABLE 3. RENEWABLE ENERGY SUPPORT POLICIES

	REGULATORY POLICIES							FISCAL INCENTIVES				PUBLIC FINANCING			
	Feed-in tariff/ premium payment	Excess capacity fee/ obligation/ RPS	Net metering	Biofuels obligation/ mandate	Renewable obligation/ mandate	Tradeable REC	Capital subsidy/ grants/ or rebate	Investment or production tax credits	Reductions in sales, energy, CO ₂ , WEC or other taxes	Energy production payment	Public investment, grants, or loans	Public competitive bidding			
LOWER-MIDDLE INCOME COUNTRIES													\$\$		
Armenia	●												●	●	
Cap Verde	●												●	●	
Egypt							●							●	●
El Salvador								●	●	●			●	●	
China	●				●	●							●	●	
Guatemala			●		●				●	●				●	●
Honduras	●							●	●	●				●	●
India		●			●	○	●						●	●	
Indonesia	●	●			●		●	●	●	●				●	●
Marshall Islands										●					
Moldova	●									●				●	●
Mongolia	●														●
Morocco														●	●
Nicaragua	●								●						
Pakistan	●		●					○						●	●
Palestinian Territories*	●									●					
Paraguay					●				●	●					
Philippines	●	●	●		●		●	●	●	●			●	●	
Senegal										●					
Sri Lanka	●	●	●		●		●			●				●	●
Syria			●												●
Ukraine	●								●	●					
Vietnam							●	●	●						
LOW INCOME COUNTRIES													\$		
Bangladesh							●		●				●	●	
Ethiopia					●									●	●
Gambia										●					
Haiti														●	●
Kenya	●									●					
Kyrgyzstan		●					●			●					
Malawi					●										
Mali										●					
Mozambique					●					●					
Nepal							●	●	●	●			●	●	
Rwanda									●	●			●	●	
Tanzania	●						●		●	●					
Uganda	●								●	●				●	●
Zambia					●		●		●						

Energy Access

- UN Secretary General's goal: Global action to achieve universal access to modern energy services by 2030
- In order to achieve universal access for all, the current global investments on energy access of annual 9 billion USD need to be increased to 48 billion USD annually
- 2.6 billion people still employed traditional cookstoves and open fires for heating and cooking in 2011
- Large numbers of actors and programmes, with limited coordination, makes impact assessment and data collection in the region a big challenge
- Lower prices of renewable energy technology is allowing manufacturers to diversify into emerging markets
- Financial models in rural energy include:
 - Small retail markets
 - Public-Private micro financing initiatives
 - National/multi stakeholder programmes

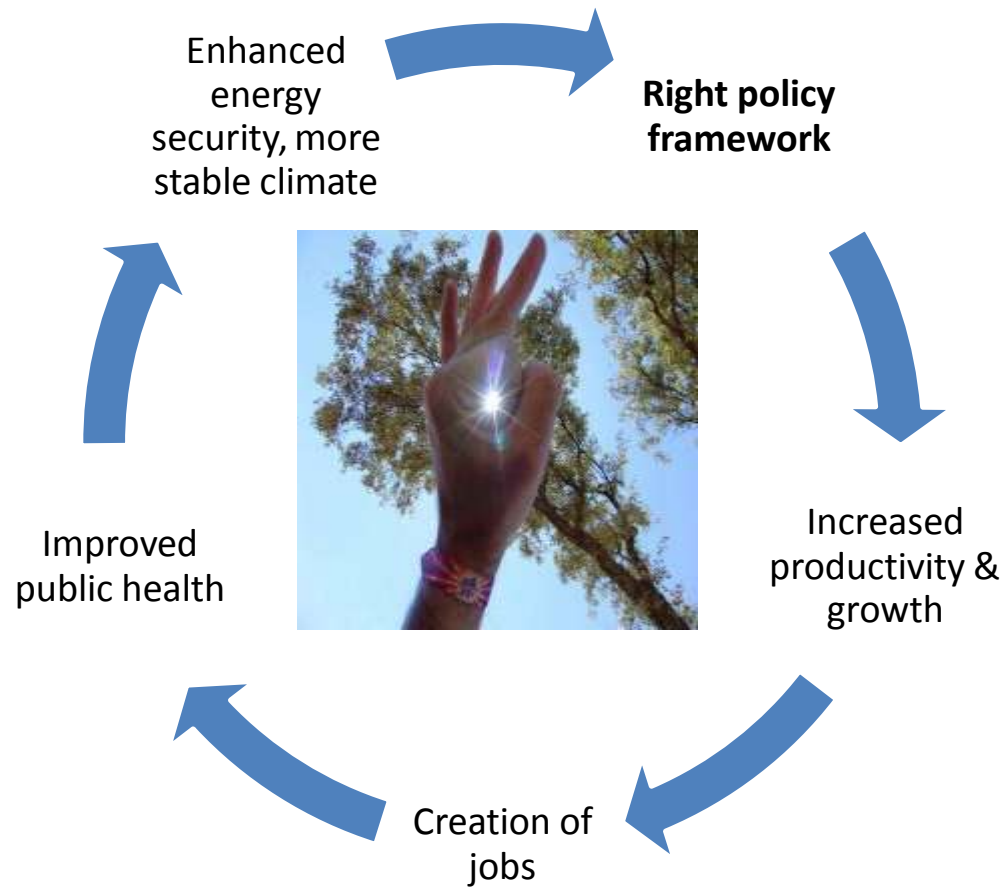
Rural Renewable Energy in Asia Pacific

Electricity Access by Region

COUNTRY	ELECTRIFICATION RATE (RURAL, URBAN AND/OR NATIONAL)
All Developing Countries	75.0%
Africa	42.0%
North Africa	99.0%
Sub-Saharan Africa	30.0%
Developing Asia ^a	81.0%
China and East Asia	91.0%
South Asia	68.0%
Latin America	93.0%
Middle East	90.0%

- Countries such as Bangladesh, Afghanistan, Myanmar, and Pakistan continue to experience very low rates of rural electrification and to rely largely on traditional biomass
- Philippines expanded its existing Rural Electrification Programme in 2011 with the goal of achieving 90% household electrification by 2017
- In Iran the Power Ministry, has electrified more than 233 households with decentralised PV systems.

Enabling Framework



REN21 facilitates global dialogue on RE transition



15-17 January 2013

incl. Launch of

REN21 Global Futures Report

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