Leonardo ENERGY

Power Quality and Utilisation Guide

Distributed Generation and Renewables

8.1 Introduction

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Distribution Generation and Renewables

Introduction

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Introduction to DG and RES

Summary

Distributed Generation (DG) and Renewable Energy Sources (RES) have attracted a lot of attention in Europe. Both are considered to be important in improving the security of energy supplies by decreasing the dependency on imported fossil fuels and in reducing the emissions of greenhouse gases. Distributed generation refers to the local generation of electricity and, in the case of a cogeneration system, heat for industrial processes or space heating etc. The economics of DG and RES depend on many factors. The main cost items are the initial investments, fuel costs, energy prices (electricity and heat) and the cost of connecting to the grid. Biomass generally gives the lowest cost electricity of all RES-based options, with onshore wind and hydro capacity coming second and solar cells being the most expensive. However, many countries have stimulation measures for renewable systems, including solar cells. The viability of DG and RES depends largely on regulations and stimulation measures which are a matter of EU and national political decisions. A stable political course with regard to stimulation measures is necessary to encourage serious investment by commercial entities in additional DG and RES capacity.

Introduction

DG and RES have attracted special attention in Europe. Both are seen as important in reaching two goals:

- Increasing the security of energy supplies in Europe by reducing the dependency on imported fossil fuels such as oil, natural gas and coal
- Reducing the emission of greenhouse gases, specifically carbon dioxide, from the burning of fossil fuels.

This Note gives a broad introduction to distributed generation and renewable energy sources. Other Application Notes in this Section will go into the details of some aspects of DG and RES. Section 7 of this Guide covers rational use of energy and energy savings in more detail.

First it is necessary to define the terms DG and RES and to introduce the terms Combined Heat and Power generation (CHP) and Distributed Energy Resources (DER), which are frequently used in the context of DG and RES.

The term 'renewable energy sources' refers to 'everlasting' natural energy sources such as the sun and the wind. Renewable energy systems convert these natural energy sources into useful energy (electricity and heat). RES are often related to electricity generation, but the generation of heat for space heating (geothermal energy solar collector) etc. is also feasible. However, this Note considers only RES that are related to the generation of electricity (RES-E). According to the European RES-E directive [1], renewable energy sources include:

- Hydro power (large and small)
- Biomass (solids, biofuels, landfill gas, sewage treatment plant gas and biogas)
- Wind
- Solar (photovoltaic, thermal electric)
- Geothermal
- Wave and tidal energy
- Biodegradable waste.

For distributed generation, there are many definitions [2, 3, 4]. As with RES, DG mostly refers to systems that generate electricity (and possibly heat) and this text is limited to electricity-related DG. Generally, distributed generation takes place close to the point where the energy is actually used.

Other features of DG include:

- Not centrally planned and mostly operated by independent power producers or consumers
- Not centrally dispatched (although the development of virtual power plants, where many decentralised DG units are operated as one single unit, infringes on this definition)
- Smaller than 50 MW (although some sources consider certain systems up to 300 MW to be classed as DG)
- Connected to the electricity distribution network which, although it may vary by country, generally refers to the part of the network that has an operating voltage of 240/400 V up to 110 kV.

Most renewable energy systems are also distributed generation systems, although large-scale hydro, offshore wind parks and co-combustion of biomass in conventional (fossil fuelled) power plants are exceptions.

Distributed Energy Resources [5] refer to distributed electricity generation and electricity storage (near to or at the load centre) with a value greater than grid power (e.g. emergency power). Electricity storage will not be covered in this Note.

Combined heat and power generation (CHP), also referred to as cogeneration, indicates the joint generation and use of electricity and heat. Generally, a portion of the electricity is used locally and the remainder fed into the grid. The heat, on the other hand, is always used locally, as heat transport is costly and involves relatively large losses. Generally, distributed generation based on fossil fuels is also cogeneration as the local use of 'waste' heat is an important benefit of DG. Application Note 8.3.5 deals with cogeneration in more detail.

Typical uses of DG are:

- Domestic (micro generation: electricity and heat)
- Commercial (building related: electricity and heat)
- Greenhouses (process related: electricity, heat and carbon dioxide for crop fertilisation)
- Industrial (process related: electricity and steam)
- District heating (building related: electricity and heat through heat distribution grid)
- Grid power (only electricity to the grid).

Figure 1 gives an overview of distributed energy and typical uses of the energy generated.

Advantages and disadvantages of DG and RES

The main reasons why central, rather than distributed, electricity generation still dominates current electricity production are the economy of scale, efficiency, fuel capability and lifetime [6]. Increasing the size of a production unit increases the efficiency and decreases the cost per MW. Even where a large power plant is based on several smaller units of the same size, the facility cost per MW will be lower.

However, the advantage of economy of scale is decreasing; small units are benefiting from continuing technological developments, while large units are already fully developed. Fuel capability is another reason to keep building large power plants. Coal, especially, is not economically suitable for DG, but it is the most abundant fossil fuel with steady suppliers all over the world and a stable price (at least more stable than oil and natural gas prices). Additionally, with lifetimes of 25-50 years, large power plants will remain the prime source of electricity for many years to come.

So why develop distributed generation in the first place? The main reason is the efficient use of the heat that is always generated when electricity is generated. It increases the overall fuel efficiency of the plant considerably, as shown in Application Note 8.3.5. As heat must be used locally, the need for distributed generation to be close to the point of heat demand is obvious.

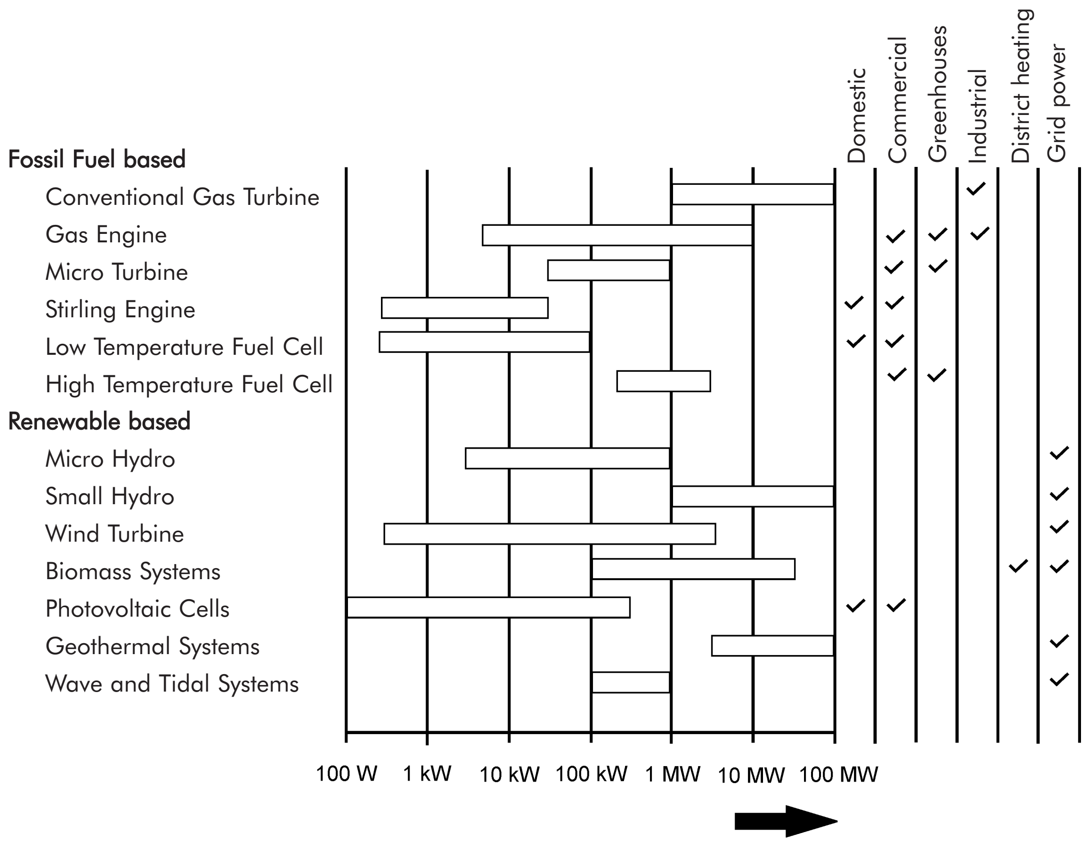

Figure 1 - Overview of distributed generation (based on [2, 3]) and of typical uses

Other benefits of distributed generation [4] include additional energy-related benefits (improved security of supply, avoidance of overcapacity, peak load reduction, reduction of grid losses) and network-related benefits (distribution network infrastructure cost deferral, power quality support, reliability improvement). Disadvantages of DG, beyond those mentioned earlier, are the costs of connection, metering and balancing. Figure 2 illustrates the effect of the degree of penetration of distributed generation on grid losses.

The main advantage of renewable energy systems is the intrinsic zero contribution to the exhaust of greenhouse gases as there are no fossil fuels involved. An additional advantage is the insensitivity to fuel prices ('the sun rises for nothing'). This decreases the operational cost of renewable energy systems and reduces operational risks. The major drawback is the initial investment in renewable energy systems, which is often larger than for non-RES. For instance, a gas turbine system may be built for 500 EUR per kW, while for a wind turbine the investment is more than 900 EUR per kW.

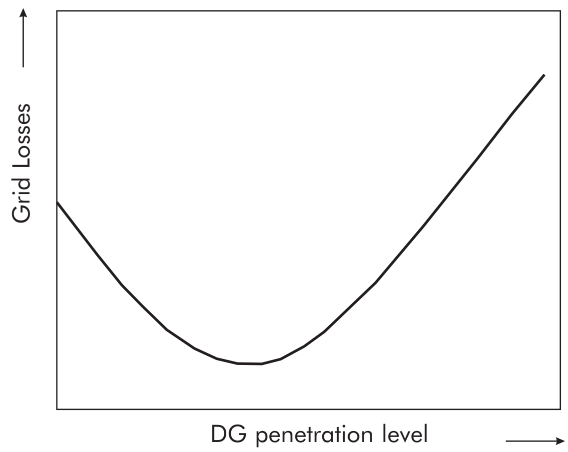

Figure 2 - Grid losses related to the penetration of DG

Other disadvantages of RES are the specific requirements of the site and the unpredictability of the power generated. The availability of renewable energy (sun, wind, water) largely determines the feasibility of a renewable energy system and this may raise environmental issues. The unpredictability of RES also means a higher cost for balancing the electricity grid and maintaining reserve capacity e.g. in the event that the wind drops or increases above the operating area of wind turbines. This problem is already encountered in areas with a high penetration of wind turbines, such as Germany and Denmark.

Summarising, DG and RES have advantages and disadvantages that might be energy-related, grid-related or environmental which need to be evaluated on a case-by-case basis.

Current status

In 2005, the total generating capacity in the EU-15 countries was 643 GW. Approximately 15% of this capacity (96 GW) was cogeneration (CHP), 19% (122 GW) was hydro capacity and 8% (53 GW) was from other renewable energy systems [7]. Roughly half of the CHP capacity was owned by electricity companies and half by independent producers. Figure 3 gives a breakdown of the generating capacity for each EU-15 country.

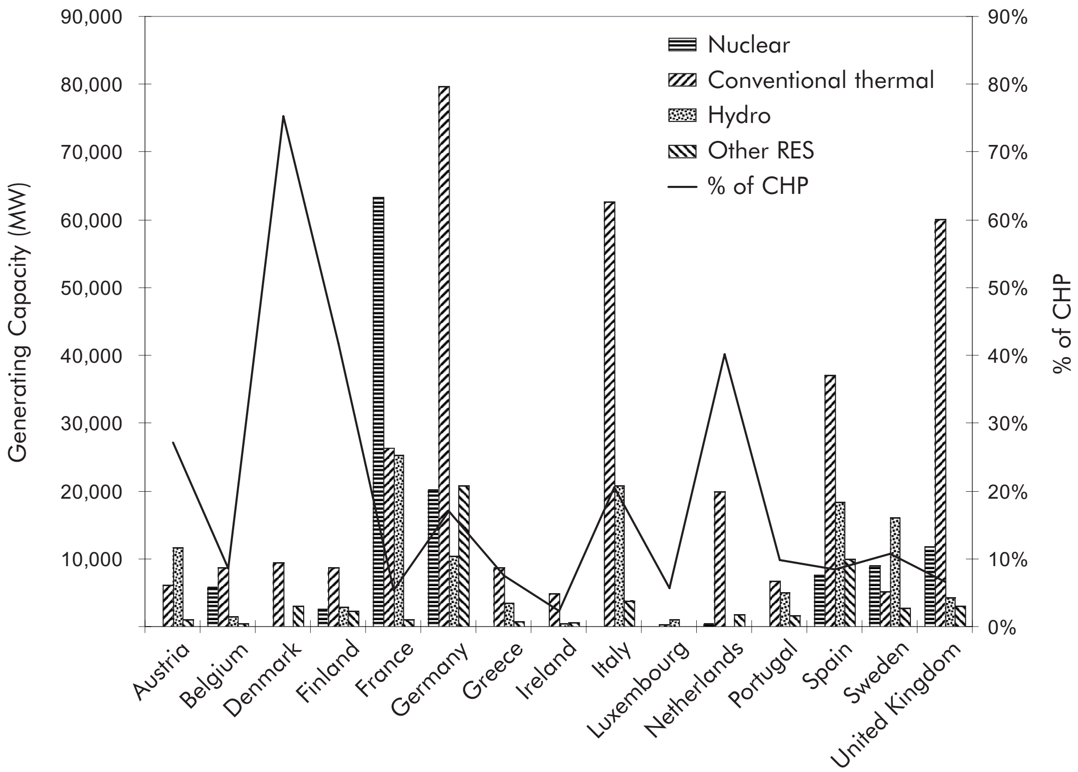

Figure 3 - Generating capacity in EU-15 countries for 2005 [7]

Based on EU figures [8], the estimated ‘renewable electricity’ production in 2004 was 400 TWh, of which more than 70% was hydro-based (as is evident from Figure 3). Figure 4 gives a breakdown for this renewable electricity production.

The RES-E directive gives targets for renewable energy production as a percentage of total gross consumption per EU-15 country. These are indicative targets for 2010 and based on 1997 as a reference.

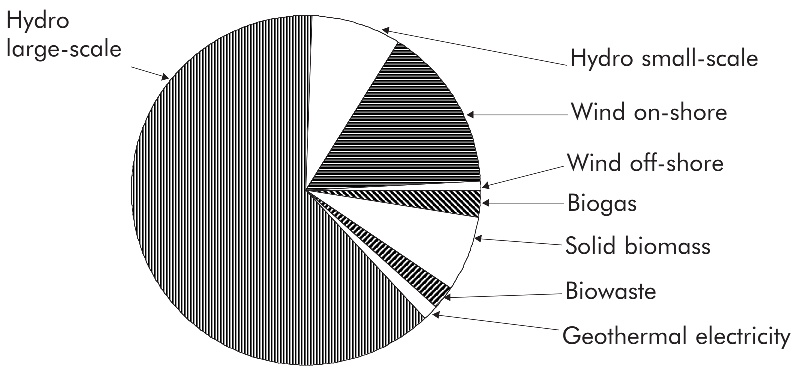

Figure 4 - Breakdown of RES-based generated electricity in EU-15 countries in 2004; the contributions of photovoltaic, tidal and wave and solar thermal energy is negligible [8]

As these targets are based on actual consumption, and the RES-E goal is a fixed percentage, the absolute amount of RES-E generation must increase if the total consumption increases.

Figure 5 shows the reference situation (1997), the target situation (2010) and the required growth in renewable electricity production to achieve this target. For the EU-15 as a whole, the reference situation is 13.9% renewable electricity from a total of 2440 TWh electricity consumption, which translates into 340 TWh of renewable electricity. As the total electricity consumption is expected to increase to 2930 TWh in 2010 [7], the target of 22% RES-E is equivalent to 650 TWh of renewable electricity. This means almost doubling the production of renewable electricity in 2010 with respect to 1997.

The currently achieved 400 TWh (2005) of renewable electricity (14.4% of the total consumption) shows that the targets set by the EU RES-E directive will be difficult to achieve. The target year 2010 is only 5 years away. Moreover, the potential for 'easy' hydro power sites is exhausted, so growth must come from more 'difficult' sources such as biomass and wind, and possibly solar power.

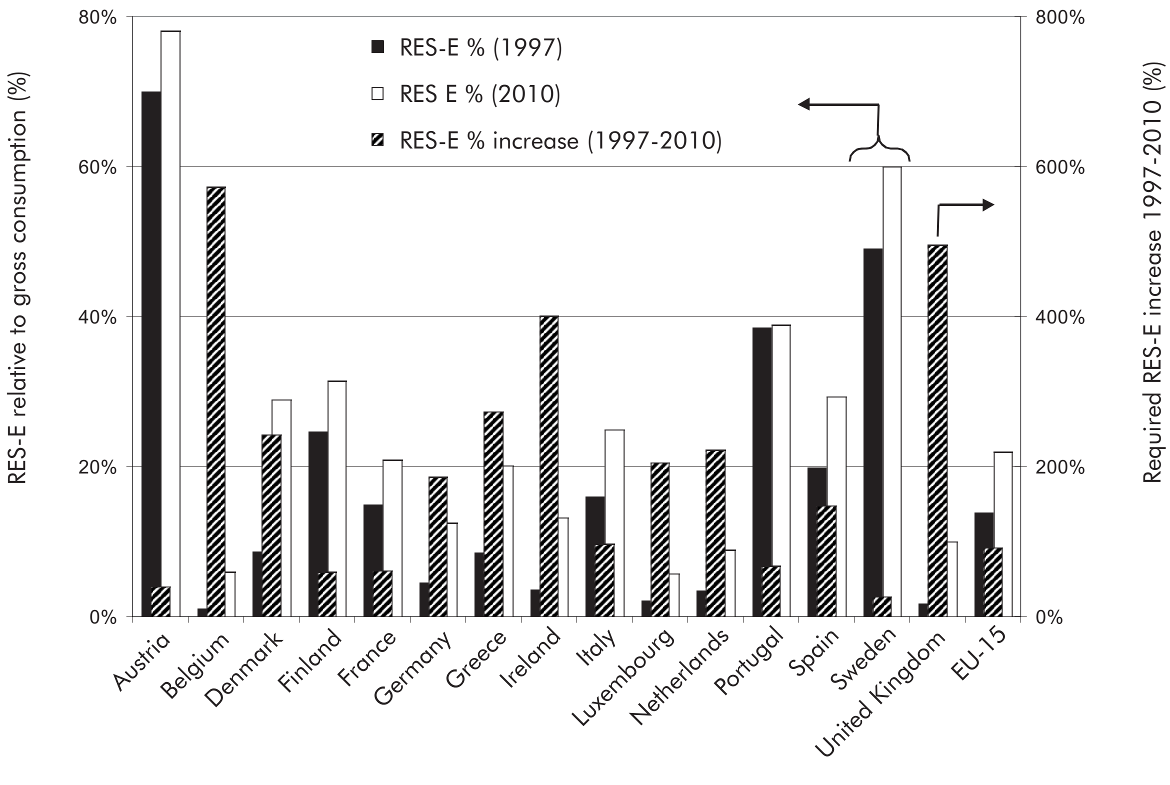

Figure 5 - Contribution of renewable electricity to total gross consumption according to the EU RES-E directive; 1997 is the reference situation, 2010 the target situation [1]

Economics of DG and RES

The economic feasibility of distributed generation and renewable energy systems depends on many things. Investments are important, as are the fossil fuel prices and the market price for electricity. The latter two are, of course, related. The market price for electricity will depend heavily on fuel prices as long as conventional fossil fuelled power plants dominate the market (currently more than 50% of the total EU-15 generating capacity).

Costs can be grouped as initial costs (before operation) or continuing costs (during operation) and as fixed costs (independent of the usage pattern) or variable costs (dependent on the usage pattern) [6]. Table 1 shows an overview of costs for DG and RES based on this classification. The costs of connecting to the grid (both getting connected and being connected) are significant in the total cost calculation, especially for DG.

Type of Expense	Initial	Continuing
Fixed	Engineering cost Investments Licensing cost MW-based connection cost Metering	MW-based distribution taiffs Fixed taxes Scheduled maintenance Insurance
Variable	MWh-based connection cost	Unscheduled maintenance Fuel cost Fuel taxes MWh-based distribution taiffs

Table 1 - Characterisation of costs for DG and RES - timing of expense

The income from DG and RES is mostly related to selling electricity (and heat in the case of cogeneration). Additional cost benefits might be grid related services (e.g. balancing, deferred grid investments, avoided grid losses) or environmental subsidies and taxes. These subsidies and taxes are generally aimed at stimulating the clean generation of electricity. Examples are green certificates or higher feed-in tariffs for electricity generated from RES, tax reductions for investments in CHP and RES, CO_2 taxation and carbon credits.

The cost of electricity from DG and RES is calculated by using a net present value method [6]. In this calculation, the value of money over time is taken into account by using a certain discount percentage to value future income and expenses.

This discount percentage includes the normal interest rate for borrowing money and a risk premium depending on the risk profile of the project. Fluctuations in fuel prices and the electricity market impose risks as do the weather conditions (e.g. wind speed for wind parks). The long-term durability of subsidies for RES is another risk item.

Figure 6 gives an overview of price ranges for RES-based options.

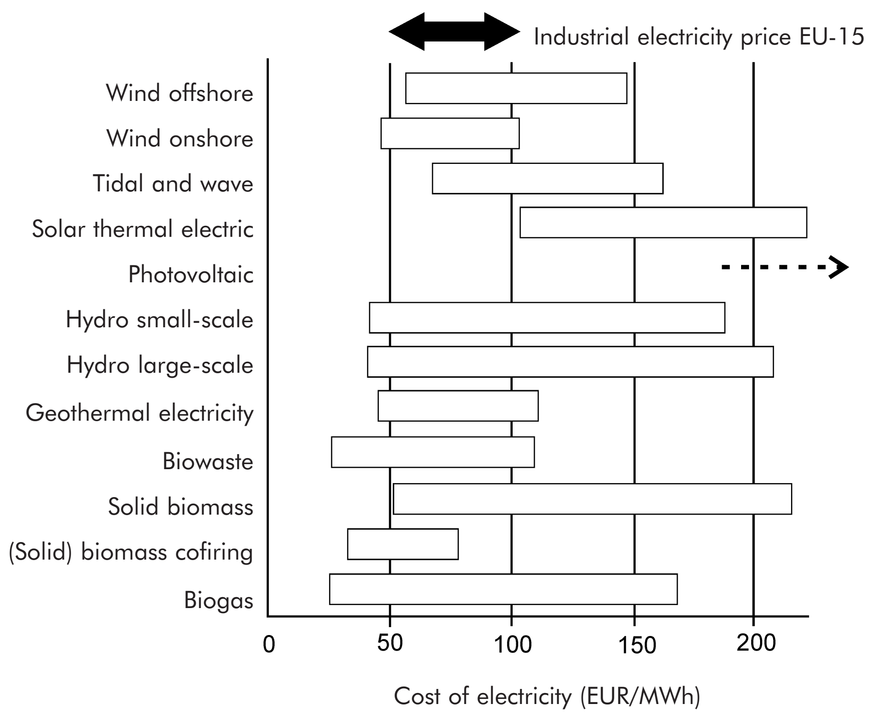

Figure 6 - Cost of electricity for RES options [8] and industrial price range in 2004 for EU-15 countries [9]

Figure 6 shows that most RES-options are (partly) within the range of industrial electricity prices, which are a measure of the cost of electricity from large-scale power plants. Solar based electricity is still rather costly with photovoltaic electricity still far above 200 EUR/MWh. Depending on stimulation measures for photovoltaic systems (either with regard to the investment or the generated electricity), they may still be economically viable to install.

Connection to the grid

The connection of DG (including RES-based DG) to the grid is an important item and many current or recent EU projects cover this subject [10]. The liberalisation of the electricity market and the separation between electricity supplier and network operator in the EU, where the electricity supplier operates in a liberalised market and the network operators in a regulated market, have drawn attention to the subject of connecting DG to the grid (costs, barriers, benefits).

Due to the predomination of centralised power, electricity grids in Europe are laid out rather uniformly as a top-down supply system. The transmission grid (operated by the transmission system operator or TSO) is a high voltage grid for high power flows. It operates typically at voltage levels higher than 110 kV. This high transmission voltage reduces grid losses. Interconnections between EU countries are made at the transmission grid level and large power stations are directly connected to the transmission grid.

The boundary voltages that define the distinction between high, medium and low vary according to country so typical values are used in this description. The distribution grid can be divided into a high voltage distribution grid (typically 60-110 kV), a medium voltage distribution grid (typically 10-50 kV) and a low voltage distribution grid (240/400 V). Distribution grids are operated by distribution network operators (DNOs). Most DG and RES based systems are connected to the distribution grid. Figure 7 gives an overview.

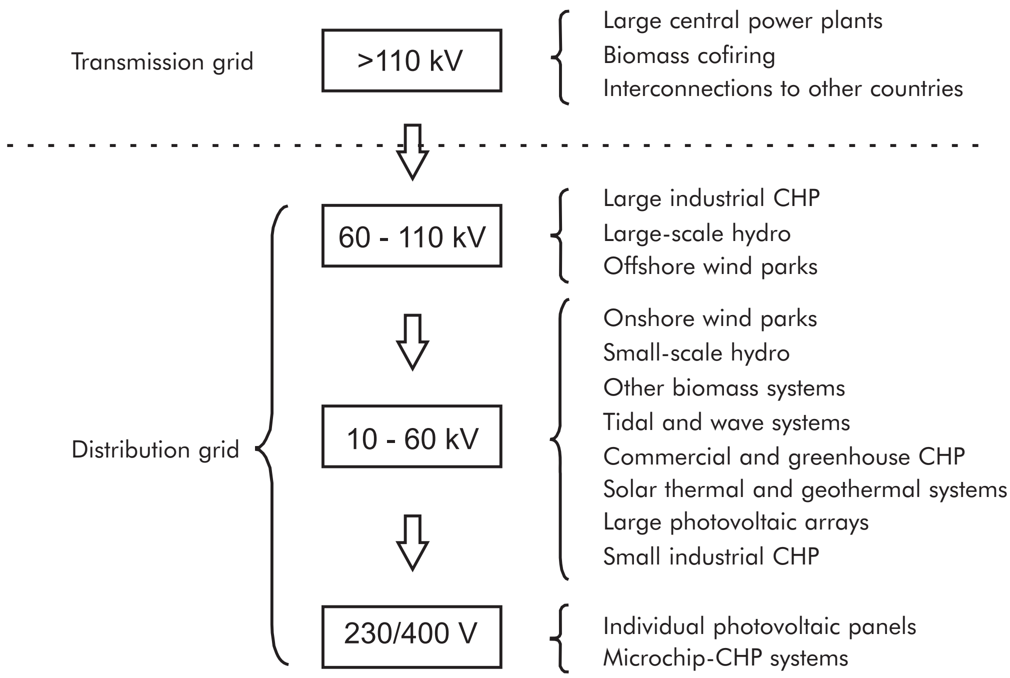

Figure 7 - Schematics of an average European electricity grid and connection levels for DG and RES. Voltage levels will vary for each country

Distribution grid operators have an obligation to connect users to the grid and to ensure the security of supply. They are also responsible for the power quality from the grid. European countries have a grid code that describes both the obligations of the DNOs and the obligations of generators connected to the grid (e.g. control characteristics, fault current contribution, etc.). Generally, a DNO is obliged to connect a compliant generator to the grid on application. Depending on the size of a DG/RES system, the DNO may require the connection to be at a particular voltage level.

Connection charging might be 'shallow', 'deep' or somewhere in between. Under a deep approach, a generator owner is required to pay all the costs involved in connection, including reinforcements further up the grid. With shallow charging, only the connection to the nearest grid access point is chargeable. Connection rules and charging differ according to EU country and should be evaluated carefully in the investment phase.

Policies and regulations

On an EU level, policies are currently very favourable towards the application of DG and RES with many regulations stimulating the use of CHP and RES [11, 12], for example:

- CHP Directive on promotion of cogeneration
- Directive on greenhouse gas emission trading
- Directive for restructuring taxation of energy products and electricity
- RES-E on targets for renewable electricity share per country.

These directives result in national stimulation measures for CHP and RES. Table 2 gives examples of stimulation measures for RES in Europe [13].

	Price	Quantity
Supply	Feed-in tariff/green prices (Germany, Austria, Spain, France, Greece, Portugal, Finland)	Tender (Ireland) Obligation for producers (Italy)
Demand	Price Support	Obligation (%) for consumers or suppliers (Denmark, UK, Sweden, Austria [small hydro], Belgium)

Table 2 - Example of RES stimulation measures within the EU [13]

Other regulations that may apply in connection to DG and RES include:

- Regulations regarding connection to the grid (grid codes). These are discussed in other Notes in this Guide.
- Regulations concerning the performance of the DG/RES system, such as energy efficiency and electromagnetic compatibility [14]
- Environmental regulations: emission of greenhouse gases and other harmful gases such as SO_2, NO_x and particulates, emission of noise, horizon pollution (wind turbines), interference with local flora and fauna.
- Regulations concerning safety and safe operation.

Scenarios for DG and RES

Scenarios are an important tool for exploring the future of DG and RES and to determine possible policy actions. In the EU-SUSTELNET project, four generic scenarios have been developed for the future of distributed electricity generation [14]. They are intended to cover a timeframe until at least 2020 and provide an overview of possible developments from the current starting point.

The scenarios are characterised by two main driving forces:

- The degree of policy harmonisation in the EU
- The degree of incentives to RES and DG operators.

	High RES and DG Incentives	Moderate RES and DG incentives
Stronger EU policy harmonisation	DG opportunities in a fully harmonised EU market: Efficient regulation (EU Regulator) Market concentration Non-discriminating grid access rule Ambitious EU-wide targets for RES and DG Strong EU-wide support schemes (tradable certificates)	Difficult times for DG in a fully harmonised EU market: Efficient regulation (EU Regulator) Market concentration Grid access rules disfavour small units Harmonisation of RES and DG support at a low level EU-wide certification scheme (tradable certificates)
Reduced EU policy harmonisation	DG opportunities in national markets: No harmonised regulation (national focus) Some EU members implement fair grid access Ambitious EU-wide targets for RES and DG Diversity of national support schemes Strong RES and DG support compensates for regulatory deficits	Difficult times for DG in national markets: No harmonised regulation (national focus) No improvements in grid access National support schemes partially reduced No compensation for regulatory deficits

Table 3 - Overview of DG scenarios from [14]

This choice of driving forces illustrates the importance of policy regulations on the further development of DG and RES. Table 3 qualitatively summarises the four scenarios.

An example of the quantification of the effect of EU policies on DG and RES is given in Figure 8. It is based on some of the scenarios described in reference [15]. The baseline scenario assumes continuing economic growth and significant energy intensity improvements. It is based on the situation in 2001 (RES-E directive not in effect, no CO_2 emission trading). The 'full policy options' scenario assumes new policies for renewables and energy efficiency, use of economic instruments, such as energy taxation and emission trading, and the acceptance of new nuclear technology. The overall generating capacity decreases in this

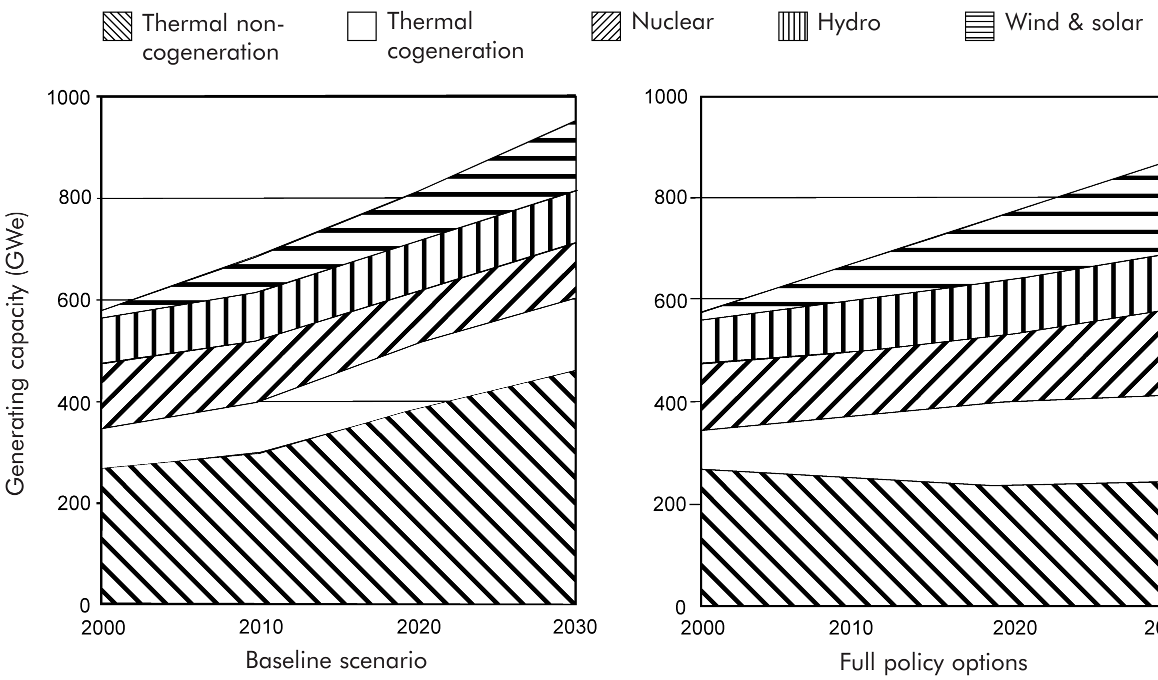

Figure 8 - Example of scenarios for EU generating capacity [15]

‘full policy options’ scenario, and the total share of hydro, wind and nuclear increases. Thermal (co)generation still dominates, although part of it will be fuelled by biomass rather than fossil fuels.

Concluding remarks

Distributed generation offers many benefits, including important political issues such as increasing the security of supply and reducing the emission of greenhouse gases. Although these benefits, and other additional benefits, are clearly identified, DG and RES are not always economically viable. Their viability depends heavily on energy prices and stimulation measures from European and national governments. A stable political course with regard to stimulation measures for DG and RES is necessary to encourage serious investments by market parties in additional DG and RES capacity.

References and bibliography

[1] Directive 2001/77/EC of the European Parliament and of the Council of 27 September 2001 on the promotion of electricity produced from renewable energy sources in the internal electricity market, Official Journal of the European Communities, L 283/33.

[2] Ackerman, T, Andersson, G and Söder, L. Distributed Generation: A Definition, Electric Power System Research 57 (2001) 195-204.

[3] Van Werven, M J N, and Scheepers, M J J. DISPOWER, The Changing Role of Energy Suppliers and Distribution System Operators in the Deployment of Distributed Generation in Liberalised Electricity Markets, Report ECN-C—05-048, June 2005 (http://www.ecn.nl/library/reports/index.html).

[4] Scheepers, M J J. and Wals, A F, SUSTELNET, Policy and Regulatory Roadmaps for the Integration of Distributed Generation and the Development of Sustainable Electricity Networks, New Approach in Electricity Network Regulation, An Issue on Effective Integration of Distributed Generation in Electricity Supply Systems, ECN-C-03-107, September 2003 (http://www.ecn.nl/library/reports/index.html).

[5] CADER, California Alliance For Distributed Energy Resources (http://www.cader.org).

[6] Willis, H L and Scott, W G. Distributed Power Generation, Planning and Evaluation, Marcel Dekker Inc, 2000, ISBN 0-8247-0336-7.

[7] EURELECTRIC, Statistics and Prospects for the European Electricity Sector (1980-1990, 2000-2020), EURPROG Network of Experts, October 2005, Report 2005–5420004.

[8] Commission of the European Communities, Communication from the Commission. The Support of Electricity from Renewable Energy Sources, Brussels, 7 December 2005, Report COM(2005) 627 Final.

[9] Energy in the Netherlands, facts and figures, EnergieNed, 2005.

[10] For example, the DISPOWER project, the ELEP project, the CODGUNET projects, the DECENT project and the SUSTELNET project.

[11] European Forum for Renewable Energy Sources, overview renewables legislation, http://www.euroforest.org, May 2006.

[12] COGEN Europe, EU Legislation and Policy Documents relevant to Cogeneration, http://www.cogen.org, May 2006.

[13] DECENT-project, Decentralised Generation, Development of an EU Policy, Report ECNC—02-075, October 2002 (http://www.ecn.nl/library/reports/index.html).

[14] Timpe, C and Scheepers, M J J, SUSTELNET, Policy and Regulatory Roadmaps for the Integration of Distributed Generation and the Development of Sustainable Electricity Networks, A Look into the Future: Scenarios for Distributed Generation in Europe, Report ECN-C—04-012, December 2003 (http://www.ecn.nl/library/reports/index.html).

[15] European Energy and Transport Scenarios on Key Drivers, September 2004, ISBN 92894-6684-7, European Communities, 2004. (http://ec.europa.eu/dgs/energy_transport/figures/scenarios/index_en.htm).

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