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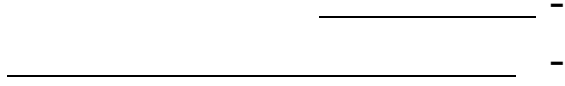
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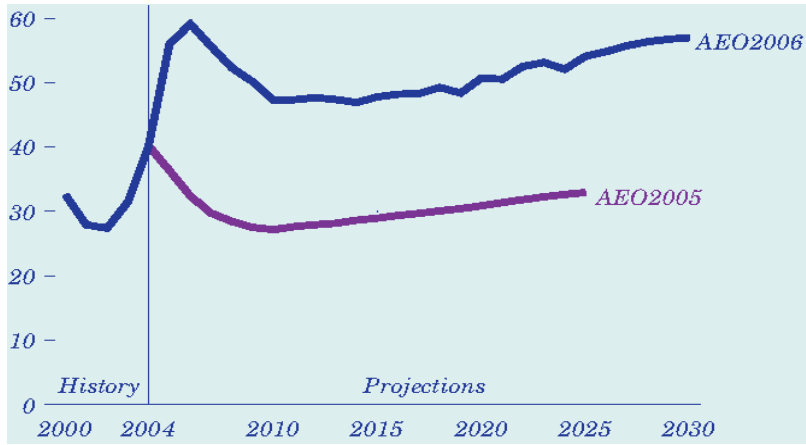
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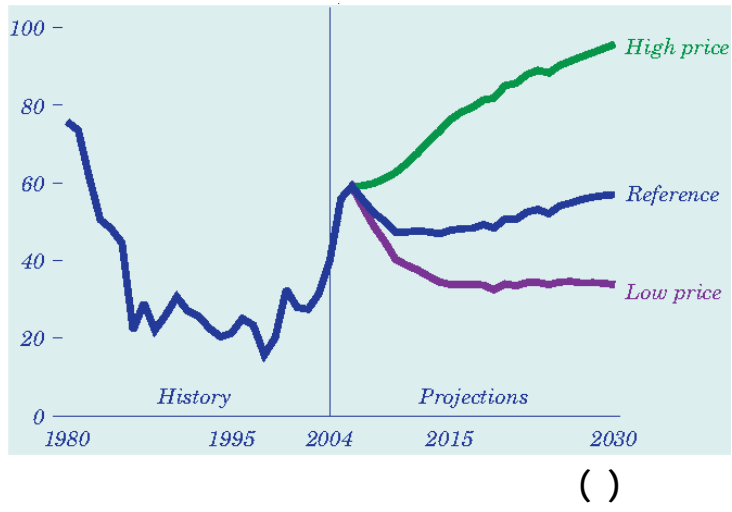


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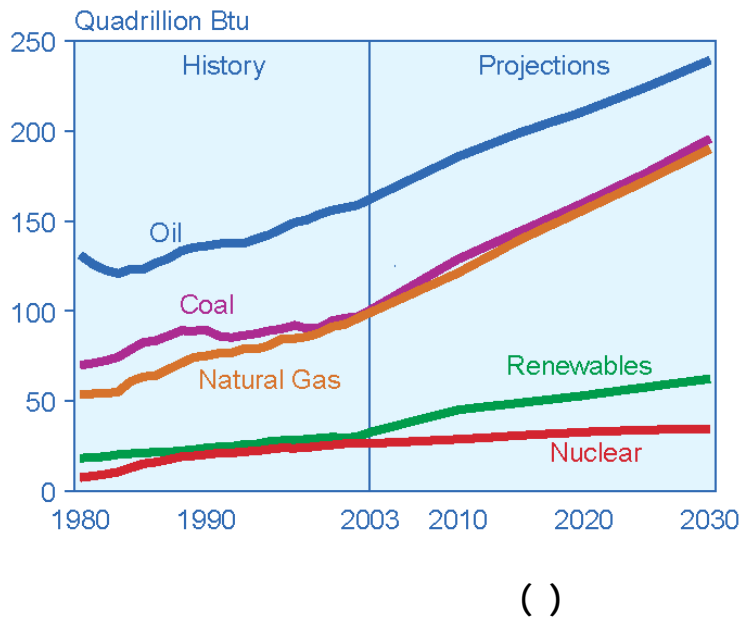
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RET	Existing Capacity	Worldwide Comparison
Power Generation Sector		
	GW	
Large hydropower	720	Electric power capacity = 3,800
Small hydropower	61	
Wind turbines	48	
Biomass power	39	
Geothermal power	8.9	
Solar PV, off grid	2.2	
Solar PV, grid connected	1.8	
Solar thermal power	0.4	
Ocean (tidal) power	0.3	
Total renewable power capacity (excluding large hydropower)	160	
Hot Water/Space Heating		
	GW _{thermal}	
Biomass heating	220	
Solar collectors for hot water/heating (glazed)	77	
Geothermal direct heating	13	
Geothermal heat pumps	15	
Households with solar water heating	40 million	Total household = 1,600 million
Buildings with geothermal heat pumps	2 million	
Transport Fuels		
	Liters/year	
Ethanol production	31 billion	Total gasoline production = 1,200 billion
Biodiesel production	2.2 billion	
Rural (off grid) Energy		
Household –scale biogas digesters	16 million	Total households off grid = 360 million
Household-scale solar PV systems	2 million	
Solar cookers	1 million	

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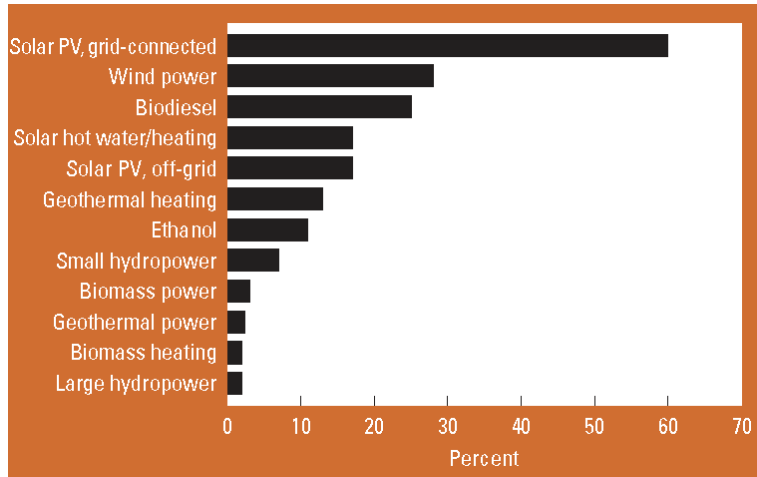
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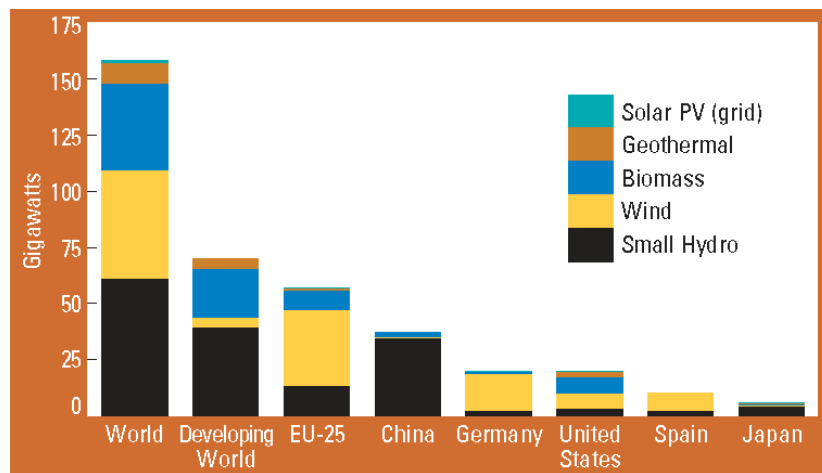
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	Primary energy supply based on direct energy output		Adjusted energy supply based on energy content of avoided fossil fuels (Mtoe)	Share of total renewable energy supply
	Natural Unit	Mtoe		
Power generation				
Biomass power	150 TWh	12.9	35.8	
Wind power	95 TWh	8.2	22.7	
Small hydro	240 TWh	20.6	57.3	
Geothermal power	60 TWh	5.2	14.3	
Total			130	6.9%
Hot water/heating				
Solar water	290 PJ	6.9	6.9	

	Primary energy supply based on direct energy output		Adjusted energy supply based on energy content of avoided fossil fuels (Mtoe)	Share of total renewable energy supply
	Natural Unit	Mtoe		
heating				
Geothermal heat	200 PJ	4.8	4.8	
Biomass heat	2,600 PJ	62.1	62.1	
Total			73.7	3.9%
Biofuels				
Ethanol	700 PJ	16.7		
Biodiesel	80 PJ	1.9		
Total			18.6	1.0%
Other renewables				
Conventional biomass		1,010	1,010	53.8%
Large hydro power	2,700 TWh	232	644	34.3%
Total			1,876	100%

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Technology	Typical Characteristics	Typical Energy Costs (cents/kWh)	Cost Trends and Potential for Cost Reduction
Power Generation			
Large hydro	<i>Plant size:</i> 10 MW–18,000 MW	3–4	Stable.
Small hydro	<i>Plant size:</i> 1–10 MW	4–7	Stable.

Technology	Typical Characteristics	Typical Energy Costs (cents/kWh)	Cost Trends and Potential for Cost Reduction
On-shore wind	<i>Turbine size:</i> 1–3 MW <i>Blade diameter:</i> 60–100 m	4–6	Costs have declined by 12–18% with each doubling of global capacity. Costs are now half those of 1990. Turbine size has increased from 600–800 kW a decade ago. Future reductions from site optimization, improved blade/generator design, and electronics.
Off-shore wind	<i>Turbine size:</i> 1.5–5 MW <i>Blade diameter:</i> 70–125 m	6–10	Market still small. Future cost reductions due to market maturity and technology improvement.
Biomass Power	<i>Plant size:</i> 1–20 MW	5–12	Stable.
Geothermal Power	<i>Plant size:</i> 1–100 MW <i>Type:</i> binary, single-flash, double-flash, or natural steam	4–7	Costs have declined since the 1970s. Costs for exploiting currently-economic resources could decline with improved exploration technology, cheaper drilling techniques, and better heat extraction.
Solar PV modules	<i>Cell type and efficiency:</i> single-crystal: 17%, polycrystalline: 15%, thin film: 10–12%	—	Costs have declined by 20% for each doubling of installed capacity, or by about 5% per year. Costs rose in 2004 due to market factors. Future cost reductions due to materials, design, process, efficiency, and scale.
solar PV	Rooftop <i>Peak capacity:</i> 2–5 kW	20–40	Continuing declines due to lower solar PV module costs and improvements in inverters and balance-of-system components.
Power (CSP)	Solar thermal <i>Plant size:</i> 1–100 MW <i>Type:</i> tower, dish, trough	12–18 (trough)	Costs have fallen from about 44 cents/kWh for the first plants in the 1980s. Future reductions due to scale and technology.
Hot Water/Heating			
Biomass heat	<i>Plant size:</i> 1–20 MW	1–6	Stable.
Solar hot water/heating	<i>Size:</i> 2–5 m ² <i>Type:</i> evacuated tube/flat-plate <i>Service:</i> hot water, space heating	2–25	Costs stable or moderately lower due to economies of scale, new materials, larger collectors, and quality improvements.
Geothermal heat	<i>Plant capacity:</i> 1–100 MW <i>Type:</i> binary, single-and double-flash, natural steam, heat pumps	0.5–5	See geothermal power, above.
Biofuels			
Ethanol	<i>Feedstocks:</i> sugar cane, sugar beets, corn, or wheat (and cellulose in the future)	25–30 cents/liter gasoline equivalent	Declining costs in Brazil due to production efficiencies, now 25–30 cents/equivalent-liter (sugar), but stable in the United States at 40–50 cents (corn). Other feedstocks higher, up to 90 cents. Cost reductions for ethanol from cellulose are projected, from 53 cents today to 27 cents post-2010; modest drops for other feedstocks.
Biodiesel	<i>Feedstocks:</i> soy, rapeseed, mustard seed, or waste vegetable oils	40–80 cents/liter diesel equivalent	Costs could decline to 35–70 cents/liter diesel equivalent post-2010 for rapeseed and soy, and remain about 25 cents (currently) for biodiesel from waste oil.
Rural (off-grid) Energy			
Mini-hydro	<i>Plant capacity:</i> 100–1,000 kW	5–10	Stable.

Technology	Typical Characteristics	Typical Energy Costs (cents/kWh)	Cost Trends and Potential for Cost Reduction
Micro-hydro	Plant capacity: 1–100 kW	7–20	Stable to moderately declining with efficiency improvements.
Pico-hydro	Plant capacity: 0.1–1 kW	20–40	Stable to moderately declining with efficiency improvements.
Biogas digester	Digester size: 6–8 m ³	n/a	Stable to moderately declining with economies of construction and Service infrastructure.
Biomass gasifier	Size: 20–5,000 kW	8–12	Excellent potential for cost reduction with further technology Development.
Small wind turbine	Turbine size: 3–100 kW	15–30	Moderately declining with technology advances.
Household wind turbine	Turbine size: 0.1–1 kW	20–40	Moderately declining with technology advances.
Village-scale mini-grid	System size: 10–1,000 kW Options: battery back-up or diesel	25–100	Declining with reductions in solar and wind component costs.
Solar home system	System size: 20–100 W	40–60	Declining with reductions in solar component costs.

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Power Generation Technology	Capital costs (\$/kW)	Low-side generation costs (cents/kWh)	High-side generation costs (cents/kWh)	Low-side generation costs by 2010
Small hydro power	1,000-5,000	2-3	9-15	2
Solar PV power	4,500-7,000	18-20	25-80	10-15
Concentrating solar power	3,000-6,000	10-15	20-25	6-8
Biopower	500-4,000	2-3	10-15	2
Geothermal power	1,200-5,000	2-5	6-12	2-3
Wind power	850-1,700	3-5	10-12	2-4

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Technology	Current cost (U.S. cents/kWh)	Projected future costs beyond 2020 as the technology matures (U.S. cents/kWh)
Solar Thermal Electricity (insolation of 2500kWh/m ² per year)	12-18	4-10
Hydro-electricity:		
Large scale	2-8	2-8
Small scale	4-10	3-10
Geothermal Energy:		
Electricity	2-10	1-8
Heat	0.5-5.0	0.5-5.0
Marine Energy:		
Tidal Barrage (e.g. the proposed Severn Barrage)	12	12
Tidal Stream	8-15	8-15
Wave	8-20	5-7
Grid connected photovoltaics, according to incident solar energy (insolation):		
1000 kWh/m ² per year (e.g. UK)	50-80	~8
1500kWh/m ² per year (e.g. southern Europe)	30-50	~5
2500 kWh/m ² per year (most developing countries)	20-40	~4
Stand alone systems (incl. batteries), 2,500 kWh/m ² per year.	40-60	~10
Nuclear Power	4-6	3-5
Electricity grid supplies from fossil fuels (incl. T&D)		
Off-peak	2-3	Capital costs will come down with technical progress, but many technologies largely mature and may be offset by rising fuel costs
Peak	15-25	
Average	8-10	
Rural electrification	25-80	

Technology	Current cost (U.S. cents/kWh)	Projected future costs beyond 2020 as the technology matures (U.S. cents/kWh)
Costs of central grid supplies, excl. transmission and distribution:		Capital costs will come down with technical progress, but many technologies already mature and may be offset by rising fuel costs
Natural Gas	2-4	
Coal	3-5	

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	R&D	Economy of scale I (components size)	Economy of scale II (manufacturing volume)	of	Economy of scale III (plant size)	of
On-land	up to 10	up to 10	up to 5		up to 10	
Offshore	up to 15	up to 10	up to 5		up to 10	

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Position	Small-scale turbine class < 750 kW	Medium-scale turbine class 750 kW to 1,500 kW	Large-scale turbine class > 1,500 kW
1	Vestas	GE Wind Energy	Enercon
2	Gamesa	Neg-Micon	Vestas
3	Enercon	Bonus	Bonus

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Company	Country	MW sold	Market share
Vestas	Denmark	1630	23.3 %
Enercon	Germany	989	14.1 %
Neg Micon	Denmark	875	12.5 %
GE Wind Energy	USA	861	12.3 %
Gamesa	Spain	649	9.3 %
Bonus	Denmark	593	8.5 %
Nordex	Germany	461	6.6 %
Made	Spain	191	2.7 %
Mitsubishi	Japan	178	2.5 %
REpower	Germany	133	1.9 %

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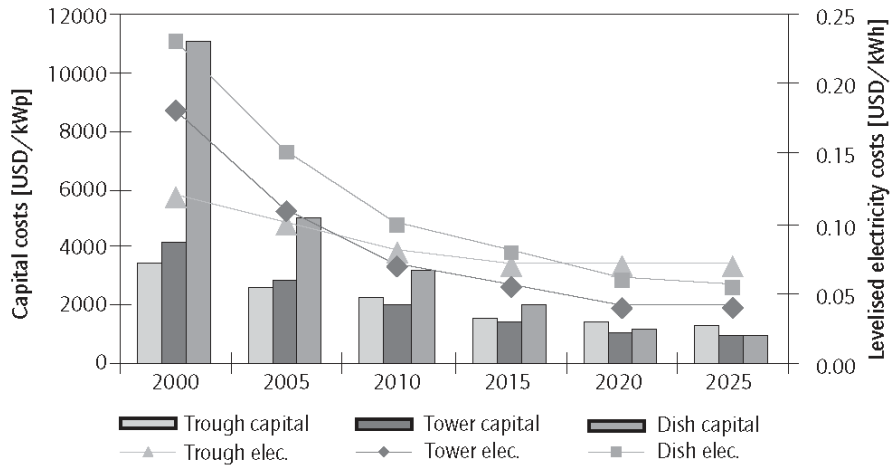
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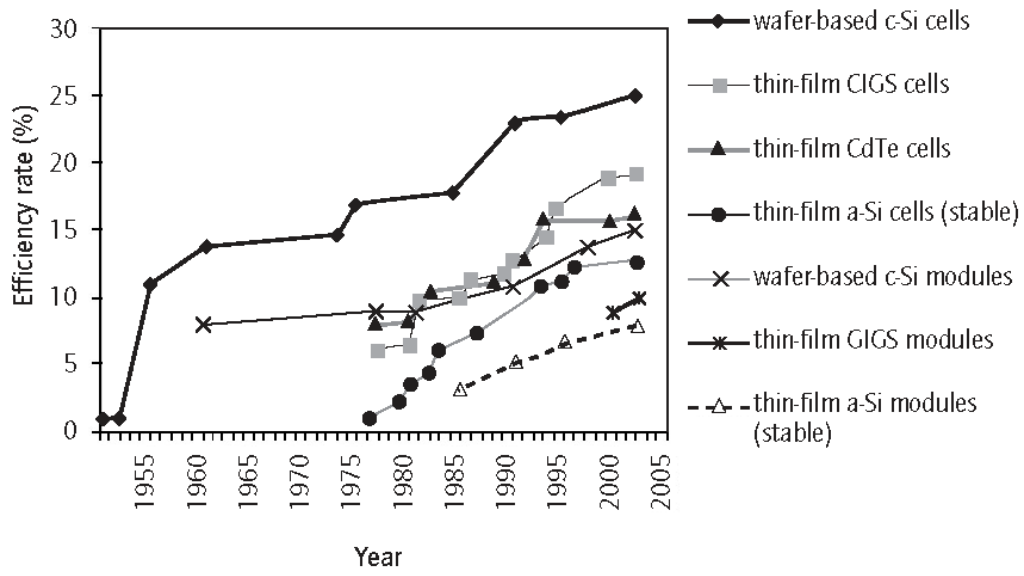
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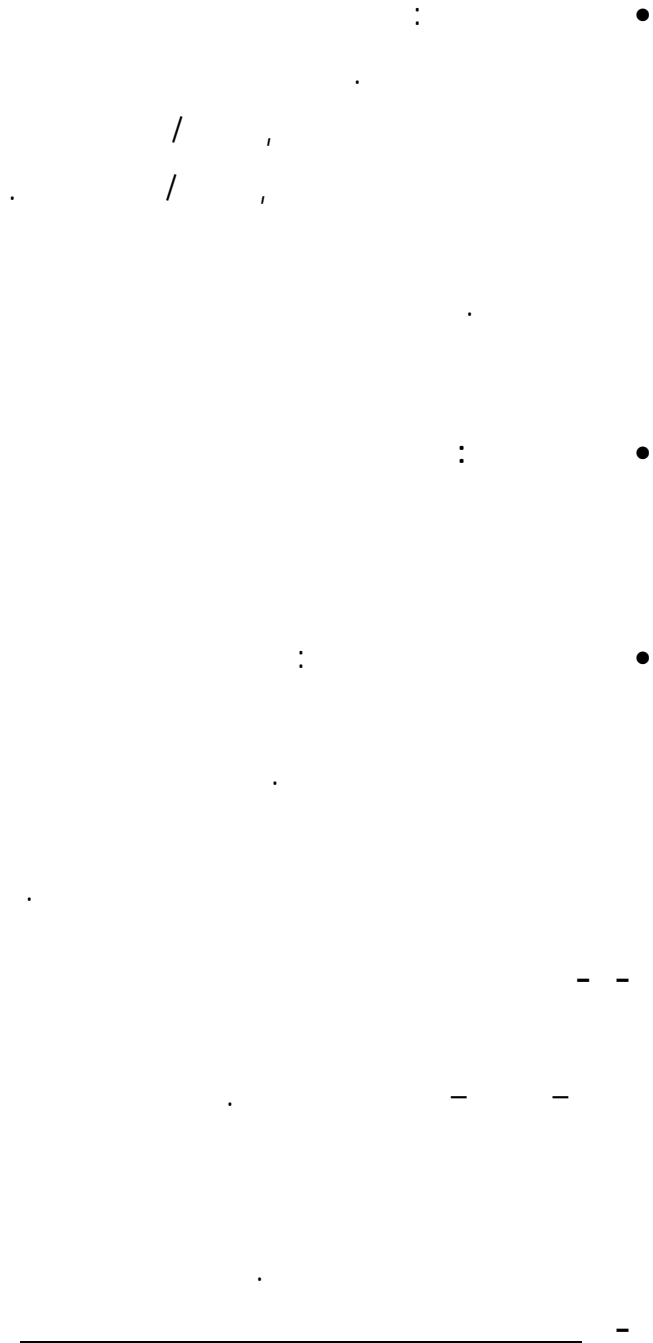


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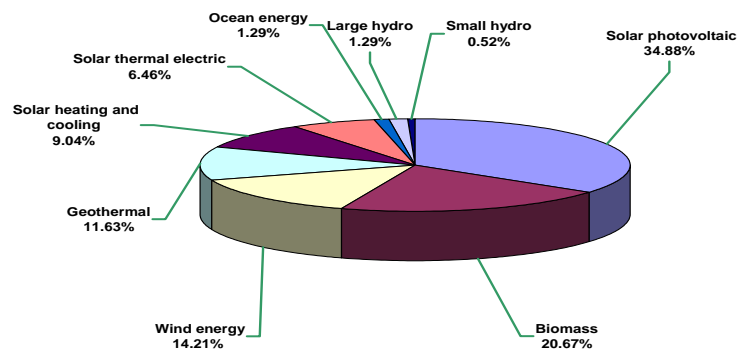
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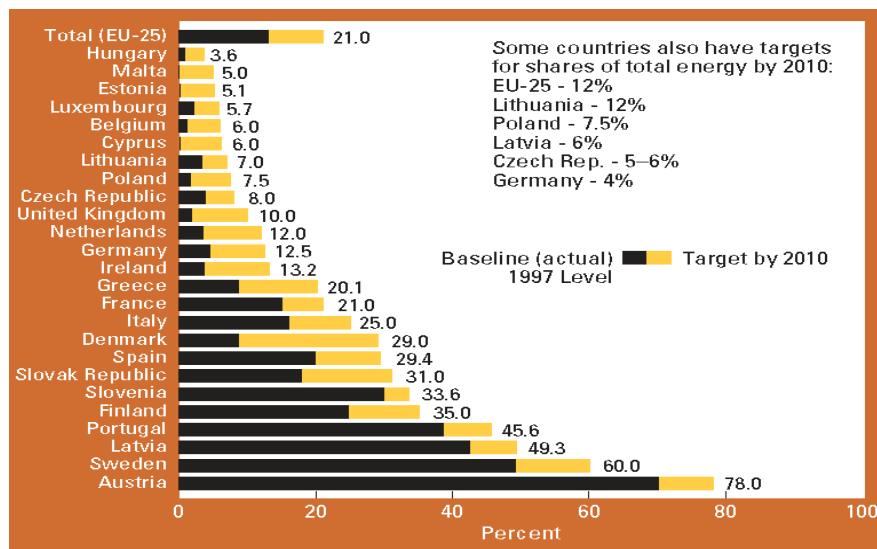
Technology	Budget by Tech. 1974-2002 (million US\$)	Shares in Energy R&D 1974-2002	Budget by Tech. 1974-1986 (mUS\$)	Shares in Energy R&D 1974-1986	Budget by Tech. 1987-2002 (mUS\$)	Shares in Energy R&D 1987-2002
Nuclear Fission	137,529	47.30%	84,866	53.60%	52,663	39.70%
Fossil Fuels	36,842	12.70%	20,559	13.00%	16,284	12.30%
Nuclear Fusion	30,562	10.50%	15,948	10.10%	14,615	11.00%
“Other” Technologies	29,212	10.00%	10,599	6.70%	18,613	14.00%
Renewable Energy	23,550	8.10%	13,317	8.40%	10,234	7.70%
Solar Heating & Cooling	3,024	1.00%	2,140	1.40%	885	0.70%
Solar Photo-Electric	6,354	2.20%	2,717	1.70%	3,636	2.70%
Solar Thermal-Electric	2,555	0.90%	1,889	1.20%	666	0.50%
Wind	2,910	1.00%	1,445	0.90%	1,465	1.10%
Ocean	754	0.30%	626	0.40%	128	0.10%
Biomass	3,578	1.20%	1,495	0.90%	2,083	1.60%
Geothermal	4,088	1.40%	2,867	1.80%	1,221	0.90%
Large Hydro (>10 MW)	93	0.00%	-	0.00%	93	0.10%
Small Hydro (<10 MW)	49	0.00%	0	0.00%	49	0.00%
Conservation	23,479	8.10%	8,607	5.40%	14,872	11.20%
Power & Storage Technology	9,844	3.40%	4,344	2.70%	5,500	4.10%
Total All Energy	291,020	100%	158,240	100%	132,781	100%

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Technology	Share of National Energy R&D Budgets 1990-2002	Share of National Renewables R&D Budgets 1990-2002	Average Renewables Budget 1990-2002 (Millions US \$)
Germany			
Photovoltaic	12.5%	48.4%	40.1
Wind	5.9%	22.7%	18.8
Italy			
Photovoltaic	5.0%	46.8%	15.9
Wind	2.4%	23.0%	7.8
Japan			
Photovoltaic	2.1%	59.6%	66.1
Geothermal	0.9%	26.0%	28.8
Netherlands			
Photovoltaic	7.7%	37.7%	12.3
Wind	5.3%	26.0%	8.5
Biomass	4.8%	23.4%	7.7
Switzerland			
Photovoltaic	8.0%	32.5%	10.8
Solar Heating & Cooling	4.9%	20.1%	6.7
United States			
Photovoltaic	2.9%	32.6%	77.3
Biomass	2.3%	25.5%	60.3
Geothermal	1.2%	12.9%	30.6

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Country	Renewable Energy Targets
Australia	9500 GWh of electricity annually by 2010
Brazil	Additional 3300 MW from wind, small hydro, biomass by 2016
Canada	3.5% to 15% of electricity in 4 provinces; other types of targets in 6 provinces.
Dominican Republic	500 MW wind power capacity by 2015.
Egypt	3% of electricity by 2010 and 14% by 2020.
India	10% of added electric power capacity during 2003–2012 (expected 10 GW).
China	10% of electric power capacity by 2010 (expected 60 GW); 5% of primary energy by 2010 and 10% of primary energy by 2020.
Israel	2% of electricity from renewable energy resources by 2007 5% of electricity from renewable energy sources by 2016
Japan	1.35% of electricity by 2010, excluding geothermal and large hydro (RPS).
Korea, Republic of	2% of total energy consumption from new and renewable energy, including solar, wind and biomass energy by 2006. 7% of electricity by 2010, including large hydro, and 1.3 GW of grid-connected solar PV by 2011, including 100,000 homes (0.3 GW)
Malaysia	5% of electricity by 2005.

Country	Feed in Tariff	Renewable Portfolio Standard	Capital Subsidies, Grants, or Rebates	Investment Excise, or Other Tax Credits	Sales Tax, Energy Tax, or VAT Reduction	Tradable Renewable Energy Certificates	Energy Production Payments or Tax Credits	Net Metering	Public Investment, Loans, or Financing	Public Competitive Bidding
Developed and Transition Countries										
Australia		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	
Austria	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>				
Belgium		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		
Canada	(*)	(*)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			(*)	<input checked="" type="checkbox"/>	(*)
Cyprus	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>							
Czech Republic	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		
Denmark	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		
Estonia	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>					
Finland			<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			
France	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Germany	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>	
Greece	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>						
Hungary	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	
Ireland	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>
Italy		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>				
Israel	<input checked="" type="checkbox"/>							<input checked="" type="checkbox"/>		
Japan	(*)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Korea	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>					
Latvia	<input checked="" type="checkbox"/>								<input checked="" type="checkbox"/>	
Lithuania	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>					<input checked="" type="checkbox"/>	
Luxembourg	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>						
Malta					<input checked="" type="checkbox"/>					
Netherlands	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			
New Zealand			<input checked="" type="checkbox"/>						<input checked="" type="checkbox"/>	
Norway			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>
Poland		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Portugal	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>					
Slovak Republic	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>					<input checked="" type="checkbox"/>	

Country	Feed in Tariff	Renewable Portfolio Standard	Capital Subsidies, Grants, or Rebates	Investment Excise, or Other Tax Credits	Sales Tax, Energy Tax, or VAT Reduction	Tradable Renewable Energy Certificates	Energy Production Payments or Tax Credits	Net Metering	Public Investment, Loans, or Financing	Public Competitive Bidding
Slovenia	<input checked="" type="checkbox"/>									
Spain	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>					<input checked="" type="checkbox"/>	
Sweden	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			
Switzerland	<input checked="" type="checkbox"/>									
United Kingdom		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				
United States	(*)	(*)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	(*)	(*)	<input checked="" type="checkbox"/>	(*)	(*)	(*)
Developing Countries										
Argentina			<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>			
Brazil	<input checked="" type="checkbox"/>								<input checked="" type="checkbox"/>	
Cambodia			<input checked="" type="checkbox"/>							
China	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Costa Rica	<input checked="" type="checkbox"/>									
Guatemala				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>					
India	(*)	(*)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Indonesia	<input checked="" type="checkbox"/>									
Mexico				<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>		
Nicaragua	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>						
Philippines				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>	
Sri Lanka	<input checked="" type="checkbox"/>									
Thailand	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>					<input checked="" type="checkbox"/>		
Turkey	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>							

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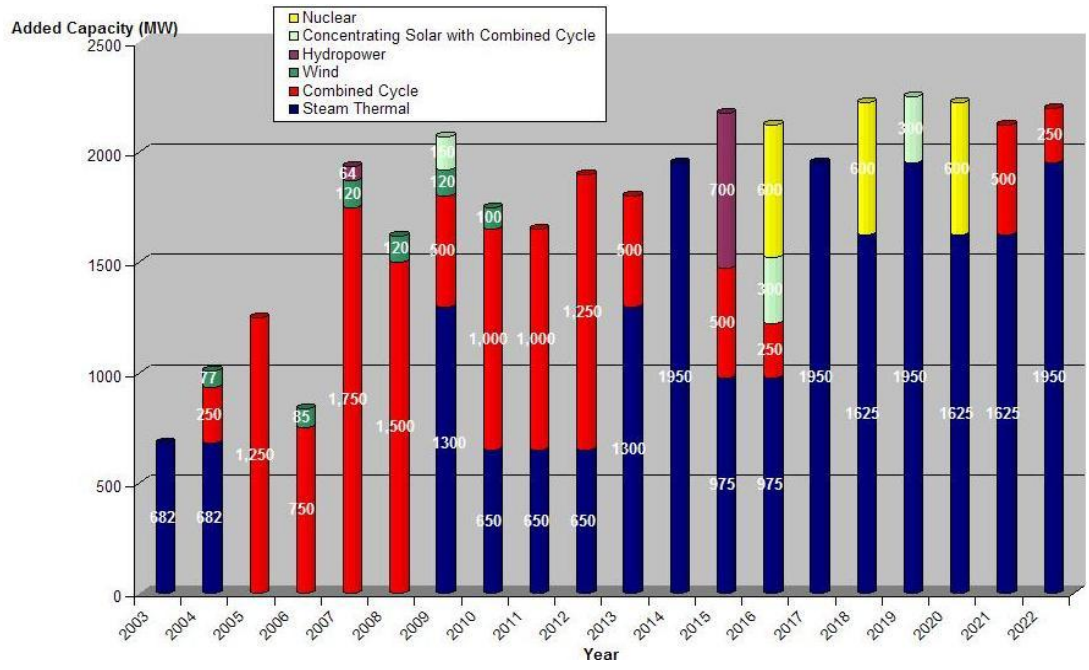
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Year	Primary Energy Consumption (million TOE)			Growth Rate (%)	
	Petroleum Products	Natural Gas	Total (million)	Petroleum Products	Natural Gas
2005	22.98	27.98	50.97	--	--
2006	23.68	29.16	52.84	3.03%	4.19%
2007	23.81	31.05	54.86	0.55%	6.50%
2008	23.94	34.14	58.09	0.56%	9.94%
2009	24.13	38.09	62.22	0.77%	11.55%
2010	24.31	40.33	64.65	0.76%	5.90%
2011	24.83	42.68	67.51	2.11%	5.82%
2012	25.72	45.07	70.79	3.61%	5.60%
2013	26.52	47.66	74.17	3.09%	5.73%
2014	27.11	50.29	77.41	2.25%	5.53%
2015	27.91	53.09	81.00	2.94%	5.56%
2016	28.41	56.04	84.45	1.78%	5.56%
2017	29.10	59.11	88.21	2.45%	5.48%
2018	29.80	62.36	92.16	2.39%	5.50%
2019	30.50	65.66	96.15	2.34%	5.28%
2020	31.19	69.10	100.29	2.28%	5.24%
2021	31.89	72.65	104.54	2.23%	5.15%
2022	32.69	76.38	109.07	2.50%	5.13%

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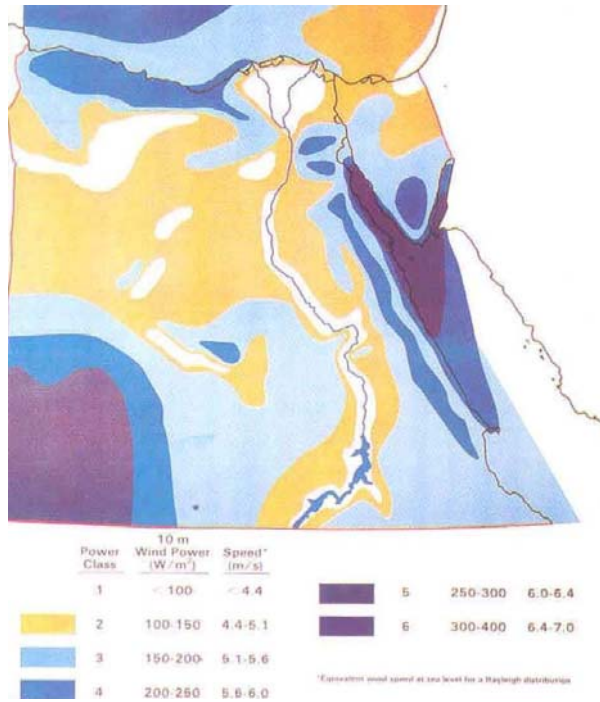
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Region	Av. Wind Speed (m/s)
Ras Sedr	7.5
Abu Aldarag	8.8
Zafarana (north)	9.2
Zafarana	9.0
Zafarana (west)	7.5
St. Paul	8.4
Ras Ghareb	10.0
El Tour	5.6
El Zeit Gulf (north)	10.4
El Zeit Gulf (north-west)	10.5
El Zeit Gulf	10.3
El Zeit Gulf (south-west)	10.8
Hurghada	6.7

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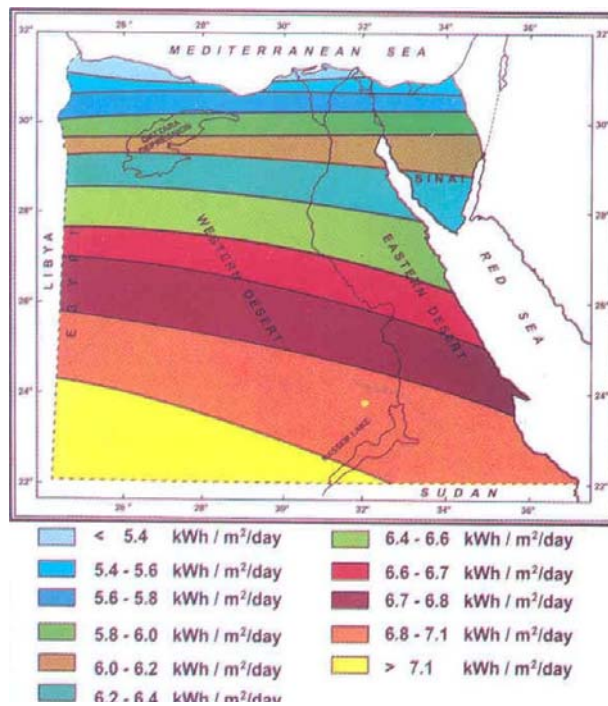
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() المخلفات الصادرة من المحاصيل الزراعية في محافظات مختلفة (١٠٠٠ طن)

Governorate	Wheat Straw	Rice Straw	Maize stalks & cobs	Sorghum stalks	Barely straw	Cotton stalks	Sugar cane residues
Alexandria	166	11	69	-	6	11	-
Behira	737	696	623	-	9	271	4
Gharbia	426	561	342	-	-	95	17
Kafr El-Sheikh	606	911	248	-	9	254	2
Dakahlia	853	1480	204	-	-	115	8
Damietta	61	195	16	-	-	18	-
Sharkia	1062	885	835	-	31	123	2
Ismailia	88	11	126	-	9	1	-
Port Said	10	53	9	-	9	1	-
Suez	4	-	9	-	3	-	1
Menoufia	312	-	866	-	-	51	1
Qalyoubia	135	62	285	-	-	14	9
Cairo	0.8	-	3	-	-	-	1
Giza	123	1	309	1	1	-	30
Beni Suef	396	-	395	12	1	66	15
Fayoum	552	76	127	237	33	45	6
Menia	642	-	991	27	1	67	575
Assuit	519	-	357	481	1	35	32
Sohag	549	-	445	411	1	14	298
Qena	281	-	125	86	4	-	2335
Aswan	52	-	25	15	5	-	1189
Luxor	42	-	34	-	-	-	350
New Valley	102	26	1	2	40	-	-
Matruh	16	-	11	-	-	-	-
North Sinai	19	-	-	-	44	-	-
South Sinai	0.08	-	-	-	-	-	-
Noubaria	458	-	203	-	6	7	-
TOTAL	8214	4968	6658	1272	213	1188	4875

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Governorate	Cows	Buffaloes	Goats	Sheep	Camels	Horses, etc	Total
Alexandria	35480	60745	8479	16486	2226	8678	132094
Behira	436021	478082	21949	85037	4255	84936	1110280
Gharbia	175090	371238	10535	35503	260	74396	667022
Kafr El-Sheikh	245161	312203	8280	33306	700	72315	671965
Dakahlia	117822	244104	5703	27314	287	27529	422759
Damietta	64511	43442	852	5227	24	13714	127770
Sharkia	275525	431930	23289	57976	4656	114477	907853
Ismailia	30157	35162	3753	6733	913	8153	84871
Port Said	26325	31209	355	1616	-	2077	61582
Suez	10297	12463	306	541	65	759	24431
Menoufia	151053	385358	10646	28331	2510	95424	673322
Qalyoubia	73089	250630	5672	15066	755	1225	346437
Cairo	3208	6061	136	328	129	448	10310
Giza	92400	200089	13805	29558	7465	50720	394037
Beni Suef	318809	221348	14124	36937	2543	84794	678555
Fayoum	160088	181392	12496	27109	3642	17193	401920
Menia	332883	498287	38535	75173	8617	167072	1120567
Assuit	202899	312826	25710	46219	7500	68642	663796
Sohag	226746	382758	34858	67378	13973	99672	825385
Qena	178921	307668	42621	94843	8374	102523	734950
Aswan	44187	49894	8201	20437	4550	26577	153846
Luxor	18760	21467	2440	8257	437	10018	61379
New Valley	74993	1344	9089	11379	1983	13756	112544
Matruh	3473	793	15053	69752	17716	1862	108649
North Sinai	2948	213	14605	21826	3023	36	42651
South Sinai	87	125	2122	2559	1939	490	7322
Noubaria	92419	67175	3189	14683	1701	8788	187955
Red Sea	923	2296	6142	24758	49700	2566	86385
TOTAL	3394275	4910302	342948	864334	149943	1158843	10820645

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	Number (1000 bird)	Total amount of droppings in 2003 (t)
Chicken	95000	1425000
Ducks	9200	404800
Geese	9100	400400
Turkeys	1900	85800
Total	115200*	2 316000

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Governorate	Population (1000)	Amount of solid waste t/d	Amount of solid waste (1000 t/y)
Cairo	7630	8775	3203
Alexandria	3756	3005	1097
Port Said	529.7	424	155
Suez	478.5	431	157
Damietta	312.6	250	91
Dakahlia	1369.4	1643	600
Sharkia	1135	908	331
Qalyoubia	1553.8	1634	596
Kafr El-Sheikh	592	533	194

Governorate	Population (1000)	Amount of solid waste t/d	Amount of solid waste (1000 t/y)
Gharbia	1211.9	1272	464
Menoufia	645	645	235
Behira	925.5	740	270
Ismailia	422	295	108
Giza	3291	3685	1345
Beni Suef	517.7	310	113
Fayoum	529	317	46
Menia	759	455	166
Assuit	905	543	198
Sohag	800	480	175
Qena	608.5	365	133
Aswan	465	279	102
Red sea	131.7	131	48
New Valley	80.7	48	18
Matruh	144.6	87	32
North Sinai	176	106	39
South Sinai	31.4	25	9
Luxor	192.7	116	42
Total	29193.7	27502	9967

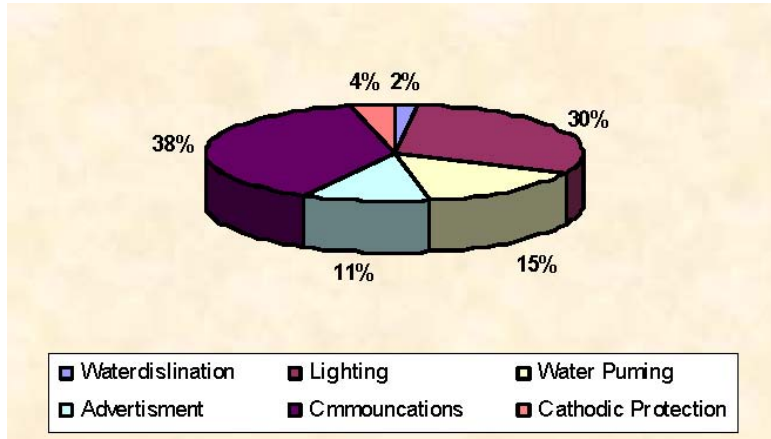
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No.	Company	Market Share
1	Middle East Engineering & Telecommunication (MEET)	50 %
2	BIC for electronics, Environment & Energy	35 %
3	Arabian co. for solar energy & technology (ASET)	5 %
4	African Arabian co.	5 %
5	IMF	3 %
6	Solatek	2 %

() ملخص المسح الميداني للشركات

Technology	Number of companies
Solar Energy	7
Wind Energy	7
Photovoltaic systems	10
Biomass Units	2
Commercial Agencies for RE Equipment	5
Other Related Companies (for different RE components)	53
Total	84

٢-٥-٢ التصنيع المحلي لمكونات الطاقة المتجددة

من وجهة نظر التصنيع المحلي يمكن تقسيم مراحل التصنيع المحلي لمكونات نظم الطاقة المتجددة إلى ثلاث عناصر كما هو موضح في الجدول التالي.

Category	Description
A	Local Manufacturing; RET components can be produced directly with current resources of the Egyptian Industry.
B	After Innovation and R&D; RET components can be produced with current resources but with help of innovation and R&D; need about 3 years.
C	Import/Joint Venture with foreign companies; RET components can be produced by Egyptian industry only when a joint ventures with big universal companies takes place (transfer of know how takes about 5 years).

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Component	Local Manufacturing	After Innovation and R&D	Import/ Joint Venture
Glass	X	X	
Absorber plates	X	X	
Selective coating		X	X
Tanks	X		
Pumps/Control	X	X	X
Insulation	X	X	
Electric Heaters and Control	X	X	
Auxiliaries	X	X	

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Component	Local Manufacturing	After Innovation and R&D	Import/ Joint Venture
Reflector material and glass		X	X
Vacuum and absorber tube		X	X
Rotary Joints		X	X
Step Motor	X	X	
Steel structure	X		
Sun tracking system		X	X
Control system		X	X
Piping	X	X	
Auxiliaries	X	X	
Trough cleaning system		X	X
Operation and maintenance	X	X	

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Component	Local Manufacturing	After Innovation and R&D	Import/ Joint Venture
Flat mirrors and surface quality	X	X	
Step Motor	X	X	
Steel structure	X		
Sun tracking system		X	X
Control system		X	X
Piping	X	X	
Auxiliaries	X	X	
Cleaning system	X	X	
Operation and maintenance	X	X	

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() تصنيع الأجزاء اللازمة لطاقة الرياح

Component	Local Manufacturing	After Innovation and R&D	Import/ Joint Venture
Tower	X		
Blade	X	X	
Yawing system		X	X
Gear-box		X	X
Generator		X	X
Control systems		X	X
Cables	X		
Transformers	X	X	
Auxiliaries	X	X	X
Operation and maintenance	X	X	

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Component	Local Manufacturing	After Innovation and R&D	Import/ Joint Venture
Solar Cells		X	X
Modules/Array Assembly	X	X	
System Integrators	X	X	X

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() تصنيع مكونات الكتلة الحيوية

Component	Local Manufacturing	After Innovation and R&D	Import/ Joint Venture
Fermentation tanks, mild steel, for medium size plants	X		
Storage tanks	X		
Gas valves, PVC gas tubes	X	X	X
Gas engines, diesel/gas engines	X	X	X
Gas meters, Rubber gas tubes, Gas regulators, etc.	X		

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Technology	% Share of local Manufacturers	
	Reactive Policy	Pro-active Policy
Solar water heaters	70%	95%
Concentrated solar power	30%	50%
Wind energy	40%	60%
Photovoltaic systems	20%	30%
Biomass	50%	95%

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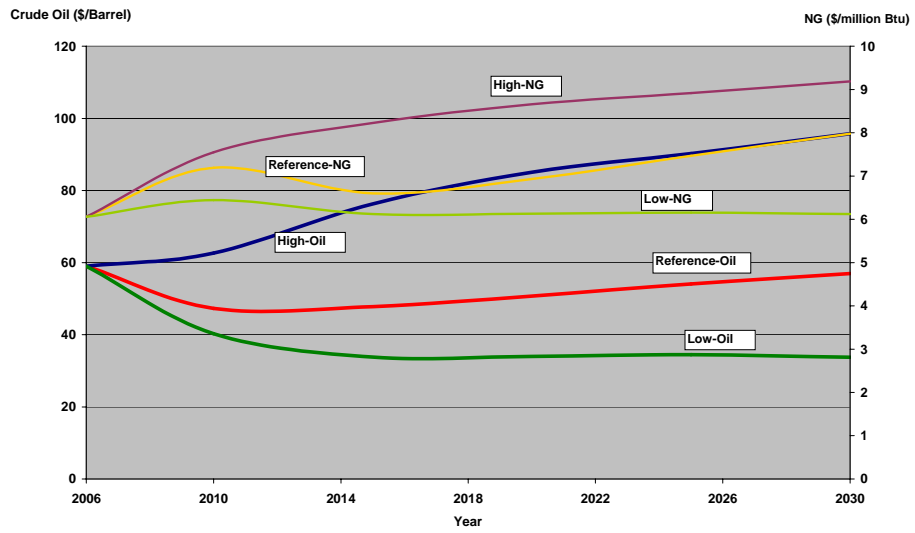
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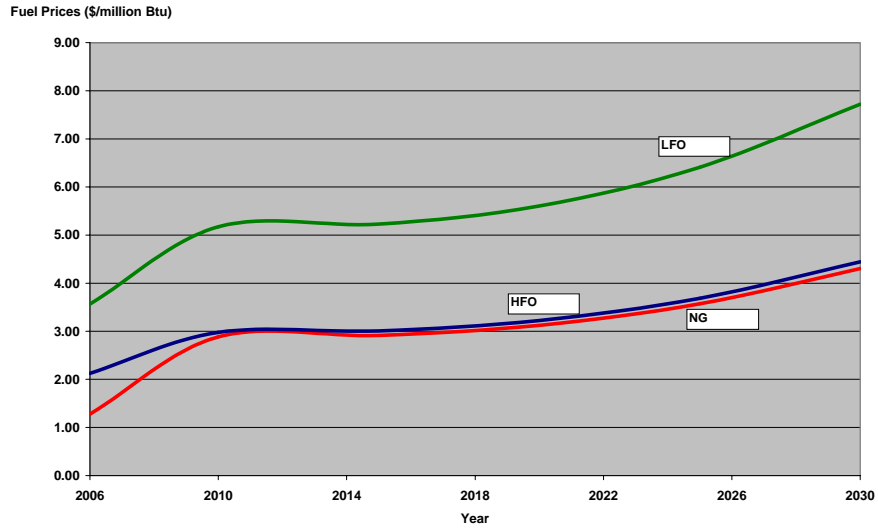
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Fuel	Year					
	2006	2010	2015	2020	2025	2030
NG - Egypt	1.28	2.88	2.91	3.12	3.57	4.30
NG - World	6.06	7.19	6.60	6.93	7.47	7.98
NG - Gap	4.78	4.31	3.69	3.81	3.90	3.68
HFO - Egypt	2.13	2.98	3.01	3.22	3.69	4.44
HFO - World	3.25	3.37	3.45	3.56	3.62	3.90
HFO - Gap	1.12	0.39	0.44	0.34	(0.07)	(0.54)
LFO - Egypt	3.56	5.17	5.23	5.60	6.41	7.72
LFO - World	13.20	13.69	14.01	14.46	14.70	15.84
LFO - Gap	9.64	8.51	8.78	8.85	8.29	8.12

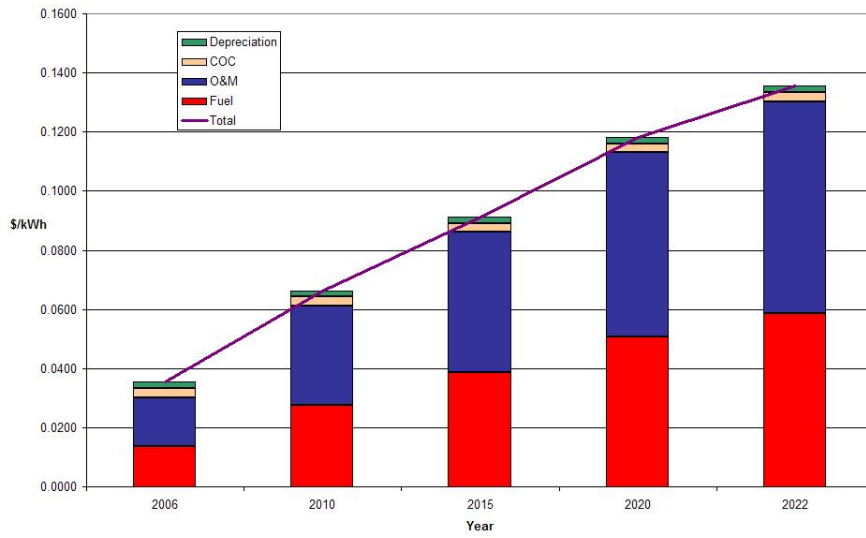
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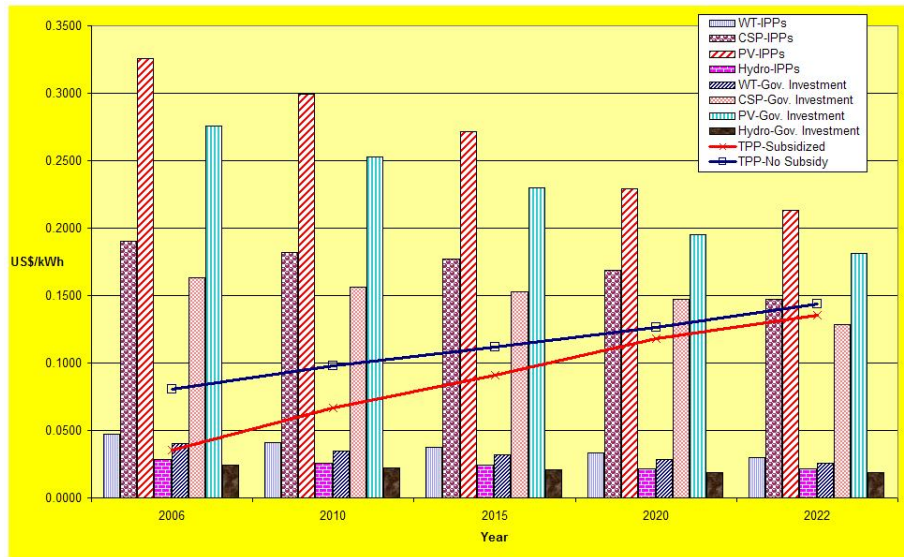
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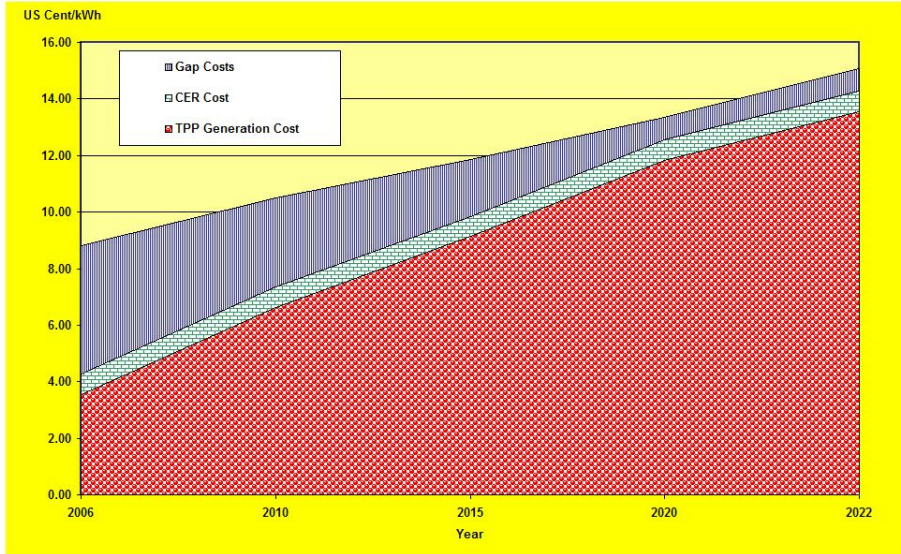
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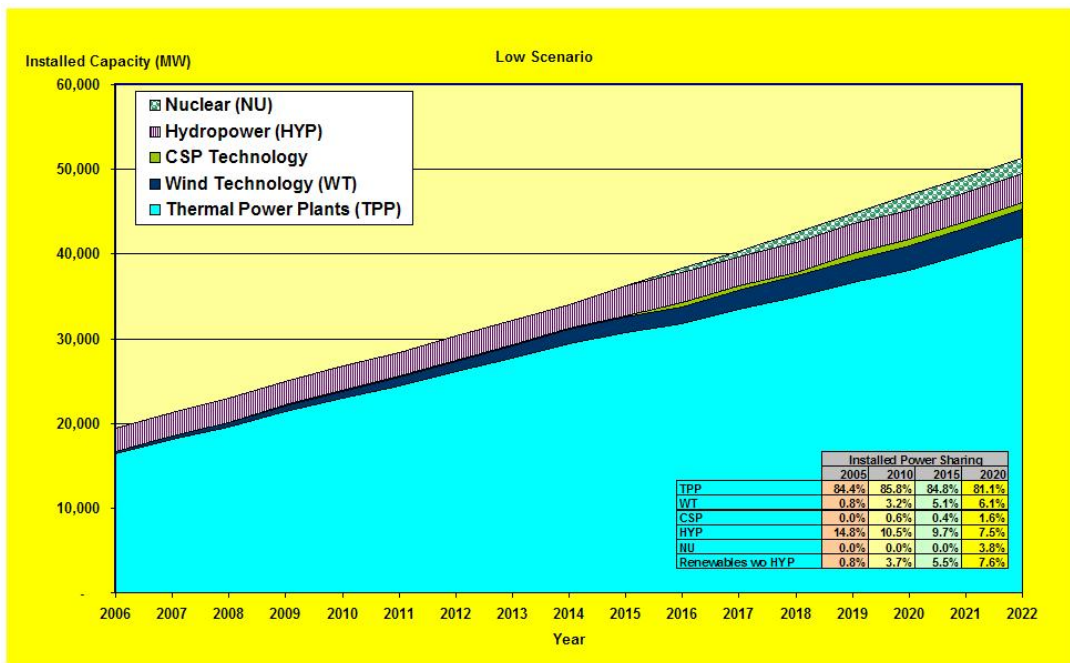
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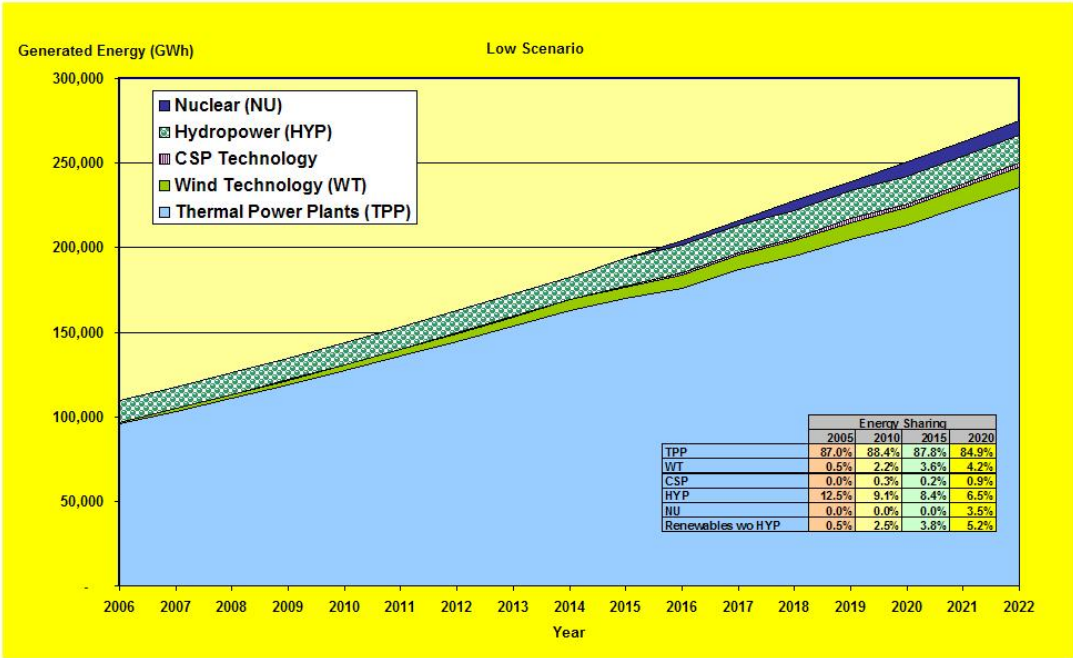
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	Debt	50.00%	Equity	50.00%	
	2006	2010	2015	2020	2022
WT	0.0405	0.0348	0.0319	0.0284	0.0256
CSP	0.1629	0.1565	0.1528	0.1469	0.1285
PV	0.2757	0.2529	0.2299	0.1949	0.1813
Hydro	0.0245	0.0220	0.0207	0.0189	0.0189

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	Grant	35.00%	Equity	65.00%	
	2006	2010	2015	2020	2022
WT	0.0310	0.0266	0.0244	0.0216	0.0195
CSP	0.1255	0.1217	0.1196	0.1154	0.1019
PV	0.2060	0.1889	0.1717	0.1449	0.1348
Hydro	0.0193	0.0173	0.0163	0.0148	0.0148

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Year		2006-2010	2011-2015	2016-2022
CER Costs	WT	45	149	399
	CSP	6	14	81
	HYP	7	29	150
	Total	58	191	630
	Annual Average	52		
Gap Costs	WT	302	881	2,220
	CSP	38	83	452
	HYP	48	170	835
	Total	389	1,134	3,506
	Annual Average	296		

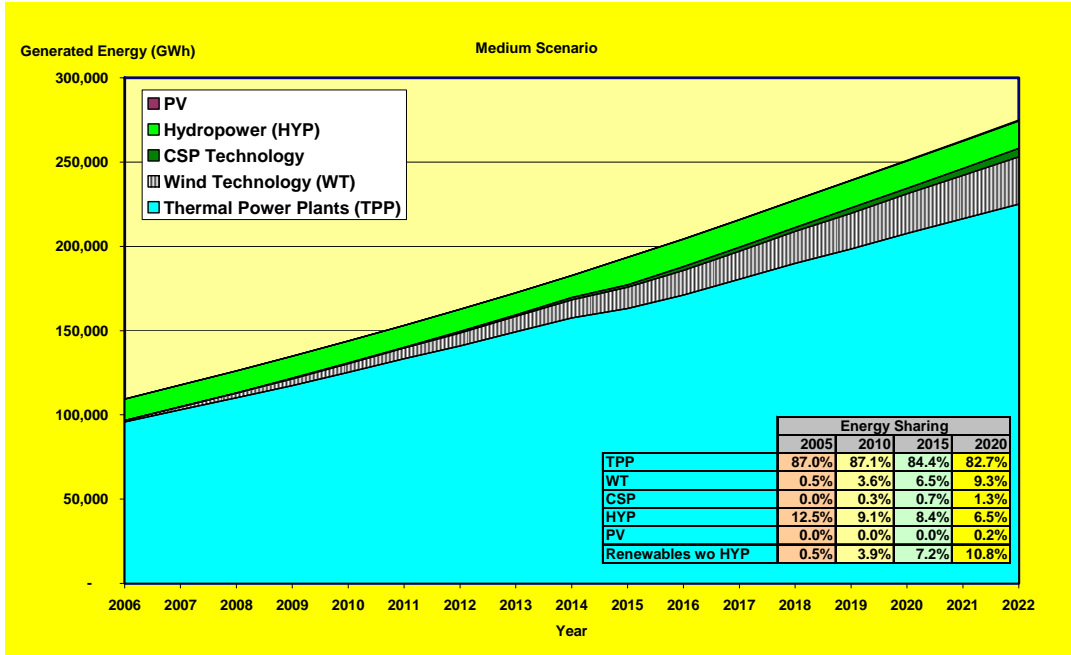
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Year		2006-2010	2011-2015	2016-2022
CER Costs	WT	73	268	882
	CSP	6	31	137
	HYP	7	29	150
	PV	-	-	15
	Total	86	327	1,184
Annual Average		94		
Gap Costs	WT	496	1,590	4,904
	CSP	38	183	764
	HYP	48	170	835
	PV	-	-	82
	Total	582	1,943	6,584
Annual Average		536		

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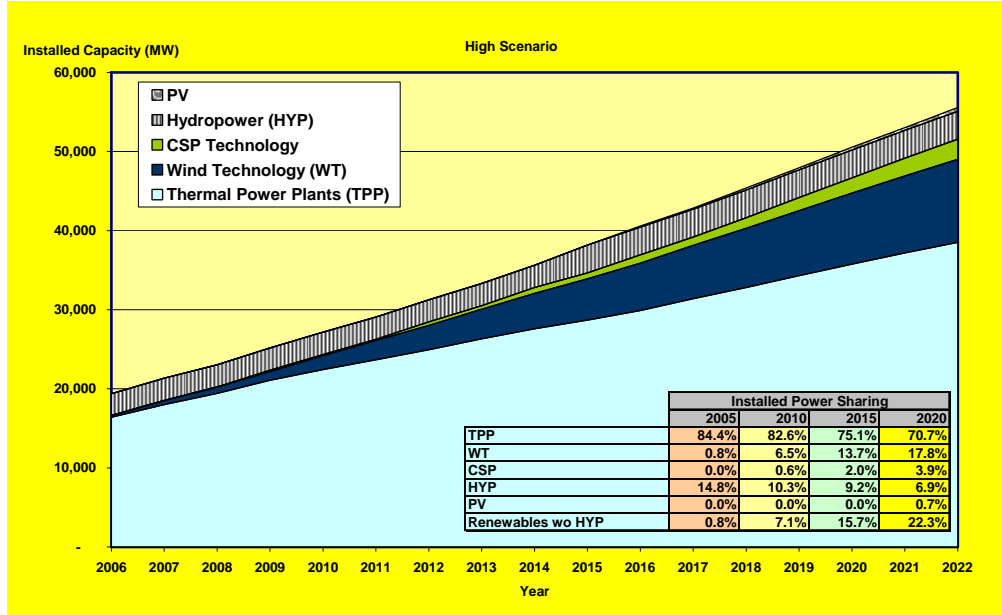
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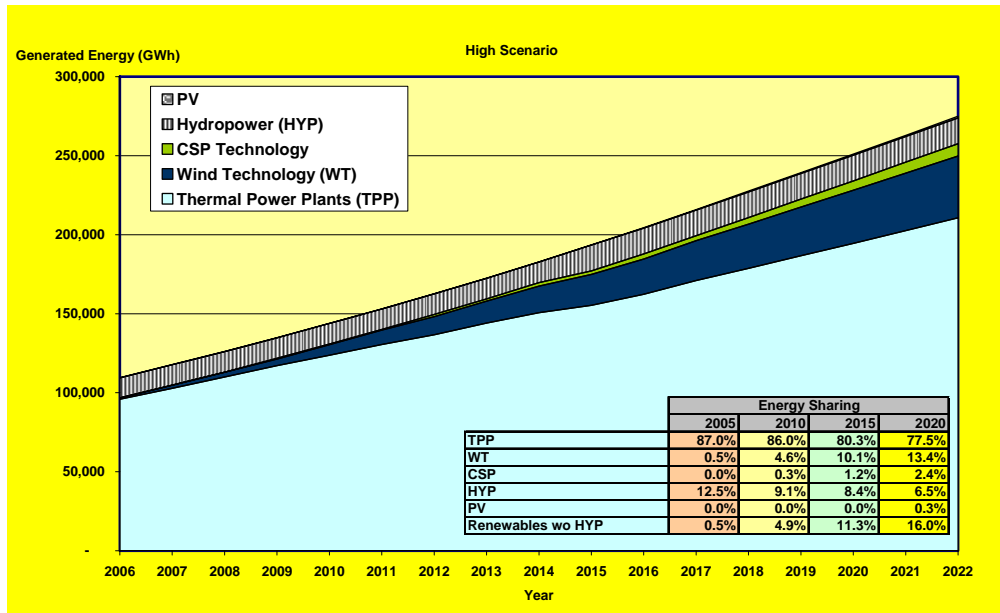
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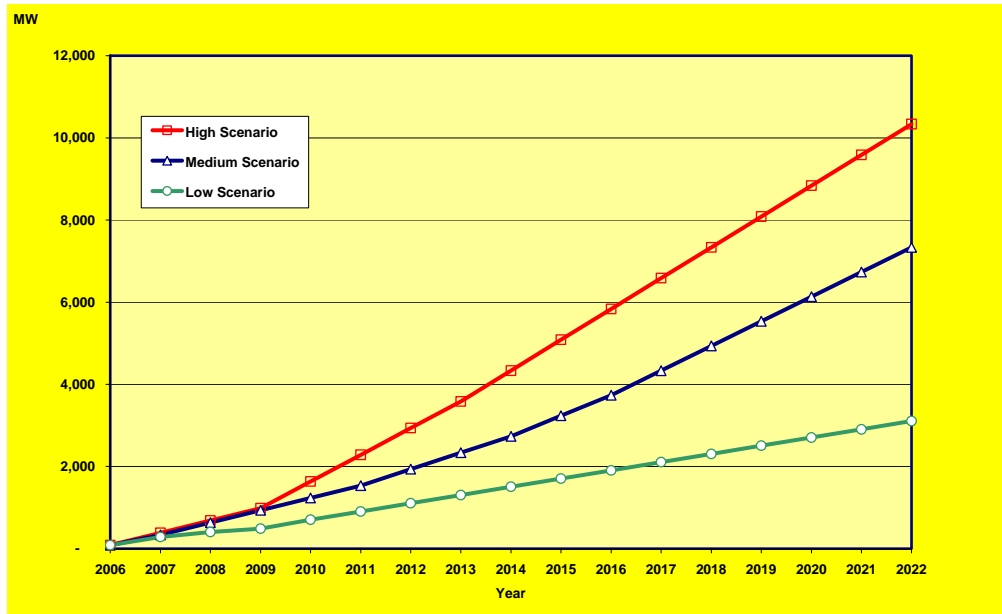
Year		2006-2010	2011-2015	2016-2022
CER Costs	WT	86	415	1,288
	CSP	6	48	221
	HYP	7	29	150
	PV	-	-	27
	Total	99	491	1,686
	Annual Average	134		
Gap Costs	WT	581	2,461	7,164
	CSP	38	283	1,231
	HYP	48	170	835
	PV	-	-	148
	Total	667	2,914	9,378
	Annual Average	762		

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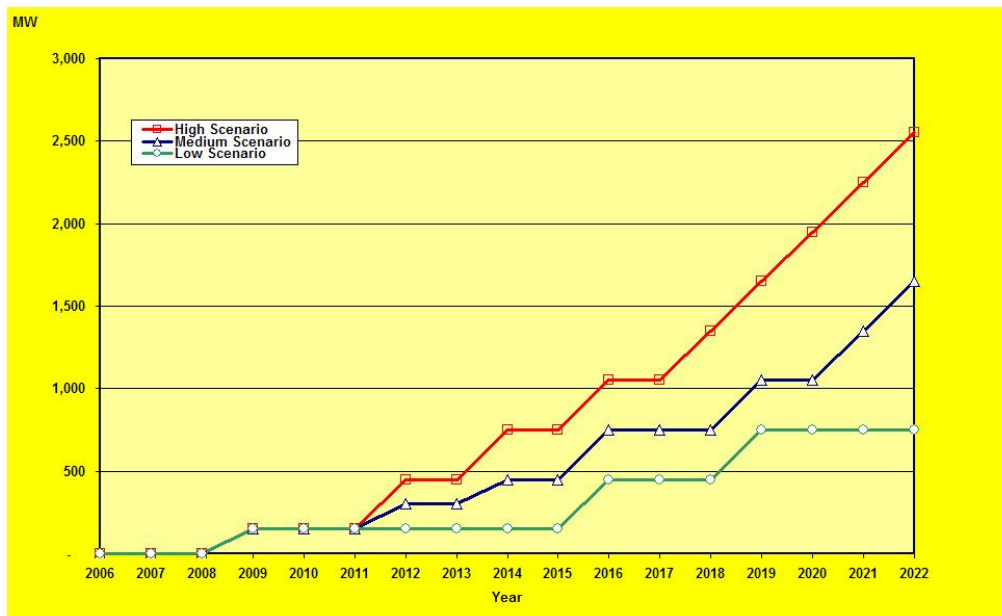
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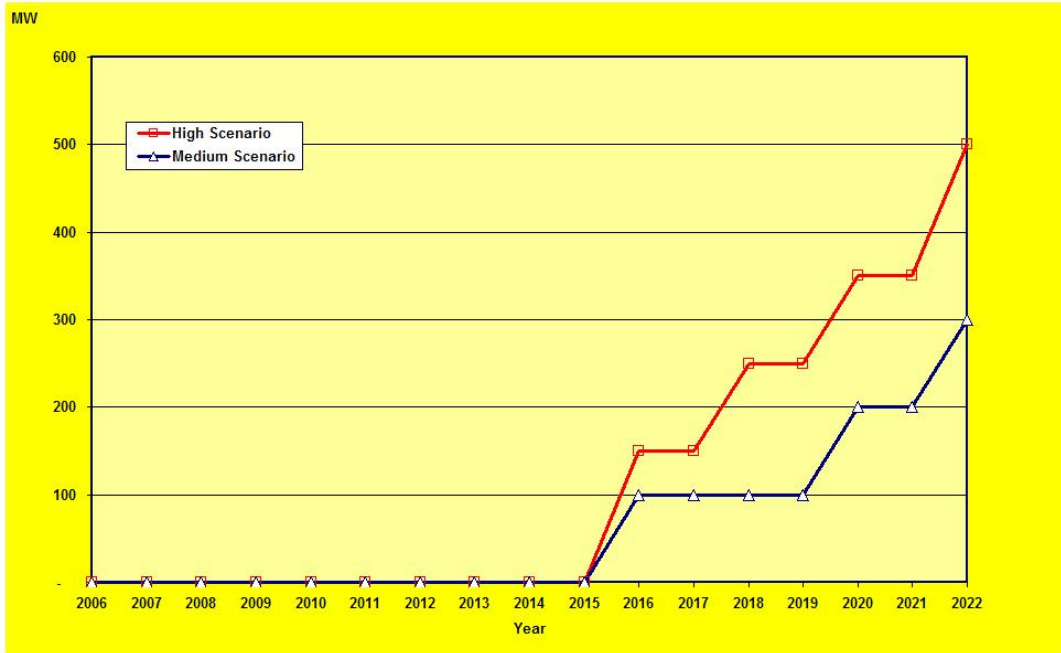
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Scenario	Year	2006-2010	2011-2015	2016-2022
High	WT	2,032	3,857	5,208
	CSP	636	2,419	6,611
	PV	-	-	2,166
	Total	2,667	6,275	13,985
	Annual Average			1,349
Medium	WT	1,547	2,233	4,061
	CSP	636	1,209	4,324
	PV	-	-	1,295
	Total	2,182	3,442	9,680
	Annual Average			900
Low	WT	891	1,119	1,389
	CSP	636	-	2,314
	PV	-	-	-
	Total	1,527	1,119	3,703
	Annual Average			373

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Technology	US\$/year	US\$/Lifetime	Present Value (US\$)	% Reduction in Investment
WT	22,761	569,014	265,242	18.95%
CSP	18,680	467,005	217,691	4.84%
HYP	28,064	701,603	327,047	34.43%
PV	13,343	333,575	155,494	2.59%

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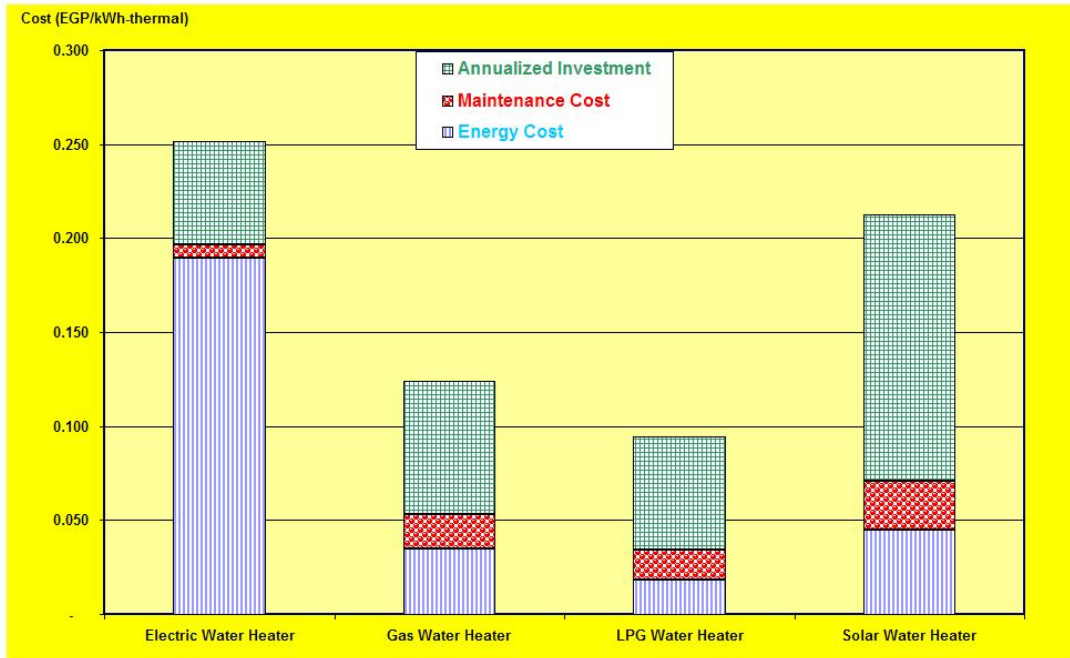
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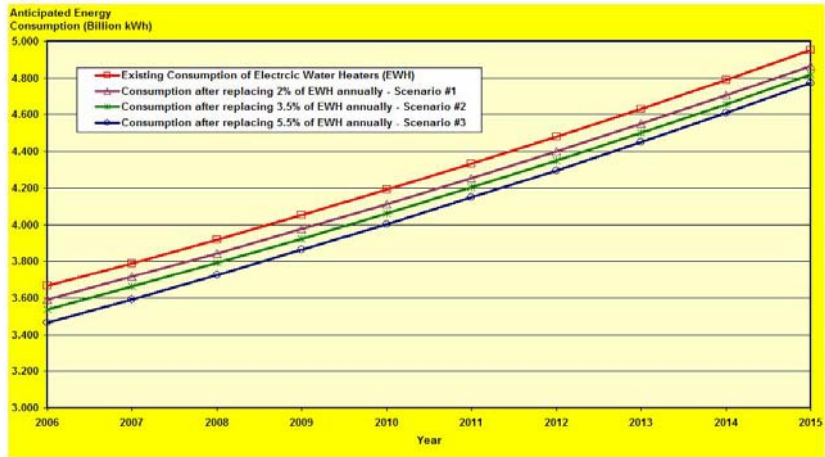
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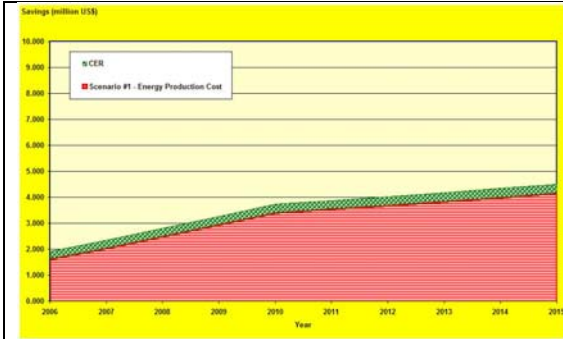
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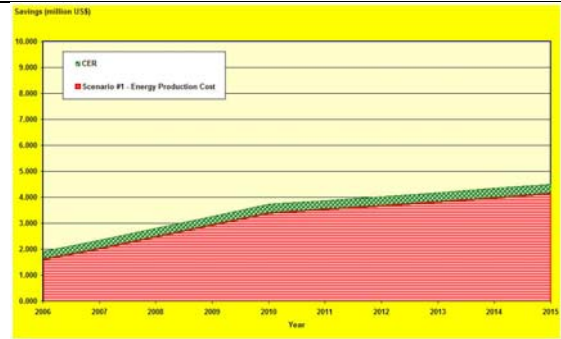
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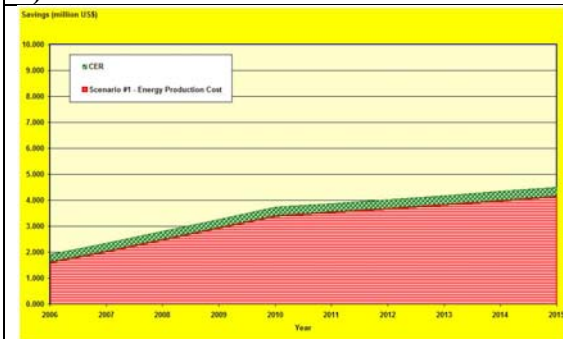
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a) Scenario #1



b) Scenario #2



c) Scenario #3

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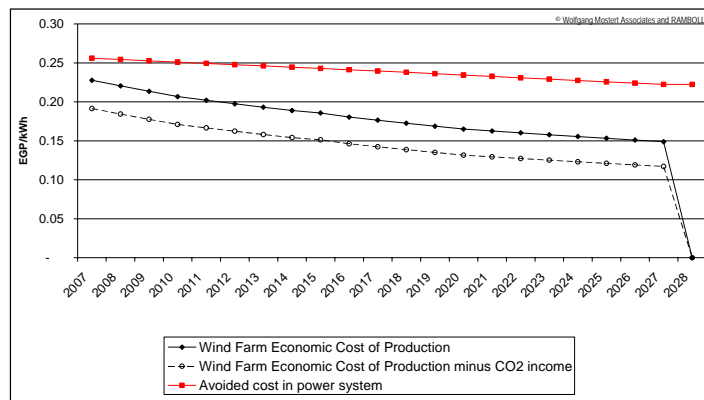
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The minimum cost is 850 USD/kW and maximum is 1,700 USD/kW	Weight per each Factor								Total
	20.00%	10.00%	10.00%	15.00%	15.00%	10.00%	10.00%	10.00%	100.00%
	Local Manufacturing Components					Requirements			International Cost Breakdown
Capability	R&D	Human	Financial	Market Potential	Know How	Technology Transfer	Investment Potential		
Wind Technology Components	90.00%	20.00%	60.00%	20.00%	60.00%	60.00%	90.00%	60.00%	5.25%
Engineering and System Setup	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	18.50%
Machine with its auxiliaries	90.00%	60.00%	60.00%	20.00%	60.00%	90.00%	90.00%	20.00%	13.76%
Blades	60.00%	60.00%	20.00%	20.00%	20.00%	90.00%	90.00%	20.00%	17.33%
Gearbox	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	9.44%
Generator	90.00%	90.00%	90.00%	90.00%	90.00%	90.00%	90.00%	60.00%	12.50%
Metal Tower	90.00%	90.00%	90.00%	90.00%	90.00%	90.00%	90.00%	60.00%	3.22%
Cables, Transformers, and Controls	90.00%	20.00%	60.00%	60.00%	60.00%	20.00%	20.00%	90.00%	14.00%
Civil Work	90.00%	20.00%	90.00%	60.00%	90.00%	20.00%	20.00%	20.00%	6.00%
Mounting and installation	71.11%	44.44%	56.67%	44.44%	56.67%	55.56%	58.89%	41.11%	100.00%
Average Measure per manufacturing component	14.22%	4.44%	5.67%	6.67%	8.50%	5.56%	5.89%	4.11%	Total Local Capability
Weighted Average									55.06%

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Scenario	WT	2006-2010	2011-2015	2016-2022	Total
High	Market Volume	2,032	3,857	5,208	11,096
	Share of Local Manufacturing	45%	55%	65%	
	Investment in Manufacturing Assets	799	1,516	2,047	4,362
	R&D Investment	24	45	61	131
Medium	Market Volume	1,547	2,233	4,061	7,840
	Share of Local Manufacturing	45%	65%	75%	
	Investment in Manufacturing Assets	608	878	1,596	3,082
	R&D Investment	18	26	48	92
Low	Market Volume	891	1,119	1,389	3,399
	Share of Local Manufacturing	45%	65%	75%	
	Investment in Manufacturing Assets	350	440	546	1,336
	R&D Investment	11	13	16	40

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The minimum cost is 3,000 USD/kW and maximum is 6,000 USD/kW	Weight per each Factor								Total
	20.00%	10.00%	10.00%	15.00%	15.00%	10.00%	10.00%	10.00%	100.00%
	Local Manufacturing Components								International Cost Breakdown
	Resources		Market Potential		Requirements		Investment Potential		
	Capability	R&D	Human	Financial	Know How	Technology Transfer			
CSP Technology Components	90.00%	60.00%	60.00%	20.00%	20.00%	60.00%	60.00%	20.00%	14.00%
Engineering and System Setup	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	25.00%
Parabolic Trough	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	0.00%
Dish	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	0.00%
Power Tower	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	0.00%
Thermal Storage System	90.00%	20.00%	60.00%	60.00%	20.00%	60.00%	60.00%	60.00%	24.00%
System controls	90.00%	90.00%	90.00%	90.00%	90.00%	90.00%	90.00%	60.00%	4.00%
Boilers/Heaters	90.00%	90.00%	90.00%	90.00%	90.00%	90.00%	90.00%	60.00%	8.00%
Turbines	60.00%	20.00%	20.00%	20.00%	60.00%	20.00%	60.00%	20.00%	14.00%
Mounting and installation	90.00%	90.00%	90.00%	90.00%	90.00%	20.00%	20.00%	20.00%	11.00%
Average Measure per manufacturing component	63.33%	47.78%	52.22%	47.78%	47.78%	44.44%	48.89%	33.33%	100.00%
Weighted Average	12.67%	4.78%	5.22%	7.17%	7.17%	4.44%	4.89%	3.33%	Total Local Capability 49.67%

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Scenario	CSP	2006-2010	2011-2015	2016-2022	Total
High	Market Volume	636	2,419	6,611	9,666
	Share of Local Manufacturing	45%	55%	65%	
	Investment in Manufacturing Assets	283	1,077	2,944	4,304
	R&D Investment	10	38	103	151
Medium	Market Volume	636	1,209	4,324	6,169
	Share of Local Manufacturing	45%	55%	65%	
	Investment in Manufacturing Assets	283	539	1,925	2,747
	R&D Investment	10	19	67	96
Low	Market Volume	636	-	2,314	2,949
	Share of Local Manufacturing	45%	55%	65%	
	Investment in Manufacturing Assets	283	-	1,030	1,313
	R&D Investment	10	-	36	46

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The minimum cost is 6,000 USD/kW and maximum is 9,500 USD/kW	Weight per each Factor								Total
	20.00%	10.00%	10.00%	15.00%	15.00%	10.00%	10.00%	10.00%	
	Local Manufacturing Components								
Photovoltaic Technology Components	Resources				Requirements				International Cost Breakdown
	Capability	R&D	Human	Financial	Market Potential	Know How	Technology Transfer	Investment Potential	
Engineering and System Setup	90.00%	20.00%	60.00%	60.00%	60.00%	60.00%	60.00%	20.00%	6.67%
Modules	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	55.00%
Inverters	60.00%	20.00%	60.00%	60.00%	60.00%	60.00%	60.00%	60.00%	5.33%
Batteries	90.00%	20.00%	90.00%	90.00%	90.00%	20.00%	20.00%	60.00%	3.00%
Cabling	90.00%	20.00%	90.00%	90.00%	90.00%	20.00%	20.00%	20.00%	4.17%
Module support structure	90.00%	20.00%	90.00%	90.00%	90.00%	20.00%	20.00%	20.00%	5.83%
Mounting and installation	90.00%	20.00%	90.00%	90.00%	90.00%	20.00%	20.00%	20.00%	20.00%
Average Measure per manufacturing component	75.71%	20.00%	71.43%	71.43%	71.43%	31.43%	31.43%	31.43%	100.00%
Weighted Average	15.14%	2.00%	7.14%	10.71%	10.71%	3.14%	3.14%	3.14%	Total Local Capability
									55.14%

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Scenario	PV	2006-2010	2011-2015	2016-2022	Total
High	Market Volume	-	-	2,166	2,166
	Share of Local Manufacturing	30%	35%	45%	
	Investment in Manufacturing Assets	-	-	1,277	1,277
	R&D Investment	8	10	51	69
Medium	Market Volume	-	-	1,295	1,295
	Share of Local Manufacturing	30%	35%	45%	
	Investment in Manufacturing Assets	-	-	764	764
	R&D Investment	5	6	31	41

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The minimum cost is 500 USD/kW and maximum is 4,000 USD/kW	Weight per each Factor								Total
	20.00%	10.00%	10.00%	15.00%	15.00%	10.00%	10.00%	10.00%	100.00%
	Local Manufacturing Components								International Cost Breakdown
Biomass Technology Components	Capability	R&D	Resources		Market Potential	Requirements		Investment Potential	
			Human	Financial		Know How	Technology Transfer		
Engineering and System Setup	90.00%	20.00%	60.00%	20.00%	60.00%	60.00%	90.00%	60.00%	8.00%
Collection System	90.00%	20.00%	90.00%	60.00%	90.00%	20.00%	20.00%	60.00%	33.00%
Technology Applied	90.00%	20.00%	60.00%	20.00%	60.00%	90.00%	90.00%	90.00%	40.00%
Civil Work	90.00%	20.00%	90.00%	60.00%	60.00%	90.00%	60.00%	90.00%	12.00%
Mounting and installation	90.00%	20.00%	90.00%	60.00%	90.00%	20.00%	20.00%	20.00%	7.00%
Average Measure per manufacturing component	90.00%	20.00%	78.00%	44.00%	72.00%	56.00%	56.00%	64.00%	100.00%
Weighted Average	18.00%	2.00%	7.80%	6.60%	10.80%	5.60%	5.60%	6.40%	Total Local Capability 62.80%

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The minimum cost is 150 USD/m ² and maximum is 800 USD/m ²	Weight per each Factor								Total
	20.00%	10.00%	10.00%	15.00%	15.00%	10.00%	10.00%	10.00%	100.00%
	Local Manufacturing Components								International Cost Breakdown
Solar Water Heater Components	Capability	R&D	Resources		Market Potential	Requirements		Investment Potential	
			Human	Financial		Know How	Technology Transfer		
Engineering and System Setup	90.00%	20.00%	90.00%	60.00%	60.00%	60.00%	90.00%	60.00%	6.00%
Collector	90.00%	60.00%	90.00%	60.00%	90.00%	60.00%	60.00%	60.00%	21.50%
Water Heating System	90.00%	60.00%	60.00%	60.00%	60.00%	90.00%	90.00%	60.00%	24.00%
Storage System	90.00%	60.00%	90.00%	60.00%	90.00%	90.00%	90.00%	60.00%	18.00%
Pumps, Valves, Auxiliaries	60.00%	20.00%	60.00%	20.00%	20.00%	60.00%	60.00%	60.00%	16.00%
Supplementary Electric Heater	90.00%	90.00%	90.00%	90.00%	60.00%	90.00%	90.00%	60.00%	5.00%
Controls	90.00%	90.00%	90.00%	90.00%	60.00%	90.00%	90.00%	60.00%	5.50%
Mounting and installation	90.00%	20.00%	90.00%	60.00%	90.00%	20.00%	20.00%	20.00%	4.00%
Average Measure per manufacturing component	86.25%	52.50%	82.50%	62.50%	66.25%	70.00%	73.75%	55.00%	100.00%
Weighted Average	17.25%	5.25%	8.25%	9.38%	9.94%	7.00%	7.38%	5.50%	Total Local Capability 69.94%

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Scenario	SWH	2006-2010	2011-2015	2016-2022	Total
High	Market Volume	116	116	232	464
	Share of Local Manufacturing	95%	95%	95%	
	Investment in Manufacturing Assets	80	20	80	180
	R&D Investment	4	1	4	9

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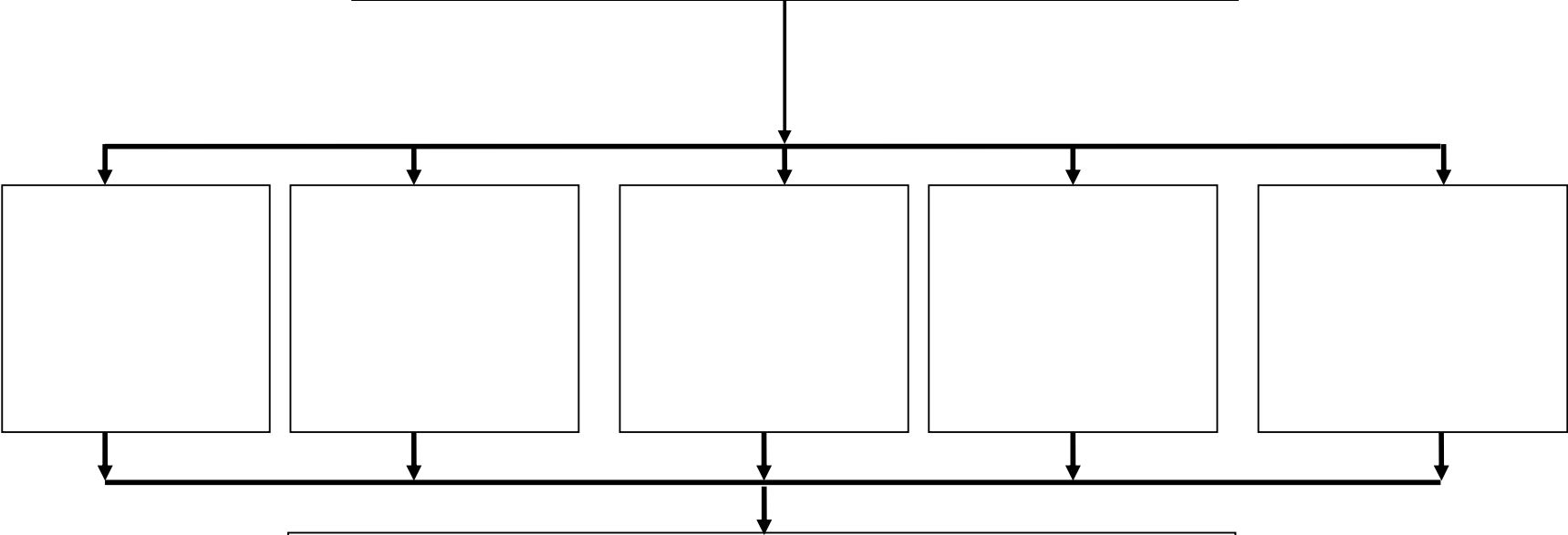
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ID	Task Name	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	
1	Activity/Technology	▶											
2	Policy Setup	█											
3	Policy Review							█	█				
4	Laws and Regulations			█	█	█	█	█	█				
5	Awareness and Promotion	█											
6	Education and Training	█											
7	Prototype Manufacturing and Learning (CSP)	█											
8	Local Manufacturing (with continuous Inn. and R&D)	▶											
9	Solar Water Heaters (70% Components)	█											
10	Concentrated Solar Power (30% Components)						█	█	█	█	█	█	
11	Wind Energy (40% Component)			█	█	█	█	█	█	█	█	█	
12	Photovoltaic Systems (20% Components)						█	█	█	█	█	█	
13	Biomass Units (50% Component)	█											
14	Import/ Joint Venture (with know-how transfer)	▶											
15	Solar Water Heaters (30% Components)	█											
16	Concentrated Solar Power (70% Components)						█	█	█	█	█	█	
17	Wind Energy (60% Component)			█	█	█	█	█	█	█	█	█	
18	Photovoltaic Systems (80% Components)						█	█	█	█	█	█	
19	Biomass Units (50% Component)	█											

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ID	Task Name	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	
1	Activity/Component	[Solid black bar]											
2	Policy Setup	[Blue bar]											
3	Policy Review	[Blue bar]											
4	Laws and Regulations	[Blue bar]											
5	Awareness and Promotion	[Blue bar]											
6	Education and Training	[Blue bar]											
7	Local Manufacturing (with continuous Inn. and R&D)	[Solid black bar]											
8	Glass	[Blue bar]											
9	Absorber plates	[Blue bar]											
10	Selective coating	[Blue bar]											
11	Tanks	[Blue bar]											
12	Pumps/Control	[Blue bar]											
13	Insulation	[Blue bar]											
14	Electric Heaters and Control	[Blue bar]											
15	Auxiliaries	[Blue bar]											
16	Import/ Joint Venture (with know-how transfer)	[Solid black bar]											
17	Glass	[Blue bar]											
18	Absorber plates	[Blue bar]											
19	Selective coating	[Blue bar]											
20	Tanks	[Blue bar]											
21	Pumps/Control	[Blue bar]											
22	Insulation	[Blue bar]											
23	Electric Heaters and Control	[Blue bar]											
24	Auxiliaries	[Blue bar]											

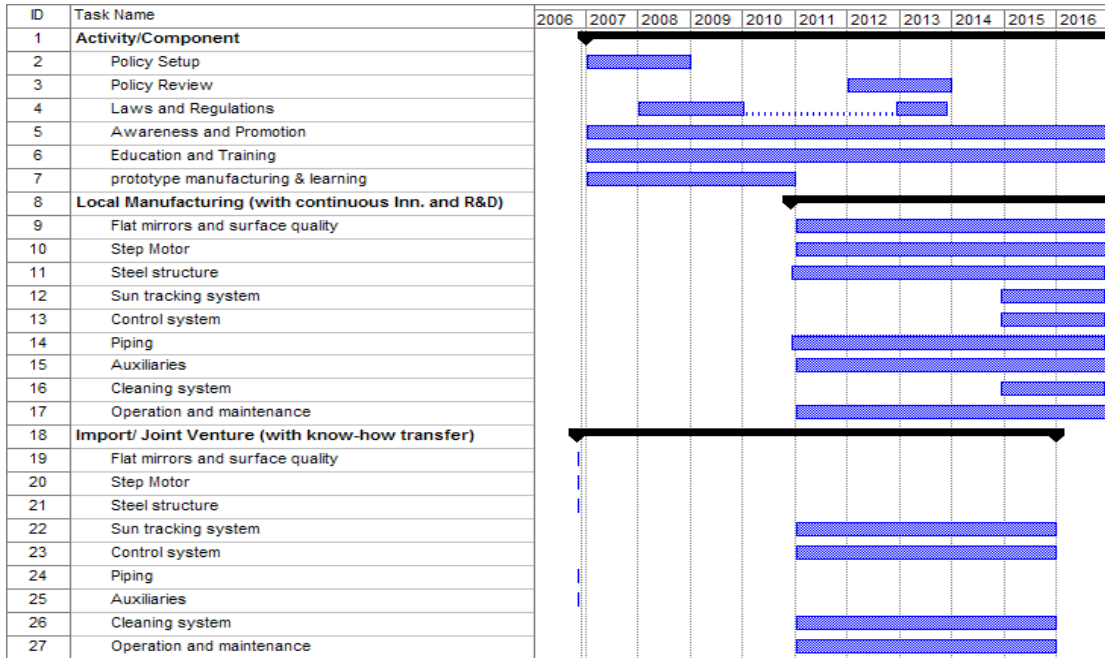
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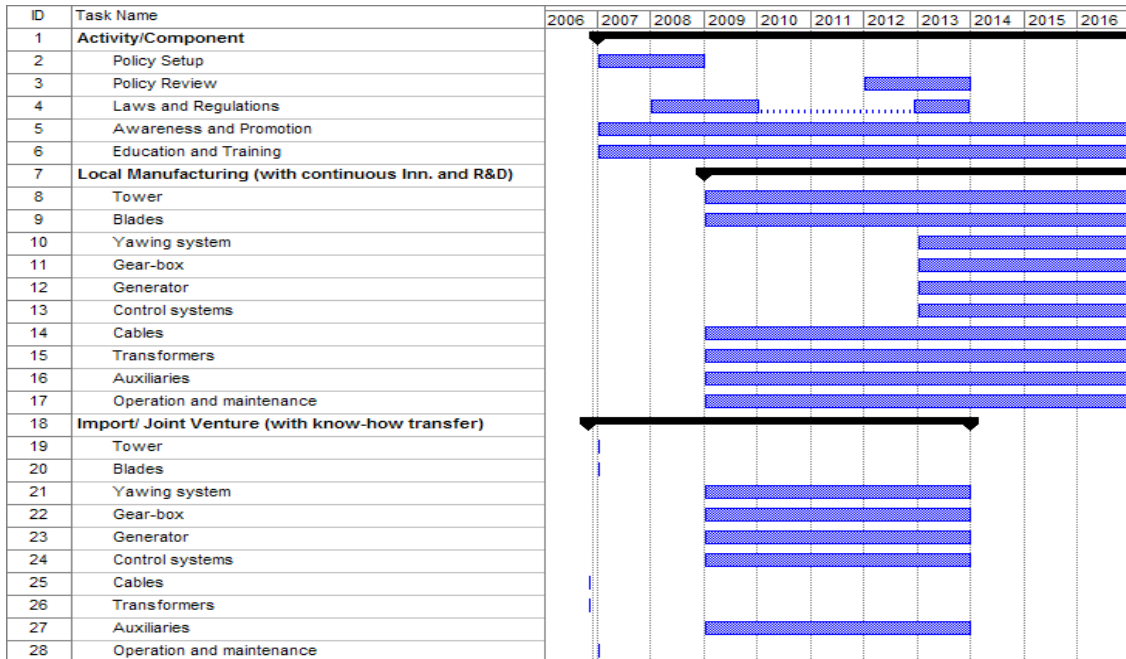
ID	Task Name	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	
1	Activity/Component	[Solid black bar]											
2	Policy Setup	[Blue bar]											
3	Policy Review	[Blue bar]											
4	Laws and Regulations	[Blue bar]											
5	Awareness and Promotion	[Blue bar]											
6	Education and Training	[Blue bar]											
7	Prototype manufacturing & learning	[Blue bar]											
8	Local Manufacturing (with continuous Inn. and R&D)	[Solid black bar]											
9	Reflector material and glass	[Blue bar]											
10	Vacuum and absorber tube	[Blue bar]											
11	Rotary Joints	[Blue bar]											
12	Step Motor	[Blue bar]											
13	Steel structure	[Blue bar]											
14	Sun tracking system	[Blue bar]											
15	Control system	[Blue bar]											
16	Piping	[Blue bar]											
17	Auxiliaries	[Blue bar]											
18	Trough cleaning system	[Blue bar]											
19	Operation and maintenance	[Blue bar]											
20	Import/ Joint Venture (with know-how transfer)	[Solid black bar]											
21	Reflector material and glass	[Blue bar]											
22	Vacuum and absorber tube	[Blue bar]											
23	Rotary Joints	[Blue bar]											
24	Step Motor	[Blue bar]											
25	Steel structure	[Blue bar]											
26	Sun tracking system	[Blue bar]											
27	Control system	[Blue bar]											
28	Piping	[Blue bar]											
29	Auxiliaries	[Blue bar]											
30	Trough cleaning system	[Blue bar]											
31	Operation and maintenance	[Blue bar]											

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ID	Task Name	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	
1	Activity/Component	[Timeline bar]											
2	Policy Setup	[Timeline bar]											
3	Policy Review	[Timeline bar]											
4	Laws and Regulations	[Timeline bar]											
5	Awareness and Promotion	[Timeline bar]											
6	Education and Training	[Timeline bar]											
7	Local Manufacturing (with continuous Inn. and R&D)	[Timeline bar]											
8	Solar Cells	[Timeline bar]											
9	Modules/Array Assembly	[Timeline bar]											
10	System Integrators	[Timeline bar]											
11	Import/ Joint Venture (with know-how transfer)	[Timeline bar]											
12	Solar Cells	[Timeline bar]											
13	Modules/Array Assembly	[Timeline bar]											
14	System Integrators	[Timeline bar]											

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ID	Task Name	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	
1	Activity/Technology	[Timeline bar]											
2	Policy Setup	[Timeline bar]											
3	Policy Review	[Timeline bar]											
4	Laws and Regulations	[Timeline bar]											
5	Awareness and Promotion	[Timeline bar]											
6	Education and Training	[Timeline bar]											
7	Prototype Manufacturing and Learning (CSP)	[Timeline bar]											
8	Local Manufacturing (with continuous Inn. and R&D)	[Timeline bar]											
9	Solar Water Heaters (70% Components)	[Timeline bar]											
10	Concentrated Solar Power (30% Components)	[Timeline bar]											
11	Wind Energy (40% Component)	[Timeline bar]											
12	Photovoltaic Systems (20% Components)	[Timeline bar]											
13	Biomass Units (50% Component)	[Timeline bar]											
14	Import/ Joint Venture (with know-how transfer)	[Timeline bar]											
15	Solar Water Heaters (30% Components)	[Timeline bar]											
16	Concentrated Solar Power (70% Components)	[Timeline bar]											
17	Wind Energy (60% Component)	[Timeline bar]											
18	Photovoltaic Systems (80% Components)	[Timeline bar]											
19	Biomass Units (50% Component)	[Timeline bar]											

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	Technology of Power Generation	Anticipated Savings		Anticipated Cost Savings (million US\$)		Anticipated Avoided Subsidy (million US\$)		Generated Energy via RET (million kWh)
		TOE (million)	CO ₂ (million tons)	Opportunity Cost for Export	Certified Emission Reduction	*Business as Usual	**Fuel Prices Liberation to close the Gap	
High Scenario	Wind	67	179	17,299	1,789	13,311	5,292	293,608
	CSP	10	27	2,656	275	2,043	751	45,070
	PV	1	3	258	27	199	62	4,380
	Total	78	209	20,213	2,090	15,553	6,105	343,059
Medium Scenario	Wind	46	122	11,830	1,223	9,103	3,648	200,776
	CSP	7	17	1,680	174	1,293	485	28,514
	PV	0.6	1.5	142	15	109	34	2,409
	Total	53	141	13,652	1,412	10,505	4,167	231,699
Low Scenario	Wind	22	59	5,728	592	4,408	1,840	97,222
	CSP	4	10	975	101	751	283	16,556
	PV	-	-	-	-	-	-	-
	Total	26	69	6,704	693	5,158	2,123	113,778



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www.eeiggr.org
National Authority of Urban Development and new Communities : www.nuca.com.eg
Housing and Building Research Institute : www.hbrc.edu.eg
Authority for Real State Finance : <http://www.eltamir.com>
State Ministry for Environmental Affairs : www.eeaa.gov.eg
Central Agency for Public Mobilization and Statistics: www.capmas.gov.eg

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