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Task 4: Co-development of a territorial cohesion indicator system, facilitating the Programme performance and impact evaluation

FINAL REPORT

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TABLE OF CONTENT

TABLE OF CONTENT 3
TABLE OF ABBREVIATIONS 4
1 Introduction 5
2 Methodological Approach 5
3 Step 1: Development of context indicators for territorial cohesion 7
3.1 Identification of adequate and relevant territorial cohesion indicators 7
3.2 Establishing baseline values for NWE – results and methodological constraints 11
3.3 Shortcomings to consider and possible solutions 13
3.4 Estimation of the potential of contribution of the NWE Programme to territorial cohesion 13
4 Step 2: Identification of strategic areas of importance/interest for the Programme 17
4.1 Territorial analysis of the baseline situation in NWE 17
4.2 Identification of strategic areas of importance 37
5 Step 3: Territorial cohesion storyline framework 39
5.1 Storyline 'Competitiveness' 41
5.2 Storyline 'Balanced development' 48
6 Conclusions and Recommendations 55
7 References 57

TABLE OF ABBREVIATIONS

DG REGIO	Directorate-General for Regional Policy and Urban Policy
ERDF	European Regional Development Fund
ESPON	European Spatial Planning Observation Network
ETC	European Territorial Cooperation
EU	European Union
EU28	European Union with 28 Member States (as of 2016)
EU2020	Europe 2020 Strategy
EUR	Euro
INTERACT	Programme aiming to reinforce the effectiveness of cohesion policy by promoting exchange of experience
INTERREG	ESIF Programmes to enhance cooperation between EU regions
JS	Joint Secretariat
LAU	Local administrative units
NUTS	Nomenclature des unités territoriales statistiques
NWE	North-West Europe
OP	Operational Programme
SO	Specific Objective

1 Introduction

The general aim of this task 4 is to reflect on how the Programme can create a link between the North-West Europe policy demand, territorial challenges and the selection of indicators used in the Programme framework. Task 4 shall complete current discussions on monitoring and evaluating the Programme's contribution to territorial cohesion and feed the Programme evaluation process.

The specific objective of this Task 4 is to establish a **measurement framework for territorial cohesion in North-West Europe**. The territorial cohesion indicator system shall facilitate the Programme evaluation process and in particular the Task 3 (impact evaluation) of the framework contract.

The expected main benefits of the application of the model are:

- Improved consistency between the policy challenges of North-West Europe and the areas currently monitored by the Programme
- Significant contribution to the impact evaluation of the Programme
- Improved steering of project development towards the territorial cohesion objective.

This report presents the results of the definition of a territorial cohesion indicator system for the NWE Programme. It presents:

- A set of context indicators including baselines (figures, trends etc.) and a set of indicators reflecting the expected contribution of North-West Europe to them, in the form of maps, graphs or other
- Strategic areas of importance/interest for the Programme (ETC variables or cohesion enablers)
- Establishment of the expected storyline framework.

2 Methodological Approach

This study builds on desk research and the elaboration and mapping of territorial cohesion data for the NWE Programme area. A two-step methodological approach is being applied:

a) The allocation/attribution of existing indicators to North-West Europe territorial cohesion (based on two existing models of indicators ESPON INTERCO and the Medeiros Model) to identify the areas where context and/or impact indicators are missing in the current framework. This approach foresees the establishment of additional indicators that the North-West Europe Programme would need to monitor.

b) The application of the "contribution to impact model", based on the "Contribution Analysis Method" involving the use of context indicators and impact contributions of individual projects to storylines developed separately. These storylines are developed for at least 2 dimensions as areas of particular importance (e.g. competitiveness) in conjunction with other dimensions of the model (capacities and governance, coordination of efforts, cooperation and networks etc.)

Initially, two models to measure and describe territorial cohesion based on a set of indicators have been identified as relevant. First, there is the ESPON INTERCO project, and second, the model to measure territorial cohesion presented by Prof Eduardo Medeiros. Both models as well as other additional territorial development and cohesion indicators are being revised during desk research in this project.

1) The first concept to be considered is based on the INTERCO project taking a multi-dimensional approach proposing 7 main areas to explore the territorial cohesion in North-West Europe. These dimensions serve as crossing points between the relevant challenges, the policy orientations and the issues to be measured with the indicators of the Programme framework. The dimensions represent the spectrum of areas different in nature, of equal importance. Some can be perceived as enablers of cohesion (innovation, competitiveness, networks), other as outcomes (quality of environment) or impacts - relating more to the well-being of North-West European citizens and sustainability of the territory). They represent different scales as well. They are Territorial structure, Networks, Competitiveness, Innovation, Accessibility and inclusion, Environmental quality and Cooperation as key to territorial integration.

2) The Medeiros model suggests a definition of territorial cohesion as 'the process of promoting a more cohesive and balanced territory, by: (i) supporting the reduction of socioeconomic territorial imbalances; (ii) promoting environmental sustainability; (iii) reinforcing and improving the territorial cooperation/governance processes; and (iv) reinforcing and establishing a more polycentric urban system'. The model includes 27 indicators.

In addition, contribution analysis (CA) is a method that helps reconstructing and verifying theories of change and an existing intervention logic through seeking evidence and analysing the robustness of the "contribution story". This method is foreseen to be the central method for the final impact evaluation of the North-West Europe Programme, establishing the analytical framework for the analysis of contribution of projects and the Programme to the Specific Objectives and to changes observed on the territory. Contribution analysis in our evaluation framework will follow five steps: 1) define the cause-effect issue to be addressed (already done in the Operational Programme), 2) develop the theory of change, including risks, external factors and other explaining factors (partially done in the programming documents), 3) gather existing evidence on the theory of change, 4) assemble and assess the contribution claim, identify external factors and challenges, 5) draft and present the contribution story with related evidence and other explaining factors.

Finally, the illustration of complex and complicated aspects in view of the foreseen evaluations will be simplified through the aid of storylines, illustrating theoretical aspects with practical examples. Through this, it is possible to provide illustrations of evidence of a result or a process that can depict a coherent (contribution) story on the added value of the Programme towards the overarching objectives. This leads to an increased visibility that permits to display good practices. Storylines will assist in understanding the various facets of the delivery process, the project results, the results in view of overarching strategies, such as Europe 2020 or territorial cohesion, implementations, mechanisms of change, etc.

3 Step 1: Development of context indicators for territorial cohesion

This section illustrates the results of the research on context indicators for territorial cohesion in the NWE Programme area.

3.1 Identification of adequate and relevant territorial cohesion indicators

In order to define the contribution of the NWE Programme to territorial cohesion, relevant dimensions of territorial cohesion and several indicators have been identified as possible proxies to reflect different aspects and dimensions of territorial cohesion.

The **dimensions of territorial cohesion** have been selected in line with previous deliberations of the NWE Programme and other studies regarding the operationalisation of territorial cohesion. The following dimensions are proposed to be used in the territorial cohesion indicator system:

Dimension of Territorial Cohesion	Coverage	Rationale (please see here representative quotes and literature)
Competitiveness	Competitiveness of private sector and territories, smart growth, innovation, R&D, knowledge, education, human capital	"*The issue of education of the population and access to technology seems important to assess the situation of European regions in terms of territorial cohesion. They can reflect the quality of human capital for economic development, but also have a social value independent from any economic consideration*." (Vandermotten and Van Hamme 2017:31)
Balanced development	Balanced integrated development, inclusive growth, equality, fair and universal access to services and public goods, territorial structure, policentricity, quality of life, attractiveness	"*We stress that polycentric and balanced territorial development of the EU is key element of achieving territorial cohesion. Where the most developed cities and regions within Europe cooperate as parts of a polycentric pattern they add value and act as centres contributing to the development of their wider regions*." (EU 2011, TA 2020)

Within these two dimensions of territorial cohesion, we identified two necessary conditions for effective territorial development: capacities for policy implementation and for cooperation and coordination. These dimensions can be considered even as goals of territorial cohesion in themselves. However, in our framework of territorial indicators, these conditions are considered as 'enabling elements' of territorial development. They are important in the context of the NWE Programme, because they are usually targeted by the Programme's transnational activities, in order to influence and steer wider territorial development processes.

Necessary and enabling conditions for territorial cohesion	Coverage	Rationale (please see here representative quotes and literature)
Capacities for policy implementation	Capacities for policy development, competences, skills, governance, effectiveness of policy implementation, human and financial resources	"[…] *even the best policy programming and implementation systems are unable to overcome the negative effects of globalisation and integration in some territories if they are not complemented by proper coordination, policymaking and implementation systems, i.e. a comprehensive governance system with a clear territorial dimension*" (Bachtler et al. 2017:46)
Capacities for cooperation and coordination in the territory	Capacities for cooperation and coordination of policies, networks, learning from territorial impacts, synergies, costs of non-coordination	*"[…] one can regard the territorial cooperation process as a fundamental political procedure to promote territorial integration by reducing the barriers posed by all sorts of borders, and by promoting territorial development […]."* (Medeiros 2015:100)

A selection of **indicators** is being proposed keeping in mind the following criteria: a) relevance of the indicator to reflect a specific dimension of territorial cohesion, b) 'communication capability' of the indicator to be understood by experts and non-experts, c) adequacy of the indicator to act as proxy to depict relevant developments over time as well as relevant differences between regions in the NWE area and between NWE to average EU values, d) availability of data at least at NUTS 2 level, if possible on NUTS 3 level, e) assurance of access to available data now and in the future, e.g. through inclusion in EUROSTAT database or surveys or through availability in ESPON databases, f) link to NWE Programme objectives and activities.

This last criterion has been applied only indirectly to exclude any irrelevant indicators. However, a more in-depth analysis of linkages between indicators, territorial cohesion and the NWE Programme will be carried out and presented later in this report.

Indicator	Data Source and Method	Rationale
Territorial Dimension: Competitiveness		
C1 Gross domestic expenditure on R&D (% of GDP)	Eurostat data. Gross domestic expenditure on R&D - GERD, by NUTS 2 regions, 2014 (% of GDP)	The regional data compared to the average of NWE indicates regional disparities. The regional data compared to EU average is a proxy for the level of competitiveness in the EU.
C2 Well-educated population	Eurostat: [lfst_r_lfp2acedu], Well-educated economically active population, 25 - 64 years old, Share of total population, ISCED11 levels 5-8 (tertiary education),	A high ratio of economically active population with a high level of educational attainment signifies a high level of competitiveness

Indicator	Data Source and Method	Rationale
	Method: ratio less educated vs more educated per region (i.e. 20 % BE12 well educated vs. 24 % NL11 well educated)	
C3 Innovative SMEs collaborating with others	EUROSTAT Innovation Scoreboard indicator (only available at NUTS0), Innovative SMEs collaborating with others (in % of total SMEs)	A high level of cooperative SMEs indicates a high level of innovative capacity among SMEs and is usually correlated with higher levels of R&D and innovation activities among SMEs.
C4 Employment in technology and knowledge-intensive sectors	Eurostat: htec_emp_reg2, high-technology sectors (high-technology manufacturing and knowledge-intensive high-technology services), by NUTS 2 regions and sex (from 2008 onwards, NACE Rev. 2), share of total employment, 2008-2016	Employment in high-technology sectors can give an indication on the uptake of low carbon technologies. Example: BE12 has a higher uptake in high technology innovations (because there are more jobs) than NL11, comparing 2 % in relation to 1,2 %
C5 Recycling rate of e electronic waste in %	Environmental Data Centre on Natural Resources, Resource efficiency indicators, Resource efficiency scoreboard, Thematic indicators, Transforming the economy, Turning waste into a resource (only available at NUTS0)	Electrical and electronic waste (e-waste) is a risk to environment because of its hazardous components. However, it also provides a high potential for recycling precious metals and other highly valuable materials. The indicator presents the effective recycling rate of e-waste which is the collection rate multiplied by the efficiency of treatment of waste electrical and electronic equipment (WEEE).
C6 ISO 14001 registered organisations/per capita	N of organisations per country, Data from ISO Survey of Certifications http://www.iso.org/iso/home/standards/certification/iso-survey.htm	The importance of observing environmental management requirements for business. Can be seen as a proxy indicator for the level of environmental awareness and management capability of businesses
Territorial Dimension: Balanced Development		
B1 Change in employment rate age-group 20 to 64	Eurostat: Change in employment rate age-group 20 to 64, by NUTS 2 regions	This indicator is a proxy for inequality and shows regional disparities. Higher levels of innovation and competitiveness can improve the values of this indicator.
B2 Net migration rate	Eurostat: Population change - Demographic balance and crude rates at regional level (NUTS 3), [demo_r_gind3] net migration plus statistical adjustment, 2000-2016. Method: share of annual immigration/outmigration in relation to the total population per region (i.e. 1,06 % for BE12 vs. -0,7 % for NL11)	The migratory balances can be used as a proxy for overall level of attractiveness of a region or territory in the long run.

Indicator	Data Source and Method	Rationale
B3 People at risk of poverty or social exclusion	Eurostat: [ilc_peps11], 2010-2015 (Attention: inconsistent NUTS levels People at risk of poverty or social exclusion by NUTS 2 regions [ilc_peps11], 2010-2015, among the total population	Large disparities and high shares of poor people illustrate large imbalances and lack of inclusiveness. Example: NL12 has a lower people risk at poverty or social exclusion or severe material deprivation rate than BE11. Overall, in NWE, the share is lower than in overall EU and therefore, there is a higher territorial balance compared to EU.
B4 Male life expectancy	Eurostat: Life expectancy by age, sex and NUTS 2 region [demo_r_mlifexp], 2000-2015	Life expectancy can be used as an indicator for development and as a proxy for quality of life and overall health status.
B5 Multi-modal Accessibility Potential	ESPON: NUTS3, 2016	Gives an indication on the level and balance of accessibility within the territory. This is an indicator for the overall balance of the territorial development.
B6 Change of Final Energy Consumption (FEC) in the transport sector in %	http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52017DC0056&from=EN 2005-2014 average annual change of total Final Energy Consumption (FEC) in the transport sector in % Data from EUROSTAT NUTS 0 level	The Final Energy consumption in the transport sector is an indicator for the overall environmental relevance of the transport sector. The decrease of this indicator is supposed to indicate a higher use of more sustainable forms of transport.
B7 Individuals who used the internet for interaction with public authorities	Eurostat: Individuals who used the internet for interaction with public authorities [isoc_r_gov_i], NUTS2, 2010-2016	Climate policies require active participation of the civil society. This indicator is a proxy for an innovative and cooperative citizen involvement. Example: NL12 is more advanced in cooperation and coordination of policies (also citizen involvement), than BE11, since it has a higher rate of interaction of citizens with public authorities.
B8 Urban population with existing low carbon strategies	In % of total urban population in a given country. Source: JRC Report 2013: The Covenant of Mayors in Figures 5-Year Assessment. Table 1.1: Percentage covered by CoM from the country urban population (The signatories of the Covenant of Mayors as of 14.3.2013). NUTS 0 level	This indicator is used as Result Indicator for the NWE Programme. It indicates the country urban population with existing low carbon strategies (i.e. signed Covenant of Mayors). Hopefully there will be a re-count of this indicator for upcoming years.
B9 Relative gross avoided GHG emissions	EEA: Renewable Energy in 2017. https://www.eea.europa.eu/publications/renewable-energy-in-europe-2017 EUROSTAT Relative gross avoided GHG emissions (per year in 2014) in % of total GHG	GHG emissions shall be avoided as a major objective of territorial development within the climate change goals. This indicator shows the relative effectiveness of all climate-relevant actions in the territory.

Indicator	Data Source and Method	Rationale
	NUTS 0 level	
B10 Change of energy intensity in industry in %	http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52017DC0056&from=EN 2005-2014 average change of energy intensity in industry in % (FEC industry in toe/GVA industry in M€'10) Data from EUROSTAT NUTS 0 level	This indicator shows the share of the energy intensity of the industry within the overall society/economy. More in detail, this indicator indicates the observed changes over the last years. It can indicate therefore a change in trends and an improvement as a decrease of the energy intensity of the industry.
B11 Change in artificial land-use per capita	Eurostat from CORINE: Change in artificial land-use, 2006-2012, square metres per capita Change to artificial surfaces clc_codes 111, 112, 121, 122, 123, 124, 131, 132, 133, 141 and 142, 2006-2012, NUTS3	Lower rates of soil sealing per capita imply more natural surfaces and thus more natural areas that give an indication on the environmental quality of the region. Example: NL11 has less urban sprawl and more non-cultivated surfaces than BE12 and has therefore a better environmental quality.
B12 National annual road freight transport	Eurostat: [road_go_na_ru3g], NUTS3, Tons per capita of total transported goods by road, annual since 2008	High levels of road freight transport by inhabitant signify a higher dependency on GHG emission producing transport systems Example: NL11 has a better performance in low carbon transport solutions than BE12, as per capita, NL11 transports 19 t less goods. Attention: this might be biased towards the location of transport hubs, i.e. harbours, ports

3.2 Establishing baseline values for NWE – results and methodological constraints

With regard to **data availability** for these potential indicators, the following has to be considered. It has been difficult to identify indicators that are sufficiently broken down regionally for some dimensions of territorial cohesion. An integral part of territorial cohesion within Europe promotes cohesion strongly from a regional point of view. Territorial cohesion is also a question between territories of different functionalities, such as urban and rural, differences between mountainous and sparsely-populated areas, etc. Data at lower NUTS levels (2 and 3 mostly) helps to serve as a proxy to catch structural differences within Member States. They also permit to observe territories without values distorting the mean, for instance through employment or GDP levels in capital or metropolitan regions. Providers of trans-European data undertake large efforts to make data accessible to the public. Eurostat for instant provides a variety of datasets of different typologies that allow comparisons and thorough assessment. From the perspective to assess and to monitor developments within Europe, there is nevertheless a

need for more data at regional level (NUTS 2, NUTS 3). The data currently available on regional level for relevant indicators[1] is not complete or spread across different NUTS levels.

For the proposed indicators, baselines values have been identified and inserted in an Excel database.

The data is structured individually per indicator. This permits to draw back on the initial database extract and allows changes linked to the occurrence of data specificities. This also allows to keep **metadata in its original format** (name of the dataset, date of extraction, etc.). When data is to be selected, we propose to always use the **smallest available level of aggregation** (here, NUTS 3). As outlined before, data availability from the different sources do not always permit such a detailed analysis. Therefore, if not available, data will be analysed for the next higher nomenclature level (in this order; NUTS 3, NUTS 2, NUTS 1, NUTS 0). A mixture between different NUTS levels might sometimes be required, depending on individual indicators. During a later monitoring of the progress, data experts should be **sensible towards NUTS mixtures or aggregations**. Therefore, changes will be indicated in the end product.

With regard to **data processing**, the following has to be noted. Because raw datasets need in most cases a substantial amount of manual pre-processing, the analyst has to rely on user interface-based software. The datasets will therefore be provided in the *.xlsx format from MS Office Excel. Data should always be structured according to two criteria, resulting in three different outputs per dataset; data should always be kept in its original and edited form. In order to illustrate changes, a separate worksheet should allow tracing back modifications made, i.e. through classifying NUTS regions as being part of the Programme area or through keeping corresponding formula that has selected NUTS regions for calculating a mean value. Where possible, the baseline year of 2014 will be chosen, since it represents the starting year of the current programming period. Where this is not possible, it will be indicated (see maps for example) and highlighted in the dataset in the metadata.

Switzerland has a member of the North-West Europe Programme. Despite the fact that Swiss partners are not entitled to ERDF funding, they can participate in the Programme and receive Swiss funding for this purpose. Therefore, the Swiss indicator values are included in the comparison of context indicators of the performance of the Programme area with the rest of EU28.

As accounting for the **United Kingdom**, all data extracts will be kept in their original format. When the UK leaves the EU, this permits to reconstruct values for the Programme area. So far, UK is included in the analysis.

The proposed indicators, together with their baseline values mostly for 2014, have been converted into maps , showing the relevant baseline situation and the existing differences within the NWE NWE and between the NWE area and the overall EU average (see Chapter 4.1). The maps demonstrate **two types of territorial evidence**: 1) the differences between regions and countries within the NWE Programme area (large map), and 2) a comparison of the whole NWE territory (average value) and the EU28 average value (s mall map bottom left).

[1] For instance, share of people at risk of social exclusion or unemployment statistics (NUTS3).

3.3 Shortcomings to consider and possible solutions

During the elaboration of the database on proposed territorial cohesion indicators, the following shortcomings have been encountered:

As outlined before, there are **important limitations** related to data availability and level of availability and lack of corresponding indictors. Where an indicator is identified but not suitable, it is checked whether he can be used or not. In general, there is a **need for more data** at **regional level** in the field of **energy consumption/production, renewable energies and energy efficiency,** as well as **GHG emissions**. Indicators related to energy and GHG emissions, more specifically to energy consumption, production, innovation and investments as well as their follow-up activities, represent a suitable proxy to measure the effects of policies of sustainability and climate change protection. It is important to provide them on a regional level in order to make them relevant for Programme authorities. A suitable indicator to express the overall development of territories towards a greener economy might be, for example, the 'share of renewable energy produced in relation to the total energy production'. However, to date it is impossible to find comparable data on this type of indicators for the regional level (NUTS2 or 3). The situation is equally scarce when it comes to **resource efficiency**, where new indicators at regional level would be needed (e.g. 'share of companies with LCA systems in place' or 'share of products that are recycled/re-used').

For now, many of the proposed indicators are, therefore, concentrated on the NUTS 0 (Member State) level. However, the analysis and conclusions to be derived from the territorial indicator system would be significantly more useful if there would be regional data available.

3.4 Estimation of the potential of contribution of the NWE Programme to territorial cohesion

An analysis has been carried out to test the linkages between the NWE Programme and territorial cohesion and to estimate the theoretical potential of contribution of the Programme to the identified dimensions of territorial cohesion.

Priority	Specific Objective (SO)	Competitiveness	Balanced development
1: Inno-vation	**SO1:** To enhance innovation performance in NWE through international cooperation	**Strong Impact:** There is a direct and strong impact on the competitiveness dimension. The projects target the innovation capacity of SMEs and other relevant stakeholders to promote new knowledge, the introduction of new technologies into the market, and to increase the technology readiness level of new technologies etc. This contributes generally to increase the R&D intensity in the regions and increase the employment	**Strong Impact:** There is a direct and strong impact on the balanced development dimension. Generating knowledge about new technologies helps to increase overall competitiveness of companies, thus contributing to job maintenance and generation as well as to the overall attractiveness of a territory. Projects can also promote the social aspects of innovation and

Priority	Specific Objective (SO)	Competitiveness	Balanced development
		dedicated to R&D, and the share of the well-educated population.	a more inclusive model of competitiveness.
2: Low Carbon	**SO2:** To reduce GHG emissions in NWE through international cooperation on the implementation of low carbon, energy or climate protection strategies	**Moderate Impact:** There is an intermediate impact on the competitiveness dimension. Projects help to build capacities to define more sustainable policies and to enhance public acceptance and remove barriers to the adoption of low carbon technology deployment. Increased capacity levels of the public authorities in NWE (e.g. for green public procurement or climate change adaptation measures) contribute to competitiveness of regions, but mostly in the public sector.	**Strong Impact:** There is a direct and strong impact on the balanced development dimension. The Programme's activities help to increase the capacities of public authorities to find holistic and effective solutions to climate change challenges. The share of renewable energy and application of energy efficient sollutions is increased, which improves the attractiveness and quality of life of NWE territories. Overall, the level of GHG emissions are reduced.
	SO3: To reduce GHG emissions in NWE through international cooperation on the uptake of low carbon technologies, products, processes and services	**Strong Impact:** There is a direct and strong impact on the competitiveness dimension. The Programme activities help test and disseminate knowledge about low carbon technologies applied as well as products, processes and services produced/improved. The number of people working with to research and development organisations in the energy efficiency and renewable energy domains is increased. Acceptance of low carbon technology development is enhanced among SMEs and in the private sector. Companies become more competitive and have better energy and environmental standards.	**Moderate Impact:** There is an intermediate impact on the balanced development dimension. SMEs and the private sector will benefit from available knowledge on technologies, products, processes and services in the area of renewable energy and energy efficiency. This will increase competitiveness and lead to new value-added employment. Overall, the level of GHG emissions will be reduced. Territorial disparities are only indirectly tackled.
	SO4: To reduce GHG emissions in NWE through international cooperation on transnational low carbon solutions in transport systems	**Strong Impact:** There is an intermediate impact on the competitiveness dimension. The Programme activities help generate and disseminate knowledge about	**Strong Impact:** There is a direct and strong impact on the balanced development dimension. Sustainable and low-carbon forms of transport will be

Priority	Specific Objective (SO)	Competitiveness	Balanced development
		low carbon technologies, products and services tangibly applied to transport. The number of people working with research and development organisations in the energy efficiency and renewable energy domain is increased. Acceptance of low carbon technology development is enhanced in the transport sector. Improved competences in the transport sector help increase the use of low carbon solutions in transport.	supported and help to introduce a more equal and sustainable accessibility. Knowledge about tested solutions for sustainable modes for freight transport (i.e. railways and inland waterways) as well as the use of low-emission alternative energy for transport, efficient vehicles/vessels and the use of related infrastructure will be shared. Overall, the level of GHG emissions will be reduced.
3: Resource and materials efficiency	**SO5**: To optimise (re)use of material and natural resources in NWE through international cooperation	**Strong Impact:** There is a direct and strong impact on the competitiveness dimension. The projects will increase the knowledge about tested technologies, products and services in the domain of resource efficiency and circular economy. More people will be working with research and development organisations specialising in resource efficiency. This will raise competitiveness levels of companies and SMEs through new technologies and improved processes and products. Overall this will help mitigate negative externalities of resource intensive industrial sectors and reduce production costs. This will contribute to the transition of the NWE economy to a more competitive circular model by enabling spill-over effects of eco-innovation in the resource intensive industry.	**Moderate Impact:** There is an intermediate impact on the balanced development dimension. The projects will help increase the competitiveness levels of companies and SMEs through new technologies and improved processes and products. This will facilitate resource efficiency and a more sustainable use of natural resources. With regard to new technologies and services, employment will be generated and maintained. Environmental impacts can be reduced. This contributes to increasing the attractiveness and quality of life of NWE territories.

As can be observed, in the table, some Specific Objectives (SO) have a stronger relationship with the dimensions of territorial cohesion than others. On one side, the ‘Competitiveness’ Dimension is more

lined to SO 1, 3 and 5. On the other side, SO 1, 2 and 4 have a strong impact on the dimension of 'Balanced Development'. However, all SO have at least an intermediate impact on both dimensions.

It has to be highlighted, that the contribution to the territorial cohesion dimensions of the NWE Programme takes place through partnership projects with a strong local/regional effect. Effects at national policy-making level are only indirect. Therefore, it is difficult to observe NWE Interreg effects in recent policy decisions in sectors where competences for decision-making are concentrated at national level. However, Interreg projects have an important showcase and 'living-lab' effect at local and regional level. This effect often helps to 'translate' national policy objectives into feasible approaches.

To a great extent, the impact occurs through stimulating the 'enabling conditions of territorial cohesion', i.e. increasing the available capacities to implement effectively public policies and increasing the cooperation and coordination among the different stakeholders that are involved in larger territorial challenges and by this, avoiding oversimplified silo-approaches to complex problems.

The following table shows the proposed indicators for territorial cohesion and the estimated potential (++=high, +=low, o=neutral) NWE Programme and its Specific Objectives to influence the values of the territorial indicators. It has to be kept in mind that here only the potential impact is assessed, i.e. if the NWE intervention logic might lead to influence the values of the specific indicator. However, this exercise does not assess the real dimension of impact which might be higher and lower in each case or might affect even more indicators.

Priority	Specific Objective (SO)	Competitiveness		Balanced development	
		Indicator	Impact	Indicator	Impact
1: Innovation	**SO1:** To enhance innovation performance in NWE through international cooperation	C1 Gross domestic expenditure on R&D - GERD	++	B1 Change in employment rate	++
		C2 Well-educated population	+	B2 Net migration rate	++
		C3 Innovative SMEs collaborating with others	++	B3 People at risk of poverty or social exclusion	++
		C4 Employment in technology and knowledge-intensive sectors	++	B4 Male life expectancy	o
				B5 Multi-modal Accessibility Potential	+
2: Low Carbon	**SO2:** To reduce GHG emissions in NWE through international cooperation on the implementation of low carbon, energy or climate protection strategies	C2 Well-educated population	o	B7 Individuals who used the internet	+
		C4 Employment in technology and knowledge-intensive sectors	+	B8 Urban population with existing low carbon strategies	++
		C6 ISO 14001 registered organisations/per capita	+	B9 Relative gross avoided GHG emissions	++
	SO3: To reduce GHG emissions in NWE through international cooperation on the uptake of low carbon technologies, products, processes and services	C4 Employment in technology and knowledge-intensive sectors	++	B9 Relative gross avoided GHG emissions	++
		C6 ISO 14001 registered organisations/per capita	+	B10 Change of energy intensity in industry in %	++

Priority	Specific Objective (SO)	Competitiveness		Balanced development	
		Indicator	Impact	Indicator	Impact
	SO4: To reduce GHG emissions in NWE through international cooperation on transnational low carbon solutions in transport systems	C4 Employment in technology and knowledge-intensive sectors	++	B6 Change of Final Energy Consumption (FEC) in the transport sector in %	+
				B9 Relative gross avoided GHG emissions	++
				B12 National annual road freight transport	o
3: Resource and materials efficiency	**SO5**: To optimise (re)use of material and natural resources in NWE through international cooperation	C5 Recycling rate of e electronic waste in %	++	B11 Change in artificial land-use per capita	+

This attribution is meant to be a flexible tool to analyse the linkages and potential contribution of NWE action to territorial cohesion. The following steps 2 and 3 of the analysis will help to discuss these linkages more in detail. The **development of storylines** will also help to identify **cross-linkages** between different NWE Programme results and impacts and different dimensions of territorial cohesion.

Indicators might be used to explain **different perspectives of territorial cohesion**. For example, the indicator Gross expenditure on R&D as percentage of GDP (GERD) can be used to describe the overall competitiveness of the NWE region compared to the EU28 average (in the dimension Competitiveness). However, it can also be used in the dimension Balanced Development to describe the magnitude of disparities between the different regions within the NWE area.

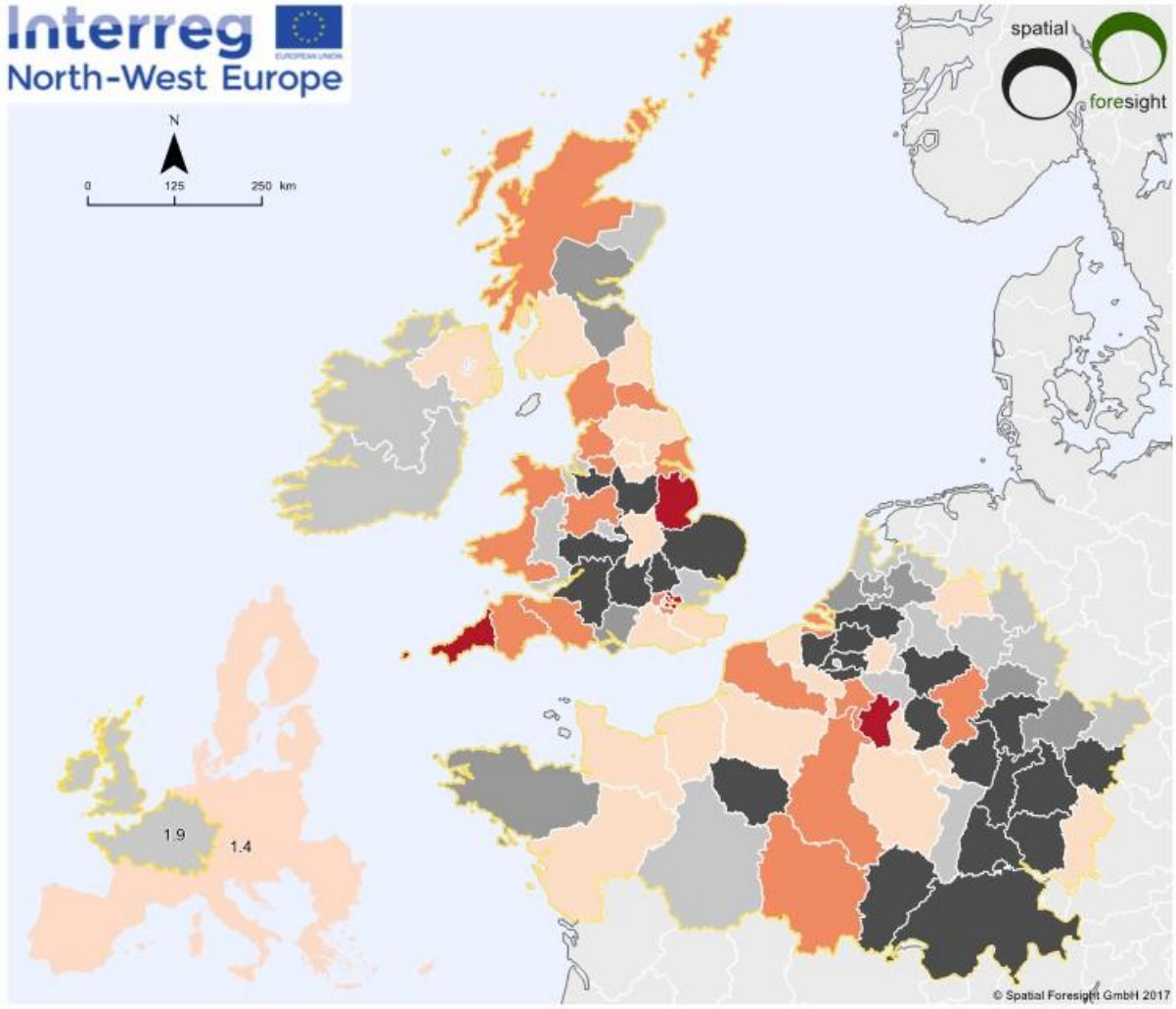
4 Step 2: Identification of strategic areas of importance/interest for the Programme

In this chapter, the proposed indicator baselines are analysed for both the NWE area (to demonstrate potential disparities within the Programme territory) as well as in comparison to the rest of the EU (to show the NWEs position in the EU). Not all indicator values were available for the same NUTS level, which made the analysis of regional disparities difficult.

4.1 Territorial analysis of the baseline situation in NWE

Baseline data available for the ‘Competitiveness’ and ‘Balanced Development’ indicators is presented and briefly described at two levels: Within the NWE area and the NWE compared to the overall EU average.

Map 1



Administrative boundaries: Spatial Foresight and University of Geneva based on material from Eurostat GISCO, the GADM database and the EEA.
Data: based on Eurostat [rd_e_gerdreg], NUTS2 for BE, DE, FR, IE, LU, UK and NUTS0 for CH, extracted on 17.08.2017, values for AT, BE, DE, EL, FI, FR, IE and SE from 2013

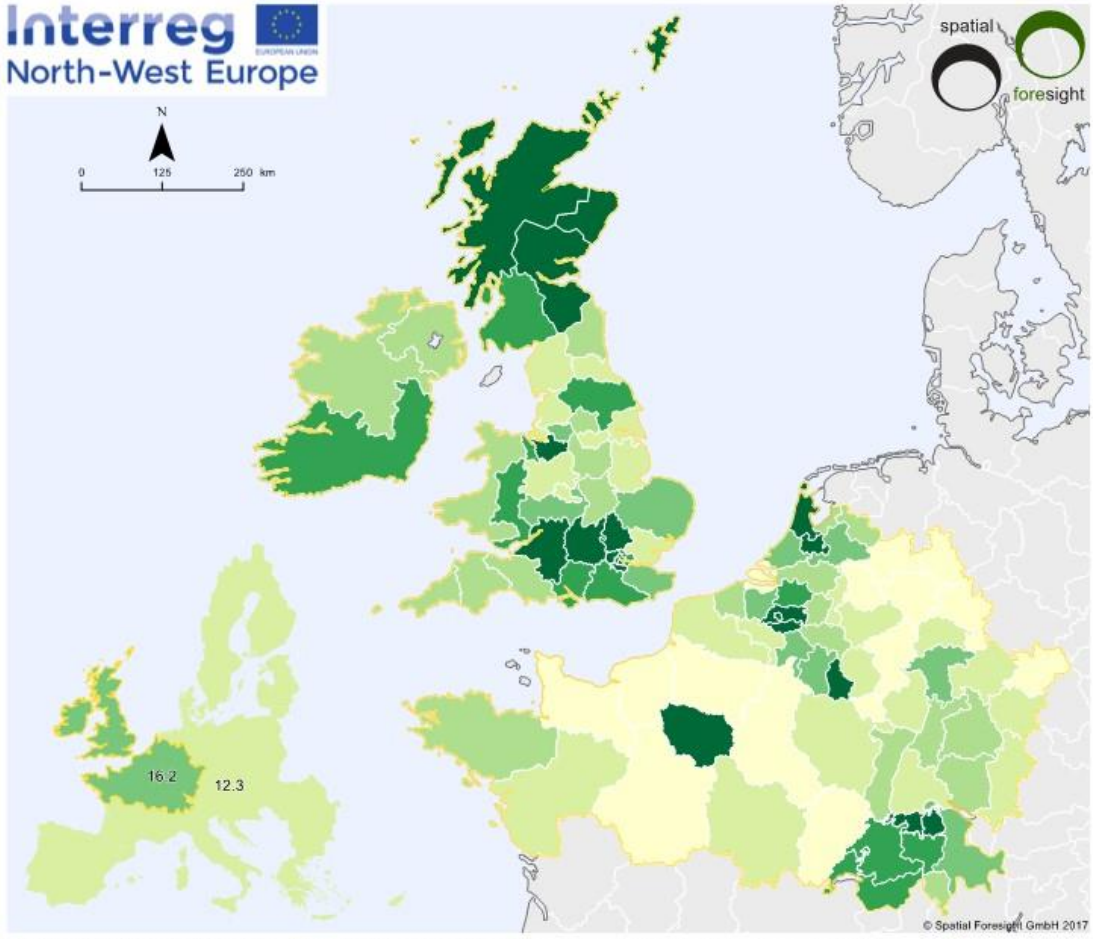
Total intramural R&D expenditure, 2014

Percentage of gross domestic product (GDP)

- < 0.5 %
- 0.5 - 1 %
- 1 - 1.5 %
- 1.5 - 2 %
- 2 - 2.5 %
- > 2.5 %
- Programme Area

The total intramural R&D expenditure within the NWE Programme area is 0.5% higher than in the rest of the EU, where it lies at 1.9%. Within, there are strong differences amounting up to 2%; Switzerland, the Germany, the Netherlands, Northern Belgium, Paris and the regions north to London feature a high share of investments in R&D whilst the lowest share of investments can be found within in Wallonia, rural France, Inner London and the rural parts of the UK. Generally speaking, R&D investments are higher in urbanised regions than elsewhere.

Map 2



Administrative boundaries: Spatial Foresight and University of Geneva based on material from Eurostat GISCO, the GADM database and the EEA.
Data: based on Eurostat [lfst_r_lfp2acedu] and [demo_r_d2jan] , NUTS2, extracted on 17.08.2017, value for FRA5 from 2015

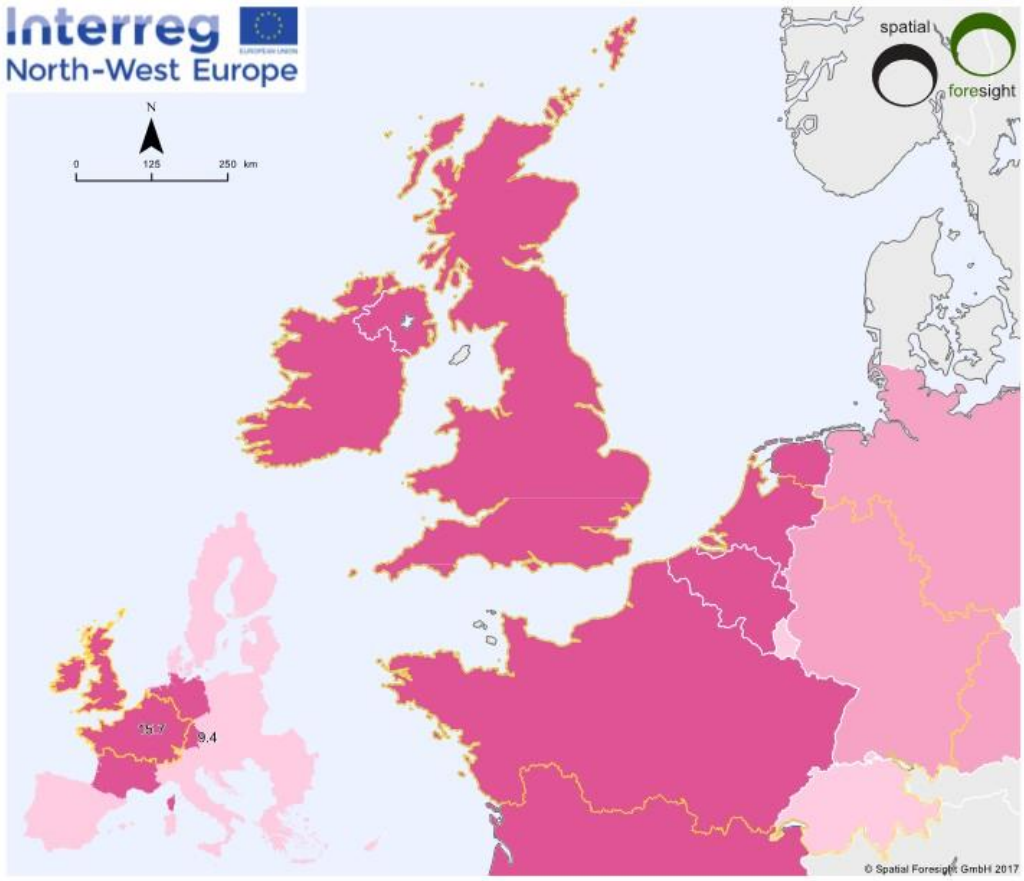
Well-educated economically active population, 25 - 64 years old

Share of total population, ISCED11 levels 5-8 (tertiary education)

- < 12 %
- 12 - 14 %
- 14 - 16 %
- 16 - 18 %
- 18 - 20 %
- > 20 %
- Programme Area

The share of well-educated economically active population is higher in the Programme area than elsewhere in the EU. It amount to 16.2 % of the 25-64 years old. The indicator confirms the general tendency, that well-educated people are specifically attracted by a high level of urbanity. The high shares of 20 % and over can be found in Paris, Luxembourg, Brussels, around Basel and Amsterdam. Areas of high concentration of well-educated economically active persons can however also be found in rural parts of the Programme area; in Scotland, in rural regions neighbouring the areas of urban concentration and in Switzerland, the indicator shows high values. There are also historic influences that can be identified; The industrially influenced areas of Ruhr and Saarland and the historically sparsely populated area surrounding the French capital provide low densities of economically active and well-educated people.

Map 3



Administrative boundaries: Spatial Foresight and University of Geneva based on material from Eurostat GISCO, the GADM database and the EEA.
Data: based on Eurostat European Innovation Scoreboard 2017 Database - Annex C, NUTS0

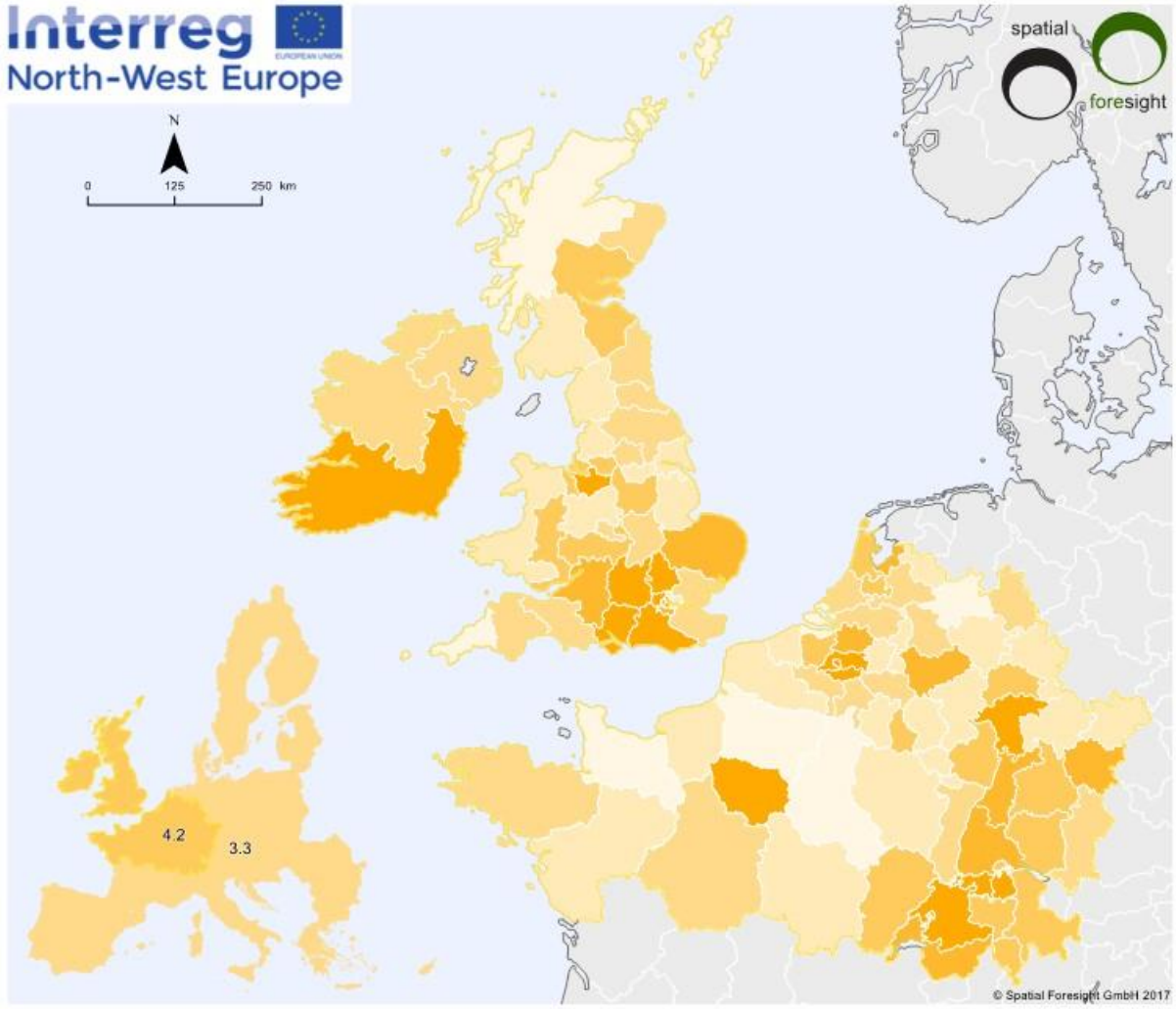
Linkages - Innovative SMEs collaborating with others, 2016

Percentage of total innovative SMEs

- < 10 %
- 10 - 11 %
- 11 - 12 %
- > 12 %
- Programme Area

Innovative SMEs tend to cooperate more within the NWE Programme area than in the rest of the EU. 15.7 % of innovative SMEs collaborate within and only 9.4 % in the countries not belonging to the Programme area. It is however not possible to give insights into regional difference as the indicator is provided on NUTS0 only. However, one can determine countries having a collaborative culture among innovative SMEs; all western Member States of the NWE Programme area cooperate more than their equivalent firms do in Luxembourg, Germany and Switzerland.

Map 4



Administrative boundaries: Spatial Foresight and University of Geneva based on material from Eurostat GISCO, the GADM database and the EEA.
Data: based on Eurostat [htec_emp_reg2] , NUTS2, extracted on 17.08.2017, values for FRA2 and PL62 from 2013, values for RO22 from 2012

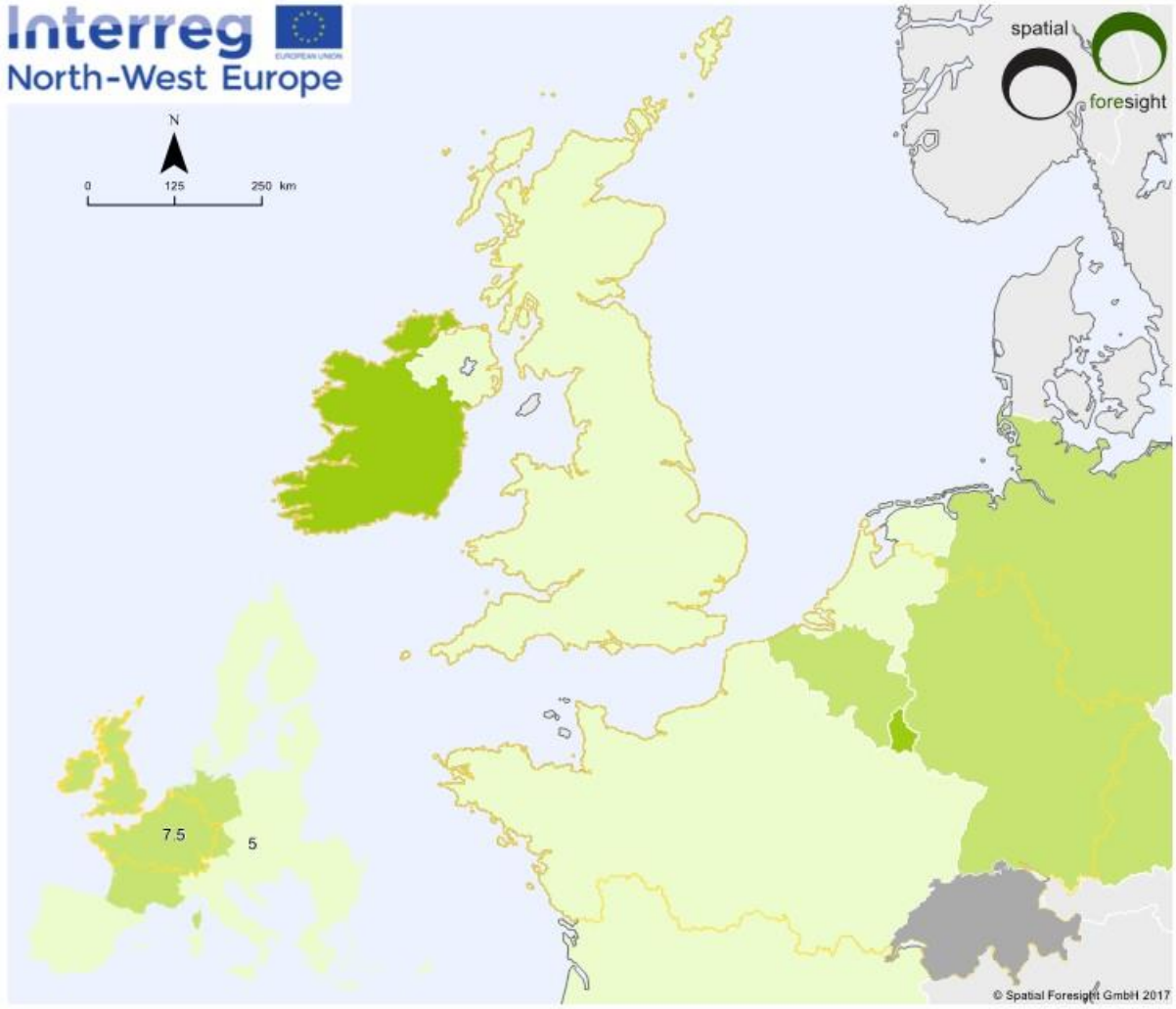
Employment in technology and knowledge-intensive sectors, 2014

Share of total employment in high-technology manufacturing % knowledge-intensive high-technology services

< 2 %	4 - 5 %
2 - 3 %	5 - 6 %
3 - 4 %	> 6 %
Programme Area	

The data shows that 4.2 % of the overall employments in the focus area were employments in HTC (high technology) sectors in 2014. This share is considerably higher than in the rest of the EU, where only 3.3 % do work in the HTC sector. At regional level, the capital and urban areas again do stand out; traditionally, agglomerations have hosted more HTC activities or agglomerations do exist because of HTC activities. Areas of very low employment in HTC are Scotland, the Picardie, Lower Normandy and Champagne-Ardenne in France, Cornwall and North-East London in the UK and the region of Münster in Germany.

Map 5



Administrative boundaries: Spatial Foresight and University of Geneva based on material from Eurostat GISCO, the GADM database and the EEA.
Data: based on Eurostat [env_waselee], NUTS0, extracted on 17.08.2017, value for CY from 2013

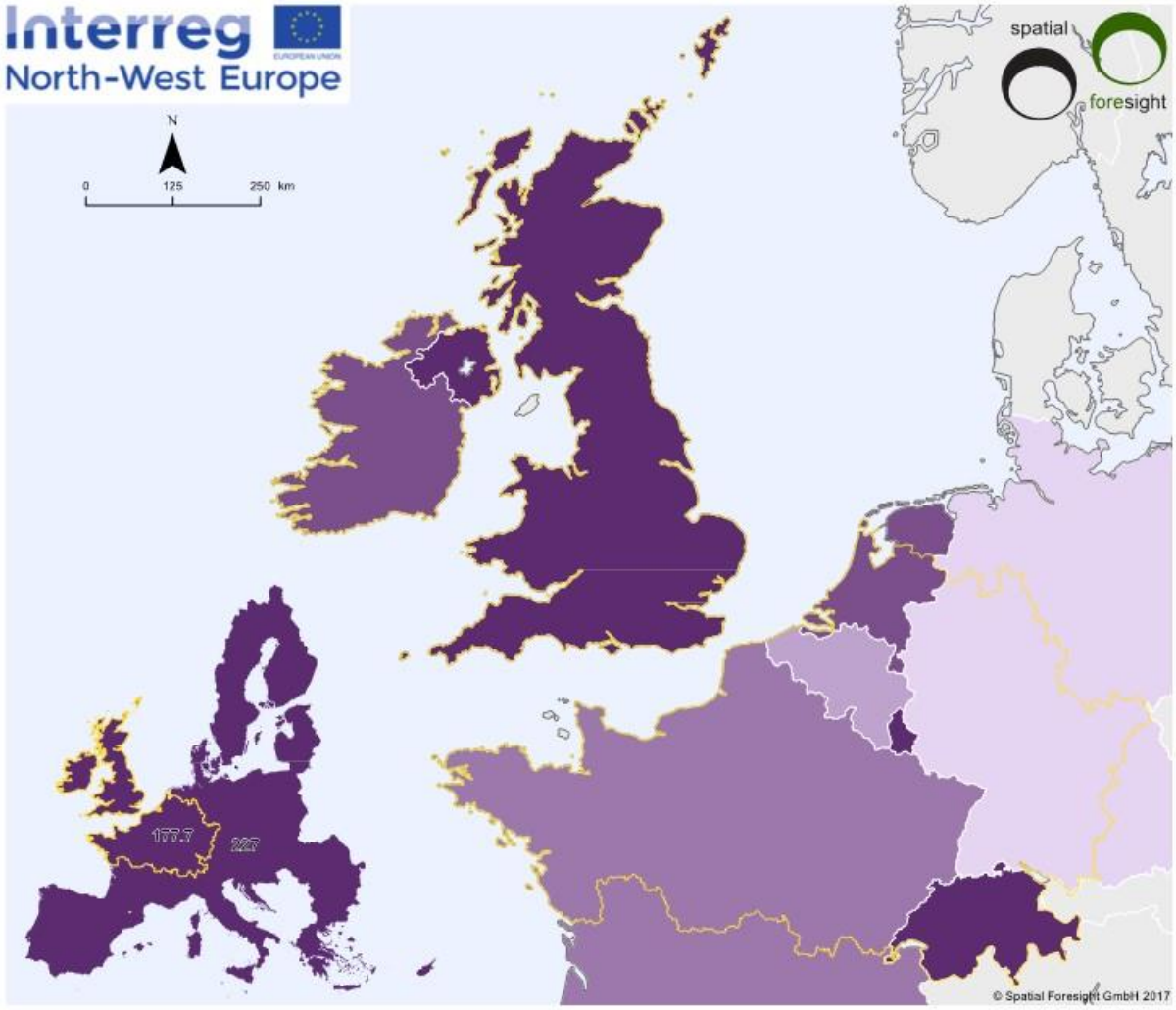
Total electrical and electronic equipment (WEEE) recycled and reused, 2014

Kilograms of waste per capita recycled or reused

- < 7
- 7 - 8
- > 8
- Programme Area
- no data

The Member States within the Programme area perform well in comparing the recycling or the reuse rate of electrical and electronic waste in relation to the rest of the EU. With 7.5 kg per capita on average, it lies 2.5 kg above the EU average. Within the area of analysis, Ireland and Luxembourg lead the way followed by Belgium and Germany. The UK, France and the Netherlands feature the lowest scores and there are no values for Switzerland.

Map 6



Administrative boundaries: Spatial Foresight and University of Geneva based on material from Eurostat GISCO, the GADM database and the EEA.
Data: based on ISO Survey, NUTS0

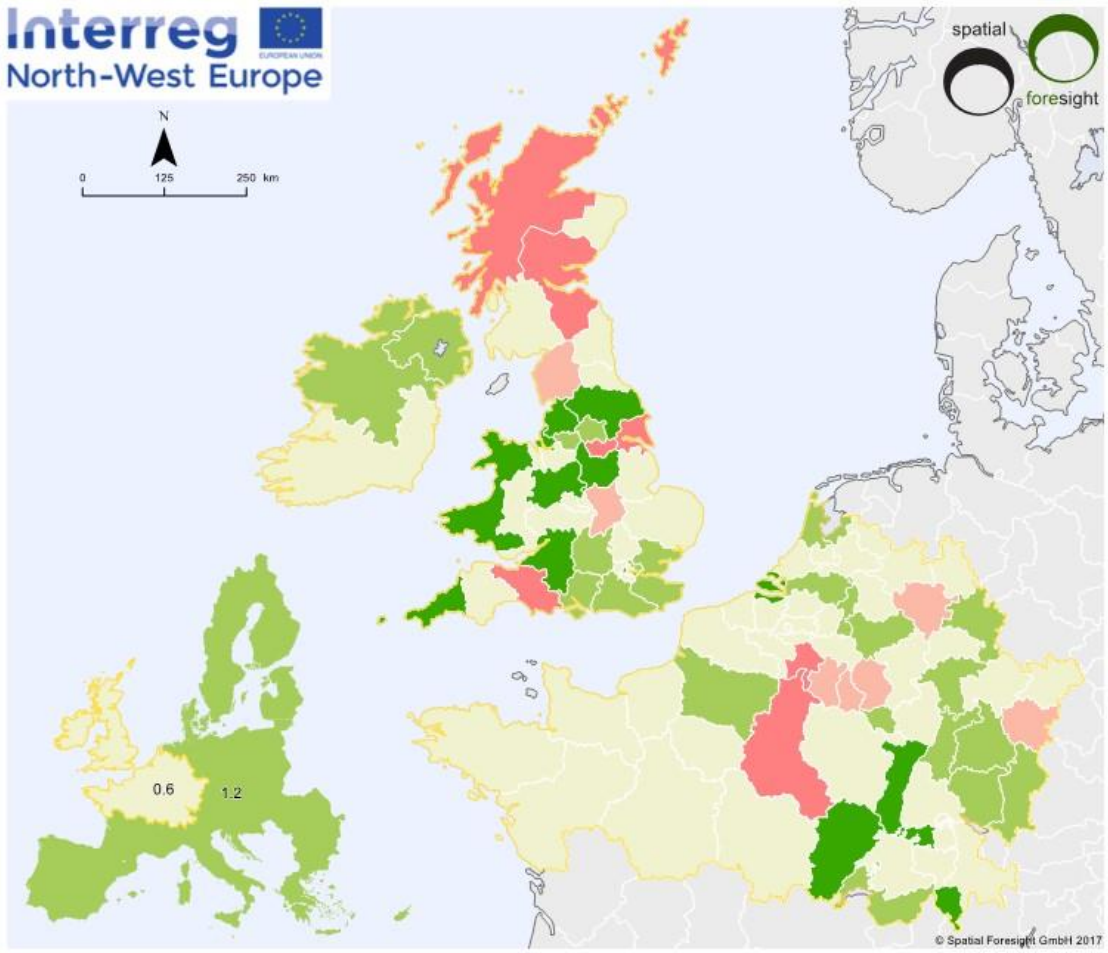
Number of ISO 14001 certifications issued, 2013

Number of ISO 14001 - ISO certified environmental management systems per 1 mio. inhabitants

- < 100
- 100 - 120
- 120 - 140
- 140 - 160
- > 160
- Programme Area

Regarding ISO 14001 certifications, which are certifications for environmental management systems, the countries forming the Programme area illustrate approximately 178 certifications per 1 million inhabitants. This is a less good performance in comparison to the rest of the EU, where there are 227 certifications per 1 million inhabitants. The large number in Italy however distorts the comparison slightly. Germany features less than 100 certified environmental management systems per 1 million inhabitants whereas Switzerland provides more than 370. The large differences within the states can be explained by different reference frameworks for valuing ISO certifications.

Map 7



Administrative boundaries: Spatial Foresight and University of Geneva based on material from Eurostat GISCO, the GADM database and the EEA.
Data: Eurostat [lfst_r_lfp2actrt], NUTS 2, extracted on 17.08.2017

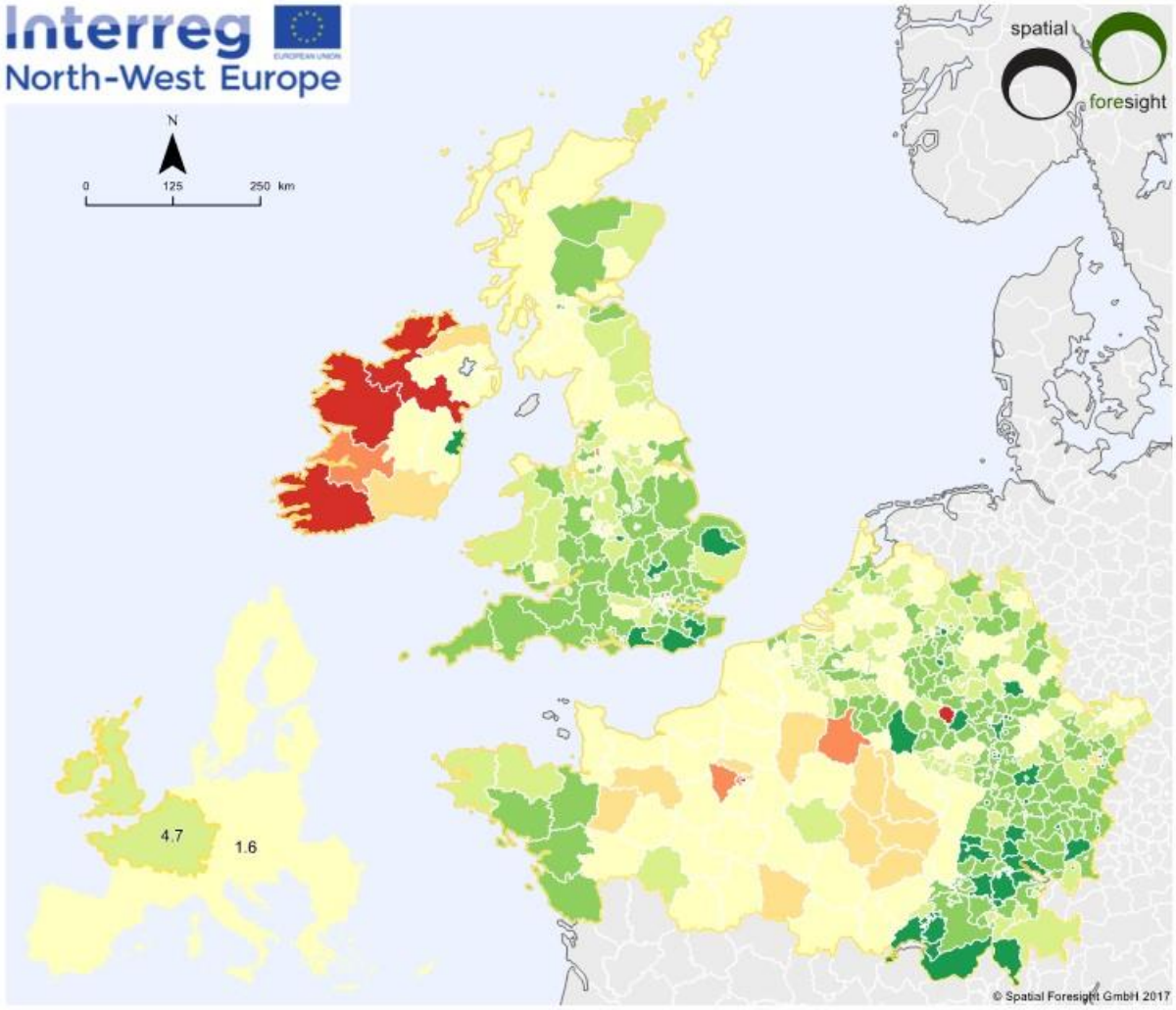
Economically active population, change 2014-2016

Share of 25 - 64 years old, change from 2014 to 2016

- < -2 %
- -2 - -1 %
- -1 - 1 %
- 1 - 2 %
- > 2 %
- Programme Area

Exogenous trends, such as the recent economic crisis can immediate impacts on the levels of employment. Between 2014 and 2016, the Programme area has succeeded to increase the share of economically active population of the persons aged 25 – 64 years by 0.6 %. Within the rest of the EU, the performance was twice as high as in the NWE. Whereas the majority of regions within the focus area have maintained the same or only a minor variance in the level of employment, some regions have succeeded to increase employment levels. These regions are the cities of second tier in England and Wales, Alsace and Franche-Comte in France, Zeeland in the Netherlands and around Basel and Ticino in Switzerland. Strong decreases can be found in Scotland, Humberside and Somerset/Dorset in the UK, Champagne-Ardenne and Namur in France and Belgium respectively. The latter regions feature considerably lower levels of employment making their populations specifically vulnerable.

Map 8



Administrative boundaries: Spatial Foresight and University of Geneva based on material from Eurostat GISCO, the GADM database and the EEA.
Data: based on Eurostat [demo_r_gind3], NUTS 3, extracted on 18.08.2017

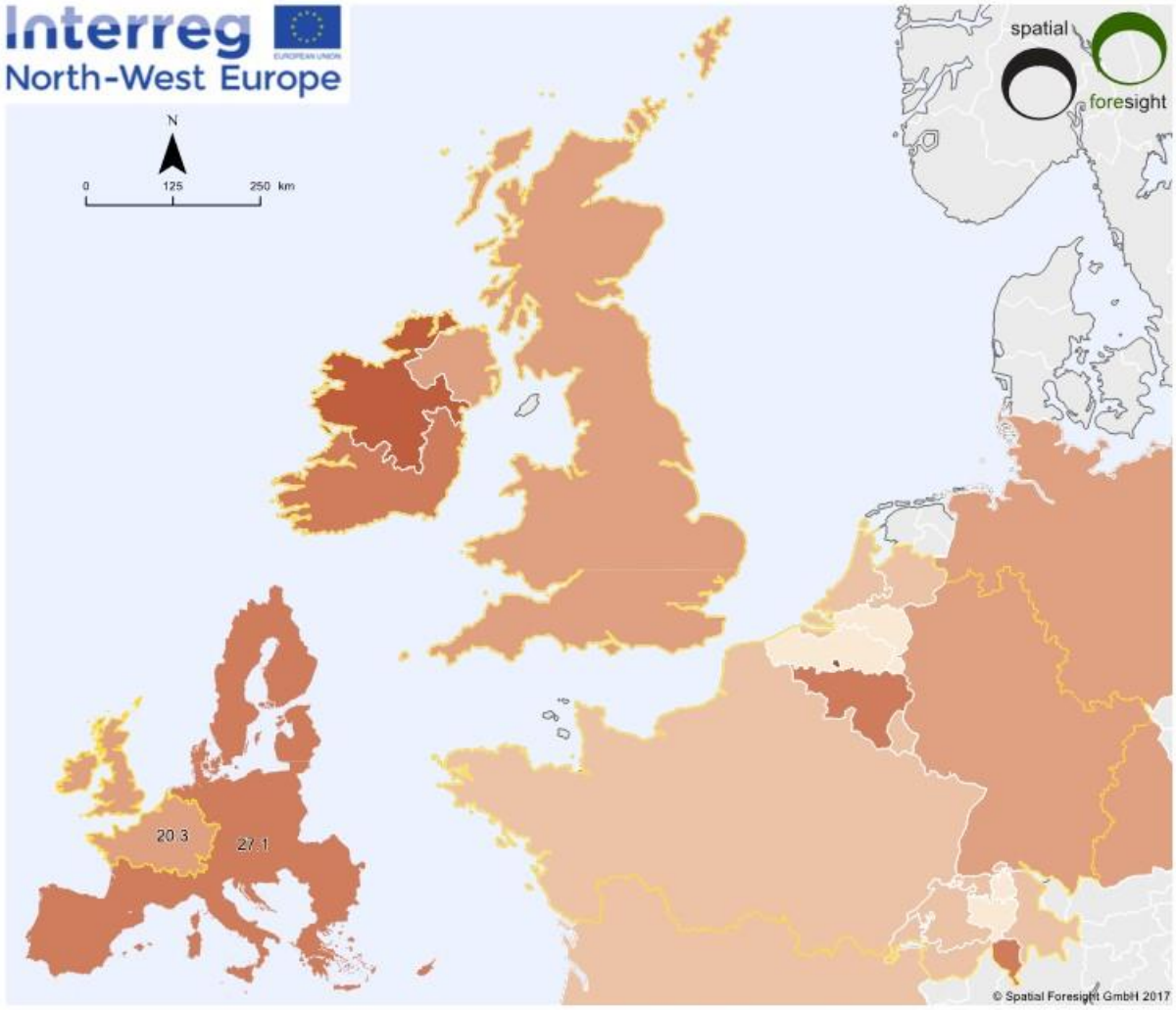
Population change - crude rate of net migration, 2014

Percentage, crude rate (plus statistical adjustment)

- > -10 %
- -10 - -5 %
- -5 - -2.5 %
- -2.5 - 2.5 %
- 2.5 - 5 %
- 5 - 10 %
- > 10 %
- Programme Area

The Programme area is an attractive area to live in. This can be illustrated with the average 4.7 % of positive net migration, highlighting the overall positive migratory balance on average. The remaining EU provides an average value of 1.6 % only. With the exception of Western Ireland, the analysis on NUTS3 level for 2014 does not illustrate large spatial disparities.

Map 9



Administrative boundaries: Spatial Foresight and University of Geneva based on material from Eurostat GISCO, the GADM database and the EEA.
Data: based on Eurostat [ilc_peps11], NUTS 2 for IE, CH, LU and NL, NUTS1 for BE, NUTS0 for DE, FR and UK

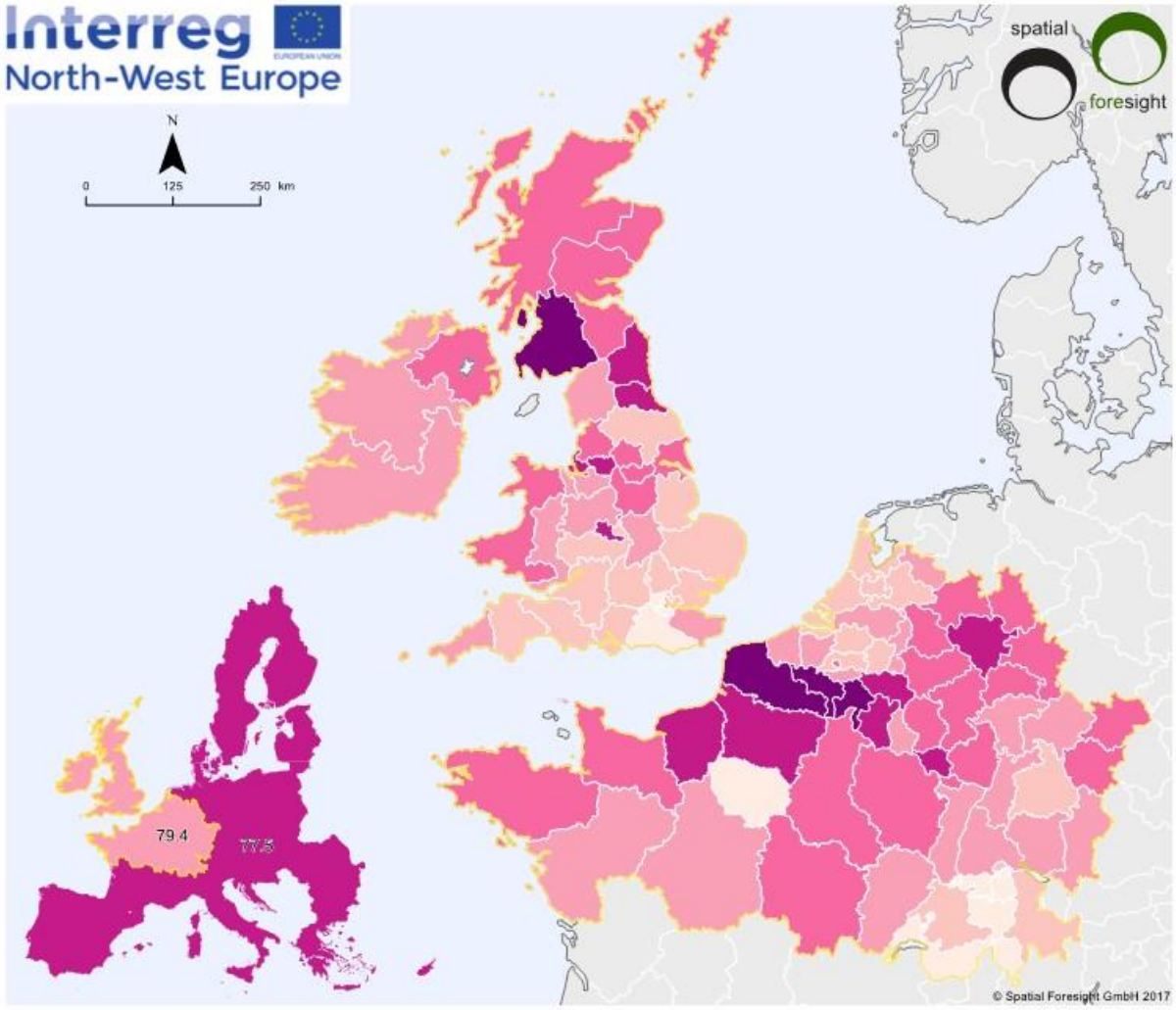
People at risk of poverty or social exclusion, 2014

Percentage of total population

- < 15 %
- 15 - 20 %
- 20 - 25 %
- 25 - 30 %
- 30 - 35 %
- > 35 %
- Programme Area

In the focus area, less people were at risk of poverty or social exclusion than in the rest of the EU in 2014. 20.3 % of the population in the Programme area were concerned in comparison to 27.1 % in the rest of the EU. A regional analysis is however difficult, as only Switzerland, Belgium, the Netherlands and Ireland do provide regional data.

Map 10



Administrative boundaries: Spatial Foresight and University of Geneva based on material from Eurostat GISCO, the GADM database and the EEA.
Data: based on Eurostat [demo_r_mlifex], NUTS 2, extracted on 17.08.2017

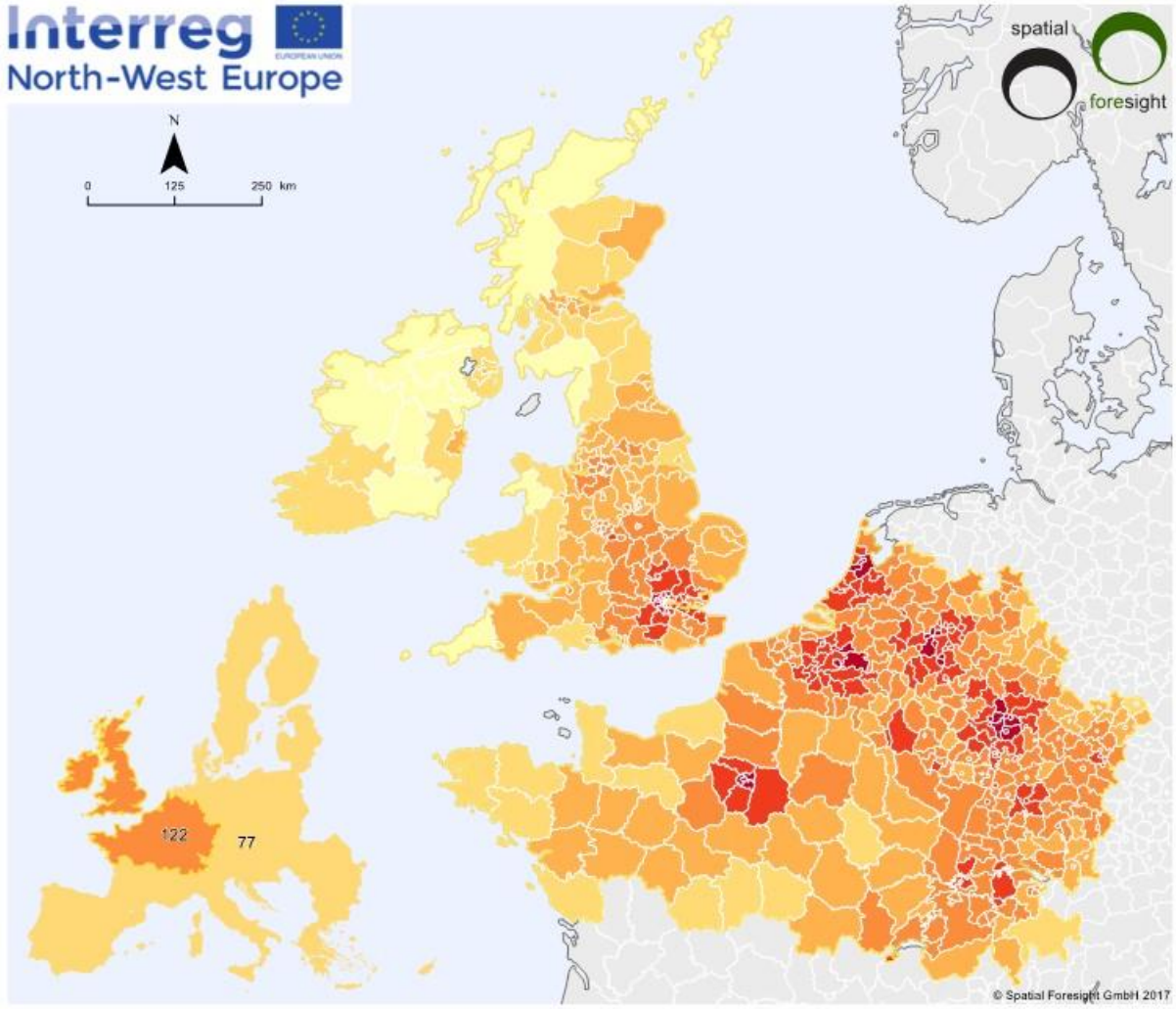
Life expectancy, males, 2014

Life expectancy, males in years for population aged less than one year

- < 77
- 77 - 78
- 78 - 79
- 79 - 80
- 80 - 81
- > 82
- Programme Area

Male life expectancy in the Programme area is 1.9 years higher than in the remaining EU, where is lies at 77.5 years. Life expectancy of males is highest in Switzerland, Paris, London and the South Counties of England. The lowest life expectancy of males, even below the remaining EU's average can be found within the NWE area in Western Lowlands (UK), Nord-Pas-de-Calais in France and Namur and Hainaut in Belgium. Regarding the functionality of the different regions, a unitary pattern that explains the differences cannot be identified.

Map 11



Administrative boundaries: Spatial Foresight and University of Geneva based on material from Eurostat GISCO, the GADM database and the EEA.
Data: S&W Spiekermann & Wegener, Urban and Regional Research, NUTS 3, 12.09.2016

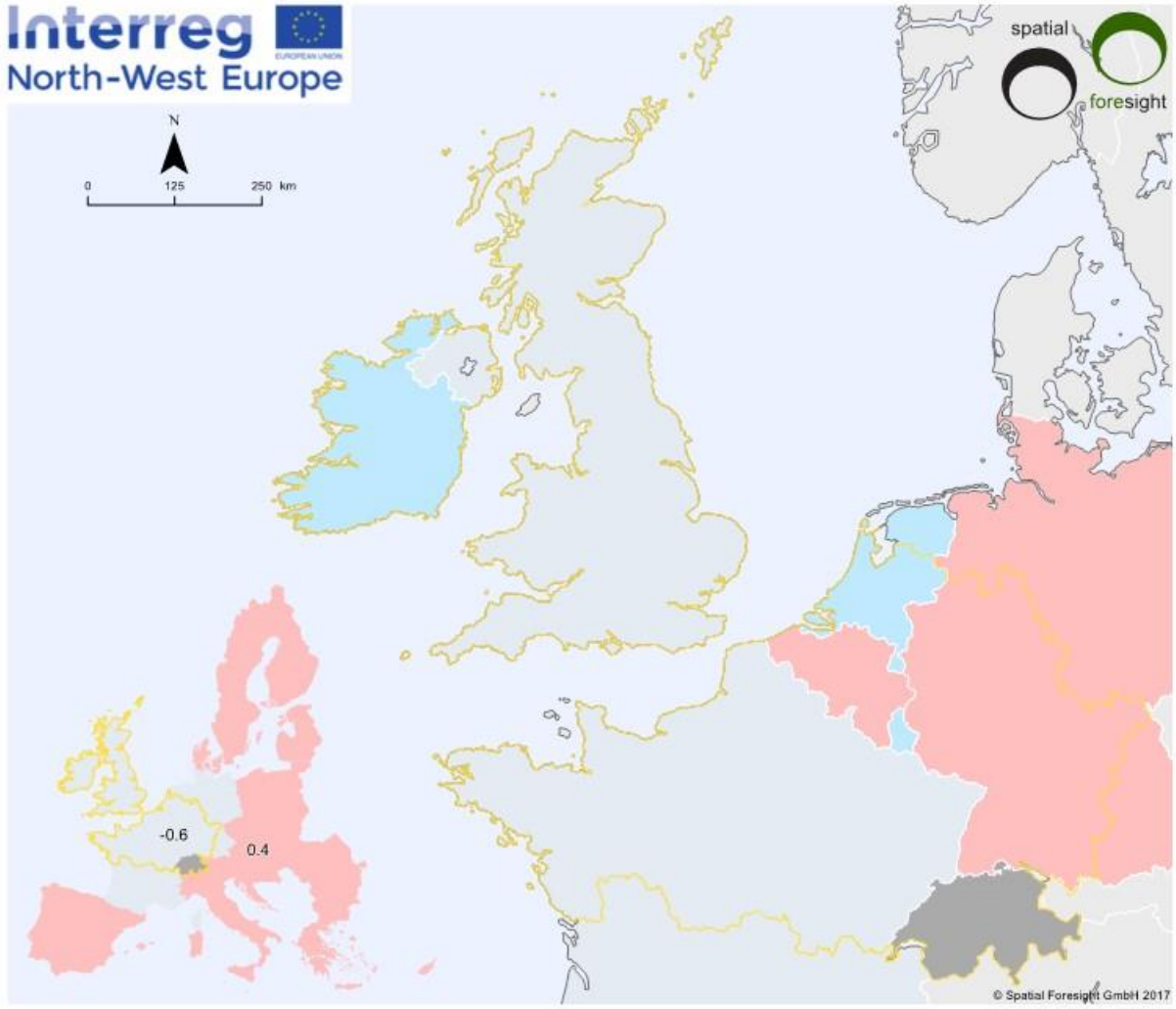
Potential accessibility multimodal, 2014

Potential accessibility travel indicator

< 60	112 - 138
60 - 86	138 - 164
86 - 112	> 164
Programme Area	

As the Programme area covers the North West of Europe, which is one of the better connected territories in the EU, it does not surprise that the focus area has a much higher potential accessibility of 122 than the rest of the EU with 77. Capital regions do again stick out in terms of the multimodal accessibility with the addition of the border areas between Switzerland and Germany, Stuttgart, the Ruhr and the Rheine-Main area. More remote areas outside of this agglomeration of agglomerations do provide low levels of multimodal accessibility. The lowest levels can be found in Northern Ireland and Northern UK.

Map 12



Administrative boundaries: Spatial Foresight and University of Geneva based on material from Eurostat GISCO, the GADM database and the EEA.
Data: based on European Commission 2016 assessment of the progress made by Member States in 2014 towards the national energy efficiency targets for 2020 and towards the implementation of the Energy Efficiency Directive 2012/27/EU as required by Article 24 (3) of the Energy Efficiency Directive 2012/27/EU, 2017, NUTS0

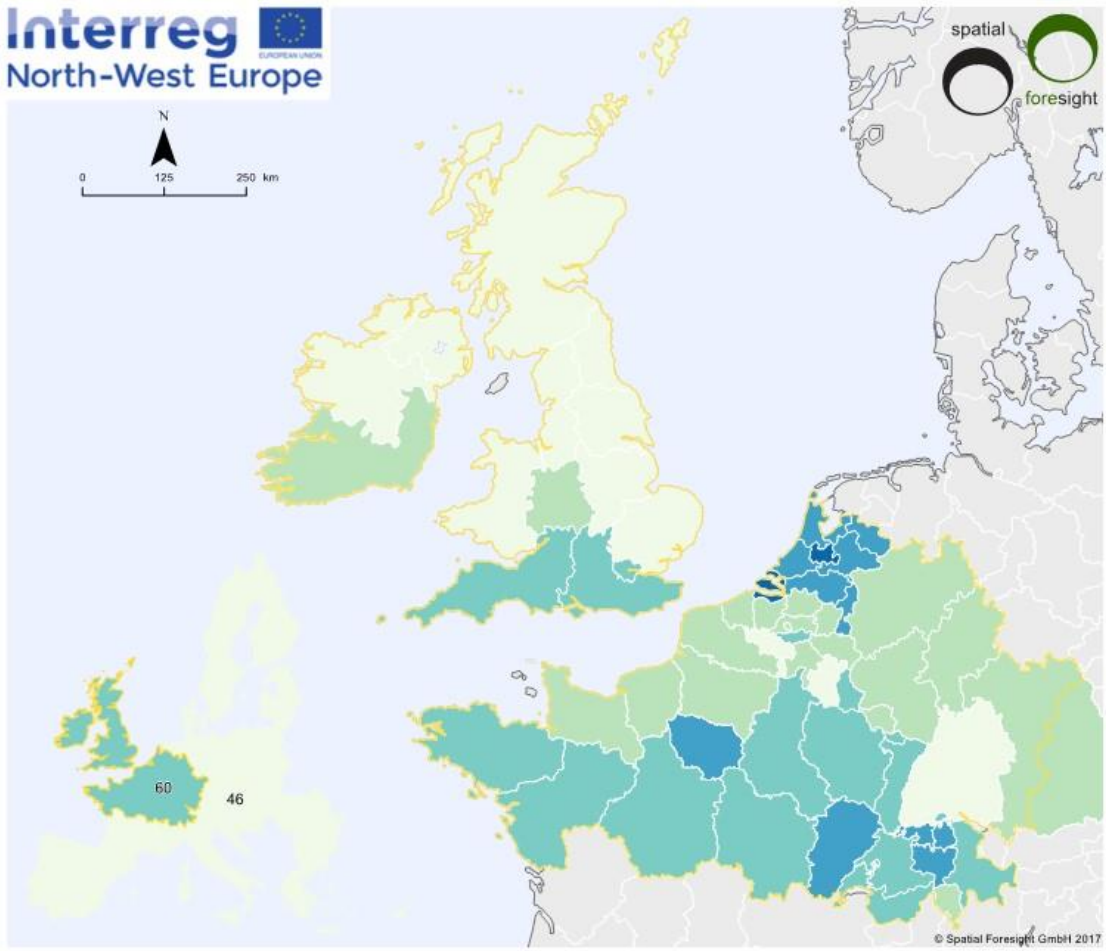
Change in energy intensity of transport, 2005 - 2014

2005 - 2014 average annual change of total FEC in the transport sector in %

- < - 1 %
- -1 - 0 %
- > 0 %
- no data
- Programme Area

The energy intensity of transport has decreased between 2005 and 2014 within the Programme area countries about 0.6 % while it has increased about 0.4 % in the remaining Member States. The largest decrease can be observed in Ireland, the Netherlands and Luxembourg. Belgium and Germany have however experienced a general increase of the energy intensity of the transport sector.

Map 13



Administrative boundaries: Spatial Foresight and University of Geneva based on material from Eurostat GISCO, the GADM database and the EEA.
Data: based on Eurostat [isoc_r_gov_i], NUTS 2 for BE, CH, FR, IE, LU, NL and NUTS 1 for DE and UK

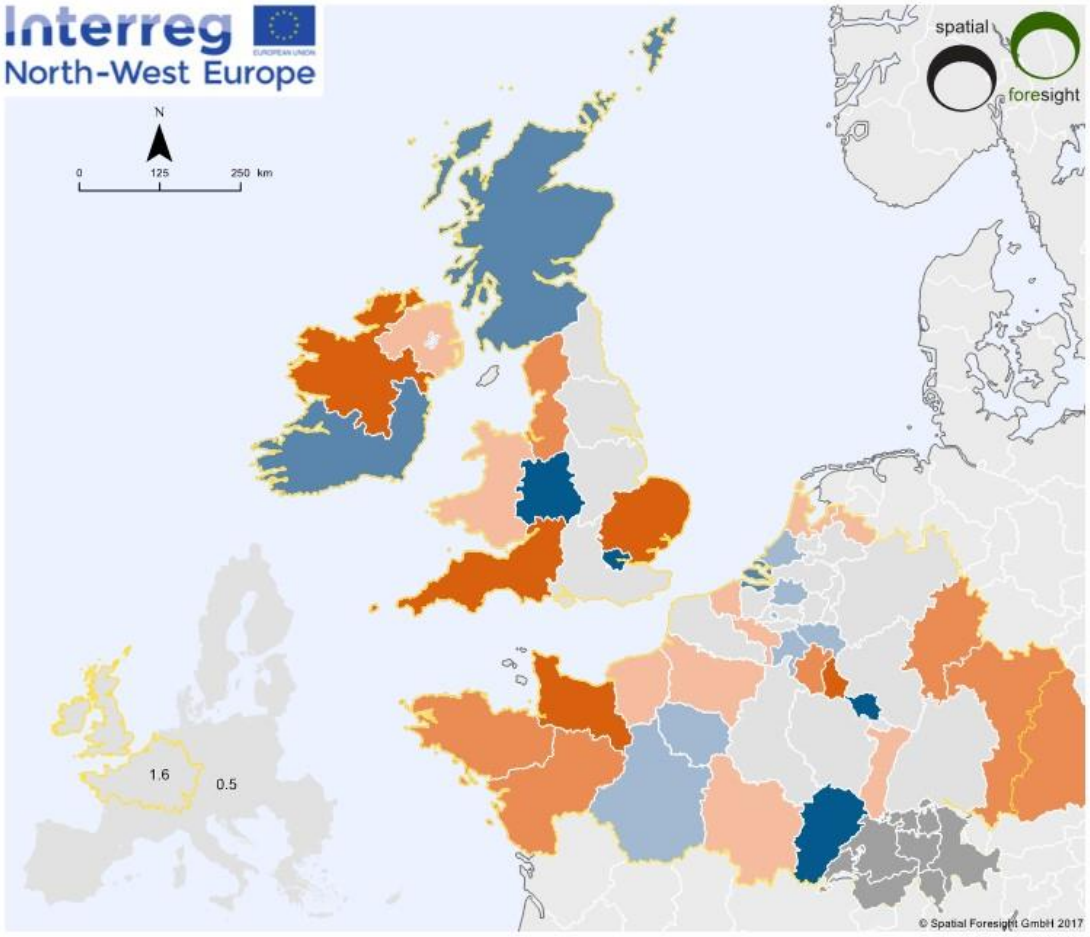
Individuals who used the internet for interaction with public authorities, 2014

Percentage of total population within the last 12 months

< 50 %	70 - 80 %
50 - 60 %	> 80 %
60 - 70 %	Programme Area

60 % of the individuals within the Programme area have used the internet during the past 12 month to interact with public authorities. This comprises all sorts of interaction ranging from simple communication to more complex procedures. This is considerably higher than among citizens within the remaining EU regions where the share amounts to 46 % respectively. Whilst the Northern territories of the UK and Ireland perform less, the only pockets of underperformance lie in the regions of Hainaut and Luxembourg in Belgium and in Baden-Württemberg in Germany. In national comparison, the Netherlands stick out as over-performers whereas the indicator shows generally lower values for Belgium and Germany.

Map 14



Administrative boundaries: Spatial Foresight and University of Geneva based on material from Eurostat GISCO, the GADM database and the EEA.
Data: based on Eurostat [isoc_r_gov_i], NUTS 2 for BE, CH, FR, IE, LU, NL and NUTS 1 for DE and UK, 2015-2016 for FRA1, FRA2, FRA3, FRA4, SI03 and SI04

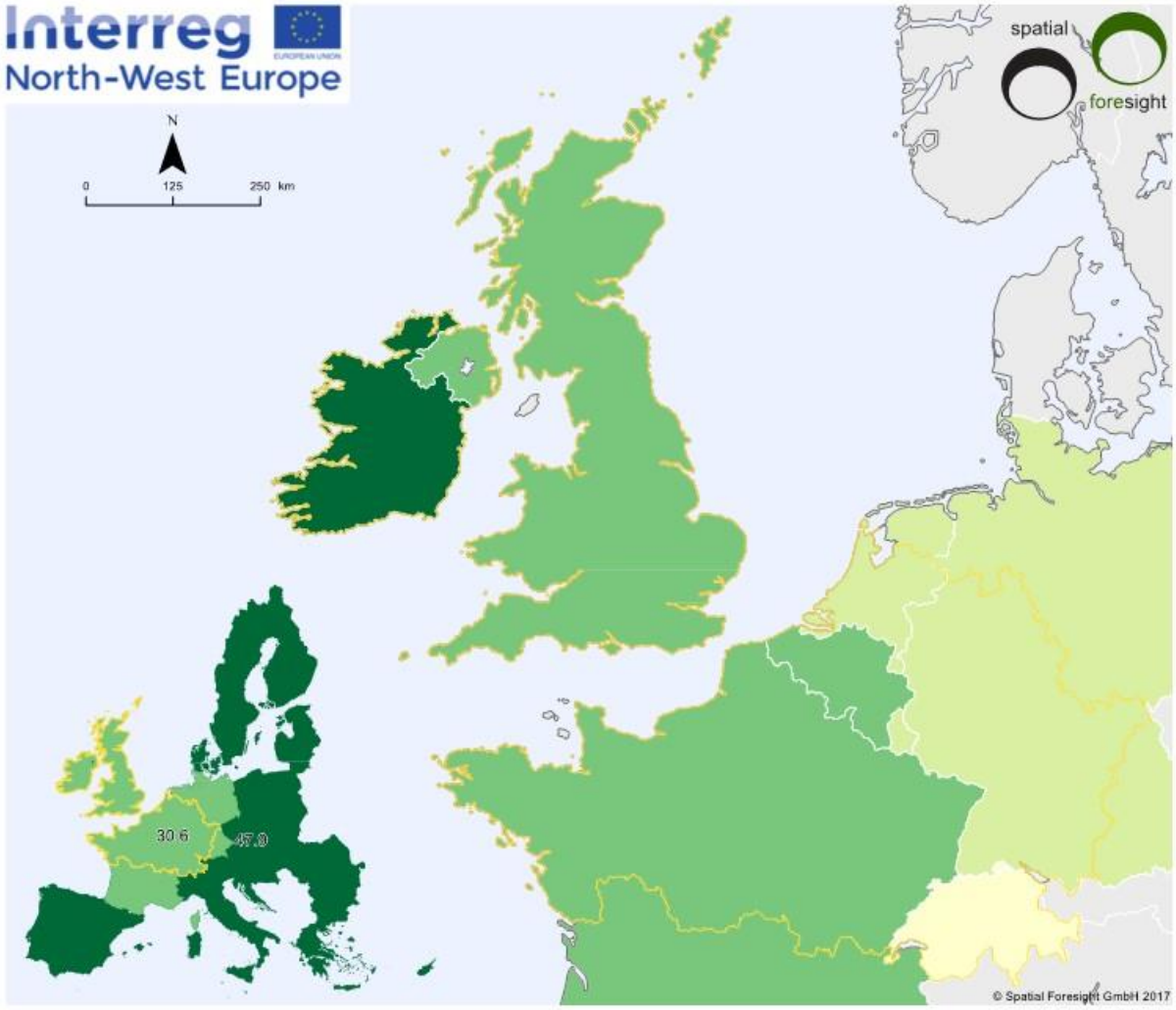
Individuals who used the internet for interaction with public authorities, 2014 - 2016

Change in percentage of total population within the last 12 months

- < -8 %
- -8 - -5 %
- -5 - -2 %
- -2 - 2 %
- 2 - 5 %
- 5 - 8 %
- > 8 %
- Programme Area
- no values

The share of population that has used the internet for interacting with public authorities has increased slightly all over the EU between 2014 and 2016. The Programme area features a slightly stronger increase with 1.6 % change than the remaining regions with an increase of only 0.5 %. In terms of regional variances, there are strong decreases for this indicator that can be observed in the West Midlands and London as well as in Saarland in Germany and Franche-Comte in France. The regional efforts to strive for eGovernance and digitalisation of public services were fruitful in Northern Ireland, within the South West and the East of England as well as in Lower Normandy and Luxembourg. The remaining territories feature a more or less random distribution of both, decrease and increase of the indicator.

Map 15



Administrative boundaries: Spatial Foresight and University of Geneva based on material from Eurostat GISCO, the GADM database and the EEA.
Data: based on Cerutti, Iancu, Janssens-Maenhout, Melica, Paina, Bertoldi, 2013, The Convenant of Mayors in Figures 5-Year Assessment, European Commission, Table 1.1, NUTS0

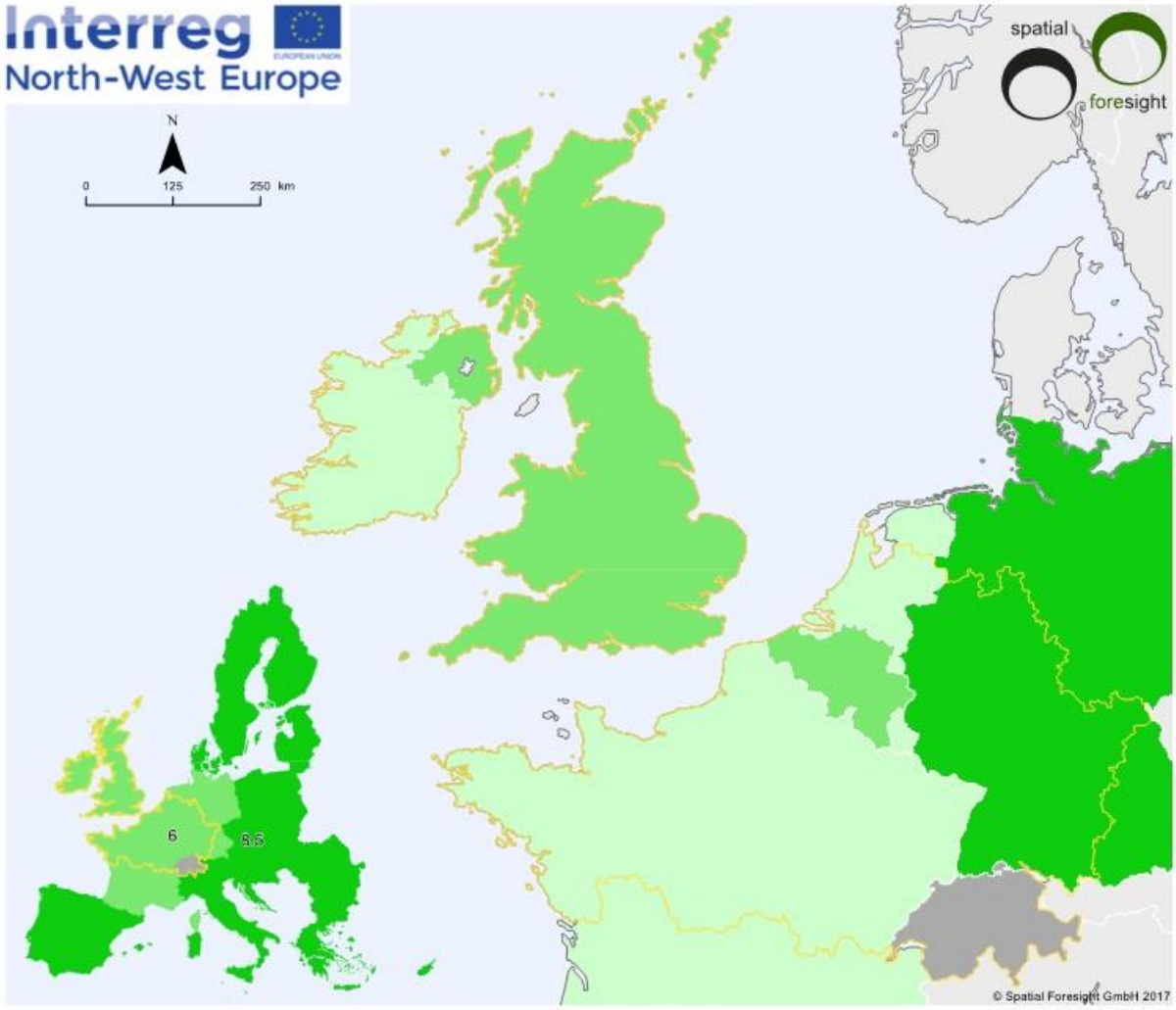
Urban population covered with low carbon strategies, 2013

Percentage of the countries' urban population with existing low carbon strategies

< 15 %	30 - 45 %
15 - 30 %	> 45 %
Programme Area	no data

On average 30.6% of the urban population within the countries of the Programme area were covered with low carbon strategies in 2013. This is considerably lower than approximately 48% outside the Programme area. Regarding the particular differences per country, Ireland performs best with more than 45% of the urban population covered whereas Switzerland performs the worst with less than 0.5%. This indicator is however subject to national differences in settlement structures and definitions of cities.

Map 16



Administrative boundaries: Spatial Foresight and University of Geneva based on material from Eurostat GISCO, the GADM database and the EEA.
Data: based on EEA, 2017, NUTS0

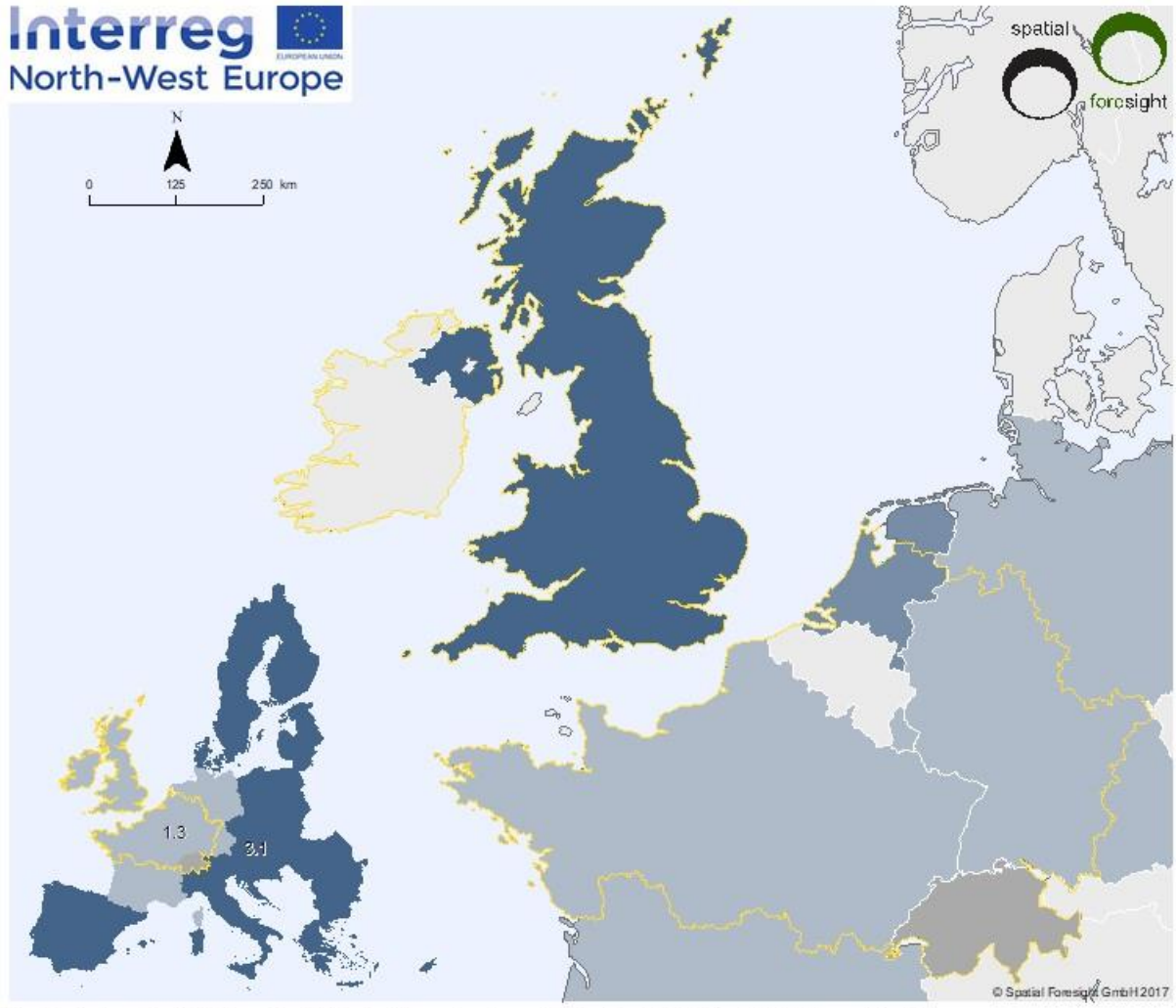
Relative gross avoided GHG emissions, 2014

Reduction per year, share of total GHG

- < 5 %
- 5 - 7 %
- > 7 %
- no data
- Programme Area

The countries belonging to the Programme area have managed to avoid 6 % of the gross GHG emissions in 2014 on average. This is a worse performance than for the remaining EU which has reduced 8.5 % of its gross GHG emissions. The Netherlands, France, Luxembourg and Ireland have struggled with the reduction whereas Germany has managed it quite well and stands out as the biggest 'reducer'. This might be linked to the occurrence of higher GHG emissions per capita in Germany and the resulting potential reductions.

Map 17



Administrative boundaries: Spatial Foresight and University of Geneva based on material from Eurostat GISCO, the GADM database and the EEA.
Data: based on European Commission 2016 assessment of the progress made by Member States in 2014 towards the national energy efficiency targets for 2020 and towards the implementation of the Energy Efficiency Directive 2012/27/EU as required by Article 24 (3) of the Energy Efficiency Directive 2012/27/EU, 2017, NUTS0

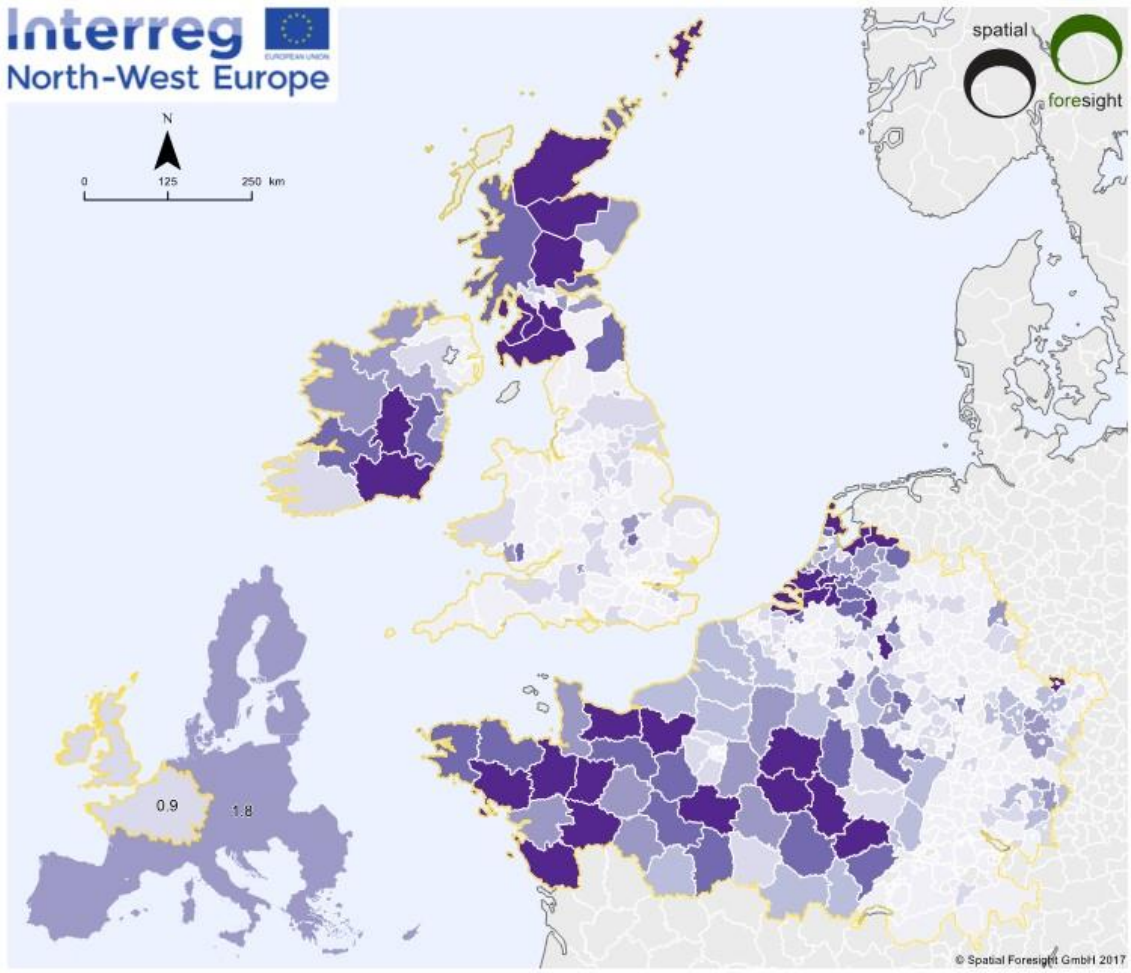
Change in energy intensity of industry, 2005 - 2014

2005 - 2014 average reduction of energy intensity in industry in % (FEC industry in toe/GVA industry in M€10)

- < 1 %
- 1 - 1.5 %
- 1.5 - 2 %
- > 2 %
- no data
- Programme Area

The energy intensity of the industrial sector within the countries belonging to the Programme has generally reduced between 2005 and 2015. However, it has reduced less than the energy intensity within the remaining EU countries. The indicator shows a reduction of 1.3 % compared to 3.1 % respectively. Whilst Belgium and Ireland have only reduced the energy intensity less than 1 %, the UK has managed to achieve a reduction of more than 2 %.

Map 18



Administrative boundaries: Spatial Foresight and University of Geneva based on material from Eurostat GISCO, the GADM database and the EEA.
Data: based on EEA Corine land cover seamless vector database, 2016 and Eurostat [demo_r_d2jan], extracted on 17.08.2017, NUTS 3

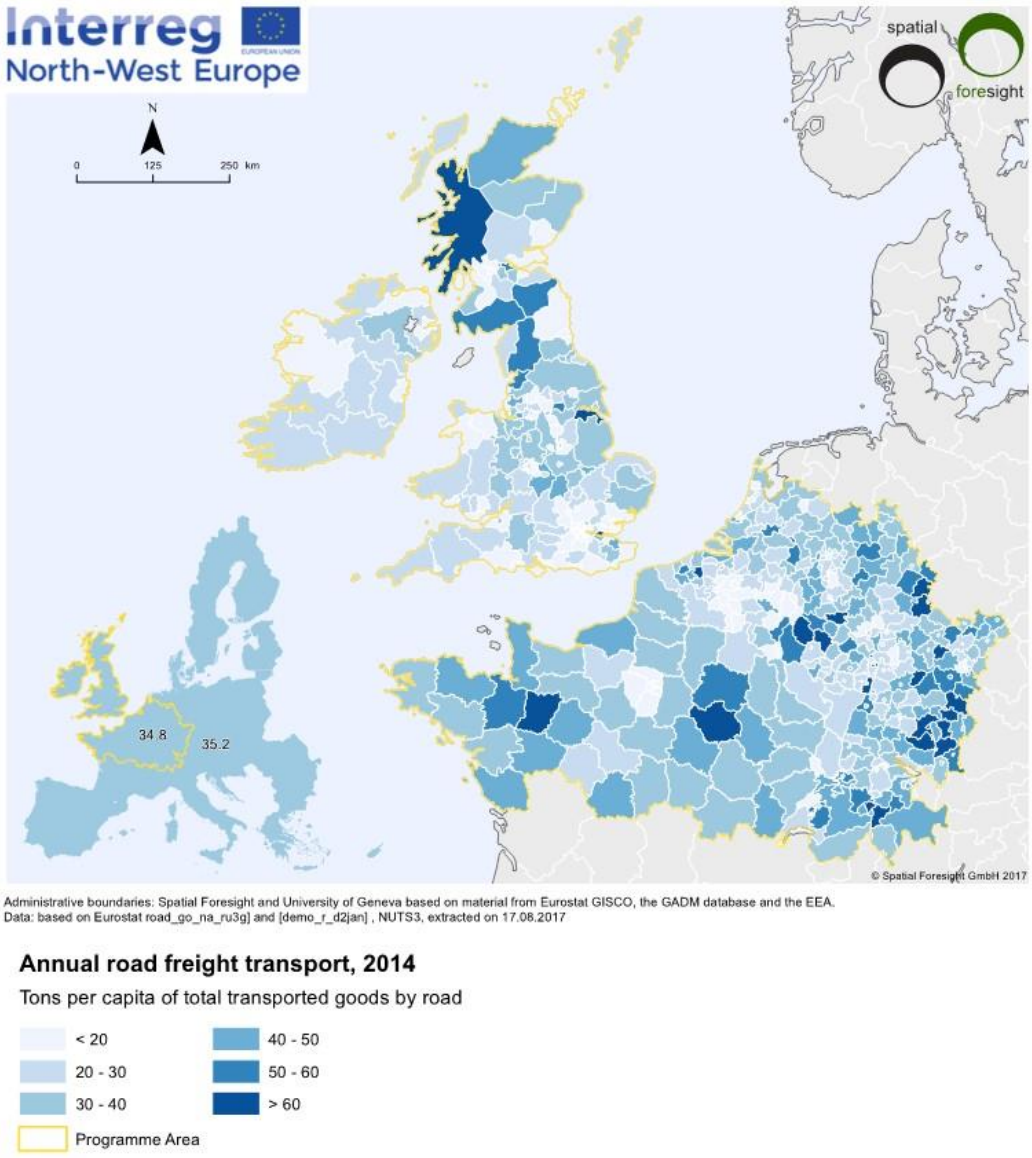
Change in artificial land-use, 2006-2012, square metres per capita

Change to artificial surfaces clc_codes 111, 112, 121, 122, 123, 124, 131, 132, 133, 141 and 142

- < 0.5 m²
- 0.5 - 1 m²
- 1 - 1.5 m²
- 1.5 - 2 m²
- 2 - 2.5 m²
- > 2.5 m²
- Programme Area

Uncontrolled consumption of surfaces by artificial settlement structures is called urban sprawl. In order to limit the human impact on the environment, it is a declared objective to strive for dense structures and thus avoiding unnecessary land use. The change in consumption per capita between 2006 and 2012 is lower within the Programme area than across the rest of the EU. Around 0.9 m^2 was consumed in the NWE compared to 1.8 m^2 across the rest of the EU. Regarding the regional distribution of land use, it becomes clear that the regions where urban development has increased is in more rural areas. This can be seen in Scotland, Southern Ireland and in large parts of France. An explanation is needed to understand why these rural areas have seen an abve average change in land use. Less restrictive land use allowed by municipal planning could be a reason.

Map 19



Overall, the Programme area is less dependent on the transport of goods via road. With 34.8 tons per capita, it is slightly below 35.2 tons per capita for the rest of the EU. Within the NWE, there dependency on road freight differs whereas a dominating pattern is difficult to identify. Generally at NUTS3 level, high levels of tons per capita transported via road can be found quite dispersed in some rural regions such as in Western Scotland for instance, the Eifel and Westerwald area in Rhineland Palatinate, the area surrounding Stuttgart. Urban regions, such as Paris, London, Brussels and around the Upper Rhine valley illustrate smaller values. This might be linked to two reasons; first, alternative infrastructures such as railways or waterways tend to be better developed in areas of demographic agglomeration. Second, keeping transport costs low, one could argue from the perspective of classic economic theory, that goods are best produced where they're also consumed. Transport of goods can thus generally be avoided. This could be a perspective trying to explain the above-described pattern.

Conclusions

The analysis of the indicators shows that the regional performance depends on the different dimensions of territorial cohesion and on the different indicators. In general, trends linked to regional typologies can be identified. In economic, demographic, transport and social aspects, cities tend to perform better within the Programme area. Regions that are far from agglomerations are the under-performers within the Programme area. This means, that usually the more rural a region is, the lower the male life expectancy, the lower the potential accessibility, the lower the public R&D investments, the lower the employment in HTC sectors and the higher the dependency on road transport. Further analysis would be needed to highlight the statistical dependency between the typology of a territory and its degree of under-performance.

Keeping the above in mind, the analysis has identified several regions that do underperform in several indicators. These are for instance Scotland in the UK and the regions on both sides of the Belgian-French border that do underperform in several indicators. However, the selection is only indicative, as the indicators were not all available on the same territorial level. Additionally, the analysis has identified a lack in regional indicators in the area of environmental protection measures. This ranges from general indicators of energy intensity, GHG emissions to policies addressing environmental protection. In particular, there is a need for environment related and GHG indicators on a regional level.

4.2 Identification of strategic areas of importance

The analysis of the data regarding the territorial cohesion and development in the NWE area leads to the identification of specific strategic areas of importance.

However, it has to be considered, that the analysis is sometimes hampered by lacking data at a more specific territorial level. Moreover, the indicators are only proxies for wider socio-economic areas and complexities.

Indicator	Baseline Situation: NWE within EU	Baseline Situation: Disparities within NWE
Competitiveness		
C1 Gross domestic expenditure on R&D - GERD	POSITIVE	HIGH
C2 Well-educated population	POSITIVE	HIGH
C3 Innovative SMEs collaborating with others	POSITIVE	LOW[2]
C4 Employment in technology and knowledge-intensive sectors	POSITIVE	HIGH
C5 Recycling rate of e electronic waste in %	POSITIVE	MEDIUM
C6 ISO 14001 registered organisations/per capita	NEGATIVE	MEDIUM

[2] Not easy to observe with only country-level (NUTS 0) data.

Indicator	Baseline Situation: NWE within EU	Baseline Situation: Disparities within NWE
Balanced development		
B1 Change in employment rate	NEGATIVE	HIGH
B2 Net migration rate	POSITIVE	MEDIUM
B3 People at risk of poverty or social exclusion	POSITIVE[3]	MEDIUM
B4 Male life expectancy	POSITIVE	HIGH
B5 Multi-modal Accessibility Potential	POSITIVE	HIGH
B6 Change of Final Energy Consumption (FEC) in the transport sector in %	NEGATIVE	MEDIUM
B7 Individuals who used the internet	POSITIVE	MEDIUM
B8 Urban population with existing low carbon strategies	NEGATIVE	MEDIUM
B9 Relative gross avoided GHG emissions	NEGATIVE	MEDIUM
B10 Change of energy intensity in industry in %	NEGATIVE	LOW[4]
B11 Change in artificial land-use per capita	POSITIVE[5]	HIGH
B12 National annual road freight transport	NEGATIVE	HIGH

Overall, it can be said that, for most cohesion indicators, there are medium to high inner disparities within the NWE area. That means that action is required by the NWE Programme and by other actors to reduce these territorial disparities. Intervention by the NWE Programme is, thus, justified.

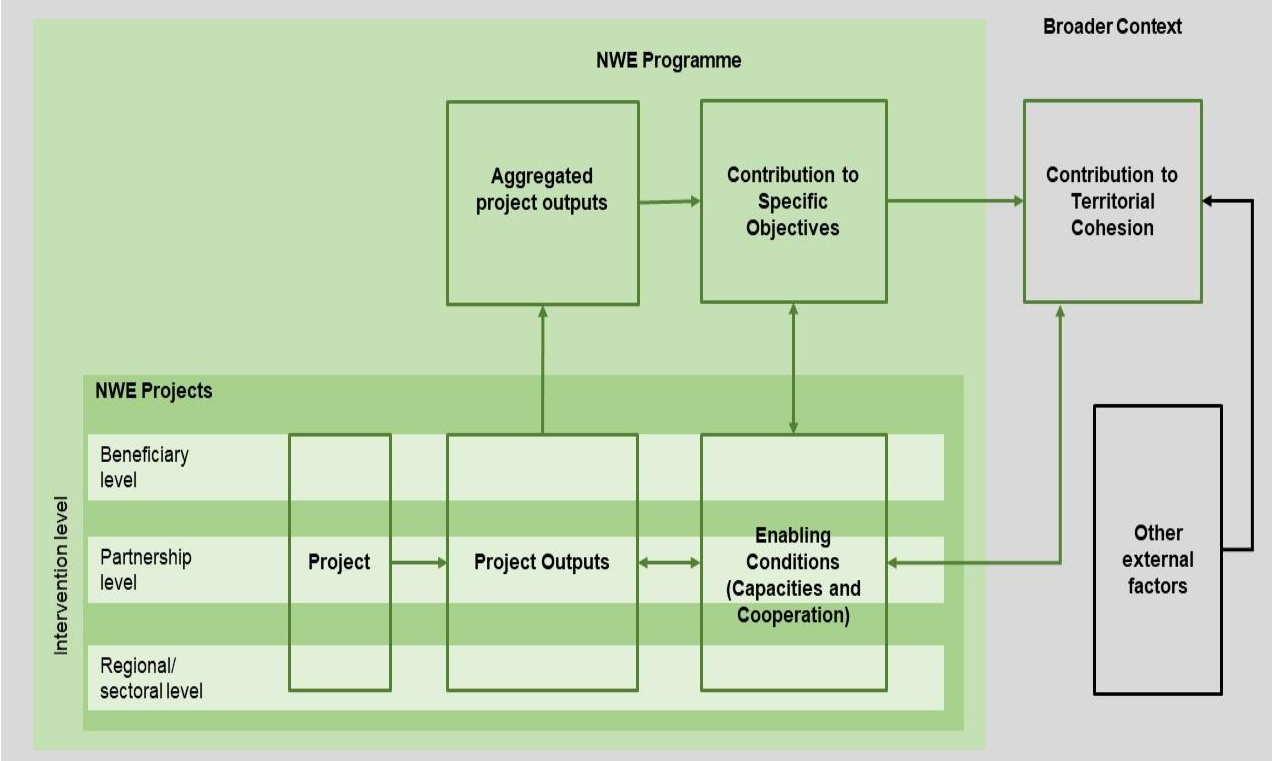
On the other side, the NWE area is generally better positioned than the EU average with regard to most of the indicators. That means, that the Programme should focus more on the reduction of inner disparities. The general development levels within the EU are not of strategic importance to NWE. In the case of energy and CO2 reduction, there might be an exception to this rule due to the lack of relevant indicators and hence data, as NWE is not better positioned than the EU average.

[3] Less people at risk of poverty within the Programme area than in the remaining EU.
[4] Not easy to observe with only country-level (NUTS 0) data.
[5] Meaning less land consumption per capita within the Programme area.

5 Step 3: Territorial cohesion storyline framework

To facilitate a better understanding of the impact of the NWE Programme on territorial cohesion and its various dimensions, we have developed different stories of territorial cohesion. The storyline approach has been tested previously in order to better work within the complexity of territorial cohesion (Böhme and Gløersen 2011). Each of these stories highlights different facets of territorial cohesion. They not only synthesise the main objectives of the funded projects and Programme Specific Objectives, but also purport to synthesise the causal processes that these projects and Specific Objectives initiate and accompany. Sometimes, the territorial cohesion stories in the different dimensions are not completely aligned, and they may even contradict one another on some points.

In general, the following analytical framework has been used to describe the intervention logic in each storyline.



The projects involve at least three different levels of intervention, the beneficiary level, the partnership level and the regional/sectoral level at which the project can demostrate its direct outputs and results. The project outputs can be aggregated and contribute to the overall Programme outputs and the Specific Objectives. At the same time, the projects as well as the Programme promote constantly the enabling conditions that are necessary for effective development and for territorial cohesion (capacity-building for policy implementation and cooperation). Through specific causal relationships, the enabling conditions and the results of each Specific Objective contribute to territorial cohesion as demonstrated in the following storylines with the example of selected territorial indicators. Naturally, also other external factors contribute to territorial cohesion.

The following storylines are presented with three elements:

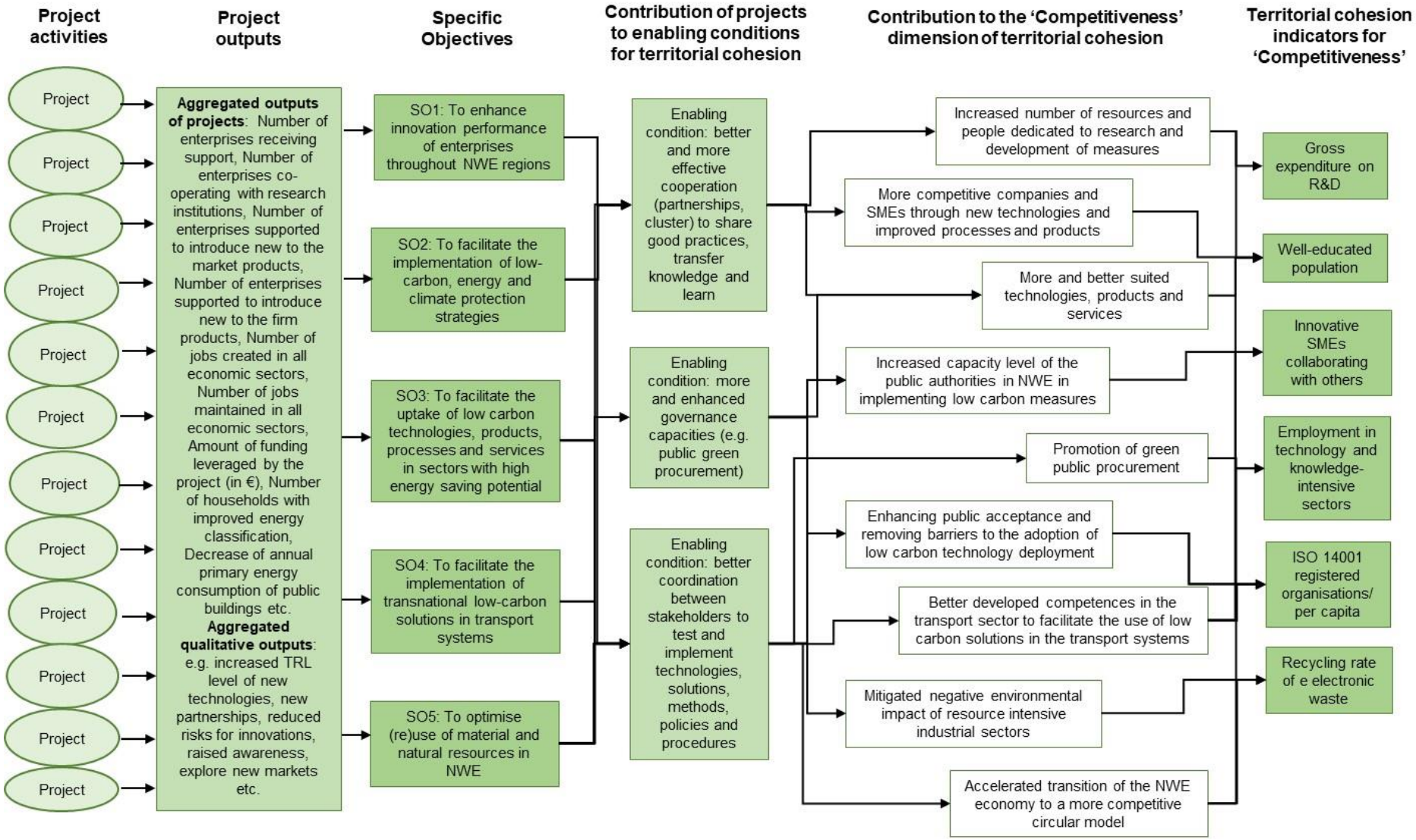
1. The **visual storyline** for each dimension that shows the connection and links between projects and territorial cohesion indicators. Highly relevant are the links between the Specific Objectives and the Indicators of Territorial Cohesion. These are working hypothesis and need to be verified through the case study analysis of concrete projects.

2. The **storyline sheet** for each dimension where all relevant elements are presented from the top (territorial cohesion) to the bottom (individual projects).

3. The **example story** for each dimension. The story helps the evaluators understand and verify the causal relationships and the contribution pathways.

This storyline framework will support the methodology of future evaluations of the Programme. For them, different stories can be developed through case study analysis. They will help evaluate the impacts of the Programme.

5.1 Storyline 'Competitiveness'



Storyline sheet "Competitiveness"

Overall aim:

To contribute to the level of competitiveness and to smart economic growth in the NWE territory in order to achieve the aims of Europe 2020 and make Europe more competitive at global scale.

Rationale:

Territorial cohesion is closely linked to economic development and high levels of competitiveness of firms and sectors make full use of their growth. The territory needs growth poles that serve as engines for the development of larger areas surrounding each of them. These economic centres are at the forefront of development and are important nodes in global economic networks. Positive development effect spill over to the surrounding territories and trickle down to other parts of the population. Connectivity to and from these centres is important.

Theoretical Background:

This facet of territorial cohesion has a theoretical background in the new economic geography and in growth pole theory. The spatial dimension of economic development policies is based on the leverage effect and positive externalities of agglomerations.

Territorial Cohesion Indicators:

- Gross expenditure on R&D
- Well-educated population
- Employment in technology and knowledge-intensive sectors
- Innovative SMEs collaborating with others
- Recycling rate of e electronic waste
- ISO 14001 registered organisations/per capita

Contribution of Specific Objective 1 to Competitiveness:

- More competitive companies and SMEs through new technologies and improved processes and products
- Increased resources working with R&D organisations
- More and better suited technologies, products, processes and services, tangibly tested in real-life conditions

Contribution of Specific Objective 2 to Competitiveness:

- Enhanced public acceptance and removal of barriers to the adoption of low carbon technologies
- Increased capacity of public authorities effectively implementing low carbon, energy and climate protection measures
- Promotion of green public procurement.

Contribution of Specific Objective 3 to Competitiveness:

- More and better suited technologies, products and services in the renewable energy and energy efficiency domains, tangibly tested in real-life conditions

- Increased resources working with research and development organisations specialising in energy efficiency and renewable energies
- More competitive companies and SMEs through better developed energy and environmental standards
- Enhanced public acceptance and removal of barriers to the adoption of low carbon technologies

Contribution of Specific Objective 4 to Competitiveness:

- More and better suited technologies, products and services in the domain of sustainable and low carbon transport, tangibly tested in real-life conditions
- Increased resources working with research and development organisations specialising in sustainable and low carbon transport
- More competitive companies and SMEs in the transport sector thanks to the tested new technologies and improved processes and products
- Improved competences in the transport sector that facilitate the use of low carbon solutions in the transport systems

Contribution of Specific Objective 5 to Competitiveness:

- Accelerated transition of the NWE economy to a more competitive circular model (3Rs - Reduce, Reuse, and Recycle) by enabling spill-over effects of eco-innovation in the resource intensive industry
- Mitigated negative environmental impact of resource intensive industrial sectors
- More and better suited technologies, products and services in the domain of resource efficiency and circular economy
- Increased resources working with research and development organisations specialising in resource efficiency
- More competitive companies and SMEs thanks to the tested new technologies and improved processes and products
- Promotion of green public procurement

Enabling Conditions:

- Improved coordination between stakeholders implementing technologies, solutions, methods, policies and procedures
- Enhanced governance capacity to decide on and implement innovation and eco-innovation policies (e.g. public green procurement)
- More effective cooperation (partnerships, cluster) to share good practices, transfer knowledge and learning

Contribution of Projects to Specific Objectives:

- To enhance innovation performance of enterprises throughout NWE regions
- To facilitate the implementation of low-carbon, energy and climate protection strategies to reduce GHG emissions in NWE
- To facilitate the uptake of low carbon technologies, products, processes and services in sectors with high energy saving potential, to reduce GHG emissions in NWE

- To facilitate the implementation of transnational low-carbon solutions in transport systems to reduce GHG-emissions in NWE
- To optimise (re)use of material and natural resources in NWE

Aggregated Results of Projects (expressed in aggregated output indicators):

- Number of enterprises receiving support
- Number of enterprises co-operating with research institutions
- Number of enterprises supported to introduce new to the market products
- Number of enterprises supported to introduce new to the firm products
- Number of jobs created in all economic sectors
- Number of jobs maintained in all economic sectors
- Amount of funding leveraged by the project (in €)
- Number of households with improved energy classification
- Decrease of annual primary energy consumption of public buildings
- Estimated annual decrease of GHG
- Additional capacity of renewable energy production
- Number of new or enhanced transnational clusters or innovation networks (SO1)
- Number of technologies, products, services and processes developed and tested in real life conditions (SO1)
- Number of end-users benefitting from social innovation (SO1)
- Number of pilot actions implemented, focusing on social innovation (SO1)
- Number of solutions facilitating the delivery of existing or emerging low-carbon, energy or climate-protection strategies (SO2)
- Number of combined mitigation-relevant adaptation solutions implemented (SO2)
- Number of adopted or applied low carbon technologies (SO3)
- Number of implemented low-carbon solutions in transport (SO4)
- Number of new or improved transport management systems leading to GHG reduction (SO4)
- Number of transport operators supported implementing low carbon solutions (SO4)
- Number of innovative uses of waste processes/products/services from waste materials (SO5)
- Number of efficient natural and material resources solutions tested and implemented (SO5)
- Amount of decreased raw material use (in tons) - the resource saving rates the projects generate (SO5)
- Amount of increased material recovery, re-use and recycling (in tons) - the recycling rates the projects generate (SO5)

Aggregated Results of Projects (expressed in qualitative terms):

For example:

- Increased TRL level for new products, services and/or technologies
- Reduce the risk involved in research and development for SME and other partners

- Facilitate the knowledge transfer from research centres and universities to private companies and the public sector.
- New learning through partnerships involving the different stakeholders of complex challenges (along the value chain/cycle).
- Identify and explore new market niches for more sustainable products, services, processes
- Raise awareness about green public procurement procedures in the public sector

Individual Results of a Project XY (example):	
Priority:	3. Resource and materials efficiency
Project Theme:	Innovative Use of Waste
Project Type:	Research/technology development
Project aim:	To replace primary raw materials with high-quality materials recycled from construction and demolition waste.
Expected change:	Increased use of recycled aggregates and recycles sands for concrete precast products and cement production of 50,000 tons/y; equal reduction of natural resources use; with 1 recycling enterprise, 3 concrete precast products-enterprises, 1 CM-enterprise and 3 municipalities using the products in partner countries. Increase the technology readiness level (TRL) of the new technology from TRL3 up to TRL9.
Effect on cooperation:	Involves partners from 5 countries along the value cycle for concrete precast products and construction and demolition waste.

Example Story "Competitiveness"

Project SeRaMCo

- Priority Axis 3 Resource and materials efficiency
- SO5: To optimise (re)use of material and natural resources in NWE

Project Summary:

About 50% of primary raw materials in the EU are used in the building sector, which is also responsible for about 1/3 of all wastes. Within the construction and demolition wastes (CDW), components like concrete, bricks, tiles and ceramics (CBTC) have high potential to be applied as recycled aggregates and sands. However, until now, recycled materials are mostly down-cycled to be used as filling materials in infrastructure projects. Although the recycling quota of CBTC is more than 70% in DE, BE, FR, NL and LU, less than 4% are re-used for the original purpose: concrete production. The project aims to increase the use of CDWs (mainly CBTC) as secondary raw materials for cement and concrete production in NWE. It is necessary to start a high-quality recycling of CBTC, which then enables the re-use of the materials for concrete precast products (CPP). In addition, the project will show how fines (<2mm) from CDW can be used in cement manufacturing (CM). The project will thus enable, 10 years after its completion, an increased use of up to 13 million tons/y of CBTC's in NWE's CPP and CM. SeRaMCo's overall outputs will be (a) Technologies enabling the use of recycled material in cement and

concrete production: innovative treatment methods for CDWs and new cement production methods using various sands qualities; (b) Industrially produced cement and CPP from recycled aggregates, which will be comparable to conventional products in costs and quality. The products will be implemented in 3 pilot areas: City of Seraing, BE, City of Saarlouis, DE and Region of Moselle, FR. With the end of the project, the products will be ready for commercialisation in NWE. To increase the demand for and the use of these products, a supply chain and a data base of CPP-producers in NWE will be established. The 3 investments are crucial for market penetration. In parallel, SeRaMCo's long term impacts will be sustained with an EU wide roll-out plan and business model.

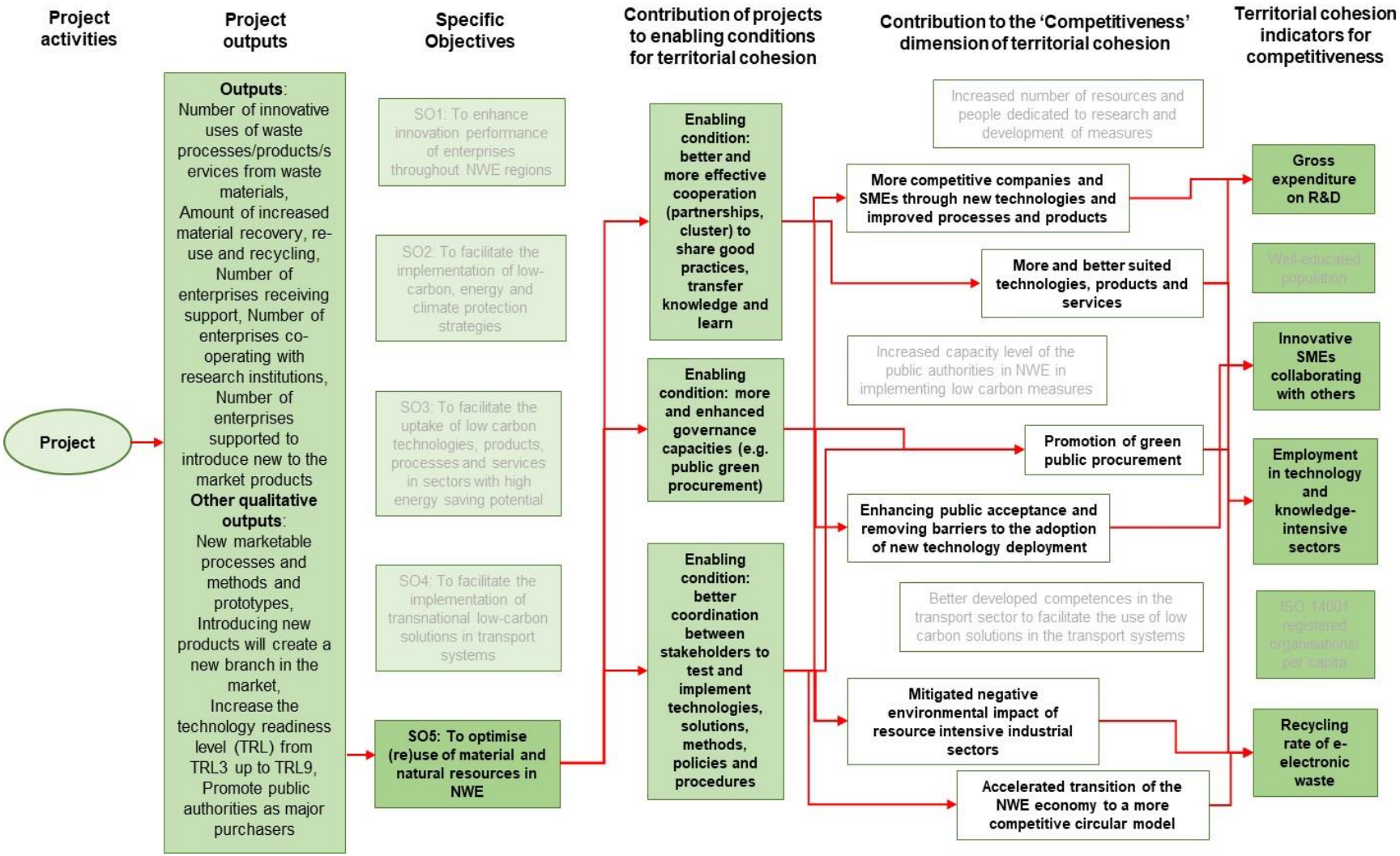
Expected Outputs:

- Number of innovative uses of waste processes/products/services from waste materials: 17
- Amount of increased material recovery, re-use and recycling: 51 500.00 t
- Number of enterprises receiving support: 31
- No. of enterprises co-operating with research institutions: 4
- Number of enterprises supported to introduce new to the market products: 20
- New marketable processes and methods and prototypes will be developed by establishing high-quality recycling, developing and testing of new concrete mixes and technologies.
- Introducing new products will create a new branch in the market, which will lead to economic advantages for the CPP producer and eventually new jobs in the sector of demolition, sorting and recycling in NWE.
- SeRaMCo aims to increase the technology readiness level (TRL) from TRL3 up to TRL9.
- The project tests and promotes the involvement of public authorities as major purchasers, showing them that using CPP and CM is possible without losing quality.

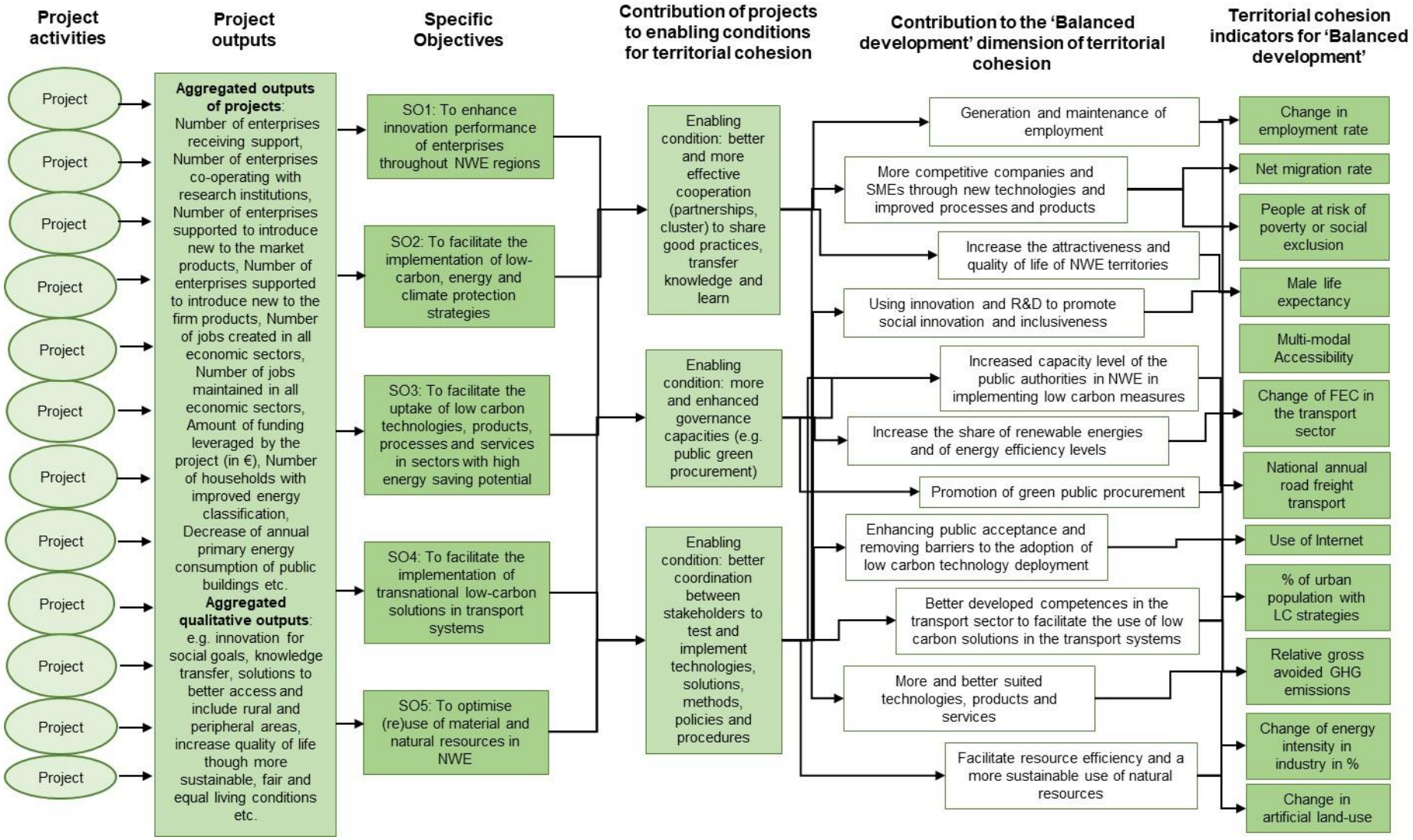
The contribution analysis focuses on the ‘competitiveness’ dimension.

The figure on the next page depicts with bold letters and red arrows the impact path of the project towards wider objectives of the Programme and the ‘competitiveness’ dimension of territorial cohesion.

In this case, the specific project does not focus on electronic waste recycling (which is the selected proxy indicator for the SO 5 territorial dimension in this case). However, it does have a general logic connection with this indicator, as the indicator reflects the overall evolution of the NWE territories with regard to recycling and resource efficiency.


Project activities
Project outputs
Specific Objectives
Contribution of projects to enabling conditions for territorial cohesion
Contribution to the 'Competitiveness' dimension of territorial cohesion
Territorial cohesion indicators for competitiveness
Project
Outputs: Number of innovative uses of waste processes/products/services from waste materials, Amount of increased material recovery, re-use and recycling, Number of enterprises receiving support, Number of enterprises co-operating with research institutions, Number of enterprises supported to introduce new to the market products
Other qualitative outputs: New marketable processes and methods and prototypes, Introducing new products will create a new branch in the market, Increase the technology readiness level (TRL) from TRL3 up to TRL9, Promote public authorities as major purchasers
SO1: To enhance innovation performance of enterprises throughout NWE regions
SO2: To facilitate the implementation of low-carbon, energy and climate protection strategies
SO3: To facilitate the uptake of low carbon technologies, products, processes and services in sectors with high energy saving potential
SO4: To facilitate the implementation of transnational low-carbon solutions in transport systems
SO5: To optimise (re)use of material and natural resources in NWE
Enabling condition: better and more effective cooperation (partnerships, cluster) to share good practices, transfer knowledge and learn
Enabling condition: more and enhanced governance capacities (e.g. public green procurement)
Enabling condition: better coordination between stakeholders to test and implement technologies, solutions, methods, policies and procedures
Increased number of resources and people dedicated to research and development of measures
More competitive companies and SMEs through new technologies and improved processes and products
More and better suited technologies, products and services
Increased capacity level of the public authorities in NWE in implementing low carbon measures
Promotion of green public procurement
Enhancing public acceptance and removing barriers to the adoption of new technology deployment
Better developed competences in the transport sector to facilitate the use of low carbon solutions in the transport systems
Mitigated negative environmental impact of resource intensive industrial sectors
Accelerated transition of the NWE economy to a more competitive circular model
Gross expenditure on R&D
Well-educated population
Innovative SMEs collaborating with others
Employment in technology and knowledge-intensive sectors
ISO 14001 registered organisations/ per capita
Recycling rate of e-electronic waste

5.2 Storyline 'Balanced development'



Storyline sheet "Balanced Development"

Overall aim:

To contribute to balanced growth in the NWE territory in order to achieve the overall objectives of Europe 2020 and to the Territorial Agenda 2020.

Rationale:

Territorial cohesion is about balanced development, focusing on European solidarity and stressing inclusive growth, fair access to infrastructure services and the reduction of economic disparities. Every territory has its own distinct set of potentials for further development – its territorial capital or comparative advantage. At the same time, every region and local area also has resources available to make use of assets and offset deficiencies. The difference between the assets and deficiencies, on the one hand, and the resources available to territories to activate their potentials and respond to deficiencies on the other, results in the strength or fragility of a territory.

Theoretical Background:

This dimension of territorial cohesion relates to theories about endogenous development potentials, place-based approaches and the necessity to avoid extreme economic differences and imbalances between regions. Theories come from the field of regional economics and attempt to identify different forms of innovative milieux, regional smart specialisation and other local productive systems.

Territorial Cohesion Indicators:

- Change in employment rate age-group 20 to 64
- Net migration rate
- People at risk of poverty or social exclusion
- Male life expectancy
- Multi-modal Accessibility Potential
- Change of Final Energy Consumption (FEC) in the transport sector in %
- National annual road freight transport
- Individuals who used the internet for interaction with public authorities
- Urban population with existing low carbon strategies
- Relative gross avoided GHG emissions
- Change of energy intensity in industry in %
- Change in artificial land-use per capita

Contribution of Specific Objective 1 to Balanced Development:

- More competitive companies and SMEs thanks to the tested new technologies and improved processes and products
- Generation and maintenance of employment
- Increase the attractiveness and quality of life of NWE territories
- The use of innovation and R&D to promote social innovation and inclusion

Contribution of Specific Objective 2 to Balanced Development:

- Enhanced public acceptance and removal of barriers to the adoption of low carbon technologies
- Increased share of renewable energies and energy efficiency levels
- Increased attractiveness and quality of life of NWE territories
- Increased capacity of the public authorities in implementing low carbon, energy and climate protection measures effectively
- Promotion of green public procurement

Contribution of Specific Objective 3 to Balanced Development:

- More and better suited technologies, products and services in the domain of renewable energies and energy efficiency
- More competitive companies and SMEs thanks to the tested and better developed energy and environmental standards
- Generation and maintenance of employment
- Increased share of renewable energies and energy efficiency levels

Contribution of Specific Objective 4 to Balanced Development:

- More and better suited technologies, products and services in the domain of sustainable and low carbon transport
- Generation and maintenance of employment
- Promotion of a more sustainable modal split (access rural and peripheral regions in particular).
- Improved competences in the transport sector to facilitate the use of low carbon solutions in the transport systems

Contribution of Specific Objective 5 to Balanced Development:

- Facilitated resource efficiency and a more sustainable use of natural resources
- Generation and maintenance of employment
- Increased attractiveness and quality of life of NWE territories
- More competitive companies and SMEs thanks to new technologies and improved processes and products.
- Promotion of green public procurement.

- **Enabling Conditions:**

- Enhanced coordination between stakeholders to apply new solutions and work on gaps that hamper balanced development
- Improved governance capacity to decide on and implement sustainable and inclusive policies
- More effective cooperation to avoid failure and share good practice and knowledge on technology applications

Contribution of Projects to Specific Objectives:

- To enhance innovation performance of enterprises throughout NWE regions
- To facilitate the implementation of low-carbon, energy and climate protection strategies to reduce GHG emissions in NWE

- To facilitate the uptake of low carbon technologies, products, processes and services in sectors with high energy saving potential, to reduce GHG emissions in NWE
- To facilitate the implementation of transnational low-carbon solutions in transport systems to reduce GHG-emissions in NWE
- To optimise (re)use of material and natural resources in NWE

Aggregated Results of Projects (expressed in aggregated output indicators):

- Number of enterprises receiving support
- Number of enterprises co-operating with research institutions
- Number of enterprises supported to introduce new to the market products
- Number of enterprises supported to introduce new to the firm products
- Number of jobs created in all economic sectors
- Number of jobs maintained in all economic sectors
- Amount of funding leveraged by the project (in €)
- Number of households with improved energy classification
- Decrease of annual primary energy consumption of public buildings
- Estimated annual decrease of GHG
- Additional capacity of renewable energy production
- Number of new or enhanced transnational clusters or innovation networks (SO1)
- Number of technologies, products, services and processes developed and tested in real life conditions (SO1)
- Number of end-users benefitting from social innovation (SO1)
- Number of pilot actions implemented, focusing on social innovation (SO1)
- Number of solutions facilitating the delivery of existing or emerging low-carbon, energy or climate-protection strategies (SO2)
- Number of combined mitigation-relevant adaptation solutions implemented (SO2)
- Number of adopted or applied low carbon technologies (SO3)
- Number of implemented low-carbon solutions in transport (SO4)
- Number of new or improved transport management systems leading to GHG reduction (SO4)
- Number of transport operators supported implementing low carbon solutions (SO4)
- Number of innovative uses of waste processes/products/services from waste materials (SO5)
- Number of efficient natural and material resources solutions tested and implemented (SO5)
- Amount of decreased raw material use (in tons) - the resource saving rates the projects generate (SO5)
- Amount of increased material recovery, re-use and recycling (in tons) - the recycling rates the projects generate (SO5)

Aggregated Results of Projects (expressed in qualitative terms):

For example:

- Promote the use of innovation and new technologies to achieve social and environmental goals

- Facilitate the knowledge transfer from research centres and universities to private companies and the public sector.
- Learn via exchange of experience and testing of project solutions through partnerships involving the different stakeholders of complex challenges (along the value chain/cycle).
- Find solutions to better access and include rural and peripheral areas.
- Make cities and regions more attractive to work and life, increase quality of life in the territories though more sustainable, fair and equal living conditions.
- Raise awareness about green public procurement procedures in the public sector

Individual Results of a Project XY (example):	
Priority:	2. Low Carbon
Project Theme:	Cycling Infrastructure
Project Type:	Integrated strategies to promote inner city sustainable transport modes
Project aim:	To develop and promote cycle highways as an effective and cost efficient low carbon solution for commuting.
Expected change:	CHIPS (Cycle Highways Innovation for smarter People Transport and Spatial Planning) will develop and promote cycle highways as an effective and cost efficient low carbon solution for commuting towards and from urban employment poles. The project expects a 1.5 to 3-fold increase in the actual number of cyclists on the bicycle highways.
Effect on cooperation:	Involves partners from 5 countries (policy makers, city planners, employers and commuters in the whole of NWE).

Example Story "Balanced Development"

Project CHIPS

- Priority Axis 2 Low Carbon

- SO4: To facilitate the implementation of transnational low-carbon solutions in transport systems to reduce GHG emissions in NWE

Project Summary:

CHIPS (Cycle Highways Innovation for smarter People Transport and Spatial Planning) will develop and promote cycle highways as an effective and cost efficient low carbon solution for commuting towards and from urban employment poles. North-West European urban areas are struggling with high GHG-emissions because of increasing car traffic. Different cities and regions in the area are considering cycle highways as a new and cost-efficient solution for medium distance (5-20 kilometres) commuting towards and from urban employment poles. Especially in combination with the growing number of e-bikes, cycle highways can effectively get commuters out of their cars. The CHIPS project will develop transnational standards and approaches and test, demonstrate and roll out solutions and tools that enable regions to tap into the full potential of cycle highways as an attractive commuting option. Cooperation between

leading and following bicycle regions in the Netherlands, the UK, Belgium and Germany will enable the project to prepare the ground for a new, more attractive generation of bicycle highways and related services that optimize synergies with public transport and even cars. In an equally innovative approach, the project will examine how bicycle highways can play a role in future-proofing spatial policy in the NWE region.

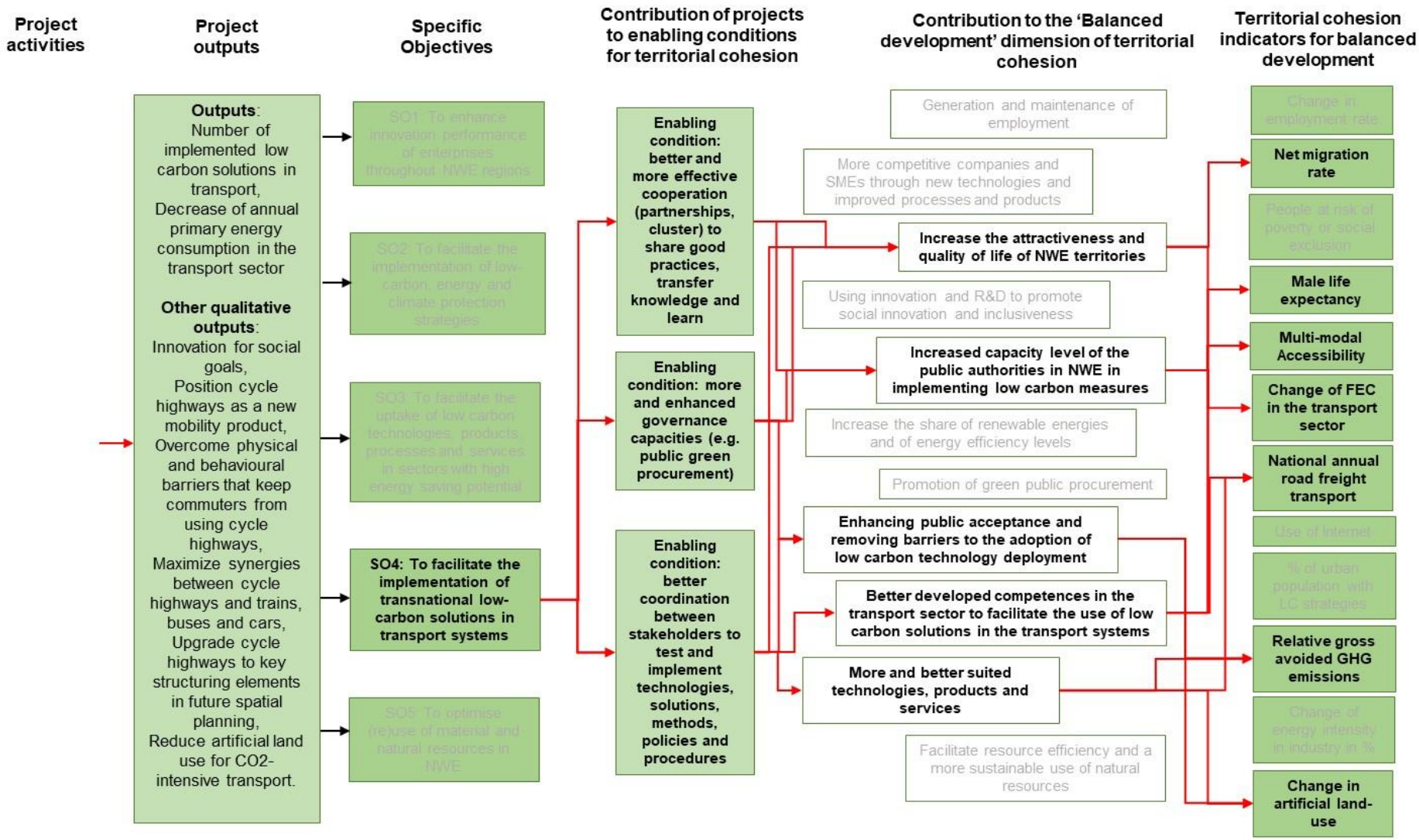
By re-designing cycle highways in 5 regions to high quality standards, both with regard to infrastructural and non-infrastructural aspects, CHIPS will demonstrate the potential impact of this mobility concept on a sustainable modal shift towards low carbon commuting in the NWE region. Because of funded investment and campaigns, they forecast a 1.5 to 3-fold increase in the actual number of cyclists on the bicycle highways. The CHIPS-consortium will provide policy makers, city planners, employers and commuters in the whole of NWE with a proven, well documented, viable and sustainable alternative to car-dominated commuting approaches. The involvement of companies that offer bicycle highway related products and services will lead to innovations, clearly increasing turnover in bicycle highway related businesses.

Expected Outputs:

- Number of implemented low carbon solutions in transport: 11
    - Cycle Highway Manual with guidelines and standards to design, promote and manage bicycle highways: 1
    - Common planning tool: 1
    - Prototype of a cycle highway: 2.0 providing insight on how to improve readability and attractiveness of cycle highways: 1
    - Tailored cycle highway promotion and behaviour change campaign methodology: 1
    - Cycle highway champions model: 1
    - Active Travel/Mobility Hub models: 3
    - Prototype demonstrators in the Arnhem-Nijmegen area showcasing synergies between cycle highways and other transport modes: 3
- Position cycle highways as a new mobility product
- Overcome physical and behavioural barriers that keep commuters from using cycle highways
- Maximize synergies between cycle highways and trains, buses and cars
- Upgrade cycle highways to key structuring elements in future spatial planning
- Reduce artificial land use for CO2-intensive transport.

This contribution analysis focuses on the ‘balanced development’ dimension.

The figure on the next page depicts with bold letters and red arrows the impact path of the project towards wider objectives of the Programme and the ‘competitiveness’ dimension of territorial cohesion.


Project activities
Project outputs
Specific Objectives
Contribution of projects to enabling conditions for territorial cohesion
Contribution to the 'Balanced development' dimension of territorial cohesion
Territorial cohesion indicators for balanced development
Outputs: Number of implemented low carbon solutions in transport, Decrease of annual primary energy consumption in the transport sector
Other qualitative outputs: Innovation for social goals, Position cycle highways as a new mobility product, Overcome physical and behavioural barriers that keep commuters from using cycle highways, Maximize synergies between cycle highways and trains, buses and cars, Upgrade cycle highways to key structuring elements in future spatial planning, Reduce artificial land use for CO2-intensive transport.
SO1: To enhance innovation performance of enterprises throughout NWE regions
SO2: To facilitate the implementation of low-carbon, energy and climate protection strategies
SO3: To facilitate the uptake of low carbon technologies, products processes and services in sectors with high energy saving potential
SO4: To facilitate the implementation of transnational low-carbon solutions in transport systems
SO5: To optimise (re)use of material and natural resources in NWE
Enabling condition: better and more effective cooperation (partnerships, cluster) to share good practices, transfer knowledge and learn
Enabling condition: more and enhanced governance capacities (e.g. public green procurement)
Enabling condition: better coordination between stakeholders to test and implement technologies, solutions, methods, policies and procedures
Generation and maintenance of employment
More competitive companies and SMEs through new technologies and improved processes and products
Increase the attractiveness and quality of life of NWE territories
Using innovation and R&D to promote social innovation and inclusiveness
Increased capacity level of the public authorities in NWE in implementing low carbon measures
Increase the share of renewable energies and of energy efficiency levels
Promotion of green public procurement
Enhancing public acceptance and removing barriers to the adoption of low carbon technology deployment
Better developed competences in the transport sector to facilitate the use of low carbon solutions in the transport systems
More and better suited technologies, products and services
Facilitate resource efficiency and a more sustainable use of natural resources
Change in employment rate
Net migration rate
People at risk of poverty or social exclusion
Male life expectancy
Multi-modal Accessibility
Change of FEC in the transport sector
National annual road freight transport
Use of Internet
% of urban population with LC strategies
Relative gross avoided GHG emissions
Change of energy intensity in industry in %
Change in artificial land-use

6 Conclusions and Recommendations

This report proposes some indicators to observe and evaluate progress towards territorial cohesion in the North-West Europe area. For these indicators, a baseline value for the start of the Programme (2014) was identified and visualised in a series of maps that cover a catalogue of territorial monitoring for NWE. Moreover, the linkages of the NWE Programme's Specific Objectives with the different indicators of territorial cohesion have been analysed. As could be expected from the planning process, there is a high interrelation between the Programme and most of the territorial indicators.

The analysis of the indicators shows that larger agglomeration areas and metropolitan areas tend to perform better within the Programme area. Regions that are far from agglomerations are the under-performers within the Programme area. This means, that usually the more rural a region is, the lower the male life expectancy, the lower the potential accessibility, the lower the public R&D investments, the lower the employment in high-tech sectors and the higher the dependency on road transport. Further analysis would be needed to highlight the statistical dependency between the typology of the territory and its degree of under-performance. Keeping the above in mind, the analysis has identified several regions that underperform in several indicators. These are for instance Scotland in the UK and the regions on both sides of the Belgian-French border that do underperform in several indicators.

Based on NWE performance (2014) a short analysis has been conducted to identify the strategic areas that the Programme should be interested in, taking account the observed disparities and observed position within the EU28. Overall, it can be said that the in many areas covered by the territorial indicators, there are medium-high inner disparities within the NWE area. That means that action is required by the NWE Programme and by other actors to reduce these territorial disparities. Intervention by the NWE Programme is, thus, justified. On the other side, NWE area is generally better positioned than the EU average with regard to most of the indicators. That means, that the intervention by the Programme should focus more on the inner disparities and that overall development levels within the EU are not of strategic importance. In the case of energy and CO2 reduction, there might be an exception to this rule (due to the lack of relevant indicators), as NWE is not better positioned than the EU average.

The development of storylines permitted to show and visualise the impact of interventions from projects to territorial cohesion, using the different outputs, outcomes, objectives, enabling conditions and territorial indicators that are linked to different storylines of territorial development. For two example projects a specific contribution analysis has been conducted. This method can later be used in the Result and Impact Evaluation of the NWE Programme and support quantitative impact analysis.

The following **conclusions** can be derived:

- The analysis has identified a **deficit in available regional data** in the area of environmental protection measures. The lacking regional data relates to indicators such as energy efficiency, sustainable urban development, sustainable mobility, GHG emissions as well as resource and material efficiency. There is a concrete need for more regionalised data at NUTS2 and NUTS3 level, in order to be able to better analyse and evaluate regional disparities in these fields, which are among the strategic areas of the NWE Programme. The same is true for social objectives, even if

these are not frequent in the current NWE Programme. For example, there is no adequate indicator that can depict the action area of ‘social innovation’ or ‘social entrepreneurship’, being this a sub-objective of the NWE Programme.

- The lack of regionalised data drives the Programme to a **bias towards the territorial objective of competitiveness**, as here are more indicators available, in general and at a regional level.
- This bias can be avoided with **more regionalised data** and a common understanding about what should be **key indicators** for energy and climate-related objectives of the EU2020, not only for the NWE Programme but even for the whole EU28 territory. Some key indicators are proposed in this report.
- With regard to the **enabling conditions** (cooperation, capacities, knowledge), it is difficult, if not to say impossible, to find objective and measurable indicators to analyse them for the NWE area. This problem persists and could not be solved by this report. If the value of capacities or cooperation shall be evaluated, then additional tools, such as surveys or case studies will be necessary.
- To use the proposed indicator system more effectively, for example, in evaluations or gap analysis, an **annual reporting on territorial cohesion indicators** is recommended. This monitoring of NWE territorial cohesion could then be used in strategic moments in time, e.g. in the next program ming phase or during debates about the contribution of ETC Programmes to territorial impacts.
- In future evaluations, the contribution analysis tool along the developed storylines can be further developed and fine-tuned. This can be a valuable analytical tool to demonstrate real territorial impacts of NWE projects.

This leads to the following **recommendations**:

- Propose to EUROSTAT to harmonise national data on climate, energy-related and resource efficiency in order to be able to have regionalised data for all EU28 Member States.

- Establish a territorial monitoring system of the NWE area based on the proposed indicators for the period 2014-2020. Elaborate annual reports in order to monitor the territorial relevance of the NWE Programme.

- Use this first report to feed the debate on the relevance of the NWE Programme for solving territorial challenges and reduce NWE disparities.

- Use the storylines and contribution analysis in future evaluations as analytical tool.

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