

## Promoting renewable energy technologies

### **Ole Jess Olsen**

Dept. of Environment,  
Technology and Social Studies  
Roskilde University  
DK – 4000 Roskilde  
Denmark  
Phone: +45 46742738  
Fax: +45 46743041  
e-mail: [ojo@ruc.dk](mailto:ojo@ruc.dk)

### **Klaus Skytte**

Systems Analysis Department  
Risø National Laboratory  
P.O. Box 49  
DK – 4000 Roskilde  
Denmark  
Ph: +45 4677 5157  
Fax: +45 4677 5199  
[Klaus.Skytte@risoe.dk](mailto:Klaus.Skytte@risoe.dk)

### **Abstract**

Renewable energy technologies are promoted nationally and internationally in order to reduce emissions, to improve security of supply and to achieve more sustainable electricity supply. As most renewable technologies for producing electricity are more costly than conventional technologies the present ambitious deployment goals will not be reached without strong public support.

Therefore, it is desirable to find a combination of policy instruments that are both effective and efficient, i.e. the new renewable technology should relatively quickly become reliable, decrease its costs of generation and consume as little public support money as possible.

Wind power and combined heat and power (CHP) using biomass (for combustion, gasification or fermentation) are two of the most promising renewable technologies for generation of electricity. Denmark has a long and well-established tradition for these technologies that now account for approx. 25% of its annual electricity production. In this paper, we present and discuss the Danish experience as a case of promoting renewable energy technologies.

The development path of the two technologies has been very different. Wind power is considered an outright success with fast deployment to decreasing costs and the Danish producers now dominating the global market in a fast expanding industry. Contrary to that the development and implementation of biomass CHP has encountered a number of difficulties. The different experience of the two technologies is discussed from the perspective of innovation theory. To this purpose we have developed an analytical scheme that fits very well the case of wind power, whereas the development of biomass appears to have followed a different path.

Our analytical scheme can be utilized for policy recommendations. Even though support systems must be adapted to each technology and its particular context, it is possible to formulate some general principles that can help to create an effective and efficient policy for promoting new renewable energy technologies.

CV Ole Jess Olsen:

*Present position:* Professor in Public Planning, Department of Environment, Technology and Social Studies, Roskilde University (1995-), Member of Energy Appeal Tribunal (2000-), Member of scientific committee for Energy System Studies, Sweden.

*Education:* Dr.Scient.Adm. in Public Administration, Roskilde University (1993).

*Scientific activities:* Author of books and refereed international journal papers within the field of energy economics and public utility regulation.

CV Klaus Skytte:

*Present position:* Ph.D., Senior Scientist, Department of Systems Analysis, Risø National Laboratory (1996-).

*Areas of work:* Economic and mathematical modelling, operations research, model development, electricity markets, renewable energy, microeconomics.

*Scientific activities:* Author of books and refereed international journal papers within the field of energy economics and regulation.