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Territorial Impact Assessment

Climate neutrality

Disclaimer

This report was produced by the secretariat of the European Committee of the Regions to support the Committee's own-initiative on *A Clean Planet for all – A European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy (ENVE-VI/037)*, whose rapporteur is Michele Emiliano (IT/PES), President of the Puglia Region.

The findings of this report are not binding for the European Committee of the Regions and are without prejudice to the final content of its opinions. The report is for information purposes only.

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This territorial impact assessment (TIA) report is the outcome of an expert workshop on the European strategy for climate neutrality, organised by the European Committee of the Regions and the ESPON EGTC on 5 April 2019 in Brussels.

The ESPON TIA tool is designed to support the quantitative assessment of potential territorial impacts according to the Better Regulation guidelines. It is an interactive web application that can be used to support policy makers and practitioners in identifying, ex-ante, the potential territorial impacts of new EU Legislation, Policies and Directives (LPDs).

This report documents results of the territorial impact assessment expert workshop about a new energy legislative framework, the Clean Energy Package, concerning energy poverty. It serves for information purposes only. This report and the maps represent views and experiences of the participants of the workshop. It is meant to be used for decision support only and does not necessarily reflect the opinion of the members of the ESPON 2020 Monitoring Committee nor of the other institutions involved.

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


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Acronyms and legend

CoR	European Committee of the Regions
EP	European Parliament
ESPO	European Observation Network for Territorial Development and Cohesion
LRA	Local and Regional Authority
MS	Member State(s)
NUTS	Nomenclature des unités territoriales statistiques Common classification of territorial units for statistical purposes
OIR	Austrian Institute for Spatial Planning (ÖIR)
TIA	Territorial Impact Assessment

Effects of the directives – colour code

	Positive effects
	Minor positive effects
	Neutral
	Minor negative effects
	Negative effects

Legend – trend of effects



	Increase
	Decrease

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Introduction

The Commission's position on climate trends is that immediate and decisive climate action is essential. Unrestrained climate change not only has an impact on the environment, but will have severe consequences for the productivity of Europe's economy, infrastructure, ability to produce food, public health, biodiversity and political stability. Weather-related disasters caused a record EUR 283 billion in economic damages in 2017 and could affect about two-thirds of the European population by 2100, compared with 5% today. This could undermine security and prosperity in the broadest sense, damaging economic, food, water and energy systems, and in turn triggering further conflicts and migratory pressures. Overall, failing to take climate action will make it impossible to ensure Europe's sustainable development and to deliver on the United Nations' SDGs.

The aim of the EU's 2050 long-term strategy¹ launched in November 2018 for "a modern, competitive, prosperous and climate neutral economy" is to confirm Europe's commitment to lead in global climate action and present a vision that can lead to net-zero greenhouse gas emissions by 2050 through a socially fair transition encompassing all sectors of the economy. The proposal does not put forward new policies or revise the Commission's 2030 targets. It sets the direction of travel for EU climate and energy policy and frames the EU's contribution to achieving the Paris Agreement's objective of keeping global temperatures below 1.5C this century, in line with the SDGs.

Strategic priorities:

- Fully decarbonising Europe's energy supply
- Embracing clean, safe and connected mobility
- Putting industrial modernisation at the centre of a fully circular economy
- Maximising benefits from energy efficiency
- Developing smart network infrastructure and interconnections
- Reaping the full benefits of bioeconomy and creating essential carbon sinks
- Tackling remaining CO₂ emissions through carbon capture and storage.

Political mandate

This report is written on the basis of the workshop organised on 5 April 2019 to **support the own-initiative opinion of the European Committee of the Regions on *A Clean Planet for all – A European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy* (ENVE-VI/037), Rapporteur: Michele Emiliano (IT/PES), President of Puglia Region.**

¹ [A Clean Planet for all: A European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy](#)

The opinion on the Commission's "A Clean Planet for All"² communication is aimed at discussing the EU 2050 long-term strategy for climate neutrality, in particular with regard to the point of view of local and regional authorities (LRAs) in this transition.

The transition to a decarbonised Europe entails huge changes in many sectors. These changes can be critical, depending on specific population groups and specific territories. To understand how decarbonisation will affect different regions is a key element in fine-tuning EU, national and regional policies and ensuring no citizen or region is left behind. When defining the actual pathway to decarbonisation and implementing a practical roadmap, targeted mapping of vulnerabilities has to be carried out.

² Communication from the Commission to the European Parliament, the European Council, the European Economic and Social Committee, the Committee of the Regions and the European Investment Bank: [A Clean Planet for all: A European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy](#) | COM(2018) 773 final .

1 Methodology: ESPON Quick Check

The concept of territorial impact assessment (TIA) aims to show up regional variations in the impact of EU policies. The ESPON TIA tool³ is an interactive web application that can be used to support policy makers and practitioners in identifying, ex-ante, the potential territorial impacts of new EU Legislation, Policies and Directives (LPDs). The "ESPON TIA Quick Check" approach combines a workshop setting for identifying systemic relations between a policy and its territorial consequences with a set of indicators describing the sensitivity of European regions.

It helps to steer an expert discussion about the potential territorial effects of an EU policy proposal by checking all relevant indicators in a workshop setting. The results of the guided expert discussion are judgements about the potential territorial impact of an EU policy considering different thematic fields (economy, society, environment, governance) for a range of indicators. These results are fed into the ESPON TIA Quick Check web tool.

The web tool translates the combination of the expert judgements on exposure and the different sensitivity of regions into maps, showing the potential territorial impact of EU policy at NUTS3 level. These maps serve as a starting point for further discussion of the different impacts of a given EU policy on different regions. Consequently, the experts participating in the workshop provide important input for this quick check on the potential territorial effects of an EU policy proposal.

The workshop on the European strategy for climate neutrality was held on 5 April 2019 in Brussels and brought together a number of experts representing different organisations and LRAs.

Two moderators from the OïR, provided by ESPON, prepared and guided the workshop and handled the ESPON TIA tool.

Figure 1 Workshop discussion



Source: Territorial impact assessment expert workshop, Brussels, 5 April 2019, OïR

³ https://www.espon.eu/main/Menu_ToolsandMaps/TIA/

Picturing potential territorial impacts considering economic indicators

- Economic performance (GDP/capita)
- Employment in industry and construction
- Employment in technology and knowledge-intensive sectors
- Employment in branches affected by the low-carbon economy

Picturing potential territorial impacts considering societal indicators

- Unemployment rate
- Disposable income
- Self-evaluation of life satisfaction

Picturing potential territorial impacts considering environmental indicators

- Emissions of CO₂ per capita (tonnes)
- Ratio between emissions of CO₂ and GVA
- Emissions of NO_x per capita (kilotonnes)
- Urban population exposed to PM10 concentrations
- Electricity generated from hard coal and lignite
- Electricity generated from renewable sources
- Renewable energy use in residential building sector
- Renewable energy use in public building sector

Furthermore, the experts agreed that the following indicators, which were not included in the ESPON TIA Quick Check web tool, were also relevant to describe the identified effects:

- CO₂ emissions (in equivalents)
- Distribution of diseases (asthma, ...)
- GVA of sectors
- Final energy consumption (heating, ...)
- Share of renewable energy in final energy consumption

1.3 Judging the intensity of the potential effects

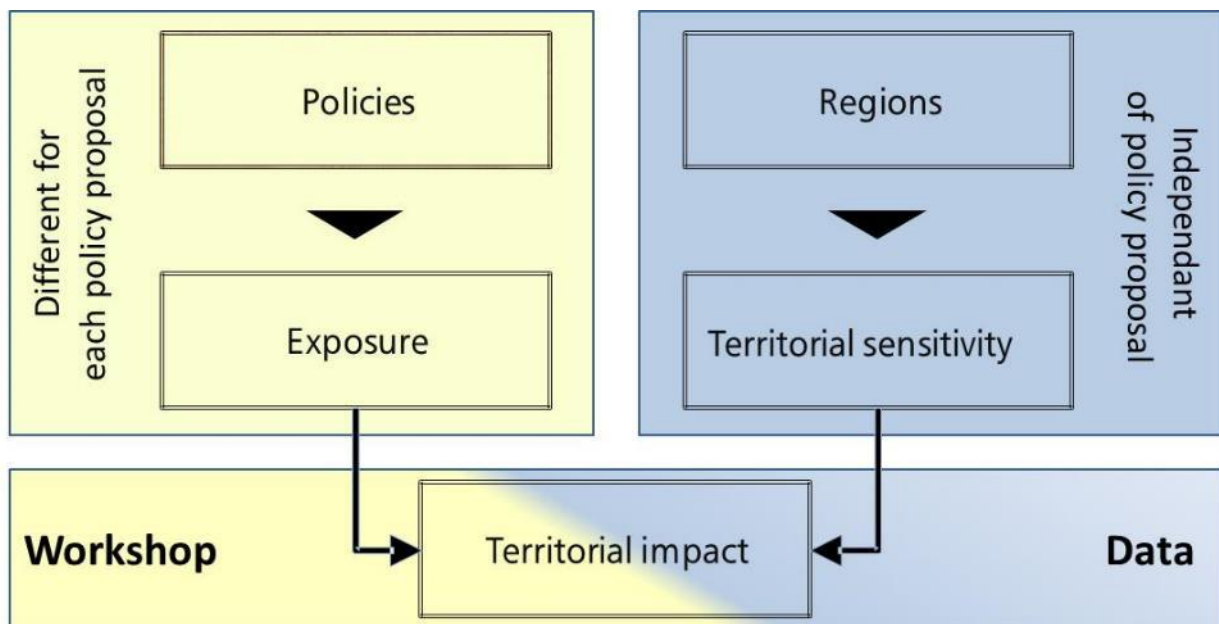
The workshop participants were asked to estimate the potential effects deriving from the European strategy for climate neutrality. They judged the potential effect on territorial welfare according to the following scores:

- ++ strong advantageous effect on territorial welfare (strong increase)
- + weak advantageous effect on territorial welfare (increase)
- o no effect/unknown effect/effect cannot be specified
- - weak disadvantageous effect on territorial welfare (decrease)
- -- strong disadvantageous effect on territorial welfare (strong decrease)

1.4 Calculating the potential 'regional impact' – Combining the expert judgement with regional sensitivity

The ESPON TIA Quick Check combines expert judgement on the potential effect deriving from the European strategy for climate neutrality (**exposure**) with indicators illustrating the sensitivity of regions, resulting in maps showing a territorially differentiated impact. This approach is based on the **vulnerability concept** developed by the Intergovernmental Panel on Climate Change (IPCC). In this case, the effects deriving from a particular policy measure (exposure) are combined with the characteristics of a region (**territorial sensitivity**) to produce potential territorial impacts (cf. following figure).

Figure 3 Exposure x territorial sensitivity = territorial impact



Source: OIR, 2015.

- "Exposure" describes the potential intensity of the impact caused by the effects of the European strategy for climate neutrality on a specific indicator. Exposure illustrates the experts' judgement, i.e. the main findings of the expert discussion at the TIA workshop.
- "Territorial sensitivity" describes the baseline situation of the region according to its ability to cope with external effects. It is a characteristic of a region that can be described by different indicators independently of the topic analysed.

1.5 Mapping the potential territorial impact

The result of the territorial impact assessment is presented in maps. The maps displayed below show the potential territorial impacts based on a combination of the expert judgement on the exposure and the territorial sensitivity of a region, described by an indicator at NUTS3 level. Whereas expert judgement is a qualitative indicator (i.e. strong advantageous effect on territorial welfare/weak advantageous effect/no effect/weak disadvantageous effect/strong disadvantageous effect), sensitivity is a quantitative indicator.

2 Preliminary discussion

2.1 Main goal

At the start of the workshop and on behalf of the European Committee of the Regions, it was explained that the objective of the workshop was to brainstorm on the diverse impacts that a transition to a climate neutral society could have on regions across Europe.

Mapping the relevant indicators at regional level in Europe would provide us with a first rough assessment of the vulnerability of the different regions to the transition to climate neutrality. The huge changes required to ensure that Europe remains aligned to the 1.5° scenario⁴ will have a different impact depending on different factors:

- The sectors driving the local economy
- The socio-economic situation
- The characteristics of the energy system
- The potential in terms of renewable energy and energy efficiency
- The potential in terms of innovation and green jobs.

2.2 Initial questions

The above elements were discussed during the workshop. The maps produced helped to identify more vulnerable regions in terms of climate neutral transition. This exercise provided insight into the main structural hurdles for the implementation of the 2050 long-term strategy. Among the questions that experts were asked to consider prior to the workshop were the following:

- What tools could be envisaged for the implementation of the single European climate strategy in your area?
- What are the challenges and opportunities for local authorities, the most important experience to build on and the major obstacles to be removed in order to promote adequate capacity-building and to bridge the gap between research, innovation and implementation at local level?
- What are the most serious social impacts we can expect from the transition to a climate-neutral economy and what are the main measures to be taken to address them?

⁴ <https://www.ipcc.ch/sr15/> .

2.3 Priority topics for debate

Prior to the discussion of which indicators should be tested, experts reflected on the crucial elements of the strategy leading to a climate neutral economy.

The issue of energy gathered the most attention, and was analysed in further detail in several subtopics. Participants paid special attention to the need to achieve greater energy efficiency. This was the case concerning more than simple energy savings, and included the optimisation of the energy that was used, regardless of whether it was related to household energy consumption, industry and services, or transport.

Also underlined in the workshop was the need to tackle energy production. In particular, the potential of decentralised energy production (including, among others, photovoltaic) was mentioned as an issue to be considered. In terms of energy demand, a change in consumption patterns needed to be anchored in life-style changes.

This, in turn, needed to take into consideration people's experiences and perceptions when dealing with climate change. Precisely because of this, citizen engagement in policy design was deemed to be strategically crucial by the experts.

Secondary issues of concern were specific sectors that, due to their use of resources, had special importance in reaching a climate neutral economy. Among them, industry, owing to its intensive use of energy, was considered to be of special concern. This was especially true in that some regions were highly dependent on this sector, and so any policies that imposed more stringent conditions on it would affect them with far greater intensity than others that might depend more on services. Other sectors of concern were transport (especially air transport) and agriculture (including land use).

A final topic that several experts deemed deserving of attention was the financing of the environmental transition. This included both direct intervention through public policy (i.e. taxation) but also private economic activities (pricing and loans for climate-friendly investments and energy efficiency). For local and regional authorities, the fact that public investment in housing could not be accounted for as a long-term investment under the regulatory framework and rules of ESA 2010 and the Stability and Growth Pact was also described as an issue of concern.

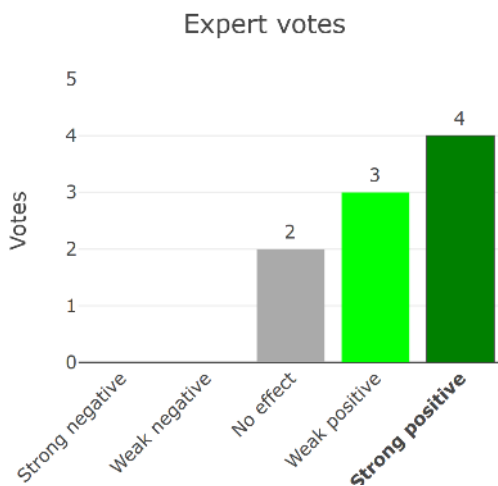
The preliminary discussion between the experts served to prepare the debate on the statistical indicators that were the most relevant in assessing the potential impact of the European long-term strategy for a climate neutral economy and which we describe in detail in the following three chapters.

3 Expected economic effects

3.1 Economic performance (GDP/capita)

The experts concluded that the European strategy for climate neutrality would promote economic development. New jobs related to the renewable energy market would be created. Thus economic performance (GDP/capita) could be affected positively. Four experts judged the effect as strongly positive and three experts as weakly positive. Two experts did not expect a relevant effect.

Figure 4 Result of the expert judgement: economic performance (GDP/capita) affected by the European strategy for climate neutrality

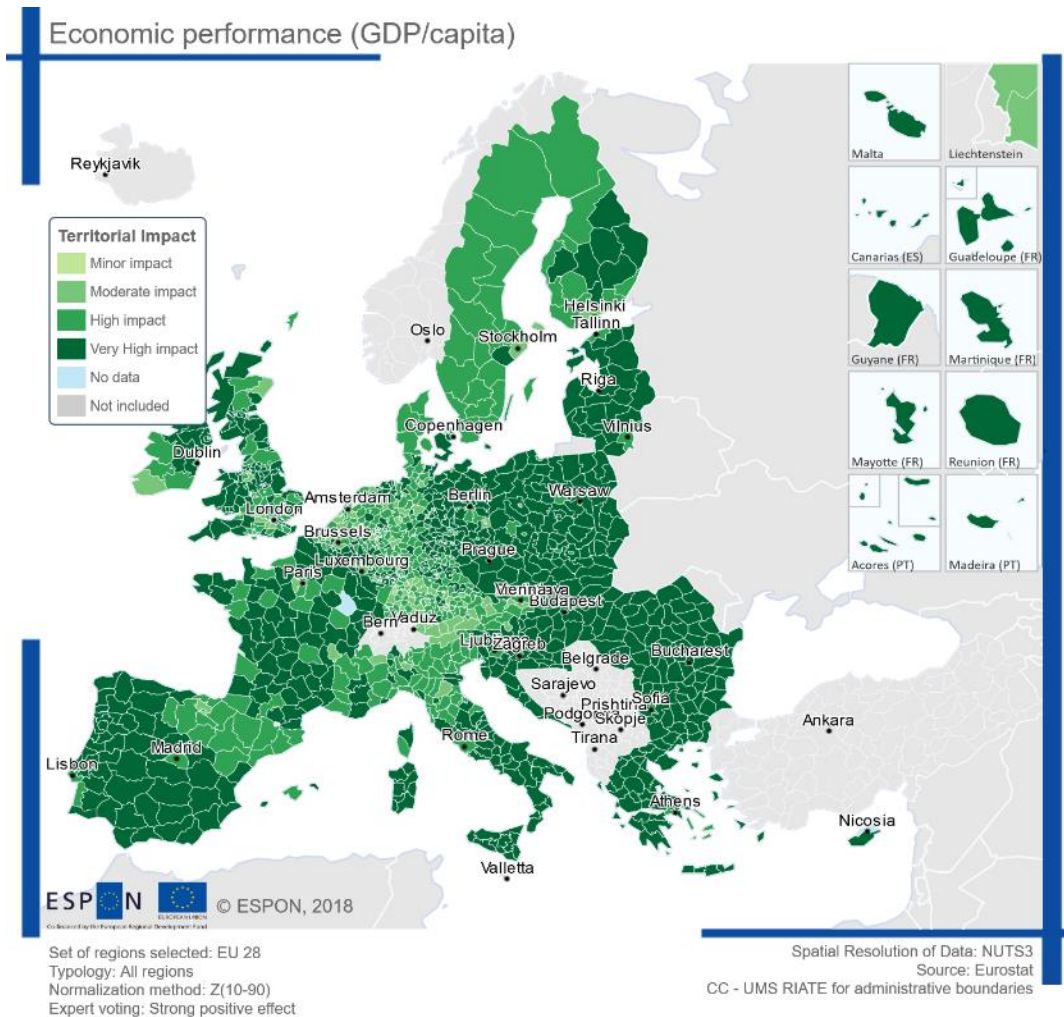


Source: Territorial impact assessment expert workshop, Brussels, 5 April 2019

The "economic performance (GDP/capita)" indicator measures gross domestic product (GDP) at current market prices (Purchasing Power Standard per inhabitant). Regions with lower GDP per capita are expected to benefit more from the development of the European strategy for climate neutrality. Sensitivity is thus inversely proportional to the level of GDP per capita.

The following maps show the potential territorial impact from the roll-out of the European strategy for climate neutrality on economic performance (GDP/capita). It combines the expert judgement of a strongly positive effect with the given sensitivity of regions. 56% of regions would benefit from a very highly positive impact, with 31% nevertheless experiencing a highly positive impact. 13% of regions were expected to face a moderately positive impact.

Map 1: Economic performance (GDP/capita) affected by the European strategy for climate neutrality – expert judgement: strongly positive effect



Source: Territorial impact assessment expert workshop, Brussels, 5 April. 2019

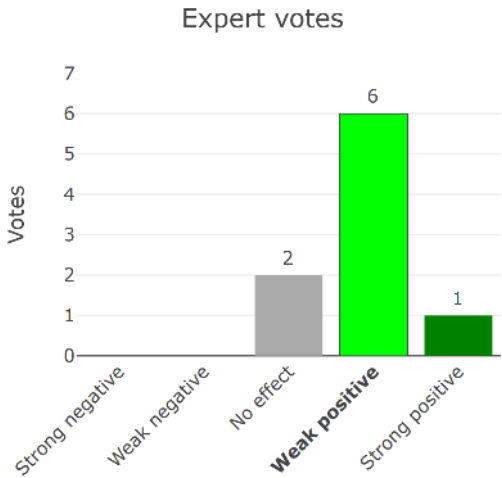
The map shows that the European strategy for climate neutrality could result in a kind of "catching-up effect". Regions with lower GDP could benefit more than regions where there was already higher GDP/capita, due to the lower marginal benefit of already economically highly performing regions. Thus the regions benefiting from a very high and high positive impact would be located in the eastern part of Europe (eastern Finland, Estonia, Latvia, Lithuania, Poland, eastern Germany, the eastern part of Slovakia, Hungary, Bulgaria, Romania) and in the south (Greece, southern Italy, Sardinia, Cyprus, southern Spain, Portugal). Furthermore, regions in the west and north of Britain, the north-east of Ireland and in the centre of France could potentially benefit more from an EU industrial policy strategy.

3.2 Employment in industry and construction

The experts anticipated that the European strategy for climate neutrality would "green" industrial production and increase the number of jobs in the industry sector. Construction work to increase the energy efficiency of buildings is especially labour intensive and will call for additional jobs in this sector.

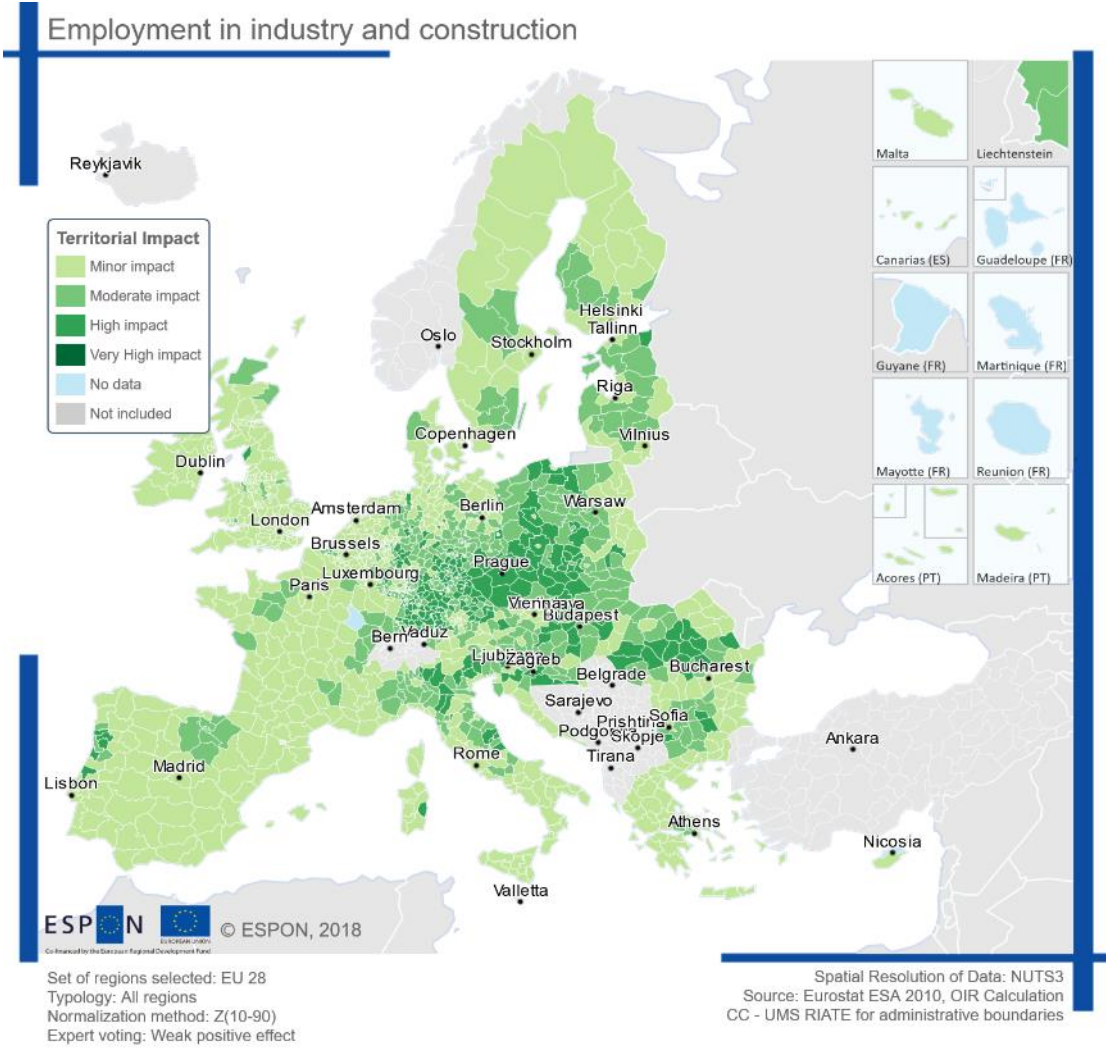
One expert voted for strongly positive and six for weakly positive. Two experts did not see a relevant effect.

Figure 5 Result of the expert judgement: employment in industry and construction affected by the European strategy for climate neutrality



Source: Territorial impact assessment expert workshop, Brussels, 5 April 2019

Map 2 : Employment in industry and construction affected by the European strategy for climate neutrality – expert judgement: weakly positive effect



Source: Territorial impact assessment expert workshop, Brussels, 5 April. 2019

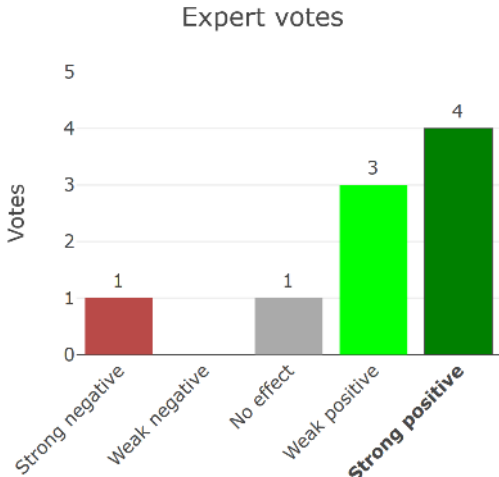
This indicator depicts the share of employment in industry and construction out of total employment. Regions with a higher share of employment in these branches were expected to be influenced more by changes concerning this sector. Sensitivity would thus be directly proportional to the share of employment in industry and construction.

The map shows the potential territorial impact of the European strategy for climate neutrality on employment in industry and construction. It combines the expert judgement of a weakly positive effect with the given sensitivity of regions. 15% of regions would benefit from a highly positive impact and 24% from a moderately positive impact. Most of these regions could be found in central, eastern and south-eastern Europe as well in parts of Italy, Portugal and the U.K. The majority of regions (61%) would benefit from a minor positive impact.

3.3 Employment in technology and knowledge-intensive sectors

In order to achieve the goals set in the European strategy for climate neutrality, new technologies in the field of renewable energy and energy efficiency are required. Therefore, the experts expected the strategy to affect employment in technology and knowledge-intensive sectors positively, as demand for employment in this branch would be higher. Four experts voted this effect as strongly positive and three as weakly positive. One expert voted for strongly negative and one expert did not expect it to be relevant.

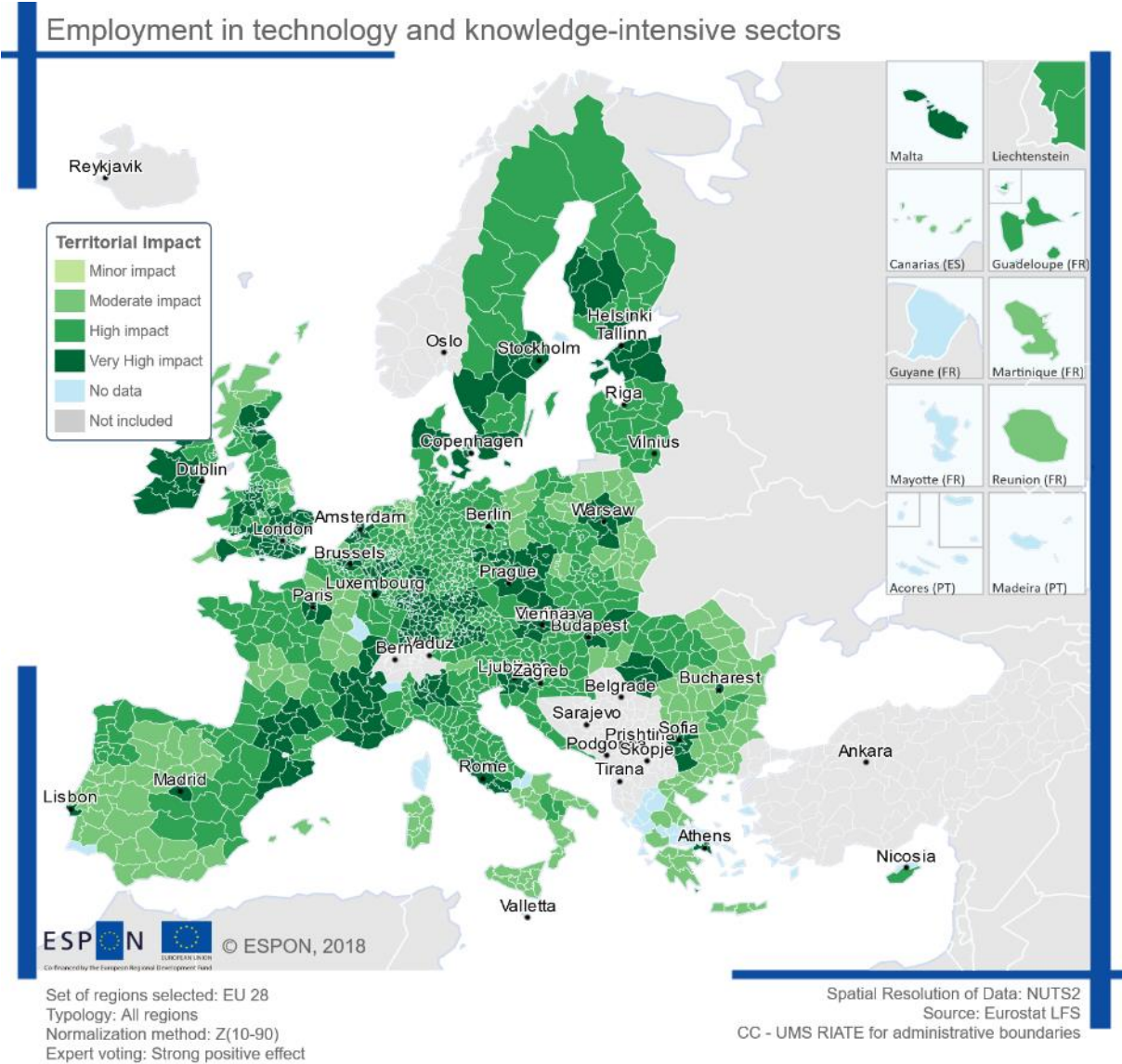
Figure 6 Result of the expert judgement: employment in technology and knowledge-intensive sectors affected by the European strategy for climate neutrality



Source: Territorial impact assessment expert workshop, Brussels, 5 April 2019

This indicator measures the share of employment in high-technology manufacturing and knowledge-intensive high-technology services out of total employment. Regions with a greater share of employment in technology and knowledge intensive sectors were considered to be more sensitive to the European strategy for climate neutrality, which could stimulate activities in the field of sustainable energy innovation. Sensitivity was therefore directly proportional to this.

Map 3 : Employment in industry and construction affected by the European strategy for climate neutrality – expert judgement: strongly positive effect



Source: Territorial impact assessment expert workshop, Brussels, 5 April. 2019

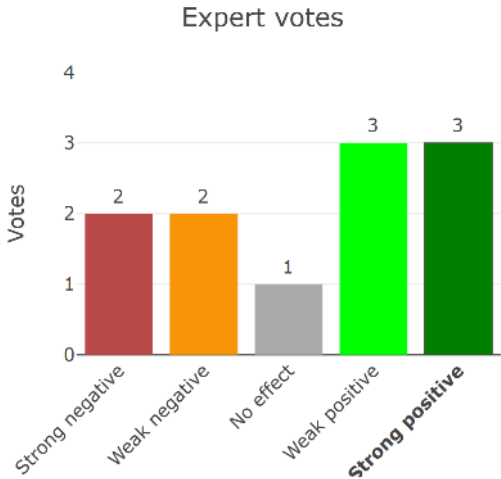
The map shows the potential territorial impact of European strategy for climate neutrality on employment in technology and knowledge-intensive sectors. It combines the expert judgement of a strongly positive effect with the given sensitivity of regions. A third of regions were expected to benefit from a very highly positive impact. Many of these areas could be found in metropolitan areas where a large number of scientific and research establishments were located. In several countries (e.g. Ireland,

France, Germany), some predominantly rural regions could also benefit from the highest impact. Half of regions (49%) could nevertheless enjoy a highly positive impact and 17% a moderately positive impact.

3.4 Employment in branches affected by the low-carbon economy

The European strategy for climate neutrality would definitely have an impact on branches affected by the low-carbon economy as e.g. in the transport, energy, building and construction sector, water and waste management. Voting was varied, though. Three experts judged the effect as strongly positive and three as weakly positive. On the other hand, two experts assumed a weakly negative effect and another two a strongly negative effect. One expert did not see this indicator as relevant.

Figure 7 Result of the expert judgement: employment in branches affected by the low-carbon economy affected by the European strategy for climate neutrality



Source: Territorial impact assessment expert workshop, Brussels, 5 April 2019

The "employment in branches affected by the low-carbon economy" indicator depicts the share of persons employed in industries that will be affected by the low-carbon economy (e.g. transport, energy, building and construction, water and waste management, etc.) out of total employment (excluding agriculture). Regions with a higher share of employment in these industries were expected to be influenced more by the European strategy for climate neutrality. Sensitivity was thus directly proportional to the share of employment in these branches.

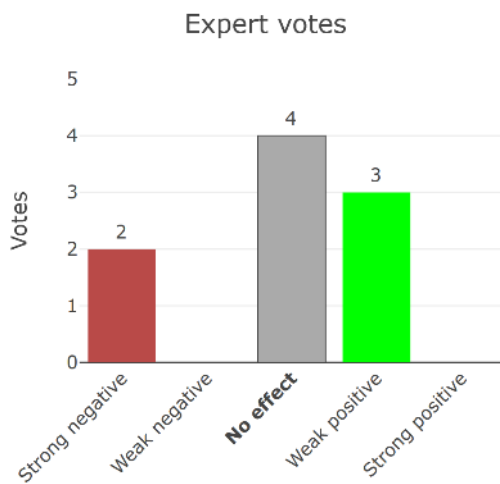
Due to the lack of uniform voting on exposure, no clear impact could be found and consequently no map is displayed.

4 Expected societal effects

4.1 Unemployment rate

Due to the positive effects of the roll-out of the European strategy for climate neutrality on economic performance, it was assumed that the unemployment rate could be affected. However, the majority of the experts did not consider this effect as relevant.

Figure 8 Result of the expert judgement: unemployment rate affected by the European strategy for climate neutrality



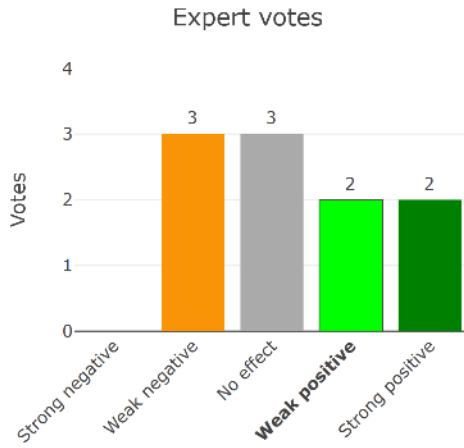
Source: Territorial impact assessment expert workshop, Brussels, 5 April 2019

4.2 Disposable income

The experts agreed that the European strategy for climate neutrality would have a positive impact on disposable income. However, the judgement of the experts was not uniform. Two experts voted the "disposable income" indicator as strongly positive and two as weakly positive. Three experts judged the effect as weakly negative and three experts did not consider this indicator as relevant.

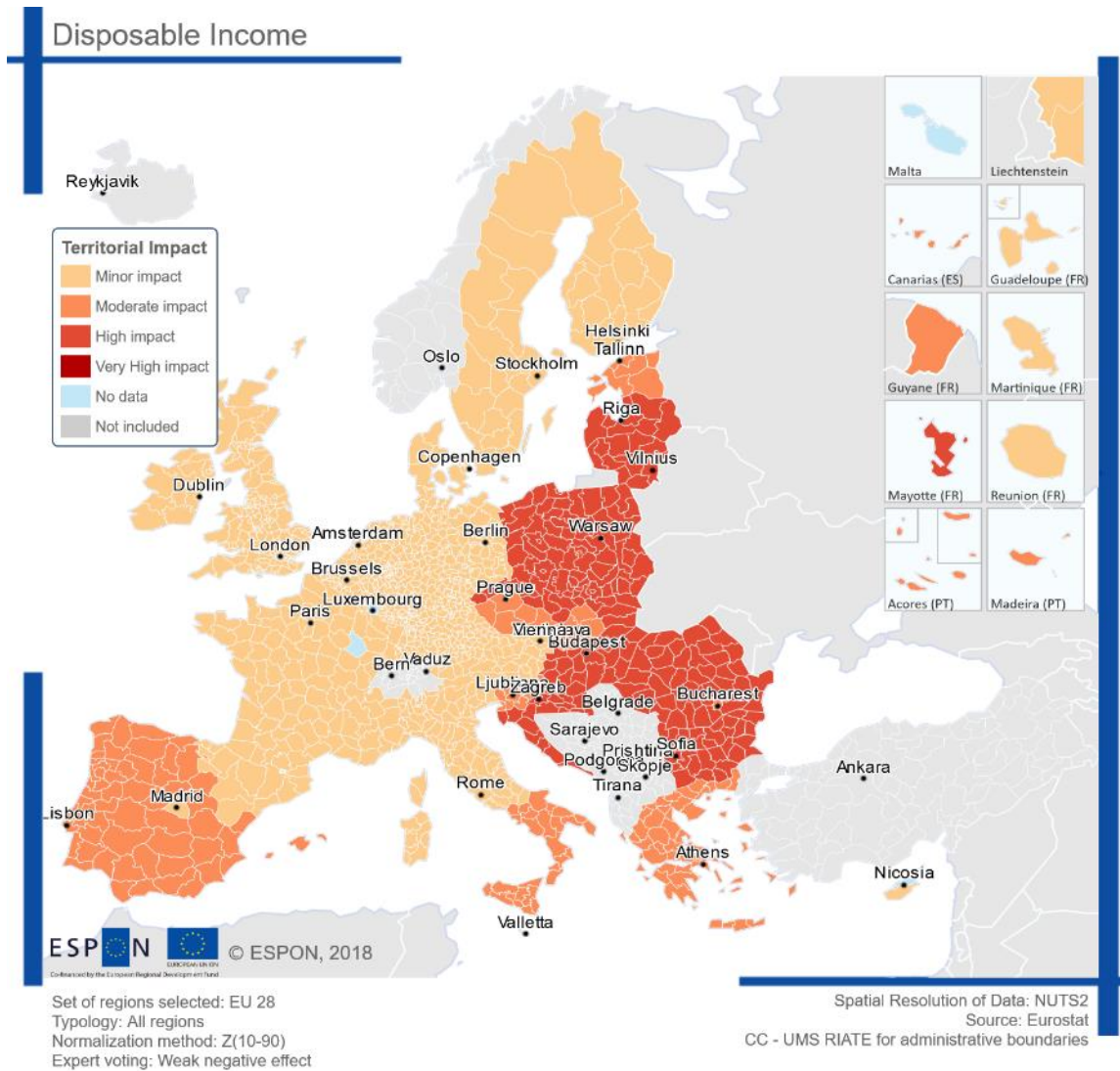
The "disposable income" indicator is stated in euro per inhabitant expressed in purchasing power standard. Regions with a lower disposable income per capita were expected to benefit more from the European strategy for climate neutrality. Sensitivity was thus inversely proportional to the level of disposable income per capita in PPS.

Figure 9 Result of the expert judgement: disposable income affected by the European strategy for climate neutrality



Source: Territorial impact assessment expert workshop, Brussels, 5 April 2019

Map 4: Disposable income affected by the European strategy for climate neutrality – expert judgement: weakly negative effect



Source: Territorial impact assessment expert workshop, Brussels, 5th April. 2019

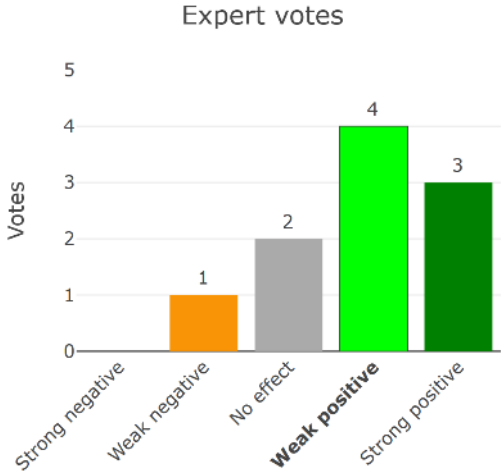
The map shows the potential territorial impact of the European strategy for climate neutrality based on disposable income. It combines the expert judgement of a weakly negative effect with the given

sensitivity of regions. 16% of regions could experience a highly negative impact. These regions, with a less developed economy, were located in the eastern half of Europe. 14% of regions, located in Portugal, Spain, southern Italy and Greece, were expected to face a moderately negative impact and the majority (71%) a minor negative impact.

4.3 Self-evaluation of life satisfaction

Some experts assumed that the roll-out of the European strategy for climate neutrality could have a positive impact on health and quality of life. As the consumption of fossil fuel energy sources was gradually minimised, emissions of pollutants would also be reduced. Health and quality of life would consequently be enhanced, improving people's life satisfaction as a result. Three experts voted this effect as strongly positive and four as weakly positive. One expert expected a weakly negative effect and two experts did not consider this indicator as relevant.

Figure 10 Result of the expert judgement: self-evaluation of life satisfaction affected by the European strategy for climate neutrality



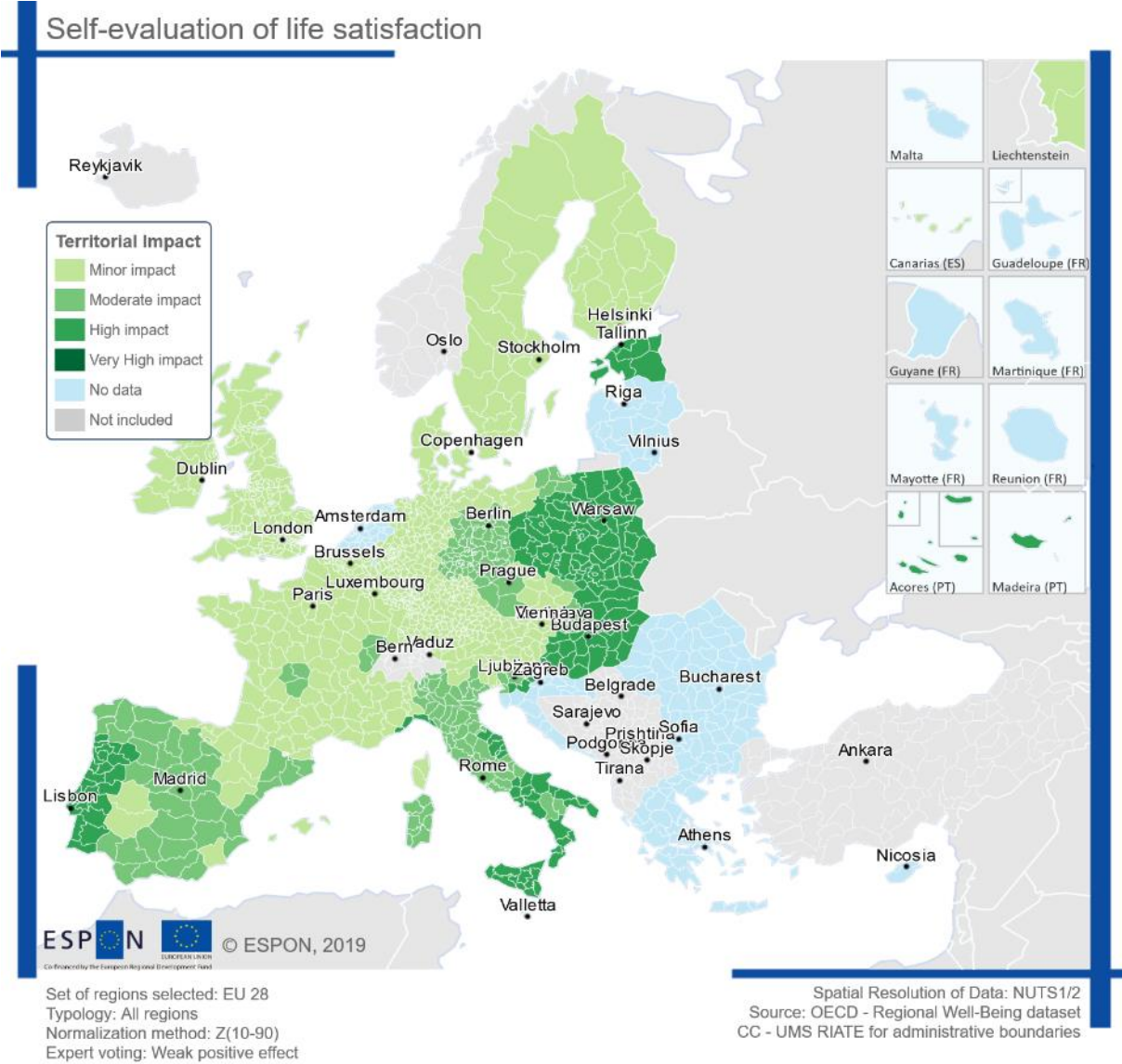
Source: Territorial impact assessment expert workshop, Brussels, 5 April 2019

The indicator pictures the sensitivity of a region according to the self-evaluation of life satisfaction. It is measured on an average score from 0 to 10 of people who replied to the following question: ‘On which step of the ladder would you say you personally feel you stand at this time?’ Regions with a lower self-evaluation of life satisfaction were expected to be more sensitive. Sensitivity was thus inversely proportional to the level of life satisfaction.

The following map shows the potential territorial impact of the European strategy for climate neutrality on the self-evaluation of life satisfaction. It combines the expert judgement of a weakly positive effect with the given sensitivity of regions. 14% of regions could experience a highly positive impact and 17% a moderately positive impact. The regions with the highest potential impact were in

Portugal, parts of Italy and Slovenia, Estonia, Poland, the Czech Republic, Slovakia and Hungary. The majority of regions (69%) would benefit from a minor positive impact.

Map 5 : Employment in industry and construction affected by the European strategy for climate neutrality – expert judgement: weakly positive effect



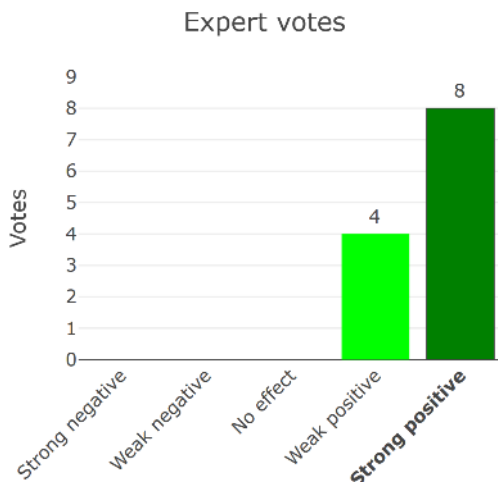
Source: Territorial impact assessment expert workshop, Brussels, 5th April. 2019

5 Expected environmental effects

5.1 Per capita emissions of CO₂

The European strategy for climate neutrality will inevitably bring in environmentally friendly production methods with less consumption of fossil fuel energy sources. Consequently, it will contribute to reducing CO₂ per capita emissions. All experts saw a positive effect: eight experts voted for strongly positive and four for weakly positive.

Figure 11 Result of the expert judgement: emissions of CO₂ per capita (tonnes) affected by the European strategy for climate neutrality



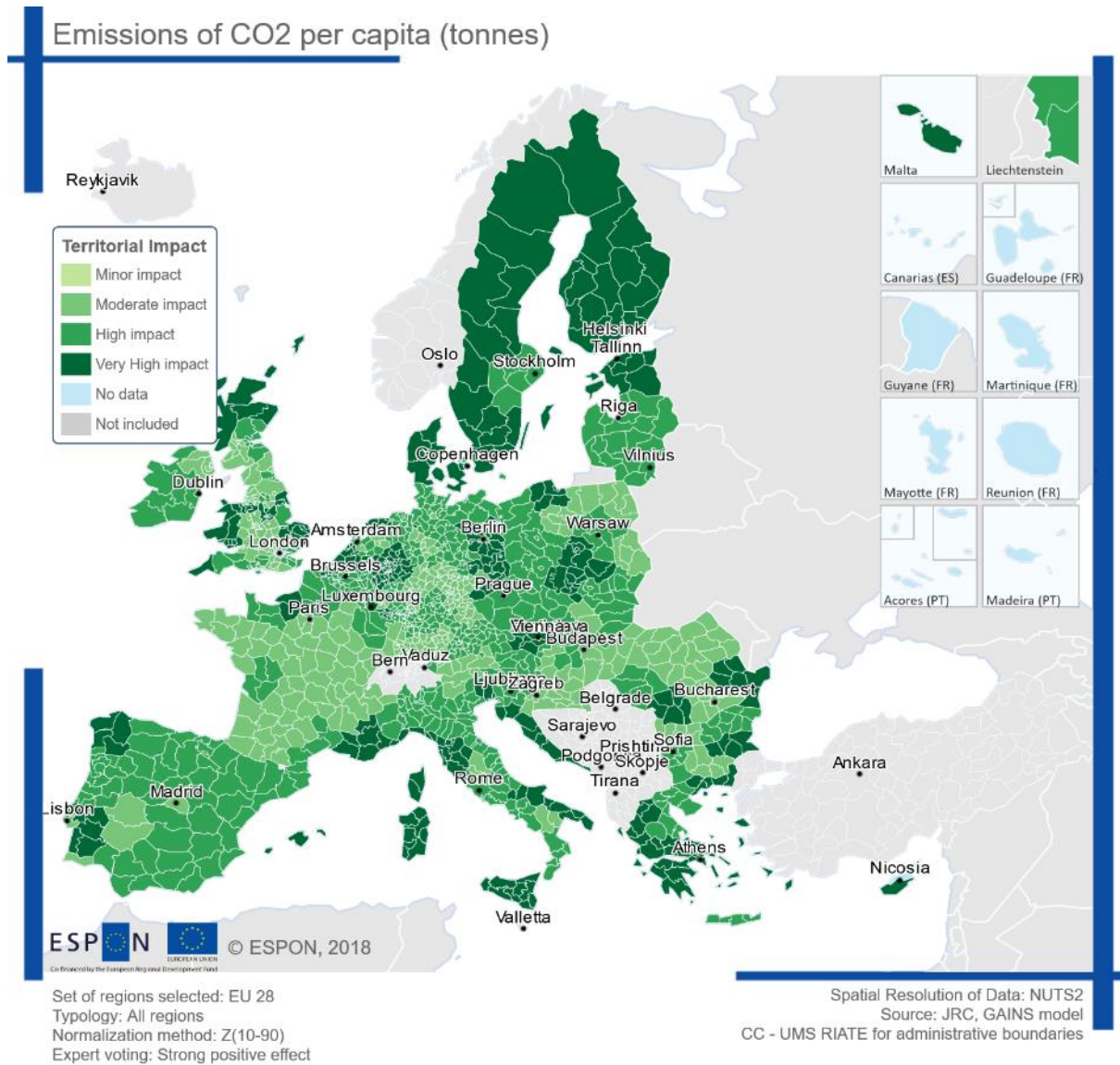
Source: Territorial impact assessment expert workshop, Brussels, 5 April 2019

The "emissions of CO₂ per capita" indicator pictures the sensitivity of a region according to the emissions of CO₂ in tonnes per capita. It is measured in tonnes per year. Regions showing higher concentrations of CO₂ per capita were expected to be more sensitive.

The following map shows the potential territorial impact arising from the roll-out of the European strategy for climate neutrality based on per capita emissions of CO₂. It combines the expert judgement of a strongly positive effect with the given sensitivity of regions. 27% of the regions could benefit from a very highly positive impact. 44% would see a highly positive impact and 29% a moderately positive impact.

Many of the regions that would experience the highest impact in terms of reduction of CO₂ emissions were port regions or industrial regions. Sparsely populated regions with high CO₂ emissions per capita in Sweden and Finland also showed high impacts due to the low numbers of inhabitants, resulting in a high level of CO₂ per capita.

Map 6 : Emissions of CO₂ per capita (tonnes) affected by the European strategy for climate neutrality – expert judgement: strongly positive effect

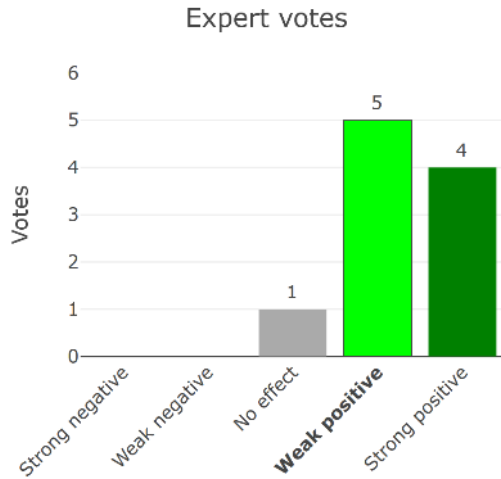


Source: Territorial impact assessment expert workshop, Brussels, 5 April. 2019

5.2 Ratio between emissions of CO₂ and GVA

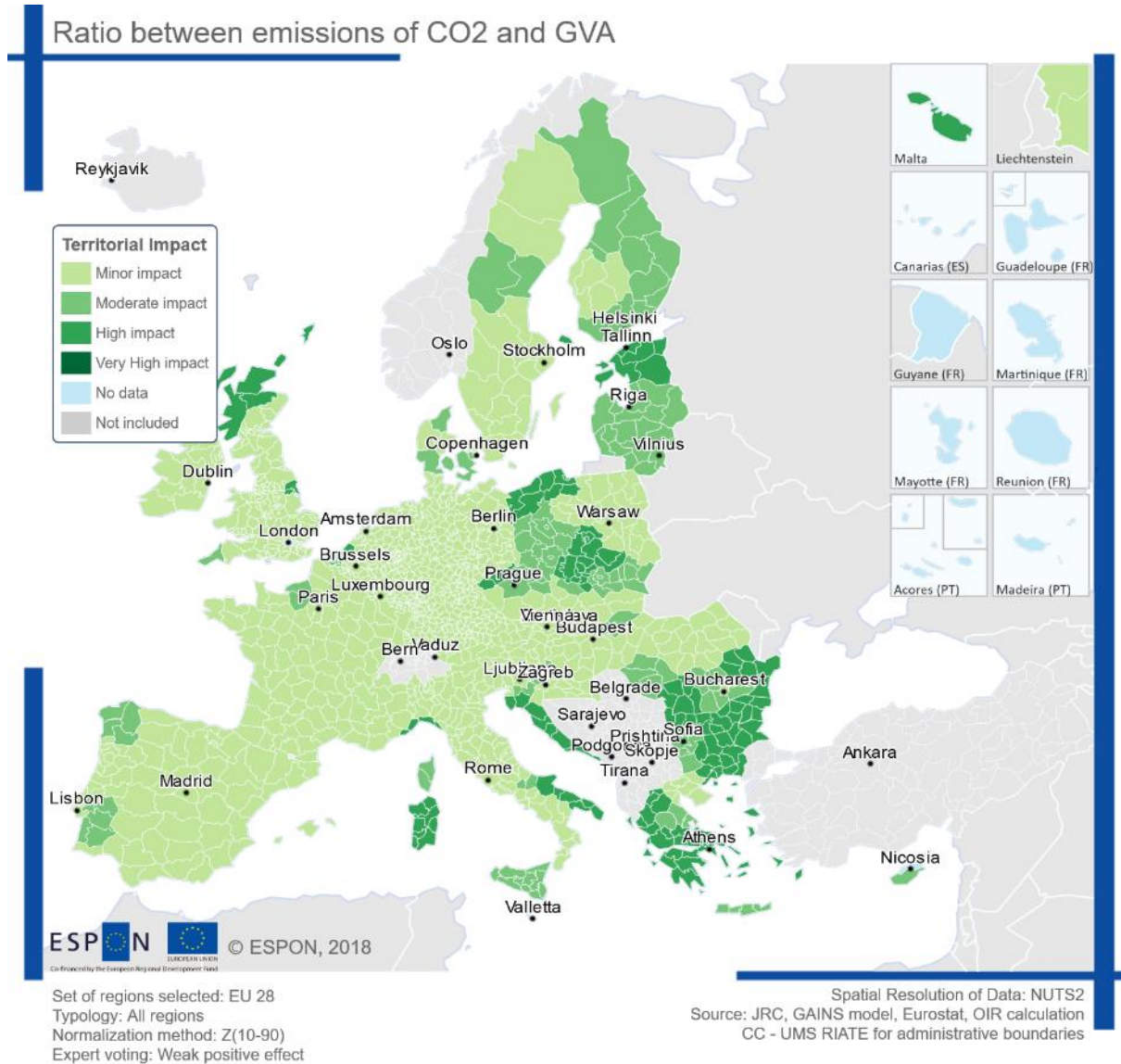
Another suitable indicator for illustrating CO₂ emissions is the "ratio between emissions of CO₂ and GVA". Compared to the "emissions of CO₂ per capita" indicator this ratio is able to show how "CO₂ efficient" the economic activities of a region are. Therefore, regions with a low ratio between emissions of CO₂ and GVA were assumed to have a sustainable economy. The majority of experts judged the effect as positive: four experts voted for strongly positive and five for weakly positive. One expert did not see this indicator as relevant.

Figure 12 Result of the expert judgement: ratio between emissions of CO₂ and GVA affected by the European strategy for climate neutrality



Source: Territorial impact assessment expert workshop, Brussels, 5 April 2019

Map 7 : Ratio between emissions of CO₂ and GVA affected by the European strategy for climate neutrality – expert judgement: weakly positive effect



Source: Territorial impact assessment expert workshop, Brussels, 5 April. 2019

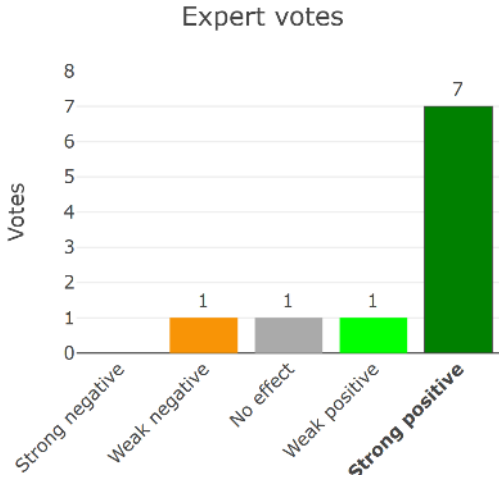
This indicator depicts the ratio between emissions of CO₂ and GVA. It is calculated by dividing emissions of CO₂ (tonnes) by GVA (Mio Euro). Regions showing a higher ratio between emissions of CO₂ and GVA were expected to be more sensitive. Sensitivity was thus directly proportional to the ratio between emissions of CO₂ and GVA.

The map shows the potential territorial impact of the European strategy for climate neutrality based on the ratio between emissions of CO₂ and GVA. It combines the expert judgement of a weakly positive effect with the given sensitivity of regions. 11% of regions could benefit from a highly positive impact. These regions were located e.g. in parts of the U.K., the Netherlands, Italy, Poland and Romania. Furthermore, Croatia, Estonia, Bulgaria and Greece in particular would be affected positively. 10% of regions were expected to experience a moderately positive impact and most regions (79%) a minor positive impact.

5.3 Emissions of NOx per capita (kilotonnes)

With the European strategy for climate neutrality contributing to improving infrastructure for public transport, the modal split will shift from private car transport to public transport. New technologies could also contribute to enhancing mobility efficiency. Consequently, the experts considered the emissions of NOx per capita as another relevant indicator measuring the effects of the strategy for climate neutrality on air quality. The majority of experts voted for strongly positive and one expert for weakly positive. One expert voted for a weakly negative effect and one expert did not consider this indicator as relevant.

Figure 13 Result of the expert judgement: emissions of NOx per capita (kilotonnes) affected by the European strategy for climate neutrality

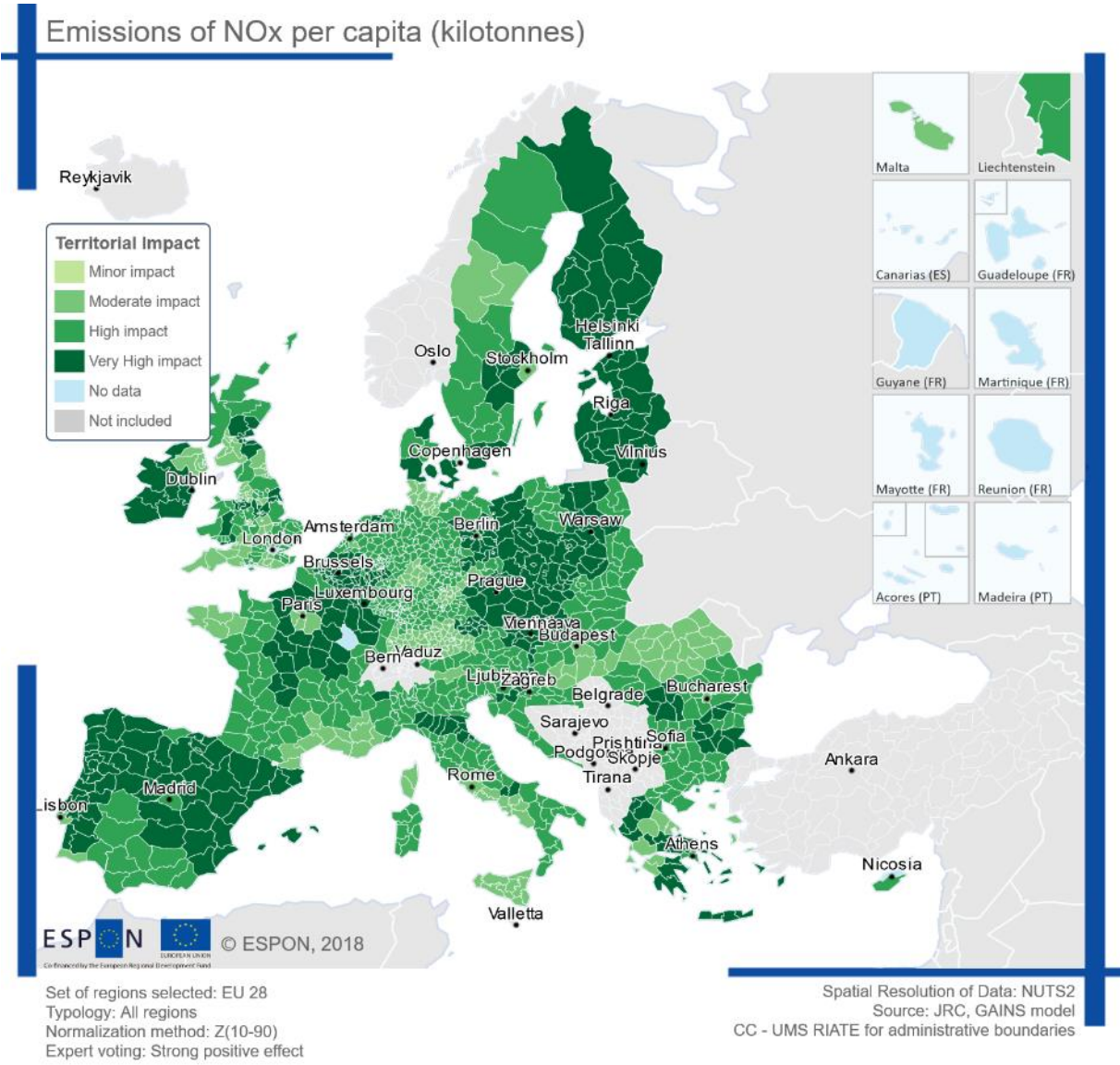


Source: Territorial impact assessment expert workshop, Brussels, 5 April 2019

The indicator picturing the sensitivity of a region according to emissions of NOx per capita is measured in kilotonnes per year. Regions showing higher tonnes of NOx per capita were expected to be more sensitive.

The following map shows the potential territorial impact of the European strategy for climate neutrality on emissions of NOx per capita (kilotonnes). It combines the expert judgement of a strongly positive effect with the given sensitivity of regions. 30% of regions could benefit from a very highly positive impact. These regions were distributed fairly evenly throughout Europe, though several countries would in particular be affected positively. Half of regions (49%) would still experience a highly positive impact and 21% a moderately positive impact.

Map 8 : Emissions of NOx per capita (kilotonnes) affected by the European strategy for climate neutrality – expert judgement: strongly positive effect

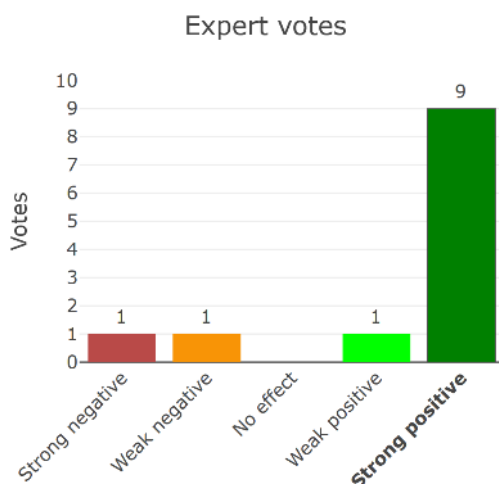


Source: Territorial impact assessment expert workshop, Brussels, 5 April. 2019

5.4 Urban population exposed to PM10 concentrations

As already described above, the European strategy for climate neutrality could contribute to reducing emissions of pollutants. Again, the substitution of fossil fuels with renewable energies would minimise the concentration of air pollutants such as PM10. Nine experts voted for strongly positive and one for weakly positive, meaning that the PM10 concentration could be reduced by the strategy for climate neutrality. On the other hand, one expert considered this effect as weakly negative and one as strongly negative.

Figure 14 Result of the expert judgement: urban population exposed to PM10 concentrations affected by the European strategy for climate neutrality

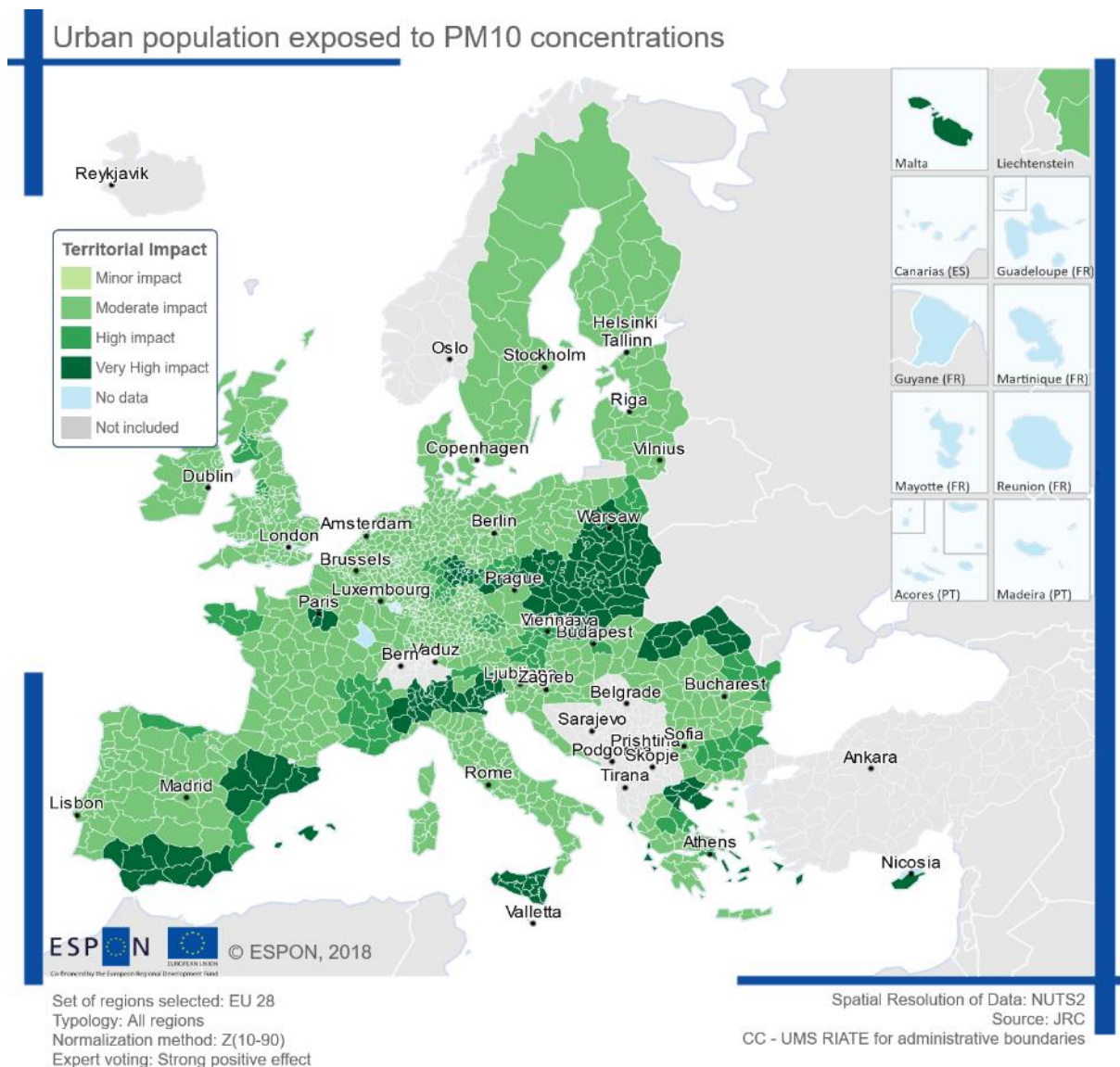


Source: Territorial impact assessment expert workshop, Brussels, 5 April 2019

This indicator depicts the percentage of the urban population exposed to PM10 concentrations exceeding the daily limit value (50 $\mu\text{g}/\text{m}^3$) on more than 35 days in a year. Regions showing greater concentration of air pollution were expected to benefit more from the European strategy for climate neutrality. For this, particulate matter (PM10) was used as an indicator of pollution in general; sensitivity was thus directly proportional to the percentage of the urban population exposed to PM10 concentrations exceeding the daily limit value.

The following map shows the potential territorial impact of the European strategy for climate neutrality on the urban population exposed to PM10 concentrations. It combines the expert judgement of a strongly positive effect with the given sensitivity of regions. 14% of regions were expected to benefit from a very highly positive impact. These regions were located e.g. in Spain, the metropolitan region of Paris, the northern part of Italy, Sicily, central Germany, the Czech Republic, Poland, Romania and Cyprus. 10% of regions would still experience a highly positive impact and 76% a moderately positive impact.

Map 9 : Urban population exposed to PM10 concentrations affected by the European strategy for climate neutrality – expert judgement: strongly positive effect



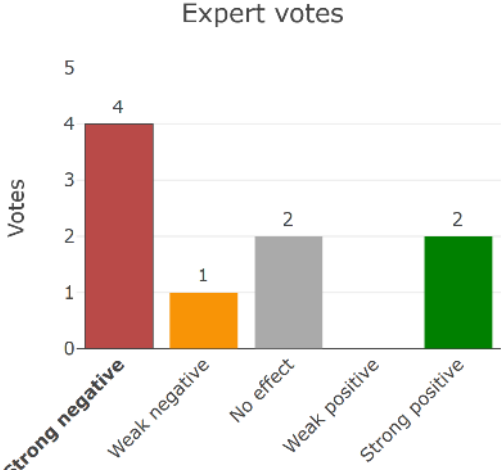
Source: Territorial impact assessment expert workshop, Brussels, 5 April. 2019

5.5 Electricity generated from hard coal and lignite

The experts agreed that the European strategy for climate neutrality would have an impact on the share of electricity generated from hard coal and lignite. There was probably some confusion here on the part of the experts regarding the trend of the indicator's impact, however, as the majority expected the strategy to have a negative impact on regions with a high share of electricity generated from hard coal and lignite.

However, the aim of the strategy for climate neutrality is precisely the contrary. Four experts judged the potential impact as strongly negative and one as weakly negative. Two experts saw a strongly positive effect and two experts did not expect the effect to be relevant.

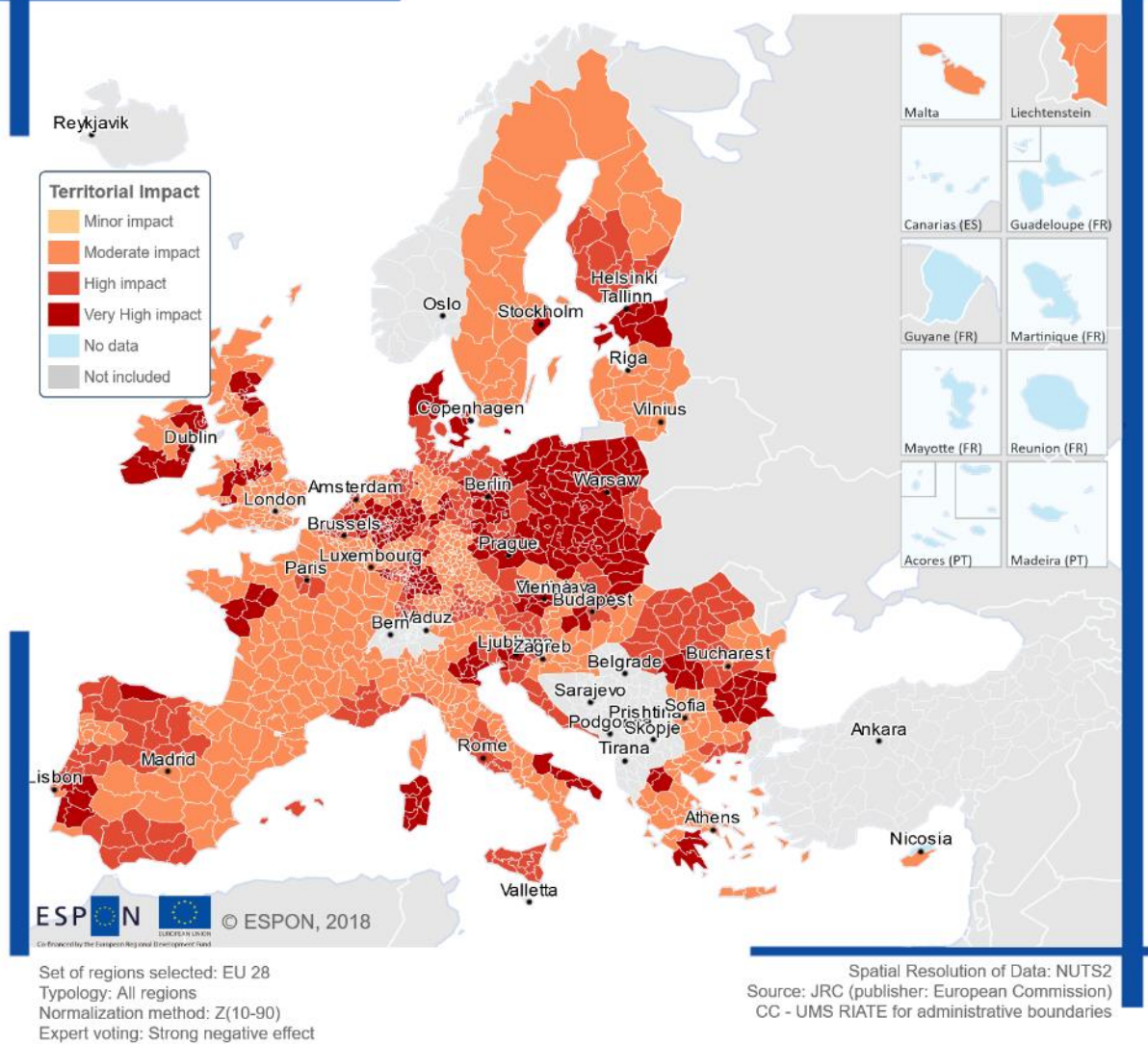
Figure 15 Result of the expert judgement: electricity generated from hard coal and lignite affected by the European strategy for climate neutrality



Source: Territorial impact assessment expert workshop, Brussels, 5 April 2019

Map 10 : Electricity generated from hard coal and lignite affected by the European strategy for climate neutrality – expert judgement: strongly negative effect

Electricity generated from hard coal and lignite



Source: Territorial impact assessment expert workshop, Brussels, 5 April. 2019

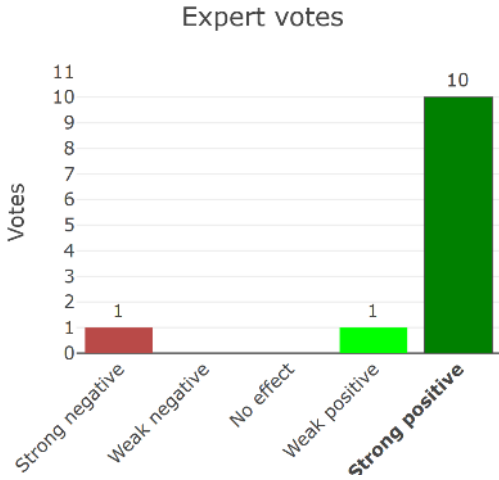
This indicator depicts the share of electricity generated from hard coal and lignite as a proportion of total electricity generated. Regions with a higher share of electricity generated from these energy sources were expected to be more sensitive to the strategy for climate neutrality. Sensitivity was thus directly proportional to the share of electricity generated from hard coal and lignite.

The map shows the potential territorial impact of the European strategy for climate neutrality on the share electricity generated from hard coal and lignite. It combines the expert judgement of a strongly negative effect with the given sensitivity of regions. 26% of regions could benefit from a very highly negative impact. Poland and Estonia in particular would be affected negatively. 24% of regions would still experience a highly negative impact and half of regions a moderately negative impact.

5.6 Electricity generated from renewable sources

The experts agreed that the European strategy for climate neutrality would increase the share of electricity generated from renewable sources. Ten experts judged the effect as strongly positive and one as weakly positive. One expert considered this indicator as strongly negative.

Figure 16 Result of the expert judgement: electricity generated from renewable sources affected by the European strategy for climate neutrality



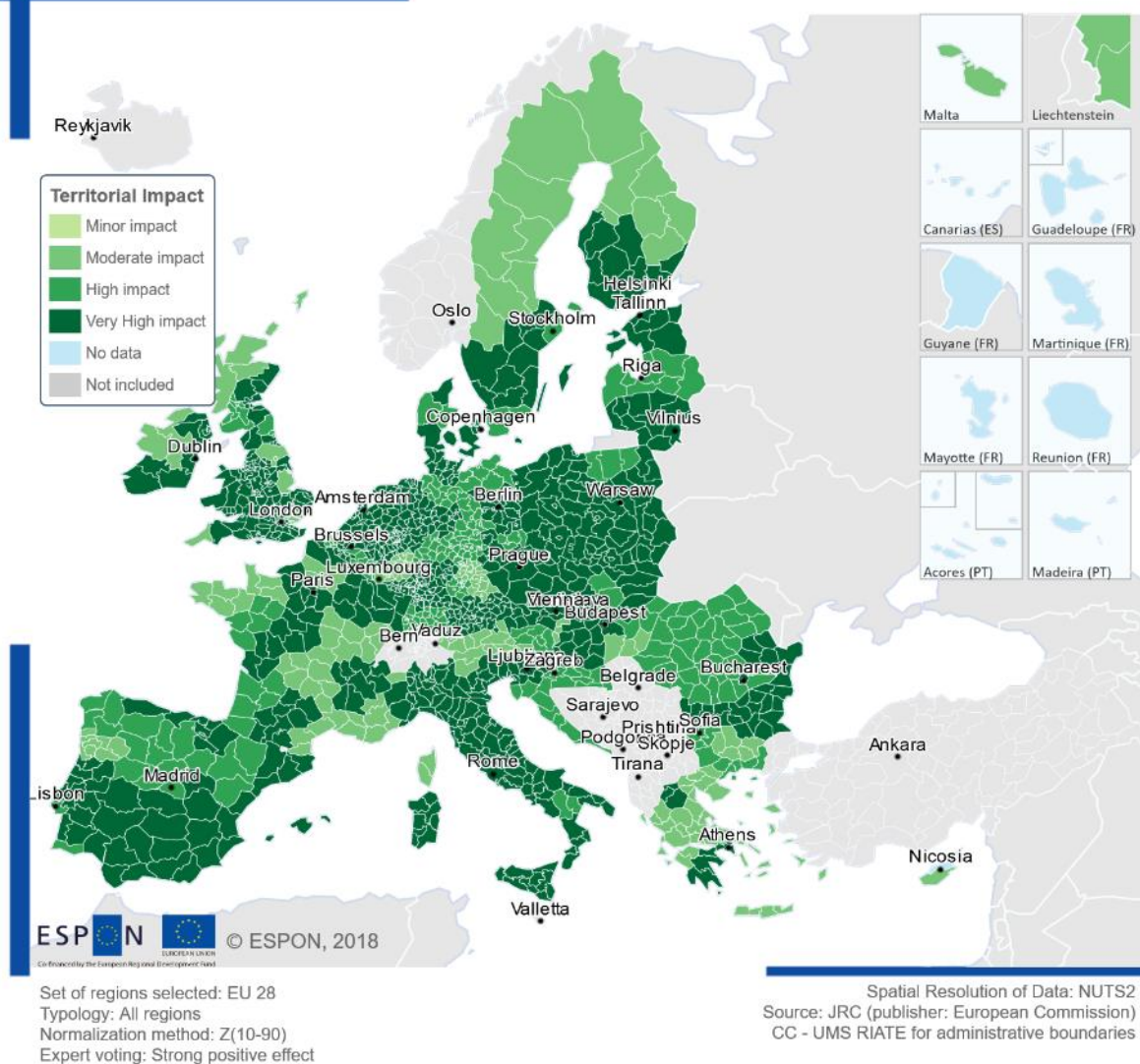
Source: Territorial impact assessment expert workshop, Brussels, 5 April 2019

This indicator depicts the share of electricity from renewable sources as a proportion of total electricity generated. Regions with a higher share of electricity generated from these energy sources were expected to be less sensitive to the strategy for climate neutrality. Sensitivity was thus inversely proportional to the share of electricity generated from renewable sources.

The following map shows the potential territorial impact of the European strategy for climate neutrality in terms of the share of electricity from renewable sources. It combines the expert judgement of a strongly positive effect with the given sensitivity of regions. 67% of regions could benefit from a very highly positive impact. The U.K., Portugal, Spain, the Netherlands, Germany, Estonia, Latvia, Poland, the Czech Republic, Slovakia, Hungary and Italy could in particular be highly affected. 19% of regions would experience a highly positive impact and 14% a moderately positive impact.

Map 11 : Electricity generated from renewable sources affected by the European strategy for climate neutrality – expert judgement: strongly positive effect

Electricity generated from renewable sources

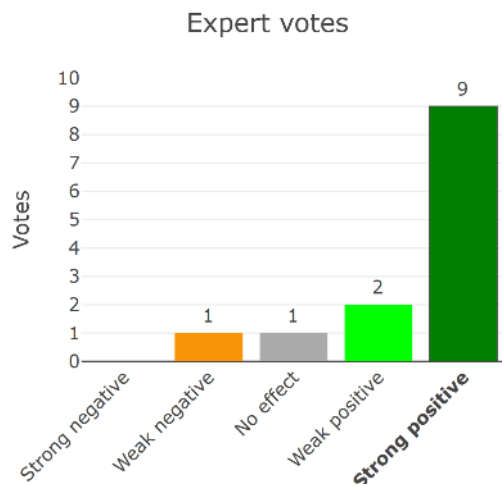


Source: Territorial impact assessment expert workshop, Brussels, 5 April. 2019

5.7 Renewable energy use in the residential building sector

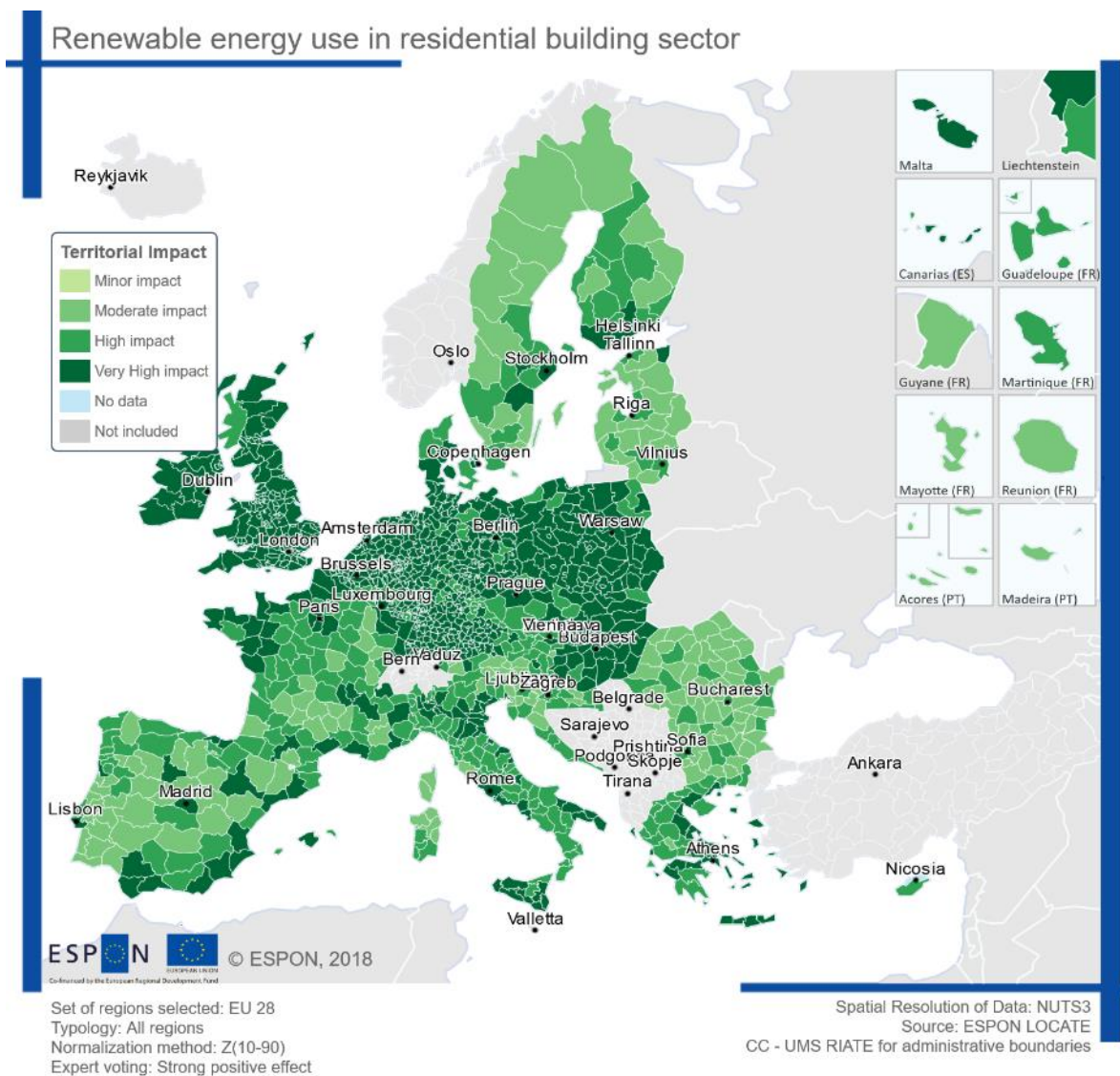
The experts agreed that the European strategy for climate neutrality could stimulate renewable energy use in the building sector. The majority of experts concluded that renewable energy use in the building sector could be affected positively: nine experts judged the effect as strongly positive and two as weakly positive. One expert voted for weakly negative and one did not see any relevant effect.

Figure 17 Result of the expert judgement: renewable energy use in residential building sector affected by the European strategy for climate neutrality



Source: Territorial impact assessment expert workshop, Brussels, 5 April 2019

Map 12 : Renewable energy use in the residential building sector affected by the European strategy for climate neutrality – expert judgement: strongly positive effect



Source: Territorial impact assessment expert workshop, Brussels, 5 April. 2019

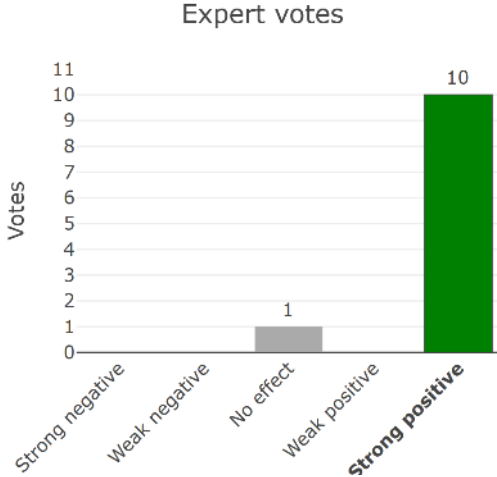
This indicator depicts the share of renewable energy carriers in terms of final energy consumption for space heating, cooling and water heating (excluding electricity) in the residential building sector. Regions with a lower share of renewable energy carriers in the residential building sector were expected to be influenced more by the European strategy for climate neutrality. Sensitivity was thus inversely proportional to the share of renewable energy use in the residential building sector.

The map shows the potential territorial impact of the European strategy for climate neutrality on renewable energy use in the residential building sector. It combines the expert judgement of a strongly positive effect with the given sensitivity of regions. 66% of regions were expected to benefit from a highly positive impact. Ireland, the U.K., Germany, Poland, Slovakia and Hungary in particular would be highly positively affected. 21% of regions could nevertheless experience a highly positive impact and 13% a moderately positive impact.

5.8 Renewable energy use in the public building sector

The experts concluded that the European strategy for climate neutrality could also affect renewable energy use in buildings in the public sector positively. Ten experts saw a strongly positive effect. One expert did not consider this indicator as relevant.

Figure 18 Result of the expert judgement: renewable energy use in public building sector affected by the European strategy for climate neutrality

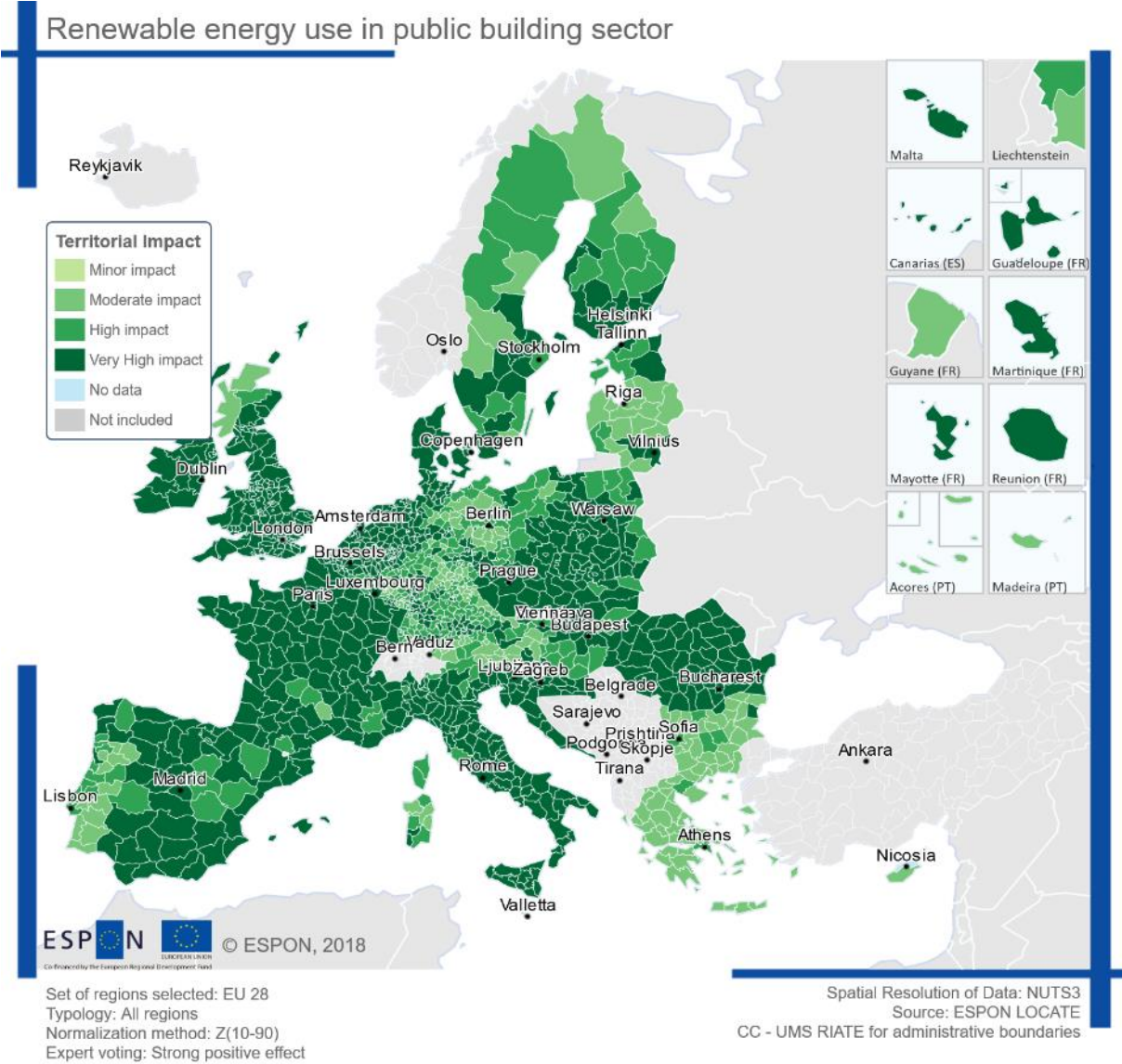


Source: Territorial impact assessment expert workshop, Brussels, 5 April 2019

This indicator depicts the share of renewable energy sources for space heating, cooling and water heating (excluding electricity) in the public building sector. Regions with a lower share of renewable energy sources in the public building sector were expected to be influenced more by the European strategy for climate neutrality. Sensitivity was thus inversely proportional to the share of renewable energy use in the public building sector.

The following map shows the potential territorial impact of the European strategy for climate neutrality on renewable energy use in public building sector. It combines the expert judgement of a strongly positive effect with the given sensitivity of regions. 70% of regions could expect a very highly positive impact and 17% a highly positive impact. Ireland, the U.K., France, Spain, the Benelux states, Germany, Denmark, Italy, Croatia, Slovenia, Poland, the Czech Republic, Slovakia and Romania have many regions which would experience the highest impact. 13% of regions would have a moderately positive impact.

Map 13 : Renewable energy use in public building sector affected by the European strategy for climate neutrality – expert judgement: strongly positive effect



Source: Territorial impact assessment expert workshop, Brussels, 5 April. 2019

Experts' policy recommendations

After the analysis of the indicators and their potential implications for regions across the European Union, the participants discussed the main policy implications to be addressed. These could be grouped in four main topics: support for economically more fragile regions; further decision-making supported by both more civic involvement and evidence; an integrated European energy policy making it possible to tackle this global problem on a continental scale; and finally the need to provide appropriate financing instruments for a climate neutral economy.

1. It transpired from most of the indicators analysed that poorer and/or more peripheral regions (mostly in the south and east of the European Union) had the most adjustments to make and would consequently need additional support. This was in line with the second policy objective of the Cohesion Policy for the period 2021-2027 *Towards a Greener, carbon free Europe* (implementing the Paris Agreement and investing in energy transition, renewables and the fight against climate change). Guaranteeing that country reports after 2020 included chapters on environment, and a funding strategy that recognised a long-term strategy on climate transition were crucial elements for the success of the European strategy for climate change.
2. Further work was needed in assessing both the social and regional consequences of the transition to a climate neutral economy, with the mapping of the most relevant vulnerabilities constituting an important tool for policy support. This went hand in hand with a more participatory process in designing public policies in the field of climate change, and the provision of more information to citizens. Indeed, the experts agreed that political support and life-style changes followed on from an understanding of the holistic nature of climate neutrality and of the benefits that it would bring in terms of water and air quality, urban traffic and better housing conditions, and consequently on human health and well-being.
3. Further EU regulatory activity needed to be taken to reduce energy demand (especially coming from fossil fuel sources), both by increasing energy efficiency and by stepping up the production of renewable energy. To this end, the creation of a European market for energy was pointed out as a potential solution. This would allow a healthy energy mix that would deliver greater stability in the provision of energy, with positive spill-over effects on European security through less energy dependency on non-EU countries. Since a continental market of this kind would allow specialisation in those energy resources where each region had better competitive advantages, it would also present a chance for poorer and rural regions to find

new economic opportunities and generate jobs within the green economy. Re-skilling of the work force needed to be addressed if this potential was to be exploited to the full.

4. Though stronger regulatory activity at European level could be positive as regarded technical and building standards, local and regional authorities did not need to wait for a top-down approach. The opportunities for a growth and jobs-friendly climate neutral economy should be harnessed through proper local and regional strategies, but the issue of funding had to be underlined as a current obstacle. A distinction had to be made between expenditure and investment. In certain Member States the ESA 2010 standards⁵ were being transposed into national law in a way that resulted in local and regional authorities being obliged to apply maximum investment ceilings per year and per inhabitant. In particular these ceilings prevented local and regional authorities from providing the co-financing needed for certain projects.

⁵ [Regulation \(EU\) No 549/2013 of the European Parliament and of the Council of 21 May 2013.](#)

Territorial impact assessment

Climate Neutrality

European Committee of the Regions, Rue Belliard 101, Brussels, Room JDE61
05 April 2019

| **Working language:** English |

| Moderator: Bernd Schuh |

09:30 Registrations open

10:00 Welcome coffee

10:30 **Welcome**

Short introduction of the experts

10:40 **Introduction to the topic**

Alessandra Antonini, Policy Officer at the ENVE Commission of the CoR

Eero Ailio, Adviser on Energy Transition and Local Governance, European Commission

11:10 **Explanation of the ESPON Quick Scan TIA tool**

Erich Dallhammer, ÖIR GmbH

11:20 **Interactive discussion**

- Dealing with cause/effect chains
- Defining the types of regions affected and estimating the intensity of the regional exposure

12:30 Lunch break

13:30 Coffee served

13:45 **Interactive discussion**

- Discussion on the findings, results and hypothesis

16:00 **Policy recommendations**

17:00 End of the workshop