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A Brief Report

on

German Renewable Energy Sector

&

*Prospects for Cooperation in the Indo-German
Renewable Energy Sector*

(Note: The information and data contained in this report have been checked and verified from published sources. In case any error or discrepancy is noted, it may be brought to the attention of CGI, Munich. The information contained in the report is purely for the purpose of reference.)



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Foreword



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It is my pleasure to present to you a brief report on "German Renewable Energy Sector & Prospects for Cooperation in the Indo-German Renewable Energy Sector" by Consulate General of India, Munich.

Though India is among the world's leading producer of energy, contribution of Renewable energy sector is negligible particularly when we compare it with the estimated potential of India from renewable energy sources like wind, small hydro, bio-energy and solar power. At present, India's 60% power generation capacity is based on coal and is further dependent on imports to meet around 28% of its total energy needs. While emerging as a reliable, qualitative and consistent source of energy, renewable energy sector remains vital for our energy security and our commitment towards reducing emission intensity by 2020. No surprise, renewable energy sector has been identified as one of the core activities in 'Make in India' initiative of our Prime Minister Modi. Renewable energy being a clean and sustainable source of energy is even more relevant in the context of our pursuits of 'Smart Cities' and 'Clean India'. Our Prime Minister has amply justified the future of renewable as "moving from megawatt to gigawatt".

Over the last few years, renewable energy sector has shown perceptible changes that can partly be attributed to policy initiatives, coordinated R&D activities and partly to our strengthening belief in the capacity of the sector and related technological advancement. In Indian context, companies investing in these technologies are eligible for incentives, tax holidays apart from financial returns for the power fed into the grid. The Govt. of India is also encouraging foreign investors to set up renewal power projects by allowing Foreign Direct Investment (FDI) of upto 100 % under the automatic route. Apart from Central

Govt. initiatives, many State Govts. have taken lead in establishing solar parks and other facilities for capacity building in solar sector.

However, apart from policy initiatives, sector calls for a public-private partnership in a big way. The fact that India needs an investment to the tune of around US\$ 110 billion in Solar sector alone very well brought forth the challenges that we are faced with in our endeavour to achieve target of 100 GW in Solar Energy sector and 75 GW in Wind Energy sector by 2022. Despite obvious challenges and bottlenecks, India is emerging as the favoured investment destination as evident by the fact that the recently concluded 'RE-INVEST 2015' hosted by the Ministry of New and Renewable Energy, Govt. of India, succeeded in mobilizing "*Green Energy Commitment*" of 273 GW by investors and stakeholders and assured financing for 78 GW of Renewable Energy projects over the next five year.

India is a large and growing market that offer huge opportunities for Germany, an acknowledged technology holder in the field. I believe any cooperation between Indian and German companies- be it is in the field of technological exchanges, R&D, JVs and experience sharing would be a win-win situation for both the parties. I am hopeful that this report will serve as a good reference material to the leading RE stakeholders and would support Indo-German bilateral cooperation in Renewable Energy Sector.



1. Introduction

The German economy is in solid shape. After two very weak years (2012, GDP Growth 0.4% and 2013, GDP growth 0.1%), German economy grew by 1.6% in the year 2014. Employment is at a record level and the good development in the labour market is creating scope for wage rises in real terms. This positive development is expected to continue in 2015. German Government is forecasting an economic growth of 1.5% in 2015. A new employment record was marked for the eighth time in succession with a total of 42.7 million people in work in the year 2014. The German unemployment rate in the month May 2015 was 6.3%. This year, employment is expected to rise further by 170,000 jobs to an annual figure of 42.8 million people at work. For the first time since the year 1969, the Federal budget did not take any new debt in 2014.

Exports of many key technologies, especially environmental technologies in the field of energy efficiency, modern and high-efficiency power plants and renewable energy are playing significant role for the better performance of the German economy.

German companies in renewable energy sector are highly skilled and innovative, they offer advanced solutions and technologies. German companies are global market leaders in the various renewable sectors. Germany is also one of the world's leading markets for renewable energy. **26.2% of Germany's gross electricity production in 2014 was from renewable energy sources. Notably, it is the number one country in the world in the field of photovoltaic (PV) and the largest in Europe in wind energy.** Investments in new renewable energy installations in Germany in 2014 amounted to 18.8 billion Euros. Turnover from operating renewable energy plants amounted to 14.1 billion Euros in 2014.

Reliable political framework and economically profitable conditions in Germany provide optimum environment to boost the potential of renewable energy. Germany has a very good system with legally fixed feed-in-tariffs, paid for 20 years, for every kilowatt hour which is fed into the grid. Priority of access and transmission also contributed to the extraordinary success story of renewable electricity in Germany. **As the share of renewable energy sources is growing, the energy-related emissions are also being reduced and it is making significant contributions towards achieving the climate protection targets in Germany.**

2. Government Approach

The expansion of renewable energy is one of the main pillars of 'Germany's Energy Transition' policy which is implemented by the Federal Government. Germany's energy supply is becoming "greener" from year to year and it is becoming more climate-friendly making Germany less dependent

on the world's diminishing reserves of fossil fuels. Germany target to produce 40 to 45 per cent of its electricity from renewable energy sources by the year 2025, 55 to 60 per cent by the year 2035 and by the year 2050 around 80 per cent of Germany's electricity is set to be generated from renewable sources. As of today, almost one out of every four kilowatt hours of electricity generated in Germany comes from wind, solar, biomass or other regenerative sources of energy. Germany's energy transition is a task spanning entire generations. The energy transition means, taking the last nuclear power plant in Germany off-stream in 2022; switching to the use of a greater share of renewable energy - which is to account for 80 per cent of the electricity supply by 2050; becoming less dependent on oil and gas imports; reducing emissions of greenhouse gases, which are harmful to the environment - by 80 to 95 per cent by 2050, etc.

Playing to the sentiments of the people, German Government announced in April 2011 that Germany will swiftly transit from nuclear to renewables. The emerging national consensus for a plan to quickly shutdown Germany's 17 nuclear power plants came in the wake of the Fukushima nuclear crisis in disaster-struck Japan.

With its Energy Concept the German Government has formulated guidelines for an environmentally sound, reliable and affordable energy supply and mapped a road for the future of renewable energy. On the path to achieving this, conventional energy sources will gradually be replaced by renewables in a dynamic energy mix.

3. Renewable Energy Sources Act (Erneuerbare-Energien-Gesetz, EEG)

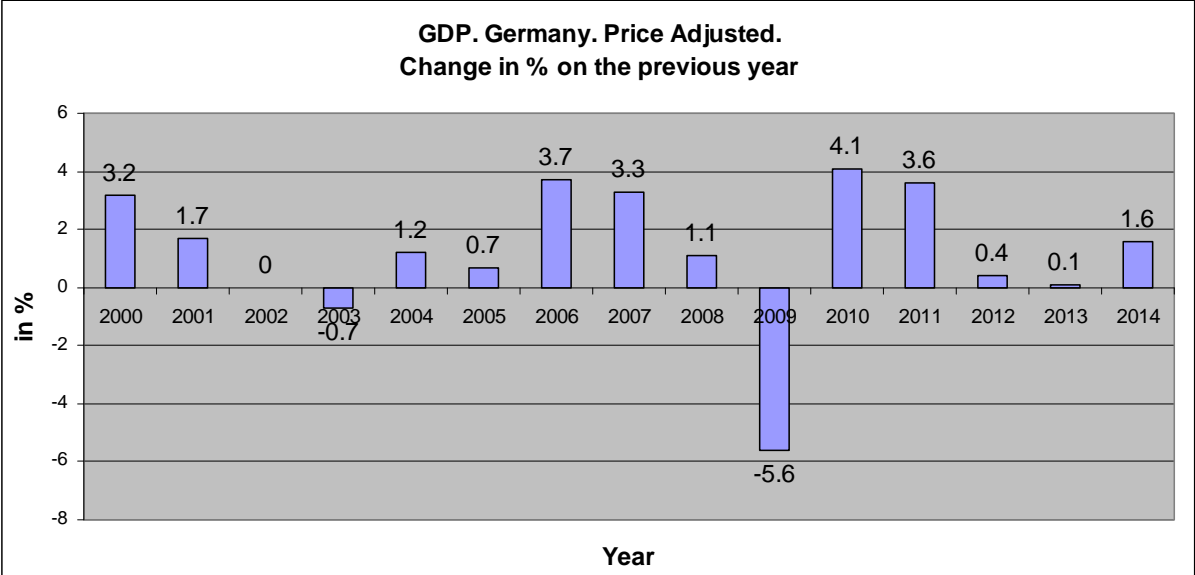
One of the reasons for Germany's success in becoming a leading renewable market in the world is the creation of landmark framework conditions like the Renewable Energy Sources Act (Erneuerbare-Energien-Gesetz, EEG) which came into effect on 1 April 2000. EEG obliges operators of power grids to give priority to purchase electricity from renewable sources and to pay fixed prices for this. The Renewable Energy Sources Act built a platform for the promotion of renewables, enabling them to emerge from a niche to become one of the major contributor of Germany's power supply, generating more than 25% of German electricity.

However, the rapid expansion is also resulting in increase in the surcharge imposed under the Renewable Energy Sources Act ("EEG surcharge"). Further, it posed a growing challenge for the stability of the electricity grids and the security of German energy supply. **The amendment of the Renewable Energy Sources Act which came to force in August 2014 was therefore an important step towards ensuring the continued success of Germany's energy transition.** The revision particularly aims to substantially slow any further rise in costs, to systematically steer the expansion of renewable energy, and to bring more and more renewable energy to the market. It is obvious that for energy-intensive industries, the

price of electricity is a major factor in their level of competitiveness. It is vital that the competitiveness of electricity-intensive industries - which already pay high electricity rates in comparison to their international competitors - is not jeopardised and that value creation and jobs are retained in Germany. The reform of the Renewable Energy Sources Act came to effect in 2014 has made the funding of renewable energy sources viable for the future, setting out a demanding expansion corridor and moving to ensure that electricity-intensive manufacturing in Germany remains competitive.

4. German Economy - Salient Features

With a population of 81.1 million and a GDP of € 2903 billion (2014), Germany is the largest economy within EU and the fourth largest globally. The German economy turned out to be stable in a difficult global economic environment. The German price adjusted GDP increased by 1.6% in the year 2014 compared with the previous year, reported the Federal Statistical Office (Destatis).



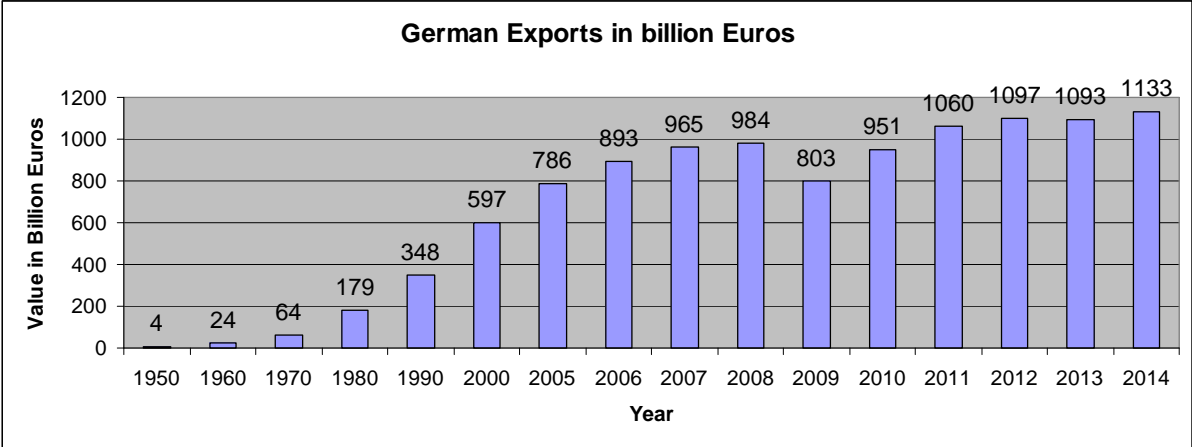
(Source: German Statistical Office)

5. German Economic Outlook

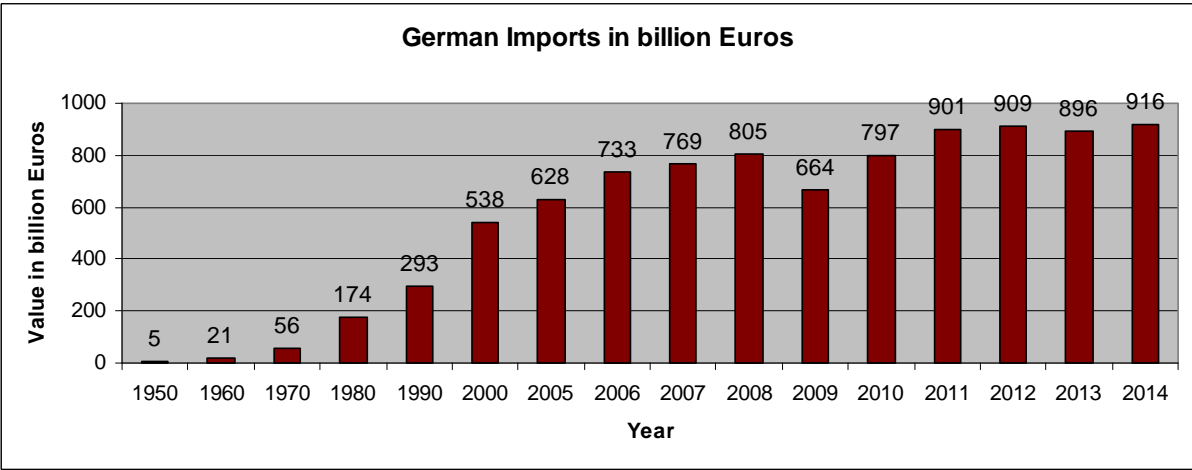
Despite the geopolitical turbulence, the German economy returned to growth last year. Stimulated primarily by a solid rise in consumer spending, German GDP is set to grow by 1.5% in 2015, according to German Government’s 2015 Annual Economic Report. German exports in 2015 are expected to grow by 3.6%. The Federal Government expects that the minimum wage (€8.50 per hour), and the increase in and broadening of pension payments, will boost consumer demand. The German economy is expected to be boosted by rising exports.

6. Foreign Trade

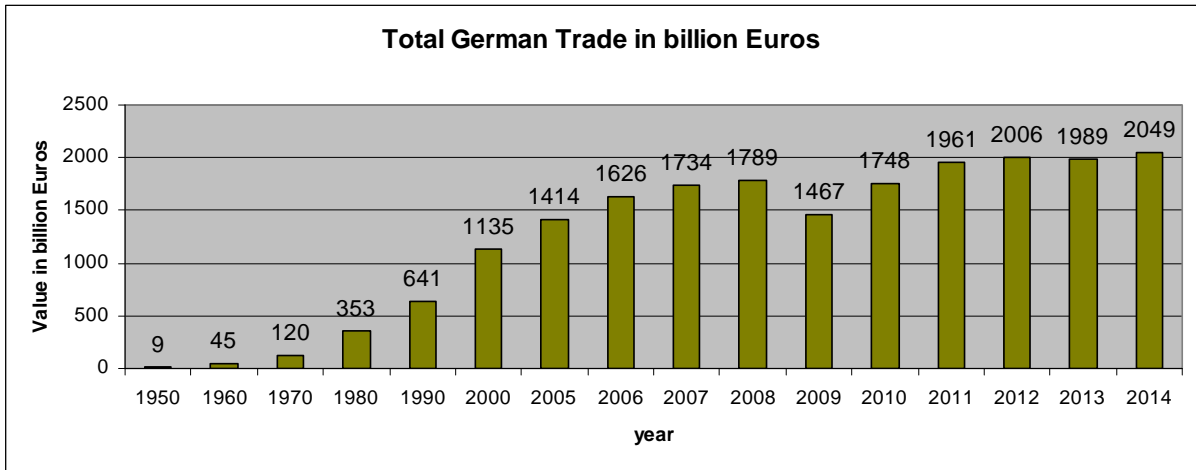
Germany is the third largest exporter in the world. In the year 2014, Germany exported goods worth to a record sum of €1133 billion and imported goods worth to a record amount of €916 billion. Compared to 2013, Germany's exports increased by 3.7% and its imports by 2.1%. The balance of foreign trade in 2014 amounted to a surplus of €217 billion, which was also the highest value ever recorded.



(Source: German Statistical Office)



(Source: German Statistical Office)

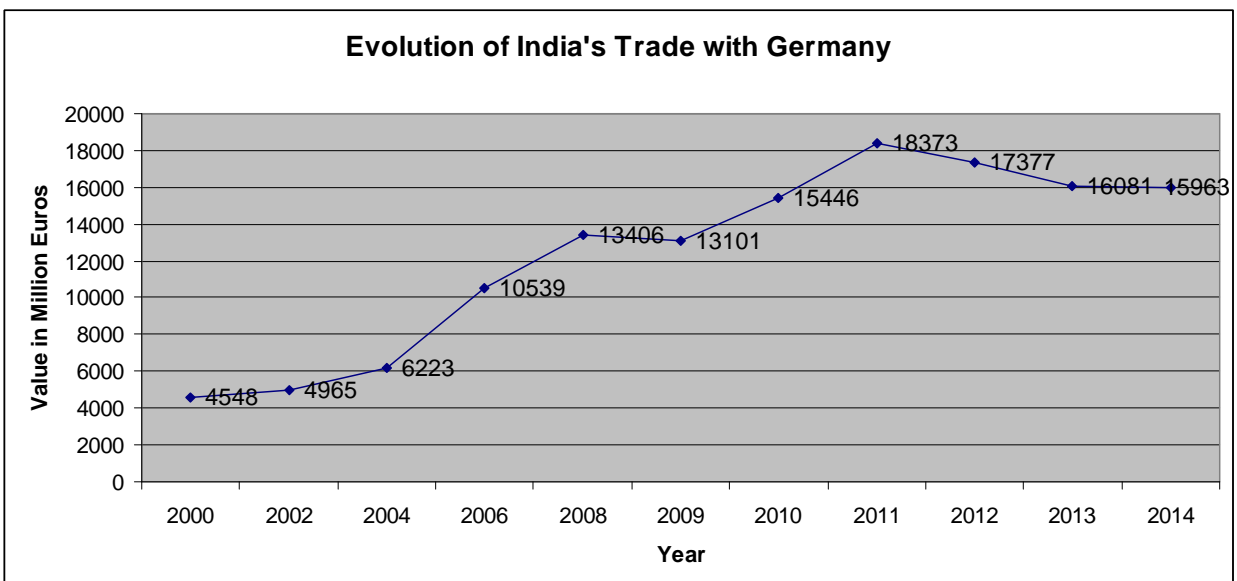


(Source: German Statistical Office)

7. Indo-German Trade

The year 2005 marked the 500th anniversary of trading contacts between India and Germany. Germany is India's largest trading partner within the European Union. Indo-German trade in 2014 amounted to €15.9 billion, a slight decline of 0.73% compared to previous year.

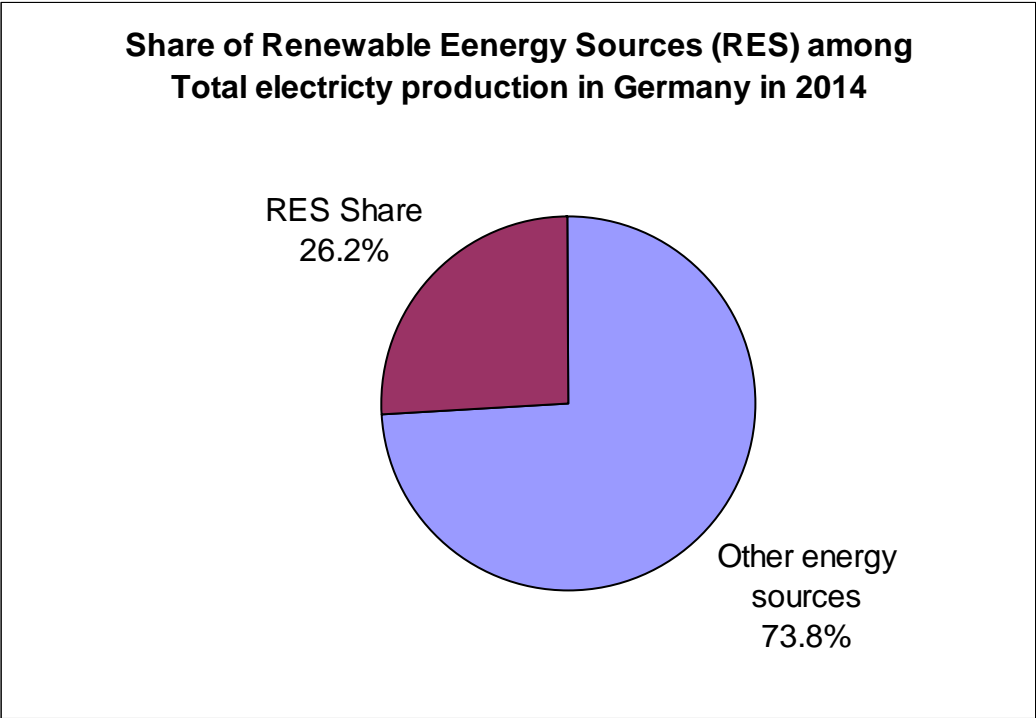
Indo-German Trade								
	2011 Million €	% Change	2012 Million €	% Change	2013 Million €	% Change	2014 Million €	% Change
Indian Exports to Germany	7502	21.14	6994	-6.77	6982	-1.46	7039	2.13
Indian Imports form Germany	10871	17.49	10383	-4.49	9189	-11.5	8924	-2.88
Total Trade	18373	18.95	17377	-5.42	16081	-7.46	15963	-0.73



(Source: German Statistical Office)

8. Overview of German Renewable Energy Sources (RES)

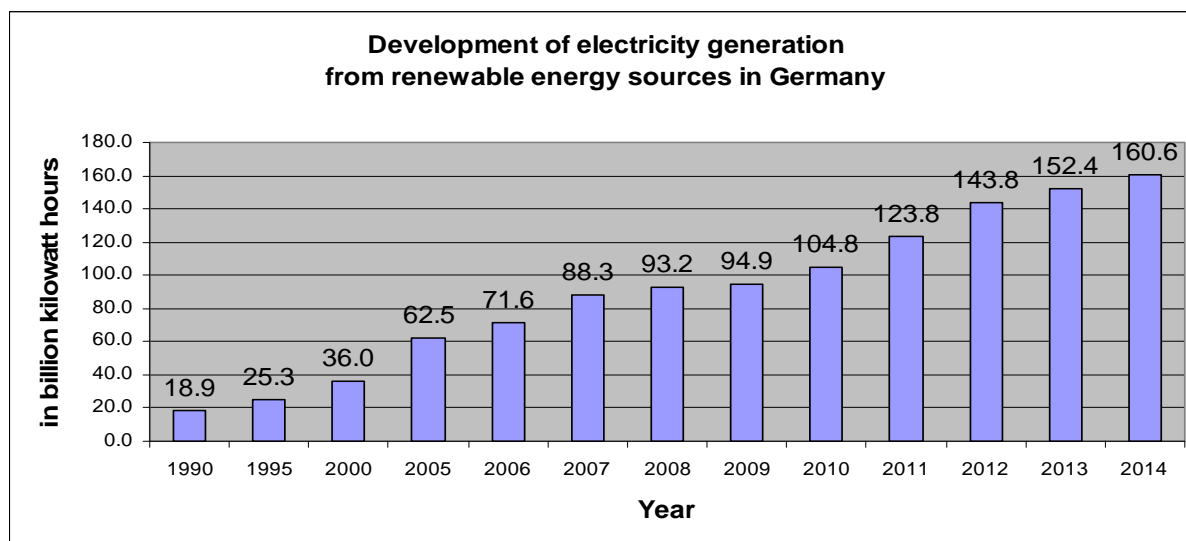
The gross electricity production in Germany in 2014 amounted to 614 billion kilowatt-hours (kWh). The share of Renewable energy sources among Gross electricity production in Germany in the year 2014 was 26.2%. The volume of power generated by the sun, wind, hydropower and biomass reached a new record, at over 160.6 billion kilowatt-hours (kWh). Renewable energies are of threefold importance to Germany; They offer climate protection, are a stimuli for economic growth and reduce energy import bills. Due to increasing focus on renewables, Germany's import bills are reducing. The use of renewables helped Germany to avoid fossil fuel imports worth of €8.2 billion in the year 2013. The use of renewables in Germany reduced greenhouse gas emissions by around 148 million tonnes in 2014. The German economy profits from the rise of renewable energy sector. Investments in new installations of renewable energy plants increased to €18.8 billion in 2014. The turnover from operating renewable energy plants amounted to €14.1 billion in 2014. The renewable energy share of gross electricity consumption in Germany in the year 1990 was just 3.4%, in 2000, 6.2% in 2010 17% and in the year 2014 it reached to 27.8%.



(Source: BEE)

The renewable energy sector in Germany currently employs more than 371000 people. The wind energy and biomass sectors contribute the largest shares with some 138000 and 126000 jobs respectively. Renewable energies have been a reliable export engine not only for the German manufacturing industry, but also for sectors such as services. Export turnover in the areas of component production and energy plant production in the renewable energy

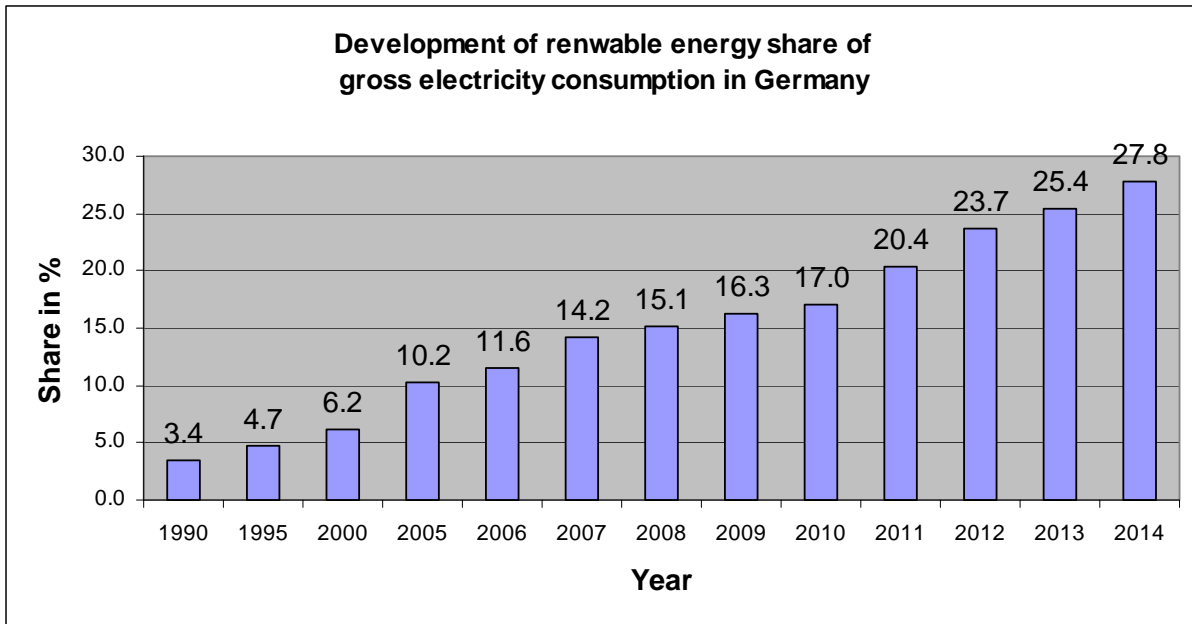
sector in the year 2013 amounted to €10 billion. The German wind sector had an export ratio of 67%, solar sector an export ratio of 65% and biodiesel had an export ratio of 50% in the year 2014.



(Source: AGEE-Stat/BMU)

Gross electricity production in Germany from 2012 to 2014						
	2012		2013		2014	
	Billion KWh	%	Billion KWh	%	Billion KWh	%
Gross Electricity Production	630.1	100	633.2	100	614	100
Lignite	160.7	25.5	160.9	25.4	155.8	25.4
Nuclear Energy	99.5	15.8	97.3	15.4	97.1	15.8
Hard Coal	116.4	18.5	121.7	19.2	109	17.8
Natural Gas	76.4	12.1	67.5	10.7	58.3	9.5
Mineral oil Products	7.6	1.2	7.2	1.1	6	1
Renewable Energy Sources	143.8	22.8	152.4	24.1	160.6	26.2
Wind Power	50.7	8	51.7	8.1	56	9.1
Water Power	22.1	3.5	23	3.6	20.5	3.3
Biomass Energy	39.7	6.3	41.2	6.5	43	7
Photovoltaic Energy	26.4	4.2	31	4.9	34.9	5.7
Household Waste	5	0.8	5.4	0.9	6.1	1
Other Energy Sources	25.7	4.1	26.2	4.1	27.2	4.3

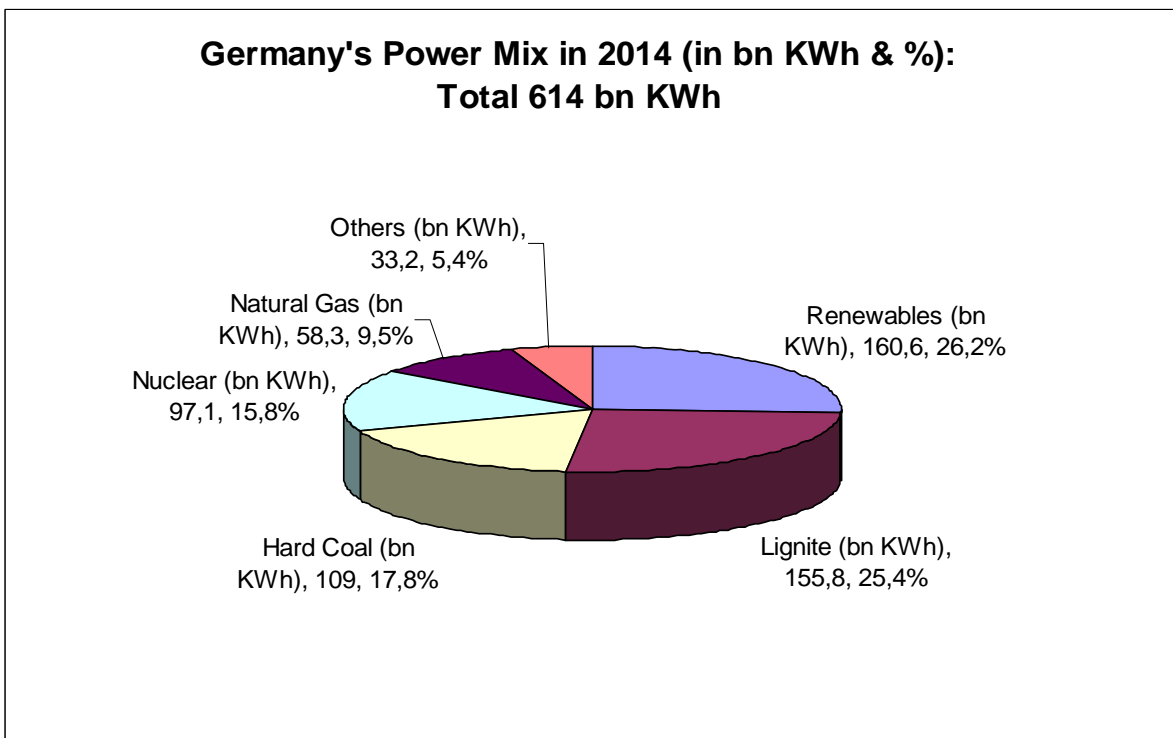
(Source: Federal Statistical Office. Destatis)



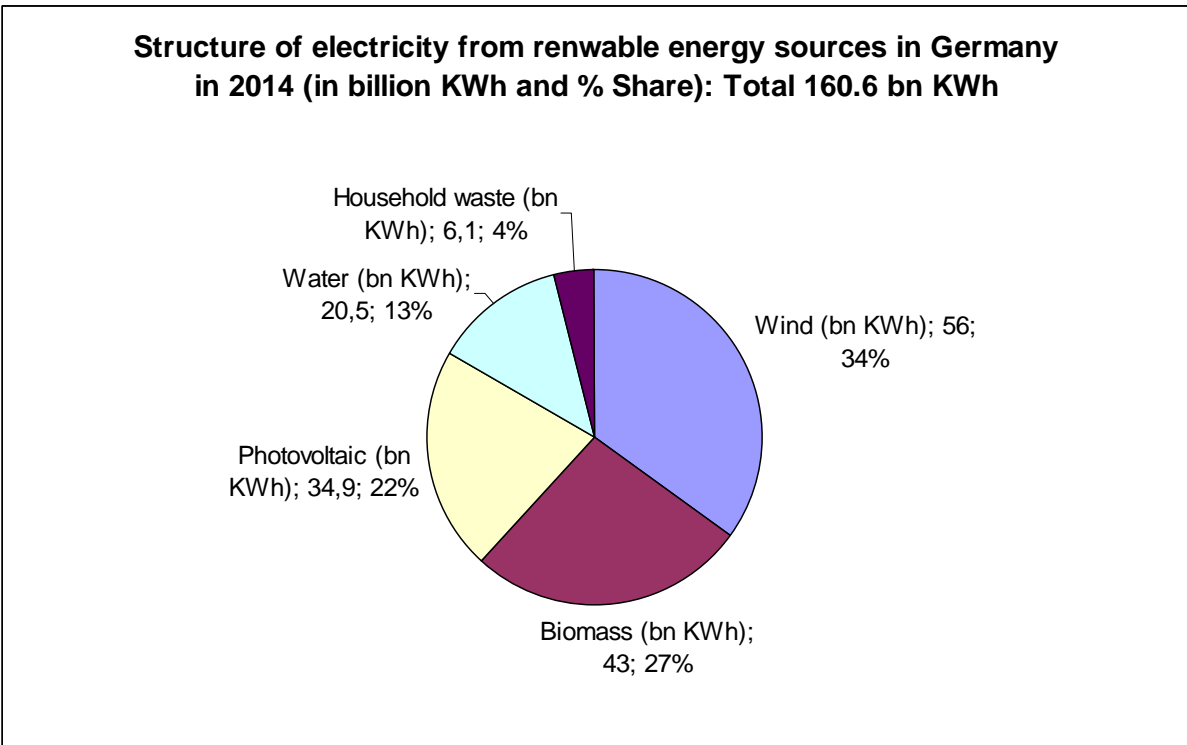
(Source: AGEE-Stat/BMU)

9. Contribution of RES to Electricity

The total electricity production in Germany in 2014 amounted to 614 billion kilowatt hours. Renewable energies contributed 160.6 billion kilowatt hours or 26.2% to gross electricity production. In 2014, Renewables surpassed lignite as Germany's most important energy source in the power sector. Amongst the renewables, wind is traditionally the strongest player. In the year 2014, wind 56 bn KWh wind energy was produced in Germany, followed by Biomass energy (43 bn KWh) and Photovoltaic Energy (34.9 bn KWh).



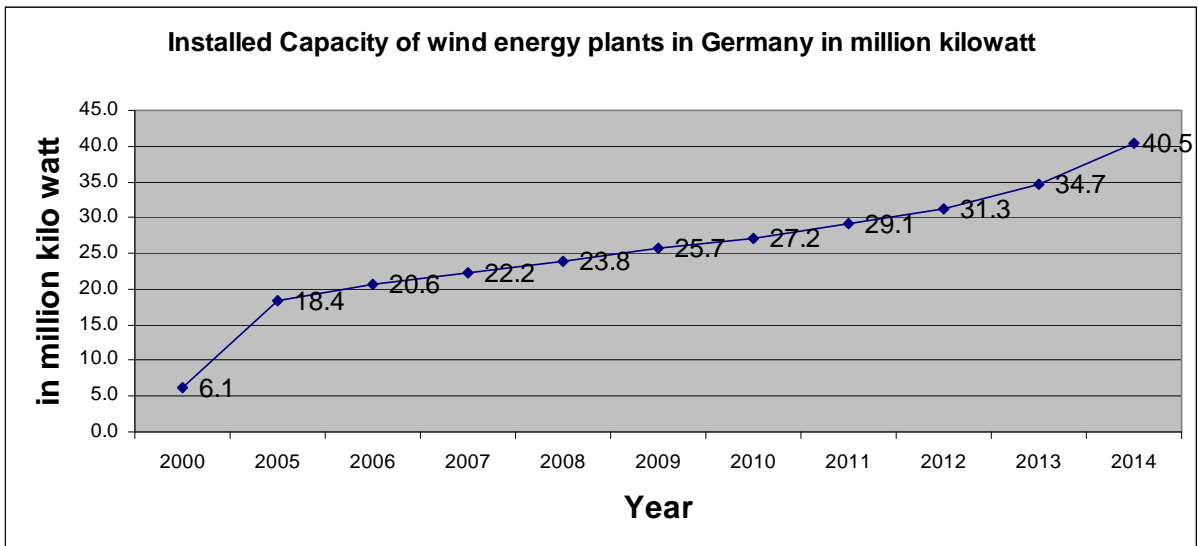
(Source: BEE)



(Source: BEE)

10. Wind Energy

Germany is one of the global leaders in the production of wind energy. Wind power now accounts for about nine per cent of the total German power supply. Some 24,200 wind turbines are in operation in Germany at present. The average installed capacity of a new turbine is 2.6 megawatts. The contribution of wind energy in German energy mix in the year 2014 was 56 bn KWh. Wind turbines are supplying power to more than 15 million (three-person) households. The German wind energy industry, which exports 67 percent of its manufactured components and has a gross value of €10.67 billion, makes an important contribution to the national economy. **Numerous manufacturers, suppliers and service providers benefit** from the planning, constructing and operating of wind turbines. About 138,000 employees work in the wind sector across Germany. Wind power is a driving force in the “Energy Transition”. Using wind energy mitigates climate change and the technology is widely accepted by the population. As per TNS emnid survey, 61 percent of German citizens said it is “good” or even “very good” to have wind turbines in the vicinity, reports the German Wind Energy Association (BWE).



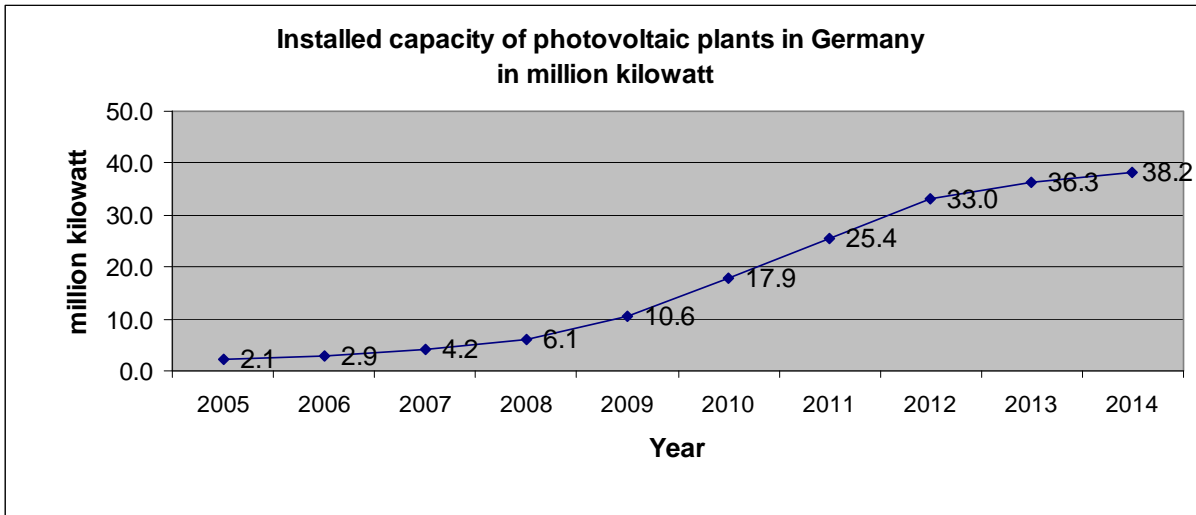
(Source: AGEE-Stat/BMU)

11. Suzlon's Acquisition of German Wind Power Company REpower

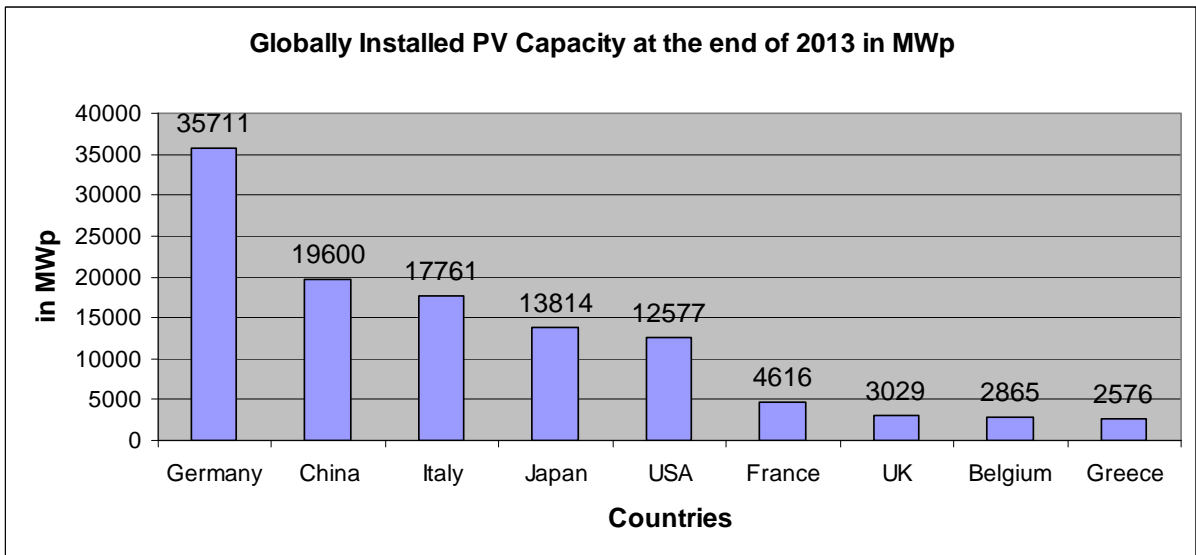
Leading Indian wind turbine maker Suzlon Energy Ltd acquired Hamburg based German Wind Power Company called REpower for €1.35 billion in the year 2007. This is by far the largest acquisition by an Indian company in Germany.

12. Photovoltaics

Germany is the largest market for photovoltaics in the world. Nearly 50 percent of the photovoltaic production technology used globally originates from German machine and installation producers. The total nominal power of PV installed in Germany rose to 38.2 million kilowatt in 2014, distributed over 1.5 million power plants, according to the Federal Solar Association (BSW). Germany is home to every fourth solar module in operation in the world. In 2014, Photovoltaics generated power totalled to 34.9 billion KWh, which is equivalent to around 6% of Germany's total power mix in 2014. **The contribution of Photovoltaics in German Renewable energy sector in 2014 amounts to 22%.** On sunny weekdays, PV power can at times cover 35 percent of the momentary electricity demand, and on weekends and holidays up to 50 percent. Around 60000 people are employed in the German solar sector. Germany also has the highest density of **PV institutes and companies conducting Research. More than 70 research organisations are operating in the PV R&D sector in Germany.**



(Source: AGEE-Stat/BMU)



(Source: GTAI)

13. Hydropower

Hydro power accounts for around 13% of the electricity generated from RES in Germany. A total of 20.5 billion KWh electricity was generated from hydropower in the year 2014 in Germany. The share of hydropower to the total German power mix in 2014 was just 3.3%. Almost 50% of all globally installed hydropower plants are based on German know-how, according to the German Engineering Association (VDMA).

14. Biomass

Electricity generation from biomass energy in 2014 amounted to 43 billion KWh. The share of biogenic sources in German electricity production in 2014 was 7%. In the German biogas industry, the export ratio in the year 2014

amounted to 50% and it expected to touch 70% in 2015, according to German Biogas Association (FvB).

15. Contribution of RES in Heat

The heat generation from RES increased in 2014 amounted to 130.9 billion kWh. Biomass contributed to 86.6% of renewably generated heat in Germany in 2014. Some 120000 heat pumps were manufactured in Germany in 2014, out of which 80000 were destined for export markets.

16. Solar Thermal Market

German Solar thermal market is the largest in Europe. The newly installed collector area in the German solar thermal sector in the year 2013 was 1.02 Mio sqm. By the end of the year 2013, the total installed collectors in German solar thermal market amounted to 17.5 Mio sqm collector. The total capacity installed in Germany by the end of 2013 was 12.3 GW (therm). The total number of systems installed in the German solar thermal segment as of 2013 was 1.9 Mio systems.

17. Investments

The German economy profits from the rapidly growing renewable energy sector. Investments in new installations of renewable energy plants increased to €18.8 billion in the year 2014. Out of this, with a total of €12.3 billion investment, wind sector attracted the largest investment amongst the renewables in the year 2014.

Investments in new renewable energy installations (In Billion €)				
	Year 2000	Year 2005	Year 2013	Year 2014
	Billion €	Billion €	Billion €	Billion €
Wind	1.9	2.5	6.6	12.3
Solar	0.8	5.5	5.1	3.1
Biomass	1.1	3.3	2.6	2.4
Hydro	0.7	0.2	0.3	0.1
Geothermal and environmental heat	0.1	0.3	1.1	1
Total	€4.6 billion	€11.9 billion	€15.7 billion	€18.8 billion

(Source: BMU/BMWi/BEE)

18. Renewables – A Cradle of Innovation

The rise of renewables sector foster innovation. A total of 1952 patents were registered in Germany in the year 2013.

Number of patent applications in the area of renewable energies registered at the German Patent and Trade Mark Office				
	Year 2000	Year 2010	Year 2012	Year 2013
Solar	165	755	1033	918
Wind	164	575	915	796
Hydro, Tidal	26	97	106	106
Biogas, Geothermal and others	44	116	152	132
Total	399	1563	2206	1952

(Source: DPMA)

19. Comparable EU Data on Renewable Energy

The primary production of renewable energy within the EU-28 in 2013 was 192 million tonnes of oil equivalent (toe), which is equivalent to 24.3 % share of total primary energy production from all sources. **The quantity of renewable energy produced within the EU-28 increased overall by 84.4 % between 2003 and 2013. The largest producer of renewable energy within the EU-28 in 2013 was Germany, with a 17.5 % share of the total; Italy (12.2 %) and France (12.0 %) were the only other EU Member States to record double-digit shares, followed by Spain (9.1 %) and Sweden (8.7%).**

Primary production of renewable energy within EU 28		
	Primary Production (Thousand toe)	
	Year 2003	Year 2013
Belgium	708	2929
Bulgaria	952	1826
Czech Republic	1663	3640
Denmark	2252	3240
Germany	12614	33680
Estonia	667	1122
Ireland	235	766
Greece	1538	2487
Spain	9196	17377
France	15521	23073

Croatia	800	1499
Italy	9999	23500
Cyprus	48	109
Latvia	1728	2137
Lithuania	794	1288
Luxembourg	41	107
Hungary	906	2074
Malta	0	10
Netherlands	1625	4294
Austria	6130	9466
Poland	4150	8512
Portugal	4241	5621
Romania	4002	5561
Slovenia	714	1071
Slovakia	651	1467
Finland	7887	9934
Sweden	12389	16770
United Kingdom	2642	8404
EU-28	104094	191961

(Source: Eurostat)

20. List of companies in Renewable Energy Sector

- A. List of German companies operating in renewable energy sector in Germany can be obtained at :
<http://www.renewables-made-in-germany.com/en/renewables-made-in-germany/branchenverzeichnis.html>
- B. List of companies operating in solar sector:
<http://www.solarwirtschaft.de/nc/en/our-members.html>
- C. Additional list of companies operating in RES sector:
http://www.wlw.de/start/wlw_dach/DE/en/index.html and
http://www.industrie.seibt.com/start/seibt_ik/DE/en/index.html

21. Intersolar Trade Fair

Intersolar is the world's largest solar technology trade fair which is organised by Germany based Solar Promotion GmbH in cooperation with Freiburg Business, Tourism and Trade Fair GmbH. **Intersolar fairs are held in Munich, San Francisco, Mumbai, Beijing, and São Paulo.** The focus of Intersolar is on photovoltaic, solar thermal technology and solar architecture.

Intersolar Europe 2015 was held at Munich Trade Fair Centre from June 10 -12, 2015. The fair attracted over 1000 exhibitors and 40000 trade visitors. A total of 12 Indian companies exhibited their latest products and services at Intersolar Europe 2015. Intersolar Europe is an annual fair and it was first held in 1991. **Intersolar fair is organised in India since 2009 and Intersolar India 2015 will take place in Mumbai from November 18-20, 2015.**

22. RE-INVEST 2016

The Ministry of New and Renewable Energy, Government of India, is organising the 2nd Renewable Energy Global Investment and Promotion Meet & Expo (RE-INVEST 2016) in New Delhi from 18-20 February, 2016. The event will consist of Global Investors' Meet and Conferences besides hosting 300 Exhibitors and over 200 eminent Speakers. Nearly 3000 delegates from 41 countries besides wide range of Renewable Energy stakeholders from around the world participated in the 1st RE-INVEST organised in February 2015. Detailed information on RE-INVEST 2016 can be accessed at www.re-invest.in.

23. Indian Renewable Energy Sector



India has the 5th largest power generation portfolio worldwide with a power generation capacity of 245 GW. By the end of the Financial Year 2014, the contribution of renewable energy sector was 31.70 GW to the total installed capacity. Economic growth, increasing prosperity, rapidly growing urbanization, etc are leading to increasing energy consumption in India. Wind energy is the largest renewable energy source in India. Wind energy accounts for nearly 70% (21.1 GW) of installed capacity, thereby making India the world's fifth largest wind energy producer.

India is the fourth largest importer of oil and the sixth largest importer of petroleum products and LNG, globally. The increased use of indigenous renewable resources is expected to reduce India's dependence on expensive imported fossil fuels. The National Solar Mission aims to promote the development and use of solar energy for power generation and other uses, with the ultimate objective of making solar energy compete with fossil-based energy options. India targets to generate 100 GW solar energy and 75 GW wind energy by 2022.

Foreign Direct Investment (FDI) up to 100% is permitted in India under the automatic route for renewable energy generation and distribution projects subject to provisions of The Electricity Act, 2003.

India offers various incentives in the Renewable Energy Sector. Incentives offered in the solar energy sector include: 10-year tax holiday for solar power projects, exemption from excise duties and concession on import duties on components and equipment required to set up a solar plant, etc. Fiscal incentives for biomass power projects include: Concessional customs duty and excise duty exemption for machinery and components during the setting up of the project, 10-year income tax holiday, exemption of sales tax in certain states, etc. Fiscal incentives for small hydro power projects include: Preferential tariffs, central financial assistance to the State Government and the private sector for the setting up of small/mini hydro projects, custom duty concessions and 10-year tax holiday.

The ambitious 'Make in India' campaign launched by the present Government in India also emphasis on enhanced energy generation through renewable sources. More information can be accessed at: <http://www.makeinindia.com/sector/renewable-energy/>. The Ministry of New and Renewable Energy (<http://www.mnre.gov.in/>) and the Indian Renewable Energy Development Agency (IREDA - <http://www.ireda.gov.in/>) could be the two major points of contacts for foreign investors in the Indian Renewable Sector.

24. Prospects

The Energy transition is one of the main focuses of the current German Government. Germany has set an ambitious target of generating 40 to 45 per cent of its electricity from Renewable Energy Sources by 2025; 55 to 60 per cent by the year 2035 and 80 per cent by the year 2050. German Government is taking necessary measures for restructuring of the energy supply to affordable, secure and environmentally friendly in the coming years. Renewable energy sector is steadily increasing and Germany will be phasing out all the nuclear power plants in the country by 2022. With a stated government policy to draw a new course towards creating sustainable and qualitative growth, Germany is well poised to take lead in both technology and trade in Renewable Energy sector. The broader goals are to increase energy security, reduce the impact of climate change and to make the most of the growth and competition potential of climate protection technologies, particularly in the fields of renewable energy and energy efficiency.

Currently, Germany covers more than 70 percent of its primary energy consumption by means of imports. Renewable energies are the only domestic energy source that will sustainably available in the future. Renewable energy technologies became more efficient over time, costs and price decreased.

Securing a reliable, affordable and environmentally sound energy supply is a great challenge for India and we have plans and policies to become one of the most energy-efficient and greenest economies in the world while enjoying a high level of economic growth.

India has recently set the targets to generate 100 GW solar energy and 75 GW wind energy by 2022. The future outlook of renewable energies and energy efficiency in Germany offers great opportunities for Indian companies. Indian companies could benefit from partnership with Germany taking advantage of the innovations, especially in the areas of Photovoltaics and wind energy. Some Recommendations to the Indian companies are:

- a. Technology acquisitions or collaborations with German companies.
- b. Mergers and acquisitions- German companies particularly, the small and medium sized companies have typical structure of family owned enterprises and are potential targets for acquisitions.
- c. Joint Ventures in Germany- To have a stake in the large German market, especially considering the enormous expansion plans envisaged in the area of renewables.
- d. Joint Ventures in India- Considering our ambitious plans in this sector, JV,s with German companies, who lack in local experience and knowledge, in areas like production and project implementation in India could be a prospective approach.
- e. Consultancy services for German companies who wish to invest in India.
- f. Participate in business delegation from Indian renewable energy sector visiting Germany.
- g. Joint Research and Development- Germany's excellent research standards and established base for basic and applied research in the form of world renowned institutes like Fraunhofer institute and Helmholtz Zentrum makes it an excellent destination for partnerships in technology development.
- h. Experience sharing and exchange of knowhow- German companies have the experience in operating large projects in different parts of the world with different environmental variables. Indian companies could benefit from their association and also contribute their local market knowledge.

25. Source of Information/References

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DISCLAIMER

(Note: The information and data contained in this report have been checked and verified from published sources. In case any error or discrepancy is noted, it may be brought to the attention of Consulate General of India, Munich. The information contained in the report is purely for the purpose of reference.)

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