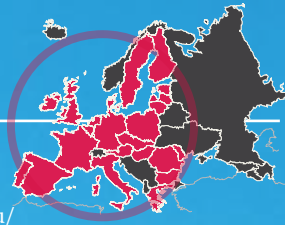


EUROPEAN UNION



Population EU 27

(Per January 1, 2008): 497,683,000

Source: Eurostat: http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=demo_gind&lang=en

Carbon dioxide emissions (CO₂), thousand metric tons of CO₂ (CDIAC) EU-27 Egen summering från data i nedanstående källa: 3 986 194

Source: (CDIAC) Carbon dioxide emissions (CO₂), thousand metric tons of CO₂ <http://unstats.un.org/unsd/mdg/SeriesDetail.aspx?srid=749&crid=>

Carbon dioxide emissions (CO₂), metric tons of CO₂ per capita (CDIAC) EU-27 Egen uträkning från data i nedanstående källa: 8,6705

Source: (CDIAC) Carbon dioxide emissions (CO₂), metric tons of CO₂ per capita <http://unstats.un.org/unsd/mdg/SeriesDetail.aspx?srid=751&crid=>

Population below \$1 (PPP) per day, percentage: No country level data are available.

Source: <http://unstats.un.org/unsd/mdg/Data.aspx>

GDP per capita: EU \$ 32,900 (2010 est.)

Source: <https://www.cia.gov/library/publications/the-world-factbook/rankorder/2004rank.html>





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EUROPEAN UNION

Overview of the EU policy landscape for clean tech innovations

This section on EU constitutes an extract and analysis of the WWF-commissioned review titled “Innovations for a Low-carbon Economy – An Overview and Assessment of the EU Policy Landscape”, produced by the Institute for European Environmental Policy (IEEP) in September 2010. More elaborate description and analysis of EU’s policy on clean technology innovation can be found in the original report at www.climatesolver.org.

In an attempt to map and analyse EU policy on clean technology innovation, this section gives an overview of the most important EU policies and programs for

the development and deployment of low-carbon innovations, with an emphasis on measures for commercialization and large scale deployment. As only a few key policies and programs are mentioned in this summary, a more comprehensive presentation of all relevant policies can be found in the original report.

Strategy Europe 2020

It is appropriate to start with the strategy “Europe 2020: A European strategy for smart, sustainable and inclusive growth” for three reasons; firstly because it gives the shape of things to come, secondly it has a significant focus on innovation, and finally because it integrates EU climate policy goals at the highest level. Europe 2020 was put forward by the Commission in March 2010 and later finalized and endorsed by the European Council in June 2010.

Europe 2020 is intended to guide action both at the Union and at the Member State level to 2020. The Strategy contains seven flagship initiatives to catalyze progress and long-term growth, where three of those are of particular interest for this study:

1. “Innovation Union” to improve framework conditions and access to finance for research and innovation, so as to ensure that innovative ideas can be turned into products and services that create growth and jobs.
2. “Resource efficient Europe” to help decouple economic growth from the use of resources, support the shift towards a low-carbon economy, increase the use of renewable energy sources, modernize our transport sector and promote energy efficiency.
3. “An industrial policy for the globalization era” to improve the business environment, notably for SMEs, and to support the development of a strong and sustainable industrial base able to compete globally.

Innovation Union

The stated aim of the Innovation Union flagship initiative is to re-focus R&D and innovation policy on challenges such as climate change, energy and resource efficiency, health and demographic change. As such, every link in the innovation chain should be strengthened “from ‘blue sky’ research to commercialization.” The Commission will work to “improve the framework conditions to innovation.” The actions cited include the creation of the single EU Patent and a specialized Patent Court; modernizing the framework of copyright and trademarks; improving access of SMEs to Intellectual Property Protection; speeding up the setting of interoperable standards; improving access to capital; making full use of demand-side policies such as through public procurement and smart regulation. Secondly, in 2011 the

Commission will test the concept of ‘European Innovation Partnerships’ between the EU, national and regional levels to speed up the development and deployment and development of the technologies needed to meet the challenges identified above. Finally, the Commission will work to strengthen and further develop the role of EU instruments to support innovation, facilitate access to funding, particularly for SMEs and to bring in innovative incentive mechanisms linked to the carbon market.

PHOTO: © WWF-CANON / ANDREW KERR



European industry as well as agriculture can become even more resource efficient and competitive with the help of climate innovations.

The October 2010 Communication, ‘Europe 2020 Flagship Initiative Innovation Union’, provided more detail on the Commission’s plans for innovation over the next decade. The Communication sets out five things that EU innovation policy must do: tackle unfavorable framework conditions; avoid fragmentation of effort; focus on innovations that address the major societal challenges identified in Europe 2020; pursue a broad concept of innovation; and involve all actors and all regions in the innovation cycle. The emphasis on closing financing gaps, demand-side measures and public procurements is promising and raises the expectations on EU’s actions in the years to come.

Resource Efficient Europe

The stated aims of the flagship Resource Efficient Europe is to support the shift towards a resource efficient and low-carbon economy that is efficient in the way it uses all resources, and to decouple Europe’s economic growth from resource and energy use, as well as to reduce CO₂ emissions, enhance competitiveness, and promote greater energy security.

It is worth noting the way in which Resource Efficient Europe bundles together a resource efficient and sustainable economy with a competitive economy. Several initiatives in relation to the energy sector are brought together, but most of them add little new to improve the conditions for the deployments of climate innovation. These different dimensions of the new economy must be achieved through “exploiting

Europe’s leadership in the race to develop new processes and technologies, including green technologies, accelerating the roll-out of smart grids, using ICTs, exploiting EU-scale networks and reinforcing the competitiveness of [EU] businesses, particularly in manufacturing and within [...] SMEs, as well as assisting consumers to value resource efficiency.” Europe will become resource efficient and decouple growth from resource and energy use through the development and deployment of new processes and technologies, and at the same time, these must serve as a motor of growth by virtue of the market shares they command at home and abroad.

A Resource Efficient Europe promises to “enhance a framework for the use of market-based instruments,” and gives as examples: emission trading, revision of energy taxation, the state-aid framework, and encouraging the wider use of green public procurement. No more detail is given. Clearly this could mean a lot of different things, and what would be new is uncertain, too. Nevertheless, from an overall strategic point of view, it is obvious that the flagship Resource Efficient Europe will, if it is successful, help create a demand pull for EU based low-carbon innovations

within the EU, and to promote their commercialization abroad. Otherwise it will have failed on its own terms. That said, at present, the initiatives outlined under the flagship initiative Resource Efficiency Europe are unlikely to add up in a way that will achieve its stated aims.

An industrial policy for the globalization era

The Commission will draw up an industrial policy intended to “maintain and develop a strong, competitive, and diversified industrial base in Europe, as well as supporting the transition of manufacturing sectors to greater energy and resource efficiency.” The Commission will also promote technologies and production methods that reduce

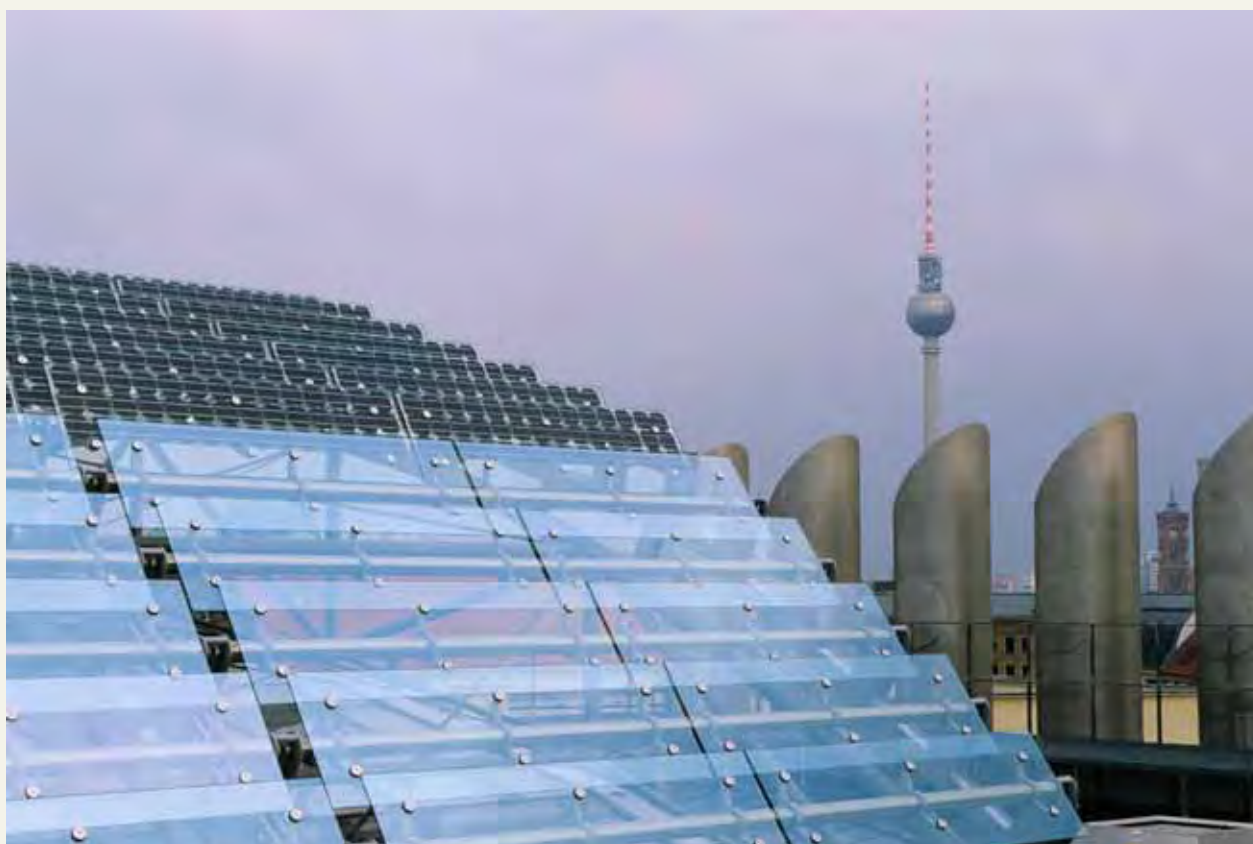


PHOTO © EDWARD PARKER / WWF-CANON

Innovations play an important role in EU's strategy for 2020.

natural resource use, and increase investment in the EU's existing natural assets. Finally, the Commission will review regulations to support the transition of service and manufacturing sectors to greater resource efficiency, and improve European standard-setting to leverage European and international standards for the long-term competitiveness of European industry. Europe 2020 states that this will include promoting the commercialization and take-up of key enabling technologies. The October 2010 Communication refers to “...a dynamic growth path strengthening EU competitiveness, providing growth and jobs, and enabling the transition to a low-carbon and resource-efficient economy.” The Commission suggests that “appropriate framework conditions and further public-private collaboration are needed to ensure the timely deployment and commercialization of these innovations across energy-intensive sectors.”

Sustainable Consumption and Production and Sustainable Industrial Policy Action Plan

The 2008 Sustainable Consumption and Production and Sustainable Industrial Policy Action Plan was presented as a strategy to “further sustainable consumption and production and promote [...] sustainable industrial policy.” The SCP/SIP contains a specific concern with the demand side of innovation policy and the most developed part of the SCP/SIP is guidance on “smarter consumption and better products.”

The Communication noted that while the regulatory framework for production processes is well established at the EU level (including the IPPC and EU-ETS) there is a need to give further impetus to resource-efficient and eco-innovative production processes, to reduce dependency on raw materials and encourage optimal resource use and recycling. Action was outlined in relation to: ‘boosting resource efficiency’, ‘supporting eco-innovation’, ‘enhancing the environmental potential of industry’, and ‘promoting sectoral approaches in international climate negotiations.’ In addition to the main lines of activity described above, the Communication also contained a set of actions to promote global markets for sustainable products.

The European Strategic Energy Technology Plan

The 2007 SET-plan was developed in the context of the 20/20/20 targets as well as a more long-term vision of 60-80% for 2050 adopted by the European Council March 2007 to “strengthen energy research, in particular to accelerate the competitiveness of sustainable energies, notably renewables, and low-carbon technologies and the further development of energy-efficiency technologies.” The SET-plan is grounded in a concern about public and private underinvestment in energy technology research in the Union since the oil price shocks in the 1970s and 1980s and the implications that this might have for the three objectives of Energy Policy for Europe: increasing the security of supply; ensuring the competitiveness of European economies and the availability of affordable energy; promoting environmental sustainability and combating climate change.

The SET-plan put in motion the creation of seven Industrial Initiatives (EII) with the aim of strengthening industrial energy research and innovation by mobilizing the necessary critical mass of activities and actors. Six EII’s were envisioned to be launched in 2008: wind, solar, bio-energy, carbon capture and storage, electricity grids, and nuclear fission. The first four were eventually launched in June 2010 on wind, solar, electricity grids, and carbon capture and storage. The SET-plan notes that “where appropriate, a combination of ‘technology push’ and ‘market pull’ instruments may be used.” But it appears that on balance, the EII’s, like the SET-plan overall is mainly oriented towards the research and developments end of innovation policy. Thus, while the EII’s contain technology roadmaps to 2020, which will include actions to develop the technologies and improve their competitiveness, limited attention is paid to the creation of markets.

The Plan states that existing European Technology Platforms should assist in the preparation phase of the European Industrial Initiatives. However, while there is scope for these platforms to develop deployment strategies, the emphasis appears to be very much on the R&D side. Nevertheless, in a recent evaluation a group of experts convened by the Commission had as one of their conclusions that “the demand side for implementing a potential solution should be tackled by concrete proposed actions” in the context of revised program for these platforms.

Challenges and Recommended strategies

The Commission published a communication reviewing EU innovation policy in September 2009. This is quite interesting for the general criticisms it makes of Community-level innovation policy, and also for the way it pulls out a number of low-carbon, innovation-relevant initiatives as examples of EU innovation policy. The purpose of the review was to identify remaining gaps and propose policy orientations to fill them.

New rules on car emissions is positioned as a way of triggering substantial innovations in the European automotive industry, resulting in cleaner, affordable European cars, and helping to keep the industry globally competitive. The Emission Trading Scheme (ETS) Directive is also mentioned as an initiative that will “foster innovation in renewable energy production and encourage the construction of more environmentally friendly power plants, including new carbon capture and storage (CCS) technologies.” The importance of the SET-Plan in achieving the “20-20-20” objectives by 2020 by accelerating the development of low-carbon technologies is referenced, as is the 2008 Action Plan on Sustainable Consumption and Production and Sustainable Industrial Policy.

In particular, the review addresses the removal of ‘critical bottlenecks in the framework conditions for entrepreneurs,’ and ‘enhancing the governance of the EU innovation system.’ In terms of bottlenecks it observes that “the EU innovation system continues to suffer from shortcomings that negatively influence the market rewards and incentives for private investment in innovation, which as a consequence remains lower than that of our main competitors.” This is suggested to be remedied by: completing the single market; improving the legal framework for the protection of intellectual property; addressing the fragmentation of the venture capital market, and stimulating the low level of equity funding; synchronising the standardisation process better with research results and market needs; strengthening the knowledge triangle between business, education and research needs; and increasing the capacity of the EU educational systems to contribute to an “innovative and agile knowledge society.”

The Commission suggests further that progress towards improving the international competitiveness and performance of the European venture capital sector has been slow, and that there are structural deficiencies in the European early-stage finance market. This includes the absence of private investors, fragmentation of the market, and low returns. While these observations are not directly addressing the provision of financing for low-carbon innovation, they sketch out a vital part of the context which affects innovation in general, and low-carbon innovation in particular.

Finally, the Commission observes that there is a need to improve the governance of innovation and that in particular there is no lack of innovation support programs in the EU in terms of numbers. The problem is identified as one of lack of critical mass and coherence. The Commission highlights that innovation support involves seven different Commission services, various agencies, and 20 committees with representatives from Member States. It also cites a recent consultation on innovation policy to the effect that users of the available funding find it complex to access.

Based on the review of existing EU policies and programs in the previous section, as well as the results of the EU review, a number of observations can be made with respect to the various features of the outlined policy landscape.

First of all, as an expression of the direction of travel for the EU over the next ten years, economic growth is paramount to the Europe 2020 strategy, and innovation

is attributed a strategic role in achieving it. Within this, low-carbon innovation specifically is also given an important role, both as part of the intention to decouple growth and resource consumption, and as a source of growth in its own right, safeguarding and capitalizing on what is perceived to be the EU's first-mover status in this area. Innovation Union, Resource Efficient Europe, and Industrial Policy for the Globalisation Era are the Europe 2020 flagships of greatest significance in the present context.

Climate change, energy and resource efficiency is one of the areas around which the Commission is proposing to re-focus R&D and innovation policy. The scope is, in principle, the whole innovation chain. EU-level action will centre on improving the framework conditions, including improving access to capital, and making full use of demand-side policy such as public procurement and smart regulation. This is encouraging, as access to capital in the early stages of commercialization is a key enabler for the transition to a low-carbon future. Moreover, 'smart regulation' in the context of the Innovation Union flagship should be decisively employed for the creation of markets for low-carbon innovations.

Of potential note is also the reference to strengthening and developing the role of EU (funding) instruments in support of innovation. There is clearly a link to be made here with the debate about 'climate proofing' the budget in general, and the work now underway to define the post-2013 multiannual framework in particular.

A number of initiatives are outlined in relation to the flagship Resource Efficient Europe, but it is often difficult to determine what is additional to existing plans. The recent Roadmap for a competitive low carbon economy by 2050 and the Energy Efficiency Plan 2011 are important. The Roadmap for exemplifying a cost efficient pathway to 80% domestic emissions by 2020, and the Energy Efficiency Plan by promising a set of potentially significant measures that could help pull forward investment in energy efficiency. The Roadmap is however but a vision, and contains some assumptions about energy supply choices that will be controversial, while the Plan is somewhat vague and leaves much to be more closely defined later in 2011.

It is worth noting that the debate about energy efficiency, which has been going on since the late 1970s, is to a large extent about the deployment of low-carbon innovations, whether these be of a technological or a behavioural nature. Therefore it is not really surprising that the limitations of this debate, in so far as it has by and large focussed on efficiency as opposed to absolute reductions, are also relevant to the debate about the deployment of low-carbon innovations. Like the SCP/SIP Action Plan, the Energy Efficiency Action Plan (EEAP) has the potential to deliver substantial deployment of low-carbon innovation on a product-by-product basis. A general condition for this will be that minimum performance requirements are sufficiently stringent, are updated at appropriate intervals, and are accompanied by appropriate supporting measures such as, for example, transparent benchmarking and technology procurement. However, it should be noted that the focus on products does nothing to halt the trend towards more energy-consuming products, with greater functionality, resulting in increasing use, and therefore increasing energy consumption. This challenge lies at the heart of the problem but has not really been taken up in a direct way in the flagship Resource Efficient Europe.

The flagship Industrial Policy for the Globalisation Era does seem to recognise that the transition to a low-carbon economy would require transition management, at least implicitly. It is recognised that while the challenges of globalisation and adjusting products and processes to a low-carbon economy will create business opportunities for some, other sectors may have to re-invent themselves.



The overall ambition in the Europe 2020 flagships may not be sufficient to decouple Europe's growth from resource and energy use.

broader sectoral perspective. A distinction is made between technologies in terms of whether they are relevant for the 2020 or the 2050 targets. While the Plan does make reference to the deployment end of the innovation chain, and indeed to the challenge of bridging the Valley of Death between supply and demand, in practice the balance of the Plan seems to be very much on research and development and thus the supply side of the innovation chain. The most market 'pull' oriented section of the SET-plan is in the context of international co-operation.

Within the EU 2006 innovation strategy, the Lead Market Initiative expressly seeks to address the demand side of the innovation chain, and the sectors it addresses contains some that are explicitly of interest here. However, it is also clear that Lead Market Initiative has some way to go before it may bear fruit, and also, in relation to the clean technology sector, it is not clear yet what the Lead Market Initiative brings in addition to what is already there.

SMEs are responsible for half of the EU turnover, and represent almost 99% of the total number of companies in EU. The Competitiveness and Innovation framework Programme (CIP) was meant to become the main legal basis grouping all Community actions in the field of (eco-)innovation and competitiveness. CIP encourages usage of renewable energies, information and communications technologies (ICT), and promotes energy efficiency. Moreover, CIP stimulates SMEs' innovation activities, and provides better access to finance and business support services by offering grants and a large portfolio of venture capital via the European Investment Bank (EIB) and European Investment Fund (EIF). In order to meet the Lisbon Strategy's objective of making Europe the most competitive and dynamic knowledge-based economy, EU policies should pay special attention to innovative SMEs that can provide low-carbon solutions to other companies, and thereby contribute to their competitiveness.

Conclusions

A number of observations can be made about the overall picture of the EU policy landscape for the deployment of low-carbon innovations. While further analysis of this extensive and evolving arena is required, it may be useful to consider the following three key questions:

It is clear from the flagships that there are a number of potentially significant policy initiatives in the pipeline. Nevertheless, there is considerable cause for concern that the overall level of ambition will not be sufficient to truly succeed in de-coupling Europe's growth from resource and energy use, thus placing at risk our capacity to secure sufficient reductions in emissions. And so it runs the risk of failing on its own terms.

The SET-plan is, as the name suggests, very much focussed on a set of specific technologies, and little or no attention is given to services, or the need to reconceptualise business strategies in a

Does the ensemble of policies add up to a coherent whole?

The overall picture which is emerging from the analysis is one of an interpenetrating web of strategies, action plans, programmes and more specific measures, rather than a coherent framework. The recent review of Community innovation policy makes a similar point deploring the “lack of critical mass and coherence” in innovation support programmes: “innovation support involves seven different Commission services, various agencies and 20 committees with representatives from Member States.” It is clear that the development and deployment of innovations for a low-carbon future is at the very least at the confluence of the work of DG Climate Action, DG Enterprise and Industry, DG Research, DG Regional Policy, DG Energy, DG Environment, and DG Competition. The Innovation Union Flagship could help to improve on this situation.

Are there some elements missing?

This question has multiple dimensions. It is clear that EU innovation policy is overwhelmingly concerned with technology, and plays relatively little attention to non-technological innovations. This also applies to low-carbon innovations. Furthermore, it is also clear that apart from the Lead Market Initiative, the overwhelming emphasis is on supply-side, with much less attention to the formation of markets, or demand-side policy. More emphasis appears to be put on the development of innovations, including low-carbon innovations, than on the deployment of innovations. Again, the Innovation Union flagship suggests that this can improve in the coming years. Here, the critical issue of access to capital is addressed, but more attention could be paid to the private sector side of the financing coin.

As we have seen in the section above, a number of elements are missing from the EU policy landscape for the deployment of low-carbon innovation, although there is an issue about where we draw the boundary around the low-carbon innovation policy landscape. However, even if we adopt an inclusive definition, the array of policies currently assembled will not get us to where we need to get to by 2050 (i.e. >80% reduction).¹¹⁰ There are some generic weaknesses in relation to innovation policy in Europe, and some specific ones in relation to low-carbon innovation, and there seems to be limited focus so far on policies specifically focussed on deployment. There is cause for concern that the overall level of ambition in the Europe 2020 flagships will not be sufficient to truly succeed in de-coupling Europe’s growth from resource and energy use, thus placing at risk our capacity to secure sufficient reductions in emissions.

What is the working theory of innovation, low-carbon innovation, and the transition to a low carbon economy which emerges from the various policy documents?

The perspective appears to have evolved over time, and is influenced by which DG is in charge of a given policy initiative. A more linear view of innovation seems to be giving way to a more dynamic systems perspective. In particular, the ‘innovation system’ perspective appears to be influential. What is clear is that the boundary of ambition is usually drawn at making the energy system more efficient, and so fails to integrate more comprehensive restructuring approaches proposed by many experts and analysts. The perspective informing the Commission’s approach to innovation should be enriched to take account of the more structural issues raised. There is a need for a more ambitious and more fundamentally transformative approach to innovation in the Community if we are to reach our climate change objectives to 2050.

¹¹⁰ Brussels European Council Presidency Conclusions 29/30 October 2009, p.3.