

2 What is Decentralised Generation?

A definition for the purpose of the DECENT research project. In the scientific and energy community many views and names of decentralised generation (DG) exist: Other often used terms are “distributed generation” and “embedded generation”¹. Further terms often used are “distributed energy resources” or “embedded resources”. Different aspects play roles in the perspective on the topic. The “resources” access widens the scope to energy management techniques like energy storage and demand side management, compared to the more restricted view on generation. Within the “generation” access some see an important distinction that the DG unit can be placed close to the actual power (or heat) demand, while others have rather the widespread use of (renewable) energy sources in mind, at the sites where they are usable which are not necessarily where the actual demand is. Other discussed factors are ownership, module size, interconnection to the power grid, grid interconnection voltage, grid interconnection level (transmission, distribution, customer side of the meter). However there is no generally accepted definition of DG, since the objective of the stakeholders are very different. While some focus on an academical definition for electrical systems, others focus on economical aspects of grid structures, others focus on development perspectives for non-electrified regions and again others focus on environmental benefits.

When defining decentralised generation (DG) for DECENT we take into account the objectives of DECENT. The political background of DECENT is to research possibilities to support the Kyoto targets of the EU. The idea is basically to study aspects of typically environmentally friendly generation technologies that bring along a new, decentralised structure to the generation network. This exercise is carried out in the framework of national energy markets which are being transformed to competitive structures and a single European internal market.

Thus the first restriction of a DECENT DG definition is that we look at generation technologies which have no or a low environmental impact in terms of CO₂ emissions. For renewables we study PV, hydropower, wind power and biomass (single power production and CHP applications). Additionally natural-gas-fired combined heat and power (CHP) installations and fuel cells which are operated in CHP mode are covered. For CHP installations an annual energy efficiency of 70 % should be a benchmark.

A relatively well established academic definition (Ackermann 2001) of DG focuses only on the connected grid level and declares “all generators that are inter-

¹ Cf. i.a. the discussion that took place in the newsgroup “Distributed-Generation” in 2000 (<http://groups.yahoo.com/group/distributed-generation>).

connected to the distribution grid, or on the customer side of the meter” to be DG. This should be accomplished for DECENT with an indicative size threshold, since for political and economical analysis of DG the size of the generating unit (as well as the size of the developing and/or operating company) are of relevance, especially when transaction costs and market entry procedures are discussed. Since many of the structural conditions that DG projects face are thus linked to the installation size, and indicative upper size threshold of 10 MW_e is chosen.

However, as DECENT does not come forward with a legal definition of DG installation, the limit value or threshold should not be seen too strict. DECENT is thus not restricted to examine generation projects that might not be part of the formal definition, if they are interesting as a comparison object (e.g. off-shore wind park connected to the transmission network).

A formal lower size threshold for DG to be analysed is not necessary: The evaluation of DG projects (especially CHP) in the case studies, however, is restricted to sizes that are already commercialised or are close to commercialisation. On the other hand, one focus of the evaluation of future developments are the perspectives of small-scale CHP applications.

Based on these considerations a short working definition:

Decentralised Generation in DECENT comprises all generation installations that are connected to the distribution network or on the customer side of the meter, and that are based on the use of renewable energy sources or technologies for combined heat and power (CHP) generation not exceeding a size of approx. 10 MW_e.