Muistio • Brief 2 • 12.12.2012
ISSN-L 2323-2463, ISSN 2323-2463

ETLA Muistiot tarjoavat ajankohtaista tutkimustietoa polttavista yhteiskunnallisista kysymyksistä.
www.etla.fi » julkaisut » muistiot
ETLA • Elinkeinoelämän tutkimuslaitos

ETLA Briefs provide timely research-based information on pressing societal issues.
www.etla.fi » publications » briefs
ETLA • The Research Institute of the Finnish Economy

The Economic Impacts of EU Climate Policy

Olavi Rantala is Research Advisor in ETLA (olavi.rantala@etla.fi).

This brief is a summary of Olavi Rantala's ETLA Reports no 2 "EU:n ilmastopolitiikan talousvaikutukset vuoteen 2020".
Research is supported by TT-Säätiö.

Reference: Rantala, Olavi (12.12.2012). "The Economic Impacts of EU Climate Policy".
ETLA Brief No 2. http://pub.etla.fi/ETLA-Muistio-Brief-2.pdf

The study evaluates the impacts of EU climate policy on the emission allowance price, electricity prices, the competitiveness of industry and macroeconomic developments in the third EU emissions trading period 2013–2020. The economic impacts of climate policy on Finland are compared to the impacts on the entire EU area. It turns out that due to its cold climate and heating energy demand, higher export intensity of the economy and higher energy intensity of the industry Finland pays a higher price for EU climate policy in terms of output and employment losses than the EU on average. The study examines the macroeconomic effects of climate policy also in the more distant future, assuming that EU climate policy is tightened further in the 2020s. Climate policy implemented by emissions trading means that the long-term economic growth in the EU area depends essentially on emission-free electricity production, and no longer on other growth factors, such as the labour supply and productivity growth.

The economic impacts of EU climate policy in the EU area and Finland in 2020

The EU's climate policy will dampen the economic growth of the EU region during the third emissions trading period beginning in 2013, when the emissions allowances of the Emissions Trading Sector (ETS) are tightened compared to the second emissions trading period of 2008–2012. The study focuses on the impact of the climate policies that the EU will follow according to the EU's Emissions Trading Directive until the year 2020 on the emission allowance price, electricity prices, industrial competitiveness and overall economic development in the EU and Finland. The impact of the EU's climate policy on economic growth is also assessed farther into the future assuming that the ETS's emissions allowances continue to be scaled back in the 2020s.

In order to gauge the impact of climate policy we need a baseline scenario as a basis for comparison describing economic developments without the effects of this policy. In the baseline scenario the rate of world economic growth and other exogenous factors affecting the EU region's economic development is expected to be slightly lower than in the early 2000s prior to the recession that began in 2008.

The price mechanism determining the impact of EU climate policies functions via the emissions trading and electricity markets. Most of the EU ETS emissions come from the production of electricity, so the key issue when forecasting the economic impact of climate policy is gauging the effect of the emission allowance price on electricity prices. A rise in electricity prices is the main factor that intermediates the impact of climate policies on the economy and energy consumption, and ultimately on the reduction of carbon dioxide emissions.

A rise in electricity prices resulting from emission price hikes reduces the consumption of electricity by households, industry and the rest of the economy and in addition has an indi-

rect impact on the consumption of electricity via the slowdown in industrial production and other production. The weakening of economic activity also leads to an outright reduction in electricity consumption and emissions.

According to the EU's Emissions Trading Directive, the ETS's emission allowances will be reduced considerably in the third trading period 2013–2020 compared to the second trading period. The amount of emission allowances will probably continue to be decreased in the 2020s. In this context, it is assumed that emission allowances will continue to be cut in the 2020s at the same pace as during the third allocation period from 2013 to 2020 (Figure 1).

Table 1 presents the economic impact of climate policy in the EU and Finland in the year 2020, compared to the baseline scenario. According to model simulations assessing the impact of climate policy the price of emissions allowances will increase by 2020 to about 20 euros per ton of carbon dioxide (Figure 1). The allowance price reflects upon the price of electricity, which will rise by nearly 40 per cent by 2020 compared to the baseline scenario (Table 1). Due to Finland's industrial energy intensity, the rise in electricity prices will boost industrial production costs in Finland more than in the EU on average. Due to Finland's cold climate, the consumption of electricity by households is also higher in Finland than the EU average. The rise in electricity prices will lead to a greater rise in consumer prices in Finland than in the EU on average.

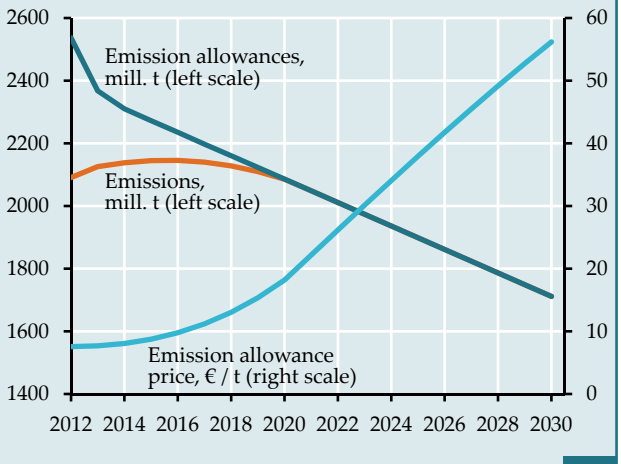
Rising industrial production costs caused by higher emission allowance price and electricity prices will undermine the EU's export competitiveness in the export markets outside the EU region and Finland's competitiveness both outside and inside the EU. Due to the erosion of competitiveness, the level of exports and industrial output will remain lower in 2020 than in the baseline scenario.

Exports and industrial production in Finland will experience a greater negative impact than in the EU on average. This is due to the fact that Finnish exports are hit by the weakening of import demand in the EU. The exports of the entire EU are affected only by the decrease in cost competitiveness relative to the export markets outside the EU. The magnitude of the asymmetry of trade dependence between Finland and other EU countries is evidenced by the fact that more than half of Finland's exports goes to the EU region, but other EU countries' exports to Finland account for only a couple of per cent of their total exports.

In addition to the asymmetry of export impacts one of the main reasons for the strong macroeconomic impact on Finland is the fact that its economy is much more open and dependent on exports than the EU region on average. In Finland the ratio of exports to GDP is approximately 40 per cent, of which more than half are exports to the EU. The entire EU's ratio of exports to GDP is only 15 per cent.

According to Table 1, the EU's climate policy will lead to a higher production and employ-

Fig. 1 Emission allowances, CO_2 emissions and emission allowance price in the EU emissions trading sector



Tab. 1 The economic impacts of EU climate policy in the EU area and Finland in 2020

	Policy impact in 2020, %	
	EU area	*Finland*
Electricity prices	37.0	37.0
Electricity consumption	-8.4	-9.2
Exports	-1.8	-2.5
Domestic demand	-1.2	-1.5
Industrial production	-1.5	-2.2
Production in the rest of the economy	-1.2	-1.6
GDP	-1.3	-1.8
Employment	-1.2	-1.7
Unit costs in industry	2.1	2.5
Unit costs in the rest of the economy	2.1	2.2
Consumer prices	2.2	2.7

ETLA

ment loss in Finland than in the EU on average. The magnitude of the employment loss is illustrated by the following estimate based on 2012 job figures: a one per cent reduction in employment means about 2 million jobs in the EU area and approximately 25,000 jobs in Finland.

The main conclusion of the economic impact assessment is that due to Finland's energy needs stemming from its northern location and cold climate, the export dependence of the economy, as well as the energy intensity of its industry, Finland will pay a higher price for the EU's climate policy carried out via the ETS in terms of production and employment losses than the EU on average.

Climate policy and long-term economic growth

It is worthwhile assessing the economic impact of the EU's climate policy further into the future because the analysis presented above extending to the year 2020 did not address the question of what happens to economic growth if climate policy is tightened further in the 2020s. The EU Emissions Trading Directive applies only to the third trading period of 2013–2020. In this context, it is assumed that the amount of EU ETS emission allowances is still tightened from 2021 onwards, so that they are reduced by the same amount each year as in 2013–2020. Model simulations are used to obtain the emission allowance price path whereby emissions will be reduced in line with the emissions allowances. Figure 1 presents the development of the emission allowance price and emission volume up until 2030.

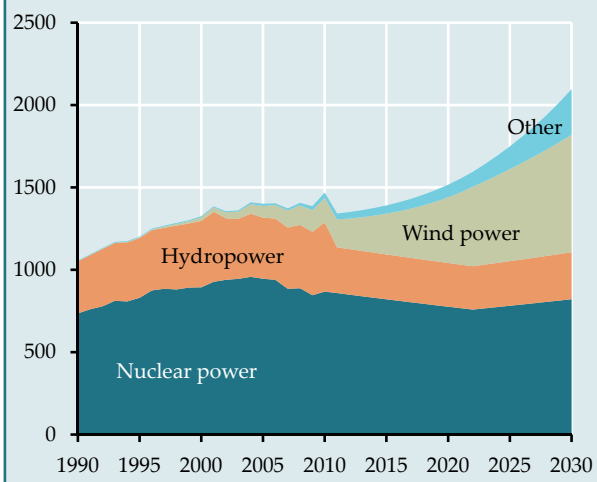
In the third emissions trading period of 2013–2020 the emission allowance price must rise at an accelerating pace, so that emissions peak and start to decline around the year 2020. The continuation of the downward trajectory will require a steady rise in the price of emission allowances as depicted in Figure 1. It is estimated that the emission allowance price will climb above 50 euros per ton of CO_2 by the year 2030.

Carrying out climate policy by limiting the amount of the ETS's emission allowances will mean that in the future the economic growth of the EU region will depend on the expansion of emission-free electricity production. The majority of the EU region's emission-free electricity production has so far been nuclear power and hydropower, even though the use of wind power has been growing rapidly in recent years. During the third emissions trading period of 2013–2020, the EU region's nuclear power production will decrease in the wake of shutdowns in German nuclear power production as only Finland and France are expected to unveil new nuclear power capacity. Wind power, on the other hand, is expected to show strong growth during 2013–2020.

Nuclear power production in the EU region might stage an upswing in the 2020s because Germany will no longer contribute negatively to the EU region's production of nuclear power and some countries, such as Finland, may build additional nuclear capacity. The EU region's wind power production growth is expected to slow down somewhat in the 2020s from the rate of growth forecast for this decade. Wind power's share of zero-emission electricity generation will nevertheless continue to grow. The share of other emission-free electricity production will also grow (Figure 2).

The impact of the expansion of emission-free electricity production on economic growth can be illustrated by assuming alternative growth paths for emission-free electricity generation and using the forecasting model to simulate alternative economic growth paths where the ETS's emissions develop in line with the emission ceiling depicted in Figure 1. The results of simulations for alternative scenarios of developments in the 2020's are presented in Table 2.

Fig. 2 Emission-free electricity generation in the EU area



The top row of Table 2 shows the GDP growth in the EU region and Finland in the baseline scenario. The second row is the result for GDP growth when emission allowances are tightened in the manner depicted in Figure 1. In this case, the EU emission-free electricity production is expected to increase in accordance with the growth path presented in Figure 2, i.e. by an average of 3.3 per cent per year.

Tab. 2 The impact of emission-free electricity generation on GDP growth rate

Annual growth 2021–2030, %

	Emission-free electricity generation	*GDP*	
	EU area	*EU area*	*Finland*
Baseline scenario	3.3	2.1	2.2
Tightening emission constraint	3.3	1.8	1.7
Tightening emission constraint	0.0	1.4	1.1
Tightening emission constraint	2.0	1.7	1.5
Tightening emission constraint	4.0	1.9	1.8
Tightening emission constraint	6.0	2.1	2.1

ETLA

In the alternative scenarios emission-free electricity generation in the EU area is allowed to vary between zero and six per cent annual growth. The forecast model simulates corresponding alternative economic growth paths where ETS's emissions remain during 2021–2030 in line with the emission ceiling presented in Figure 1. Annual GDP growth is at its lowest at 1.4 per cent in the EU region and 1.1 per cent in Finland, while it is at its highest at 2.1 per cent in both the EU and Finland.

Based on the results it can be concluded that climate policy implemented by limiting the ETS's emissions allowances leads to a situation where the EU region's economic growth in the future will depend on the expansion of emission-free electricity production and no longer as much on other growth factors, such as the labour supply and productivity growth. Thus, the EU countries' policies on nuclear power and other forms of zero-emission electricity generation will play a crucial role in the future course of economic and employment developments in the EU region and Finland.