Beiträge zur 41. OGE-Fachtagung

Global energy perspectives and the role of technology¹

N. NAKICENOVIC

The provision of affordable and environmentally sound energy services is a prerequisite for further social and economic development in the world. This is a formidable challenge considering that two billion people today are still without access to adequate energy services in the world. This additional need for energy services is going to be voracious and will not be satisfied with the current structure of the energy system, with current technologies and certainly not with the current adverse impacts associated with energy, from indoor air pollution and regional acidification to climate change.

Technology may be more important in determining the structure of future energy systems and services than any other of the main driving forces such as population growth or economic development. Neither can social and economic development issues be seen in isolation of technological change. There is growing evidence that alternative technological developments can lead to fundamentally different future energy systems structures and services, that they are "path dependent" as the result of the cumulative nature of technological learning processes. Therefore, there is a clear need to improve the efficiency of energy use, improve the environmental compatibility of fossil technologies, shift to energy sources with lower environmental impacts such as natural gas, or shift away from fossil to new renewable sources and perhaps also nuclear power. The development of clean energy carriers and infrastructures is a prerequisite for the provision of energy services to the masses and the achievement of longer-term development and environment goals.

The quality, convenience and efficiency of provision of energy services have vastly improved over the last two centuries. However, the improvement potential is still very large. Only a fraction of the current global energy use would be required to provide the same energy services if the best state-of-the-art technologies were used. For example, wider use of modern energy carriers such as energy gases and electricity would promote higher energy efficiencies, better quality of energy services and substantially lower environmental impacts, especially at the level of energy end use. The same is generally true for natural gas as a source of energy and for most of the new renewable resources. The potentials of renewables are

enormous compared with any conceivable energy needs of the humanity, but the challenge will be to deploy a large number of technologies at competitive costs and expand their markets-shares significantly both because hydrocarbon resources are also abundant and because these technologies are being improved continuously as well.

A rapid expansion of new technologies can be promoted by finding ways to drive down their costs. For example, the "green" pricing of electricity and heat is an immediate policy option already practiced in some industrialized countries to promote early deployment of renewables. Most of all, it is important to find ways to attract investment in these technologies in expectation of achieving buy-downs along the learning curves and eventually also competitiveness with more mature and dominant energy technologies.

A strong conclusion for a whole range of sustainable energy strategies is that a substantial increase in RD & D for new energy technologies as well as for technology transfer is needed especially for providing affordable energy services during the 21st century. Otherwise most clean, efficient fossil and renewable technologies may not reach competitiveness with traditional options. Another important conclusion from the analysis of global energy scenarios is that far-reaching technological improvements are central to the transition towards sustainable development and thus need to be developed and disseminated throughout the energy system – including the decentralized systems and end users. Improvements in end-use technologies, through which millions, rather than hundreds, of units are produced and used, are more amenable to standardization, modularization, and mass production, and hence to benefit from learning-curve effects, resulting in cost reductions and performance improvements. ■

¹ Kurzfassung eines Vortrags der 41. Fachtagung der Österreichischen Gesellschaft für Energietechnik (OGE) im OVE, die am 5. und 6. November 2003 in Salzburg stattfindet.

NAKICENOVIC, Nebojsa, Univ.-Prof. Mag. Dr. rer. soc. oec., Technische Universität Wien, Institut für Elektrische Anlagen und Energiewirtschaft (E 373), Gußhausstraße 25–29, A-1040 Wien (E-Mail: naki@eeg.tuwien.ac.at)

Regulatorische Aspekte der dezentralen Erzeugung¹

W. BOLTZ

1. Einleitung

Die dezentrale Erzeugung stellt neue Anforderungen an die Verteiler- und Übertragungsnetze, sie kann aber auch zur Netzentlastung und Verringerung der Verluste beitragen. Förderung von dezentraler

Erzeugung aus erneuerbaren Primärenergieträgern sowie die neuen EU-Richtlinien über Elektrizität, CO₂-Emissionen, Kraft-Wärme-Kopplung und Wasserrecht (*EU-Richtlinie 2003/C 50 E/02; EU-Richtlinie 2000/60/EG; EU-Richtlinie (Vorschlag) 2001/*

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BOLTZ, Walter, Dipl.-Ing., Energie-Control GmbH, Rudolfsplatz 13a, A-1010 Wien.