What becomes of Green Gold? Evaluating the effects of increasing bio-fuel production in Finland with VATTAGE – A MONASH-type CGE model for Finland

The European directive on renewable energy mandates increased use of bio-fuels in the transport sector and also sets an overall target of 20% to renewable energy for all 27 of the Member States. Finland is one of the few countries that already exceeds the 20% target with a renewable share of 24% of all primary energy, with bio-energy accounting for some 20%. Finland does not meet the target for bio-fuels in the transport sector, however. The potential for increasing crop-based bio-fuels is limited in the northernmost country in the world, but there is plenty of potential to use Finland's Green Gold, the forests, for bio-fuel production. However, forest-based bio-fuel production will be in competition with other uses of wood, most notably as an input for forest industry and combined heat and electricity generation. Consequently, the various bio-energy targets may actually be in conflict with each other with possibly negative environmental and financial consequences. This study evaluates the effects of increasing the production of bio-fuels in Finland both in the light of imposing the mandatory targets, and in the light of potential bio-fuel production capacity. The study uses the VATTAGE model, a MONASH-type CGE model for Finland.

Introduction

The European Council reached an agreement on common, European energy policy goals at the beginning of March this year. The Council endorsed the proposals of the council of environmental ministers that proposed a binding emissions reduction target of 20 per cent compared to 1990 levels for the European Union as a whole, and also agreed on a target of 20 per cent of primary energy consumption for the use of renewable energy for the union as a whole. In addition, the Council set a separate, binding target for the use of biofuels in the transport sector.

It is clear that these ambitious targets are interconnected. If the union succeeds in raising the share of renewables from the current level of about seven per cent of primary energy to 20 per cent by 2020, emissions of greenhouse gases will in all likelihood be significantly lower by the strength of this policy alone. Yet it pays to study the implications of the energy policy targets separately as well. This is primarily because the member states have very different starting points. Some countries, notably the Nordic countries, already have renewable shares exceeding 20 per cent of primary energy, whereas others, like the UK, are below the seven per cent current average share. The potential for increasing the share of renewables in all likelihood differs very much between the member states.

This paper studies the renewable energy target form the Finnish point of view. We describe the Finnish energy system and the role renewable energy currently has. Then, we survey recent estimates of the potential for increasing the use of renewables especially form the point of view of measures that have been applied to subsudise renewables. Finally, we present the results of a simulation studying the effects of increasing the use of renewables at the theoretical maximum and evaluating the implications of these increases for the design of energy policies.