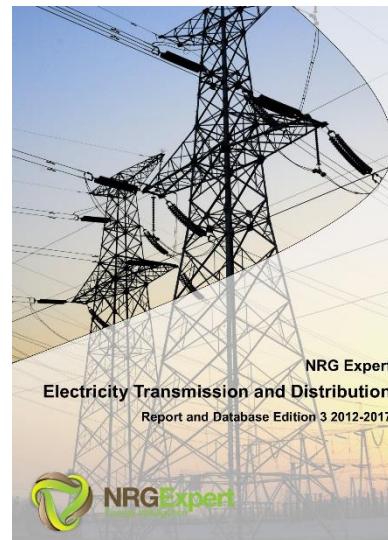


NRG Expert Transmission and Distribution Report and Database Edition 3, 2013

Market Intelligence

T&D networks are continuously evolving in both size and nature. They must grow in order to cope with ever rising demand. In the past where it was a matter of adding more lines, trans-formers and ancillary equipment, today the technology of the systems is often able to substitute increased sophistication for physical growth, or to reduce the additions required by making the system more efficient.

This NRG Expert Database and accompanying report allow you to make key business decisions based on our forecasts and analysis of the Electricity T&D Market. Our team of analysts, backed by the vast data we have collected, have created this industry analysis and forecasted data to 2017 for key sectors of the industry.



The Database

The database is the main focus of the product and as such contains the important forecast information and current figures. The database consists of 1 **Global Data Summary** and 9 individual **Region** Microsoft® Excel (.xlsx) files.

Global Data Summary

The **Global Data Summary** file contains three tabs:

- Annual Demand
- Line Lengths
- Capex

The *Annual Demand* tab shows a regional and by-country overview of the annual demand 2012 actual figures and forecasts for 2013-2017 in 2012 United States Dollars (USD) as broken down into the 9 sectors defined by NRG Expert: Transformers, Power Systems, Utility Automation, Cables, Switchgear, Sub-Stations, Towers, Insulators, and Meters. Scroll right in the spreadsheet to access all sectors.

The *Line Lengths* tab gives a global overview of the total installed line lengths in both the Transmission and Distribution categories separately. The year 2012 shows actual figures with forecasts from 2013-2017.

The *Capex* tab follows a similar format as the Annual Demand tab and shows Capital Expenditure in the T&D industry by region and by country presenting 2012 actual and 2013-2017 forecast figures in 2011 USD.

Region Files

Each region file contains a tab with *T&D Company Listings* for that country, a breakdown of the *Annual Demand* and *Capex* figures of countries of that region (mirroring the data contained in the *Global Data Summary*) followed by individual tabs for each country in the region.

Country Profiles

NRG Expert has compiled data in the T&D Sector for **180 countries** broken down into 9 regions. The country profiles contain:

- Transmission¹ and Distribution line-length (installed KMs) data:

Transmission Installed Base (km)	2012	2013	2014	2015	2016	2017
	5,162	5,266	5,405	5,472	5,593	5,697
Distribution Installed Base (km)	2012	2013	2014	2015	2016	2017
	34,225	34,602	35,016	35,363	35,717	36,062
Line Extension (km)	2012	2013	2014	2015	2016	2017
Transmission	72	104	139	67	120	104
Distribution	134	376	414	346	353	344

- Capex (2012 actuals forecast to 2017 in 2012 USD) data:

Capex (2012 Million US\$)	2012	2013	2014	2015	2016	2017
	130	137	153	145	164	172

- Annual Demand (2012 actuals forecast to 2017 in 2012 USD) data:

Annual Demand (2012 Million US\$)	2012	2013	2014	2015	2016	2017
Transformers	12.80	13.09	14.04	15.96	14.44	15.14
Switchgear	9.75	11.90	10.50	11.25	11.40	11.92
Cables	21.28	23.78	26.04	26.40	27.20	28.70
Insulators	5.67	6.32	6.48	6.93	7.29	7.67
Towers	2.52	2.31	2.49	2.25	2.25	2.25
Utility Automation	8.40	8.00	8.91	9.48	10.20	10.80
Power Systems	13.94	14.40	15.01	16.59	16.17	17.07
Sub Stations	6.75	7.80	9.24	8.36	8.47	8.82
Meters	0.79	0.82	1.64	1.66	1.50	1.72

- Generation Capacity (Installed MW Capacity) data:

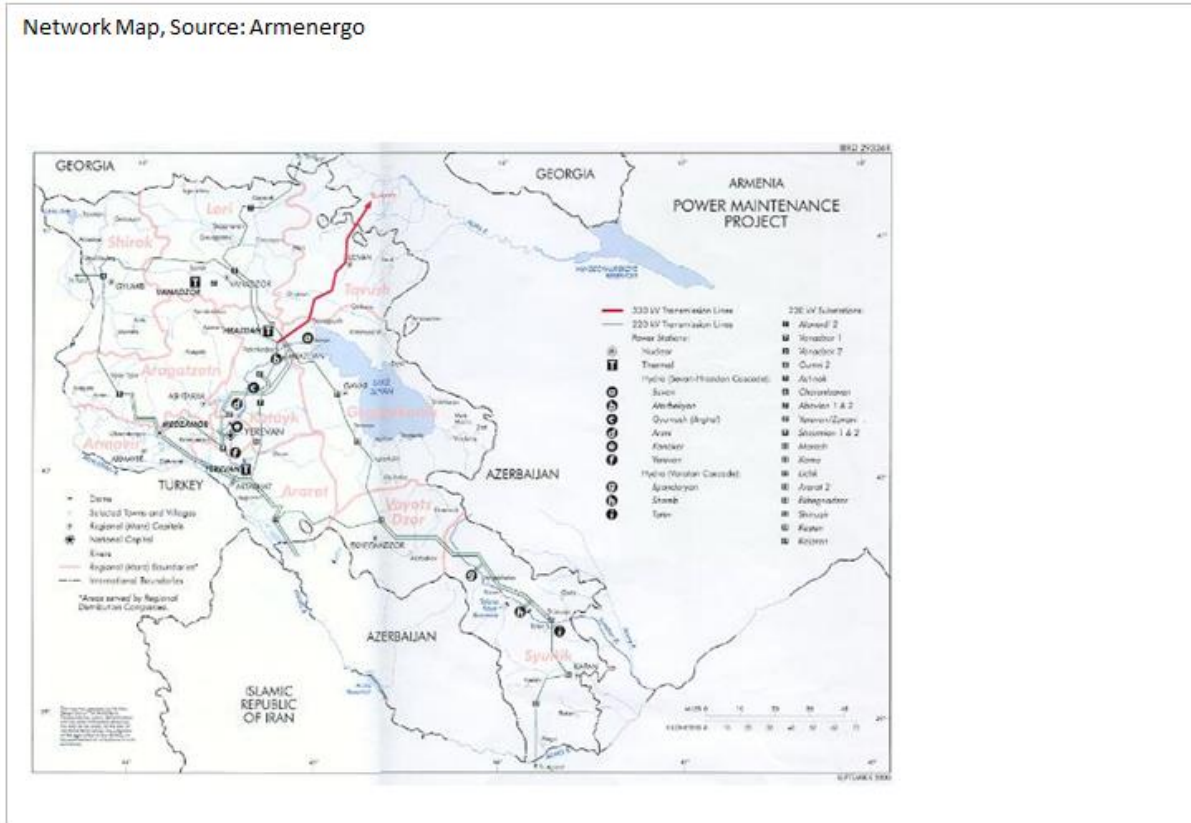
Generation Capacity (MW)	2012	2013	2014	2015	2016	2017	2018	2019	2020
Coal	-	-	-	-	-	-	-	-	-
Oil	50	50	50	50	50	50	50	50	50
Diesel	-	-	-	-	-	-	-	-	-
Gas	2,095	2,179	2,266	2,357	2,451	2,549	2,651	2,757	2,868
of which Multi fuel	-	-	-	-	-	-	-	-	-
Pumped storage	-	-	-	-	-	-	-	-	-
Hydro	1,232	1,300	1,375	1,421	1,050	1,050	1,050	1,050	1,050
Nuclear	395	395	395	395	395	1,200	1,200	1,200	1,200
Wind	42	42	42	42	42	42	42	42	42
Solar Thermal	-	-	-	-	-	-	-	-	-
Solar PV	-	-	-	-	-	-	-	-	-
Biomass	-	-	-	-	-	-	-	-	-
MSW & other waste	-	-	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-	-	-
Ocean/tidal	-	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-	-

¹ Where applicable

- Voltage Breakdown and Overhead Underground Analysis²

Trunk transmission		Transmission			All Transmission			Distribution		Reticulation		Transmission	Distribution
330 kV >	200-275 kV	110-161 kV	Sub-Trans 45-90 kV	OH line	UG cable	Subsea	MV OH	MV UG	LV OH	LV UG			
4%	28%	68%	0%	100%	0%	0%	38%	15%	41%	7%	12%	88%	

- Network Maps²



- Listings of Grid Interconnections²

Country	Connection Type	Operational state
Azerbaijan	Line HVL-330 kV (100 km)	Out of Service
	Line HVL-220 kV (63 km)	Out of Service
	Line HVL-110 kV (98 km)	Out of Service
	Line HVL-110 kV (30 km)	Out of Service
Georgia	One line HVL-220 kV (65 km)	Operational
	One line HVL-110 kV (35 km)	Operational
	One line HVL-110 kV (19 km)	Operational
Turkey	One line HVL-220 kV (65 km)	Out of Service
Iran	One line HVL-220 kV (78 km)	Operational
	One line HVL-220 kV	Operational

² Not available for All Countries. Please refer to the NRG Expert T&D Database Guide for complete listing

Countries Covered in the Database

Country	Trans. Inst. Base	Dist. Inst. Base	Capex	Annual Demand	Gencap	OV/UG/V	Network Map	Grid Interconnections
Afghanistan	o	o	o	o	o	o	o	
Albania	o	o	o	o	o	o	o	
Algeria	o	o	o	o	o			o
Angola	o	o	o	o	o			
Argentina	o	o	o	o	o	o		
Armenia	o	o	o	o	o	o	o	o
Australia	o	o	o	o	o	o		
Austria	o	o	o	o	o	o	o	o
Azerbaijan	o	o	o	o	o	o	o	o
Bahamas	o	o	o	o	o			
Bahrain	o	o	o	o	o	o		
Bangladesh	o	o	o	o	o	o	o	
Barbados	o	o	o	o	o			
Belarus	o	o	o	o	o	o	o	o
Belgium	o	o	o	o	o	o	o	o
Belize	o	o	o	o	o			
Benin	o	o	o	o	o			
Bermuda	o	o	o	o	o	o		
Bhutan	o	o	o	o	o	o	o	
Bolivia	o	o	o	o	o			
Bosnia & Herzegovina	o	o	o	o	o	o	o	
Botswana	o	o	o	o	o			
Brazil	o	o	o	o	o	o		
Brunei	o	o	o	o	o		o	
Bulgaria	o	o	o	o	o	o	o	o
Burkina Faso	o	o	o	o	o			
Burundi	o	o	o	o	o			
Cambodia	o	o	o	o	o	o	o	
Cameroon	o	o	o	o	o			
Canada	o	o	o	o	o	o		
Central African Republic	o	o	o	o	o			

Country	Trans. Inst. Base	Dist. Inst. Base	Capex	Annual Demand	Gencap	OV/UG/V	Network Map	Grid Interconnections
Chad	o	o	o	o	o			
Chile	o	o	o	o	o			
China	o	o	o	o	o	o		
Colombia	o	o	o	o	o			
Congo	o	o	o	o	o			
Congo DR	o	o	o	o	o			
Costa Rica	o	o	o	o	o			
Côte d'Ivoire	o	o	o	o	o			
Croatia	o	o	o	o	o	o	o	o
Cuba	o	o	o	o	o			
Cyprus	o	o	o	o	o	o	o	o
Czech Republic	o	o	o	o	o	o	o	o
Denmark	o	o	o	o	o	o	o	o
Djibouti	o	o	o	o	o	o	o	o
Dominican Republic	o	o	o	o	o			
Ecuador	o	o	o	o	o			
Egypt	o	o	o	o	o			
El Salvador	o	o	o	o	o			
Equatorial Guinea		o	o	o	o			
Estonia	o	o	o	o	o	o	o	o
Ethiopia	o	o	o	o	o			o
Fiji	o	o	o	o	o			
Finland	o	o	o	o	o	o	o	o
France	o	o	o	o	o	o	o	o
French Guyana	o	o	o	o	o			
Gabon	o	o	o	o	o			
Gambia	o	o	o	o	o			
Georgia	o	o	o	o	o	o	o	
Germany	o	o	o	o	o	o	o	o
Ghana	o	o	o	o	o			
Greece	o	o	o	o	o	o	o	o
Guadeloupe	o	o	o	o	o			

Country	Trans. Inst. Base	Dist. Inst. Base	Capex	Annual Demand	Gencap	OV/UG/V	Network Map	Grid Interconnections
Guatemala	o	o	o	o	o			
Guinea	o	o	o	o	o			
Guinea Bissau		o	o	o	o			
Guyana	o	o	o	o	o			
Haïti	o	o	o	o	o			
Honduras	o	o	o	o	o			
Hong Kong	o	o	o	o	o			
Hungary	o	o	o	o	o	o	o	o
Iceland	o	o	o	o	o	o	o	
India	o	o	o	o	o	o	o	
Indonesia	o	o	o	o	o		o	
Iran	o	o	o	o	o	o	o	
Iraq	o	o	o	o	o			
Ireland	o	o	o	o	o	o	o	
Israel	o	o	o	o	o	o		
Italy	o	o	o	o	o	o	o	o
Jamaica	o	o	o	o	o			
Japan	o	o	o	o	o	o	o	
Jordan	o	o	o	o	o	o		
Kazakhstan	o	o	o	o	o	o	o	
Kenya	o	o	o	o	o			
Korea - North	o	o	o	o	o		o	
Korea - South	o	o	o	o	o	o	o	
Kuwait	o	o	o	o	o	o		
Kyrgyzstan	o	o	o	o	o	o	o	
Laos	o	o	o	o	o	o		
Latvia	o	o	o	o	o	o	o	o
Lebanon	o	o	o	o	o			
Lesotho	o	o	o	o	o			
Liberia	o	o	o	o	o			
Libya	o	o	o	o	o			o

Country	Trans. Inst. Base	Dist. Inst. Base	Capex	Annual Demand	Gencap	OV/UG/V	Network Map	Grid Interconnections
Lithuania	o	o	o	o	o	o	o	o
Luxembourg	o	o	o	o	o	o		
Macau	o	o	o	o	o	o		
Macedonia	o	o	o	o	o	o	o	o
Madagascar	o	o	o	o	o			
Malawi	o	o	o	o	o			
Malaysia	o	o	o	o	o	o		
Maldives		o	o	o	o			
Mali	o	o	o	o	o			
Malta	o	o	o	o	o	o	o	
Mauritania	o	o	o	o	o			
Mauritius	o	o	o	o	o			
Mexico	o	o	o	o	o	o		
Moldova	o	o	o	o	o	o	o	
Mongolia	o	o	o	o	o			
Morocco	o	o	o	o	o			o
Mozambique	o	o	o	o	o			
Myanmar	o	o	o	o	o			
Namibia	o	o	o	o	o			
Nepal	o	o	o	o	o		o	
Netherlands	o	o	o	o	o	o	o	o
Netherlands Antilles	o	o	o	o	o			
New Caledonia	o	o	o	o				
New Zealand	o	o	o	o	o	o		
Nicaragua	o	o	o	o	o			
Niger	o	o	o	o	o			
Nigeria	o	o	o	o	o	o		
Norway	o	o	o	o	o	o		
Oman	o	o	o	o	o	o	o	
Pakistan	o	o	o	o	o	o	o	
Panama	o	o	o	o	o			
Papua New Guinea	o	o	o	o	o			

Country	Trans. Inst. Base	Dist. Inst. Base	Capex	Annual Demand	Gencap	OV/UG/V	Network Map	Grid Interconnections
Paraguay	o	o	o	o	o			
Peru	o	o	o	o	o			
Philippines	o	o	o	o	o		o	
Poland	o	o	o	o	o	o	o	o
Portugal	o	o	o	o	o	o	o	o
Puerto Rico	o	o	o	o	o			
Qatar	o	o	o	o	o	o		
Romania	o	o	o	o	o	o	o	o
Russia	o	o	o	o	o	o	o	o
Rwanda	o	o	o	o	o			
Sao Tome & Principe	o	o	o	o	o			
Saudi Arabia	o	o	o	o	o	o	o	
Senegal	o	o	o	o	o			
Serbia & Montenegro	o	o	o	o	o	o	o	o
Seychelles	o	o	o	o	o			
Sierra Leone	o	o	o	o	o			
Singapore	o	o	o	o	o	o		
Slovakia	o	o	o	o	o	o	o	o
Slovenia	o	o	o	o	o	o	o	o
Solomon Islands	o	o	o	o	o			
Somalia	o	o	o	o	o			
South Africa	o	o	o	o	o	o		
Spain	o	o	o	o	o	o	o	o
Sri Lanka	o	o	o	o	o	o		
St. Lucia	o	o	o	o	o			
Sudan	o	o	o	o	o			
Suriname	o	o	o	o	o			
Swaziland	o	o	o	o	o			
Sweden	o	o	o	o	o	o		
Switzerland	o	o	o	o	o	o	o	
Syria	o	o	o	o	o	o		o
Taiwan	o	o	o	o	o	o	o	

Country	Trans. Inst. Base	Dist. Inst. Base	Capex	Annual Demand	Gencap	OV/UG/V	Network Map	Grid Interconnections
Tajikistan	o	o	o	o	o	o		
Tanzania	o	o	o	o	o			
Thailand	o	o	o	o	o	o	o	
Togo	o	o	o	o	o			
Tonga	o	o			o			
Trinidad & Tobago	o	o	o	o	o			
Tunisia	o	o	o	o	o			o
Turkey	o	o	o	o	o	o	o	o
Turkmenistan	o	o	o	o	o	o		
Uganda	o	o	o	o	o			
Ukraine	o	o	o	o	o	o		o
United Arab Emirates	o	o	o	o	o	o		
United Kingdom	o	o	o	o	o	o	o	o
United States of America	o	o	o	o	o	o		
Uruguay	o	o	o	o	o			
Uzbekistan	o	o	o	o	o	o		o
Venezuela	o	o	o	o	o			
Vietnam	o	o	o	o	o	o		
Western Samoa	o	o	o	o				
Yemen	o	o	o	o	o			
Zambia	o	o	o	o	o			
Zimbabwe	o	o	o	o	o			



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