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Combining an inter-sectoral carbon tax with sectoral mitigation policies: Impacts on the French forest sector

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ABSTRACT

As France works out its plan to tackle climate change issues, questions are arising in the forest sector as to how sectoral mitigation programs such as those designed to enhance fuelwood consumption or to stimulate in-forest carbon sequestration may coincide with an inter-sectoral program such as an economy-wide carbon tax. This paper provides insights into this question by exploring the impacts of (1) a combination of a carbon tax and a fuelwood policy, and (2) a combination of a carbon tax and a sequestration policy on (i) the economy of the forest sector, and (ii) the dynamics of the forest resource. To do this, we used a modified version of the French Forest Sector Model (FFSM) and carried out simulations on a 2020 time horizon. Basing our analysis on the fuelwood sector, we showed that wood producers always benefit from the combination of a carbon tax with either a fuelwood policy or a sequestration policy at the national level. Conversely, and although it favors wood products instead of non-wood substitutes, a carbon tax always decreases consumer surpluses by increasing wood product prices. As a consequence, the combination of a carbon tax with sectoral policies is likely to raise questions about the political economy of the mitigation program. This is particularly true in the case of a combination of a carbon tax with a sequestration policy, which already decreases consumer surpluses. We eventually showed that by increasing transport costs between domestic

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regions, the carbon tax reallocates production patterns over French territory which could lead to the necessity of a regional breakdown of policy-mixes in the forest sector.

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Introduction

According to the Intergovernmental Panel on Climate Change (IPCC), there will be a significant economic potential for climate change mitigation in the next few decades. In particular, bottom-up analyses show that the international emissions reduction potential for the forest sector equals 1,1 (+/– 1) to 4,2 (+/– 1,5) Gt eq CO₂/yr, respectively for carbon prices of 20 US\$/tCO₂ and 100 US\$/tCO₂ which represents 3% to 14% of the total CO₂ emissions (Nabuurs et al., 2007). The climate change ability of the forest sector can be broken down into two types of mechanisms: sequestration and substitution. Upstream, sequestration mechanisms consist of enhancing forest management practices such as densification, afforestation, reforestation and reduction of deforestation in order to increase the quantity of carbon sequestered in the forest biomass (Kurz et al., 1997; Nabuurs et al., 2007; Luysaert et al., 2008; Grace, 2004; van der Werf et al., 2009). Downstream, sequestering carbon in long-lived wood products (e.g. construction wood) postpones its return to the atmosphere thereby delaying CO₂ release in the atmosphere (Vallet, 2005). Substitution mechanisms consist of reducing greenhouse gas emissions through the replacement of fossil fuels with fuelwood and by substituting non-wood products with wood products in the building, packaging and furniture sectors (Petersen, 2006; Petersen and Solberg, 2005).

So far, and in order to reach its ambitious mitigation targets,¹ the French Government has opted to base its policy-mix on substitution mechanisms through sectoral policies. These policies aim at (1) structuring the French fuelwood sector through economic incentives, (2) changing domestic heating systems, for example, through the development of collective boilers, and (3) encouraging the development of medium- to large-scale biomass energy plants. The overall objective is to increase fuelwood consumption by 6 Mm³/yr by 2020 (Puech, 2009).

In addition to these policies promoting the use of fuelwood, two other types of mitigation policies involving the forest sector are currently being discussed in France: a policy to enhance sequestration in forests and an intersectoral carbon tax based on substitution mechanisms, but in an indirect way, promoting low-carbon content products and discouraging their more carbon-intensive substitutes.

While the impacts of a sequestration policy and of its combination with a fuelwood policy are analyzed in depth in Lecocq et al. (2011), the impacts of a carbon tax on the forest sector and its interactions with sectoral policies, either fuelwood policy or sequestration policy, remain unclear.

In the French context, a normative shadow price of carbon to be used in evaluating public investments was set at €100/tC, or €27/tCO₂, in 2000. For the preparation of the 2009 carbon tax proposal, an expert group of economists proposed an initial €45/tCO₂ (Quinet, 2009) that would progressively increase to €100/tCO₂ in 2030. The view was that this initial value and increase trajectory would be compatible with the achievement of the Factor 4 goal which consists in improving the energy efficiency and the use of renewable energy in order to divide CO₂ emissions by a factor of four before 2050. In 2010, a consensus value of €32/tCO₂ emerged from a broader expert consensus (Rocard, 2009) – with the same increase trajectory as in the previous report. After several months of discussion, an initial value of €17/tCO₂ +€2/tCO₂/yr was finally announced by the Government on acceptability grounds before it was killed by the French Constitutional Council in 2010.

Nevertheless, some form of carbon tax scheme is likely to be necessary in France in the future since the objective of mitigation remains. Such a tax would therefore coexist with previously enacted sectoral fuelwood policies and/or sequestration measures. One question that then arises is how would

¹ The European Union sets the objective of increasing the share of renewable energy in its overall energy mix to 20% by 2020.

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