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Author: Carlo Sessa (ISIS), based on 1st draft by Philippe Doucet and Jean-François Drevet (IGEAT)

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Full Supporting document

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Document prepared by Carlo SESSA (ISIS)

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1. Introduction

The ambition of this document¹ is not to predict what Europe will be, or even could be, in 2050. Instead, its purpose is to fuel the debate about the long-term future of territorial policies, EU cohesion in particular. To this end, a tentative picture of what the European territory may look like in 2050 has been outlined, and it is presented in Section 3 of this document.

Section 2, after this introduction, provide a context analysis, including:

- Values which underpin the Territorial Vision and may be considered fundamental for future improved EU territorial efficiency and cohesion policies;
- a “future situation” analysis showing signals of unfolding trends and pervasive/disruptive changes - induced by technology, demographic, social and economic factors - as well as possible global and EU governance changes which may affect the situation of Europe in 2050. These represent “2050 vision elements”, introduced and discussed in Section 2 still with a “spatially blind” mind-set, without considering their territorial implications as is done instead in Section 3.

Although this document includes a part of imagination, it assumes that a significant number of objectives already set at EU level for the years 2030 or 2040 will be attained by 2050 at the latest. We expect the actors involved to have demonstrated their ability to implement successfully the common policies established by the EU as from the 2010s , including efficient territorial policies. However, the document intentionally adds radically new elements – either “utopian” prospects or real technological and social opportunities of which we can see the seeds and signals already in the current situation - which contribute to enrich our vision of the future.

Finally, Section 4 describes the steps for the implementation of the Territorial Vision at European level, with the drafting of mid-term targets and pathways and the support of a consensus building process to be performed until the end of the ET2050 project.

2. Europe in 2050: context analysis

2.1 Values and policy paradigms

In 2050, Europe is:

- **at peace**: no clash of civilisations, elimination of terrorism, improved relations between neighbouring countries formerly in conflict; this has greatly improved territorial development at the EU periphery, especially in the Mediterranean, ensuring better relations between the EU and all neighbouring countries;
- **democratic and promoting multilevel governance** : predominance of the rule of law, compliance with the Charter of Fundamental Rights, the rights of minorities, etc., and consolidation of the

¹ This “supporting document 2” is elaborated by c. Sessa, using supporting document 1 elaborated by P. Doucet and J-F. Drevet, as well as input from several participatory activities, in particular 11 October 2013 workshop with territorial development stakeholders.

“acquis” of the courts (Court of Human Rights in Strasbourg and European Court of Justice (ECJ) in Luxembourg); although not a new constitutional entity (e.g. called the *United States of Europe*), the EU will function virtually as a federation, thanks to fully policy integration achieved in most common priority matters, and new policy, fiscal and cohesion principles set out in a new Treaty;

- **prosperous but environmentally friendly:** Europe has a smart, sustainable and inclusive economy, which has secured its competitiveness vis-à-vis emerging countries; sustainability is a priority, in particular to preserve natural and cultural heritage;
- **improving economic, social and territorial cohesion:** many lagging regions are catching up, although still in need of a dedicated policy; social solidarity and the preservation of welfare remain an area of concern despite the convergence of national policies and progress achieved at EU level; territorial cohesion is fully adhered to, not only for designing spatial policies, but also through a careful ex-ante evaluation of the territorial impact of other policies.

The following paradigms are deeply rooted in the policy discourse and the economic and social fabric of Europe :

- **Sustainable development:** since the issuing of the EU2020 Strategy, the spirit guiding the EU was that of sustainable development of the Union territory, and beyond. Sustainable development refers to universally accessible human and harmonious development, encompassing three dimensions: economic, environmental and social. This has been achieved in 2050, as an harmonious development policy balancing economic growth, environment protection and social cohesion aspects was one of the “raison d’être” of the European Union, addressing the expectations of the European citizens, wherever they live, to be given the chance of benefiting from the opportunities and avoiding the risks created by globalization.
- **Well-being and quality of life:** it is recognized that the GDP measure of growth is obsolete. The goal of a socio-economic order is to sustainably improve human well being and quality of life, whereby material consumption and GDP are merely means to that end, not ends in themselves. A new frame is set up to account features of well-being “beyond GDP”, including self-production and services rendered by nature, taking into account mechanisms and transactions that do not pass through the market or that receive irrelevant evaluation therein. But “beyond GDP” does not mean “against”: it rather amounts to adding new terms to the accounting equations, e.g. measures of the natural, human and social capital, and a better measurement of intangibles in the productivity statistics.
- **Solidarity:** This concept is embedded in the development of the nation state – the nation, which members are united by a social bond, is considered a community (Geimenschaft) – but the notion has been established also at the European level, identifying common European norms and values, uniting not only its member states but especially its citizens. These common norms and values include freedom, democracy, sustainability, and equal opportunities to enable a decent quality of life for all European citizens. Solidarity adds to these either the concept of shared work with equal partners/countries pooling common risks or the diversified financial support from stronger/richer member states to weaker member states, in order to create or sustain a common European space of stability. Yet solidarity is not a one-way approach but includes commitments of responsibility by the country receiving financial aid, and solidarity only grows stronger with consequent responsibility and mechanisms that ensure the fairness and effectiveness of any subsidy or compensation put in place for solidarity purposes. European solidarity agendas and

mechanisms concretely adopted until 2050 cover: 1) financial solidarity; 2) energy solidarity; 3) adaptation to climate change solidarity; 4) immigration solidarity; 5) social solidarity.

- Territorial efficiency and cohesion:** In the European Union, citizens of countries which, after centuries of conflict, had come together under common rules clearly expected it to commit to ensure equal opportunities for everyone. Market and currency unification, at the beginning of the 21st century, were not considered objectives in themselves but means for achieving the ultimate objectives which motivated the formation of the Union: increasing growth and well being and preserving peace. All Unions need to accompany sovereignty over markets and money and their responsibility for encouraging internal mobility of labour and capital with a development policy aiming at giving all places the opportunity to make use of their potential (efficiency) and all people the opportunity to be socially included independently of where they live (social inclusions). A place-based cohesion policy was considered the best way for the EU to fulfil its development task, aiming either to “territorial efficiency” and “territorial cohesion” across Europe. The overall task assigned by the EU Treaty to cohesion policy (namely the Structural Funds and the Cohesion Fund) “to promote overall harmonious development” – and the goal of reducing disparities and backwardness of regions – has been definitively interpreted and applied considering both the efficiency and equity dimensions of development, and establishing two interdependent although very different missions: all regions must be given the opportunity to achieve their full potential (*territorial efficiency*), and all citizens must be given the opportunity to live a life worth living independently of where they live (*territorial cohesion*). In so doing, the cohesion policy acknowledged that “convergence” of per capita average GDP of regions was an inappropriate proxy of the two missions, and that disentangling the two missions and transparently pursuing them as a part of a unitary, comprehensive strategy was a key prerequisite for improving the effectiveness of the cohesion policy. In addition, a clear distinction was made between cohesion policy and other financial solidarity mechanisms put in place in the EU to tackle with common financial, energy, climate change, migration and social challenges. While the latter are mostly new means of financial redistribution among Member States and Regions – implemented some years after the 2008 global crisis to help the whole EU to overcome financial troubles, and more broadly to address structural and permanent imbalances or common risks and crisis management – the former is targeted not to redistribution (although some places may receive more from interventions than they contribute through taxation) but to trigger institutional change and to break inefficiencies and social exclusion traps through the provision of public goods and services. These comprise goods and services traditionally provided by the public sector, such as education, training, basic research, water supply and waste disposal, business support, transport and healthcare. The peculiarity here is that they are provided in integrated bundles as a result of an exogenous (cohesion policy) intervention.

2.2 Changes in Europe as whole (“spatially blind vision”)

In 2050, the Europe as a whole has experienced profound changes, fostered by the widespread diffusion of disruptive technologies, the continuation and deepening of key demographic and social trends, and important global and European Union governance changes.

2.2.1 Technology induced changes

Technological progress entails new ways of doing things. New technologies are mostly cost savings technologies, but they usually also improve the quality and user convenience of the goods and

services. At the same time, however, technology often disrupts, supplanting other ways of doing things and rendering old skills and organizational approaches irrelevant. In 2050, the tension on international markets for critical raw materials, the rising prices of raw materials in general and green taxes have created very strong incentives for the development of technologies and approaches in the EU to keep material consumption to a minimum. As a result, the non-recovered fraction of waste has shrunk dramatically: most former waste streams are now used as sources of secondary raw materials. New resource technologies also enhance water management through desalination and irrigation efficiencies. In 2050, another family of breakthrough technologies affects directly human health, with disease prevention and management technologies delivering significant healthy longevity gains throughout the world, while human augmentation technologies will likely transform everyday life, particularly for the elderly and mobility-impaired populations. Health care technologies (like specific mobile technology) applied extensively contribute to reduce the health expenditure, although this will remain an important share of the GDP in the most advanced countries, and namely in Europe. Besides the pervasive impact of resource efficiency technologies on consumption of raw materials and water, and health technologies on the prolongation of humans life, in 2050 the following technologies have a deep and radical impact on the way we organize our lives and mobility:

The future of Internet: everywhere connectivity ...

The use of *mobile internet* was already widespread in 2012, with more than one 1.1 billion people using smartphones and tablets (McKinsey, 2013). The rapid and enthusiastic adoption of these devices has demonstrated that mobile internet technology is far more than just another way to go online and browse. New mobile software and apps offer a wide range of capabilities, effectively placing the capabilities of an array of gadgets (including PCs) in a mobile package that provides voice calling, Internet access, navigation, gaming, health monitoring, payment processing, and cloud access. Cloud technology allows the delivery of potentially all computer applications and services through networks or the Internet. With cloud resources, the bulk of computational work can be done remotely and delivered online, reducing the need for storage and processing power on local computers and devices. The cloud also enables pay-as-you-go models to consume IT. Cloud computing drastically reduces ICT and energy costs, and enhance the use of digital platforms, content and services.

... has changed our social landscape: Equipped with Internet-enabled mobile computing devices and apps for almost any task, people increasingly go about their daily routines using new ways to understand, perceive, and interact with the world. Web 2.0 and collective awareness platforms allows people to share content and collaborate online for amatory and civic purposes. In 2050, the members of social networks evolved from being passive consumers to active producers of content (prosumers), and user-generated content has grown exponentially, creating economic value in a variety of ways. Most of this value is very difficult to monetize, because it is realised by dispersed communities who do not pay a monetary price for membership. In 2050, social networks are used extensively in civic contexts to support citizen's e-Participation, and within public administration and business ecosystems to improve knowledge-sharing and streamline decision processes, as well as to foster co-creation of value and improve productivity. In addition to humans mediated interactions on the web, the "Internet of Things", with the spread of sensors (motion and temperature detectors, level indicators, smart meters, etc) enables the gathering of huge amounts of data about the real world and the sharing of this data through the cloud. Services around the data value chain proliferate in, generating new waves of productivity growth and consumer surplus. Amongst several other ways

to create value, big data are widely used to improve the efficiency of infrastructures in the context of smart cities and wider geographical scopes.

... our learning and work landscape: In 2050, a wide range of educational innovations has occurred, linked to the take-up of new learning platforms such as mixed reality, pervasive mobile computing, adaptive learning platforms, and gamification. The advent of massively-online courses (MOOCs), at university level, has enabled large-scale online participation with the creation of learning networks. At the same time, ICT has continued to transform work, enabling more agile workflows and reducing costs. The idea of a fixed physical workplace has changed as new technologies allow remote work with realistic experiences. Initially, in the first two decades of the century, many workplaces in Europe (in both the private and public sectors) have proved resistant to change, mostly because of implementation costs, unclear regulatory frameworks or a lack of skills. But such resistances have been eventually overcome, and in 2050, new forms of value creation are widespread. The approach of one company and legal entity producing the lion's share of innovative industrial and service production is substituted by new and more flexible forms of value creation and organization of knowledge activities, e.g. by means of projects (also instituted as own legal entities), with groups of workers and self-employed innovators working together loosely knit on a temporary basis to come up with new products and solutions. A key pervasive feature of the transformation in the way value added is produced in the service sectors – to support any kind of business, including industry, agriculture, environment, urban services etc. - is the dynamic development of knowledge bases and the use of knowledge. Automation of knowledge work is also widespread in 2050. A confluence of advances in computational speed, machine learning and natural user interfaces has brought computing to an important milestone: computers will be capable of doing jobs that in the early 2000s it was assumed only humans could perform.

... our manufacturing landscape: Additive manufacturing (3D printing) is a group of technologies that allows a machine to build an object by adding one layer of material at a time, based on the informational design of the object itself. With this family of technologies, Internet crossed the border of delivering only informational products, letting users to produce material products in the physical world. Additive manufacturing, or 3D printing, was already in use since the early 2000s to make models from plastics in a range of sectors, from consumer products to the automotive and aerospace industries. In 2050, additive manufacturing replaces on a large basis conventional mass production, particularly for short production runs or where mass customisation has high value. Additive manufacturing also leads to large numbers of micro-factories akin to pre-industrial revolution craft guilds, but with modern manufacturing capabilities. Such local micro-factories manufacture significant amounts of products, especially those for which transport costs are traditionally high or delivery times are too long, and this contribute to shorten and simplify supply chains. The reduction in the mass of products sold coupled to the increase in transport costs and the development of ICT, robotics and additive manufacturing has led to a decentralisation of manufacturing. Objects for personal consumption now tend to be manufactured close to where they are sold or used, whether they are sold directly to the consumer or purchased by service providers.

... our energy landscape: The integration of Internet with smart energy technologies (smart meters, smart grids, and new storage capabilities, including those given by electric vehicles connected to the grid) has changed the way we consume electricity, from passive consumers to active customers. In 2050, most of the households are associated to active electricity demand schemes, with their home appliances connected to smart boxes that enable optimized consumption/saving schedules. Several customers (e.g. small enterprises, owner of PV panels, micro-wind or hydro installations) are able to

sell energy in excess to the grid, when this is exceeding their local consumption needs. The energy and transport sectors are also fully integrated, with fleets of electric vehicles providing energy storage capacity when they are parked into urban and peri-urban solar parks connected to the grid.² Smart networks, thanks to the possibility of exchanging, directly on the network, the energy stored in electric vehicles (EV) or in plug-in hybrids, have facilitated the diffusion of electro-mobility in cities and to some extent in peri-urban and rural zones in wider metropolitan areas alike, with the creation of solar park-and-ride installations in the peri-urban areas, mobility corridors and the offer of e-city cars/moto/bicycle services in the city centres.³ More in general, Better batteries and storage systems enable indeed more efficient grid applications – placing storage capacity on the grid to reduce the cost of meeting peak demand and to facilitate feeds from wind and solar generators – as well as distributed off-grid energy installations, using batteries to bring power to areas where wiring or reliable supply is not available. Thanks to these developments, we live in 2050 a new era of *localized energy independence*, with entire neighbourhoods or factory development being served through distributed renewable power. This makes remotely located housing and manufacturing plants more viable by reducing the transmission capacity required from the grid, or even eliminating the need to access the grid altogether.

... and our daily habits and mobility landscape: In 2050, the consequences of the technological changes envisioned above for our daily life organization and personal mobility is evident and profound. Combined with important social changes (see section 2.2.2 below), the mobile Internet and cloud technologies, the changed ways of working and learning, decentralised energy and manufacturing patterns, and in addition the diffusion of fully automated and autonomous vehicles⁴, promise to change our daily habits – both when and where we make our social (work, education, leisure) and personal activities during the day/week - and the urban mobility landscape. People are increasingly disconnected from a single place for their production and consumption activities, due to the increasing flexibility and ubiquity of work, education, leisure and other personal activities enabled by the mobile Internet and cloud technology. An increased share of workers - especially older workers in a wealthy ageing society - see their labour input disconnected from the need to stay all the time at the same workplace. These persons - as well as a growing share of retired people - mostly live and spend their money in residential places outside or even far away from the city cores where the workplaces are concentrated, with flexible seasonal/week/day mobility schedules as

² More advanced storage systems help to accommodate intermittent renewable sources as solar and wind, and advanced batteries make electric vehicles (EV) more convenient than in the early 2000s, when the range of electric vehicles was still very limited (max 100 km before recharging, and the time for recharging was too long) and recharging stations were rare. Now the driving range of EV is wider, although not large as it was for the conventional Internal Combustion Engine (ICE) vehicles (400 km). It fits to the purpose of driving in the urban environment, where conventional ICE vehicles are banned as it was envisaged since 2011 in the EU Transport White Paper.

³ Electro-mobility follows a different paradigm as compared to the past Internal Combustion Engine (ICE) cars: energy is no more purchased at a given price and stored in our car to take us anywhere at any time of the day or night. On the contrary, energy is captured from and/or released to the grid, with purchase or sale prices differentiated according to the time of day, depending on total grid loads. Recharging stations and solar parks are adequately distributed in the urban and peri-urban areas, to facilitate the use and recharging of EV at optimal times (e.g. charging during the night, discharging during the day) and places (e.g. solar park&ride installations in hinterland of large cities, instead that in the inner cities). Diffused electromobility and the storage capability provided by solar parks helps in integrating alternatives to fossil fuels into the energy mix, contributing also to improve the reliability of the electric supply and bringing electricity to new users.

⁴ In 2050, partly or completely self-driving cars and trucks are a reality, and enable a revolution in road passenger and freight transport. Fully Automated Vehicles (FAV) provide the drivers with 100% assistance and automatic pilot functionalities (as it is for driving airplanes) which is compulsory to use for driving in high density flow circumstances (e.g. on some urban and interurban highways at peak-off hours) to keep regular speed and avoid congestion. In addition, autonomous vehicles (AV) offer the additional “driver-less” functionality, i.e. they can move and go, e.g., to park themselves without the driver. FAV and AV offer several potential benefits to the users. Since most driving accidents are due to human errors, removing discretionary driving actually increase traffic safety and reduce deaths, injuries, and property losses. Convoys of trucks speed down the highway with no driver needed (or just one driver in the lead truck), with as little as one foot of space between them. Roadways accommodate therefore more vehicles without expansion, and acceleration and braking is optimized to reduce fuel consumption and CO₂ emissions. In addition, closely spaced vehicles have much lower aerodynamic drag, which further reduces fuel consumption. Drivers are free to use their drive time to work, relax, or socialize while being transported.

compared to the industrial workers of the past. With the ageing of the baby boom generation – and the savings accumulated by this generation – a new form of “residential economy”, created by the disconnection between the place of production and the place of living/consumption typical of new work organization schemes, became an increasingly important part of the whole economy, making mobility patterns much more hectic to predict. As it concerns the urban mobility landscape, in 2050 the ICE conventional cars do not circulate any more in our cities, substituted by gas fuelled hybrid cars (60% of circulating vehicles) and fleets of electric cars (the other 40% of circulating vehicles). While hybrid cars maintain most of the functionalities of the conventional cars – in particular a wide driving range that make them convenient also for long-distance trips – the electric vehicles are specialized for short distance urban or peri-urban trips, and managed through advanced car sharing services. Thanks to IT developments, most of the urban road infrastructure and highways and running vehicles are now communicating – as well as the vehicles between themselves – and this has enabled the diffusion of automated driving. Most of the privately owned cars are indeed fully automated, and most of the car sharing services use fleets of electric and autonomous vehicles. Users of car sharing services have access to “Utility Cars” (UCs) parked in the streets or at depots using a smartcard or similar devices containing the user profile and contract terms. In case no vehicle is available nearby, the users able to have access to an on-demand service using a smartphone (or other similar devices) in order to have a vehicle sent in the specified location. Vehicles are self-driving and, at destination, users are relieved from finding a free parking place, which is currently a cause of stress, excessive fuel consumption and traffic; they have just to leave the vehicle near one of the parking spots distributed in the city. If requested, the vehicle would keep driving to pick-up the next client.⁵

2.2.2 Demographic and social changes

The disruptive technologies discussed above are just some of several factors that have changed the landscape of the European society in 2050. Other factors are the following unfolding demographic and social trends.

EU mature demography and consequences for growth: During the first half of the 21st century, the EU demography was characterised by a slow population growth resulting from both slightly rising fertility rates and positive net migration.⁶ Demographic policies have been a contentious issue, be it about boosting the birth rate, allocating the added value between generations or managing immigration. The average fertility rate has reached nearly 1.8%. This results from the spread of a new social model (working women want more children) and the resulting reforms of family policies. Public policies addressing child care have significantly improved. In 2050, following the ageing trend experienced since the 1950s, the population over 65 has increased by 40 % compared to 2005, from 19 to 32 % of the total population. Ageing has become a common feature of the whole continent. Given their political weight, the elderly benefit from continued attention by public authorities and have secured their favourable treatment in the welfare system. However, many regions need to address the decline of their working age population. 35-40 % of regions are affected by a reduction

⁵ An automatic self diagnosis system of the vehicle checks the operational status of the vehicle in order to decide whether it is able to serve another user or maintenance operations are needed (e.g. if the vehicle is electric, it checks the level of battery charge, and if low the vehicle goes automatically to the nearest depot/charging station). Time and mileage of effective use are automatically charged on the smartcard (as already happens in some currently running car sharing schemes).

⁶ In Europe population growth has stabilized and stagnation and ageing of population in Europe is highlighted in all future projections (EEA, 2011). Age structure projections show an increased life expectancy and a proportional reduction of younger people (EEA, 2011; EC, 2009). Eurostat statistics predict that the share of the elderly above the age 65 in Europe will grow from 16% in 2000 to approximately 21% by 2020 and 28% by 2050 (Brög, W., 2005; Rogge, L., 2005).

of their labour force, a “demographic burden” which is typical for mature economies at the end of long-term demographic transition periods.⁷ The impact of ageing on growth is not limited to labour supply, as it also affects potential job growth via the higher demand for health and long-term care (where productivity advances are limited), but also pressure on public finances because of the higher numbers of people living on pensions and incurring long-term health care expenses. These negative impacts have been offset through a policy mix aimed to widen the boundaries of the working age population, increase the activity rate of the resident population and facilitate net in-migration.

A key driver of growth – human capital development: Without a doubt, the potential for economic growth depends not only, nor even mainly, on the number of workers in the labour force, as discussed above for the EU demography, but on their quality, i.e. their level of education. Sustained educational expansion has characterised advanced economies’ policies since the post-war period. While national systems initially focused on primary and secondary education, up-skilling today concerns an ever-greater portion of high-school graduates enrolling in university.⁸ Until 2050, accumulation of human capital will continue in advanced economies, with a marked convergence towards the levels of the United States. The same trend to convergence will be observed in major emerging economies: in 1980, the average years of schooling was 4 years in China and 12 years in the United States. In 2050, China attains a level of education comparable to that of the US in 1980, while the average year of schooling in US has increased to 14. Europe is doing also very well and more or less catches up with the US level.⁹ The average level of education in the world is increased dramatically in 2050, which is good news in terms of functioning of the institutions, in terms of innovation, or simply in terms of well being of our societies.

More active and healthy ageing baby boomers: With rising life expectancy, technological progress and the extension of the period of activity for healthier elderly, the work organization is changed substantially in 2050. Already by 2020, several countries in Europe have substantially revised their pension system by allowing their citizens to adopt flexible retirement schemes in which, after a certain age, they could progressively decrease the number of working hours. So, since 2020 the proportion of older workers in the workforce increased, bringing both experience and better workplace performance, and we have seen in Europe a gradual extension of flexible and part-time

⁷ The demographic transition from a regime of high mortality and fertility to one with low rates is an established concept of demographic theory and has been observed in many empirical studies. During the transition period countries undergo a substantial rise in the share of the working age population in the total population. This is a positive development: given fixed output per worker, labour force participation rates, employment rates, and the absence of environmental and spatial restrictions on economic growth, a rise in the share of the working-age population leads to an increase in output per capita, which is a *first ‘demographic dividend’*. This may last for several decades, but it is a temporary phenomenon: a period in which there is a high share of the working ages will eventually be followed by a lower one, while the share of elderly in the population will be increasing. The same demographic forces producing an end to the first dividend will lead to a *second demographic dividend* arising from savings and assets accumulated during the years people worked, while the cost of raising children was low because they had fewer children to raise (as fertility rates were lower than in previous generations). This second demographic dividend typically follows the first demographic dividend but it is dependent on the propensity to save. However, demographic dividends eventually end, and turn into a *demographic burden*, when the share of working age population declines more sharply.

⁸ For many years the US had been the leader in this development, but the data show that there has been a process of convergence between Europe and the US, especially in the last decade. Many European countries are likely to achieve, and even exceed, the EU2020 target that 40% of the cohorts aged 30 to 34 should have completed tertiary education. As argued by Aghion et al. (2006), a highly skilled labour force (meaning with tertiary education attainment) enhances productivity growth more significantly for countries that are closer to the technological frontier. This happens because high-skilled labour is better equipped to generate innovation at the frontier, whereas lower skilled labour is better suited to imitation. University education is, in this sense, fundamental to the creation and implementation of innovation. However, secondary education is also important for its role in technology diffusion. In the real world, tertiary education systems can take three forms: i) elite when it is reserved for only a few; ii) mass when participation concerns more than 15% of the relevant population; and iii) universal when the percentage rises above 50%. As of now, hardly any country has achieved universal tertiary education: most advanced economies (including Korea, which has seen a spectacular expansion) managed to ensure mass tertiarisation, whereas countries like China and India are still very close to an elitist system.

⁹ Global Europe 2050

jobs, with employees working between 1.800 and 2.000 hours per year until the age of 50, then progressively reducing their activity to 1300-1500 hours per year at around 60, and 500 to 1000 hours per year when nearing 70. The length of the working week as well as the retirement age has become variable.¹⁰ Broadly speaking, *active ageing* has a positive impact on society, through the increased communication of values and expertise – when three, or four rather than two generations are involved. Life-long education, informal and non-formal learning plays a pivotal role. Self-ownership of health and an increased responsibility for one's own health (direct information, of self-monitoring and self-treatment) and the active involvement of the population, regardless of age and functional ability, is an integrated part of the health system. Breakthrough technological innovations (e.g. new bio-tech pharmaceuticals) contribute to improve the elderly health. Considerable savings on elderly care, and creation of a mass market and new employments, are achieved thanks to ambient assisted living (AAL) services, telecare, and other ICT based solutions. The diffusion of Internet and changing lifestyles has also helped to improve the elderly life. Cognitive stimulation of the elderly via Internet facilities reduces brain deterioration, and the social networks contribute to keep the elderly in touch with different communities (personal and civic).

Smartphone more than car-centric lifestyle of the digital generation: Even though recession and high fuel prices have significantly affected the use of cars in terms of driven distances in many countries since 2008, a declining trend in car use was already starting before the economic crisis. Surveys also showed that young people started driving later than they did before, and that young people were more and more inclined to consider cars as appliances, not aspirations (The Economist, 2012). The members of the digital generation were not rushing to get driver's licenses the way baby boomers did.¹¹ They also held the least purchasing power, and were therefore likely to embrace pay-as-you-go car-share models (as they actually did, as shown by the booming of car sharing). In 2050, the virtualization of life and work and the increasing importance of teleworking, e-shopping, electronic communication and social media has definitively established new lifestyles, habits and mobility behaviors. Lifestyles are more versatile, leisure activities are more widespread, and the everyday life is more irregular and quickly changing.

An open European society: In 2050, fueled by innovations in the field of electronic media and Information and Communication Technologies people in different contexts is more active in communities. Some citizens/customers contribute more actively to certain forms of issue-based discourse and campaigning activities, based on shared interest or the identification with a certain group of people or certain attitudes/values. The increasing openness, availability of and access to information contribute to increasing public awareness and sensibility against any type of unfairness and injustice around the globe. In Europe, public engagement in the most relevant EU policies is promoted, in particular to support the implementation of the EU cohesion policy (EUTeCOS) with a place-based approach, and sectoral dialogues are installed and working for the most relevant challenges: energy and climate change, water and other environmental challenges. The first of such dialogues was the European Energy Dialogue (EED), proposed by the European Economic and Social Committee in 2013 and implemented with the support of European, national, regional and local institutions until 2020 and beyond. Given the success of the EED, the approach was extended to

¹⁰ The change in the working-against-free-time personal budgets has affected, amongst other, travel demand patterns. Seniors are more mobile than in the past (see section 2.2.1 above).

¹¹ In the western economies for baby boomers, especially, coming on age and getting a driver's license was a sort of rite of passage. However, since the early 2000s younger generations, the ones who grew up with game consoles and smart phones, were not so in love with cars. They already lived perpetually connected lives, and while they had the same desire for mobility on demand, their identity was less likely associated to the 'driving experience'.

several other sectors where the EU regulation was increasingly binding (e.g. in the water and waste sectors).

A more fluid transnational labor market in Europe: The free movement of workers is one of the fundamental rights guaranteed to EU nationals by the Treaty. Yet, since the beginning of the 21st century, larger discrepancies between the labor market situation and wages between old and new member states made intra-EU mobility a more salient issue, and this became even more salient after the global financial crisis, and the visible effect this delivered since 2009 in terms of raised unemployment in almost all EU member states – and especially those of Southern Europe. In addition, in a context of crisis many of the workers losing their jobs were not entitled to unemployment benefits. This was clearly the case for informal workers, but also for regular workers holding temporary jobs as, in many countries, receiving unemployment subsidies was conditional to long qualification periods. Despite persistent unemployment rates and major income gaps between regions, mobility between Member States remained hampered by many obstacles.¹² However, in 2050 substantial progress is achieved in mobility policies at the EU level – including a better coordination of the social protection systems¹³, portability of pension rights and incentives to learn foreign languages – as well as at national level, with more flexible labour and housing markets (finding decent houses at affordable rents is almost as important as finding decent jobs). Moreover, labor market insertions and job transitions are more effectively managed and secure. All young entrants, unemployed people and workers affected by restructuring are offered training and/or a job, solving a number of difficulties. National policies for cross-border mobility are coordinated, cooperation agreements established, and the necessary infrastructure created for a trans-European market, including: 1) an European public service that provides advice and information on training and career transition opportunities, and that it work to ensure such transitions are secure, acting as an interface for close cooperation between national agencies; 2) the European recognition of professional qualifications, the development of European labels, programs and training initiatives, especially in the new technology fields; 3) a renewed labor contract law, so that contracts are valid across Europe and evolve from plain subordination to employers to carrying and sharing responsibilities that come with the acquisition of new skills, career security and contributing to innovation in all its forms. All these measures together contribute to make more fluid the job-to-job transition within the national labor markets. By contrast, the geography of cross-border labour mobility in 2050 is not deeply modified, due to more profound cultural barriers. Whereas some 4 % of the European working population are tempted to migrate, only 2% decide to do so, which is however roughly the double of the proportion in the early 2000s.

A changed migration to and within Europe: Migration into Europe is driven both by push and pull factors. The push comes from differences in economic possibilities, income and quality of life between Europe and other world regions. High population growth in Europe's immediate neighboring regions (the Middle East and North Africa) coupled with poor economic performance,

¹² A survey done at that time showed that only 10% of Europeans had lived and worked abroad (EU and/or non-EU) at some point in their life (TNS Opinion & Social, 2010). In reality, the most mobile segments of the population were at the opposing ends of the qualification spectrum: 1) the very low-skilled workforce (usually migrants from non member countries), because knowledge of the national language is not required for many execution tasks; 2) the very high-skilled workforce, because knowledge of a vehicular language (English) allows them to occupy many high level positions in multinational companies. For almost all the other jobs, a good working knowledge of the national language is essential: this is a major obstacle to migration beyond the language area of origin.

¹³ As it concerns the convergence of social protection systems, although the situation at the beginning of the 21th century - with the EU having sovereignty over markets, liberalization and a common currency and Member States retaining their sovereignty over welfare - became increasingly unsustainable, the option of transferring sovereignty for welfare intervention to the EU, as in economic areas, was not feasible. This was due to cultural diversity and differing national aspirations and social models as well as to the lack of political legitimacy of the EU level of government. However, in 2050, European rules apply across member states to determine the minimum wage, sickness insurance and retirement pensions, which contributes to reducing regional disparities.

scarcity of natural resources and human rights abuse constitute a strong driving force for many migrants, reinforced by the very wide disparities in earning possibilities. On the pull side, together with a need for specific skills, the ageing of the EU population provokes a generalized and increasing shortage of labor, which is likely to reassert itself once the present crisis is over.¹⁴ In 2050, in virtually every region of Europe, immigration is still a reality, but also a need, to compensate the decrease of the working population. The main source of immigrants is South Saharan Africa (SSA), while the pressure of the young bulge¹⁵ from North Africa and Western Asia has decreased after 2020, due to the decline in fertility, already visible in these two regions since the early 2000s. Selected immigration flows continue also from other parts of the world, especially of high-skilled/knowledge workers from South Asia. Migration within Europe will continue to be low, in comparison with USA that has a much younger population, but higher than in the past. Indeed, the migration internal in Europe – i.e. among and within member states - is expected to grow because of higher mobility of the elderly (moving to places rich of amenities), as well as because of economic reasons. Labour migration from less developed Eastern rural regions to Central regions, and to the larger industrial and service sector in Eastern countries is likely to happen if less developed countries do not catch-up more developed European countries, and they will not be able to offer better jobs and higher salaries to most of their population. The volume of the labour migration flows East-West and South-North can be a serious threat to societies and economies of a number of countries, for Lithuania for example, that can lose a significant part of their population. Since migrants are usually young people, migration will also have a dramatic impact on age structures of the sending countries. Migration will also affect skilled people attracted to large global cities in search of better job opportunities, in this case from all over Europe.

European border management solidarity: In 2050, an overall migration policy framework is in place since several decades, and it associates the EU countries - members of the same Schengen area - in consultation with some other non-EU countries. A common EU migration policy organises the reception of selected migrants, focusing on qualified immigration of varied geographical origins and diversified inside Europe. A milestone towards the EU common migration policy was the adoption in 2015 of new asylum and border management solidarity rules. Solidarity on asylum and border management was reaffirmed already in the Treaty of Lisbon,¹⁶ and the removal of the control on internal borders in the Schengen area implied mutual trust among the member states. However, the Arab Spring generated an unprecedented scale of mixed migration flows in the region, and has increased migratory pressures on the EU's external borders, notably those bordering the Mediterranean and in the South East. The Dublin II regulation proved quickly to be insufficient.¹⁷ More robust solidarity mechanisms were necessary, including compensatory sharing measures such as internal physical redistribution of refugees or financial compensation. Such mechanisms have been implemented, helping to manage migratory crisis since then caused by troubles in the

¹⁴ In 2005, there was an estimated net inward migration to the EU of some 1.6 million, adding just over 0,3% to EU's population, only slightly lower than for the US in the same year (0,4%). Marked regional differences exist, however, with the inflows being very much concentrated in certain parts.

¹⁵ The young bulge, defined as a share of the cohorts aged from 15 to 29 in the total population, peaked in North Africa before 2010, and it is expected to stabilize at 15% after 2015, while the youth share in SSA will remain higher, at about 28% until 2030, when it will start to gradually decline too (to 25% in 2050).

¹⁶ Article 80 states that "the policies of the Union in the fields of border management, asylum and immigration shall be governed by the principle of solidarity and fair sharing of responsibility, including its financial implications, between the member states when such measures are necessary".

¹⁷ The Dublin II Regulation determines which state is responsible for considering an application for asylum or subsidiary protection on the basis of two criteria: the first Schengen country of entry and family reunification. As a result a large share of the migratory pressure affects member states with external borders (like Greece, Italy, Malta, Cyprus), while member states without external borders (Austria, Czech Republic, Luxembourg) and those with more easily manageable sea borders (for example the Nordic countries) remain almost unaffected, demonstrating the limits of Common European Asylum System (CEAS) put in place under Dublin II.

Mediterranean and South-Saharan Africa, which continued until 2020. The same mechanisms have been adapted and extended later to manage other – more regular – categories of migrants and/or other aspects of EU migration management.

2.2.3 Economy changes

Globalization and competitiveness: Until 2050, globalization will continue but at the same time will decelerate, at least in the form we see it today as mostly increasing trade of material goods.¹⁸ However, the rapid growth of income in the emerging economies will have a much more than proportional impact on their participation in global financial markets, especially their tendency to invest abroad. Global financial markets will no longer be dominated by the mature economies of today. China will stand out as potential source country for outward Foreign Direct Investment (FDI), comparable in importance to the US and the EU. In 2050 the global economy is therefore multi-polar, characterized by a much broader consultative process that extends to a large number of jurisdictions. Greater cooperation amongst major economies on financial sector regulation has been achieved, leaving the big troubles occurred for the western economies after the start of the crisis in 2008 a memory of the past. Moreover, two unfolding globalization trends will fully manifest themselves in 2050: the increasing globalization of services and knowledge, and a turn towards regional clusters, i.e. a new model of clustered globalization driven by higher transport costs. As for the *globalization of services*, so far there is little evidence of globalisation in the services sector. Available data suggest their direct trade of services is still relatively small: services trade is still worth still only about 30% of goods trade for most countries, including within the EU. It should be recognized, however, that trade in goods incorporates to a large extent the value-added created by services sectors such as business services and transport.¹⁹ Until 2050, this trade in services will continue to increase faster than trade in goods, thanks also to the liberalisation of the sector and the fact that services make up an ever-increasing part of GDP. Most of these services exported on the global markets will be clearly knowledge-based, and therefore the productivity of knowledge assets and knowledge-based activities will increasingly be a key factor of global competitiveness. Indeed, in 2050, the continued *globalization of knowledge* will have contributed to erode the advantage of the early industrialized countries, with obvious implications in terms of sharing of the knowledge at the world level. Indeed, an implication for the globalization of knowledge is that how well an individual, an organization, an industry, a country, does in acquiring and applying knowledge becomes the key competitive factor. In 2050, the knowledge society will be far more competitive than any society we have yet known--for the simple reason that with knowledge being universally accessible, there will be no excuses for nonperformance. There will be no "poor" countries. There will only be ignorant countries. And the same will be true for companies, industries, and organizations of all kinds. It will be true for individuals, too. Increasingly, an educated person will be somebody who has learned how to learn,

¹⁸ Expanding trade and international financial transactions are the key indicators of globalization. The importance of trade relative to GDP has expanded considerably since the 1990s, resulting in the perception that unstoppable globalization will make all countries increasingly open to trade. However, part of this phenomenon has been due to the rise of emerging economies, whose growth tends to be intensive in trade at the beginning of their development. This is likely to change as these economies mature, with less global trade of goods.

¹⁹ Perhaps the most important finding of the existing research on the value-added incorporated in exports is that a surprisingly large proportion in exports of manufacturing goods consists of services. For most countries, manufacturing exports incorporate up to about 40% of the value-added created by services (business services, transport, etc.). If one adds to this the direct exports of services, the result is that roughly a half of all international trade really consists of the exchange of services. This finding implies that productivity in services is a key factor for the competitiveness of nations, even for the export of goods. One significant and immediate implication for the EU is that the completion of the internal market for services is not only necessary to liberate domestic growth potential, but also to maintain the competitiveness of the European economy on a global scale. Moreover, the extent to which the European economy can benefit from trade liberalisation, even if it is formally only for goods, depends to a large extent on the productivity of its services, or at least those services most directly used as inputs for goods that can be traded (mainly business services).

and who continues learning, especially by formal education, throughout his or her lifetime. In 2050, achieving mass tertiarization will be a prerequisite for countries and regions competitiveness on the global market, but the possibility of acquiring knowledge will no longer depend only on obtaining a prescribed education at a given age. Learning will become the tool of the individual--available to him or her at any age--if only because so much skill and knowledge can be acquired by means of the new learning technologies. Finally, in 2050, we will see a *new model of regionally clustered globalization* to prevail. The conventional globalization model based on import-export of goods exploiting country level comparative advantages (e.g. low labour costs, availability of land or natural resources, etc.) and cheap transport costs will evolve into a new form of globalization based on the internationalization of value chains within regional clusters of countries, and in particular in three main "vertical" regions on the globe: the North and South America, Europe-Middle East-Africa (joined in a "triangle of growth" originated by a strong cooperation in the energy sector and a common transition to a low carbon economy²⁰), and the Far East Asia and Australia. This new clustered globalization model is based on growing share of intermediate goods and services imports embedded in the global exports of the cluster, sharing of value added and co-production within the cluster, with the split of the production chain, short transport circuits (industrial clusters are connected by fast transport – road, rail or air – connections within a time threshold of less than 3 hours) and shared research, innovation and quality control functions.²¹

New global opportunities for the EU industry: In 2050, the process of globalization has increasingly resulted in tightly interlinked international value chains and new opportunities for the European industry. Emergence of global value chains not only led to efficiency gains and a geographical fragmentation of production processes by fabrication of components in different locations around the globe, but also moved some of the relevant know-how and services into these locations. In 2050, Europe exports worldwide a wide range of high level manufacturing goods and services. Increased trade with the rest of the world, which has a higher demographic and economic growth, is a key element of its prosperity. The share of high value added services on total trade is relevant, in the form of direct exports of services or services embedded in the exported goods. The increase of production costs in emerging economies also ensures a rebalancing of trade. With a few exceptions of some workshop countries, the developed world (which now includes Asia and Latin America) is now wide enough to absorb their exports, without excessive downward pressure on labour costs. Europe is clearly among the globalisation winners and benefits from ever increasing opportunities. Accession to the developed world of its trading partners enlarges its commercial positions, and co-development partnerships are established within the Europe-North Africa-Middle East region (see section 3.2).

A successful socio-ecological transition to a creative and green economy within Europe: In the global context, and besides the successes achieved by the EU industry in terms of exports of goods and services on the global markets, the European domestic economy has already entered in the period from 2010 to 2050 a phase of qualitative, rather than quantitative, growth.²² This stems from three main factors: i) the European demographic structure, which includes a high percentage of

²⁰ This was firstly proposed in 2015 as strategy to exit from the Mediterranean area instability and it was established in 2020, delivering in the next decades a strong integration in the energy and later also in other sectors, see section 3.2 below.

²¹ In this model, the different countries in the cluster contribute with their specialization, and imports from other countries of the cluster are necessary for the exports of any country of the cluster to other regions of the globe. An indicator of the new model is the share of intermediate imports on total exports, which increased in the OECD countries from 20% in the past to 40% today, and that will continue to increase up to a 60% global average share in 2050.

²² As a result, the EU average yearly growth rate is 1.4 %, sizeably below the world average of 2.9% from 2010 to 2050 estimated in the Global Europe 2050 study.

inactive population (below 25 years and over 70 years, for an average life expectancy of 85 years, which gives 40 years of inactivity for a working period of 45 years); ii) environmental constraints, which regulate growth while improving its quality and sustainability; iii) a larger share of low-productivity services (including personal services to ageing population). However, Europe has restored its competitiveness through an industrial rebirth of high productivity activities derived from technological innovation. Behavioral change and social innovation are proving as crucial as better economic solutions and technological innovation. Incorporating the cost of externalities, shifting to low-carbon energy systems, improving sustainable water management, halting deforestation, have deeply modified the business environment divisions, avoiding mistakes of the past.²³ Resources are priced in accordance with their relative abundance, the energy intensity of their extraction and the degree of sustainability of their use.²⁴ Under the pressure of policy changes and new market developments, production and consumption patterns, and business models, have been radically changed, in the direction of a broad socio-ecological transition, fully implemented in Europe in the year 2050. This has produced a paradigm shift from quantitative to qualitative growth, from material to growing immaterial consumption/use of intangibles, from mass production to creative production of tailored goods and services, from individual ownerships to sharing of goods – primarily “utility cars” in the urban environment, and many other things – and eventually from almost exclusively market/profit-making to a growing share and importance of social economy and entrepreneurship.²⁵ A key component of the new business paradigms in operation in 2050 is *ecological sustainability*, and the shift this requires towards eco-design “waste equals food” principles in the industrial system.²⁶ The widespread diffusion of the eco-design industry paradigm delivers a dramatic increase in productivity and product quality improvement, while at the same time creating jobs and reducing pollution. The paradigm is extended beyond organic products, to include not only *biological metabolism* but also *technical metabolism*²⁷ Moreover, from the perspective of eco-design, it makes no sense to personally own products and to throw them away at the end of their useful lives.²⁸ The resulting economy is no longer based on the ownership of goods, but on the concept of service-and-flow. In a service-and-flow economy the demand for labor - to do all the disassembling, sorting and recycling - increases, as waste decreases. Finally, in the service-and-flow economy is the interest of both manufacturers and customers to create/use long-living products requiring a minimum of energy and materials.

²³ According to the WBCSD 2050 vision, the implementation of these new policies is contributing to 1.4 to 4.5 % of 2050 GDP (Vision 2050, The new agenda for business, World Business Council for Sustainable Development (WBCSD), February 2010, 80p. The study involved 29 global companies representing 14 industries)

²⁴ This was made possible by a strong development of sensing, monitoring and communication technologies in the 2020's, making real time monitoring possible along the whole use chain. An internationally agreed compendium of all natural resources serves as the basis for this pricing, compiled after a thorough and elaborate review of all tradable resources worldwide.

²⁵ In 2050, material living standards are preserved in Europe, but ensured by using stocks of longer-lasting goods and sharing services, rather than accelerated consumption of short-lived goods: in the new business paradigm, material living standards are measured by the stock of goods in use, rather than the volume of flow from consumption to waste. In addition, continued rapid technological advances, such as digitization, electronic communications and virtual systems, contribute to create new “weightless” sectors of the economy, making it much easier to combine high living standards, with an higher share of intangibles in the personal consumption recipes and less resource consumption and emissions.

²⁶ Today, a major clash between economics and ecology derives from the fact that nature's ecosystems are cyclical, whereas our industrial systems are linear. Tomorrow, in 2050, a circular economy principle will be extensively adopted, with all products and materials manufactured by industry, as well as the wastes generated in the manufacturing processes, which eventually provide nourishment for something new, entailing a vast increase in resource productivity.

²⁷ Matter that cycles in the biological metabolism is biodegradable and becomes food for other living organisms. Materials that are not biodegradable are regarded as technical nutrients, which continually circulate within industrial cycles that constitute the technical metabolism. In order for these two metabolisms to remain healthy, great care must be taken to keep them distinct and separate, so that they do not contaminate each other.

²⁸ It makes much more sense to buy their services, i.e. to lease or rent them. Ownership would be retained by the manufacturer, and when one has finished using a product, or wants to upgrade to a newer version, the manufacturer would take the old product back, break it down into its basic components – the technical nutrients – and use those in the assembly of new products, or sell them to other business.

The EU social economy matters: Besides the ecological dimension, also the social dimension of the transition proved to be particularly relevant to preserve prosperity and well-being in Europe. In 2050, the whole economy increasingly operates with the contribution of the *social sector*, including organizations funded from private, public or hybrid sources, geared to the needs of people and ecosystems, while not driven by market forces or the exclusive profit motive. The diversity of “social enterprises” is fully recognized: mutual benefit societies, cooperatives and associations provide innovative solutions in many areas: health, dependence and social protection; education, training and information; housing, etc. They are not confined to merely standing in for centrally-administered or market services when the latter are inadequate. Instead of being seen as an awkward “third” sector, they are promoted as a necessary family of enterprises in a capitalist system driven partly by public goods. This not only means changing the social economy management models, but also setting up an appropriate framework for regulating financial capitalism, through a process of “democratization of wealth”, with increasing employees share-ownership and participation in shaping the destiny of the companies. The building blocks of the social economy are mostly small-scale local economies, highly self-sufficient in terms of energy and materials inputs but well connected in a global communication network. The social economy system is multi-level – not only local – but with a consistent grassroots/bottom layer primarily populated by cooperative and participatory local systems, whereby people in small communities self-govern their affairs.

2.2.4 Energy, Transport and Climate changes

Better energy and CO₂ reduction prospects: In any “Business as Usual” vision, as economies grow, the demand for energy, food, protein, water and metals all pretty well scale linearly: increasing GDP per capita is largely directly linked to per capita resource consumption. The big challenge for any alternative vision going forward is to decouple resource use from economic growth by essentially using less and yet continuing to allow economies to grow.²⁹ In 2050, Europe has successfully tackled this challenge, realizing a socio-ecological transition towards a low carbon economy. This is also the merit of an effective implementation of the EU energy and resource efficiency roadmaps, that achieved the Europe 2020 Strategy objectives and continued to provide benefits after the 2020 horizon, until 2050. Following the Energy Roadmap goals, the EU as a whole has reduced its *domestic* emissions by 80% by 2050 compared to 2010 - domestic meaning real internal reductions of EU emissions and not offsetting through the carbon market. A transition took place from a system characterized by high fuel and operational costs to a model based on higher capital expenditure and lower fuel costs. In 2050, the share of renewable energy sources (RES) exceeds 55% of the gross final energy consumption (compared with 10% in 2010)³⁰. The share of electricity in the final energy demand has doubled (from 20% in 2005 to 40% in 2050), which has significantly contributed to the decarbonisation of transport and heating/cooling. For this purpose, structural change took place in the power generation system, whose decarbonisation level exceeds 95% in 2050. Due therefore to relevant policy choices and the availability of new technologies, considerable energy savings have been achieved, bringing the gross EU energy consumption from 1,800 Mtoe in 2015 down to 1,200 Mtoe in 2050³¹. Moreover, renewable energy generation technologies have achieved huge progress. However, even with very strong expansion of the use of renewable energy and other low carbon energy sources, hydrocarbons – mostly gas - will still make almost half of global energy supply in

²⁹ Technological developments may drastically cut down energy consumption in production, distribution and waste processes. Other factors include: (1) focus on dematerialization and de-carbonization of society; (2) consumption behavior changes to more modest and environment conscious life styles; (3) spatial planning which improves local consumption patterns.

³⁰ *Energy Roadmap 2050*, Graph 1. See also EC DG Research (2012) - *Global Europe 2050*, pp. 105-106

³¹ *Energy Roadmap 2050*, Graph 3

2050.³² EU energy security is enhanced through a better interconnection of the energy grids that allow to fully access to the renewable resources from the North (wind) and South (solar) Europe³³, plus a residual nuclear production and gas production from the North Sea and South-East Mediterranean (near Cyprus) sea basins. This is however not enough to ensure self-sufficiency, and Europe is still – although less dramatically – dependent predominantly on gas imports from the East (Russia) and South neighbourhood countries, with whom the EU is however associated in 2050 by cooperation agreements in the energy and other strategic sectors (e.g. water, research and human capital development with the South Mediterranean countries). Security is enhanced also through the diversification of gas imports, as a share of these imports come in 2050 from the US.³⁴

EU energy solidarity: Although the debate on European energy solidarity³⁵ saw a significant boost since 2008, when more and more countries were hit by the global economic crisis, yet the EU's energy policy was still unable at that time to successfully and simultaneously achieve its main objectives. Indeed, although the interdependence and level of political, economic and technical cooperation between member states in the field of energy was formally fairly strong, in reality the European energy policy was considered a highly sensitive issue of purely national interest, national independence and national competence. These circumstances hampered the development of a united EU energy approach and consequently endangered active energy interdependence and solidarity between the EU member states at least until when the failure of the internal energy market goal became evident.³⁶ Since then, a more effective policy approach was put in place to effectively decarbonise the production of energy in Europe, while maintaining affordable choices for the consumers, along with a joint infrastructure architecture and a market model that uses benchmark prices (high CO2 price) that deliver the right signals regarding investment value. An *Energy Solidarity Pact* has been negotiated between European countries to ensure the complementarity of energy sources and the cohesive development of the infrastructures needed to ensure the interconnection of electricity and gas grids.³⁷ Thanks to the new Pact, each country continued to choose its own energy sources, while complying with few common principles: renewable energy that share the cost of intermittency and transport; gas and (increasingly less) coal with carbon capture and storage, nuclear power with high safety standards and a joint control structure, etc.. Supply networks have been connected to a more optimised European generation system, designed to integrate peripheral countries. Establishing an efficient pricing system implied a

³² Extensive carbon capture and storage might allow this continued use of fossil fuels without damage to the atmosphere, but the CCS prospects are currently very uncertain, in Europe and elsewhere.

³³ Including also the exploitation of better grid connections with and concentrated solar power in the South Mediterranean countries, that in 2050 are associated in a strong energy cooperation scheme with the EU and Middle East countries (see section 3.2 below)

³⁴ In Europe, gas production recently increased, but not as much as in other continents, including in particular the US where the “shale gas revolution” contributed to transform the country from oil importer to gas exporter since the early 2000s. An American-style shale gas revolution will not take place in Europe on the short term as things stand at the moment. The economic profitability of the European resources is not as interesting in most Member States, and their social acceptability is not granted. Moreover, some structural factors make shale gas less easy and convenient in Europe as compared to US – including for instance the higher population density and the different natural resource ownership rules (in Europe the extraction of resources from the subsoil belong to the state, while in the US belongs to the private owner of the land).

³⁵ According to Art. 198 of the Treaty, the European Union's energy policy shall be exerted in a spirit of solidarity between member states to ensure 1) the functioning of the internal energy market, 2) security of energy supply and 3) the development of new and renewable forms of energy.

³⁶ In particular through the evidence that European consumers were still paying very different prices for electricity in the different countries in 2014, when the internal energy market was deemed to produce an harmonization of such prices across the national markets.

³⁷ For instance, the North Sea grid project shows a real difference between the overall benefits and the benefits felt by each country. The development of the grid benefits low-cost electricity exporters (Norway and UK) because in the regions where they export (Continental Europe) they obtain higher sale prices than in their respective markets. European consumers benefit from this infrastructure that provides them with lower prices. By contrast, electricity producers in more costly regions (Continental Europe) are losers in terms of market share and congestion rent, etc.. It is therefore important to come up with an option to establish the appropriate solidarity and financial compensation mechanisms to correct this problem in the short and medium term.

carbon tax, a definition of universal service, an EU-wide capacity market, long-term contracts, etc.. Resources had been pooled in order to finance investments, with a discount rate capable of making long-term investment attractive. All these steps helped to achieve effectively the goals set out in the EU Energy Roadmap to 2050, which would have otherwise been destined to remain on paper.

Smart investment in global and local infrastructure: The nature of transport and energy infrastructure will change with the increasing use of smart technologies. For instance, instead of an increasing grid for transport, less roads and rail infrastructure will become necessary with higher precision transport systems and automatic braking systems. In 2050, transport infrastructure is accompanied by pay-as-you-use systems, and pressure on government for new transport infrastructure building is decreased. Smart grids reduce the need to build new centralized power plants. Local infrastructure upgrading (energy distribution grids, urban transport, other urban infrastructure) is another key issue, successfully tackled in Europe, with smart systems and infrastructure builders and operators increasingly able to export solutions, especially in developing countries.

Smart and sustainable transport: Also as a consequence of the changes of lifestyle and daily mobility patterns illustrated in section 2.2.1 above, in 2050 the landscape of transport in Europe is radically changed, broadly achieving the goals of smart, low-carbon and sustainable transport set out in the EC 2011 White Paper “Roadmap to Single European Transport Area”.³⁸ Altogether, urban transport was where the largest scope for a different type of mobility and for abatement of emissions was identified.³⁹ Whereas each city would have had to pursue its own preferred strategy for the substitution of conventional petrol and diesel vehicles – with different emphasis on soft modes, public transport and clean vehicles – their gradual phase out and eventual elimination in 2050 from the urban environment was the necessary ingredient indicated in the WP for any strategy aiming at a significant reduction of oil dependence and greenhouse gas emissions. Initially, implementing the ambitious strategy set out in the EC WP proved to be difficult. As of 2020 however, things turned out differently. The lack of safety and environmental sustainability of the EU transport system as well as an unprecedented level of traffic congestion raised definitively the awareness and political will – at all levels - about the need for radical steps. The changes were also enabled by tremendous progress in location-based services, information processing & satellite technology (‘Galileo’). People started to change much more significantly their behavior and their attitudes towards existing forms of transport and traffic.

Climate change: Climate change is a slow-moving process, driven by the accumulation of greenhouse gases (GHG) in the atmosphere that – according to most models – will ultimately lead to major disruptions to long-term weather patterns.⁴⁰ In 2050, to cope with climate change, in particular to

³⁸ To help develop the European transport system consistently with the EC White Paper (WP) vision for 2050 of an integrated, sustainable and efficient mobility network, *ten goals* were identified, to ensure the deployment of sustainable fuels and propulsion systems, optimisation of logistic chains and modal choices and the efficient exploitation of the network. The WP goals were to be interpreted as benchmarks, guiding policy action at all levels, and helping assess progress towards competitive and resource efficient transport systems in Europe.

³⁹ Estimates from the White Paper impact assessment study were suggesting that emissions of urban passenger transport could be reduced by up to 88%³⁹ relative to a scenario at unchanged policies, through a combination of measures related to fuel efficiency standards (44% reduction), decarbonising energy supply (42% reduction), spatial planning and shift to slow modes and to public transport (2% reduction).

⁴⁰ Global GHG emissions continue to increase at a fast rate. In May 2013, carbon-dioxide (CO₂) levels in the atmosphere exceeded 400 parts per million (ppm) for the first time in several hundred millennia and are up from about 280 ppm in pre-industrial times (IEA, 2013). The latest report by the International Panel on Climate Change (IPCC) suggests that global mean temperatures could rise by as much as 1.8-4.0°C over the course of this century if global action to limit GHG emissions fails (IPCC, 2007). The IEA (2013) estimates that the world is currently on a trajectory towards an average temperature increase of between 3.6°C and 5.3°C by the end of this century. The variability of these estimates suggests that there is great uncertainty about projections. Major uncertainties also remain about the impact on human

mitigate the effects of global warming, strict norms have been prescribed and enforced by the WEO, in close consultation with the relevant authorities in the various continents, among which Europe is not facing the worst situation. Nevertheless, the physical, social, economic and environmental assets of several categories of European regions are variously impacted by the effects of climate change (sea level rise, more frequent river floods, heat, etc.) Southern Europe but also the Benelux coasts and, to a lesser extent, France, the British Isles and Norway have been seriously affected. Until recently however, southern regions were more vulnerable because of their lower adaptive capacity. The Arctic also faced major changes including a higher than average temperature increase. As a consequence the reduction of ice cover was accelerating and impacted to local natural and human systems. However, the Arctic represented also an area of growing opportunity and strategic importance for the EU. In particular, there was a strong interest from Far East Asia and Europe as well to use the Arctic Route as a new commercial shipping lane. As compared to the traditional route through the Indian Ocean, a significantly shipping distance reduction was reached, mainly from Northeast Asia (i.e. Japan, South Korea, China and Taiwan) to North-western Europe.⁴¹

2.2.5 Governance changes

Global governance: Political developments are inherently unpredictable, given the wide scope for human agency in shaping the course of events. However, some insights into the future international political system emerge from a number of international outlook studies. First, in the absence of a clear and established international political system, like the one based on the East-West confrontation during the Cold War, globalization itself will be the most influential factor shaping international politics. Second, multipolarity will be a fact of life. The rise of new global and regional players such as China, India, Brazil, South Africa and Indonesia among others will make the international system more heterogeneous. The ability of the West to influence international affairs will be put to the test as its share of world population and GDP is shrinking. Third, global governance will be put under serious strain. The relationship between old and new powers will determine its future. A more interdependent and complex world generates challenges, which demand a coordinated response. The movement towards a multi-polar world will be characterized therefore by a much broader consultative process that extends to a large number of jurisdictions and will address global economic and environmental challenges. In 2050, greater coordination amongst major economies on financial sector regulation will be realised. A global environmental governance will definitively emerge. Various climate-related tensions will raise public awareness about the fragility of the planet and resource depletion, while prompting a world-wide mobilisation of people. Most vulnerable countries fiercely and successfully will advocate the adoption of world-wide mandatory environmental standards. The United Nations' World Environment Organisation (WEO) will have extensive powers and financial resources to implement a comprehensive policy. A World Court of Justice will be established to enforce obligations on recalcitrant states. Financial resources will be made available to help poorer countries. This policy will have important implications for land-use and territorial planning departments, which will have to comply with mandatory standards (minimum rate of afforestation, energy-efficient land-use patterns, rationalisation of water storage and consumption). Following the EU example, regional integration processes will have gathered pace in

society, including long-term effects, regional conflicts, migration and political instability. However, Human-induced climate change is driven mostly by GHG emissions. These are largely due to the use of fossils fuels, although deforestation, land-use change and agriculture also provide significant but smaller contributions. Major drivers at the global level are therefore population growth, increases in demand for food, water and energy and agricultural practices.

⁴¹ For instance, the distance is reduced by around 35% from Japan to North European countries, 25% for South Korea, 20% for China and 10% for Taiwan.

South-East Asia, Latin America and Africa, and steadily greater account of territorial issues is taken in this framework.

EU economic recovery heading to more integration: After the 2008 crisis, the EU economic recovery path was difficult but ultimately pointed more decisively towards further political and economic integration as a result of the financial euro-zone crisis. At the political level, there was gradual recognition that the financial crisis could only be solved through stronger European, as opposed to national, political representation and control. This held both for the political left and political right and for Euro-sceptics and pro-European parties. It was, in other words, not based on any future romantic vision of a European identity, rather it was the outcome of the political realisation both with policy makers and public opinion that economic integration, and in particular the economic and monetary union with the formal introduction of the euro back in 2002, could not survive without a increased political integration. The huge financial investments in each other economies, both between euro-zone MS and with other MS, led to the political realization even within the most euro-skeptic MS that close mutual control of each others' fiscal policies, of the functioning of MS' internal labor markets, of the sustainability of MS' social welfare systems including their pension schemes, etc., was in one own direct interest. What was politically unthinkable in the EU, appeared at the time economically the only way forward: more political coordination leading to some form of European political union via the backdoor of monetary integration. In short, further European integration not out of love but out of need. However, while heading to more integration, it was soon realized that, due to the internal political, economic, social and cultural diversity of the EU, the optimal degree of its fiscal centralization had to be lower than other "mature" and more homogeneous federal states. In addition, taking into consideration the remaining huge productivity differences across the EU, centralization of social and income policies – one of the most frequent federal mandates which is often the reason for the substantial size of federal budgets and their countercyclical capacity – would have led to excessive convergence of labor and social costs and, as a result, make the labor market even more rigid than before.⁴² However, as it concerns the role of the EU on the global arena, in 2050 the new EU is able to speak with one voice, but many votes, in all international forums, and to promote multilateralism by means of the support given to international agreements on key global issues (climate change, water, public health, global security and fight against crime, combating poverty).

A new EU subsidiarity architecture: As it concerns its own institutional architecture, the EU continued to be built around the principle of subsidiarity enshrined in Art. 5 of the Treaty, and the EU overall architecture remains also in 2050 anchored to this principle, according to which functions of higher levels of government should be as limited as possible and should be subsidiary to those of lower levels. As a result of the subsidiarity approach, the EC provides the underlying technocratic support needed for the implementation of a lean integration model, which also fully benefit from the wide variety of institutions within the different MS. The European Central Bank is often used as the example of a centralized European institution created with the full support of the national bank

⁴² In most historical cases, the countercyclical role of the federal budget came as a result of the prior centralization of various responsibilities - public pension system, unemployment benefits, bank deposit insurance, federal infrastructure projects, and general public services (e.g. defense, foreign policy, public health, education, justice administration, federal taxation, etc.) – but this proved to be unfeasible in the European Union context. The size of the EU budget has oscillated around 1% of the EU's Gross National Income for a long time and its own revenues are not allowed to exceed 1,23% of the EU's GNI. Its expenditures must be closely matched by revenues, and the EU budget structure is presently dominated by cross-country transfer programs such as the CAP, cohesion and structural funds, and foreign aid, plus the costs of functioning EU institutions. If one looks for historical comparison, the US federal budget, in peace time, amounted to 2-3% of GDP until the beginning of the 20th century and started to grow substantially only after the Great Depression in the 1930s, achieving a share of almost 25% of GDP in 2008. Unlike the EU budget, it was concentrated on the provision of typical federal public goods such as general government services and national defense, with almost no redistribution and transfers.

institutions who each kept their specific national role, but other more decentralized institutional reforms are also explored. However, a pragmatic approach is also maintained, whereby subsidiarity and additionality are the key concepts in providing legitimacy to newly multi-governance approaches linking the action of EU, MS, regional and local governments in specific policy fields (e.g. the place-based approach framing the cohesion policy). In the context of EU heading to more integration, and given the key role of Research and Innovation for the competitiveness of Europe, a Common Research Policy is realized. Joint research programmes become effectively the only way forward for most research support policies, involving both public and private actors. National public research organisations with leading national technical universities and the most research intensive private firms form the building blocks for a truly European Institute of Technology and Innovation EIT, and for a whole set of other new European research institutions such as the European Institutes of Health with leading academic institutions and hospitals, the European Energy Agency incorporating the SET plan, the European Environmental Agency. Individual MS commit themselves to coordinate their national research policies. At the same time, social sciences and humanities research become more closely involved in bridging the gap between the citizen and society's problems.

3. A Territorial Vision for Europe

So far, in the previous section of this document, we have looked forward to 2050 with a “spatially blind” attitude, to highlight both global trends and desired changes that will feature a sustainable Europe in the year 2050. Now the ambition is to produce a territorial vision for the European territory (**TeVi-Europe 2050**).⁴³ The basic structural elements of territorial dynamics include: the urban settlement system (hierarchy and networks), the semi-urban areas (suburban, peri-urban, diffuse city patterns), the more rural areas (including also areas with a high natural heritage value), systems of transport and communication networks. The territorial dynamics shall include also the relationships beyond the EU borders, with countries in the neighborhood East and South regions. These elements are to be analyzed to understand the future evolution in the different territories of specific problems (e.g. congestion, depopulation, insufficient accessibility to transport networks and/or other basic services, negative impacts of climate change, etc.) and opportunities (organization of knowledge-based clusters, exploitation of local renewable energy sources, organization of the tourist, culture and leisure economy, natural and cultural heritages, cross-border and transnational territorial strategies). Territorial dynamics are highly complex, as they depend on a number of long-term heavy trends – population ageing, social mobility, globalization, resource shortages, diffusion of ICT in society and economy, growing knowledge-based production, progressing climate change, to name a few – as well as uncertainties – the level of international migrations from outside Europe, the global and regional flows of Foreign Direct Investments (e.g. towards central and eastern Europe), possible departure from nuclear energy production and accelerated promotion of renewable energy sources, to name a few. Smart growth (fostering knowledge, innovation, education and digital society), sustainable growth (making production more resource-efficient while boosting competitiveness) and inclusive growth (raising participation in the labor market, acquisition of skills and fight against poverty) remain until 2050 the leitmotifs of EU policies, and these will have important territorial impacts.

Today, for the first time in history, more than 50% of the world's population live in urban areas.⁴⁴ Demographers estimate that even in Africa half the population will live in cities by 2030⁴⁵ and Asia will be home to more than 50% of the global urban population in a long-term horizon (2050). Although many emerging and developing economies may not achieve the same level of urbanisation as today's developed countries within the next two decades, the speed and scope of the urban transition in the developing world is far greater today than it was just 50 years ago.⁴⁶ As a consequence, the share of Europe's urban population on the global total is likely to have shrunk considerably in 2050. The urban-rural picture in Europe is and will remain partially different from the rest of the World. While the global mega-city is one extreme interpretation of a dense urban

⁴³ Basic information on the European territory is available in various official EU documents, including among others the Fifth Cohesion Report, the revised Territorial State and Perspectives and the “Territorial Agenda 2020”. Findings of the EC DG Regio ESPON program are also available, which show the most relevant challenges for the future territorial dynamics of Europe, within its borders – with different possible patterns of competition and cooperation among the different regions of Europe – and in relation to the evolution of neighborhood regions. Most of these sources have been already consulted to deliver a 1st draft of the Territorial Vision, elaborated by P. Doucet and J-F Drevet, presented and discussed in the 11th October Workshop with several ESPON stakeholders. The ambition of this 2nd draft is to consider the feedbacks received to the 1st draft of the vision and the territorial implications of further seeds of change and vision elements presented in the 2050 context analysis of chapter 2.

⁴⁴ Defining what is urban has been a difficult task and there is no commonly agreed definition. Each country defines ‘urban’ in its own way and can refer to cities, towns, villages, conurbations or localities. There are a number of approaches in which criteria are used to determine what an urban area is.

⁴⁵ McKinsey Global Institute (2010).

⁴⁶ UN Population Division (2010).

environment valid for Asia and elsewhere, groups of mid-cities are in many ways a better solution, especially for some regions in Europe. Network of interlinked cities, with efficient transport systems operating between them, will create highly effective urban regions in several parts of Europe, without the challenge of growing in one place.

The global dynamics of urban population for the different regions of the world (including when the 50% tipping points are overcome) is presented in the table below:

Level of urbanisation per World Region and tipping points

Region	Tipping point before 2010 (year)	2010 urban (%)	Tipping point after 2010 (year)	2050 urban (%)
World		50.6		70
MORE DEVELOPED REGIONS				
	before 1950	75		86
Europe	before 1950	72.6		83.8
Eastern Europe	1963	68.8		80
Northern Europe	before 1950	84.4		90.7
Southern Europe	1960	67.5		81.2
Western Europe	before 1950	77		86.5
LESS DEVELOPED REGIONS				
		45.3	2020	67
Africa		40	2030	61.8
Sub-Saharan Africa		37.3	2032	60.5
Eastern Africa		23.7		47.6
Northern Africa	2005	52		72
Southern Africa	1993	58.8		77.6
Western Africa		44.6	2020	68
Asia		42.5	2023	66.2
Eastern Asia		48.5	2013	74.1
South-central Asia		32.2	2040	57.2
South-eastern Asia		48.2	2013	73.3
Western Asia	1980	66.3		79.3
Latin America and the Caribbean	1962	79.4		88.7
Central America	1965	71.7		83.3
Rest of the World				
South America	1960	83.7		91.4
Northern America	before 1950	82.1		90.2
Oceania	before 1950	70.6		76.4

Source: UNDESA, World Urbanization Prospects.

At the global level, outside the EU borders, some cities will reach unprecedented sizes and the number of megacities across the globe will rise, putting enormous strain on their natural resource support systems. The peri-urban or 'rurban' areas will grow faster than city centres as such areas

provide cheaper land for housing and manufacturing. Metropolitan regions will spill over multiple jurisdictions to create metro-regions.⁴⁷

Coming now to the “Territorial Vision for Europe” at the 2050 horizon, the first challenge is to imagine how the population will be distributed in the urban, rural and other specific types of territories of Europe.⁴⁸ This will be obviously dependent on i) underpinning global and local, technological and social, environmental and (last but not least) governance drivers that will eventually influence the future urban-rural life opportunities and the preferences of the population, and ii) the territorial investments needed to enable/facilitate the envisioned distribution of the population and urban-rural activities in the different territorial categories.

The table overleaf shows the different territorial categories used to partition the European territory⁴⁹, their current (2010) population share and land coverage, and the broad population tendency assumed until 2050. In addition, a box is included to illustrate different urban archetypical forms that are used to distinguish different settlement patterns in the urban regions.

In 2050, the great majority of the population is leaving in an urban environment (84%), and the residual 16% in a rural environment. In 2010 the same shares were 75% and 25%. The “European Urban Territory” is partitioned in four layers of functional areas:

- **Layer A - global cities and large metropolitan areas:** these are more or less affected by the “urban sprawl” disease and tightly connected with other cities of the same layer in Europe – with fly or high speed train connections within a 3 hours threshold. Some cities of the layer are truly “global”, with strong economic, cultural and transport connections with other cities of the world (global airport or port hubs).
- **Layer B - polycentric areas:** regions where the population and the urban functions are distributed in a number of cities, without a predominant centre (the capital city is only slightly more populated than the other city of the region). The cities are well connected between them (within 1 hour of travel time) and it exist at least one regional hub infrastructure (airport or train station) to connect them within a 3 hours threshold to a layer A city.
- **Layer C – compact cities:** these are areas where, due to historical and morphological circumstances (e.g. mountainous surroundings, islands), the urban population is concentrated in only one small to medium size city, where urban functions are concentrated. The city is connected within a 3 hours thresholds to a Layer A city (this means that Layer B and C holds the same hierarchical level in the overall transport system).
- **Layer D – “rurban” regions:** these are low density areas with sparse agglomerations, but well equipped with low to middle urban functions within the area, and connected within a 2 hours threshold to a layer B regional hub or a layer C city (and occasionally to a Layer A city)

⁴⁷ There is an important cause-and-effect nexus between urbanization and economic growth: urbanization has worked as one of the main sources of domestic demand - especially in China and other emerging countries - through higher consumption of a growing affluent middle class and very high spending in infrastructure. This process is expected to continue in the future. For instance, the target of the Chinese government is to transform 60% of the population of almost 1.4 billion into urban residents by 2020. Plans to build homes, roads, hospitals and schools for them are already in place. However, the pattern of urban growth over the next decades may look strikingly different from the past, as megacities will become further limited by physical land constraints and burdened by vehicular congestion, costly infrastructure legacies and deteriorating sanitation and health conditions.

⁴⁸ Specific types of territories include mountains, islands, remote and sparsely populated areas, coastal zones, border areas and outermost regions (see the ESPON project GEOSPECS for definitions). Of course, these specific territorial categories overlap with any continuous urban-rural classification of the European territory, but they need to be considered as distinct categories as well, in parallel to the urban-rural distinction, because they imply specific territorial policy challenges.

⁴⁹ Obviously only the urban-rural categories represent a comprehensive partition of the whole European territories. The other categories – mountain areas, coastal areas etc. – cover only specific parts of the European continent (and oversea regions).

This partition of the “European Urban Territory” is not administrative – the current NUTS and LAU classification of administrative entities is left unchanged – but functional, and the four areas are classified for policy coordination purposes, based on morphological and functional criteria (density thresholds, commuting travel time thresholds, connectivity with other urban hubs). The functional classification of the urban territory is periodically updated, and constantly monitored through a set of territorial indicators (mostly describing the evolution of land use and transport patterns) managed by the Eurostat in cooperation with EEA and the ESPON network.

Type of region	Definition	Population and land shares (%)	Population tendency (until 2050)
Overall Europe	The whole ESPON territory		Stable (due to immigration)
Urban regions	NUTS3 predominantly urban and intermediate regions (**)	Population (EU-27): 75,9% Land (EU-27 urban grid cells): 3,8%	Increasing to 84% share
<i>Urban sprawl</i>	<i>Large urban areas featuring low-density suburban rings around a monocentric city core.</i>	n.a.	Stable
<i>City Network</i>	<i>Networks of compact/high-density city cores connected with fast transport infrastructure and a polycentric distribution of urban functions/mix of land uses in the different cities</i>	n.a.	Increasing
<i>Compact City</i>	<i>Compact medium-size to small towns – relatively far from other cities so that they do not belong to any network - with a mix of land uses within city boundaries, which facilitate walking, cycling and public transport options</i>	n.a.	Increasing
<i>Ruralised City</i>	<i>Sparse settlements of detached agglomerations in an otherwise rural hinterland (“diffuse” or “ruralised city” forms)</i>	n.a.	Increasing
Rural regions	NUTS3 rural regions (**)	Population (EU-27): 24,1% Land (EU-27 rural grid cells): 96,2%	Decreasing to 16% share
Sparsely populated regions	Traditionally, SPAs are identified on the basis of population densities, with thresholds levels of 8 inhabitants/km ² for Regional Policy. According to the GEOSPEC project, SPAs are delineated on the basis of population potentials, i.e. the number of persons that can be reached within a maximum generally accepted daily commuting from each point in space. Based on a population thresholds of max 100.000 inhabitants (i.e. 12,7 persons/km ² within a 50 km radius), SPAs are delineated using the isotropic distance (i.e. the possibility to commute 50 km from a point in all directions equally) or as “poorly connected regions” using 45-minute travel times along road networks as a proxy for the maximum generally accepted commuting distance.		Increasing
Mountains	The delineation is based on altitude, terrain roughness and slope, building on studies conducted for the EC DG Regio and the European Environment Agency (EEA).	Population: 25,4% Land: 41,3%	Increasing
Coastal regions	As various types of coastal effects are associated with different ranges of mobility and interaction, a “one-size-fits-all” delineation (e.g. until 10 km from the coastline) is not considered. To identify these various ranges, GEOSPEC considers areas within 45 minutes distance by road from the coastline.	Population: 34,7% Land: 22,9%	Decreasing (due to climate change adaptation)
Islands	All territories that are physically disjoint from the European mainland or the main islands of the British Isles (UK and Ireland) are considered insular, including parts of municipalities, but excluding inland islands. Islands with a fixed connection to the mainland are a separate category.	Population: 3,4% Land: 4,7%	Stable
Border regions	GEOSPECS identifies different types of border effects. Because the ranges of mobility and interaction associated to these different types vary, a general delineation of border areas is not considered. However, a significant time-distance parameter used to identify these areas is 45 minutes from the borderline, as a proxy for the maximum generally accepted commuting distance.	Population: 17,6% Land: 18,8%	Increasing
Outermost	As the Outermost regions are legally defined, their delineation is given	Population (EU-27): 0,8%	Stable

regions	Land (EU-27): 2,3%	
Sea areas	There are six seas in Europe, the Atlantic Ocean, the Arctic Sea, the Baltic Sea, the Black Sea, the Mediterranean Sea and the North Sea. This identification is based on the application of several regional sea conventions such as OSPAR, HELCOM, and the Barcelona and Black Sea conventions.	Not applicable
Neighborhood regions	The range of countries addressed by the EU neighbourhood policy (excluding those already included in the ESPON space)	Increasing (especially in the South)
Rest of the World	All other regions of the world	Increasing

(*) Shares on ESPON totals – base year 2010 (if not specified differently); (**) According to the Eurostat urban-rural classification. It is important to note that the land cover indicated in the table is referred to the underlying grid cells: some rural cells should be allocated to the predominantly urban and intermediate regions to which they belong, which is not, and for this reason the share of land allocated to the urban category is underestimated (according to EEA 2007, urban plus urban landscape land cover in 2005 was 6,2%).

As indicated in the table above, in 2050, the urban regions as a whole still cover 6% of the European Territory (as in 2010), and the rural regions the remaining 94%. As compared to 2010, the total population is remained stable for the whole Europe, as the natural decline of the European population due to ageing and persistent low fertility are compensated by immigration flows that continued, especially from North Africa and South Saharan Africa. Immigrants are well integrated, and Europe is much more multi-ethnic and multi-cultural than in the early 2000s. However, the distribution of urban population is changed significantly: while the population in Layer A (large metropolitan areas) remained stable, the population increasingly preferred to live in Layer B, C and D areas. Depopulation of rural regions continued, although some of them are transformed in ruralised city forms (Layer D) with an increasing population and access to urban life standards. Immigrants are also directed to Layer B, C and D areas, and well integrated thereof, and no more concentrated mostly in larger metropolitan areas (Type A).

What do we mean by cities? In which form of cities the people will live?

The ancient Greek philosopher Aristotle, asked on why human beings – at that time as today – liked to live in the city, answered:

“People gather in the cities to live; they remain there to live better”

The distinction between rural and city life, as well as geography, was much more evident and clear at the Aristotle times than today, and it will become even more fuzzy in the next decades, until 2050. There are many definitions of a city. “City” can refer to an administrative unit or a certain population density. A distinction is made between towns and cities – the former are smaller (e.g. between 10000 and 50000 inhabitants) and the latter larger (above 50.000 inhabitants). “City” can also refer more generally to perceptions of an urban way of life and specific cultural or social features, as well as functional places of economic activity and exchange. Indeed, there are two different realities to consider: the *de jure* city – the administrative city – and the *de facto* city – the larger socio-economic agglomeration. The *de jure* city usually corresponds to a large extent in Europe to the historic city with its clear borders for trade and defense and well-defined city centre. The *de facto* city corresponds to physical or socio-economic realities which can be defined and concretely detected through either morphological or functional concepts.

For analytical purposes, a relatively simple and harmonized approach has been developed by Eurostat to identify population living in *urban areas*: 1) a population density threshold (300 inhabitants per km²) is applied to label grid cells of 1 km² as “potentially urban”; 2) a minimum size threshold (5.000 inhabitants) is then applied to potentially urban cells grouped based on contiguity, to label them as definitively “urban” if they are together above the density threshold. By contrast, the population living in *rural areas* is the population living outside the urban areas identified through this method. The approach based on the 1 km population grid overlying the whole EU territory classifies 68% of the EU-27 population as living in urban areas and 32% as living in rural areas. In addition, NUTS3 regions are classified as predominantly urban (PU), intermediate (IN) and predominantly rural (PR) according to the following criteria: a) a NUTS3 region is PU if the share of population living in rural areas is below 20%; b) a NUTS3 region is IN if the share of population living in rural areas is between 15% and 50%; c) a NUTS3 region is PR if the share of population living in rural areas is higher than 50%. Based on this new NUTS3 urban-rural typology elaborated for the EU-27 countries, the population is distributed today as follows: 40,3% in predominantly urban regions, 35,6% in intermediate regions, and 24,1% in predominantly rural regions.

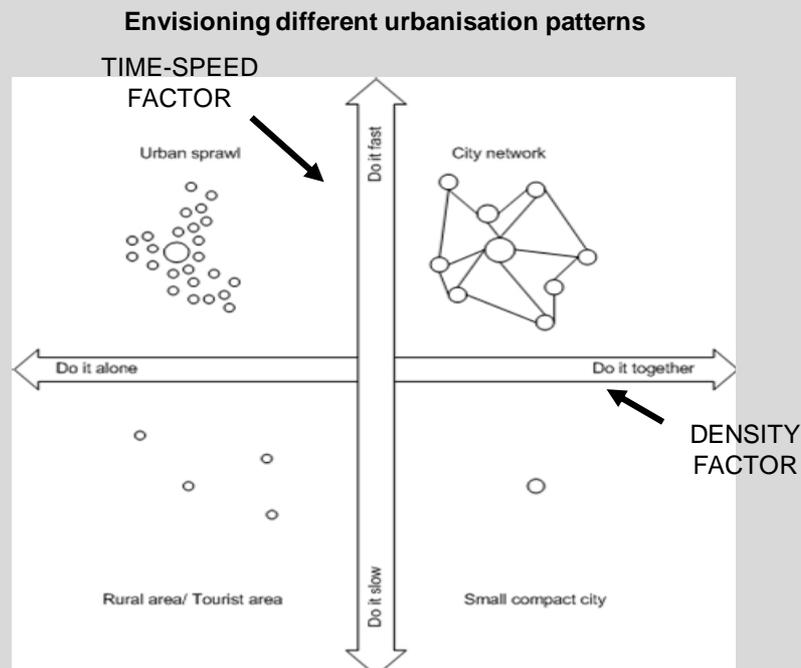
The above urban-rural classification applies a *Morphological Urban Area (MUA)* concept, depicting the continuity of the built-up space with a defined level of density. This criteria is used in the above definition to identify urban and rural areas, and to classify predominantly urban, intermediate and predominantly rural regions. A complementary concept is that of *Functional Urban Area (FUA)*. This is defined starting from urban centres/poles and considering their labor market basins and the daily commuting patterns they create. The

FUA concept includes therefore the wider system of peri-urban towns, villages and even rural places that are highly economically and socially dependent on a major urban centre. Thresholds of commuter flows to/from the urban centers are used to identify the boundaries of such wider functional urban areas.

FUA may be monocentric or polycentric, the latter corresponding to networks of tightly linked cities or agglomerations with no dominating centre and bidirectional commuting flows. However, neither MUA nor FUA are stable entities: as the urban landscape and economic patterns evolve, so do densification and mobility patterns. With past population growth and increasing urbanization, the reality of the *de facto* city in Europe has expanded far beyond the *de jure* city and it is at this level that urban policy must find its long-term perspective. The boundary between the city and the countryside is fading out while the rural and the urban somewhere have melted into a new “rurban” condition

In this context, we may consider for the purpose of building our Territorial Vision for Europe the population living in “non predominantly rural” regions (i.e. in predominantly urban and intermediate region) as “urban population”, and envision for this share of population – including nowadays a little bit more than 75% of European citizens - four different archetypical settlement typologies (cities/urban forms) where people may happen (or in the future prefer) to live.

The different typologies are presented in the grid below, based on two key dimension: 1) the time-speed factor, i.e. how fast is on average the connection between people living in the area, based on the form of the urban settlement and the availability of transport infrastructure (we do not consider congestion effects); 2) the density factor, i.e. how compact or sparse is the distribution of the population in the area.



This grid helps to identify archetypical urban forms that have been considered in multiple other studies in the field (e.g. *The Netherlands 2040* by CPB, 2010; *Territoires 2040* by DATAR, among others). The urban forms include: I) *Urban Sprawl*; II) *City Network*: Networks of compact/high-density city cores connected with fast transport infrastructure (e.g. high-speed trains or highways) and a polycentric distribution of urban functions/mix of land uses in the different cities that makes transport less car dependent (e.g. bidirectional flows between the cities may be best served by public transport alternatives); III) *Small Compact City*: Compact medium-size to small towns – relatively far from other cities so that they do not belong to any network - with a

mix of land uses located within city boundaries, which facilitate walking, cycling and public transport options; IV) “Rurban” Area/Tourist Area: Sparse settlements of detached agglomerations in an otherwise rural hinterland (“diffuse” or “ruralised city” forms).

3.1 Europe in the World

Since 1939, Europe is no longer in a position to determine the future of the world. Instead, the evolution of the world reshapes Europe.⁵⁰ To compete globally, cities need to be places where human capital and skills, as well as hard goods, are exchanged. But increasingly to compete, cities need to be active in the global services economy. The globally connected cities are indeed particularly important in terms of trade of services, and they will continue to be important places, continuing to attract human capital and international companies. However, Europe, while hosting some global cities, has a balanced and more even distribution of small and medium-sized cities than USA and China, and many of these have been growing in global connectivity too. Considering the challenges that global cities may have in terms of overconcentration and overheating which could hamper growth, this characteristic of Europe will be a plus as compared to other parts of the globe. A relief will be found for European global cities from small and medium sized cities in the vicinity, based on joint global promotion and networking activities.

In 2050, The EU-globe relationship is still shaped by unfolding globalization trends, in the areas of trade, mobility and energy markets. These trends impact the European territory and other continents alike. The globalization process has evolved towards a more balanced pattern. Uninterrupted technological progress has taken place while favoring sustainability. The largest part of the world population is affected by ageing, in particular the Asian region. This has considerably changed the conditions of international competition. The former gaps between the EU and the emerging countries have narrowed considerably as a result of demographic changes in these countries, and also because of significantly higher social and environmental expenditure, which has led to a much heavier tax burden. As production costs are converging in a large part of the world, globalization and international trade have kept their momentum. Competitiveness gaps have been reduced. Industrial production has decentralized within regional clusters, there are no longer real “workshop countries”. Intra-branch trade has strongly developed and EU external trade is more than ever an important component of European growth.

In 2050, countless key-players of the public and private sectors - including NGOs and the corporate sector - are involved in global governance. In this context, the EU has become a world actor/model/leader on the global stage, with increasing the power of Europe in defining global rules and being actively engaged in dealing with global challenges. Indeed, the EU is a successful institutional model of democratic multi-government/multi-stakeholders governance for other regions of the world.

In the global energy policy field, saving energy is a world objective, to which compulsory environmental standards to combat global warming also contribute. Tensions on the energy market are reduced, thanks to technological progress (abundance of renewable energy) and improvements in energy efficiency. Due to the action of the World Environment Organisation (WEO) a world-wide

⁵⁰ The continent is currently losing ground in its global share of trade and services. Existing markets, predominantly in the European neighbourhood, will remain important but Europe needs to look to expanding to new territories and markets to stay competitive in the long term.

efficient governance system on environmental issues has been set up. The WEO works in close consultation with the International Maritime Organization (IMO) to promote safe, secure, environmentally sound, efficient and sustainable shipping. The issues of conservation/ exploitation of natural and energy resources are settled, not only in the Exclusive Economic Zones (EEZ) of the various nations but also in the high seas. A less formal but very intense interregional cooperation takes place on a variable-geometry basis, involving countless public and private bodies on topics such as city networking, urban and rural development, “triple helix⁵¹” networking, transport, environmental protection, cultural heritage, etc.

Finally, a global territorial change, affecting in particular trade links between the Europe and Far East Asia, has been the opening of a new route in the Arctic Sea, due to climate change. Trade costs reductions via shorter distances translated into bilateral trade increases of around 20% between Northeast Asia and North-western Europe. As a consequence, intra-European trade is reduced, since the North-western countries are exporting more to Asia, while South and some Eastern European countries will experience a decrease in their exports to North-western Europe.⁵² However, although the melting of polar ice has provided new opportunities (navigation, drilling, fisheries), new environmental risks had to be taken into account, and the access to Arctic sea opportunities is tightly regulated by the WEO to protect the natural environment; navigation is carefully monitored, and the riparian countries have signed a treaty to put their territorial claims on hold (as in the Antarctic).

3.2 Europe and its neighbourhoods

Until 2050, the EU will continue the enlargement process including countries beyond the 27 members achieved in 2004, geographical widening the EU boundaries. However, a balance will be maintained for EU enlargement so as to avoid continual distraction of enlarging the Union and potentially weakening its ability to be a valid global partner. As a result of the whole process, in 2050 the European Union will be virtually enlarged to the whole ensemble of the 47 Council of Europe countries. Most of them will be full members of the Union, while some – namely Russia due to its global power status – will be associated in the EFTA agreement, as it is today for Norway and Switzerland. The EFTA will include also the two most advanced and wealthy countries in the East of Mediterranean, Turkey and Israel, was association has been facilitated by the definitive settlement of the Israel-Palestine dispute before 2020 and the much improved diplomatic relations between the two countries since then.

In 2050, the Eastern border of EU includes therefore what at the beginning of the century were the Eastern neighbourhoods. Since that time, the challenge of fostering more deep and sustainable democracies in the Eastern countries, with the “more to more” approach shaping the neighbourhood policy, was successfully tackled.

⁵¹ Government-university-industry cooperation, typical of the knowledge economy.

⁵² According to prospective computations carried out in a recent study, the trade shifts are translated into not dramatic but anyway territorially differentiated macroeconomic changes: GDP and welfare will show an increase in the countries that can directly use commercially the Arctic route of less than a percentage point, while some South-eastern European countries – Portugal, Spain, Italy, Slovenia, Greece, Cyprus, Hungary, Bulgaria and Romania – will experience a slight decrease of less than half a percentage point. However, besides these potential benefits and costs computations, there are several challenges and uncertainties that may hamper the use of the new Arctic route, including weather and ice movements that can reduce the navigation window, and enhanced vessels’ technical requirements in terms of ice class and size. Cfr. Joseph F. Francois, Hugo Rojas-Romagosa†, and Ana-Maria Vasilache-Freudenthaler, “Melting ice caps and the economic impact of the Northern Sea shipping lanes”, May 2013

On the South borders of the EU, the very unstable situation in the Southern and Eastern Mediterranean Countries (SEMCs) following the so-called Arab Spring, was eventually faded away. Initially, there was very little the EU could do to influence events directly, and the return to support the previous ‘false stability’ provided by the authoritarian regimes in the region was hardly an option. However, relatively soon – before 2020 - important demographic trends in the South neighbourhood (and beyond) regions pushed for increasing EU-MED and EU-Africa cooperation, to contrast threats and exploit instead potential opportunities of co-development for regions in different stages of demographic transition.⁵³

The Mediterranean area has offered also an important opportunity to address the EU’s energy transition challenge in a wider and more favourable territorial context, i.e. the EURO-MED and the Middle East areas, that have been associated in a cooperation agreement initially known as “the triangle of growth”⁵⁴. This designed before 2020 a shared EURO-MED energy transition roadmap to 2050, which was more than an extension of the EU Energy Roadmap to include the SEMCs in the European energy strategy: it became a triangular cooperation agreement between the EU, the SEMCs and the countries of Gulf Cooperation Council (GCC), to mobilize new financing sources and technical assistance for the development of renewable energy projects in the SEMCs.⁵⁵ This cooperation scheme opened the way to a “triangular Marshall plan” that fed the development of the whole South and East Mediterranean area. The latter became a main destination of FDI from Europe and the Middle East, initially targeted to the energy sector, but then flowing to other industrial sectors. This wider cooperation was enabled from the European side with the contribution of EUTECOS and Joint Territorial Integration Strategies (JTIS) in some key interface regions at the EU external border (e.g. Strait of Gibraltar and Sicily-Tunisia), and from the side of the SEMCs by new renewable energy and industrial South-South cooperation schemes established in the Southern shore of the Mediterranean and with Middle East countries. As a result, in 2050 a new Euro-Med partnership is established, and a new “co-production” model implemented, based on the

⁵³ Current demographic trends in the SEMCs and in South-Saharan Africa (SSA) give reason to think that the demographic and hence migration pressures will change in the coming decades. The EU, the SEMCs and the SSA are at very different stages of demographic transition, and this has important consequences for future socio-economic development challenges and opportunities in the area. In North Africa and Western Asia the youth bulge - which has been declining in Europe since 1950 - it is expected to stabilize at around 15% from 20% after 2015. This may offer a double opportunity to the South neighbourhood regions at least for some time: high educated cohorts represent economic potential for the regions while the dependency ratio may be declining and could help to reduce the potential for political strife and upheaval. However, just beyond the North Africa neighbourhood region, developments in Sub-Saharan Africa will be different. Mainly as a result of the expected continued high rate of fertility, the youth ratio south of the Sahara can be expected to remain at a high level, at about 28% of the total population up to 2030, and will then decline only modestly in the following decades. The rise in Sub-Saharan Africa’s share of the world’s youth population will continue to increase throughout the 21st century, while in North Africa, Western Asia and Europe may each remain flat.

⁵⁴ The current energy situation in the SEMCs is characterised by a rapid increase of energy demand, low energy efficiency and low domestic energy prices due to extensive and universal consumption subsidies. The latter act as strong disincentives to a more rational and efficient use of energy and investment in the energy sector, including renewable energy. In short, the current energy situation does not appear to be sustainable and poses several risks for the prospects of socio-economic development of the region. However, the SEMCs are endowed with a huge potential for renewable energy and significant energy efficiency and demand-side management (DSM) potential. With appropriate technological and institutional changes, all SEMCs could make use of this large potential. While in the past only hydropower potential was exploited (mainly in Turkey, Egypt and Morocco), other renewable sources, such as solar, wind and biomass can be developed for both domestic and export markets. Physically exporting electricity generated from solar plants in the SEMCs to the EU represents both a technological and a financial challenge. To limit transmission losses, high-voltage direct current transmission lines are needed, which are very capital intensive and therefore only viable if their utilisation is sufficiently high. However, physical exports might not be the only possibility to profit from renewable sources in foreign markets.

⁵⁵ Notably, a strong complementarity exists between these regions in the field of renewable energy. The wide availability of capital in the GCC, the great renewable energy potential of the SEMCs, with the possibility - considering their geographical proximity - to export some of it to Europe, and the institutional and technical support of the EU can represent the three main pillars of such a new ‘triangle of growth’ agreement. Today, private and public investors (such as sovereign wealth funds) from the GCC are increasingly focusing their investments on the renewable energy sector, with the aim of transforming oil wealth into future technological leadership in renewable energy. Some of the investment could be directed towards the SEMCs, whose potential for solar energy is among the highest in the world and which are already promoting several large-scale renewable energy projects. The EU should facilitate the implementation of this process by providing institutional support (in terms of both regulation and public finance) and technological know-how.

redistribution of the value chain between activities distributed on the North and South shores of the Mediterranean. The co-development strategy combines the huge market dimension (500 millions affluent consumers market) and R&D capabilities of the North with the energy, qualified labour and strategic access to Sub-Saharan Africa of the South shore of the Mediterranean. The whole area is also better connected through fast transport infrastructures. Indeed, the prospect of fast growing freight and passenger demand between the two shores of the Mediterranean has allowed major new infrastructure to be completed. In particular, a new fixed link across the strait of Gibraltar connect Spain and Morocco, and a new inter-modal route to Tunisia will cross Sicily, which will be connected in 2050 to the mainland after the realization of the Messina bridge.

The main territorial implication of the developments envisioned above will be the increasing strategic relevance of some gateways to Europe in the North, East and South borders. In the North, thanks to the opening of the Arctic Sea route, the ports in the Barents sea will get an unprecedented commercial relevance, and a fast transport infrastructure will connect those ports to St. Petersburg, another important interface area between Russia, Finland and the Baltic States. In the East, the most relevant gateway to Europe will remain Istanbul, but the interface strategic area connecting Rumania and Bulgaria to Turkey will be much more relevant than today, with high-speed train and highway infrastructures connecting the Danube area with Ankara in Turkey. In the South, the high-speed to Seville will be prolonged until Casablanca in Morocco, with the construction of the Strait of Gibraltar tunnel. This route will serve especially the trade with the Maghreb countries. As mentioned, another relevant interface area and route will connect Tunis and the hinterland (including also Libya) with the ports of Sicily (Trapani and Palermo), and from there to the mainland via the Messina bridge and new high-speed train connections (used at night for freight transport) to new strategic markets in Italy (especially in the South, which will be benefited by the whole co-development of the Euro-Mediterranean) and elsewhere in Europe.

Finally, in 2050 the increasing activities and vitality of the interface regions at the EU borders will influence the form of the network of Layer A global cities in Europe, as some gateway cities and regions – Seville and Cadiz in South Spain, Palermo and Trapani in Sicily, Sophia in connection with Istanbul, Helsinki and the Baltic States capitals in connection with St. Petersburg - will grow much more than expected in a “business as usual” scenario. The network of global and large cities will be less “pentagon-centric”, including more cities at the extremities of the European territory.

3.3 The future of the European territory

What will be in 2050 the European territorial characteristics that will represent a plus of Europe as compared to other parts of the globe?

3.3.1 A better quality of urban and rural life

Feedbacks to the 1st TeVi draft:

Addressed in this 2nd draft:

- Most of the people lives better, in a more cohesive, participatory society, with less top-down decisions making, a very diversified society, multi-ethnic, multi-religious, different needs are met in a multi-cultural society.

- Long before 2050 Quality of Life became the central issue: healthy, vital cities; diversity of cultural expressions, vital nature, diversity of landscapes, cities are not producing waste, but what was previously called waste, became gradually completely used as resource for new material, fresh water and energy. The specificities of Europe are qualities. Peculiarities - the differences from the general average - provided opportunities for diversity of place-based development. Since quality of life dominates our thinking and actions, we stopped applying old-fashioned economic simplifications as GDP and employment as only indicators for welfare. (Economic criteria were so dominant in the first half of the 21st century that we implicitly use them as only criteria and called beautiful island or silent peripheries “handicapped, lagging behind” regions). Quality of life consists of a large diversity of specific qualities and individual interpretations, not of measuring simplified quantities of abstract categories.
- Involvement of citizens
- Cities at different levels will play a role: this is one key issue in territorializing the vision, do something with polycentrism in the vision. Infrastructures change over the time, creating new hubs of various flows of which some develop as hub in the global economy.
- Pentagon should be accompanied not only by peripheral centres of Western Europe, but also by peripheral centres of Eastern Europe (Budapest, Prague, Warsaw ...) so that the distribution of (global city) power will be geographically more balanced.
- The big metropolitan areas are very important but how the medium size cities will be able to work at the European level, through networks? Indeed, large metropolitan areas are engines of economic growth, but medium size cities should be supported for polycentric model.
- MEGA's, big cities should not be limited but medium-sized cities should be more influential in the decision-making process.
- The most important spatial entities are functional regions cooperating in wider areas. Speaks about functional areas (cities + surrounding rural areas can be dealt with together).
- Through networking, small and medium cities play a major role; the natural, cultural and agricultural landscapes are valuable assets.
- Cities are still an object in the territory in the future. Nature, will have a higher value, it will become an asset in the mind of people, a nice environment is important, this is what will happen, less conflict between nature protection and living.
- Cities will be much more digital than it is now.
- More on urban economy (creative, Europe specialisation)
- Add the issue of multi-culturalism, an asset for cities
- High level rural housing/living
- Empowered role of small and medium sized towns in rural/regional development

Not addressed in this 2nd draft:

- Increase population in Europe also means improve the position of women in the society. In case women have a good education, employment and therefore sufficient income, motherhood will be for them a more attractive idea. Leaving the job shall not bring such a fundamental deterioration of living standards and a system of care should operate across the EU.
- Immigration: multidirectional world
- Immigration will be spatially uneven
- Demographic trends can be changed with suitable demographic policies
- More urban-rural social and economic integration (consider Urban cooperation league and Rural cooperation league working together for balanced development)
- Private sector interests and investments of driving forces for the cities

Globalization still favors metropolitan areas in 2050, but their economic and demographic growth capacity is limited by various hindering factors. Virtually every large European city has completed the “urbanisation/suburbanisation/counter-urbanisation/re-urbanisation” cycle. The globalization process turned out to be a positive sum game between cities. Worldwide cooperation between

private and public bodies from various cities considerably intensified, whereas a small number of “global cities” emerged in each continent as main gateways to the global economy. In Europe, these cities are no more only concentrated in the “Pentagon” – whose global cities continues however to represent a strategic interface network for the communication with the key-players of the globalized economy – but extended in a wider area that include cities that were peripheral centres of Western Europe (e.g. in Spain and Portugal) or Eastern Europe (e.g. Budapest, Prague, Warsaw), but in 2050 are new centralities. The peripheral cities and regions have capitalized on significant opportunities generated by higher growth and better living conditions, and stronger links with neighborhood countries.

Development and quality of life prospects are better in secondary growth poles offering attractive living conditions and good connections to the metropolitan areas. In countries with no such areas (e.g. Switzerland), larger cities have been boosted and they attract international functions of good level despite their relatively smaller size. Small towns and rural areas are however not penalized by these developments. Moreover, the polycentric paradigm of European territorial development has been consistently implemented, especially in less central areas, where capital-cities and other cities have been voluntarily supported to rebalance the territorial structure of the continent. The completion of some missing cross-border links in the TENs has considerably improved physical connectivity between cities.

Cooperation in cross-border, transnational and global networks of cities has considerably intensified. Tangible cooperation projects focusing on specific issues of relevance for territorial integration are particularly successful. Permanent thematic networks contribute to harnessing synergies between projects addressing similar issues, whereas macroregions and Euregios (the latter including also some interface regions at the external North-East, South-East and South borders of the EU) , concentrate on long-term cross-sector territorial integration strategies.

A European smart, sustainable and inclusive eco-city model is widely implemented, whose key-principles are as follows:

- make cities of tomorrow places of high social progress with a high degree of social cohesion; platforms for democracy, cultural dialogue and diversity; places of green, ecological or environmental regeneration; places of attraction and engines of economic growth;
- promote a compact settlement structure and combat urban sprawl;
- transform profoundly the metabolism of cities : forego the old linear metabolism (high quantities of inputs and outputs) and promote an efficient circular metabolism through minimised waste and emissions and maximised recycling;
- promote social mix in neighbourhoods and at school through all appropriate means (e.g. small public housing operations in the urban fabric or appropriate mix of more and less profitable operations in planning permissions delivered to private developers)
- favour high density urban development in strategic nodes and along public transport lines; forego further development elsewhere, and promote progressive ecological restoration of low density residential areas inherited from 20th century urban sprawl;
- strictly protect the blue-green infrastructure; be more flexible in zones dedicated to economic activities and residence
- irrigate residential areas with public transport and slow traffic (pedestrians/cyclists) infrastructure while reducing car traffic speed and land take

- adopt a holistic model of sustainable urban development; integrate policies vertically (between decision-making levels), horizontally (between sector policies) and geographically (transcending administrative boundaries, e.g. those of municipalities) while deeply involving citizens.

Long before 2050 Quality of Life became the central issue: most of the people lives better, in a more cohesive, participatory society, with less top-down decision making, in a very diversified society, multi-ethnic, multi-religious, where different needs are met in a multi-cultural society. In 2050, most of the urban population lives in healthy, vital cities, but also the rural regions are not lagging behind, thanks to a regeneration of the rural landscapes – with more bio-productions in some areas and/or valuable natural assets protected in other areas – and the permanent repopulation of some rural/attractive towns in the countryside, in some coastal areas, islands or mountain areas. The widespread availability of fast Internet connections in these areas, new e-health care and other e-services make easy – especially for older workers and the elderly – organise the daily life in these rural regions.

Cities and also some rural/peripheral regions are able to offer attractive places and lifestyles, associated with place-based qualities such as cultural and recreational amenities, diverse neighbourhoods, architectural quality, access to nature, etc. which attract the creative workforce, and this contributes to better territorial balance and cohesion.

3.3.2 More clean and secure energy

Feedbacks to the 1st TeVi draft:

Addressed in this 2nd draft:

- More sustainable energy, with waste reduction, energy saving, local production, local services, social chains; decentralised energy grid.
- METREX has done work on the scope of energy saving in urban Europe and the scope for urban renewable energy generation. The conclusions are: 1) final urban energy consumption could be reduced by 29% in the period to 2030; 2) urban solar energy, using the potential of PV on roof space alone, could meet some 13% of final energy consumption and 60% of the demand for electricity; 3) this would mean the achievement of 27% energy self-sufficiency, and consequent security of supply, from these measures alone; 4) it would also mean 42% decarbonisation and a 26% reduction in greenhouse gases; 5) energy saving could, progressively, deliver some €265bn a year; 6) if such savings were to fund the retrofitting and generation required then some 2.6m jobs might result; 7) after the investment phase savings would become disposable income or funding for further investment. Our view is that there is a decentralised energy future available where Europe's urban areas become the decentralised power stations of the future.

Not addressed in this 2nd draft:

- Be more controversial (quid nuclear energy?)
- Current Member States strategies are very different (France going for nuclear, Germany for renewable energy)
- More hydrogen/electric based industries, ICT based
- Discuss how diverging Member States energy policies can converge
- Nuclear programs have to be approved and are controlled at EU level
- Show what are key grid connections that need to be made
- Check energy/transport questions against general EU concept of free movement of people and goods.
- Not all territories will be able to achieve national Renewable Energy Source targets. Some countries do not have enough national RES energy sources to comply with the negotiated targets. Some countries have too many natural areas (Nature 2000) which prevent from developing RES production in them (generally

speaking, Nature 2000 should not be an obstacle, but in the real world, project implementation is “a mission impossible”). Such an inability could lead to energy poverty on the “territorial” level (import-dependent territories).

In 2050, Europe has successfully completed the transition to a low carbon economy. Energy intensity (energy consumption elasticity in relation to GDP) has decreased due to more service oriented economies and increased resource and energy efficiency in production and consumption. Carbon intensity (GHG emissions elasticity in relation to energy consumption) is also decreased thanks to improved technology. The goals set out in the Energy Roadmap to 2050 have been achieved, and a transition took place from a system characterized by high fuel and operational costs to a model based on higher capital expenditure and lower fuel costs. Impressive energy savings have been achieved during the first half of the century.

Smart grids have revolutionized electricity production and distribution but the amount of energy so produced has turned out to be insufficient to meet all the needs. Decentralized energy production and electricity storage capability – including that provided by vehicles to grid connections – is generalized, but centralized large-scale systems of energy generation remain essential. Concentrated solar power stations in Africa and southern Europe deliver a very significant contribution. Decentralized and centralized power generation systems complement each other, for example, if local resources are not sufficient or varying in time, or in case of strategic threat on major power plants and transmission lines. A fair and geographically balanced access to energy at a moderate price has been secured everywhere. An ambitious action plan has been successfully implemented to reduce the vulnerability of regions facing energy poverty (especially in Eastern and Southern Europe) and promote energy solidarity between regions.

Europe is not de-industrialised, on the contrary, the industry has evolved successfully towards a circular economy concept applied in all sectors, with the dematerialization of most industrial activities thanks to technologies enabling enormous resource productivity gains. The same concept of “resource productivity” has evolved into “getting more value per unit of resources”, with the same resources having a second, or a third life. Europe continued to be the champion in energy efficiency achievements in the industrial sector. The material savings from recycling, waste prevention and eco-design has been in the order of 30% of all non-energy material consumption.

The energy challenge has been tackled especially in cities. They are no more only centres of energy consumption, but also of energy saving and production:

- Firstly, cities succeeded in energy saving. Cities are the places where public buildings (12% by area of the EU building stock) and houses, private offices, shops and other buildings (almost 40% of final energy consumption) are concentrated. Techniques to cut existing buildings’ consumption by 50-75% and to halve the energy consumption of typical appliances existed since the early 2000s. Moreover, energy saving investment showed a double dividend: while reducing energy consumption, the retrofitting of buildings generate jobs, and the energy bill savings are permanent, generating disposable income after the investment pay-back period. The 2012 EU directive on energy efficiency was successfully implemented. This required member states to adopt a long-term strategy for renovating private and public buildings, imposing an obligation to renovate 3 percent of the floor area occupied by central government each year. This triggered emulation by local government and beyond, in the private sector, and it represented a major push in favour of energy performance contracting, featuring measurable performance commitments that the private partners must guarantee. Contracts of this type generate

significant, achievable energy saving over time, with investments amortized over 10 years at most. They became a popular instrument, widely used in cities across Europe to renovate the urban fabric. Renovation of the urban fabric included rationalizing building heating systems, but also switching to renewable sources (e.g. with the installation of solar panels where appropriate) and the fitting of building energy management systems. More generally, the EU, where heating accounted for 46 of energy consumption, adopted before 2020 a new roadmap for heat, establishing specific targets for district heating networks, which proved to be far more efficient than individual installations. Better construction and use of buildings in the EU has influenced 42% of our final energy consumption, about 35% of our greenhouse gas emissions and more than 50% of all extracted materials. It has also helped us save up to 30% of water. By 2020 the renovation and construction of buildings and infrastructure has been made to high resource efficiency levels. The Life-Cycle approach has been widely applied; all new buildings are nearly zero-energy and highly material efficient, and policies for renovating the existing stock are in place so that it is cost-efficiently refurbished at a rate of 2% per year. 70% of non-hazardous construction and demolition waste is recycled. Remarkably, sand and gravel and other non-metallic minerals for construction are a major EU import, and the successful zero-waste policy in the building sector has contribute to reduce such imports by 27%.

- Secondly, and coupled with energy saving achieved in the building sector, the urban renewable energy potential has been also recognised and actively promoted. Either as a decentralised sources of energy, e.g. by means of solar panels connected to the grid, or providers of electricity storage capacity to balance the grid (e.g. by means of solar park installations in the cities and in their hinterland), the cities in 2050 are truly decentralized “green power stations”. In this respect, the most optimistic visions of the past have proven correct, and urban solar energy, using the potential of PV on roof space alone, met some 13% of final energy consumption and a consistent share of the demand of electricity, enhancing energy self-sufficiency and consequently energy security in Europe.

In 2050, millions of individuals in Europe can collect and produce locally generated renewable energy in their homes, offices, factories, and vehicles, store that energy in vehicles batteries connected to the grid or in the form of synthetic gas (or hydrogen), and share their power generation with each other across a Europe-wide intelligent grid.

3.3.3 More sustainable transport

Feedbacks to the 1st TeVi draft:

Addressed in this 2nd draft:

- The digital society matters a lot and influence the transport needs, as people are less rooted in the same place and this causes greater mobility.
- Not only missing transport links should be completed, but also capacity of major existing links should be increased, in particular within the Pentagon.
- Technologies will help to move less daily from home to work, but moving will be more induced by tourism, leisure and social interactions.

- 2050, a very quiet environment: no noise, no cars in the city, very fantastic, cities more attractive, new way of travelling of working, ICTs developed with more dematerialised, electric and hydrogen cars; the economic model is also based on local apps, smart phones and everything accessible to everybody.
- There are no cars anymore, silent world, big flows of information, you can get in touch with everything you need just by thinking to it, the need of mobility will be dramatically reduced, accessibility improved.
- Real land use management policy strategies, connecting transport and mobility with land use, are needed
- It seems that dramatic reduction of GHG emissions in transport is possible (technology, “zero” CO2 gasoline, legislation which demands that long distance freight transport is done by railway) but a dramatic turn over is likely not to be achieved because it is in contradiction with the general orientation of free movement of people and goods in EU. Namely, free movement of people means that decision where to live and where to work is a basic individual choice which, on the one hand, should not be questioned, while on the other, it demands for daily commuting, specific distribution of services of public interest, higher expenses for fuel... On the other hand, the concept “just in time” in economy sectors requires daily distribution of raw materials to producers which increases the traffic, congestions, emissions, increases demands for road improvements and expenses for management and causes economic losses in case of unpredictable weather events (road closures due to snow, floods....).
- Besides, delays with the improving and integrating railway system would prevent from efficient EU transport system, taking into account that territorial cohesion can be achieved in sustainable way only if no EU territory is left outside the major flows.
- As it concerns air travel, we know that air travel is more damaging because of the impact of emissions at the height that planes fly. Whilst it is possible to envisage low emission transport technologies for many modes of transport, particularly in a renewable energy plentiful future, and we know that hybrid planes are being developed, it is difficult to see how air travel growth can be sustainable. Air travel doesn't seem to feature in the ET 2050 futures as yet but, its impact is great and would become greater in a Europe (67% until 2050?) growth scenario. And air travel is obviously relevant to connect cities within Europe and to the rest of the world. We would envisage high environmental taxes on air travel, to control take up within emission caps, in much the same way as congestion charges seek to control urban road capacity.

Not addressed in this 2nd draft:

- Add more efficient multi-modal infrastructure and sea motorways; multilevel communication without borders.
- It is important to better link the north and south of Eastern Europe.

In 2050, a radical progress has been achieved in the transport sector, which led to a 60% reduction of GHG emission in four decades. New and sustainable fuels and propulsion systems have been developed in virtually every transport mode. Green freight (rail, sea and inland waterways) corridors have marginalised long-distance road freight. An EU-wide multimodal TEN-T and the HST networks have been completed (in particular through closing missing links in border regions), all core network airports and seaports have been connected to the rail network and, where possible, the inland waterway system. The efficiency of transport and of infrastructure use has been increased, thanks to information systems and market-based incentives (including the full application of the “user pays” and “polluter pays” principles). Due to the increasing use of smart technologies to operate infrastructures and services, less roads and rail infrastructure has become necessary. However, some transport infrastructure deficits constraining economic growth still exist on Eastern European regions, while in most Southern regions infrastructure investments on long-distance Transeuropean networks have been very high in the previous years, largely because of Cohesion and Structural Funds, to the point that infrastructure endowment is now one of the main assets for future development (even if local and regional infrastructure still presents deficits and the infrastructure actually build often was not cost-effective).

Transport demand has increased following the economic growth. No decoupling has been achieved neither for freight nor passengers for any trip purpose and long-distance travel, but – and most importantly - only for urban mobility in most of the European cities. The number of intercontinental flights from major airports and maritime routes from ports have become increasingly important development assets. European major gateways for passengers and freight transport to the neighbouring countries and the rest of world continued to expand their capacity to achieve even higher economies of scale, requiring specialised connections from the rest of the territory, either dedicated freight lines or High-Speed trains. In this context, some balancing of hub-and-spoke networks were necessary to achieve a more efficient traffic distribution across Europe (e.g. promoting Mediterranean ports to capture new maritime flows from the South Mediterranean, increasing the intercontinental flights from national airports). As it concerns air travel, although new hybrid planes have been developed, the growth of traffic is hardly sustainable: however, air travel remains essential to connect cities within Europe and, through the major airport hubs, with the rest of the world, and it is subject to environmental charges linked to emission caps.

The most radical changes, however, are achieved in urban mobility. Landscapes of parked cars in most of the inner cities and daily traffic jams at peak-hours – also on the hinterland highways - are a memory of the past. Urban congestion still occurs sometime, but it is episodic (mostly due to unpredictable accidents) and efficiently solved thanks to the operation of real time traffic management systems. Congestion disappeared both due to changes in the daily travel demand, that is reduced and much more flexible than in the past⁵⁶, and to changes in the quality of vehicles and urban transport services. Public and private transport are radically changed. As it concerns the urban public transport, mostly automated metro and tram lines continue to serve high demand routes, but scheduled bus services are substituted by seamless door-to-door public transport mostly provided by cyber-vehicles (there will no longer be any bus stop or time schedule, when you need to be moved from one destination to another, the vehicle will be provided to you according to your time schedule rather than a fixed one for everybody). Moreover, according to EU regulations, private car circulation is allowed in the major city centers only to privately owned non conventional fuel cars (mostly gas or bio-fuelled hybrid vehicles, which represent about 60% of the vehicles circulating in the cities) and to shared fleets of autonomous Electric Vehicles, which will represent about 40% of the vehicles circulating in the cities. As the fleets of autonomous EVs (Utility Cars) will be continuously circulating to serve different users, or parked in off-road deposits (while today privately owned cars stay parked on-road on average 96% of their life span, contributing to urban space congestion), they will not use anymore on-road parking space, and this will free further space for circulation. Depending on the penetration of fleets of shared EV as compared to privately owned hybrid cars (that have the same parking requirements of conventional cars), in some cities congestion is really in 2050 a memory of the past. In addition, also the private hybrid cars are fully automated, and subject to regulated driving that imposes regular speeds on urban highways when the traffic become too dense, or low speeds in urban traffic calming areas. This contributes a lot to reduce traffic congestions on the highways and safety in the urban areas, besides other favorable environmental impacts (less noise, pollution and CO₂ emissions).

As a result of the above changes, new forms of urban and peri-urban collective passenger transport services (including car sharing) are dominant in the 2050 city environment. Collective transport has gained a much higher share than in the early 2000s in the transport mix, become easily accessible for

⁵⁶ In 2050, most of the working population will not need any more to be at office 9 to 5 pm, but people can work from home or everywhere they like, adjusting their daily or even weekly visits to the office as it fits better to their or their household needs. So urban mobility patterns will not present “peaks”, but will be much more continued and smoothed over the daytime.

everyone and fully integrated with non-motorised modes. The use of integrated electronic tickets and smart cards provides public transport operators and authorities with real time statistical data on users' behaviour, and this information is used both to optimise the planning of the services and to design marketing strategies aimed at increasing the use of collective transport. Information on the available choices and the ability to purchase tickets has been revolutionised through personal mobile communication devices. In the inner cities, walking and cycling, together with collective transport, often provide better alternatives not only in terms of emissions, but also of speed: they have substituted the large share of trips which cover less than 5km. In addition to lowering greenhouse gas emissions, they bring major benefits in terms of better health, lower air pollution and noise emissions, less need for road space and lower energy use. Facilitating walking and cycling has become an integral part of urban mobility and infrastructure design. Town planning, access regulation including Low Emission Zones, stricter controls on parking, pricing policies and alternative forms of accessibility (eGovernment, tele-working, etc) significantly influence mobility choice. Town planning and appropriate governance, at the level of functional urban areas, are crucial. They favour good coordination between transport planning, brown field regeneration and new settlements in the wider functional area. The use of standard technologies (for example for electronic tolling) and of common criteria (for example on the type of vehicles that are admitted in Low Emission Zones) help to reduce suppliers' costs and facilitate users' compliance.

As it concerns urban freight transport, in 2050 the interface between long distance and last mile transport is organised more efficiently everywhere, by the consolidation of freight at multimodal logistics centres located on the outskirts of cities, coupled with distribution centres and collection points within the city. The aim of this reorganization was to limit individual deliveries, the most 'inefficient' part of the journey, to the shortest possible route. Companies often share their loads in an effort to reduce empty and inefficient runs, and information technology assist these practices with better cargo and travel planning and tracking and tracing capability. The last mile delivery is performed with smaller and cleaner trucks. The use of new engines and energy carriers – electric and hybrids freight vehicles – is part of the strategy to reduce the carbon intensity of city logistics. New engines also have the advantage of silent operation, allowing a greater portion of freight transport within the urban areas to take place at night time. This contribute to further ease the problem of urban road congestion during the daytime.

3.3.4 More green and blue growth

Green Growth (on the land)

Feedbacks to the 1st TeVi draft:

Addressed in this 2nd draft:

- A sustainable Europe, in terms of energy, water, food, waste and biodiversity is possible to imagine and the technologies and policy approaches exist to achieve this. However, the key issue is what would a sustainable economy look like? The global population is currently 7bn plus and this may rise to 9bn plus by 2050. We know that the GDP per capita for the 1.2bn in the OECD countries is about \$33k a year, for the 3bn in the BRICS is \$2-7k and in much of the rest of the world it is \$500 plus. The Vision (as per 1st draft) envisages a 1.4% growth rate to 2050, which implies a 67% increase in the period to 2050. What assumptions have been made about growth outside Europe and how would this be sustainable if even our present levels of consumption in the OECD are not? One response is, as is said, through the more efficient use of resources. The EC has said that resources will have to be regarded as having a higher value, in the same way that labor now has. But even this would not enable a 67% growth to be achieved. A sustainable

European economy can only exist in a sustainable global economy and this can only be contemplated if most of the world consumes more and the OECD less. Indeed, the words “sustainable economy” are easily and frequently used but not so easily imagined. It seems likely that they will mean less, longer lasting and local. This seems to imply a move away from global dependence to greater local security and supply.

- Changing paradigm: prosperity towards quality of life
- A Europe, small player in a global economy. After 2020, paradigm shift, which led for the European territory to: a balanced place in Europe, good living conditions for the European citizens, a pattern of interaction with the global market and the global economy.
- Europe is green: nature plays a central role: a perfect distinction between urban areas and green areas. Urban areas have their own characteristics but they don't overwhelm the other places; a lot of diversity throughout Europe, and people can live in the place they want to live; the specificity of a place is enhanced in different parts of Europe.
- What about the agricultural area: more than 80% of the territory remains rural: will it be used for food production, etc? How to enhance the value of nature.
- Cultural identities, agricultural aspects, nature assets will gain more importance; also the maritime dimension will become very important.
- Welfare state, services for the elderly, etc. and less production.
- Senior citizen still working with pleasure; uniqueness of location; more general rule related to nature and agriculture, with local participation, local policies combined to a global vision.
- 3D printing should not be too much emphasized (as in the 1st TeVi draft, when nothing is said about other possible new technologies)
- More local production-processing-consumption chains
- Promote more local food production/consumption
- The 1st TeVi draft concludes that, “many so-called “rural areas” no longer invest in traditional crop-farming and stock-rearing industries, but instead in the “New Rural Economy (NRE)”. Whilst it is sure that rural areas have, and will continue, to diversify, it also seems certain that in the world of climate changed 2050 the productive capacity of the globe will diminish. In these circumstances the productive capacity of Europe’s rural areas will become a yet more valuable resource, where food production would have to increase.
- New rural economy – a leading principle for most of the European territory
- More on the private sector, business, economic structures.

Not addressed in this 2nd draft:

- More on business and mobility, location preferences
- Excellence also for small and medium enterprises.
- To converge towards a common social protection schemes requires substantial shift away from the current Member States power on the matter.

As a conscious pathway to definitively recover from the 2008 crisis, the European economy has entered since 2015 a phase of more qualitative than quantitative growth (1.4 % yearly growth rate, sizeably below the world average). The need to reduce drastically both the emissions of greenhouse gases and the use of resources, coupled to a chronic high level of unemployment made the conditions ripe for a radical economic rethink. Having despaired of reaching stricter binding targets at international level, and very conscious of the geopolitical and economic advantages that it would obtain, the EU has decided to go it alone. The EU embraced green taxation wholeheartedly, with the purpose to reduce emissions, reduce imports of energy and raw materials and address unemployment. This led to decreased taxes on labour to tackle unemployment and keep service companies competitive. In addition, the EU enacted a raft of binding legislation on energy and resource efficiency based on steadily improving best available technologies. Under the pressure from European public opinion, EU leaders decided to set up cost compensation mechanisms at the EU

borders in order to avoid hampering unduly the international competitiveness of EU companies. Green public procurement has become the norm. This environment gives EU companies a competitiveness boost.

In 2050, Europe has therefore restored its competitiveness through an industrial rebirth of high productivity activities derived from technological innovation. Europe exports worldwide a wide range of high level manufacturing goods and services. The increase of production costs in emerging economies has rebalanced the terms of world trade. Europe is clearly among the globalisation winners and benefits from ever increasing opportunities. The decentralisation of industrial production (favoured by 3D printing) gives an edge to the consumption centres, in particular major cities. The map of disparities has become more complex and looks like a *“leopard skin”*, with less-favoured regions sometimes located very close to the most prosperous areas. Behaviour change and social innovation, in particular a quest for constantly greater sustainability, have deeply modified the business environment, avoided repeating mistakes of the past and stimulated environment-friendly growth.

The eco-industry/circular economy paradigm is the dominant one in Europe. This entails a different way of doing in every sector and phase: extraction, production, consumption and end of life. Just like every other continent, Europe started very simply to create a circular economy, recycling paper, cardboard and scrap metal. However, to take the process to the next level required technological advances to ensure that recycled products are able to meet requirements for quality, health and safety, and economic competitiveness, and often the change of entire business models. The *“cradle-to-cradle”* pathway of products involved many changes as compared to conventional practices of the past, including: i) in the extraction stage, shifts to renewable resources, more secondary raw materials, shorter supply chains and more local sourcing; ii) in the production stage, more industrial symbiosis, more distributed/small-scale manufacturing, waste reduction with very efficient material separation, redesign/adaptation to service based business models; iii) in the consumption phase, shift to consumption of local products, sharing of durable (e.g. cars) and capital goods, and the development of IT systems/social platforms in support of shared consumption/use; iv) in the end of life phase, company ownership of the end-of-life products and new recovery service business models, decreases in volumes of waste, new waste collection and material/energy recovery techniques, and expanded industrial symbioses to close material and energy loops across different sectors and companies located in the same areas. The new business models now prevailing in several eco-industry sectors, rather than trying to sell more focus on selling less, despite the fact that they are still generally financed via sales. Widespread environmental tax incentives helped the economic operators to shift to business models where the remuneration is based on the quality of service performance rather than volumes of products sold. Considering the virtuous environmental impact that these business models deliver, operators are often incentivized to increase their income by meeting targets of material or energy consumption reduction set by local authorities rather trying to sell more volumes of products.

In 2050, policy steps and programmes to strengthen economic, social and territorial cohesion still remain necessary, to stimulate development in some lagging regions of the EU but also in still deprived areas of non-EU EUROMED countries. However, various less accessible remote areas of eastern and southern Europe remained more *“agrarian”* and experienced little diversification of their economy. Especially in these remote areas, a proactive support to *“Services of General Interest (SGI)”* contributed to economic recovery, but also, and more importantly, a proactive rebalancing of the (often too monocentric) urban system, combined with an improvement of the accessibility and a

diversification of the rural economy. Targeted policy steps were also taken to tackle issues specifically faced by areas affected by a geographic handicap, in particular the Arctic and mountain areas, and islands. However, two drivers contributed to revitalize the more accessible rural regions in Europe. The first driver was the opportunity created by climate change, that in 2050 has decreased the productive capacity of agricultural land in other regions of the globe, while is increased in the North of Europe. In these circumstances, the productive capacity of Europe's rural areas has become a yet more valuable resource, where food production has increased. The second driver was the fact that many so-called "rural areas" no longer invest in traditional crop-farming and stock-rearing industries, but instead in the "New Rural Economy (NRE)", i.e. other industries associated with the rural economy (e.g. tourism, local trade and products) but also some manufacturing and service industries more directly associated to bio-resources and organic agriculture. Moreover, growing attention is paid to the needs of people not engaged in active employment, who are a source of financial transfers and consequently an opportunity for job creation in many regions. Besides, the spatial distribution of jobs no longer mirrors the geography of production. Due to the importance of welfare transfers in Europe, a significant part of the added value is not spent in its region of production, but in areas inhabited by specific groups of population (commuters, pensioners, students, some unemployed people). This is the basis of a "residential economy" fed by considerable financial transfers associated with the redistribution of taxes and welfare contributions. This process impacts much more on the reduction of disparities than do regional policies. Moreover, jobs so created are more evenly distributed on the territory and more stable than those created by conventional manufacturing industries.

As it concerns the impact of the economy on the Europe's territory, this remains less adaptable than, for instance, the US territory to economic transformation. Geographical and historical circumstances, still valid in 2050, explain why the "shale gas revolution" didn't cross the Atlantic to transform the also the European energy landscape In 2050, namely the higher population density and the different natural resource ownerships rules prevailing on the two sides of the Atlantic (these are public in Europe and belong to the owner of the land in the US). The weight of history continues therefore to play an important role in EU territorial policies, whereas high standards apply to environmental protection and the conservation of natural resources.

Except in the most recent accession countries, the EU borders have lost their former filtering role. Borders have become highly permeable thanks to the construction of new infrastructure and simplification of controls. The intensification of trade has favored new activities in border regions and reduced the income gaps, as a result of various mechanisms catalyzing territorial integration, in particular cross-border and transnational territorial cooperation supported by the EU at its internal and external borders.

Blue Growth (on the sea)

Feedbacks to the 1st TeVi draft:

Addressed in this 2nd draft:

- Maritime policy matters, but making a long history of ICZM, Integrated Maritime Policy and Maritime Spatial Planning (as in the 1st TeVi draft) does not make much sense since it's only a framework proposed by the EU which does not really change the practices in the MS (except if we have one day a Framework-Directive on Maritime Spatial Planning). It would be more appropriate to examine what could be in 2050 the place of maritime activities in EU economic development and what could be the level of protection of coastal zones and maritime environment.

- More on blue growth, and potentials, related to the different European seas
- Integrated approach to maritime/coastal/hinterland issues needed
- Why sea basin strategies? (they are mentioned in the 1st TeVi draft)
- A very particular vision about the sea: marine laboratories, new exploitation of new resources, development of marine technology, importance of marine biodiversity, we'll have lot's of more renewable energy: marine turbine, wind farm, big platform associating wind farm, development of artificial islands, with all the opportunities offered we can change the management of the Region, the Atlantic sea front can have a specific management structure. Development of the Blue Economy/Growth, sustain: mine research should develop that.

Not addressed in this 2nd draft:

- Maritime vision: we believe in the big roles of maritime cities to answer the great future issues about ocean resources, the importance of maritime metropolitan functions.
- For Outermost Regions (ORs) and Overseas Countries and Territories (OCTs) express also contradiction (what does a "single market" mean for them).
- I take well into consideration the Mediterranean region in the reflections, particularly in terms of relationships with the South and East Mediterranean countries during this sensitive period following the Arab springs – as well as the role of the Regional Sea Conventions, namely Barcelona Convention/UNEP/MAP and Bucharest Convention/BSC as instruments supporting the integration process and cooperation with neighboring countries.

The sea is closely connected with people's lives in large parts of Europe. 35% of the European population lives in coastal areas and 3% on islands.⁵⁷ The sea is a valuable source of economic development, constituting a key pillar for trade, growth and employment. These valuable marine potentials are explained by the richness of the European seas in energetic, mineral and food resources as well as by their transport possibilities. There are six seas in Europe, the Atlantic Ocean, the Arctic Sea, the Baltic Sea, the Black Sea, the Mediterranean Sea and the North Sea. This identification is based on the application of several regional sea conventions such as OSPAR, HELCOM, and the Barcelona and Black Sea Conventions. However, the definition of seas and sea borders is not always straightforward, and there have been several approaches in terms of European policy to identify the sea boundaries.⁵⁸

Like other territorial potentials, those for maritime development are not equally distributed across all part of Europe, and this geographical legacy set the scene of maritime resources exploitation also in 2050. There are:

- Strong land-sea interactions at the economic core of Europe and in some regional hubs. The territory extending from the North Sea to the Atlantic coincides with the highest concentration of economic activities based on land-sea interaction. In turn, regional hubs as the one located in the western Black Sea and in Portugal, present intense land-sea interactions nourished by transnational maritime clusters, smaller ports and tourism. These intense economic land-sea interaction territories are obviously responsible for high pressure on the maritime environment.
- Weaker land-sea interactions and maritime rural areas. Transition areas, such as the ones found in the eastern Mediterranean and the Baltic Sea, show less intense land-sea interaction and pressure on the maritime environment. However, they still gather significant economic benefits from their maritime activities thanks to their function as transport corridors.

⁵⁷ Cfr. ESPON, Territorial Dynamics in Europe: Regions Integrating Land and Sea, Territorial Observation No. 8, August 2013.

⁵⁸ The identification of marine boundaries is mainly based on maritime law and the international maritime conventions. According to maritime law, all nation states have declared territorial waters extending up to 12 nautical miles (about 22 km), while others have declared exploitation rights, based either on Exclusive Economic Zones (EEZ) which extend up to 200 nautical miles (about 370 km) from the shore, or based on the limits of the continental shelf, under the UN Convention on the Laws of the Sea.

- Important maritime jobs potential in Mediterranean regions. In Mediterranean regions the sea is a key source of jobs and growth, with 52% of the population working on maritime directly or indirectly related activities. This figure is unmatched in the rest of Europe.
- Agglomeration benefits and challenges in the “banana” core of Europe. 40% of the total port traffic in Europe is concentrated in the four largest ports, all of them in the North Sea, namely Rotterdam, Antwerp, Hamburg and Bremen. This concentration makes this part of Europe an important global gateway but also brings challenges in terms of congestion, hinterland connections and environmental pressures.
- Strategic potentials to create/enhance supergrid connections in the North Sea and to Northern Africa. The development of offshore electricity networks and their integration to terrestrial grid systems is important for strengthening the weight of renewable energy and building the European supergrid.
- Important offshore wind potentials in the North Sea and northwest Atlantic. The North Sea currently leads in installed capacity for the exploitation of offshore wind. However, the northwest Atlantic has greater potentials, as it is exposed to the strongest average wind speeds. Therefore, these two seas offer the best prospects for investment in energy generation from offshore wind.
- Important tidal and wave power potentials. Because of strong tidal surges, the UK’s and northern France seas hold the greatest potential for tidal power, followed by the Straits of Gibraltar and Messina. In turn, western coastal areas, which are fully exposed to the Atlantic, have the greatest capacity to develop wave power.
- New oil and gas areas in the outskirts of Europe. Additional potentials for exploitation of fossil resources exist in the Arctic, off Cyprus and Greece, as well as of Bulgaria and Romania in the Black Sea.
- Growing potentials for maritime transport. 80% of the world trade of goods is currently carried over the sea, and around 90% of the EU’s trade with other countries passes through Europe’s ports. Traffic intensity is distributed over the sea as follows: 30% of total maritime traffic in the Mediterranean (but today is mostly transit traffic from Suez to Gibraltar and then the ports in the North of Europe), 40% of total port traffic in the Channel and North Sea (concentrated in the ports of Rotterdam, Antwerp, Hamburg and Bremen), 15% of the world’s cargo transport in the Baltic Sea. To capitalise on growing maritime transport opportunities, however, and to avoid the rise of transport costs due to ports’ and shipping lanes’ congestion, there is the need of continued investments onshore and offshore to increase capacity and efficiency. Moreover, there is an increasing need to invest in maritime spatial planning and environmental management to guard against unintended and undesirable side-effects such as spillages or the spread of invasive species. Short-sea shipping is also likely to offer good investment prospects within Europe.
- Important maritime transport jobs potentials. Europe as a whole has the world’s largest shipping fleet, with 41,6% of the world’s vessels, directly employing 300.000 seafarers on board merchant vessels and another 3 million in related jobs.
- Important regional accessibility potentials still to be improved. In the North Calotte region in the north of Sweden, ports play a central role for major regional exports such as the products of mining and forestry industries. Furthermore, North Calotte is increasingly functioning as a commercial interface to North West Russia, while together with North Iceland it also tries to serve as a gateway to the Arctic. In Southern Europe, ports play an essential role in insular territories such as Malta and Cyprus, as they are crucial channels for delivery of goods to and from the islands (and due to the geographical location of these islands, they have the potential

to develop small-scale gateway functions, namely Cyprus to the Middle East and Malta to North Africa).

In 2050, all the above potentials will have been exploited, and the related challenges tackled. This also thanks to the EU maritime policy, in particular with the EU adoption in 2012 and the subsequent successful implementation of the Blue Growth strategy. The strategy targeted those characteristics of the seas that work as drivers for the economy, fostering technological developments, coping with the environmental challenges of land and seawater resources, promoting renewable energy resources and aiming to unlock the untapped potentials of seas and coasts jobs and growth. The strategy took an integrated approach to sustainable development, considering in a balanced way the economic, environmental and social aspects of the land-sea interaction, and it was focused on five topics: blue energy; aquaculture; maritime, coastal and cruise tourism; maritime mineral resources and blue technology. Together with other instruments of the EU policy – Integrated Coastal Zone Management, the Integrated Maritime Policy (mostly focused on maritime transport), and Maritime Spatial Planning, to name a few - the strategy contributed to dramatically improve maritime governance. In 2050, also the international governance environment is greatly improved. Common actions carried out by the UN (via the WEO) and the EU have been reinforced. Long negotiations have consolidated the law of the Sea, and the WEO has established a legally binding legal framework which is included in all sea governance arrangements.

More in detail, as it concerns the maritime economic potentials, in 2050 we will see:

- in the North of Europe a ring of offshore wind-farms in the five territorial waters of the North Sea, as well as several offshore wind-farms in the northwestern Atlantic, connected to the European supergrid, and in the South of Europe high-voltage transmission lines crossing underneath the Mediterranean to connect the European grid to centralised solar plants built in the Sahara desert. The potential energy from the winter winds in the North (especially in the wintertime) and from the sun in the South (especially in the summertime from South Europe, but almost permanently in the Sahara desert) will be connected and available through the grid, improving the overall balance of the electricity system in Europe. Also the Baltic Sea will exploit the good potential for a continued expansion of marine wind waters, facilitated by shallow waters, and the further development of a transnational grid system.
- In the western coastal areas the wave power potential fully exploited where appropriate (i.e. in the open coastal areas of the Atlantic and the North Sea, while this source is less important in the other more closed seas)
- Tidal power potential fully exploited in the coastal zones of UK and northern France
- In the North Sea, carbon storage fields making use of the large potential represented by depleted oil and gas fields in the area.
- Additional fossil resources extracted in the Mediterranean (especially gas off Cyprus and Greece) and the Black Sea
- More maritime passenger (including touristic cruises) and freight transport crossing the Mediterranean, and connecting ports on the North and South shore, due to the increasing co-development and consequent increased traffic of intermediate and finished products in the whole area. A short motorway connecting Tunis with Sicily will see intensive traffic, and the gateways capabilities of the Cyprus and Malta ports will be up-scaled.
- The scaling-up of the North Calotte area as a global gateway for the new and important commercial traffic with the North-West Russia and the Far East Asia, due to the opening of the Arctic route to trade as a consequence of climate change and the warming of the Arctic sea. What we will not see, instead, is the exploitation of natural resources from the Arctic, due to the

strict environmental control enforced by international agreements to protect the sensitive ecosystems in the area.

Thanks to these blue energy developments, but not only, a new maritime industry has bloomed in 2050. This includes industrial clusters for technological development, manufacturing, construction and servicing of wind farms, wave and tidal power plants, but also marine laboratories, activities to protect marine biodiversity, planning and management services, and the like.

As it concerns instead the environmental protection, in 2050 the EU has established common policies to improve environmental protection while exploiting natural resources in complete safety, and considerable progress has been achieved in integrating the EU maritime policy. A joint strategy of harmonious and sustainable development of the land-sea continuum has been approved and incorporated in the EUTeCoS, and its implementation is monitored on an on-going basis. While promoting trans-boundary cooperation on maritime issues, this strategy organises a close collaboration between sector-based (e.g. Transport, Energy, Fisheries) and horizontal policies (such as Integrated Maritime, Environment and Regional policies). Major progress has been made in coordinating structured maritime cooperation and land-use planning of coastal regions, and Maritime Spatial Planning (MSP) has been integrated into the existing planning systems. The MSP contributes, amongst other things, to avoid the depletion of fish stocks and other biodiversity losses by disruption of coastal ecosystems.

Finally, a greater attention is given at the opportunities present in the seven Outermost Regions (ORs) and Overseas Countries and Territories (OCTs, belonging to 4 member states, but not to the EU itself). ORs represent a modest part of the EU territory but 2.5 million km² of its Economic Exclusive Zone (EEZ). Although still affected by territorial handicaps, they took much advantage of the EU structural assistance while harnessing the potential of their immense maritime space (e.g. modernisation of fisheries and exploitation of sub-marine resources). Technological change has contributed to improving their accessibility. More intensive cooperation with the neighbours (the Caribbean, other archipelagos in the Indian Ocean, West Africa) has catalysed trade. Also the size of the EEZ of the OCTs is not commensurate with that of their terrestrial part⁵⁹. This huge maritime domain, often full of resources, hosts a very small human population. Considerable technical and financial means need to be invested to ensure its control and its development. Some OCTs have opted for independence, which sometimes endowed them with tremendous riches, out of proportion of their tiny population (Greenland). Elsewhere, the OCTs decided to weave closer ties with their respective member state and the EU, which ended up giving much more consideration to these territories.

3.3.5 More educated workforce and diversified jobs

Feedbacks to the 1st TeVi draft:

Addressed in this 2nd draft:

- There is a point I wanted to stress: the place of young people in the society: many young people are unemployed. I hope that in the future we will have an education and training giving the opportunity to people to manage their work all life long, further than the current 60/65.
- Add young people activity (promote adequate education and training)

⁵⁹ An island of 1 km² may generate an EEZ of 107,500 km².

- Health services are crucial
- Increased economic interdependence between states, strive for better education of people.

Possessing adequate cognitive skills is increasingly necessary for the capacity to enjoy life, for self-esteem, for increasing income and for finding jobs. A relative higher level of cognitive skills is required also in the less knowledge intensive services. Possessing adequate skills is even more important in a situation where rapid technological change, global challenges and external shocks are likely to make the existing skills obsolete or in need of updating in the next years and decades.⁶⁰

Indeed, the extent to which today's emerging technologies could affect the nature of work is striking. Automated knowledge work tools will almost certainly extend the powers of many types of workers, but they could also automate some jobs entirely. Advanced robotics could make more manual tasks subject to automation, including services where automation has had little impact until now. At the very least, the benefits of new disrupting technologies may not be evenly distributed, and could even contribute to widening income inequality. Advanced technology, such as automation of knowledge work or advanced robotics, could create disproportionate opportunities for some highly skilled workers and owners of capital while replacing the labour of some less skilled workers with machines.

But the above argument considers only first order effects of automation where the machine replaces the worker. The total employment impact includes also a second order effect: the organization using the machine saves money and that money flows back into to the economy either through lower prices, higher wages for the remaining workers, or higher profits. In all three cases that money gets spent, which stimulates demand that other companies respond to by hiring more workers.⁶¹ Economic theory and government policy will have to be rethought only if technology is indeed destroying jobs faster than it is creating new ones. But technologies like the Web, artificial intelligence, big data, and improved analytics - all made possible by the ever increasing availability of cheap computing power and storage capacity - that are automating many routine tasks will not necessarily kill human jobs at an unprecedented rate.⁶²

On the contrary, combined with social innovation policies and higher investments in education, training and learning directed primarily to the young generations (but not only, as also the older works will be involved in life-long learning activities), these technologies will continue to support in Europe the raise of a class of knowledge and creative workers.⁶³ There are a number of studies

⁶⁰ Indeed, it is not surprising that new technologies make certain forms of human labour unnecessary or economically uncompetitive and create demand for new skills. This has been a common phenomenon since the industrial revolution: the mechanical loom marginalised home weaving while creating jobs for mill workers. But this time the impact of the 'great transformation' this time promises to be different, because today displaced industrial workers cannot simply move into knowledge work or services the way displaced farmers and domestic workers moved into industrial work in the 19th and 20th centuries.

⁶¹ This common sense view is borne out virtually all economic studies looking at the relationship between productivity and jobs. While some studies have found that productivity growth does have some short-term negative job impacts, all the studies find either no impacts or positive impacts on total jobs in the longer term. This argument obviously holds for well functioning democratic economies, where the benefits of technological change are widely distributed within the whole society and not concentrated in the hands of few affluent people or autocrats.

⁶² First, because to do so productivity growth rates should increase significantly, while there is little evidence that productivity can grow in excess of 3 percent a year. This is in part because despite IT advances that boost productivity in information-based functions, a growing share of jobs involve interacting with people or doing physical tasks that are difficult to automate. Second, even if the rate of productivity miraculously increases to – let say - over 5 percent a year, it still doesn't matter for jobs. For that would mean that national income increases 5 percent a year and we would all buy more restaurant meals, vacations, cars, houses, therapeutic massages, college educations, and 3-D TVs. And workers have to work to produce these goods and services.

⁶³ The creative workforce includes professional employed or self-employed in selected ISCO-88 classes (e.g. computer programmers, journalists, musicians, travel guides, handicraft workers in textile, jewellery, etc.). In Europe, the creative workforce numbered around 19

focusing on the “creative class”⁶⁴, its characteristics, and the tendency creative people have to agglomerate among themselves in dense city environments, as they need intense face-to-face transactions both to collaborate in production or to sell the products of their creativity. Creative products may be more or less knowledge intensive, as the category include both highly knowledge intensive profiles (e.g. authors, writers, journalists, scientists, university teachers), highly interactive profiles (e.g. business service agents and trade brokers, travel guides, social work professionals), specialized knowledges (as those required for computer system designers and analysts, computer programmers, composers and musicians) and a large number of low-knowledge intensive but high handicraft ability profiles (e.g. precision-instrument makers and repairers, jewels and precious-metal workers, handcraft workers in textile, wood, glass etc.). The creative tasks thus combine a wide range of both intellectual knowledge and handicraft abilities, they are sophisticated jobs.⁶⁵

Whereas today the creative class includes also workers without formal education – e.g. handcraft artisans that have acquired their abilities through informal apprenticeship - this will be no more the case in the larger creative class of 2050. The great majority of the creative jobs require qualifications that the industrial or artisan worker of the past did not possess or was required to acquire. They require a good deal of formal education and the ability to acquire and to apply theoretical and analytical knowledge. They require a different approach to work and a different mind-set. Above all, they require a habit of continuous learning. Of course, knowledge work continues to vary tremendously in the amount and kind of formal knowledge required.⁶⁶ However, whether the knowledge required for doing the job is primitive or advanced, creative workers are in any event highly specialized, and for most of the creative works, the workers have to work in teams and be affiliated with an organization.⁶⁷ Teamwork and being affiliated to an organization, even if not engaged as a full time employee, but only on part-time, consultancy or partnership basis, is the most typical working condition for the creative workers. In the activities featured by high transaction costs and requiring therefore intense face-to-face interactions, the teams and organizations are mostly concentrated in clusters, localized in dense and socially mixed neighborhoods of the larger cities or even in medium or small size cities that are particularly attractive for specific categories of creative and knowledge workers (e.g. natural or cultural tourism places). But global connections are equally important too, and these are established through the Web. We will increasingly assist to a shift in the social logic of production, whereby the old logic (division of labor, functional organizations, hierarchy and standardization) is replaced by the new logic of sharing knowledge in virtual networks and teams, with a focus on core competencies, continuous learning, absorptive capacities, and innovation. With the growth of the creative commons and open source movements, core components of corporate and institutional knowledge are increasingly shared without restriction – and this causes a further

million people in 2008, making up 7% of the EU labour force (cfr. ESPON, Territorial Dynamics in Europe: The Creative Workforce, Territorial Observation No. 5, November 2011)

⁶⁴ The most popular one is Florida (2002), *The Rise of the Creative Class*, but there are many others.

⁶⁵ An extreme example of a very sophisticated job is neurosurgery. The neurosurgeon's performance capacity rests on formal education and theoretical knowledge. Obviously an absence of manual skill disqualifies one for work as a neurosurgeon. But manual skill alone, no matter how advanced, will never enable anyone to be a neurosurgeon. The education that is required for neurosurgery and other kinds of knowledge work can be acquired only through formal schooling. It cannot be acquired through apprenticeship.

⁶⁶ Some jobs will continue to have fairly low requirements, and others will require the kind of knowledge the neurosurgeon possesses. But even if the knowledge itself is quite primitive, only formal education can provide it. Increasingly, an educated person will be somebody who has learned how to learn, and who continues learning, especially by formal education, throughout his or her lifetime.

⁶⁷ There is a great deal of talk these days about “teams” and “teamwork.” Most of it starts out with the wrong assumption--namely, that we have never before worked in teams. Actually people have always worked in teams; very few people ever could work effectively by themselves. But until now the emphasis has been on the individual worker and not on the team. With knowledge work growing increasingly effective as it is increasingly specialized, teams become the work unit rather than the individual himself. We will have to learn to use different kinds of teams for different purposes. We will have to learn to understand teams--and this is something to which, so far, very little attention has been paid. The understanding of teams, the performance capacities of different kinds of teams, their strengths and limitations, and the trade-offs between various kinds of teams will thus become central concerns in the management of people.

decline of copyright and weaker patents. This continue to boost the creative economy, which takes a major share of the workforce in 2050. A part of the creative work is based on peer production schemes, delivering cognitive and cultural outputs through the Web often for free.⁶⁸

While the creative economy bloomed up, in 2050 robotisation has made progress in the manufacturing and standardized service sectors to an extent unimaginable in 2013, changing the employment landscape. Hardly anyone works in mass manufacturing productions any more, and a lot of mid-level white collar work has been replaced by robots, expert systems and a handful of software engineers and robot maintenance experts, making manufacturing both cheaper and more flexible. For highly skilled or one-off handicraft, cooperative robots increase the productivity and dexterity of humans. Robotics have also penetrated homes, relieving humans from cleaning, helping old people stay at home longer, even taking care of basic medical support. Many shared driverless vehicles – cars and trucks - roam our streets and highways, resulting in a significantly lower number of transport sector workers.

In the European context, the current employment trends by level of qualification - showing that the “skill intensity” of jobs in Europe has been increasing in recent years - are expected to continue in the coming years.⁶⁹ As a result, the proportion of high qualified jobs will increase to over a third already by 2020, whereas the proportion of jobs employing low qualified people is expected to decrease to 15%. However, the very large unemployment level in many European regions will keep driving salaries down in real terms for the years to come, and more jobs are expected to be created in Europe, overall, if the actual trend towards lower salaries will continue for the next decade. Employment will therefore grow in most European regions, even in regions with low or negative economic growth, where growth will result for by an increased workforce rather than by higher productivity, similarly as it happened in many Southern regions with high immigration from 2000 to 2008. A wide range of diversified jobs has been created until 2050, mostly in the creative workforce, in eco-industries and in personal service sectors across Europe. However, a relative reindustrialisation occurred also in traditional industrial areas in the centre of Europe, recentralising high-quality and technologically advanced production, as well as in Southern regions where salaries remained relatively low, making already existing industrial investments profitable enough to remain there longer, delaying delocalisation plans towards Eastern regions, but to a less extend towards emerging markets. A net increase in the service sector occurred in Eastern regions, clustered in main cities. All the new job opportunities described here helped to absorb the high unemployment, and especially the cohorts of young (and educated) unemployed after the 2008 crisis.

⁶⁸ Peer production is a new modality of production based on radically decentralized, collaborative, nonproprietary, based on sharing resources and outputs among widely distributed, loosely connected individuals who cooperate with each other without relying on either market signals (prices) or management commands. The outcome of peer production cannot be measured with the standard productivity and monetary output measures, as it produces intangible (but not less real) benefits for the users. The economic value could be measured indirectly, measuring the users’ virtual willingness to pay/consumer surplus, or, more pragmatically, through the indirect earnings (e.g. advertising, request of tailored services, cost savings) accrued to the users.

⁶⁹ CEDEFOP, “Future skill needs in Europe”, 2010.

With an increasing share of service jobs, the reality of the “cost disease”⁷⁰ was affecting Europe, and after the 2008 crisis public spending review programs – enacted especially in the most indebted Member States of South-Europe – started to heavily cut education, health and other social services. But soon this recipe proved ineffective, and indeed damaging as it contributed to exacerbate social tensions in the countries without increasing their productivity and competitiveness. Spending review programmes were therefore turned into social innovation investment programmes, with the participation of public, business and civil society actors into new funding and management schemes, that ultimately delivered better services to the people, improving well being and quality of life for the European population. In our vision, therefore, what in the early 2000s was perceived as a “cost disease” affecting health, education, research and other personal services expenditures, in 2050 has been definitively turned into an opportunity for Europe more qualitative growth. After the recovery from the 2008 crisis, in 2015, the unprecedented productivity growth in the progressive sectors of the economy has indeed continued, and this has ensured that both wages and per capita income continued to rise, making most products and services cheaper relative to consumers’ buying power. Due to the average productivity growth of the whole economy, and effective solidarity mechanisms transferring resources to health, education and other key social services according to (measured) needs, the European society eventually could afford not merely the survival of the stagnant services in Europe, but also ever greater quantities and rising quality, despite their rising costs.⁷¹ Technological and social innovation⁷² together has helped to achieve this result, acting as unified forces and drivers of change: the former boosting labour productivity in the progressive sectors of the economy (manufacturing and business services) and producing more and better products while saving/freeing labour, the latter enhancing the quality of environment, health, education, research and personal care and social services provided to the population, while creating new jobs in these typically labour-intensive activities (where new technologies are used mostly to provide more quality to users – e.g. through advanced healthcare technologies – rather than reducing labour input).⁷³

⁷⁰ Since the first industrial revolution, labour-saving productivity improvements have been occurring at an unprecedented rate in most manufacturing activities, reducing the cost of making these products, even as workers’ wages have risen. Meanwhile, in other sectors of the economy, notably in the personal services industries, automation is hardly possible, and labour-saving productivity improvements occur at a rate well below average for the economy. As a consequence, the quantity of labour required to produce these services is difficult to reduce, at least without reducing the quantity of service delivered at a standard quality level. This stems from the nature of ‘personal services’, which usually require direct, face-to-face interaction between those who provide the service and those who consume it. Yet, despite no measurable productivity achievement, the price of these services continues to grow – the so-called “Baumol cost disease” (see Baumol, William J., 2012, *The Cost Disease: Why Computers Get Cheaper and Health Care Doesn’t*, Yale University Press, New Haven and London). In a nutshell, the cost disease asserts that the costs of health care, education, live performing arts, and a number of other economic activities known as ‘personal services’ are condemned to rise at a rate significantly greater than the economy’s rate of inflation. The reason is not difficult to identify: the items in the rising-cost group – the stagnant sector – generally have a human element not readily replaceable by machines in their production process, which makes it difficult to reduce their labour content. Items whose costs are falling – the progressive sector – are predominantly manufactured via more easily automated processes. Their steadily falling real costs simply reflect their declining labour content.

⁷¹ One must understand that the source of the problem, paradoxically, is the growth of our economy’s labour productivity – or rather the unevenness of that growth – boosted by labour-saving technological innovation in the progressive (industry and service) sectors. This creates the problem, but also the potential solution, provided that politicians, business and social leaders become aware of the cost disease paradox and its implications.

⁷² One concrete example of social innovation was the widespread adoption in the mountain regions of the countries most affected by the 2008 crisis (Greece, Portugal, Spain, Italy) of local currencies complementary to the euro, to fund jobs of environmental and town rehabilitation in the less populated areas, without recurring to bank credits. Such new jobs were also useful to integrate new waves of immigrants from outside Europe in these territories. The local currencies are enabled by national legislations, take diversified forms fit to the local contexts, and are incentivized by local government initiatives. Pioneer examples in the early 2000s were the “torekers” system to encourage volunteering for urban gardening in the City of Ghent, Belgium, and the proposal of “Civics” to fund social, cultural or civic activities. The latter are electronic currency units earned by residents that contribute to publicly agreed aims. All residents are required by a local government ordinance to contribute a certain number of Civics tokens each year. To pay the contribution in Civics to the local government, resident can work in the social programme directly or exchange national (Euro) currency for Civics on a free-market basis; a local online market is created to facilitate such exchanges and assure transparency and trust. The Civics have been proposed for the first time in the Report from the EU Chapter of the Club of Rome, Money and Sustainability: The Missing Link (2012).

⁷³ Together with policies to boost productivity, there will be the need to examine systematically, for the stagnant sectors, two issues: i) what outputs cost to produce and consequently what consumers (private or public) must pay to purchase them, and ii) which benefits will

3.3.6 A successful adaptation to climate change and other environmental challenges

Feedbacks to the 1st TeVi draft:

Addressed in this 2nd draft:

- I see old equipments, very old equipments, the climate change and its impact and the necessity of a European risk management, natural and industrial, in the future years, it'll be a very important issues.
- The right to have a environment of quality should become a fundamental right
- Support green infrastructure, emerald networks, environment impact assessment also on cross-regional/national level, biodiversity does not stop at borders.
- What about land take reduction? Soil sealing? Urban areas expansion and land take.

Not addressed in this 2nd draft:

- Natura 2000 is a too sectoral approach. Beyond Natura 2000 places, landscape protection/planning is extended. There is the need to consider how to preserve biodiversity everywhere (including in urban areas).

As an effect of climate change and global warming, summers are becoming drier in South Europe and winters wetter in North Europe. This means increased availability of water in the northern Europe and reduced availability in southern Europe, but also increasing flood risk in the North and in mountains areas (especially in the Alps but also mountainous coastal areas in the North shore of the Mediterranean). Besides river flooding, heavier, more intense winter rainfall is increasing the risk of soil leaching, soil water-logging, and difficult access to the rural land for animals and machines. On the other side, reduced summer rainfall is increasing in South Europe the risks of irrigation water shortages, reduced diluting of river water pollution, reduced crop yields, soil loss on light lands, reduced water cooling for power stations and – last but not the least – increased forest fires. The effects expected on food production in Europe are important, with a northward shift of farming potential for grain maize, sunflower and soya, and other useful crops. Health impacts are also heavy, especially in urban areas, as the 2003 summer heat wave on the European population (especially the aged people) has shown. Besides these first order effects, there are also indirect effects that are expected from global warming in other areas of the globe, and that may have an impact on Europe security, as climate caused migrations or food shortages having a perverse impact on food prices, etc.

The main climate challenges in Europe differ therefore geographically, along the North-South climatic gradient. Also the response capacity is different, higher in the North and West of Europe (the most affluent regions) and lower in the East and in the South (the less affluent regions). Moreover, local characteristics, as for example the exposure of a region to natural hazards and the population density, are decisive for the vulnerability of a region. These obviously include lowland coastal regions

accrue to the consumers – that is, how good the product is for the money that consumers spend. As for the latter point, it is important to note that, as the stagnant services produce mostly intangibles (health and well-being, education and knowledge, aesthetic values, and so on), the standard output measures in terms of GDP are no more enough to fully measure the impacts of innovation and quality improvements. In addition to GDP measures of standard of living, we therefore need metrics that account for true value.

subject to sea level rise risks, lowland regions exposed to river flooding, mountain regions with high dependence on winter and summer tourism. Cities are also facing the highest challenges as they are home to a major part of the population and are crucial to Europe's economy as centres of major economic assets and innovative activities, possessing a high damage potential. However, besides the challenges that need to be faced with regard to climate change, new opportunities also arise for cities and regions. This includes new business opportunities, the opening of new shipping routes in the Arctic, enhanced forest growth, increased crop variety and yield and additional summer tourism in Northern Europe.

It was clearly essential to pursue effective mitigation and adaptation to climate change in Europe, by means of actions targeted to the different territories, noting in particular the special needs of South and South-East Europe, and at a more detailed territorial level the different vulnerabilities, adaptive capabilities and needs of urban regions, rural regions, mountains and coastal areas, and the islands. Accordingly, an EU climate strategy, whose content was integrated in the EUTeCoS, has been approved to tackle climate change, in particular its territorial impact. This strategy involves a considerable reduction of greenhouse gas emissions, a significant improvement of the energy efficiency and the promotion of clean electricity generation. Much emphasis is also placed on the need for appropriate policy steps at the regional and local levels, with particular regard to land-use planning, in rural and urban areas alike. Integrated and coordinated territorial approaches are also of particular relevance to the management of natural hazards and climate change related risks, particularly when they cross administrative boundaries. The same is the case for finding opportunities for new development, growth and job creation that may become a result of slowly changing climatic conditions. As far as urban development is concerned, the sustainable city paradigm is widely promoted and guides the elaboration of integrated strategies tailored to specific circumstances. EU subsidies supplemented by national/regional matching funding are provided to support the implementation of adequate policy responses in the areas particularly affected by floods, drought and other consequences of the climate change. Priority is of course given to areas expected to be hit severely while having a low capacity to adapt to climate change.

More in general, the paradigm of "living within the limits of the planet" is predominant in Europe in 2050, making us able to cope with a whole ensemble of environmental challenges (besides climate change, which actually affects all the other environmental challenges). With this paradigm we mean living in such a way that our standard of living can be sustained with the available natural resources and without further harm to biodiversity, climate and other ecosystems. This is ensured increasing the agricultural output without increasing the amount of land or water used (the latter thanks to new smart irrigation and recycling technologies), providing universal access to low carbon mobility, and delivering a four-fold to ten-fold improvement in the use of resources and materials. Making such changes globally would enable humanity to consume just over one planet's worth of ecological resources in 2050, as opposed to the 2.3 planets we will be using if we continue on the business as usual path we are on today.

Besides what is undertaken in other parts of the globe to preserve the environment, the contribution of Europe in 2050 to the Earth sustainability is important. The right to have an environment of quality has become a basic right for all European citizens, and it is included in the EU Charter of Fundamental Rights. Sustainable management of resources (such as raw materials and minerals, energy, water, air, land and soil) together with the necessary protection, valuation and substantial restoration of biodiversity and the ecosystem services it underpins remain key priorities of the EU environmental policy. Indeed, boosting resource efficiency remains indispensable to make progress

towards sustainability, but maintaining ecosystem resilience is no less essential. Three policy areas of particular relevance for territorial development deliver a major contribution in this respect, namely waste, water resources and biodiversity.

Concerning the waste policy the “managing waste as a resource” principle is applied all over the EU. Put otherwise, landfills and illegal shipments have been eliminated, whereas waste prevention, reuse and recycling have been maximized. Appropriate policy responses have been defined to accelerate progress towards the achievement of the “near zero waste” objective, and to better control cross-border waste flows. For this purpose, a reference binding strategy has been adopted, and reflected in the EUTeCoS, mobilising various authorities and other key-players of the waste policy, including those involved in EU territorial cooperation.

With regard to water resources, the objective set out by the European Commission in its “Blueprint to Safeguard Europe's Water Resources” was not met in 2015⁷⁴, but an ambitious integrated strategy was elaborated in the following years. An ambitious integrated strategy was therefore elaborated in the following years (and included in the EUTeCoS) to secure an acceptable level of availability and quality of water resources in the EU. An important chapter of this strategy was dedicated to the necessary cross-border and macroregional cooperation between all the authorities and relevant stakeholders. The integrated management of water resources thus became a key-component of territorial cooperation strategies applied by the Euregional and macroregional authorities to transboundary river basins, and succeeded in developing a sense of solidarity between upstream and downstream areas of these basins.

As for biodiversity, the situation in the first decades of the century was also alarming. Limited progress was achieved toward the establishment of Natura 2000, the world's largest network of protected areas. Later on, a new strategy “Natura 2050” was approved and successfully implemented to protect, value and appropriately restore the EU biodiversity and the ecosystem services it provides. All the specific targets defined in the strategy were met, and properly reflected in the EUTeCoS, in very diverse fields: evolution of the status of species and habitats, ecosystems and their services, agriculture and forestry, fisheries, Invasive Alien Species (IAS), and the EU contribution to averting global biodiversity loss. All the stakeholders involved in territorial and land-use planning were strongly encouraged to intensify their contribution to the implementation of biodiversity strategies at all levels. This was the case in the domestic contexts, but Euregional and macroregional authorities also deepened their involvement in the Biodiversity Strategy implementation, and adapted their respective joint territorial integration strategies (JTIS) accordingly to ensure cross-border coordination. The protection of biodiversity does not stop therefore any more at the internal regional/national borders within Europe.

Finally, as it concerns the use of land, there is nearly always trade-off between various social, economic and environmental needs (e.g. housing, transport, energy production, agriculture, nature protection). Decision on land use are long-term commitments, which are obviously difficult or costly to reverse. In the EU, more than 1.000 km² are subject to land take every year for housing, industry, roads or recreational purposes. About half of this surface is actually sealed. In many regions soil is

⁷⁴ European Commission (2012), *A Blueprint to Safeguard Europe's Water Resources*, COM(2012) 673 final. While recalling the objective set out in the EU Water Framework Directive (WFD - Directive 2000/60/EC), namely to achieve good water status by 2015, the Blueprint showed that considerable progress was still needed to secure an acceptable level of availability and quality of water resources in the EU. At page 3, the Blueprint stated that “The EEA State of Water report and the Commission assessment of the Member States' River Basin Management Plans (RBMPs) developed under the WFD concur that this objective is likely to be achieved in slightly over half (53 %) of EU waters.”

irreversibly eroded, or has a low content of organic matter. Soil contamination is also a serious problem.

However, in 2050 the trend towards more urban and less rural land is halted and actually reversed, with more green areas that are refurbished and cultivated also within the urban boundaries when possible, helping to increase also urban biodiversity. This was mostly a result of combating urban sprawl policies in the urban regions, and after 2030 there was almost no more net land take for new urban areas in most of the large metropolitan areas, where the population remained stable and the available space was saturated. Also the rural land has been regenerated and put to productive use in several regions, with the expansion of the bio-organic agriculture.

3.3.7 A better EU territorial governance

Feedbacks to the 1st TeVi draft:

Addressed in this 2nd draft:

- 1912 my grandmother was born and she's still alive: how did you experience it in 1912: "Europe did not exist, we were living in villages and cities and were afraid of the others; now Europe is in peace; happy with the idea of being in Europe. In 2050: the same good living conditions that we have now but with everyone keeping his own identity: retaining our specificities".
- I prefer the idea of promoting peace through dialogue, reconciliation and cooperation between peoples, nations, religions, races and cultures. It means not only elimination of terrorism, but also improved relations between neighbourhood countries formerly in conflict.
- Europe will be consisting of 47 countries (EU and Council of Europe will overlap?)
- No national borders anymore (the whole EU adopts the Schengen rules?)
- Will EU be a "federation"? Although there is nothing against the concept, it sounds too much institutional. It should be better to start from the policies and to examine which ones and how they could be more integrated in the future. Let's talk about policy integration in parallel to federation. We have two recent examples: the new competence given to the Commission regarding the conservation of halieutic resources first; the way how the EU Growth Pact pushed the idea to adopt a more integrated (between EU and MS) economic policy (bank union, etc..).
- What is a "federation", what is the aim for the EU budget? Compare USA/EU is quite useful: current EU 1% is ridiculous, 25% (as for the US) is impossible by 2050.
- What is the added value of a State level in a federated Europe?
- It could be useful to go beyond the distinction of 6 levels of governance (see 1st TeVi draft) and be more targeted: a) choose the 3 or 4 more relevant scales for activating the policy process; b) elaborate on the way how we articulate these scales to make the key territorial policies effective; c) pay attention to possible contradictions in territorial development between different scales. A good example of the latter is polycentricity improved at EU level but decreased at national level particularly in polarizing growth in capital regions of Eastern countries (cohesion policy is inefficient in facing this up-to-now). Such an approach would justify the necessity to make the policy choices at the appropriate scale.
- 3 levels: global, regional, local
- What structures are best at local level? Include the community led local development, implying integrated development run by the 3 type of actors: authorities + socio-economic partners + NGOs.
- Shift in governance: local groups, municipalities moving to inter-municipalities, the national, the member states are disappearing: what kind of policy do we have, what kind of structures are related to these functional territories? The answer should be supported by a general framework, but this raises the issue of how to remain coherent, both locally and internationally. We should keep the green infrastructure in-between; more interactions between public and private sectors.
- I imagine Europe being a core and should be a unity divided in various (functional) regions with their own identity but disregarding national or other administrative borders. That's what I imagine Europe to

become: I like the idea of a European federation enhancing regional specificities but skip all the rest. Get rid of national (planning) responsibilities.

- The governance level should be developed on issues and disappear with the issue (i.e. after the issue is successfully tackled – problem solving approach).
- Territorial cohesion is the key objective for the future of Europe, the level the most appropriate for implementation is the functional region.
- The cohesion concepts need to be clearly defined: it could, namely, come out that improving economic, social and territorial cohesion in the way that we are doing it now is not economically sustainable on the long run.
- Every territory should invest on its own potential and local assets (identity, culture, specificities to become motors of development). Differences matter positively, they imply distinct potentials. Stop speaking about disparities, etc.. use positive terms and speak about different abilities, uniqueness, strengths, opportunities. We need to keep EU diversity of spatial and cultural identities.
- Better interaction between European Commission DGs (they should talk each other)
- More on democracy and multilevel knowledge governance
- The EUropean TErritorial COhesion Strategy (EUTECOS) is certainly the key policy objective supporting the Vision. The EUTECOS should be clearly and precisely defined, by going beyond the Lisbon treaty background, the governance principle behind the concept and the consideration given to the concept in the next 2014-2020 framework for EU "structural" policies. There is the need to explain precisely what it is about and what it is not about with this Strategy (e.g. giving examples in maritime policy, environment policy and rural development policy priorities). Such a clarification appears crucial in order to avoid the well known trap of some ESPON work: means the trap of an ESPON project being considered by some policy makers as purely and simply a work of "lobbyist of territorial cohesion and EU spatial planning".
- Presently, cohesion is mostly a national matter, with very diverse ways of implementation. How can we build EU cohesion? EU transfer? Shift the focus from national territory to regional/macro-regional cooperation.
- EUTECOS would require integration of EU environment, energy, agriculture, transport, water ... policies, which is, at this stage, very visionary.
- Cross-border program involving population, e.g. on risk management, natural resources, preservation, landscape, ...
- Macroregions/EUregions contribute to territorial integration and competitiveness.
- Macroregions are both bottom-up and top-down processes, idem cross-border regions: how are diverging policies coordinated?

Not addressed in this 2nd draft:

- The importance to look at the experience and how they are useful for the others. How to collectively mobilize and create awareness of the importance of cooperation between cities and towns; great investment in education is a key target.
- EU directives: the changes have to be enforced as countries are not able to make the change by themselves.
- EUTECOS regularly updated, with policy maps.
- Integrated territorial strategies in some cases could be matched with macroregions, but not in all cases, especially this could be true for the countries/territories which, due to their specificities "fall" in different macro-regions.
- Make it more easy to develop transnational and cross-border structures
- Emphasis on reducing physical and regulatory cross-border gaps: effect of integration?

In 2050, the digital age has considerably intensified world-wide interrelationships and communication flows. This has sizeably impacted the evolution of the global governance system and contributed to a peaceful world. Governance arrangements have constantly evolved toward further complexity. Six main governance levels have emerged: the global, supranational, macroregional,

national, cross-border and regional/local levels. Macroregional and cross-border authorities are not entitled to produce legal or regulatory norms such as treaties, laws and regulations, a prerogative of the other governance levels. As it concerns more specifically the EU territorial governance dimensions:

- In the framework of the EU neighbourhood policy, steadily closer cross-border cooperation takes place between the EU and the countries located in proximity of its territory. Proximity cross-border territorial cooperation in “Euregios” has become commonplace at every internal and external border of the EU. Arrangements similar to those used by macroregions apply, *mutatis mutandis*, to territorial cooperation in most Euregios: EGTC (European Grouping of Territorial Cooperation) legal personality, assembly mainly composed of representatives of the regional and local authorities and supervising the action of the cross-border executive authority, reference JTIS adopted and periodically updated by the assembly, Euregional budget. The Euregio does not produce any legal or regulatory norm, but engages in other joint activities contributing to the objectives set out in the JTIS in policy areas such as water and other natural resource conservation, mobility/transport, etc. The Euregional territorial integration process is catalyzed by the mobilization of a considerable number of people, associations, NGOs, public or semi-public bodies and the corporate sector.
- Within the EU territory, national borders are only administrative boundaries – as it was for the regions within nation states – but no more legal borders for the citizens. The European citizens, as well as the immigrants after legally crossing the EU external borders, are free to move through the whole EU territory without passing any border control. The whole EU is a wide Schengen area. At the same time, and again within the EU territory, it is well recognized that different territorial and governance levels have more or less relevance depending on the specific challenges and objectives they have to address. For instance, issues such as water management are best dealt with at sub-regional or regional level, public transport and research infrastructures are best addressed at metropolitan or city-regional level, while equality and integration needs a more local approach at neighborhood level.

Given the quest for variety and flexibility, it was increasingly clear in the EU, since the early 2000s, that different levels of fixed government structures alone are not well suited to addressing the future challenges in a sustainable way. Moreover, new formal governance system tailored to functional urban or rural areas were considered not relevant to solve operational problems, given the time required to put new administrative systems into practice.⁷⁵ Coordinated approaches in a multi-level governance framework have been therefore preferred to effectively tackle future challenges. Different government levels play different roles in a multi-scalar governance system, following a functional and flexible approach that both respects the principles of subsidiarity and can be adapted to a functional geography, to solve problems that do not respect strict administrative boundaries, and this at different territorial scales.

In this context, a key milestone, achieved in 2015, was the adoption of most of the proposals presented in the Agenda for a Reformed Cohesion Policy⁷⁶ and the related place-based approach for a better territorial governance of EU cohesion policy. As a result, since 2020 territorial governance is consistently achieved within the EU territory through a new interpretation of the subsidiarity principle, which is no more governing the separation of responsibilities with reference to whole sectors or services, but the separation of tasks within the same sector/service or to address a

⁷⁵ Indeed, adapting government structures to better respond to challenges may be a futile task: not only would the dynamic nature of challenges demand a constant re-adaptation, but their multi-dimensional nature requires responses at different scales.

⁷⁶ Fabrizio Barca, Independent Report, 2009

common policy challenge. A multi-level governance architecture is put in place, i.e. a system by which the responsibility for policy design and implementation is distributed between different levels of government and special purpose local institutions (private associations, joint local authority bodies, cooperation across national borders, public-private partnerships and so on). In this architecture, it is up to the top levels of government to set general goals and performance standards and to establish and enforce the rules of the game. It is up to the lower levels to have the freedom to advance the ends as they see fit. Special-purpose local institutions are also key, as they play a decisive role in eliciting the knowledge and preferences of citizens and stakeholders in specific places, and necessary, as in their absence, multi-level governance can degenerate into a system of negotiation between bureaucracies representing different elites. In 2050, well-established ingredients of territorial governance within the EU are therefore: 1) a clear allocation of tasks among levels of governments and role of jurisdictional Regions⁷⁷; 2) contracts negotiated between levels of government; 3) consistent decision processes at local level; 4) public debate being focused on objectives, learning and counterfactual impact evaluation. In 2050, all these ingredients are working to steer territorial governance of cohesion and sectoral policies in Europe.

As it concerns more specifically the EU cohesion policy, since 2020 an “EU Territorial Cohesion Strategy (EUTeCoS)” formally approved by the EU authorities provides a coordination framework for all the EU policies with a territorial impact. The EUTeCoS consistently implements a multi-governance, place-based approach, following the principles and pillars set out since 2009 in the Agenda for a Reformed Cohesion Policy (Barca Report). Such principles and pillars are summarized in the box below.

The place-based approach: What is about? How it works?

The policy concept single out in the Barca Report is the place-based development approach, what the OECD calls the “new paradigm of regional policy”, which has been experimented with in various part of the world in the past two decades. Its objective is to reduce persistent *inefficiency* and persistent *inequality* in specific places. Places are defined through the policy process from a functional perspective as regions in which a set of conditions conducive to development apply more than they do in larger or smaller areas. Alternative options for pre-defining “places” – often called “functional regions” – exist, as many as there are dimensions of human life and activity. In the context of a policy aimed at development, *place* must be defined as a social concept, a contiguous/continuous area within whose boundaries a set of conditions conducive to development apply more than they do across boundaries (i.e. relative to other places): natural and cultural circumstances and the preferences of people are more homogeneous or complementary, the knowledge of people is more synergetic, and positive externalities and formal and informal institutions are more likely to arise. The boundaries of places are thus independent of administrative boundaries, endogenous to the policy process and can change over time. A place-based development policy can therefore be defined as:

- a long-term development strategy whose objective is to reduce persistent *inefficiency* (underutilization of resources resulting in income below potential in both the short and long-run) and *inequality* (share of people below a given of well-being and/or extent of interpersonal disparities) in specific places,
- through the production of bundles of *integrated*, place tailored *public goods and services*, designed and implemented by eliciting and aggregating *local preferences and knowledge* through *participatory political institutions*, and by establishing linkages with other places, and
- promoted from outside the place by a system of *multilevel governance* where grants subject to *conditionality* on both objectives and institutions are transferred from higher to lower levels of government.

⁷⁷ Whatever their role, however, in a place-based territorial governance approach jurisdictional Regions cannot be the unit of intervention (i.e. the “lower level” of multi-level governance) since neither their boundaries nor their internal governance are coherent (unless by accident) with the specific and changing objective of the policy.

The concept is proposed to reform the EU Cohesion Policy, based on ten pillars:

1. *An innovative concentration on core priorities* (55-65% of funding on 3-4 priorities) and a conservative territorial allocation (whereby current criteria for the allocation of funding through Member States and Regions are maintained).
2. *A new strategic framework for cohesion policy*, setting out clear-cut principles to enhance strategic dialogue between the European Commission and Member States (Regions) and a set of indicators for assessing performance
3. *A new contractual relationship, implementation and reporting aiming at results*, with a new type of contractual agreement (a National Strategic Development Contract) covering all cohesion policy resources and specifying verifiable commitments, coupled with an Implementation Assessment by the Commission and of Strategic Reports on Results by Member States.
4. *A strengthened governance for the core priorities*, based on a set of ex-ante conditionalities and a system for assessing progress in meeting targets.
5. *Promoting additional, innovative and flexible spending* through a better linkage to the Stability and Growth Pact and assessment of how the policy is delivering the value added for which it is justified.
6. *Promoting experimentalism and mobilising local actors*, for creating an incentive for local agents to risk and invest and preventing policy from being captured by local interest groups.
7. *Promoting the learning process and a move towards prospective impact evaluation*, by encouraging the design and implementation of counterfactual methods for assessing the impact of policy interventions, and to improve understanding of what works, especially in a prospective sense.
8. *Refocusing and strengthening the role of the Commission as a centre of competence*, with a significant investment in human resources and organisational changes in the Directorates-General of the Commission which have overall responsibility for cohesion policy.
9. *Addressing financial management and control*, adopting measures that will allow a greater efficiency to be achieved.
10. *Reinforcing the high-level political system of checks and balances*, enabling a much improved high-level political debate, fuelled by the new information on performance produced by the previous changes, together with a renewed system of check and balances among the Commission, the European Parliament and the Council, with the creation of a formal *Council for Cohesion Policy*.

EU territorial efficiency and cohesion objectives are pursued and integrated with those of sectoral energy, transport, resource efficiency roadmaps and other strategies (e.g. biodiversity strategy, maritime strategy), to make all relevant sectoral policies contribute to territorial objectives. The latter are based on the territorial policy orientations of the EU Cohesion Policy – harmonious, balanced and sustainable development - and the priorities as set out in the Territorial Agenda 2020 (see box below).

Priorities of the TA2020

1. Promoting polycentric and balanced territorial development as an important precondition of territorial cohesion and a strong factor of territorial efficiency.
2. Encouraging integrated development in cities, rural and specific regions to foster synergies and better exploit local territorial assets.
3. Territorial integration in cross-border and transnational functional regions as a key factor in global competition facilitating better utilization of development potentials and the protection of the natural environment.

4. Ensuring global competitiveness of the regions based on strong local economies as a key factor in global competition preventing the drain of human capital and reducing vulnerability to external development shocks.
5. Improving territorial connectivity for individuals, communities and enterprises as an important precondition of territorial cohesion (e.g. services of general interest), a strong factor for territorial competitiveness and an essential condition for sustainable development.
6. Managing and connecting ecological, landscape and cultural values of regions, including joint risk management as an essential condition for long term sustainable development.

To achieve the above objectives, territorial investments funded through the EU cohesion policy instruments were aimed to reduce the disparities between the relative prosperous European urban core (the Pentagon) and the peripheral areas within the European territory, and to strengthen the connectivity in the interface areas with the South and East neighbourhood of Europe. They were also aimed to improve connectivity across different scales of polycentric development within the Member States, and not only focused on the connectivity within the higher layer linking the capital cities of the Member States to global cities and hubs in the core Europe. In so doing, the EUTeCOS was successfully ensuring a greater equality of competitive opportunities across the European territory, enabling cooperation within urban clusters and corridors (intra-polycentricity) and between such clusters and corridors (inter-polycentricity). The implementation of the TEN/T Programme has reflected this strategic drive.

Besides more balanced competitiveness goals, the EUTeCOS has pursued territorial cohesion objectives creating visible “European public goods” across the cities and regions of Europe involved in place-based interventions promoting endogenous development. A new paradigm of regional policy has been applied to reduce persistent inefficiency (underutilization of resources resulting in income below potential in both the short and long-run) and persistent social exclusion (primarily, an excessive number of people below a given standard of incomes and other features of well being) in specific places. It is important to note that, in this new paradigm, the convergence of Member States or regions GDP is no more the “totem” indicator of cohesion policies.⁷⁸ This is substituted on one side by the pervasive and deep assimilation of the concept of “territorial diversity” – i.e. the diversity of endowments and potential opportunities for creating wealth the different regions of Europe have – and on the other side by a battery of territorial cohesion indicators and targets, the latter providing minimum thresholds of income and, more importantly, access to other functional capabilities and features of well being (e.g. access to health care, education, etc.) that are to be ensured to all European citizens wherever they live.

In 2050, the selection of EUTeCOS priorities – the “European public goods” – is always the result of a high-level political debate through a strategic process that also leads to decisions on governance and on resource allocation. Some European Institutions, besides the EC DG Regio, have a relevant role in this process, including in particular the Committee of the Regions and the European Economic and Social Committee. The choice of priorities is based on a clear set of criteria: 1) *EU-wide relevance*, in terms of needs and expectations of European citizens and of advantage of the EU over Member States in addressing the issue; 2) *their place-based nature*, in the sense of the extent to which the inefficiency and/or social exclusion problems relevant for the issue are context dependent and require interventions which are tailored to the characteristics and needs of different places; and 3)

⁷⁸ We mean as “totem” indicator the key indicator used in the policy and media discourses to feature the state of matters in each sphere. Of course the “totem” indicator is not the unique important indicator to feature a given sphere, but only the most frequently used and evoked in the public discourse.

verifiability, i.e. the extent to which policy objectives can be clearly identified and measured, and a consensus can be built at the EU level on the principles which economic institutions of Member States using the funds must follow. In practice, following these criteria, few key priorities have been focused and targeted to achieve territorial efficiency goals (e.g. “innovation” to foster smart specialization opportunities in different regions of Europe, and the new “adapting to climate change” priority), territorial cohesion goals (e.g. “migration” to foster the integration of immigrants and a more even distribution of them in different territories of Europe, i.e. not only in the larger metropolitan areas but also in small and medium size cities or rural regions) or both (e.g. the “skills” enhancing priority and the “ageing” priority).

These EU territorial policy priorities are combined in what, after the Barca Report proposal, has been named a “territorial social agenda” for delivering public goods and addressing multiple dimensions of social inclusions and environment protection. In this respect, the agenda includes also interventions for depopulating regions of collective interest (including also Natura 2000 areas, but not only, as the category includes remote islands or mountain areas or those with extreme natural conditions), i.e. those regions of Europe that have no unused economic potential but other “irreplaceable environmental or cultural resources” or diversity to preserve, increasing more in general the well being of the national or international community.⁷⁹

⁷⁹ In such special cases, it is justifiable for the national or international community as a whole to compensate people for living in the area through paying them subsidies.

3.4 Visualization

Feedbacks to the 1st TeVi draft:

- What is needed is to add the missing spatial concreteness to the European Spatial Development Perspective (ESDP) of 1999 and the Territorial Agenda 2020 (TA2020) of 2011. This requires explicit spatial concepts for the European territory in 2050 presented in unambiguous cartographic visualizations.
- By presenting things on a map, symbolic map presenting the vision should include culture and nature, which are also assets.
- We need one common, highly visionary vision, which is clearly visualized: a) get rid of administrative borders, old barriers obstruct functional relations and cohesion; b) visualisations (graphics, identification of every region's potential in Europe is possible) help creating more understanding and appropriation of the future idea; c) provide at the start more alternatives so that decision makers can co-produce and develop those into one clear vision of their own: invest in co-ownership so that they will support implementation; d) involve creative spatial planners to serve the decision-makers by providing ideas, identifying opportunities, showing consequences, presenting solutions, detecting potential synergies, sketching concepts.
- Develop a small and medium size cities representation, not only metropolitan areas.

4. Implementing the Territorial Vision

Topics addressed:

- *Common midterm targets and pathways (EU Territorial Agenda 2050)*
- *Going back to the ET2050 scenarios: what can be changed to simulate the impact of the most realistic expectations and/or some wild cards?*
- *Coordination with national spatial development policies*
- *Implementation of place-based visions in different territories of Europe: After the end of ET2050, participatory foresight approaches (e.g. Future Search: www.futuresearch.net) may be suggested to continue with the implementation of place-based visions in different territories of Europe, using the ET2050 TeVi as a common reference.*

Rationale:

Briefly discussing the strategy that is being followed to determine targets and midterm pathways at EU level (Three Horizons Model), and the new scenario variants that will be implemented/delivered in the final part of ET2050 to simulate the impacts of the most realistic elements of the TeVi and/or some relevant wild cards.

As for the latter, some wild cards will be identified at the global level (e.g. China growth collapse), neighbourhood level (e.g. a new Euro-Mediterranean scenario), and within Europe (e.g. new independent Member States within Europe), and the strategy to tackle them briefly discussed.

This part should include also recommendations for the concrete implementation of the vision in the Member States (coordination with national spatial policies) and elaboration and ownership of new territorial visions in the different territories of Europe. The latter should be broadly aligned with the EU level TeVi goals and targets, but tailored enough to take into account the diversity of the different territories.

Feedbacks to the 1st TeVi draft:

- The task relies on the Regions because of the consciousness of their uniqueness but within a global project, a clear framework: that is the Vision for Europe.
- If you want to really implement it, make the Vision concrete enough In various sectors many objectives are already decided: setting up the vision, we haven't decided of a possible future, but we have tried to identify how the existing policy framework when implemented will impact at a territorial level, some welcomed it, some others less. And we see the territorial implications. Our vision is very concrete. But we have to be modest at the institutional level: each country is pretty complex and we have to live with that. We should live with it, even if sometimes the coherency is not very available. Under this framework, we can achieve this progress.
- But avoid to make the Vision not visionary enough ... about 40 years ago, every country had its own money, and now we all use Euros; make your vision visionary! National countries are not the best (level) to steer the implementation of the vision. There're emergencies that should be tackled globally but if we want to implement a global vision, we need an institutional level able to manage that on the ground and that is the "functional level" (eventually to be coupled with the regional/local level).
- But how to realize the Vision? There is only one chance to do it: with ESDP in 1999 we had the introduction of a vision, what can we learn from that experience? There should be co-ownership of the vision among many more persons. We should avoid a very legalistic approach towards implementation (e.g. as presented in the 1st TeVi draft): Which level may decide (on standards...!!) and what administration has what competences. That is not the way forward. Accept that every actor holds his specific attitudes towards future development. Insights and conviction are needed to create co-ownership. Therefore it is important to start thinking about how to start this process. That should be done differently than issuing a

study report. If you start the discussion by proposing one vision, this will be shot by every actor who does not feel co-owner: it is important to propose sets of possibilities: various optional future developments.

- At the moment we go for “one vision for Europe”, but for the implementation of it, it is important to see that the Vision is territorially based and should be territorialized. Try to build something on that: if it is too much a dream, it is difficult for the decision-maker to implement it. Going in the direction of a place-based vision is what we should aim at. This helps also the future implementation of the Vision. We should not forget that the private sector is the key funding source of all that. We should make a loop where we try to involve.
- We must distinct the content of the vision from its implementation. The content should be rather independent from the implementation: For achieving one vision, we must think about how to reach that if co-ownership is not given? Helping politicians to decide is giving them possible options, combinations of values. The process towards one agreed vision is through co-production. One visionary, visualized vision will be accepted by the decision-makers if they feel co-authorship.
- To achieve acceptance by the Member States it is necessary to co-ordinate and integrate the Vision with the existing national spatial development concepts. Try to discuss with Member States how to make national strategies converge towards a EU framework.
- Because spatial planning is increasingly transnational, it is necessary to give the EU a mandate for transnational spatial planning within the constraints of subsidiarity. To scientifically support transnational planning, the establishment of a European Spatial Planning Agency would be desirable.
- Bottom-up vision is fundamental: our worries are important; working is very important, the history of cooperation of Brest and other cities: our first big crisis of the naval industry: Brest went to see other cities, and say to the EC that they have problems. We initiated some networks; we joined existing networks (the Conference of the Atlantic Arc). One of the best things of the European Union: since forty years cities have started to know each others, to collaborate on various levels. Coastal zone management for instance varies from one country to another.
- Participatory process for one convincing vision, with population involvement, civil society and public sector (“Agenda 2050”)
- We need co-ownership through involvement: a) private actors are essential as co-producers in the process; b) private initiatives are the only creators of prosperity; c) planning practitioners on regional and local levels must be intensively involved, and as conceivers of local and regional plans they should adhere to the vision.

4.1 Connecting the TeVi to the ET2050 scenarios: application of the “Three Horizons” model

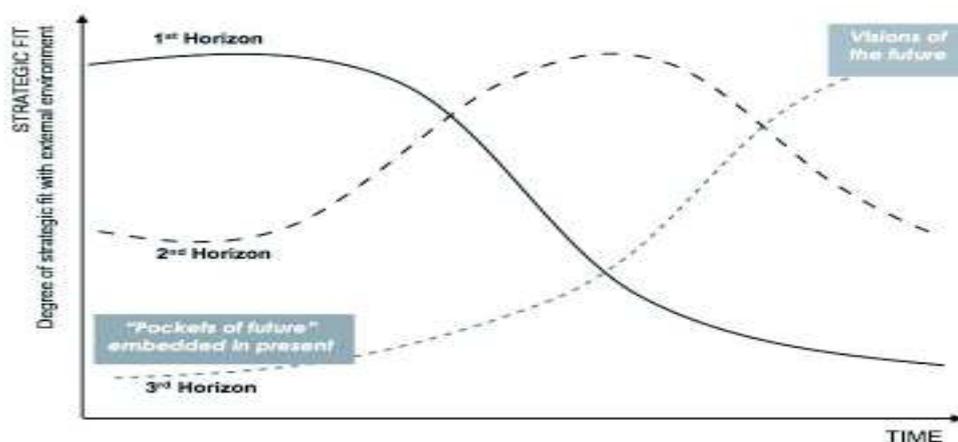
In this section we outline the use of a futures technique, “Three Horizons Model”⁸⁰, which connects the present with desired futures, and helps to identify the divergent futures which may emerge as result of conflict between the embedded present and these imagined futures.

The technique is useful to connect the ET2050 Territorial Vision with the results – and further elaborations – of the ET2050 baseline and exploratory scenarios. To explain why, let us start from noting a number of criticisms of conventional foresight and scenarios building processes (as also the ET2050 scenario process is). First, they frequently do not interrogate sufficiently or seek to criticize the underlying values and assumptions of the futures world which they create. Second, their emphasis on 'important' drivers of change (whether 'certain' or 'uncertain') encourages participants to pay insufficient attention to weak signals or emerging issues, which might otherwise open up possibilities of disruptive change. Finally, the presentation of scenarios as likely possible outcomes

⁸⁰ The section is mostly based on excerpts from the seminal paper of Curry, A., Hodgson, A., (2008), Seeing in Multiple Horizons: Connecting Futures to Strategy, *Journal of Future Studies*, August 2008, 13(1): 1-20.

can sometimes discourage individuals from believing that their actions can make a difference. The Three Horizons model has something to say on each of these three points, as we will briefly discuss below – after presenting the model - with reference to the ET2050 scenario building process.

A brief representation of the Three Horizons Model concept is shown in the figure below:



Schematic of the futures-oriented Three Horizons model (source Curry & Hodgson, 2008)

In summary, the futures-oriented version of the model, shown in the Figure above, comprises:

- **“1st Horizon”**: the current prevailing system as it continues into the future, which loses "fit" over time as its external environment changes;
- **“3rd Horizon”** ideas or arguments about the future of the system which are, at best, marginal in the present, but which over time may have the potential to displace the world of the first horizon, because they represent a more effective response to the changes in the external environment. Although the diagram suggests there is only one such '3rd horizon', in practice, especially in the early stages, there will be several, or many, 3rd horizon arguments being articulated.
- **“2nd Horizon”**; an intermediate space in which the first and third horizons collide. This is a space of transition which is typically unstable. It is characterized by clashes of values in which competing alternative paths to the future are proposed by actors.

A short discussion of an example of the Three Horizon Model is provided in the box below, to help to articulate this in a less abstract manner⁸¹.

Horizons for energy transition

Horizon 1, at least in the affluent world, is a world in which fossil fuel sources are dominant, in terms of consumption, production, and distribution infrastructure. It is also generally centralized. The prevailing consumption model is that energy is "always on"; continuous power is supplied to whoever wants it and can afford it. This prevailing system is falling away because of concern over carbon emissions and resource shortages.

Horizon 3 advocates propose, generally, the production of energy from renewable energy sources; some also advocate more local or decentralized energy systems; there are some who propose reduced consumption. Some link high levels of energy use explicitly to degradation of eco-systems and biodiversity. Emerging technologies (such as combined heat and power) are championed; different energy-based business models are

⁸¹ The model is obviously a conceptual one, it does not entail to use a quantitative modelling framework, although some of the emerging issues considered in the 3rd horizon may be prone to quantification by means of S-curves (Schultz, 2006)

tried (for example service-based energy companies). Other Horizon 3 actors point to hydrogen-based energy futures; some to an energy future based on nuclear fission.

In these cases, "weak signals" for Horizon 3, or "pockets of the future embedded in the present" can be seen, for example, in green critiques of energy policy; in the increasing use of wind turbines on new sites; in the "Transition Towns" movement; in the emergence of new energy businesses; and in continuing research into solar, fission, and other energy technologies.

Horizon 2, then, becomes a space of both conflicts and options. There are some options in which the technologies espoused by Horizon 3 advocates are given significant public (and fiscal) support, as has happened to a significant extent in Germany. There are options around approaches to demand reduction, whether through changes in values and behavior, or changes in energy management systems.

Other options represent responses of the prevailing energy industry to those factors which are identified as challenging the current Horizon 1 model. These might include 'cleaning' existing energy supply technologies (such as 'carbon capture and storage') or investment in existing technologies which are regarded as clean (such as nuclear power). In some areas, though generally no longer in energy, Horizon 1 actors can simply contradict (or ignore) the frame, or frames, being used by Horizon 3 actors as the basis for advocating change.

The axes of the Three Horizons diagram are time (along the x-axis), and level of strategic fit with the external environment, from low to high (along the y-axis). Horizon 1, then, at its left hand end, is the world in which we find ourselves today, and the way in which it is expressed and represented in the prevailing discourse. The S-curve tailing away to the right represents the failure of any given model if it does not adapt to external change. Horizon 3, in contrast, represents a world (more accurately, one of a number of possible competing worlds) that is desired by those who propose a different paradigm. Looking into the future, then, Horizon 3 represents proposals for transformative change. Such proposals can be thought of as emerging issues, and the evidence for these is found only in small "pockets of the future" embedded in the present. In futures terms, Horizon 3 is a world of weak signals. Because of the transformational nature of the change that is sought, the trajectory of Horizon 3 is deeply informed by values. It fumbles towards utopia, using the only tools which its marginalized advocates have to hand; the power of voice and experiment. This leads to the world of Horizon 2. In Horizon 2 we learn what is heard of Horizon 3 and acted upon by those in Horizon 1. Sometimes, this is merely a recognition of timescales, as adaptation to any radical change takes time. Sometimes, though, it represents a far more fundamental conflict of values and of discourse.⁸² The outcome is that the world of Horizon 2 is turbulent and ambiguous.

As mentioned, the Three Horizons Model helps to articulate a wider range of future visions and scenarios than usually done in conventional scenario building.

First, one of the underlying features of the model is that it requires different possible versions of the future, as read by different mindsets, to be held in view simultaneously. Horizon 3, in particular, has little traction in the present moment other than as an articulation of a future which is constructed quite differently from the present. It is driven by a desire for change.⁸³ Horizon 1, in contrast, is a

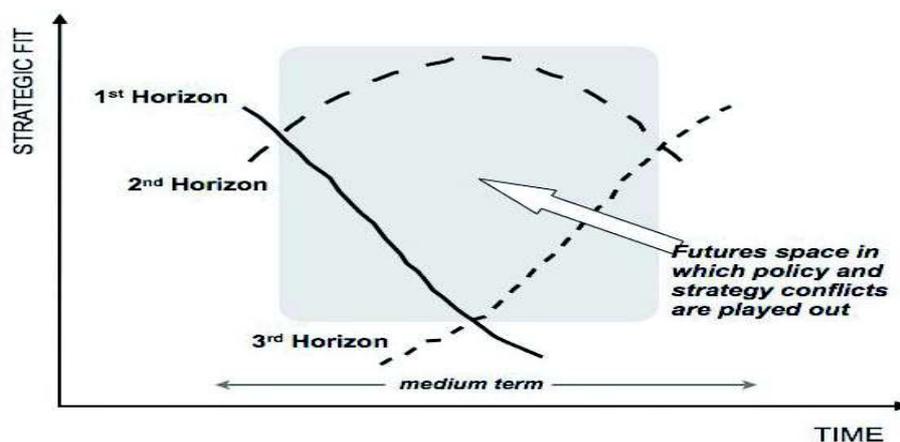
⁸² In the case of energy, there are clear conflicts in Horizon 2 around "green" and "clean", between "local" and "centralized", between maintaining consumption and reducing it, between self-contained energy systems and energy systems that are integrated with other social and environmental processes. Thus, the dominant actors in Horizon 1 can hear the word 'green' but translate it as 'clean', and can disregard the components about integration and decentralization. Their vision for the long-term future of the industry has some consonance with that of their critics, but the consonance is limited.

⁸³ It is worth reiterating that there will be multiple Horizon 3 worlds, certainly in the early stages, supported and promoted by different advocates, and largely underpinned by differing values. For example, looking at the future of urban vehicle transport, one future might be dominated by the need to improve the performance of existing vehicles, in terms of fuel, noise and other pollutants, whereas a competing third horizon view might be about trying to reduce the impact of vehicles on community cohesion and vulnerable users of urban space. A second group envisages a reduction in the numbers of vehicles as well as their environmental impact. A third may wish to make car use complementary with public transport systems instead of competing with it, and so on. While they may appear to have more in common

world whose values are all too familiar, to the point of being hegemonic. Horizon 1 is "the way we do things around here", the world of 'business as usual'.⁸⁴

Second, one of the particular features of the Three Horizons model is that it positions emerging issues in such a way that neither the prevailing or dominant view represented by Horizon 1, or the emergent view, in Horizon 3, is privileged. Further, the requirement to understand the structure of the second Horizon, which evolves from the contingent circumstances in which Horizon 1 is challenged by the new perspectives offered by Horizon 3, means that the values, assumptions, and actors within both Horizons 1 and 3 need to be properly understood. In some conventional futures processes, in contrast, some views of the future tend to be privileged over others.⁸⁵ As a matter of fact, Horizon 3 is constructed as the domain of emerging issues, and thereby ensures that these are as visible in the process as the more familiar shorter term trends which are generally better understood and better rehearsed by participants. It offers a framework which gives permission to think beyond the usual strategic limits without being ridiculed, and also enables participants with competing or divergent views of the future to discover where different viewpoints lie across the three curves, and therefore what conversations between them should be prompted.

Third, the interplay between the Horizon 1 and 3 help to identify actions that will help as a catalyst for change in the desired direction, and eventually to organize those actions into "midterm pathways". The review of Horizon 1 serves as a critique of the present, while Horizon 3 permits a desired future to be articulated. In this respect, one of the most interesting aspects of the Three Horizons technique is that the shape of the curves of the different horizons effectively defines a *triangle of choice*, in the space where the first horizon has started to fall away, the second horizon is close to its apex, and the third horizon is still gaining influence. This is shown in the figure below:



The triangle of choice (source Curry & Hodgson, 2008)

with each other than with actors in Horizon 1, this is not necessarily the case. This is partly because they are likely to define the problem they seek to resolve quite differently from each other. The values, desires, and assumptions which underpin these competing projects can be sharply at odds.

⁸⁴ Because all systems decay in the face of change, sooner or later, analysis of Horizon 1 makes explicit the assumptions and values which underpin the current world. Equally, in reviewing the possible paths of adaptation of the current system to construct the Horizon 2 world, an assessment can be made of the extent to which this is a system which is making an adaptive shift to new values, or, on the contrary, is making the smallest possible adjustment to maintain itself.

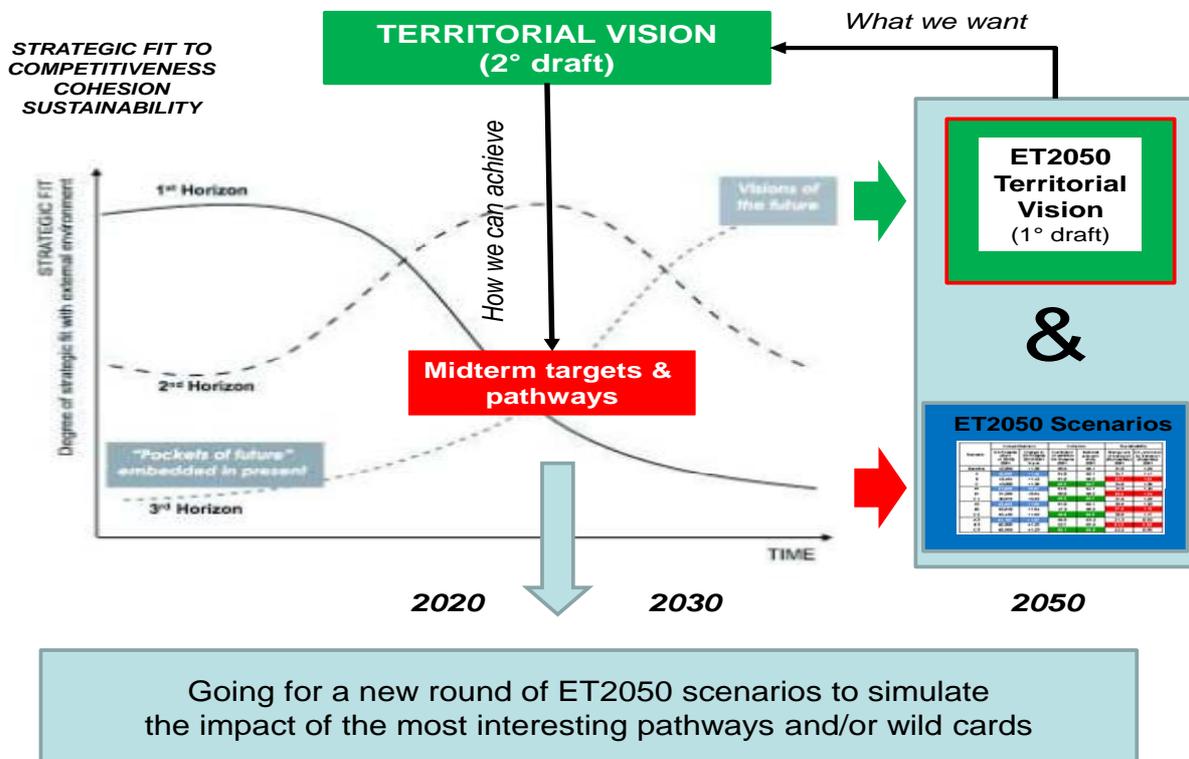
⁸⁵ Often, conventional deductive scenarios do not challenge existing power relationships. At the same time, weak signals of change are often not given sufficient consideration by participants. Equally, some visioning processes are so energetic in constructing their desired world that they spend too little time on understanding the worldviews underpinning the current model.

These choices, obviously, are about the resolution of the conflicts identified under Horizon 2. It is also possible to assess how these might be resolved, and which actors will capture the future social or commercial value. In most of the work done to date, such choices have typically been around strategy or policy issues. But they could equally be about choices in values.

Again the energy transition example

It is worth returning here, briefly, to the example of the energy supply industry, to explore how such conflicts are played out. For energy, one of the conflicts within the triangle is that between the centralized model which has prevailed for the past 50 years, and a distributed model of possible future distribution. If the centralized model prevails, it will do so by combining the need for a low carbon model (part of the challenge of values from Horizon 3) with the Horizon 1 values of centralized management and control. But if this centralized model is successful, it is unlikely that there will be room for alternatives, other than at the edge of the system, because the investment required to develop the required 'clean' technologies (such as carbon capture and storage, and nuclear), and to rebuild the ageing long-distance grid infrastructure, will be substantial, and likely to squeeze out investment in renewable or local energy systems.

The Three Horizon Model described above is proposed here to support the implementation of the ET2050 TeVi and scenario analysis with a coherent framework for the analysis of both scenario results and the vision elements presented in the TeVi document itself. This overall logic of the TeVi finalization process and the complementarity with the ET2050 scenarios is illustrated in the figure below:



Connecting the ET2050 Territorial Vision, midterm pathways and scenarios

In the scheme, the different horizons are briefly as follows:

- **First Horizon:** Today fossil-fuel based system passing away
- **Third Horizon:** Tomorrow low carbon system coming in
- **Second Horizon:** Mid-term choices bringing towards the first or the third horizon realization

Obviously such characterization of the 1st and 3rd only in terms of energy transition is partial, as it does not encompass all the different dimensions considered both in the vision and in the scenario exercises (although several aspects of the vision and of the scenarios are also intertwined with the transition or not to a low carbon economy). However, the aim of this simplified interpretation of the 3 horizons is to show that the TeVi is inherently aiming to imagine where Europe will get to in the third horizon, while the ET2050 baseline and exploratory scenarios were still positioned in the first horizon setting. The overall process will aim to elaborate midterm pathways to achieve a blend of realistic (i.e. projection of the 1st horizon elements that are reputed to continue until 2050) and visionary (i.e. 3rd horizon elements) expectations, and simulate their impact on the European territory with a new round of ET2050 scenarios. Such new round may consider also wild cards, by means of appropriate sensitivity analyses.