

POSSIBILITIES FOR INCREASED ENERGY AUTONOMY BY SUSTAINABILITY AND EFFICIENCY

Guenther Brauner: Institute for Power Systems, Vienna University of Technology
Gussshausstrasse 25/373, A-1040 Wien: e-mail: g.brauner@tuwien.ac.at

Overview

The directives of the European Union are directed towards the security of supply, the increased integration of regenerative Sources (RES) and to improvement in energy efficiency. The increased demand of fossil resources especially in the Asian and Pacific areas necessitates the EU to investigate strategies for securing oil and gas supply. But this will not solve the emission problems.

The new alternative strategy is to combine increased use of RES with higher efficiency in the end-use sector buildings, households, industry and traffic. This will be necessary because the limitation of potential of RES, higher costs for investment and operation. Less demand can equalize the higher costs. According to the allocation plan for energy efficiency of the EU the energy savings should be minus 1% per year until 2020, which is minus 20% in total. In the following it will be investigated what is the energy saving potential in the private sector of households.

Methods

In a first model the energy demand in the private sector is simulated depending on the living space and age of building, the number of persons living there, the furnishing with alliances and the live style of the inhabitants. The influence of the age of equipment on the demand according to energy labelling of appliances of different decades is included. Three demand models are compared: high demand with air conditioning, medium demand and high efficiency with low demand. With help of this model the rate of energy savings possible under the effect of different philosophies can be investigated.

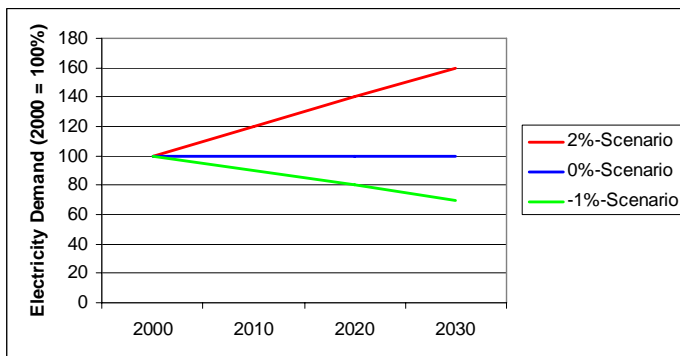


Fig. 1 - Efficiency improvement models

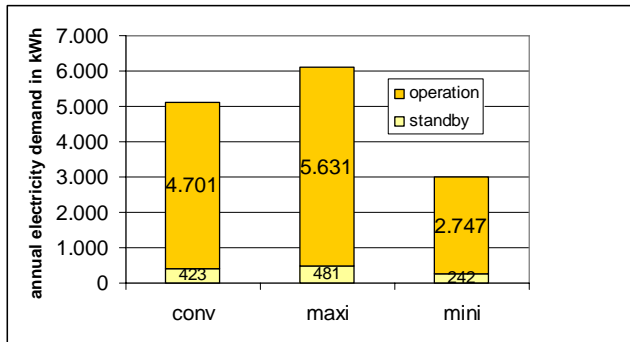


Fig. 2 - End-use energy demand and efficiency potential

In a second model the regional RES potential (small hydro, wind, biomass, solar) is investigated in relation to energy density per land area and energy demand. This forms the precondition for the evaluation of the degree of energy autonomy possible.

Both models are linked together for finding the optimum solution area of demand reduction by efficiency improvement and increased regenerative generation under the aspects costs and highest possible degree of energy autonomy.

Results

The energy saving potential in the private sector is high. By high efficient appliances and illumination and avoiding of air conditioning up to 30% less demand is possible without significant perception of consumers. The regional degree of energy autonomy possible depends on the density of available RES versus population. For the Area of Lower Austria a simulation with the potentials of Biomass from forests, Wind, Solar and Biomass is shown.

Conclusion

Efficiency improvement forms the most essential topic in the energy strategies of the future, as it enables a high degree of energy autonomy, low influence on climate change and for balancing of higher energy costs by lower demand.

It will not be possible in future to reach regenerative energy autonomy in EU, but it seems to be realistic to increase this portion by efficiency improvement and energy saving.

References

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