Summary for non-specialists
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Support schemes for renewable electricity in the EU

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The renewable energy policy has three main objectives (i) reducing CO2-emissions, (ii) diversifying the energy mix and thereby improving energy security, while at the same time (iii) contributing to the competitiveness and growth of the EU economy through technological development and the development of a new industry. Hence, the policy in effect aims at addressing externalities related to environmental damage, energy security risks, and knowledge spill-overs. The Renewable Energy Directive creates a regulatory framework for achieving a share of 20% renewable energy of the EU energy consumption by 2020. It sets national renewable energy targets for the Member States taking account of different starting points and potentials, as well as differences in GDP.

The policy instruments applied to promote the introduction of renewable energy sources remain, however, the competence of Member States. This paper focuses on the policy instruments to support renewable electricity production in the EU, and in particular on the features of the most common systems, i.e. feed-in tariffs, feed-in premiums and green certificate systems. Feed-in tariffs provide the eligible renewable power producer with a guaranteed price for the power they feed into the grid. A feed-in premium provides the producer with a guaranteed premium in addition to the electricity market price. Green certificate systems create a market for the renewable property of electricity. The government creates a demand through imposing an obligation on consumers or suppliers to have a certain percentage of the electricity sourced from renewable sources. One objective of this paper is to assess the support levels in relation to the above mentioned externalities. Another objective is to look at how the different support systems can be designed as efficiently as possible considering the ambitious renewable policy target.

A theoretical model is used to frame the discussion. The model considers two sectors: fossil-fuel and renewable based power producers. Optimal support schemes are then discussed according to which externalities need to be addressed by the regulator and according to the available policy instruments. It is notably found that using one instrument for more than one externality does not allow the regulator to design a first-best policy instrument, that is, it is not feasible to reach the highest level of potential welfare.

The paper shows that policies that solely aim to address environmental externalities and energy security risks are unlikely to make renewable power technologies competitive. Learning effects and spillovers are necessary to justify the need for support schemes promoting renewable-based electricity. In terms of the design of support schemes, feed-in

premiums guaranteed in addition to the electricity market price should be preferred over feed-in tariffs. The premiums should be time limited and frequently reviewed in order to keep costs low. Certificates, on the other hand, should in theory limit the costs to consumers as the level of support is determined on the market. Furthermore, they limit internal market distortions and facilitate trade in the green property of electricity. However, tradable certificates also induce a market risk for producers, which has proved to limit investments in new capacity.

Harmonisation of support schemes would equalise marginal production costs and would thereby minimise the cost of the policy as production would be allocated efficiently across the EU. However, harmonisation based on a common certificate system would run the risk of mainly supporting mature technologies. An optimal allocation of renewable power production is also dependent on well-functioning and competitive electricity and certificate markets. A sequencing of instruments according to the maturity of the technology is instead suggested. Feed-in premiums can be used for technologies at the early stage of market deployment. Once the volumes start to have an impact on the internal market and the technology approaches competitiveness, tradable green certificates would be a more suitable support instrument.

Differences in support levels must be justified by differences in each technology's contribution to energy security or in each technology's learning rate. Overall, these considerations do not seem to be the main explanation for observed variations in support levels across Member States. As regards wind energy, expected learning rates are modest beyond 2020 and therefore support levels are probably too high in the medium term. Furthermore, photovoltaic energy currently benefits from very high support levels due to high learning rates. However solar energy produced by photovoltaics will still be far from competitive in 2030. Hence, instruments which support technology development more directly, for example research grants, would seem more efficient to internalise the spill-over effects.