energycities
WHERE ACTION & VISION MEET

The European association of
local authorities in energy transition

Economic impact of the energy transition at the local level

Methodologies and case studies

Study undertaken by **Energy Cities:**

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LISTE OF ABREVIATIONS AND SYMBOLS

ACEE American Council for an Energy-efficient Economy

ADEME French national energy agency (Agence de l'Environnement et de la Maîtrise de l'Energie)

AEE Employment-environment alliance (Alliance Emploi-Envronnement)

ARD Regional development agency (Agence Régionale de Développement)

ARENE Regional environment and new energies agency (Agence Régionale de l'Environnement et des Nouvelles Energies)

AWEA American Wind Energy Association

CCC Copenhagen Cleantech Cluster

CIRED International research center on environment and development (Centre International de Recherche sur l'Environnement et le Développement)

CO_2 Carbon dioxyde

DEIT Industrial and territorial ecology approach (Démarche d'E*cologie Industrielle* et Territoriale)

DFI Direct Foreign Investments

ERDF European Regional Development Fund

EU European Union

EUR Euros

GBP Great Britain Pounds

GDP *Gross Domestic Product*

GW Gigawatt

Insee French national institute of statistics and economic studies (Institut National de la Statistique et des Etudes Economiques)

kW Kilowatt

KWZ Kirklees Warm Zone

LCR Leeds City Region

LEED Local Economic and Employment Development

MSWI Municipal Solid Waste Incinerator

NPV Net Present Value

OECD Organisation for Economic Co-operation and Development

R&D Research and Development

SME Small and Medium-sized Enterprise

TETF Texas Emerging Technology Fund

UITP International Union of Public Transports

UNEP United Nations Environment Programme

USD United States Dollars

VSB Very Small Business

WHO World Health Organization

WWF World Wildlife Fund

ZAE Economic activity area (Zone d'Activité Economique)

SUMMARY

Outlook and objectives of the study

An understanding of the mechanisms that link the energy transition to the stimulation of the economy on the ground is indispensable in terms of more efficient targeting of local energy transition policies. Objective evidence of economic results is required, as is a better understanding of economic analysis methods, in order to equip local and regional authorities with the tools required to demonstrate the economic benefits for all the key players.

With the ***"Economic impact of the energy transition at a local level – Methodologies and case studies"*** study, Energy Cities illustrates numerous socio-economic aspects of the energy transition and confirms the local economic benefits, through the use of data.

As with any complex, new and diffuse process, this field of research is still not fully understood. Appropriate, high-quality analysis at the local level has rarely been carried out to date and a critical assessment of the methods used is necessary.

This study will fill a gap and provide suggestions on potential areas for further research in a range of fields which should be further explored and examined in collaboration with local authorities and voluntary partners.

Methodology and results

The first part of the study sets out the scope of the study and contains a **general description of the impact observed and the potential outcome of transition policies** in the main green growth sectors: eco-innovation, the energy performance of buildings, renewable energy, sustainable mobility, recycling and industrial ecology.

The analysis then focuses on the feedback of six towns and regions with a policy of active sustainable development (building renovation, support for eco-industries, promotion of soft mobility etc.), presented from the point of view of the economic results observed and the evaluation methods used.

The study comprises five European authorities - Brussels, Copenhagen, Hannover, Kirklees and the Greater Paris Region, and one North American authority - Nolan County. The table below summarises the case studies with the main subjects addressed, the sources for documents and the methods used.

City / Themes	Source	Methods / Data
Bruxelles Capitale		
Renovation of buildings	Bruxelles Environnement Alliance Emploi-Environnement European Commission	Estimation of expenditure avoided Annual dashboards - Sustainable Construction sector Econometric modelling of the "green value"
Copenhague		
Green sector	DAMVAD	Case-by-case identification of green businesses
Cleantech sector	Copenhagen Cleantech Cluster	Annual monitoring through a business survey
Green growth	OECD- LEED	Dashboards - international comparison
Mobility, water, waste	Green Growth Leaders	Factual data by project area
Hannover		
Energy efficiency	Proklima	Input-output model
Kirklees		
Renovation of buildings	Kirklees Council	Input-output model
Green sector	Yorkshire Cities	Estimation of expenditure avoided and "green value" Primary and secondary green jobs
Nolan County		
Wind energy	New Amsterdam Wind Source	Factual data and estimations
Paris-Ile de France		
Green sector by industry	OECD	Bibliographic compilation
Eco-innovation	OECD	Green patents; technological advantage index
Green sector	Insee	Green jobs and "going green"

The study then addresses **the synthesis of the methods used in the case studies and presents other evaluation tools produced by different organisations**. Through this analysis a range of methodological approaches were identified and critically examined, which the authorities can make use of in order to conduct their own research and practically evaluate their programmes.

This work is then completed by a **bibliography** of approximately sixty documents, mainly in French and English, connected to the topic of green growth and **references for the case studies.**

THE POTENTIAL OF GREEN GROWTH

The economic opportunities brought by the energy transition are garnering recognition among business circles and political decision-makers. A new vision is coming to the fore: instead of being viewed as a threat or a constraint for business, environmental issues are now seen as a source of high levels of business activity and performance, as the basis for a new economic model based on respect for the natural environment.

Some experts emphasise the mutually reinforcing nature of economic and environmental viability in the urban environment[1].

Sustainable urban development is often associated with a range of terms in relation to the economy, such as low-carbon economy, circular economy, green growth, attractiveness, etc.

Green growth is defined by the OECD as the stimulation of economic growth and development through activities that ensure that the natural asset base continues to provide environmental resources and services[2]. Increasingly, decision-makers are turning to such activities, which are seen as having a high return in terms of job and enterprise creation, attracting investment and reinforcing local competitive strength.

By contributing to improving the quality of the local environment and responding to global issues, specifically climate change, decision-makers are taking steps away from the model in which economic growth goes hand-in-hand with the deterioration of the environment.

Green growth sources are defined in a coherent manner by various organisations, including the OECD, as follows:

- productivity gains due to greater efficiency in the use of natural resources, in the broadest sense - energy, water, unused land;
- technological innovation in terms of finding solutions to environmental problems;
- emergence of new markets stimulated by the demand for clean technologies and green goods and services, with opportunities for growth and employment;
- investor confidence with greater predictability and political stability;
- stable macroeconomic conditions and reduced volatility in the price of resources;
- a solution for "bottlenecks" in resource flows;
- reducing imbalances in ecosystems in order to reduce the risks related to the natural environment.

The French Centre for Strategical Analysis[3] shares this vision, where green growth is conditioned and stimulated by the following factors:

- the trend for price rises for non-renewable energy resources and their significant volatility;
- public policy on climate change: taxation, rules, regulations which result in a price signal;
- public policy on sustainable development: grants, programmes to assist businesses, support for eco-innovation, delivery of renovation and infrastructure projects;
- changes in consumer preferences and behaviour towards more sustainable consumption and more socially responsible business practices;
- technological innovations.

It is often said that the energy transition must take place at local level, as it depends on the particular characteristics of the area which require a specific approach, and a strategy based on good local knowledge inlcuding strengths and weaknesses, the needs and difficulties experienced by businesses, local players and their relationships.

The involvement of public authorities is important at this point in order to trigger large-scale changes, as the market is still new and the need for funding cannot always be met by private investors.

[1] Eco2 Cities Guide - World Bank, 2012
[2] The benefits brought by ecosystems, biodiversity
[3] www.strategie.gouv.fr

According to the UNEP[1], the crucial role of town authorities in the transition towards the green economy can be explained by three major factors: their capacity for innovation, the potential for development of clusters and the predominance of the service sector in urban areas, as green business involves mainly service activities.

The unemployment rate is a crucial issue for decision-makers, and emphasis is often placed on the impact of the green transition on employment. However, it is important to understand that whilst the transition will lead to the emergence of new markets and jobs, this will go hand-in-hand with the destruction of jobs in traditional sectors, which may not be entirely substituted by the new jobs.

However, many existing jobs will be affected by the ”greening” of the economy. New skills-sets will be required, and there will be a need for education and training.

[1] Cities Investing in energy and resource efficiency – UNEP, 2011

OPPORTUNITIES IN VARIOUS SECTORS

This part contains a general discussion on the reported and potential impact of the environmental transition towards a sustainable development model. Although not all the issues addressed here are directly linked to local authorities, we have sought to develop these aspects in order to establish a theoretical framework and to try to clearly set out the scope of the subsequent case-studies.

Eco-innovation

With regard to environmental and economic challenges, eco-innovation has the potential to become a cornerstone of sustainable urban development. New technological solutions to promote the competitiveness of businesses and local areas, driving growth based on efficiency and specific skills and knowledge.

Environmental innovation is the creation of adaptation of goods and services, either through procedural modifications, or practices – in the latter case, it is known as systemic innovation. **The economic benefits are mainly related to greater efficiency in the use of energy and raw materials, and therefore lower production costs**. Lower costs are reflected in prices, which improves buying power among consumers and the competitiveness of local businesses. Other less tangible impacts are related to the brand image of the region, which is often associated with attracting external investment, new partnerships, new customers and greater loyalty amongst existing customers.

The two major sources of opportunity today – innovation and sustainable development – are both to be found in urban areas.

The green economy sector, a strategic pillar of European public policy, strengthens the demand for clean technologies and environmentally-friendly goods and services, is showing strong growth and now represents 2.2% of GDP in Europe[1]. This is an opportunity for local knowledge-based development, efficient use of resources, higher productivity, and to build relationships between the private and public sector, and entrepreneurs and researchers. **Furthermore, the range of "green" technologies - i.e. to summarise, all activities with a low environmental impact involving lower levels of consumption of resources and energy - is wide enough so that various regions will be able to find their own niche:** from ecotourism to environmental consulting and eco-design for infrastructures and buildings. This is even more so the case, given that greening of the economy applies to every aspect of every sector.

> *"Eco-innovation is defined as the production, assimilation or use of innovation in products, processes, services or management practices, with the objective, throughout the life cycle, of preventing or significantly reducing environmental risks, pollution and other negative impacts associated with the use of necessary resources."*
>
> *[developpement-durable.gouv.fr]*

One form of innovation with strong roots in the local area is setting up clusters based on specific local assets. The clustered businesses are concentrated around a specific resource, skill-set, or research centre, which increases the advantages of a close-knit business community.

An emblematic example of an environmentally-friendly cluster is **Eco World Styria**[2], "the green technology valley" in Austria, (Graz), which is a real driver for regional development[3]. The cluster, which is recognised as a world leader in the area of renewable energies and environmental engineering, brings together approximately 550 businesses (including 180 official members) and employs 15,000 people

[1] http://ec.europa.eu/environment/enveco/industry_employment/pdf/facts_and_figures.pdf eco-industry represented 2,5% of European GDP in 2008 (an increase of 7% since 2000)
[2] http://www.eco.at/cms/223/
[3] We have not had the possibility to draw up a report on this experience as we do not have access to the underlying studies or the data cited.

(almost 3% of the regional working population)[1]. It was an initiative by a local entrepreneurship agency to support regionally established green businesses in 1998 that led to this success. The results for 2010 speak for themselves: the growth in turnover for green businesses (+18%) is greater than that of the global market (+10%). Growth follows the increase in the proportion of GDP allocated to R&D investments (4.3% in 2010 compared to 3.9% in 2009). Employment in the sector has grown by approximately 10% per annum since 2005 (+11.7% in 2010).

The sector represents approximately 10% of the regional product, which is on the increase. The export rate has reached 93%.

Overall, the region holds a strong position in Austria with a growth of +4.7% in 2010, which places it first in Austria. Support for the development of green technologies has proved to be an efficient solution in the fight against the decline of traditional industries (transformation of metals) at a time of structural change in the economic model.

Energy performance of buildings

Impressive effects on health

A national house renovation programme in New Zealand, in which 40,000 low-income households were involved, has resulted in a 43% reduction in the number of admissions to hospital attributable to respiratory illnesses and a significant decrease in the number of absent days at work or school (-39% and -23% respectively). An overall evaluation estimated that the costs of the programme were entirely offset by the energy savings.

[Recognizing the Full Value of Energy Efficiency – RAP 2013]

In Europe, the construction sector is responsible for 40% of energy consumption and 36% of CO_2 emissions[2]. The situation has been aggravated by continuous urbanisation, which creates a demand for further construction and results in urban sprawl, to the detriment of natural and agricultural areas. On the other hand, the construction sector is in itself an important driver for action, and with concentrated effort and measures, large-scale results can be achieved. The improvement of energy efficiency in buildings is a priority for urban planning policy with a view to reducing energy consumption and greenhouse gas emissions. Furthermore, improving energy efficiency is associated with good levels of cost-effectiveness: for example, the Warm Zone programme in Kirklees, presented in the "case-study" section, shows that it is possible to achieve significant gains.

Ambitious actions to improve the energy performance of buildings provide opportunities in terms of direct and indirect employment, as the sector is labour-intensive and there are a large number of SMEs working in this area[3] – local installation companies and their suppliers. Public investment in the implementation of renovation projects has a leverage effect on private investment.

Jobs directly linked to investments in energy efficiency can be classified according to the main tasks they entail, as follows:

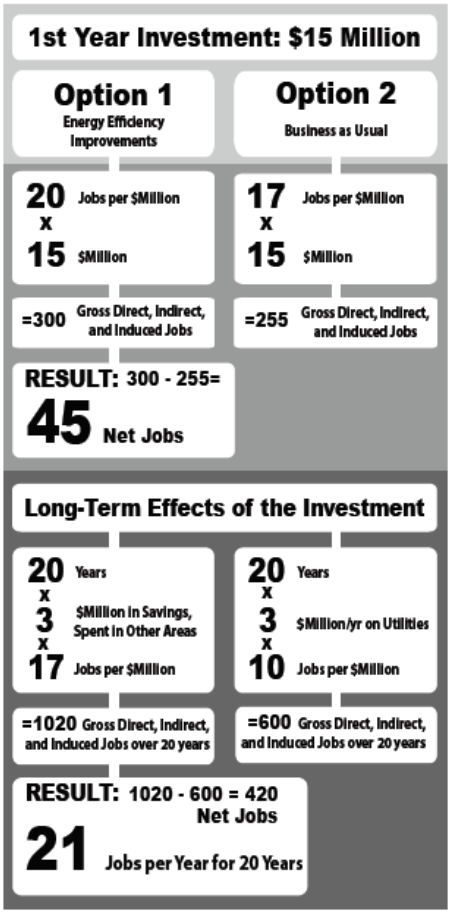
- the manufacture of equipment and material;
- the organisation of the action plan in order to plan and monitor the distribution of equipment to consumers (including training needs);
- technical audits and expertise prior to the installation of equipment;
- installation of equipment in the consumer's premises (insulation, double glazing, heating systems etc.);
- use, management and maintenance of equipment once installed in the consumer's premises;
- jobs linked to financial bodies mobilised according to the financial tools developed to support the different measures[4].

[1] http://internationalcleantechnetwork.com/partners/eco-world-styria-austria/
[2] http://urbact.eu/fileadmin/general_library/19765_Urbact_WS6_ENERGY_low_FINAL.pdf
[3] Energy efficiency and jobs: UK issues and case studies – EST, ACE, 2000
[4] ARENE Île-de-France, 2006

It is important to note that the majority of jobs are local (except the manufacture of equipment which remains marginal in terms of the jobs expected to be created).
In addition, the immediate impact observed of a reduction in energy consumption on the energy bill boosts the purchasing power of users and allows them to redirect their spending, leading to additional consumption in other sectors, which generates jobs.

A hypothetical example given by the ACEEE in a fact sheet on the creation of jobs by energy efficiency reveals two options as a result of an investment of USD 15 millions - either the energy efficiency of public buildings can be upgraded or the status quo scenario can continue. This calculation is based on two observations:

- Construction is more labour-intensive than other sectors: in the case of the American economy, 20 jobs are created for an investment of EUR1 million in comparison to an average of 17 jobs for the same investment;
- Energy consumption redirected to other sectors, thanks to energy expenditure savings, results in the net creation of jobs. In the case of the American economy, 17 jobs are created for EUR1 million of consumption on average in comparison to 10 jobs for the same amount spent on energy.



Source: ACEEE Fact SheetSource: ACEEE

In addition**, improving the energy performance of buildings is a tool that can be used to fight energy precariousness, which remains an important socio-economic concern for European countries**. Poor housing conditions have a direct effect on health and social well-being and therefore on the related expenditure (see box above).

The price of property is another source of value creation and these prices are affected by an improvement in environmental performance of buildings. The analysis of this mechanism has given rise to the concept of green value: according to the DINAMIC[1] association it corresponds to an increase in value (measured, for example, by the sale or rental price) generated by the improved energy and environmental performance of a building in comparison to another property, if all other characteristics are identical". The "range" of this value is quite broad as it is conditional upon the method of evaluation and other factors (it varies based on geographical location, for example) even though econometric studies do of course take into account the effect of the differences between the housing compared. In any case, the positive impact of energy labelling on the price of housing has been widely confirmed.

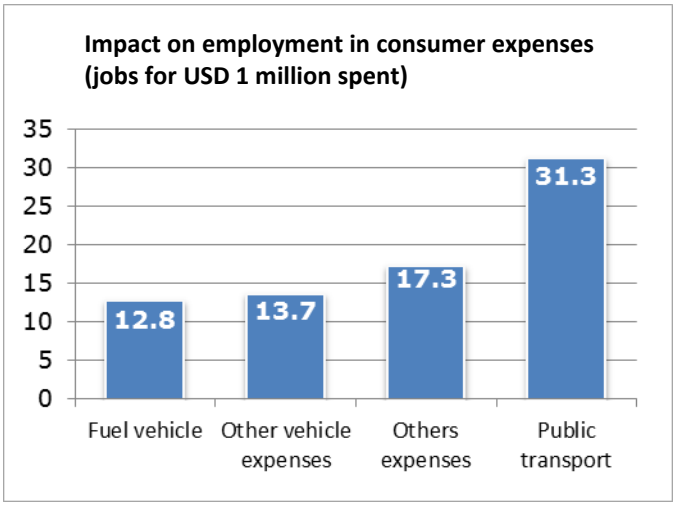
Saving energy also contributes to business competitiveness in all sectors thanks to a reduction in production costs, therefore making the region more attractive to investors.

[1] Development of notarial information and analysis of the property market and conjuncture -http://www.notaires.fr/notaires/etudes-et-analyses-dinamic

Renewable energy

The main economic argument in favour of renewable energy is based on the fact that it mainly relates to local energy production. This means that there is greater self-governance of the territory (or even an energy independence) and therefore protection against significant price fluctuations in external markets, which encourages macro-economic stability, an important source of comparative advantages. In addition, this entails redirecting external financial flows to the local economy, safeguarding value within the territory, and creating local jobs instead of supporting jobs linked to energy exporting.

More so, over time, the technological progress and economies of scale of producers enable renewable energy costs to be reduced which will then become more competitive in comparison to conventional sources of energy. In the United States, the cost of wind energy dropped by 20% between 2010 and 2012 and has dropped by 80% since 1980. In Europe, data from 2013 has demonstrated that Italy, Germany and Spain[1] have already achieved "grid parity"in photovoltaics, the cost of which is now competitive in comparison to conventional sources of electricity. In Denmark, the national energy agency recently announced that onshore wind energy has become the country's least expensive source of energy: new power stations will become operational in 2016 and will have a cost of 4 Euro cents per kilowatt hour[2]. It is not surprising that it is those countries mentioned above that have the most significant experience in this field.



With regard to employment, it is important to understand the net effect of developing the renewable energy sector, as there will inevitably be a loss of jobs in conventional energy production and distribution in parallel. In this respect, the differences in the intensity of labour involved play a crucial role: a positive net balance will be achieved if the developed sector requires further labour per unit of output. This is precisely the case for renewable energy, according to numerous independent sources cited by the CIRED study on the Negawatt scenario[3], which reaches the same conclusion – the net effect of energy transition is positive[4]. This applies to professions such as manufacturing and distribution, project development, the construction and installation of turbines, their operation and maintenance, transport and logistics and also technological research and professional financial, legal and consultancy services[5].

The other benefits for communities relate to the taxes paid by energy companies to local authorities and the land rent paid to land owners.
The development of industries linked to renewable energy is also an opportunity for regions experiencing industrial decline to become reindustrialised and to take advantage of their background in traditional industry to develop a green industry.

Sustainable mobility

The energy efficiency of urban transport and the promotion of green methods of transport are at the heart of the sustainable mobility policy which is a combination of physical planning and the development of intermodality (as opposed to the use of individual cars), along with support for research into alternative fuels

[1] These are the same 3 or 4 European countries analysed in the ECLAREON report: http://www.eclareon.com/sites/default/files/npgpm2014_engl.pdf
[2] http://treealerts.org/region/europe/2014/07/wind-declared-cheapest-energy-source-in-denmark/
[3] The "NegaWatt scenario" for an energy transition by 2050 presents a progressive reduction in the use of nuclear energy based on sensible energy use, energy efficiency and resorting to renewable energy.
[4] CIRED 2013
[5] AWEA U.S. Wind Industry Annual Market Report: Year Ending 2011

and electric cars. This issue is all the more important as the volumes involved in public transport will inevitably increase alongside expanding urbanisation.

Investing in extending and improving public transport networks is one of the best solutions to reduce the use of cars in a city. This provides the local economy with a direct incentive as the jobs created will be local and non-outsourceable and will replace jobs in other locations as automobile sector products are mainly imported. **According to the UITP, public transport operators are the biggest employers in cities such as Amsterdam, Barcelona, Brussels, Genoa and Dublin and are among the top 5 employers in Paris, Porto, Madrid and Turin[1].**

Research on the costs and benefits of transport[2] has shown that the expenditure linked to the use of a car provides less support for local jobs than other sectors, in particular the public transport sector which is highly labour-intensive.

In addition the advantages of eco-mobility, as in other fields, extend beyond the labour market. For households, the expenditure linked to owning and using a private car (fuel, parking, maintenance and insurance) which is avoided, is a considerable sum which can be redirected to the consumption of goods and services in other sectors, in particular goods produced locally.

The service economy, which bases its logic on the use of property rather than its ownership, subverts production and consumption models. Car sharing and car pooling are part of these new practices. A survey carried out in partnership with *France-Auto-partage* (Car sharing France) and ADEME estimated the savings linked to this mode of transport[3]. According to data on 21 French cities, each kilometre travelled through car sharing costs the user, on average, 0.54 Euro cents in comparison to EUR1.60 with a private car in a paid car park[4] (EUR1.20 to park on the street). **Car sharing is therefore 2 to 3 times cheaper[5].**

In addition, the decrease in road traffic would reduce the pressure on road infrastructure and consequently provide councils with financial savings in relation to infrastructure maintenance as well as new constructions. The alternatives developed – cycle paths, light railway networks and bus lanes – require less investment while simultaneously offering a greater transport capacity (number of people per hour), as illustrated by the table below.

Transport Infrastructure	Capacity [pers/h/d]	Capital costs [US$/km]	Capital costs/ capacity
Dual-lane highway	2,000	10m – 20m	5,000 – 10,000
Urban street (car use only)	800	2m – 5m	2,500 – 7,000
Bike path (2m)	3,500	100,000	30
Pedestrian walkway / pavement (2m)	4,500	100,000	20
Commuter Rail	20,000 – 40,000	40m – 80m	2,000
Metro Rail	20,000 – 70,000	40m – 350m	2,000 – 5,000
Light Rail	10,000 – 30,000	10m – 25m	800 – 1,000
Bus Rapid Transit	5,000 – 40,000	1m – 10m	200 – 250
Bus Lane	10,000	1m – 5m	300 – 500

Source: UNEP 2011

Improved accessibility thanks to public transport or cycle paths is often a key factor in urban renewal, encouraging the development of businesses and stimulating the prices of property in proximity to transport routes. Moreover, the consumption behaviour of motorists differs from that of cyclists: studies show that the latter tend to spend more frequently and to generate more revenue overall for neighbourhood shops. According to a memorandum on cycle tourism, another sector boosted by the development of cycling infrastructure, cyclists spend an average of around EUR14 per day more than tourists who travel by car (EUR66

[1] UITP Contribution to the Transport Business Summit 2014 – Brussels, March 2014

[2] Evaluating active transport benefits and costs - Victoria Transport Policy Institute, 2014

[3] Résultats de l'Enquête Nationale sur l'Autopartage 2012 http://www.presse.ademe.fr/files/ena_4pages_presse_130306.pdf

[4] These costs include vehicle depreciation, insurance, maintenance, repairs, parts and accessories, fuel and parking.

[5] https://www.futuribles.com/fr/base/article/premier-bilan-de-lautopartage/

in comparison to EUR42 in the central region)[1]. Switzerland, with 7000 km of national and regional routes, generates around EUR80 billion per year in added value from cycle tourism, relating to accommodation, catering and transport.[2]

Urban problems such as air pollution or congestion that appear to be purely environmental, are considered in economic theory as externalities that create external costs for society. The evaluation methods of these costs allow the positive impact of a more sustainable and safer urban mobility to be measured. For example, the annual costs related to congestion within the European Union are around USD 100 billion, or around 1% of GDP[3]: they include fuel wasted and time lost. According to a white paper by the Secretary of State for Transport in the United Kingdom with the title *Creating Growth, Cutting Carbon*, the delays caused by congestion cost urban economies GBP 11 billion per annum, carbon emissions cost society up to GBP 4 billion per annum and the health costs could reach GBP 25 billion[4].

Regarding the effect of cycling on public health, in France the savings in health costs related to cycling are estimated, according to the WHO, at EUR 5.6 billion or EUR 1.21 per kilometre cycled[5]. For companies better physical health of employees means less sick days and hence greater productivity.

Labour productivity is also dependent on conditions of accessibility to places for training and work and therefore on functioning transport systems, urban density and mixed use urban districts. These effects are difficult to measure but nevertheless they are recognised by employers. Likewise it is difficult to estimate at what point a town functions better as a ″business unit″ with better access to demand, and good and predictable logistics. A rise in external investments, for example, is a sign of a good business environment and can be used as an indicator.

Recycling

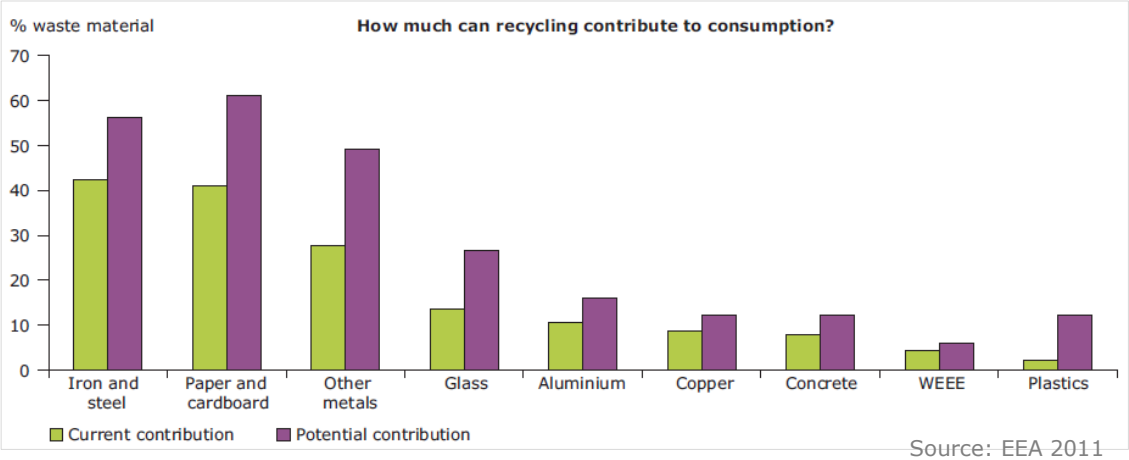
The recycling industry today is expanding, with an annual growth rate in the order of +6.5% (+45% from 2000 to 2007) in European countries[6]. This is the result of political and economic changes which are the source of future opportunities for the industry:

- ambitious public policies aiming at increasing the percentage of waste recycled : for example, European regulations on waste recovery state a rate of 70% (by weight) for recycling and recovery of construction and demolition waste by 20207;
- new environmental regulations that have an impact on the costs of landfilling and disposal in favour of the competitiveness of recycling:
- lower prices for materials from recycling than for those of raw and non-renewable materials, whose rarity determines a continuous rise in prices;
- the development of technologies specific to this industry which enable materials to be obtained that are easier to recover, processes to be optimised and operating costs to be lowered;
- improved secure access to rare raw materials and hence less exposure to risk;
- higher labour intensiveness of alternative means of processing than of traditional means (landfill, incineration): one of the studies on this subject has shown that the impact of one unit recycled through employment is almost double that of one landfill unit.

As the diagram below shows, there is significant growth potential for the recycling sector, given that the current volume cannot satisfy demand even on a European scale.

[1] Cycle routes, a tool for the sustainable development of tourism – brief memorandum – IAU, 2008
[2] ibid
[3] http://ec.europa.eu/transport/themes/urban/urban_mobility/index_en.htm
[4] Green growth in cities: Paris/IDF – OECD, 2013
[5] Spécial Economie du vélo – Atout France, 2010
[6] Earnings, jobs and innovation: the role of recycling in a green economy – EEA, 2011
[7] http://www.usinenouvelle.com/article/yprema-cherche-a-se-developper-par-la-franchise.N176541

Current and potential contribution of recycling to satisfying the need for materials in the EU (2006)



Source: EEA 2011

Nevertheless it is important to ensure that the increase in recycled volumes reflects an increase in recovered waste, i.e. that it goes hand in hand with a reduction in incineration or landfill. Recycling does not make sense if it is caused by a growing accumulation of waste.

Besides, economic opportunities can be found equally in other sectors than that of the recycling industry. In view of rising prices for raw materials, improving preventative practices and waste management then becomes an instrument of competitiveness for all companies involved in this process.

Industrial ecology

POSITIVE SOCIO-ECONOMIC EFFECTS		for	
		business	**cities**
cost reduction	purchase of raw materials	X	
	waste processing and disposal	X	
	energy consumption	X	
	pruchase, maintenance, transport and storage of infrastructure, vehicles & flow	X	
increase of income	sale of co-products	X	
	performance of companies (recycling, appreciation)	X	X
	access to financing programmes	X	
consequences of industrial competitive advantages	establishment of companies (including SMEs and SMIs)	X	X
	creation of stable and diversified local jobs		X
	creation of local jobs that are conducive to reintegration		X
	the fight against delocalisation	X	X
	increase in the budget allocated to investments, process/infrastructure improvements and salaries	X	

1: impacts perceived by communities that are related to the amount of business tax paid (related especially to the number of businesses and their turnover)

Waste recovery is a key element of industrial ecology, a basic concept in the circular economy. This is a model based on high productivity of resources, efficiency of logistics and transformation of waste into raw materials or energy sources in contrast to a linear economy (extraction > transformation > consumption > waste). Implementation of this model is effectively done at a local level, hence the concept of "industrial and territorial ecology". It is a major contribution to sustainable development of an area.

For companies involved in the industrial ecology process, potential economic advantages can be found particularly in the increase of comparative advantages, the sources of which can be summarised as follows:

- the utilisation of co-products as raw materials avoid or reduces production costs – a factor all the more important since the prices of resources and disposal of waste are constantly rising;
- additional earnings from the sale of co-products or recyclable materials;
- sharing infrastructure and public services, providers, equipment, vehicles which creates synergies;
- enhancement of companies' image when communicating their ecological commitment.

Furthermore, if companies function as an integrated system, this allows them to benefit from advantages such as proximity, formal and informal exchange of information and knowledge, technology transfer and lower interaction costs.

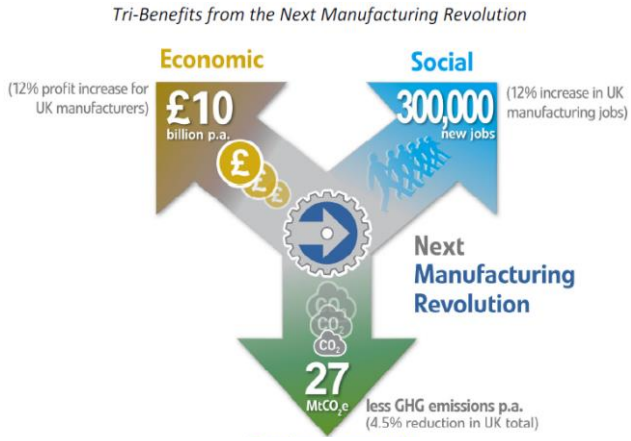
For communities, a commitment to industrial ecology boosts the attractiveness of the area, injects new life into the business climate, protects existing jobs and attracts new businesses interested in the whole array of flows available to create a place where production factors are concentrated, including specialised trades. The chart opposite summarises all the benefits for companies and communities.

The famous example of the town of **Kalundborg** in Denmark is an illustration of the economic benefits of industrial symbiosis. The annual savings to companies in the eco-park who utilise excess heat, water and waste, are estimated at between USD 12 million to USD 15 million[1]. The average ROI for a project is less than 5 years (based on 18 projects to exchange flows implemented before 1998)[2].

A study on the economic opportunities provided by better productivity of resources for the economy in Britain estimates the number of new jobs created at a national level to be 314,000. The benefit to profits for companies in the manufacturing sector are estimated to GBP 10 billion (a growth of +12% on average)[3].

This figure is composed of profits from several sources:

- energy efficiency;
- prevention of losses of raw materials;
- avoidance of disposal charges;
- trading waste;
- optimisation of packaging;
- optimisation of logistics;
- re-organisation of the supply chain;
- value capture from materials used in the form of re-utilisation, re-manufacturing, utilisation of the waterfall effect, recycling and recovery.



Source: Next Manufacturing Revolution 2013

[1] Industrial Symbiosis in Kalundborg, Denmark - Journal of Industrial Ecology, 2006
[2] The Industrial Symbiosis In Kalundborg, Denmark – Case Study - UNEP
[3] Next Manufacturing Revolution, 2013

CASE STUDIES

This section presents the feedback of towns or regions where the impacts of sustainable development policies (e.g. renovation of buildings, support for eco-industries and promotion of soft mobility) were analysed.

Amongst the concerned local authorities are five European ones: Brussels-Capital, Copenhagen, Hannover, Kirklees and Paris-Ile de France, and one in the US: Nolan County.

For some of them, in particular Paris-Ile de France and Copenhagen, we have collected complementary pieces of information in order to provide a bigger picture of the green economy in the local authority's territory.

The six case studies prove of real interest in terms of observed economic results and analysis methodologies used.

The table below summarises the case studies, giving the main issues addressed, the source of underlying documents and the methods applied.

City / Themes	Source	Methods / Data
Bruxelles Capitale		
Renovation of buildings	Brussels Environment Work-Environment Alliance European Commission	Estimation of expenditure avoided Annual dashboards - Sustainable Construction sector Econometric modelling of the "green value"
Copenhague		
Green sector	DAMVAD	Case-by-case identification of green businesses
Cleantech sector	Copenhagen Cleantech Cluster	Annual monitoring through a business survey
Green growth	OECD- LEED	Dashboards - international comparison
Mobility, water, waste	Green Growth Leaders	Factual data by project area
Hannover		
Energy efficiency	Proklima	Input-output model
Kirklees		
Renovation of buildings	Kirklees Council	Input-output model Estimation of expenditure avoided and "green value"
Green sector	Yorkshire Cities	Primary and secondary green jobs
Nolan County		
Wind energy	New Amsterdam Wind Source	Factual data and estimations
Paris-Ile de France		
Green sector by industry	OECD	Bibliographic compilation
Eco-innovation	OECD	Green patents; technological advantage index
Green sector	Insee	Green jobs and "going green"

BRUSSELS-CAPITAL, BELGIUM

1,139, 000 INHABITANTS

Brussels-Capital, the economic heart of the green capital of Belgium.

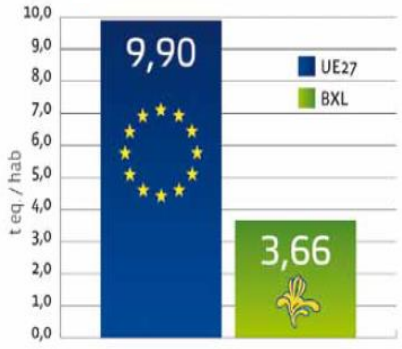
Covenant of Mayors signatory: 2008

KEY FIGURES

EMPLOYMENT ENVIRONMENT ALLIANCE - SUSTAINABLE CONSTRUCTION FOCUS AREA

Objectives
- *create 4 300 jobs between 2010-2020*
- *reduce companies energy bills by 35%*

First results
- *500 jobs created*
- *1 800 companies with raised awareness*
- *15 training bodies engaged*
- *155 teachers trained*
- *100 public contracting authorities informed about the new environmental and social clauses to be included in specifications;*
- *58 research laboratories and 92 research projects in the sustainable construction field identified.*



European Green City Index 2009.

The Brussels region has made significant progress over the past decade. Energy consumption per inhabitant and the total greenhouse gas emissions per inhabitant fell by 18% between 2004 and 2010. The current level of CO_2 emissions is well below the European average, as illustrated by the graphic opposite.
The efforts made by the region have garnered recognition at international level. Brussels received a WWF award as part of the *Earth Hour City Challenge 2014*, which awards pioneering towns and cities for their efforts to fight climate change. The prize followed on from the European Commission *Sustainable Energy Award* obtained in 2012. The standard of environmental governance is among the highest in Europe, according to the

Policies and projects

Policy in Brussels has a strong focus on sustainable construction. In the early 2000s, it was noted that the region had very poor results in terms of building insulation: annual energy losses had reached 250 MJ/m^2 - the highest level in Western Europe[1].

Today, buildings account for 75% of energy consumption and 70% of CO_2 emissions in Brussels[2]. Clear progress was made from 2004 onwards, owing to a clear policy direction from the government. At the time, none of the buildings met the 'passive house' standard. In 2013, the total surface area meeting this standard reached 520,000 m^2. Today, Brussels is the world leader for adoption of the passive standard for all new constructions: the "Passive 2015" agreement stipulates that all planning permission applications for construction or heavy renovations introduced after 1 January 2015 must involve highly energy efficient buildings[3].

The political framework is conditioned by the EPB Directive (Energy Performance of Buildings) with the short term objective of achieving "nearly zero energy buildings"[4]. Funding for individuals, local authorities and business, in the form of energy subsidies and zero rate loans, will be complemented by the organisation of training and assistance from a network of experts. Projects initiated by the state such as "Exemplary Buildings" or PLAGE are designed to roll-out energy efficiency to all renovations and new constructions.

[1] Success Model Brussels
[2] http://www.villedurable.be/themas/batiments-durables
[3] http://www.villedurable.be/content/news-brussels/bruxelles-pionniere-dans-le-standard-passif
[4] http://guidebatimentdurable.bruxellesenvironnement.be/fr/g-ene00-diminuer-la-consommation-d-energie-des-batiments.html?IDC=1048&IDD=5292

The **Job-Environment Alliance** launched by the regional government in 2010 emphasises the two-fold advantage of the green transition. Job creation and economic development are linked to environmental objectives: "the environment as a source of economic opportunities and an economy that benefits the environment"[1]. The aim is to stimulate the sectors of the economy with the highest potential in terms of green growth. Construction, water, resources and waste, sustainable food supply.
Details on the economic benefits of the PLAGE projects and measures taken by the Sustainable Construction AEE are available, and we intend to use them.

Methodology and indicators

PLAGE PROGRAMME

Since 2006, Brussels Environment, the government authority for the environment and energy in Brussels, has led a number of projects as part of PLAGE - Local Plan for Energy Management Measures. This funding and technical assistance programme is among the measures to improve the energy performance of the buildings in the region.

The PLAGE methodology provides four steps set out over four years and co-ordinated by an Energy Manager (RE). The success of the programme has encouraged the regional government to make this method obligatory for private and public owners and occupiers of buildings above a certain surface area, from 2015 onwards[2]. The Region covers the salary of the RE and offers tools and support from bodies, such as energy subsidies.

The programme was recognised in two ways during the European Sustainable Energy Week - EUSEW - 2013: it was amongst the finalists for the *ManagEnergy Local Energy Action Awards* and *Sustainable Energy Europe Awards* in the Consumer category.
Given that the measure is addressed to bodies managing major public sector buildings, emphasis was placed on both environmental and financial gains. The results of the first three projects are available: PLAGE Communal 1 (2006-2009), PLAGE Hospitals (2007-2009) and PLAGE Schools (2009-2013). The economic aspect of the evaluation of the projects involves calculating the costs avoided throughout the duration of each programme. The difference is calculated between the bill paid at the end of the project and a stimulation of the bill if consumption had remained stable in relation to its value at the beginning of the project, in current prices.

Given the complexity of estimating the costs of the programme, the report only presents the net gains for a given project. The total investment in construction works is not included as a cost, given that renovation budgets are often provided for outside the scope of the PLAGE programme. The proportion of the costs attributed to the intervention of the RE, which involves a modification or redirection of the initial investment, is difficult to identify. Further, major investments are supported by energy subsidies, i.e. the regional budget.

Data source: Brussels Environment; Energy Project Manager

EMPLOYMENT-ENVIRONMENT ALLIANCE

The Employment-Environment Alliance (AEE) is a government initiative in the Brussels region that comes under the "Pact for Sustainable Urban Growth". Its first focus area is Sustainable Construction (SC). The plan, containing 44 actions, created in partnership with stakeholders from the construction sector, aims to boost the competitiveness of eco-construction and eco-renovation companies, promoting the mastery of technical skills and strategic management.

In addition to construction itself, the sectors targeted by the programme are professional training, the social economy, business information and support services and R&D.
The economic objective of the programme is to create 10,100 jobs for the 4 focus areas between 2010-2020, with 4,300 of them being in sustainable construction. Moreover, it aims to reduce the energy bill of citizens and companies by 35%, with its potential being estimated at EUR5 million per year.[3]

[1] Speech by Evelyne Huytebroeck, Brussels Minister for the Environment, Energy and Urban Renewal - 21 February 2013
[2]
[3] Speech by Evelyne Huytebroeck, Brussels Minister for the Environment, Energy and Urban Renewal - 21 February 2013

Particular attention is paid to monitoring actions and results on a regular basis through action monitoring reports and an annual scoreboard. For each indicator the following are prepared:

- a report detailing how it is made up, the source of the data, the method of calculating it, the figures and their evolution since 2007;
- a methodological report.

Monitoring carried out by the AEE SC is based on 5 key indicators:

- the turnover of Sustainable Development in Brussels per year;
- the number of jobs in Sustainable Development;
- the number of participants and hours of training in Sustainable Development.
- the evolution of the annual energy consumption of the Brussels urban area (in kWh/m²);
- the evolution of the surface area of homes in relation to their energy performance (passive, model, Energy Performance of Buildings).

WASTE PLAN

The economic dimension is also included in the Regional Plan to prevent and manage waste, which was launched in 2010. The Plan was chosen as an example of Best Practice under the ERDF's PreWaste project. The budget set out for the 2010-2013 period presents the expenditure and the additional benefits in relation to the current budget. This evaluation demonstrates that the implementation of the Plan should generally result in savings for the Brussels region.

BRUXELLES PROPRETE BUDGET - differences in comparison to the current budget (in thousands of Euros)

	2010	2011	2012	2013	Amounts
biometanation of organic waste			2 000	2 000	4 000
increasing separate collections (awareness-raising actions & checks on white bags)	2 500				
increasing separate collections (checks on white bags)		1 200	1 200	1 200	3 600
waste collection centres		500	500		1 000
underground bins (glass)	163	163	300	300	925
TOTAL	**2 662.50**	**1 862.50**	**4 000.00**	**3 500.00**	**12 025.00**

*aim of 20 sites per year at EUR15,000 per site. EUR137,500 in liquidation expected in 2010 and EUR137,500 in 2011

REVENUES AND SAVINGS - differences in comparison to the current budget (in thousands of euros)

	2010	2011	2012	2013	Amounts
removal contract obligation	2 000	3 000	4 000	5 000	14 000
incineration tax revenues	550	550	550	550	2 200
TOTAL	**2 550**	**3 550**	**4 550**	**5 550**	**16 200**

Under the Plan, the region commits to change its legislation on waste processing obligations, so that all economic players producing waste are covered by a waste disposal contract. The obligation to have a waste disposal contract should have a beneficial effect on the region and should result in a progressive increase in the revenue of the Bruxelles-Propreté public body: the figure is currently around EUR 15 to EUR 16 million per year and should increase to around EUR 20 million.

Incineration taxes would allow for revenue of approximately EUR 550,000 to be generated. This calculation is based on the tonnage incinerated at the regional MSWI in Neder-over-Heembeek, and not from the collections carried out by Bruxelles-Propreté.

In addition, it is expected that the implementation of the plan will boost local employment; the results are currently being evaluated.

Results

PLAGE

The summarised results of the three PLAGE projects are presented in the table above:

P.L.A.G.E.	'Tows	'Hospital	Schools
Period concerned	2005-2009	2007-2009	2009-2013
Number of buildings	70	5	110
Area, m^2	195 789	483 000	5 419 009
Gas consumption	-15,8%	-14,3%	-18,0%
Electricity consumption	-4,3%	-0,6%	=
Tons of CO2 avoided	2 574	12 000	13 500
Expenditure avoided	1,3 M€	2,1 M€ (2009)	2,6 M€

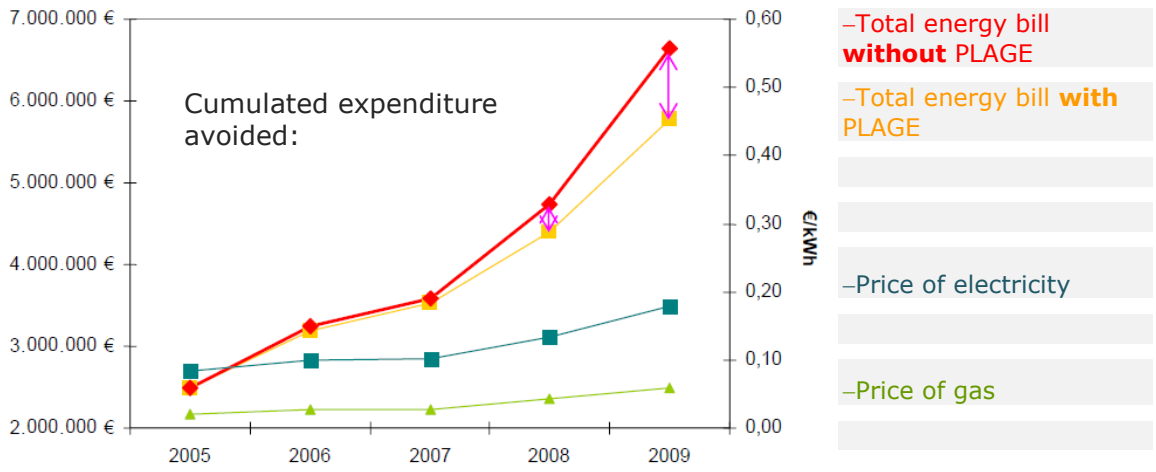
Source: www.bruxellesenvironnement.be

The first PLAGE project took place from 2006 to 2009 in seven municipalities in Brussels: Anderlecht, Berchem-Ste-Agathe, Ixelles, Molenbeek-St-Jean, Schaerbeek, St-Gilles and Watermael-Boisfort. Together these municipalities have 389 buildings of which 70 were marked as a priority according to the high energy consumption criteria. The consumption of these 70 buildings represents 52% of the gas and 58% of the electricity consumed in total in the municipalities taking part.

The sum of the grants awarded by the region is between EUR 36,000 and EUR 130,000, depending on the municipality. These grants have allowed for a series of energy measures to be carried out. A decrease in gas and electricity consumption has been observed since 2008.

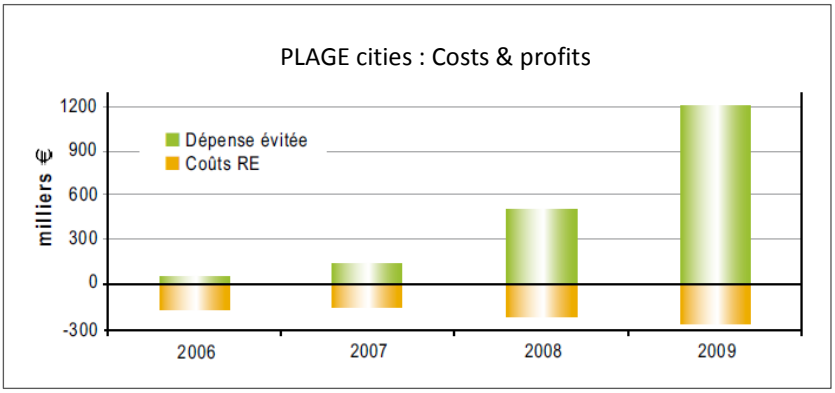
It is important to note that, despite this decrease in consumption, the total cost has not followed this trend owing to price variations, and has continued to increase for both fuel and electricity. Nonetheless, this increase would have been even more significant without the measures that have been adopted. The **expenditure avoided** is around EUR1.3 million over the 4 years.

Economic benefits of PLAGE Co1



The **net benefits** were also estimated for the first project. These are defined as the difference between the cost of the measures, made up of the salary of the Energy Manager and the costs linked to the work, and the savings achieved.

Net economic benefits of PLAGE Co1



In the first seven PLAGE municipalities the costs of the programme remained stable while the increasing costs avoided resulted in a net gain of EUR 464,770.

Source: Brussels Environment Energy Information Reports

The PLAGE hospital project was initiated at the end of 2006. The total energy required in the healthcare sector represents 8% of the tertiary sector in the Brussels region and this was constantly evolving before the implementation of the PLAGE measures. The effects on the consumption of gas were quickly apparent, from the very first year. Regarding electricity, consumption has stabilised, as the reduction was not significant, but this is a good result given the trend for consumption to increase between 2003 and 2006.

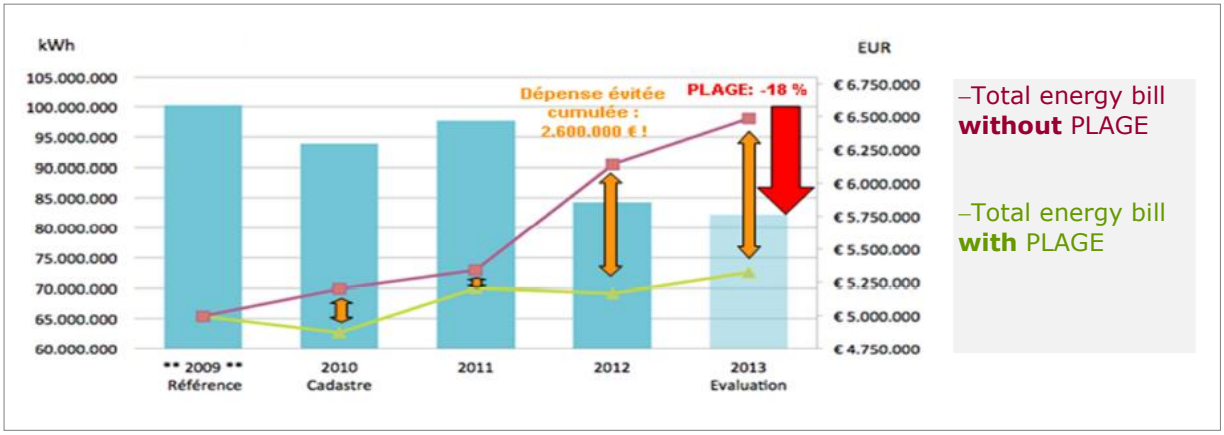
In the same way, the reduction of consumption was not sufficient to counterbalance the increase in prices and bills.

The financial benefits are estimated at EUR2.1 million for 2009 alone and around EUR1 million in 2008.

The report also presents the types of action carried out without necessarily requiring significant funding, which provide a return on investment in under 4 years. For example, just by changing the hours ventilation is in use in accordance with the needs of users, a saving of EUR 250,000 per year was achieved, at a cost of EUR 4,000.

The success of the initial experiences resulted in the creation of the PLAGE Schools project, targeting the compulsory education sector in which energy consumption represented 6% of the regional tertiary sector in 2009. 110 of the buildings supported by the Energy Manager saw their gas consumption decrease significantly (-18%) and electricity usage stabilised, while at national level, at the same time, there was an increase of 1.7%. In addition, fuel represented 90% of the energy bill in Brussels' schools.

Economic benefits of PLAGE Schools



More generally, the effort made by the region contributed to the reduction of energy expenditure in the community as a whole. With 787 million Euros in 2011, the energy bill of the residential sector has decreased by 53 million Euros or 6% in comparison to 2010[1]. This decrease occurred despite the increase in energy prices and the increase in housing stock.

PEB BRUXELLES

By analysing property transactions, an econometric study of the green value carried out by the European Commission, demonstrated the impact of Energy Performance Certificates (EPCs) on the price of property. For Brussels the positive effect of an improvement corresponding to a decrease of 100 points in terms of the EPC*, is translated as an increment of +2.9% for sale prices and +2.6% for rental prices. The statistical regression was carried out based on 1,220 sales and 660 rentals.

In Flanders, where almost 16,000 sales were studied, an improvement in the energy performance is linked to a price increase of +4.6%.

**EPC class A: <45, class D: >345*
Source: EC DG Energy 2013

EMPLOYMENT ENVIRONMENT ALLIANCE - SUSTAINABLE CONSTRUCTION FOCUS AREA

The preparation of an economic scoreboard is currently in progress. The first results of the implementation of the Alliance, presented in the 2010-2014 Multi-Annual Report, indicate that over 500 jobs have been created to date, thanks to the AEE. In addition, the Sustainable Construction Focus Area has:

- raised awareness among and supported 1800 companies (some in the social economy) and independent entrepreneurs through concrete actions;
- worked with 15 training bodies;
- enjoyed the participation of almost all schools in Brussels in the actions of the AEE;
- trained or involved 155 teachers in the actions;
- supported 1,600 young people in their basic vocational training;
- informed 100 public contracting authorities about the new environmental and social clauses to be included in specifications;
- identified 58 research laboratories and 92 research projects in the sustainable construction field;
- supported 12 research projects in the sustainable construction field.

Particular attention is paid to training: 12,200m² of Sustainable Construction training centres were created and 184,000 hours of training were provided in the 2011 to 2013 period. The target audience consists of VSBs and SMEs which represent 90% of the construction sector in Brussels. Given their lack of financial and human resources, they find it difficult to access information and training and to network and are therefore a priority for the AEE.

[1] Energy Balance Sheet 2011

Methodological remarks

The evaluation of PLAGE projects focuses on a single indicator – expenditure avoided – without taking into account the overall economic advantages resulting from the renovation of buildings;

The financial savings presented are gross and do not allow for a balance sheet to be drawn up as the investment amounts and the energy premiums supporting them are not specified.

The preparation of an economic scoreboard for the Employment Environment Alliance is currently in progress. It would be beneficial to monitor the results of this scoreboard.

COPENHAGEN, DENMARK

528, 200 INHABITANTS

Copenhagen, a well-known leader in the fight against climate change

Covenant of Mayors signatory: 2009

KEY FIGURES

Green sector

18,000 companies involving approximately 25,000 jobs.

2009 turnover: 7 millions EUR (+ 55% in 5 years).

Labour productivity: 40% higher than the average level in other industries in the region.

The majority of companies in the green sector (~80%) are VSBs with 1 to 9 salaried employees often linked to local jobs.

***Cleantech Cluster**: 722 companies, involving 18,000 jobs.*

Transport

650 full time jobs linked to sales and services associated with bicycles

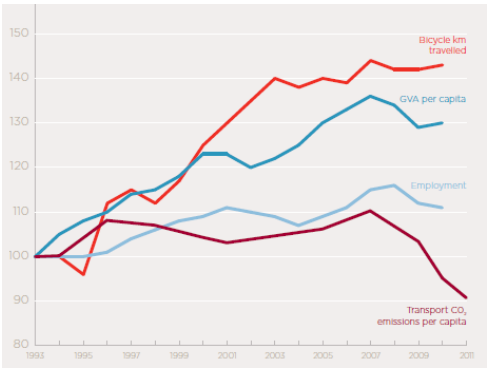
New light metro line resulted in the creation of 1,500 jobs in 3 years

***Waste:** turnover increased by 17% between 2004 and 2008*

***Property prices :** price of apartments rose 57% (from 2002 to 2011) in the area around the port*

Copenhagen was able to create its image as a sustainable town thanks to a unique combination of historical, social, cultural and geographical factors. The most recent proof of this is the presentation of the *European Green Capital Award 2014*[1] and the honorary awards it received at the *WWF Earth Hour City Challenge 2014*[2]. But the city has set itself even more ambitious targets: to become the first carbon neutral capital by around 2025.

Beyond these environmental activities, Copenhagen is seeing its economy prosper due to the development of the "cleantech" sector and to numerous initiatives. With energy consumption that has remained unchanged for 30 years[3] and a drop in CO_2 emissions observed recently, this is a spectacular example of decoupling sought after by political decision-makers. Per capita consumption has dropped by 11% for electricity and 5 % for heating in recent years[4].



Bicycle km travelled

GVA per capita

Employment

Transport CO_2 emissions per capita

Source: 'Going Green' LES Cities-ICLEI-GGGI 2013

[1] http://ec.europa.eu/environment/europeangreencapital/winning-cities/2014-copenhagen/
[2] http://subsite.kk.dk/Nyheder/2014/Marts/OKF_WWWF.aspx
[3] Gross energy consumption data for Denmark : Danish Energy Agency, 2012
[4] City of Copenhagen > Living in Copenhagen > Climate & Environment, http://subsite.kk.dk/

It is not surprising that the case of Copenhagen has been the subject of numerous studies, and specifically of the first analyses intended to prove the economic and social advantages associated with green initiatives at a local level.

Policies and projects

The green sector in general, which plays an important role in the economy of Copenhagen, developed largely due to several political initiatives which have placed energy and environmental issues at the heart of development strategies. A global approach in public policy covering several fields (energy, central heating, land-use planning, buildings, transports, waste) has resulted in a large number of projects, for example:

- development of an integrated shared transport system;
- promotion of cycling;
- recycling and recovery of waste;
- renovation of buildings;
- district heating and cooling systems;
- installation of water meters;
- renovation of the port.

Methodologies and indicators

The various studies on the role of Copenhagen's ecological initiatives in local economic performance have revealed a range of methodological approaches. The most reliable sources include DAMVAD (Scandinavian consultancy in the fields of socio-economics and public sector), LEED Programme[1] of the OECD, Copenhagen Cleantech Cluster[2], Green Growth Leaders/Sustainia (communications platform for a sustainable future).

SECTORAL APPROACH

The DAMVAD method consists of describing the green growth sector at a local level at two scales: the city of Copenhagen and the Hovedstaden region (the Capital Region). In the absence of agreement on the definition and extent of the green sector and its non-existence in official statistics, an innovative approach is proposed. It consists in identifying the sector based on international definitions of "eco-activities" and applying them to microeconomic data.

Hence, according to the OECD and Eurostat, green products, services and technologies help to "measure, control, prevent, treat, minimise, study and repair environmental damage and exploitation of resources". The interpretation of environmental products in accordance with the Harmonised System for Designation and Codification of Goods (Harmonised System Nomenclature) is also used. Companies are divided into 4 categories according to the part of a company represented by an activity linked to green growth: key, intermediate, peripheral or incidental.

Identification of companies which make up the green sector and classification of their activities means standard parameters can be quantified (such as turnover, volume and intensity of exports, jobs, labour productivity). It also allows for comparison with other sectors and inter-temporal monitoring.

Data sources: Statistics Denmark and own calculations

The study by the OECD within the LEED programme also uses a sectoral approach in part by referring to the DAMVAD study quoted above, but also *Monitor Copenhagen Cleantech Cluster* produced by CCC and Oxford Research in 2011. Copenhagen Cleantech Cluster, established in 2009 in order to support and co-ordinate the development of companies in this sector, carries out annual monitoring of this environment. Therefore a distinction must be made between the organisation itself and the cleantech sector which it monitors.

[1] Local Economic and Employment Development, http://www.oecd.org/cfe/leed/
[2] http://www.cphcleantech.com/

Monitoring is based on a survey of companies that have been identified as belonging to cleantech, defined by CCC as "activities for the development, production or implementation of products and processes which enable:

- the production of renewable energy or sustainable materials to be increased;
- the use of natural resources to be reduced through more efficient exploitation;
- the damage caused by fossil fuels to be reduced;
- pollution to be reduced by means of products, processes and consultancy services.

Introduced in 2010, this annual survey utilises 10 criteria to evaluate developments within the cluster:

- number of companies;
- number of jobs;
- turnover;
- productivity;
- number of patents registered;
- new collaboration projects in R&D;
- foundation of new companies;
- foundation of foreign companies (direct foreign investments - DFI);
- formation of companies following a separation (spin-off);
- setting up of new partnerships.

Data source: annual survey

INTERNATIONAL COMPARISON

Another part of the OECD study actually aims at creating a set of indicators which would allow the transition to green growth at a local level to be comprehended. An evaluation tool is then proposed which will be used in the 5 "case studies" included in the project[1]. It is a dashboard based on a comparison of local indicators - including economic indicators - to OECD, European or national standards, as the case may be. The indicators were elaborated by the OECD for a national level in previous publications[2] and are grouped according to subject: base of natural resources, productivity of resources and environmental productivity, environmental aspects of the quality of life, economic opportunities and socio-economic context. They have been adapted to the case of Copenhagen by allowing for the distinctive features of the area and in co-operation with local agents.

Eight indicators for economic opportunities have been selected:

- jobs in R&D;
- percentage of graduates (in general and in the environmental field) in the working population: the number of students studying environmental science acts as a variable to estimate 'green' skills;
- ratio of R&D expenditure to GDP;
- number of patents related to environmental subjects;
- sector of environment goods & services: jobs and turnover;
- DFI attracted - binary indicator.

Data source: Statistics Denmark, OECD, DAMVAD

ANALYSIS OF PROJECTS

The reports prepared by Green Growth Leaders and LSE Cities-ICLEI-GGGI[3] describe these specific projects and their evaluation using indicators suited to each individual case. The indicators used are, for example, savings linked to the reduction in water consumption, trends in real estate prices, the number of companies and jobs created, the costs avoided.

Data sources: other studies (DAMVAD, Bicycle Account)

[1] This study on Copenhagen is the first of its type conducted by OECD-LEED
[2] Towards Green Growth: Monitoring Progress, OECD: Paris, 2011
[3] Going Green : How cities are leading the next economy, 2013

Results

A SUBSTANTIAL GREEN SECTOR

In 2011, when the study on the green growth sector was conducted, 559 key companies were identified, all in the manufacturing industry. The intermediate group already included more than 5,500 companies, the majority offering professional services to businesses (*Knowledge Intensive Business Services*), one quarter in construction and 7% in the manufacturing industry. In total there are almost 18,000 companies related to green activities, especially in the manufacturing sector, professional business services and construction.

According to a classification depending on the environmental problem or field related to companies' activities, more than half of total turnover of the sector is generated by water management, 23% is related to waste treatment, 11% to activities related to air pollution.

The green sector in the region is substantial, with a turnover of around EUR 7 million, which is the equivalent of 3.5% of the local economy (2009 data). It grew by 55% in 5 years and has around 25,000 employees.

The competitiveness of the sector is determined by labour productivity (here added value per unit of full-time work) which is 40% higher than the average level in other industries in the region. This performance is an important factor in the strength of the local economy because it is growing 8% per annum, while the average rate for Denmark is only 1.1% and around 2% for developed countries.

On the other hand, the increase in productivity is associated with a more moderate trend in employment. In the case of Copenhagen the number of employees dropped from 2004 to 2007, but the trend reversed from 2007 (during the economic crisis, it should be noted). Furthermore, employment in the green R&D sector grew by 300% in the 6 years from 2003 to 2009.

Exports in this sector rose by 80% in 5 years in response to international demand which represents a potential that could be exploited. Export intensity (i.e. the part of production that leaves the country) is 36% for the region and 44% for the capital.

The majority of companies in the green sector (~80%) are VSBs with 1 to 9 salaried employees. The authors note that this is an important feature because small businesses are more closely linked to local jobs.

Another important aspect concerns investments in R&D expenses because innovative capacity is a crucial factor in development and competitiveness of the area. Copenhagen is a major contributor to national investments in R&D, including those related specifically to green growth.

DYNAMIC CLEANTECH CLUSTER

According to the results of the 2013 Monitor, the cleantech sector comprises 722 companies and more than 18,000 jobs.

The initial investment guaranteed by European Structural Funds and regional budgets in Denmark amounted to EUR20 million for 5 years, while the cluster generated a turnover of EUR 30 billion in 2011.

In 2013 turnover and number of employees dropped in relation to the 2007-2008 level, but this is a general tendency of the Danish economy. In addition, the study distinguishes between cleantech and non-cleantech activities in companies, and concludes that for the cleantech the trends are positive for the majority of businesses. It is a dynamic and innovative environment which attracts entrepreneurs, partners and foreign investment. Labour productivity, calculated as the added value per employee, is almost 3 times higher than the average in other sectors.

ENCOURAGING FOR RELATIVE PERFORMANCE

The OECD dashboard was compiled for two questions out of five which are considered to be the main aspects of green growth: productivity of resources & environmental productivity and economic opportunities.

A comparison of data for Copenhagen with national data or OECD data proves the success of the city in its efforts and initiates aimed at sustainable development. For example, regarding employment in R&D:

Economic opportunities		Unit	Source	Comparison	Source
R&D employment	24,1	per 1000 employees, Greater Copenhagen Region	Hovedstadregionen - local and metropolian statistics (2011)	EU-27 average : 6,3 (2010) Denmark average : 12,3 (2010)	OECD Factbook 2011: Economic, Environmental and Social Statistics

The results are shown attributing an indication of the position of each criterion in relation to the reference:

In certain cases, the authors note a lack of available data at a local level, for example, regarding graduates specialising in environmental studies.

PROJECTS WITH A MAJOR ECONOMIC IMPACT

The analyses carried out on projects on the ground provide an overview of the variety of the resulting economic benefits.

Transport: avoided costs, job creation

The two sections about sustainable urban transport modes - cycling and public transport - contain references to the estimated cost reductions. With regard to the use of bicycles instead of cars, the cost per kilometre and per type of externality was calculated, and the total annual cost for the company was estimated at USD43 million (in particular traffic congestion). With regard to transport in general, no estimations have been made of the savings, but the current amount of losses linked to traffic is EUR0.76 billion per year, even though the town already has a well-developed transport system.

A comparison of cost-savings linked to bicycle use, in relation to the infrastructural costs further supports public investment: the cost of constructing a cycle lane is approximately DKK 500,000 per kilometre, compared with DKK 1 billion for 1 km of metro line. However, there is still a real need to extend cycle lanes: putting in a new cycle lane increases the number of cyclists by 20%, and reduces the number of cars by 10%[1]. The annual turnover for the sector made up of sellers and services associated with bicycles is DKK 1.3 billion (approximately EUR169 million) and represents 650 full time jobs.

Health gains due to daily use of bicycles resulting in reduced sick leave and medical costs, are estimated at EUR0.75 per kilometre per person, or a total of EUR230 million per annum in savings[2] for households.

[1] City of Copenhagen > Bicycle statistics
[2] Bicycle Account 2012

The construction of new metro lines, based on the principle of *Transit-oriented développement*, contributes to the creation of local jobs: the Ørestad project generated 12,000 jobs between 1995 and 2010; this result failed to meet the objectives (60-80,000 jobs up until 2025), but growth was limited by the 2008 crisis. The construction of a new light metro line (Ring 3 light rail, 27 km) resulted in the creation of 1,500 jobs in 3 years[1].

Furthermore, infrastructure projects increase the value of local lands. Income from the sale of land along the lines is used to finance the development of projects: the Ørestad project in the Copenhagen region, the New York metro and "*Rail and Property*" in Hong Kong confirm the success of this model[2]. It should also be noted that improvements in general accessibility create an attractive atmosphere for entrepreneurship in the metropolitan area and contribute to competitiveness.

Water: reducing the bill

The installation of water meters and the transition to billing based on individual consumption is a source of significant savings for households: in Copenhagen, this involves approximately EUR113 (DKK 846) per year per person, or a total of 59 million euro per year overall (DKK 456 million) The calculation is based on the hypothesis that in the absence of such measures, current consumption would be equivalent to 1987 levels, without taking into account changes in prices.

Waste: local energy production

Thanks to the efforts made in the area of waste treatment, in particular the taxation on waste, Copenhagen draws benefits from 98.2% of its waste, which is either recycled or incinerated in co-generation plants. The waste disposal tax, which has increased to EUR 62.6 per tonne[3] (in 2010) is a powerful incentive for the reuse of waste and an important source of savings, estimated at EUR 4 million per year for Copenhagen. It should be noted that the calculation does not take into account savings on other energy sources, whereas waste combustion meets the heating needs for 50% of households in the town.

The private recycling sector that has developed provided good economic opportunities: according to the *European Environment Agency*, the number of jobs in the sector in the European Union grew by 45% between 2000 to 2007, around 7% per year, and the annual CA growth rate was 17% between 2004 and 2008[4].

Urban planning projects: property prices

Investment in water treatment at the port and the transformation of the industrial quarter into a space for people has had a direct impact on the value of property. In 2002-2011, the price of apartments rose 57% (up to 100% in some cases) in the area around the port, whereas for property located further away, the rate of growth was only 12%; the price differential per metre squared has reached 42%. Furthermore, due to the attractiveness of this new local leisure area, local business has been revitalised, in particular, restaurant services: over 40 outlets have been opened, generating a number of jobs for the town.

[1] Green Roads to Growth, United Federation of Danish Workers, 2011
[2] Journal of Transport Geography http://www.sciencedirect.com/science/article/pii/S0966692312000130
[3] Denmark - municipal waste management - European Environment
[4] Earnings, jobs and innovation: the role of recycling in a green economy, EEA 2011

Methodological remarks

The original DAMVAD report on the green sector is highly developed and complex. It is therefore difficult for small and medium-sized towns to fund such reports.

The CCC Monitor survey offers a full report on the current situation in the cleantech sector, in particular with regard to innovative aspects. One of the disadvantages of such a report is that the information is often of a qualitative nature, and the ″yes or no″, or ″more or less significant″ responses lack precision.

The advantage of the OECD approach lies in the simplicity, with the use of a dashboard which sets out the progress and perception of users. However, this tool only indicates whether local performance is superior, inferior or at the same level in relation to the chosen reference point. This method does not show whether an advantage (or a weakness) is significant, and there is no evolution in the parameters. The use of international standards could reduce the disparities. This choice is justified by the availability of data, particularly at local level. However, it might be useful to choose other countries with similar characteristics as points of reference (in the case of Copenhagen – other Scandinavian countries).

The positive effects of investment in transport are demonstrated using various parameters. This issue could be studied in greater depth through an estimation of the impact on the development of local business (at neighbourhood level) in areas which have been made more accessible with the introduction of cycle lanes: where an area becomes busier, demand is created for local services, such as restaurants. The positive effect on businesses along roads with cycle lanes has been noted in a number of towns in America (according to the *League of American Bicyclists*[1]), particularly in light of the fact that cyclists generally spend more than motorists. An evaluation could also be carried out on other significant savings for households such as fuel and garage costs.

[1] http://issuu.com/bikeleague/docs/economic_benefits_bicycle_infrastructure_report

HANNOVER, GERMANY

520, 000 INHABITANTS

Capital of the Land of Lower Saxony, important economic and scientific centre, Hannover was one of the first towns in Germany to introduce sustainable energy to its political agenda.

Covenant of Mayors signatory: 2012

KEY FIGURES

***ProKlima** : 2.6 million EUR of grants were allocated in 2010*

The expenditure incurred: 33 million EUR, or a high expenditure factor of 12.7 (19 EUR for 1EUR of funding for building renovation and 13.7 EUR for 1EUR of funding for RES).

76% of spending is directed at the local economy, including 50.4% in the proKlima area and 25.5% in other parts of the region

The added value generated by beneficiary expenditure was EUR46.7 million euros in 2010

757 full-time jobs per year jobs created per year, mainly visible at a national level (57%). A third of the jobs are in the Hannover region

Since the 1980s, with the decision of the town council to promote restraint in energy consumption and to expand renewable energies in the region, sustainable development has become a major political priority. The city has developed numerous tools, including Agenda 21 and Ecological Standards for Building Construction within the Municipality's Sphere of Influence'[1], which provides an underlying legal framework.

Thanks to a diverse economic make-up, well-known universities, co-operation between business and research, business support programmes, Hannover has a strong economy and has shown a relatively good performance in recent conditions of financial crisis and budgetary constraint. Moreover, despite the intensification of urban traffic and the increment of residential space per inhabitant accompanying economic growth, energy consumption of the city dropped by 10% between 1990 and 2010[2].

In 2011 Hannover was awarded the title of European capital of biodiversity, acknowledging its efforts as regards urban ecology and was award winner of the price "Local Climate Protection 2010". In 2011 the city hosted a congress as preparation for Rio +20 on the subject of "Sustainable development at a local level". Energy and environmental engineering is also a key sector for the *Hannover Messe*, the largest industrial technology trade show in the world and which hosted the 16th European Forum on Eco-Innovation in 2014.

Policies and projects

In 1994 the climate protection bureau was founded within the city administration to push climate protection in Hannover. The bureau is responsible for the establishment and monitoring of climate protection action programmes and many other energy related topics. In 2005 Hannover adopted its sustainable urban development programme, "*Hannover plusZehn"* (2005-2015), which integrates actions regarding innovation, business development, social questions and environmental protection. The municipal government has been re-organised to create a single economic and environmental department. This is the first example amongst European cities to show its conviction regarding the fact that economic and ecological objectives go hand in hand and generate important synergies. One of the outstanding projects in terms of energy and ecological aspects has been the Kronsberg settlement, which was built in 1998 and which is still growing.

In 2007 stakeholders from the City of Hannover developed in cooperation with the municipality a climate protection action programme and started to work in three big networks, the Climate Alliance Hannover 2020, to support the City's target of a 40 % reduction of CO_2 emissions. Until now the Climate Alliance Hannover 2020 is meeting regularly.

[1] http://www.hannover.de/content/download/221413/3496087/file/Ecological-standards-for-buildings.pdf
[2] http://www.agenda21.de/images/stories/sustainable_hannover/SynergiesEnvironment-Economy.pdf

In 2012 an ambitious project, the 'Masterplan City and Region Hannover | 100 % climate protection' started. The aim is to promote a nearly climate neutral Region Hannover by reducing 95 % of greenhouse gas emissions and to half energy consumption by the year 2050. This goal is a big challenge and pursued with stakeholders and citizens from the Region Hannover.The economic effect of actions in environment-energy is to a large extent expected from lowering energy dependence: today imports account for EUR440 million or almost one third of annual expenditure in the region for electricity, heating and fuel (2012 data)[1].

"**proKlima**" is a fund dedicated to co-ordinating actions regarding energy and climate protection. One of its objectives is the creation of economic value and jobs. It was founded in 1998 by six communities in the Hannover region and Stadtwerke Hannover AG, the municipal utility company for electricity. The fund has an annual budget of EUR5 million financed by the profits of Stadtwerke and a system of taxes on gas consumption. Around 1,000 projects receive financial aid each year for thermal renovations and organising training for tradesmen. It has been estimated that EUR 1 of support creates between EUR10 and EUR 12.70 of private investment[2], a considerable leveraging effect.

The city's approach to eco-construction started in 1989 when the first "zero energy" house was built. Today, the mandatory standard for any new municipal construction or for on municipal land is that of a passive house, which is much more stringent than national standards.

The regional climate protection agency **Klimaschutzagentur** was founded in 2001 together with a public-private partnership. It specifically promotes the role of climate change as a catalyst for change and long-term regional engine of growth. It established action plans for climate protection for municipalities from the Region of Hannover. and is engaged in climate protection campaigning

The activity of Klimaschutzagentur and proKlima make sustainable energy a key sector in local development.

HannoverImpuls[3] is a programme that supports start-ups and existing companies in the region or companies that wish to relocate to Hannover in the fields with a strong potential regarding sustainable growth, innovation and job creation in the area, including renewable energy and energy efficiency.

Likewise, the environmental criterion is present in decisions whether to grant funding to other sectors. In addition, HannoverImpuls hosts an initiative *ImpulsProgram Passive House* which offers funds to SMEs involved in passive house construction in the region.

Ecoprofit – *Ecological Project for Integrated Environmental Technology* - is another initiative for companies, especially SMEs, and has been active for 14 years. It offers technical and financial aid intended to improve operational efficiency in the use of resources and treatment of waste which helps to reduce CO_2 emissions and make financial savings. Small businesses can make savings to the order of EUR 12,000 and larger companies EUR 67,000 on average[4].

Sustainable mobility is another important field of action, with the objectives of doubling the amount of bicycle traffic to 25%, optimising the public transport system, reducing the number of accidents involving cyclists and developing car-sharing. The Stadtbahn light rail system is already an example of excellence, producing its own energy based on transformation of braking energy and the introduction of trains compliant with high environmental standards. The bus system is also geared to more"ecological" modes and has been using hybrid buses with low fuel consumption since 2011.

[1] http://www.agenda21.de/images/stories/sustainable_hannover/SynergiesEnvironment-Economy.pdf
[2] Latter from Success story
[3] http://www.hannoverimpuls.com/_english/industries/energy/index.php
[4] http://www.agenda21.de/images/stories/sustainable_hannover/SlidesEcoprofit.pdf

Methodology and indicators

A study entitled "Regional Impacts of the Enercity proKlima funds in terms of Added Value and Jobs" was carried out by the ***Pestel Institut*** in 2011. The starting point for the analysis was the finding that the level of investment made by the fund beneficiaries is clearly superior to that of the grants. The subject of the study is the direct economic impact of these investments, and the indirect effects linked to the additional expenses incurred along the beneficiary supply chain, through the salaries associated with the jobs created and the local taxes that fund public consumption.

The territorial approach assesses the effects at four different levels: the region in receipt of the "assistance" (proKlima region), which corresponds to six towns providing funds (I), the Hannover region (II), Lower Saxony (III) and the rest of Germany (IV). The work is organised around the following issues:

- the relationship between the grants made and the expenditure incurred by the beneficiaries;
- the effect of the funded expenditure on added value and employment in the regions concerned;
- the proportion of expenditure and added value that remains in the proKlima region, the Hannover region and in Lower Saxony, and the number of jobs created at each local level;
- the business sectors strengthened directly or indirectly in the proKlima region.

The grants are divided into seven support programmes:

- renovation of buildings;
- construction of new buildings;
- renewable energy;
- educational programmes;
- co-generation;
- electricity savings;
- demonstration projects.

The reference point includes all the grants requested after 1 January 2008 and paid before 15 September 2011 - a total of 3,128 grant files. For the sample, 575 files were included, or 18.4% in total. Based on the sample, the following indicators were determined with regard to the two main themes - local area and programme:

- beneficiary expenditure in relation to the amount of funding;
- added value created;
- impact on employment induced by the added value.

The method used to estimate the added value and jobs created is based on an input-output model. The empirical basis for this method is an input-output table designed by the German Federal Statistics Office, which determines the interdependent relationships between the 71 production sectors. The production co-efficients indicate the value of intermediary goods used to create a product unit in the sector of interest (beneficiary business sector). The number of assets that contribute to the production of goods to satisfy direct or indirect demand is based on the number of assets per unit of gross added value created (overall economic calculation). On this basis, the indirect effects that translate into intermediary consumption and knock-on effects generated by the income, taxes and indirect gains, used for investment or consumption could be estimated. The reference year of the evaluation is 2010.

The customised approach employed in the study should be emphasised. The data on the grants made were analysed on a case-by-case basis, including additional information such as orders and invoices from suppliers or tradespersons. Furthermore, the documents were analysed in terms of regional aspects, based on postal codes (supplier or tradesperson addresses) and in terms of production branches.

The analysis of the projects also involves measuring the wage costs for businesses in each sector. Wage costs are seen as an important factor, as a large proportion of salaries paid by the beneficiaries to their employees is likely to be spent locally.

The effects of the proKlima business itself (salaries of fund employees, taxes paid, goods and services consumed) are not taken into account; the estimation only covers expenses attributed to funding measures.

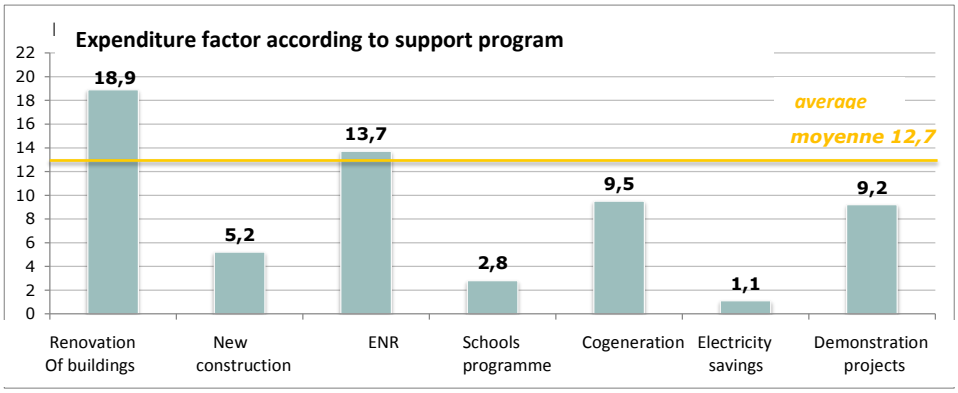
Data source: proKlima's own sources

Results

BENEFICIARY EXPENDITURE

In total, 2.6 million euros of grants were allocated by proKlima in 2010. The expenditure incurred by the beneficiaries because of such funding amounted to 33 million euros, or a high expenditure factor of 12.7.

It should be noted that the economic impact is not proportional to the amount of funds granted. The expenditure factor is higher for the *Renovation of Old Buildings* programmes (almost EUR 19 for EUR 1 of funding) and *Renewable Energies* (13.7). The average is brought down by the *Electricity Savings* consulting programme, with a value of just 1.1. This is partly explained by the fact that only immediate costs on consulting services were taken into account, without taking into account the investments made following the consulting.



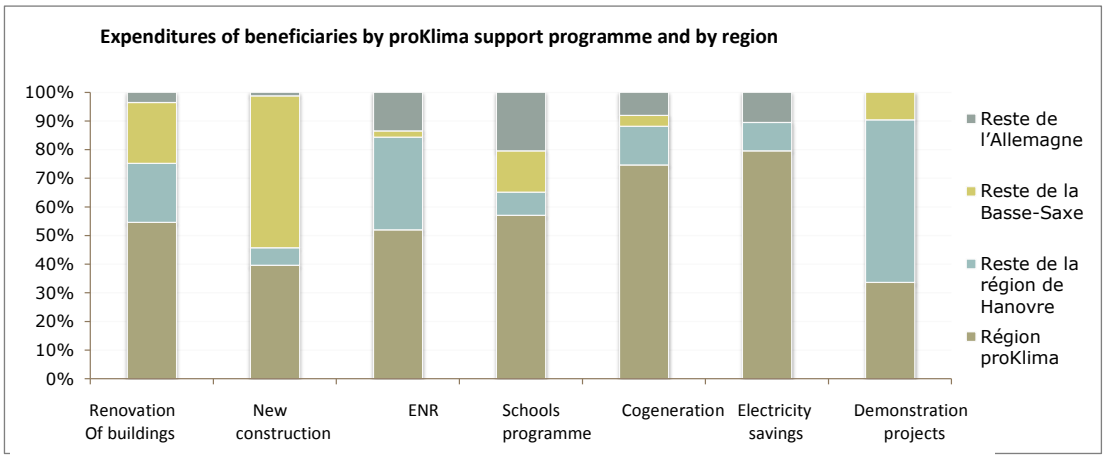
The expenditure factor varies significantly depending on the type of measure in each programme, as illustrated by the *Building Renovation* example: the *Building Programme* generated EUR 19.5 per EUR 1 of funding, whereas the factor for *Consulting/Insurance quality* is only 2.7.

Renovation of buildings - measurements	**Expenditure factor**
Heating/hot water/comfort ventilation	15,1
Building envelope	19,5
Advice/quality assurance	2,7
Roofing/ceiling of the upper floor	23
Passive house window	13,9
Average [1)]	**18,9**

1) taking into account the expenditure involving numerous measurements at the same time

The analysis of the territorial distribution of spending shows that a large proportion of the investments made by the beneficiaries remain in the Hannover region: 76% of spending is directed at the local economy, including 50.4% in the proKlima area and 25.5% in other parts of the region.

The distribution also varies depending on the programme, as presented in the graphic below.



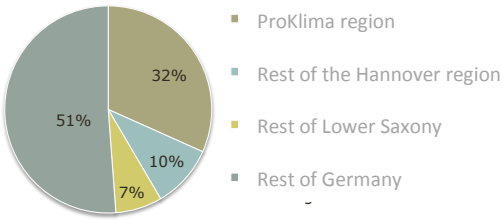
ADDED VALUE AND JOBS

According to the results from the model, the added value generated by beneficiary expenditure was at EUR 46.7 million euros in 2010. The distribution of added value among the various regional levels is illustrated by the diagram below.

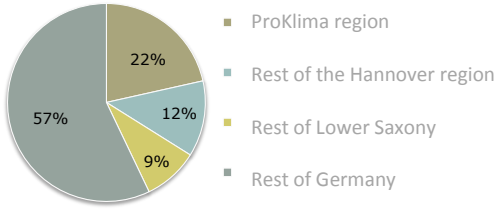
The geographical zone affected by the indirect and knock-on effects is very wide and difficult to delimit. A number of production sectors are covered, which are not necessarily present at a local level. For this reason, the proportion that contributes most to the wealth of the region is naturally smaller than the direct expenditure of the beneficiaries. Half of the added value created by expenditure of local beneficiaries generates economic benefits at a national level (in the rest of Germany). However, 42% of the value creation is attributed to the Hannover region.

With regard to the jobs created, the effects in terms of value creation are translated into the equivalent of 757 full-time jobs per year. We would note that the impact on employment is mainly visible at a national level (57% of the jobs created). A third of the jobs are in the Hannover region, and the remainder are in the rest of Lower Saxony.

Regional distribution of added value

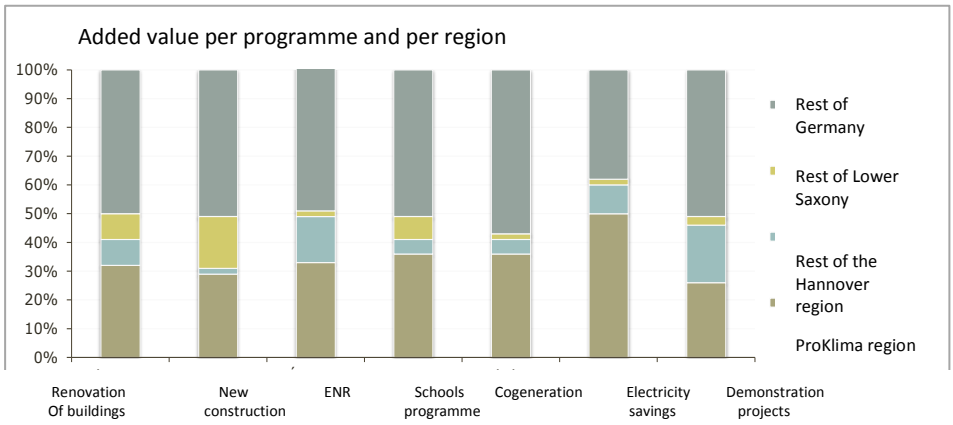


Regional distribution of effect on employment

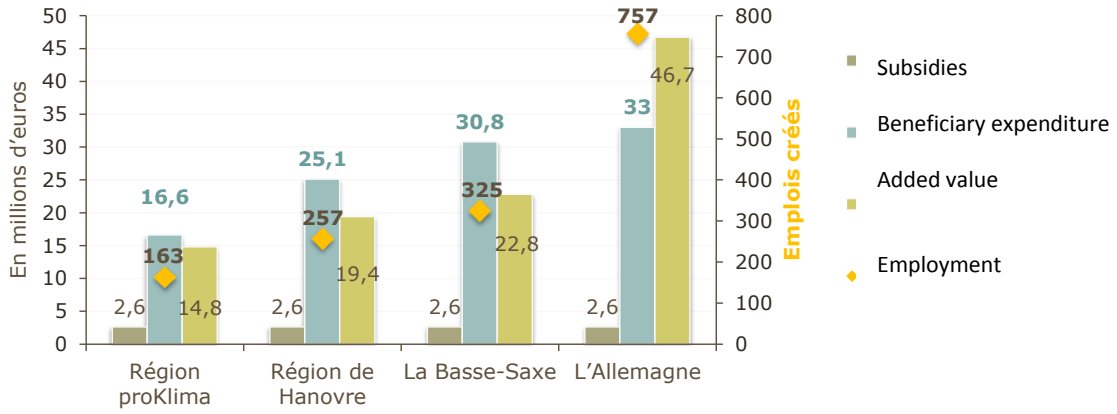


With regard to the proKlima region, the sectors that benefit most in terms of job creation have been identified. Three areas have been grouped together: the construction sector, with "finishing works" and equipment manufacturing accounting for just over 40% of the jobs created, services (including engineering and architecture services) representing just over 30% of the jobs, and the rest being distributed across other sectors of the economy.

The contribution to the local economy in terms of added value and job creation also varies across funding programmes. It is conditioned by the nature of the measures, and the characteristics and economic make-up of the region. For example, in the proKlima region, the *Electricity Saving* programme makes the most significant contribution in relative terms (approximately 50% added value for this programme), whereas the *Demonstration Projects* had the lowest level (approximately 26%). In any case, the share of the value created in the rest of the country is very high.



The following graphic summarises all the indicators for the economic benefits in terms of the immediate impact on the proKlima region, at both regional and national level, which represents the total impact of the grants in 2010.



The proKlima project in Hannover is exemplary in a number of respects: the operational model, the scale of the measures, the two-fold economic and environmental approach, and the reported results. The impact of proKlima goes well beyond the scope of the climate and energy objectives, which is exactly what the fund has sought to demonstrate through the economic analysis. The study commissioned by the *Pestel Institut* brings to light the possibility of measuring the impact of the proKlima grants on the regional and national economy using tried and tested methods. There are still methodological issues to be worked out, which means that all of the effects cannot be measured at present. However, there is no question but that value is being generated and that the grants are having a ripple effect.

Methodological remarks

The study is based on reliable data, from the proKlima fund itself. The input-output analysis is a recognised method and the case-by-case analysis of the data ensures the quality of the results. The input-output tables were obtained from the German Federal Statistical Office, and are accessible to all.

The absolute values (expenditure, added value, number of jobs) are not sufficient in order to arrive at an understanding of their relative contribution to the local economy. A comparison with other programmes or the inclusion of other data on the dynamics of the sectors covered could be useful;

It would be interesting to compare the distribution of jobs created between the sectors, which was the case in the proKlima region, and explains why the majority of jobs were created outside the Hannover region.

KIRKLEES, UNITED KINGDOM

428, 000 INHABITANTS

Kirklees is one of the first local authorities in Britain to implement a programme against climate change.

Covenant of Mayors signatory: 2009

KEY FIGURES

Kirklees Warm Zone

The initial cost of the programme: an injection of GBP21 million into the local economy (GBP 1 invested has a return of GBP 1.88)

The multiplier effect of the programme created around 117 positions, or 263 jobs in total

One job created for every GBP 86,000 invested

Energy bills reduced by around GBP 200 per annum

Property value rose 5.6 points

Health and well-being contribute GBP 5 million to the public health system

In 2002, as part of the *UK Emission Trading Scheme,* the local authority undertook to formally reduce its CO_2 emissions. Since 2006 some impressive results have been achieved, with a reduction of 34% compared to 1990[1]. Measures aimed at improving energy efficiency in the residential sector, a priority field for Kirklees, have been able to attract GBP 38 million of outside investment throughout the last decade, boosted by funding of GBP 18 million from the area itself[2].

These environmental ambitions are one of the priorities of the *Integrated Investment Strategy* adopted in 2010 by the Kirklees council. It recognises specifically the economic potential of the green sector, including eco-technologies.

On the other hand, the local authority also recognises the importance of citizens' participation. The economic recession has made the council aware of the issues of employment and revenue, so the accent has shifted to the potential offered by the energy transition to increase purchasing power and restore economic activity. Job creation and promotion of 'green' skills are therefore key objectives in the undertaking of the initiative *Climate Local*[3] signed in 2012.

Policies and projects

Kirklees has been the origin of several projects, notably *Warm Zone* focusing on insulation of buildings; its success enabled other initiatives to be launched, for example to promote renewable energy and energy efficiency, such as *Sun Cities, BIG Energy Upgrade, 2RE-Charge*.

The first major success for Kirklees was the *Warm Zone* project which ran from 2007 to 2010. A pioneer in this field in the United Kingdom, this programme won national recognition when it was awarded the *Ashden Award* for the best local initiative for sustainable energy development. The programme offers all households in the town free insulation for their houses (as long as the building is eligible in technical terms). All households were visited by advisors, with 51,500 houses been renovated.

In addition to ecological considerations, this programme clearly also had socio-economic motives. In fact, studies published by the ministerial department for energy and climate change in 2003 and 2006 showed that a significant part of households in the area were experiencing instability in energy prices, which accounted for more than 10% of household income. In 2010, uncertain energy prices still affected 32,500 households, or 18.9% of all households in the community[4]. The fight against uncertain energy prices has, therefore, become one of the main objectives of the programme.

[1] Kirklees and Climate Change, Energy Cities 2009

[2] http://www.publications.parliament.uk/pa/cm201314/cmselect/cmsctech/254/254we20.htm

[3] Initiative of the Local Government Association

[4] Fuel poverty 2010: sub-regional data, www.gov.uk

Kirklees is also investing in renewable energy: for example it is participating in the European project *Sun Cities* with its programme to install solar panels in residential property, the largest programme of Great Britain, and which has attracted GBP 1.8 million of investment, the majority external[1].

Furthermore, local businesses have access to technical and financial aid. Advisory services are offered within the *Green Business Network* which began 15 years ago and has already co-operated with more than 2,000 companies regarding their environmental performance. As part of a new scheme *Business Environment Voucher,* where the total sum for 2013-2014 is GBP 250,000, financial support is offered for projects which help to improve the efficiency of resource utilisation and optimise treatment of waste.

Methodology and indicators

Analysis of the Warm Zone programme

The economic impact of the *Warm Zone* project (KWZ) was the subject of an ex post study[2]commissioned by Kirklees Council.

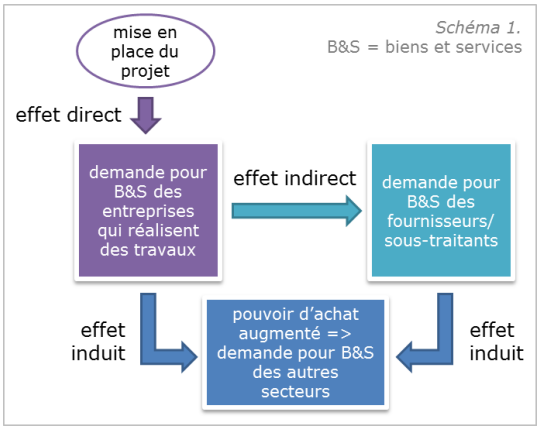
The study highlights the effects assessed in the 5 key areas, each of which requires a specific evaluation method:

- job and value creation
- energy expenses and cost of CO_2 emissions
- real estate value
- health and well-being

Local jobs and expenditure

The evaluation of the impact of the project on employment and additional local expenditure is limited to the duration of the programme, i.e. 3 years.

The input-output model differentiates between direct effects (stimulation of local demand through initial investment and jobs associated with this rise in demand) and indirect, induced effects which multiply along the *supply chain*. This relation is shown in diagram 1.



The method consists of applying the jobs and expenditure multipliers to the direct effects of the initial investment (jobs and expenditure) in order to express the overall impact in figures. These are the official economic multipliers used by the Scottish government for the construction sector[3] which were used:

[1] Case Study: SunCities Solar Villages, Kirklees Council
[2] Kirklees Council also prepared an analysis ex ante.
[3] Scottish Government Economic Multipliers : SIC Category 45 - Construction

Type	Possible multipliers for Construction Industry group: Scottish Government category 88 or SIC2003 Construction 45 (Plumbing 45:3)			
	Output multiplier	Income multiplier	Employment multiplier	GVA multiplier
I (Direct + indirect impacts)	**1.59**	1.61	**1.58**	1.62
II (Direct + indirect + induced impacts)	**1.88**	1.91	**1.93**	1.95

In the case of the KWZ programme, the direct effect concerns services of fitters, consultants, managers, administrative functions and trainers. The authors obtained the data on jobs created directly from the general contractors. The amount of investment in the project is considered to be a directly created expense.

Data source: survey of companies, Kirklees Council

Energy expenditure and cost of emissions

The financial gain linked to an improvement of insulation is calculated based on annual energy and CO_2 savings. A reduction co-efficient of 50% is used in comparison to the potential level when two factors are taken into consideration:

- potential sub-performance of installations
- the phenomenon of using the sums saved by households to turn up the heating (where a temperature was maintained above a comfort level sufficient to perform the work - so-called "*comfort taking*").

On the other hand, part of the savings evened out by households which turn up the inside temperature is reflected by a reduction in medical expenses (this is dealt with in the next section).

The reduction of annual energy bills is calculated based on the breakdown of heating fuels and their average prices in 2009-2010. The *net present value* (see box) and ROI are then calculated according to the following hypotheses:

- average annual inflation of energy prices = 5%
- discount rate for public investments = 3.5%
- service life of installations = 40 years

Regarding carbon emissions, the financial gain represents the costs avoided for future environmental damage. In this study the unit cost is set at GBP 100 for 1 tonne of carbon for the period 2010-2050 in accordance with the official recommendations of the British government.

Net present value (NPV)

Investment creates a succession of future financial flows comprising revenue minus costs. Since these flows will be in the future, the time and risk factor must be included in order to determine the return on investment. Hence it is a question of discount - reduction on the same basis of financial flows which occur at different times and there cannot be added together.

The 'value of time' is translated as the rate of interest without risk. EUR1 invested at i% today would be worth EUR(1+i) in one year; similarly EUR1 in one year would be worth EUR1/(1+i) today. The discounted value of *F* in the period *n+1* is *F/(1+i)* in the period *n*. The risk premium *r* must be added.

NPV is the sum of flows ***Fn** = [revenue – costs]* for the year, discounted by the discount rate ***t** = [i+r]*, minus the initial investment value F_0:

$$VAN = F_0 + \sum \frac{F_n}{(1+t)^n}$$

Source: http://rb.ec-lille.fr

Data source: Kirklees' Maxim database, Department of Energy & Climate Change - Quarterly Energy Prices

House prices

In order to be able to quantify the impacts of the KWZ programme on the real estate market, the approach consists in calculating the energy class of each house concerned upstream and downstream of the work performed. A methodology recommended by the British government - *Standard Assessment Procedure (SAP)* - is used to this end. An average improvement in energy class means the level of an average premium can be predicted (based on the results of work completed) over present prices. This price differential is multiplied by the total number of houses renovated.

Data source: evaluation of buildings during the project, Land Registry House Price Index

Health and well-being

Since the state of housing, in particular the cold and humidity, has a direct influence on the health of residents, an improvement in insulation also generates savings for the public health system. This aspect of the KWZ programme has been studied separately by the University of Ulster using cost-benefit analyses. It shows the positive effects more on mental health rather than on physiological health, partly because the period was too short for the effects on health to show significantly. The method consists in establishing a relation between housing conditions and an improvement in the mental health of the people living there. A monetary value has been assigned to this improvement, whereby the amount is recommended by the *National Institute for Health and Care Excellence*[1]. The total financial contribution to the public health system is calculated on the basis of the number of people concerned.

ANALYSIS OF THE LOCAL GREEN SECTOR

The profile of Kirklees is part of the report *Prospects for Green Jobs to 2020* prepared for *Yorkshire Cities*, an association of 9 local authorities. This report evaluates the state of sites and development prospects for a green economy in the area. The title highlights the main focus of the analysis - jobs.

The authors distinguish between primary and secondary green jobs, referring to sectoral definitions created by the *UK Forum of Environmental Industries (UKFEI)* and the ministerial *Department for Business Innovation and Skills* as well as the SIC classification. A more detailed note on methodology is also available. The primary green sector covers activities directly linked to the environment:

- energy management;
- renewable energy;
- waste and recycling;
- water distribution and treatment;
- environmental consulting;
- green infrastructures (landscaping, forestry activities, etc.);
- miscellaneous

The category “miscellaneous” covers services and equipment to monitor noise and air pollution.
The secondary sector is composed of companies that are partly involved in eco-activities: for example, in the construction, agricultural and transport sectors. This method is based on attribution of a sectoral quotient to the total number of jobs in each sector. The quotients were determined via documentary research and interviews with companies.
Leeds City Region (LCR)[2], which includes 10 local authority areas and hence Kirklees, can act as a reference when determining areas of strong performance in the region.

Data source: Office for National Statistics, database compiled from several sources

[1] http://www.nice.org.uk/
[2] Leeds City Region

Results

KIRKLEES WARM ZONE

The monetary value of overall social benefit is shown in the table below:

	Scheme Costs	Lifetime Fuel Savings (40yrs)	Liftetime CO_2 Savings (40yrs)	Jobs Created & Economic Impact	Saving to NHS	House Value Increase	Confirmed Benefit Claims	Net Benefit (sum of monetised values)
Original Measure	-	4,237 GWh	934 ktonnes	243 FTE	-	5.6 Avg SAP increase		-
Monetised Value	-£20.9m	£156.0m	£30.6m	£39.1m	£4.9m	£38.4m	£0.7m	**£248.8m**

The initial cost of the programme shows the payments to suppliers and there is equivalent to an injection of GBP 21 million into the local economy. A rise in demand in the supply chain generated another GBP 12.3 million. Additional spending related to a rise in purchasing power contributed GBP 5 million. The total impact on economic activity through local spending is therefore estimated at GBP 39 million. In other words, GBP 1 invested has a return of GBP 1.88.

The programme directly created 126 full-time jobs, with salary expenses of GBP 2.7 million over 3 years. It should be noted that in actual fact the number of people affected was much greater because those in charge of diagnostics for buildings worked part-time. Around half of these positions were made permanent after the project.

The multiplier effect of the programme created around 117 positions, or 263 jobs in total. These results should be viewed in a general economic context where only ~1800 new jobs were created over 10 years between 1998 and 2008[1]. If the number of new positions is related to the initial investment, this results in one job created for every GBP 86,000 invested.

Energy savings have a tangible effect on households, with energy bills reduced by around GBP 200 per annum. In 40 years for the community as a whole, allowing for the cost of CO_2 emissions, the overall cumulative benefit is GBP 186 million. With an NPV of GBP 128.6 million, the ROI is 23.7%.

Since the value of property is influenced by its energy performance which rose 5.6 points on average according to the SAP[2], prices for renovated houses have a growth potential which can be expressed as a surplus of GBP 38 million for all housing. The individual price differential would be GBP 790 per house.

Furthermore, the benefits linked to health and well-being are by no means negligible: they contribute GBP 5 million to the public health system and hence to the overall benefit of the community.

GREEN JOBS IN KIRKLEES

Due to its green initiatives, the district has gained considerable experience in this field which could become an important factor for the competitive strength of the district.

It is estimated that Kirklees has around 4,400 green jobs (2009 data): 2,300 in primary sectors and 2,100 in secondary sectors. The green sector represents 2.7% of total employment in the district. This figure is slightly lower than in the LCR region overall (3.1%).

Nb of jobs	primary	secondary	total
LCR	20 900	28 000	51 900
Kirklees	2 300	2 100	4 400
% LCR	*11,0%*	*7,5%*	*8,5%*

[1] Kirklees Local Economic Assessement 2010/11, Kirklees Counsil
[2] Standard Assessment Procedure

Kirklees has a stronger position in the primary sectors than in the secondary sectors in its area.

The main activities in the primary sector are waste treatment (31%) and energy management (20%). When compared with the situation in the Leeds region, Kirklees performs well primarily in the field of renewable energy, waste treatment and particularly in services related to controlling pollution (25% of green jobs in the region). On the other hand, it is weak in water distribution and treatment. Environmental consultancy is also an above-average field.

Primary green jobs 2009

Sub-sector	Kirklees	LCR	% LCR	
Waste & Recycling	700	5 200	13,5%	*
Energy Management	470	3 800	12,4%	
Renewable Energy	320	2 200	14,5%	*
Green Infrastructure	300	2 500	12,0%	
Other Sectors	250	1 000	25,0%	*
Environmental Consultancy	160	1 900	8,4%	
Water Supply & Treatment	160	4 300	3,7%	
Total	**2 360**	**20 900**	**11,3%**	

Regarding the secondary sector, the total number of jobs is 7,300, with the 'green' part estimated at 29% or 2,100 jobs. In the LCR region this figure is much higher– 35%.

The majority of activities (74%) are concentrated in three fields: construction, plumbing/heating/electricity and sustainable transport. A detailed classification of activities shows that in the region Kirklees is relatively good in the field of electricity (manufacture of equipment and distribution), construction of residential property, air-conditioning and non-domestic ventilation systems.

Methodological remarks

The analysis of the impact of the KWZ project gives a very complete image of the different economic aspects which are often ignored due to the complexity of their underlying concepts. The other side of the coin is inevitably resorting to theoretical hypotheses or a presentation of potential effects rather than observed effects. Nevertheless, these are generally accepted methodologies.

Regarding house prices, the price differential applied is very moderate (less than one per cent) while a study published in 2013 based on 300,000 real estate transactions in Great Britain, has revealed an average premium of 14% for buildings with high energy performance1. Especially for Yorkshire & Humberside, the minimum difference in prices, i.e. between categories F and G, is 9%

Source: https://www.gov.uk/government/publications/an-investigation-of-the-effect-of-epc-ratings-on-house-prices

	EPC A/B	EPC C	EPC D	EPC E	EPC F
UK average	14%	10%	8%	7%	6%
North East	38%	26%	23%	20%	15%
North West	27%	21%	18%	16%	12%
Yorkshire & Humberside	24%	16%	14%	12%	9%

[1] https://www.gov.uk/government/news/green-deal-inspiring-energy-saving-action

NOLAN COUNTY, USA

15 000 INHABITANTS

Nolan County is located in the state of Texas, a leader in the area of renewable energy, where 10% of electricity is generated by wind1.

KEY FIGURES

15% of the working population were working in the wind energy sector in 2008 (1,124)

Taxes payed by wind power companies to private landowners was estimated at USD 12.2 million in 2008

With their wind energy, Nolan County is a clear example of economic success based on new energy sources. The first wind farm in the county was put into operation in 2001, and ten years later, Nolan County surpassed the State of California in terms of electricity capacity. Today, Nolan County has three of the five largest wind farms in the world - Roscoe, Sweetwater and Horse Hollow[2].With a population of 15,000 - the majority of whom live in Sweetwater - approximately 1,300 are directly employed in the sector.

The economy in Nolan County, with roots in cotton production, was in decline since the Great Depression, and the trend failed to be reversed by the discovery of oil in the territory in 1939. For 60 years, the local population was in decline, with young people leaving the area. One in five were living below the poverty line. The development of renewable energies was a real driver for the wave of job creation from 2002 onwards, and a fall in the employment rate since 2010, which has been on the lower end of the scale both in Texas and at a national level over the past few years[3]. Although average incomes remain on the lower end of the national scale, positive trends indicate strong business activity in the area. From 2000 to 2011, employment, salaries and income grew at a faster rate than the United States average; a significant rise in per capita income was observed (over 25%).

Policies and projects

The framework law for the development of renewable energy was adopted in Texas in 1999. The law is entitled *The Renewable Electricity Standard* (RES), and sets the objective of increasing the proportion of renewable energy in overall electricity production. The law imposes obligations on electricity companies. Supported by tax credits, such measures are at the heart of the success of green energies in the United States.

In 1999, Texas set its primary objective at 2 GW concerning installed electricity capacity. The initial threshold was exceeded in 2005 and a new objective was set: 5.9 GW in 2015, including 0.5 GW from sources other than wind energy. A voluntary objective of 10 GW was also set for 2025. All of these objectives have been exceeded in advance of the deadlines, and Texas now has 12.4 GW of installed capacity4. This trend offers undeniable proof of the economic potential of clean energy.

The measures designed to encourage the development of the renewable energy business are either specific to the sector (as for tax exemptions for wind and solar energy equipment), or accessible as support for entrepreneurship in general (grants to the *Texas Emerging Technology Fund – TETF,* exemption from “franchise tax”).

The TETF grants for the green energy sector currently represent around USD 44 million (2005-2012) attributed to producers of photovoltaic cells, bio-fuels, and energy storage projects. The five projects that obtained the largest grants are almost all in research:

[1] http://www.sustainablebusiness.com/index.cfm/go/news.display/id/25483
[2] http://www.energydigital.com/top_ten/top-10-business/the-top-ten-largest-wind-farms-in-the-world
[3] http://locallabs.org/nolancounty-texas-work
[4] 2013, http://www.awea.org/Resources/state.aspx?ItemNumber=5183

Texas Emerging Technology Fund Renewable Energy-Related Awards		
Recepient	**Technology**	**Award, $**
National Wind Resource Ctr.	Research	8 400 000
Algae Bio Fuels Consortium	Research	4 025 000
Superconductivity Applied Research Hub	Research	3 675 000
21-Century Silicon	Polysilicon	3 500 000
Texas BioEnergy Alliance	Research	3 412 500

Source: Industry Report 2012

Methodology and indicators

The conclusions of the study on the economic impact of wind energy in Nolan County are supported by a number of indicators based on varied approaches. The surveys carried out directly on businesses were an important source of information, and were made possible by the moderate number of projects and operators in the county.

Ground rent

The sums paid to land-owners by wind energy companies are confidential. Therefore, the method to determine the total annual amount involves a calculation based on hypotheses drawn from the surveys:

- electricity production in the area = 2,500 MW in 2008.
- load factor of 35%, a standard level for projects in Texas
- wholesale electricity price = USD 40/MWh
- average ground rent amount = 4%

Direct jobs

The number of persons employed in the wind energy sector was obtained directly from the businesses. Only jobs directly linked with construction, set-up, operations and maintenance and transport are taken into account. However, the wind energy industry results in business for other professions such as legal and administrative professions, which is not measured.

The data on the working population provide the basis for an analysis of the importance of the sector for the local employment market.

The payroll bill is calculated based on a minimum threshold, without taking into account either overtime or additional bonuses or benefits. The average salary level comes from businesses.

Land use fees

Wind turbine projects add to the local tax base and therefore to tax revenues, which facilitates investment in local development. Such data are available from the local tax office. The taxes are paid to various jurisdictions - the local authority or district.

Additional indicators

The growth in tax revenues comes from the planning permission process, stamp duty and residence tax, which are good signs of economic regeneration. The actual amounts were obtained from the City of Sweetwater.

REDUCTION OF ENERGY EXPENDITURE

A number of studies demonstrate that the expansion of wind energy results in lower electricity prices[1]. This can be explained by technological developments and economies of scale that lead to reduced production costs. This cost advantage compared with the competition brings down the general level of prices on the electricity market, including electricity produced using fossil fuels. However, it should be noted that opinion on this issue is not unanimous, and the contrary has also been stated.

The conclusions of an analysis carried out by *Lawrence Berkeley Laboratory* estimates, on a highly approximate basis, a profit of between USD 7.5 et USD 20 for 1 MWh produced by turbines.

Data source: requests submitted to the US Census, Nolan County Central Appraisal District, City of Sweetwater

Results

With the installation of wind turbines on their land, landowners, mainly crop and livestock farmers, receive an annual payment, without any change to their main working activities. The total amount contributed to their income was estimated at USD 12.2 million in 2008.

Based on a capacity of 2,500 MW, this comes to USD 4,880 per MW installed. According to data from AWEA on Texas, this amount exceeded USD 38 million in 2013, for 12.4 GW[2], so the price for 1MW is lower - USD 3,000.

The number of jobs in the wind energy sector was 1,124 in 2008, with growth forecast of up to 1,330 in 2009, including 480 permanent jobs. The majority of jobs are in construction (750 jobs), operations & maintenance employs 324 persons, and another 50 are linked to transport. Although construction activities might be viewed as temporary, the State is involved in future projects, which ensures stable jobs. The projects in the construction phase in Texas represent 7,000 MW at the end of 2013[3].

The authors used the 2003 data to determine the proportion of local jobs in the sector. Given the availability of current data, we can confidently say that 15% of the working population were working in the wind energy sector in 2008:

Source: http://sweetwatertexas.net/community-profile/employment

The total payroll bill attributed to these jobs exceeded USD 45 million in 2008 (56 million were provided for 2009). The average salary in the sector is USD 40,038, which is 26% higher than the average in Nolan County - USD 31,752 in 2008[4].

With the arrival of wind energy businesses, the tax base was multiplied five-fold: from USD 0.5 to USD 2.4 billion between 1999 and 2008.
Growth was highest between 2006 and 2007, which corresponds to the large-scale set-up of generators.

Year	active Population	active population In employment	Wind sector
2008	7 801	7 469	1 124
Share of the wing energy sector :			*15,0%*

The total amount of tax collected from the wind farm projects is USD 30 million for the 2002-2007 period. The tax receipts for 2007 represent 67% of that amount. It should be kept in mind that only the projects

[1] Wind Power's Consumer Benefits - www.awea.org
[2] State Wind Energy Statistics: Texas - www.awea.org
[3] State Wind Energy Statistics: Texas - www.awea.org
[4] http://www.txcip.org/tac/census/profile.php?FIPS=48353

commissioned before 1 January 2007 were taken into account. Therefore, certain payments were omitted, including payments for the Roscoe wind farm.

New school buildings were constructed as a direct consequence of the tax revenues, for a total amount of USD 24 million.

Additional indicators show that the economic conditions in Nolan County are good. The tax received from planning permission fees between 2002 and 2007 was 24.8 million, i.e. 4.1 million per year on average, a clear increase in comparison with 2001 (1.6 million). Planning permission prices therefore tripled between 2001 and 2007.

Income from sales tax were 40% higher in 2007 compared with 2002. The taxes taken into account relate to all commercial activities that were revitalised thanks to the wind energy sector. However, during the same period, tourist taxes paid by hotel clients grew 81%, leading to an expansion in the hotel network in Sweetwater.

Savings generated by a theoretical reduction in electricity prices are estimated between USD 57 and USD 153 million per year.

Methodological remarks

The analysis is largely based on reliable data: either first-hand information, directly obtained from businesses, or official statistics.

The reliability of the reduction of electricity costs linked to a fall in prices is debatable, as an indicator. Firstly, the reduction is not reported in the study, but is presumed. Secondly, the data on electricity prices are published regularly and are freely accessible[1], and the period covered is not long enough to define a trend.

There is no consensus on the effect of renewable energy on electricity prices, and the issue is the subject of political debate. The authors cite a report from the *American Wind Energy Association* (AWEA), which makes a comparison on the evolution of prices between 2008 and 2013 in 11 states, where it is reported that electricity prices are rising at a much faster rate in states with lower wind energy capacity[2]:

Electricity price change, 2008-2013	
States >7% wind powered	-0.37%
Other states	+7.79%

The same report refers to 15 other studies that draw equivalent conclusions. However, the majority of the studies are of a prospective nature.

Furthermore, one of the criticisms put forward is that owing to the many and complex factors influencing electricity prices, it is impossible to explain the fluctuations uniquely by reference to renewable energy.

The number of jobs in the wind turbine sector does not take into account the impact of the manufacturing industry, whereas strong growth was noted in Texas, with a number of exporting factories. For example, in Sweetwater there is a blade repair factory.

[1] http://www.eia.gov/electricity/monthly/epm_table_grapher.cfm?t=epmt_5_6_a
[2] State Wind Energy Statistics: Texas - www.awea.org

PARIS-ILE-DE-FRANCE, FRANCE

11,980,000 INHABITANTS

The Greater Paris region is the premier economic region in France and among the highest performing regions at a European level.

KEY FIGURES

Eco-activities, according to the French regional Development Agency: ARD

- *Regional turnover is in excess of 17 billion euros*
- *number of jobs is around 112,000 (2008 data).*
- *Growth was 15 - 20% between 2000 and 2008*

***Public transport**: one of the 5 major employers in Paris. RATP – (Independent Parisian Transport Authority) has 44,800 employees in Ile-de-France*

Renewable energy

- *440 companies and organisations were set up in the region in 2007.*
- *Job creation: 73% for solar energy and 28% for wind power respectively in 2009 in comparison to the previous year.*
- *Wood energy sector: between 1990 and 2009 the declared amount of wood for heating increased by 80%*

The region boasts a range of assets, such as a young and highly qualified population, capacity for innovation, transport infrastructure, attractiveness for entrepreneurs and investors. In parallel with strong economic activity, the region has achieved a reduction in energy consumption since 2005. In that respect, progress has been made towards breaking the link between economic development and damage to the environment. The reduction in energy consumption in industry between 1990 and 2009 was at 36%, owing to an expansion of the services sector, as well an improvement in energy efficiency. Furthermore, consumption per inhabitant is now below the national average.

The Paris region is well-placed in strategic industrial green growth sectors[1]:

- renewable energies (biomass, biofuel, photovoltaic power) and CO_2 storage;
- the sectors focused on high energy performance (low consumption buildings, low CO_2 vehicles, logistics optimisation, intelligent energy networks, batteries);
- related sectors (waste recycling, green chemistry, water and sanitation, instrumentation, process optimisation).

Issues in relation to the energy transition and sustainable development have increasingly been integrated in a number of strategic regional documents and national policy, as well as in the departments and towns.

Policies and projects

The Economic Development and Innovation Strategy (SRDEI), which was adapted for the Greater Paris region in 2011, is an example of a policy that seeks to recognise the need for a change of paradigm with regard to environmental issues. Three major axes - strengthening SMEs, socially-responsible innovation and development - have been chosen in order to achieve the joint objective of transforming the known economic model and setting a new trend through environmental and social changes to the regional economy.

With regard to support for entrepreneurship in particular, the environmental transition is seen as a source of value creation through the design of a number of products, a new marketing strategy, reductions in costs, and developing the financial value of businesses[2].

The Regional Climate, Air and Energy Plan (SRCAE) adopted in 2012 also takes into account socio-economic issues: i.e. reducing energy poverty by lowering energy bills, improving the French balance of trade, developing industries with the potential to create local jobs, in particular buildings renovation and the development of new energies[3].The objectives set by the SRCAE, set out for the industrial and tertiary sectors, aim at achieving a

[1] Towns and cities and green growth: Paris/IDF – OECD 2012
[2] SRDEI 2011
[3] http://www.driee.ile-de-france.developpement-durable.gouv.fr/schema-regional-du-climat-de-l-air-r507.html

reduction of 24% of energy consumption and 33% of greenhouse gas emissions by 2020 (taking into account the energy consumption for buildings).

The objectives and directions for the SRCAE contain a chapter on economic activities, which proposes three action points:

N°	OBJECTIVE	N°	ORIENTATIONS
ECO1	Ensure that energy challenges being taken into account is a factor in business competitiveness and sustainability	ECO 1.1	Promote energy efficiency actions within companies
		ECO 1.2	Encourage synergies and pooling between economic stakeholders in the same activity field
		ECO 1.3	Promote comprehensive approaches to eco-design within companies

With regard to energy efficiency, the main issue is supporting small businesses, such as tradespeople, SMEs and VSBs (businesses with less than 10 employees), in managing energy consumption, as they rarely have sufficient engineering or investment capacities to take the initiative alone[1]. Improving the energy efficiency of buildings is also part of this strategy.

The second objective - promoting industrial ecology - was carried out in the Jean Mermoz ZAE in Courneuve (Plaine Commune). The project was launched in March 2011 and is based on the 12 flow assessments carried out, which identified 25 possibilities for synergies in the area of materials, water, energy, services and transport. There are now 200 businesses operating in the Eco-Parc, with two business sectors making up half of the jobs: urban logistics and messaging (30 businesses and 1,000 jobs) and eco-industries (15 businesses and 500 jobs).

An example of an initiative in the area of eco-design is a project by the Regional Chamber of Commerce and Industry and the ADEME. The project was rolled out in 2012 for regional SMEs. As part of such measures, in 2012, 400 SMEs received advice on waste prevention and eco-design; 120 businesses were provided with diagnostics on waste prevention and eco-design to measure the environmental impact of their actions and discover the possibilities for new production and operational methods.

Jobs and development are also at the heart of the initiatives for the "Greater Paris Area" project, an urban planning project aimed at improving living standards for the inhabitants and build a sustainable city in order to transform the region into a global metropolis.

Methodology and indicators

Cities and green growth

The study carried out as part of the OECD's Green Cities[2] programme had as its objective the evaluation of the prospects for green growth in the greater metropolitan area of Paris-Ile-de-France and also presents an analysis of the current picture. The report addresses a large number of issues, in particular the importance of the green sector for the local economy. However, the authors recognise the difficulty of measuring these activities, given the lack of statistics - a problem shared by all studies on this subject, the consequence of which is a fairly considerable divergence in results. The OECD in particular sees this asymmetry of information as one of the challenges to governance of green growth and recommends regular monitoring of statistics based on common definitions (in France, the National Observatory of Green Jobs - *Observatoire national des emplois et métiers de l'économie verte* - proposes a classification of professions to this end).

In the report on the Ile-de-France region, the accent is on jobs linked to eco-activities. This is not a global analysis of the sector, but rather a compilation of resources and analyses because the data are from different sources and refer to different years - between 2004 and 2011, depending on the source. Figures are presented

[1] SRCAE 2012
[2] http://www.oecd.org/regional/greening-cities-regions/

in a table with the number of jobs and growth rates per sector and industry as well as an estimation of job creation and loss.

Furthermore, the study illustrates the performance of the region regarding eco-innovation by referring to data for green patents (the number and classification of regions are from the OECD).

Data source: Conseil régional de l'IDF (Ile-de-France Regional Council), Insee, Arene, Ademe et al.

GREEN AND "GOING GREEN" PROFESSIONS

In order to present different approaches and fill in missing information, we have added data from other sources. For example, a publication "Les professions vertes et potentiellement verdissantes" (Green and potentially "going green" professions) from **Défi métiers** and **Insee**, which distinguishes between these two categories composed of 9 and 73 professions respectively within the scope of the work performed by the National Observatory of Green Jobs[1].

Green professions include the following activities:

- production and distribution of energy and water;
- cleaning and treatment of waste;
- engineers and technicians working in the environment/ pollution control;
- nature conservation.

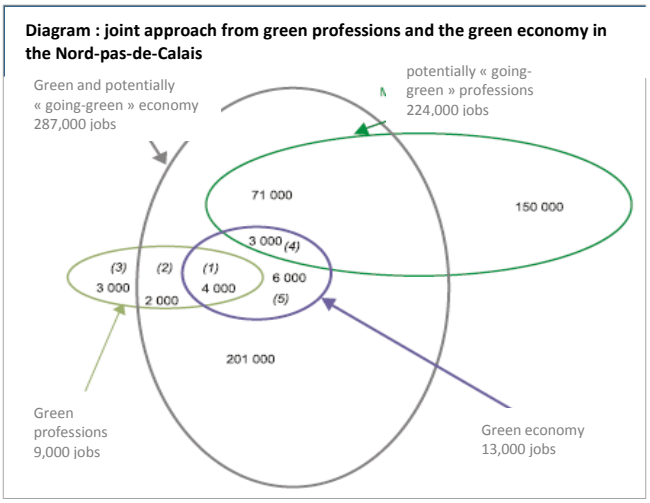
Eco-jobs in building or transport, in contrast, are included in the "going green" category. This category does not differentiate between "eco-activities"and conventional practices used within a profession. For example, the transport sector includes all "lorry drivers and long distance lorry drivers"(of which only a small part can be linked to sustainable mobility) as well as drivers for public transport. However, this distinction is made using definitions of eco-activities which comprise the green economy.

According to the approach by Insee, the two types of profession (green and "going green") can be exercised either within the green economy or in other sectors. More precisely, in addition to a list of professions, 11 activities in the green economy and 97 "going green" activities are defined. The classification was carried out according to the *Nomenclature d'Activité Française* - French Classification of Activities - (NAF).

The points where 4 categories meet reveal 5 areas of interest as shown in the diagram below (here the Nord-Pas-de-Calais region).

By way of illustration, zone 4 is formed by the overlapping of "going green" professions with activities of the green economy: a lorry driver working in refuse collection would be included in this category.

Diagram : joint approach from green professions and the green economy in the Nord-pas-de-Calais



[1] http://www.developpement-durable.gouv.fr/L-observatoire-national-des,18551.html

Results

THE GROWTH OF ECO-ACTIVITIES

It can be said that companies in the Île-de-France region are successful in the field of eco-activities. The region has been able to develop its comparative advantages, and eco-activities today play an important role in the local economy. The sector shows a positive trend in terms of turnover as well as jobs.

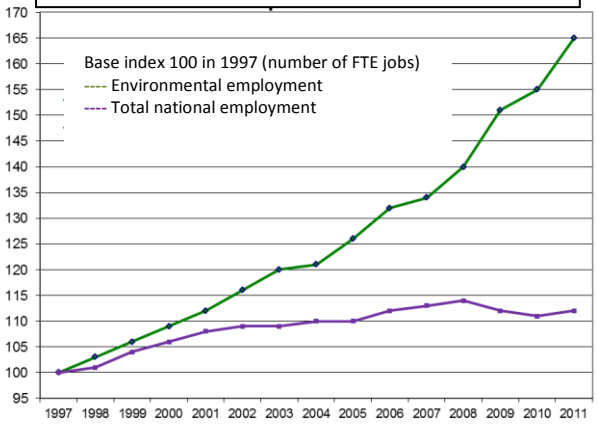
According to the ***Agence Régionale de Développement*** - French Regional Development Agency - (ARD)[1], regional turnover for eco-activities is in excess of 17 billion euros and the number of jobs is around 112,000 (2008 data). Growth was 15 - 20% between 2000 and 2008, depending on the industry. The number of jobs directly at the core of the sector (eco-industry, waste, heating, water) is 35,000, with growth of around 20% during this period.

Given that France is 4th in the world as exporters of green activities (after the United States, Germany and Japan)[2] and that the Ile-de-France region contributes significantly to the national economy, the performance of this region is even more impressive. In fact, "traditional" sectors for wastewater management, waste treatment and environmental manufacturers accounted for 15% of international activity in 2010 with earnings of 1.1 billion euros (+38% compared to 2009). This puts France 4th in the world exports ranking after the United States, Germany and Japan[3].

The growth rate for green jobs in France was 4.5% on average between 2004 and 2011, against less than 1% for total employment. This development continued even during the crisis, in contrast to the general trend.

According to the methodology used by **Insee**, this accounts for 26,300 green jobs and 739,700 of potentially "going green" jobs (2009 data) in the Ile-de-France region, or a total of 13.5% of jobs there. The region is slightly under-represented in relation to its importance to national employment: all professions together represent 21% of the total for France, with 19% for green professions and 20% for "going green" professions.

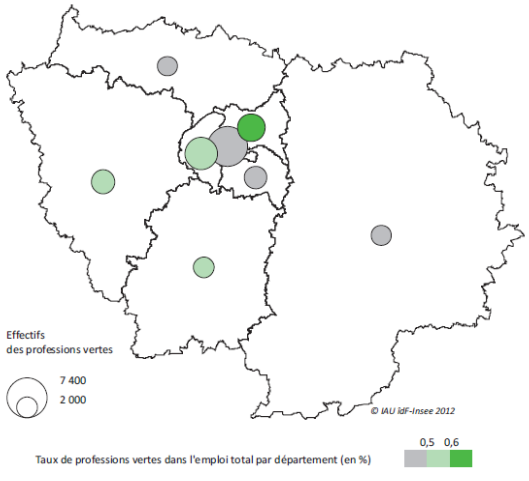
Evolution of environmental employment and total national employment



Champ : France entière.
Source : Insee (Comptes nationaux, base 2005) - SOeS, 2012.

The importance of green professions continues to be limited. They are slightly over-represented in the inner ring of Paris (see map below), i.e. 3 departments on the edge of the inner ring with 0.5% - 0.6% of total employment. "Going green" professions are over-represented in the 4 departments of Greater Paris on the edge of the metropolitan region (15-17% of total employment).

Effectifs et taux de professions vertes par rapport à l'emploi total par département francilien en 2009



According to the approach of "overlapping" professions and activities, green professions account for 59% in cases of green activities, while "going green" jobs account for 31%. If this is related to the total number of positions, this gives 244,824 employees in the green economy.

One interesting fact applies to conditions of employment: the number of permanent contracts (92%) is greater than in the average number of jobs in the metropolitan area (80%). Green professions account for the majority of full-time jobs: part-time jobs only affect 5% of employees, against 14% on average for all professions.

Number and rate of green professions in relation to total employment by region in the Greater Paris Region in 2009

[2] http://www.tnep.org/accueil/preves/espoir-de-croissance-durable-leconomie-verte-theme-de-la-mission-2014/
[3] Ibid.

SECTORAL OVERVIEW

According to the French Regional Development Agency, enterprises active in the Ile-de-France region are especially competitive in the fields of eco-technology, eco-construction and eco-mobility; these include large companies as well as SMEs. The strong potential of these sectors as regards green growth is highlighted in the OECD study. The increasingly green face of these fields, which is key to sustainable growth, is a powerful lever to obtain visible results regarding the environment, given the significant role played by construction and transport in energy consumption and CO_2 emissions at a regional level.

Construction

With 70% of buildings dating from before 1975, the Ile-de-France region must prepare itself for major renovation work to its buildings. The new energy consumption standards for buildings should provide work for numerous skilled trades.

The current number of jobs in eco-construction is estimated at 34,000 by the Regional Development Agency; composition and calculation methods have not been explained. Partial data sourced from SIRENE, the computerised directory of companies and establishments (*Répertoire National d'identification des entreprises* - National enterprise identification registry), show that the selected activities in the building sector - installation of heating and air conditioning systems, insulation and roofing - account for 25,000 jobs. Although it is difficult to measure the importance of these figures out of context, nevertheless it shows a positive trend. For example, the growth of +13.8% observed between 2005 and 2009 in insulation installation, i.e. +3.5% per year on average.

According to Défi Métiers, "going green" professions related to construction account for 223,100 jobs or 16% of the total number in France (2009 data). This is less than the importance of the region in total employment in France (around 22%).

Transport

The region is exemplary in terms of the model shift in transport, with 42% of journeys made using public transport, i.e. equal with the percentage for cars. This is explained in part by the compactness of the city because Paris is one of the most densely structured cities in the world. Hence the demand for transport services, which is always rising, means that public transport is one of the 5 major employers in Paris, according to UITP. *Régie Autonome des Transports Parisiens* (RATP - Independent Parisian Transport Authority) has 44,800 employees in the Ile-de-France region[1].The railway company SNCF Transilien, which serves Paris and the outskirts of the Ile-de-France area, is intending to hire new staff in view of the expansion of the network and states that there is "an enormous need for recruitment in the field of infrastructure"[2].

The OECD study only gives the number of jobs for all activities producing equipment, trade, repair, transport, storage. We have not identified other sources that specifically characterise the sustainable mobility sector.

According to Défi Métiers, "going green" professions related to transport and logistics account for 142,600 jobs or 20% of the total number in France (2009 data).

Waste

According to the *Observatoire Régional des Déchets d'Ile-de-France* (ORDIF) - Regional Observatory for Waste in the Ile-de-France region - the waste sector is No. 1 in the green economy in terms of numbers employed. In its annual scoreboard ORDIF estimates the minimum number of employees in the Ile-de-France region at 22,000, of which 80% are in the private sector (2010 data). The strong growth in jobs in private companies (+16%) between 2000 and 2010 was three times greater than the regional average

[1] http://www.ratp.fr/fr/ratp/c_20790/chiffres-cles-rh/
[2] http://www.lemonde.fr/economie/article/2012/09/24/la-sncf-va-embaucher-plus-de-10-000-personnes-en-2012_1764330_3234.html

(+5%). The report also classifies activities according to labour intensity: the number of employees for 10,000 tonnes of treated waste varies from 1 in landfill to 31 in sorting waste from municipal waste collections. This underlines the importance of expanding selective sorting in terms of jobs in relation to other types of treatment such as incineration, for example (3 employees/10,000 tonnes).

Renewable energy

In 2009 the output for the production and recovery of renewable energies was estimated at 13,000 GWh/p.a. or 5% of energy consumption in the region. In 2010 primary energy from renewable sources in Ile-de-France consisted mainly of biomass (57%), followed by hydro-power (24%), geothermal power (8%) and renewable municipal waste (5%), with a small percentage of wind (4%) and solar (0.5%) power.1

According to Arene, at least 440 companies and organisations specialising in renewable energy and energy efficiency were set up in the region in 2007. Almost one third are represented by design offices; installation and distribution companies account for 18% of the number and associations 11%. This compilation was based on data provided, for the most part, on voluntary information which does not tell us precisely which part of the sector is covered. Furthermore, it should be noted that it is not possible to put a figure on the headcount of the companies covered.

In terms of job creation in the region, the greatest growth was found in solar and wind power, which are significantly under-used in relation to their potential. These two sectors grew by 73% and 28% respectively in 2009 in comparison to the previous year.

Installed photovoltaic capacity is still low in the Ile-de-France region, but is enjoying strong growth: an increase of 170% was recorded between 2009 and 2010. The field comprises around 107 industrial establishments; 38 public laboratories are working directly on PV or related matters[2]. The annual rate of growth in the total number of jobs in the PV sector was 60% in 2008 and 113% in 2009 for France[3].

Despite the late start of the wind industry in France compared with more advanced countries in this field, the domestic market is developing very strongly, with annual growth rates of +65% for the last 10 years. 112 establishments are active in wind energy in the Ile-de-France region, 72 of them in the industrial sector[4].

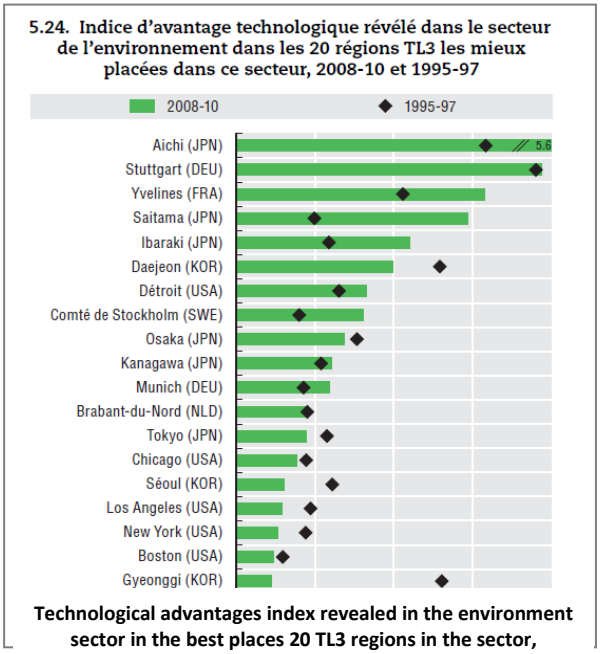
The wood energy sector is in full swing in the region. Between 1990 and 2009 the declared amount of wood for heating increased by 80%[5]. Biomass is scarcely represented in the urban heating system (1%) and hence has considerable potential. According to Arene, wood energy creates 2 to 4 times more jobs than that of oil or gas for the same quantity of energy consumed.

The authors of the OECD study emphasise that for the moment progress in the renewable energy sector is driven essentially by government subsidies and is therefore subject to the vagaries of political decisions. More active participation of players in the private sector is required.

ECO-INNOVATION

According to ADR, research in eco-technologies is one of the fields of expertise of the Ile-de-France region. The region has around 300 public and private research centres, with 12,000 researchers employed in these companies. It generates 40% of green patents filed in France[6] and therefore has a comparative advantage in this field since its share of total patents is 34%. According to the latest data, in 2008-2010 Ile-de-France was in 5th place out of the most active OECD regions for the filing of patents, with regards to green patents[7] (19.3%).

[1] Towns and cities and green growth: Paris/IDF – OECD 2012
[2] http://www.iau-idf.fr/
[3] http://www.iau-idf.fr/
[4] http://www.iau-idf.fr/
[5] Insee
[6] Towns and cities and green growth: Paris/IDF – OECD 2012
[7] Ranking by number of patents was not available



Technological advantages index revealed in the environment sector in the best places 20 TL3 regions in the sector, 2008-10 and 1995-07

The region has enjoyed strong growth in this field over the past 15 years. It has moved from 20th to 8th in the classification of metropolitan areas in the OECD with regard to green patents. Furthermore, it has an advantage in this field compared to other sectors, such as information technology (13th) or biotechnology (14th).

In the same period the department of Yvelines developed a high level specialisation in environmental technology, putting it 3rd among the NUTS3 territorial units (this statistical division corresponds to the French departments).

The *technological advantage index* characterises the specialisation of a region in a particular field in relation to the national average. It is defined here as the relative percentage of green patents divided by the relative percentage of total patents.

The index is equal to 1 if the percentage of the region is identical to its percentage in all fields (no specialisation); it is greater than 1 if the region offers a specialisation in the domestic market. The index for the Yvelines department went from 2 to 3 between 1995 and 2010.

As the primary department in France for the automotive industry, with large manufacturers such as Renault and PSA Peugeot-Citroën, a network of sub-contractors and design offices, the Yvelines department generates 65% of green patents in the field of mitigating the effects of transportation on the climate. The policy of supporting innovation, adopted in 2009, provides more than EUR50 million for R&D in eco-technologies (hybrid and electrical). The eco-mobility research project **VeDeCom** (*Véhicule Décarboné, Communicant et sa Mobilité* - vehicle decarbonisation, communication and its mobility) was recently designated as "*Institut pour la transition énergétique*" (Energy Transition Institute); it forecasts 42,000 direct jobs in industry and services throughout France over 10 years[1].

The importance of public policy and the strong performance of this sector as regards sustainable development is reflected by the calls for projects by the *Fonds unique interministériel destiné aux pôles* - Single interministerial funds for hubs - (FUI). "Eco" projects received 38% of the total amount of financing in 2011, as compared with 12% in 2007. Their percentage of the total number of projects rose from 12% to 42% in the same period.

Ile-de-France has eight hubs of competitive strength, with two working on issues of sustainable economic development: Advancity and Mov'eo.

Advancity is a hub dedicated to sustainable cities and sustainable mobility. It has more than 241 members, of which 160 are SMEs and intermediate sized enterprises as well as 18 world leader groups. Innovation projects can be divided into four strategic areas:

- Urban technologies (water, waste, air, etc.) & renewable energy (eco-technologies);
- Sustainable buildings and infrastructure (eco-construction);
- Transport, accessibility, mobility (eco-mobility);
- Cities, organisation, management, decision support (eco-city).

The results of 6 years work given in the table below firstly confirm active participation of SMEs in projects and secondly the leverage effect of subsidies: EUR 1 of subsidy creates EUR 1.40 to EUR 2 of private investment, depending on the strategic area.

[1] Conseil Général des Yvelines (Yvelines departmental council) - http://www.yvelines.fr

	EcoTechnologies	EcoConstruction	EcoMobility	EcoCity
Projects financed	21	68	28	22
Partners	122	117	63	84
-of which SME and national social partnersI	80	50	25	40
- of which large groups	12	15	12	10
Total investment (M€)	66,6	165,6	83,5	81
- of which subsidies	26	68	34	27
Part subsidies	39,0%	41,1%	40,7%	33,3%

Source: www.advancity.eu

Mov'eo is a competitive R&D hub for the automotive and public transport sectors, especially orientated to sustainable mobility technologies. Furthermore it has the objective of contributing to activity and development in the region, with innovation being viewed as a source of new wealth, competitive strength and employment. Measuring the economic results of these actions on the region is priority, as announced in the Performance Contract 2013-2015.

Mov'eo Ile-de-France has 197 members, of which 111 are SMEs, 45 large companies, 25 research/training establishments and 16 institutions and local authorities[1]. 22 R&D projects were approved in the region in 2012, representing almost EUR84 million, with 150 regional entities involved, of which 36 were SMEs and 68 research institutes. This is also the 1st hub of competitive strength which is an official partner of ESSEC Ventures[2] for its efforts to assist young entrepreneurs; it accompanied 3 companies in 2012.

Methodological remarks

In contrast to previous case studies, this analysis is not based on a rigorous methodology but rather represents a compilation of various sources which we have supplemented with other available information. Nevertheless, in conjunction with statistical data, this means a global image of trends can be mapped in the transition of the Paris region to a sustainable economic model as well as a certain amount of progress in this field, even though numerous objectives remain to be achieved.

At the same time, the lack of more in-depth studies on performance observed (at least freely accessible) for a region as important as this on a European level, is fairly characteristic of the general state of things. The "lack" of quality analyses on the subject, on projects in individual sectors as well as on general performance of local authorities can be a real concern. This would favour a strong argument in favour of initiatives for ecological transition and would mean the successes to date could be showcased properly to a larger public.

The OECD study contains an in-depth analysis based on a sectoral approach. Forces and opportunities determine the potential of green growth as well as threats and set challenges for governance. However, the lack of a uniform approach and the different timeframes of data do not allow a global view or comparisons to be drawn. Furthermore, in the context of the dynamics of change, 2004 data are already obsolete.

Other reference documents focus primarily on jobs but often limit themselves to stating a quantity without placing it in a wider context (as a comparison of growth rates or percentage of total employment).

In the Insee study the potentially "going green" professions cover a wide variety of occupations which are often not directly linked to eco-activities. It would, therefore, be interesting to see the evolution of these occupations towards performance that is more mindful of the environment. Changes in skills are important in this case because they can be characterised by hours of training provided and the number of certificates awarded (diplomas, accredited qualifications, etc.).

[1] Mov'eo Activity Report 2012

[2] ESSEC Ventures is a structure for entrepreneurs in the ESSEC Group (*École Supérieure des Sciences Économiques et Commerciales* - Graduate School of Economics and Business)

METHODOLOGICAL APPROACHES

In this section, we present a summary of the economic evaluation methods used in the case-studies. We have added other methodologies, indicators and approaches identified or used by other organisations.

Approaches to the case studies

INPUT-OUTPUT MODEL

One of the most common project evaluation models is the economic input-output model presented in detail in the *Case-study* section (Kirklees and Hannover). The fact that this model is static is a disadvantage, as inputs and outputs are assumed to be constant and price fluctuations are not taken into account. Therefore, this model is best suited to short-term analysis. Furthermore, it might be difficult to collect detailed data to obtain the results needed. Nonetheless, provided that the model is used correctly and the limits and hypotheses are taken into account, its speed and flexibility can offer the advantage of becoming an effective tool for analysis.

SCOREBOARD

We noticed that in many cases, the analyses are not preceded by economic modelling, but are instead based on scoreboards or matrices that are filled with empirical data: this approach is taken in 5 out of the 6 cases reviewed. The choice of indicators and methods varies considerably, depending on the nature and duration of the project, the sector and the available data. **While such an approach is not conducive to an overall understanding of an economic system, it is often based on concrete reported results.**

Below, in the form of a table, we present the indicators noted in various studies, which form the basis for the *Case-study* section, in accordance with four sectors: buildings, sustainable mobility (including transport infrastructure), renewable energy and waste management. While this is not an exhaustive list, it allows us present an overview.

	Buildings	Mobility	EnR	Waste
Jobs created	+	+	+	+
- direct/indirect	+	+	+	+
- by investment unit	+			
- salary vs. Average regional salary			+	
- comparative intensity in employment	+	+	+	+
- weight of the sector in regional employment			+	
Companies created/hosted	+	+	+	+
return on investment	+		+	
Time of return (payback)	+	+	+	
National investment	+		+	
Property/land prices	+	+		
Local businesses	+	+		
Additional taxes		+	+	
Additional revenue		+	+	+
- ground rent			+	
- sale of energy (feed-in)			+	
- sale of recycled valuation types				+
- advertising space, building permits, etc…		+	+	

	Buildings	Mobility	EnR	Waste
Expenditure avoided:	+	+	+	+
- energy bill	+		+	
- medical expenditure	+	+		
- transport infrastructure		+		
- fuel, parking, garage etc…		+		
- external influences (such as traffic and pollution)		+	+	
- disposal and tipping of waste				+
- pruchase of raw materials				+

SECTORAL APPROACH

Public policy projects that follow the value-chain structure are known to be more effective, covering the entire sector: suppliers of goods and services, clients, funding bodies, research bodies and other stakeholders. Analyses of the green sector in general employ a range of terms: green economy, eco-industries, eco-activities. In general, the aim is to quantify the number of jobs and businesses associated with the development of activities with a small environmental footprint, or those specifically aimed at the prevention and elimination of harmful effects on the environment. There is no common approach to the definition of such activities, although organisations such as Eurostat and the OECD have drawn up widely-used classifications. Furthermore, national statistical recommendations are also used by analysts. The use of a set nomenclature facilitates coherence, determines trends and makes comparisons between sectors and regions. Surveys among businesses, as carried out on the Cleantech cluster in Copenhagen, is another approach.

Other methodological recommendations and tools

SOCIO-ECONOMIC MATRIX

The socio-economic matrix drawn up as part of the European Commission CONCERTO programme[1] for energy efficient buildings and towns is worth studying. Although the programme is not a case-study as such, it is worth mentioning as a much more elaborate approach is involved. The description of the method is followed by an illustration of its application to a project in Ostfildern, Germany.

Knowledge sharing is an important component of the CONCERTO initiative. To that end, monitoring of the projects was carried out on the basis of data and kept up to date using the CONCERTO Premium service. Furthermore, the participating local authorities have methodology guides available to them, including a guide on economic monitoring[2] (mainly focused on construction costs and building functions).

A report published in 2010 on the evaluation of socio-economic impacts provides concrete examples of local initiatives and their results. The idea behind drawing up a methodological framework for socio-economic evaluation is to put the experiences gained by towns and cities in a context that goes beyond technical aspects in order to ensure an integrated vision in line with the concept of sustainable development. It is also emphasised that analysis at a local level is particularly important in terms of ensuring the effectiveness of local policy.

The analysis was carried out five years after the implementation of the CONCERTO programme in 26 towns and cities. The economic evaluation is based on 15 quantitative and qualitative indicators divided into four groups:

- economic-environmental profitability (analysis of the demand and the energy bill);
- local energy production (viewed as an important economic factor);
- stimulation of the local economy (creation of local jobs and generating local business)
- time of return (payback).

The matrix was drawn up in co-operation with the participating local authorities and experts integrating theoretical aspects and empirical data collected on-site.

[1] http://concerto.eu
[2] http://concerto.eu/concerto/library/library-concerto-guidelines.html

Socio-economic matrix: economic dimension

Economic-ecologic cost effectiveness	a) Costs in M€ per avoided ton of CO_2
	b) % of reduction in energy costs per m^2 of building area
	c) 5 point Likert scale: influence of the CONCERTO measures on the energy bills
Increase in local control of energy supply / local energy production	a) % of locally produced energy of the total energy consumption (thermal energy and electricity) - CHP
	b) % of locally produced energy of the total energy consumption (thermal energy and electricity) - RES
	c) 5 point Likert scale: perception / acceptance of local control of energy
Stimulation of local economy	a) Number of jobs created in course of the CONCERTO activities
	b) Number of new businesses created in the CONCERTO area
	c) Number of trainings / persons / day per person / hour per person offered
	d) % increase in real estate and flats value
	e) % change in community demographics - neighbourhood growth
	f) 5 point Likert scale: perception of stimulation of local economy
	g) 5 point Likert scale: improvement in the perception of demo site image/rank
Payback period (investor side)	a) Payback period
	b) 5 point Likert scale: perception of payback period of CONCERTO measures

The qualitative indicators are based on the Likert Scale - a widely-used scale employed in psychometric questionnaires where the respondent indicates the extent to which they agree or disagree with a given statement.

The matrix defines a methodological framework, but in practice, only a limited number of the indicators could be measured, and for only a limited number of towns and cities, as the majority of projects could not be completed when the evaluation was carried out. Furthermore, the authors indicate that overall, the period studied was not long enough for all the effects on the economy to become apparent. The most detailed evaluation in terms of economic indicators was carried out for the POLYCITY project: **Scharnhauser Park** in Ostfildern, Germany.

Scharnhauser Park, located close to Stuttgart, is a renovation project on a 140 ha former military zone, and an exemplary environmental area. The works were carried out between 2005 and 2009. The main objective was to reduce the consumption of fossil fuels and non-renewable fuels through technological innovation using three strategies:

- energy performance of buildings;
- optimisation of the energy production and distribution system;
- greater use of renewable energy.

All the buildings constructed as part of the project meet a standard for low energy consumption. The project covers 178,000 m² of residential and commercial space and are powered by a wood co-generation power plant (with 1 MW of electricity capacity and thermal capacity of 6.3 MW), a solar thermal power plant and photovoltaic equipment integrated into the buildings (70 kW).

The number of jobs created over the course of the programme is over 2,000 – an impressive result, particularly in comparison with the population of the town, comprising 35,000 inhabitants (2010). The influence of the programme goes beyond the jobs directly linked with the project, and extends to an overall trend in the town. Unfortunately, this figure is not compared with the trends observed before or in other towns in the region.

The impact of the CONCERTO measures on the energy bill is estimated at 2.2 points out of 5 (where a weak influence corresponds to 1 and a strong influence to 5). This result is based on a comparison between the costs and the average reduction in the demand for energy. It should be noted that energy consumption is 30-38% lower compared with national standards.

Improvements in local controls on production/distribution is at 2.6 out of 5: this average indicator has deteriorated since 2007 (3.7 points) owing to a fire in the co-generation centre.

FOCUS ON JOBS

Analysis of the sector is carried out based on various criteria: the turnover for the sector, the rate of creation of green businesses, the productivity of the workforce, expenditure by firms on R&D. Although R&D is usually designated as an input for stimulating innovation, it is also a good way of shedding light on the vibrancy and potential of businesses. However, employment is the most requested indicator.

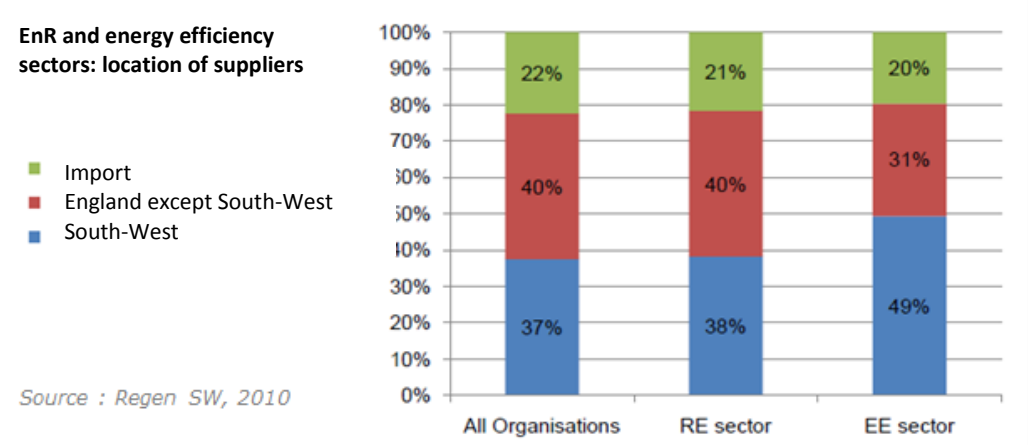
Often, analyses seek to distinguish green jobs, directly linked to the environment, and "going green" jobs. The latter show strong potential in terms of growth insofar as they involve integrating the environmental dimension into professional practices, regardless of the sector, and have a ripple effect right throughout the economy.

Concerning job creation and indirect or knock-on effects for the local area, it is important to consider the place of residence of the relevant economic players. The analysis of the green sector in the South-West of England[1] is an example that illustrates the possibility of "outflow": it was estimated the proportion of employees residing outside the region at 9%, which constitutes a significant proportion of the payroll leaving the area. This proportion is relatively high compared with the 3.4% observed on average in the region.

TERRITORIAL DISTRIBUTION OF THE IMPACTS

The rate of coverage of goods and services suppliers can be studied in order to determine the distribution of expenditure by the green sector between the region, the rest of the country and imports. This approach was taken in the study carried out in South-West England mentioned above. The analysis was carried out based on a survey of a sample of businesses.

Positive results have been achieved in the energy efficiency for buildings sector, which have higher rates of local spending than average: almost half of suppliers are established in the South-West.



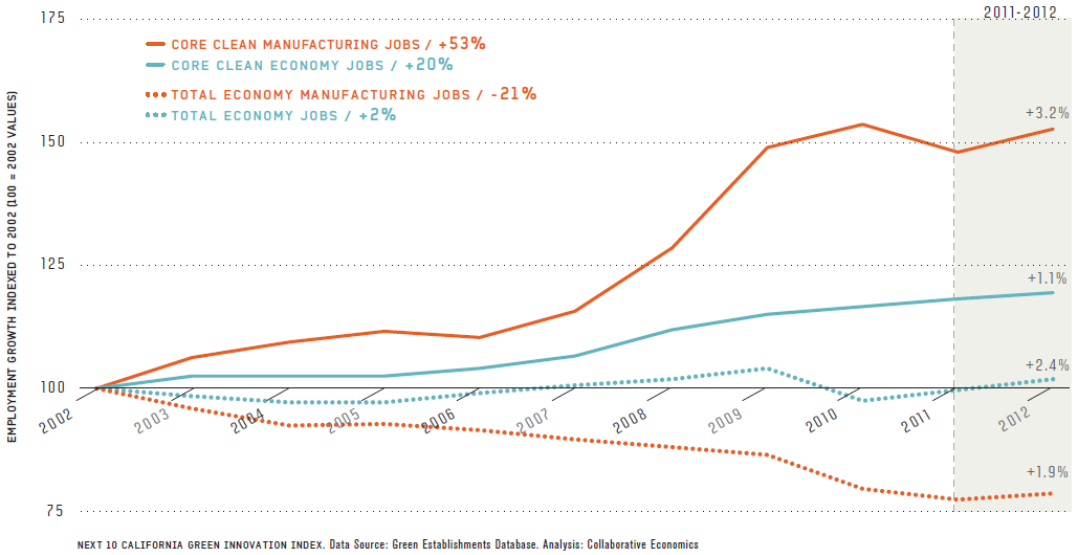
CONTEXT

Although the collection of local data involves difficulties, it is always an important component of the assessment of the status of the area, either in comparison with the national average or compared with other regions with comparable characteristics, in the same country or abroad.

The study carried out in South-West England offers a way of comparing regional indicators to national averages. The number of jobs per company, the turnover and the value added per full-time job were assessed. These three indicators are compared to the national level across the same sectors.

The comparison with other sectors and the general context are equally important. The following graph illustrates the trends over the past ten years in California: it distinguishes between the jobs in the "clean" manufacturing sector and the clean "economy" in comparison with the overall manufacturing sector and overall growth in the state.

[1] The Economic Contribution of the Renewable Energy and Energy Efficiency Sectors in the South West of England – Regen SW, 2010



This illustration is drawn from the "2014 *California Green Innovation Index*"[1] report. The report analyses the Californian economy showing that it is possible to disassociate GDP growth and an associated growth in greenhouse gas emissions per capita, energy efficiency, the proportion of renewable energy, and finally innovation and clean technologies: investments in businesses and projects per source and per industry, green patents (developments and rankings) and jobs per sector.

REGIONAL SPECIALISATION

One effective method for the assessment of the relative performance of a region is the specialisation index - as employed for green patents (see the case studies for the Greater Paris region). This method, as applied to the evaluation of green growth in Chicago measures specialisation as follows: the numerator is the proportion of the total number of jobs in the sector in the metropolitan region of Chicago; and the denominator is the proportion of the jobs in the sector across the United States. A value greater than 1 indicates that the region is specialised in a given sector. Therefore, Chicago can be said to be highly specialised in energy professional services (such as consulting). Chicago is ranked as 4th among the American metropolitan regions for this sector.

Table 1.6. Green sector specialisations and jobs in the Chicago Tri-State metro-region

Segment[1]	Special-isation	Ranking[2]	Jobs in Segment 2010	Change in jobs 2003-2010	Share of all Green Jobs[3]	Sub-category
Professional Energy Services	3.4	4	5353	4%	12%	buildings
Air and Water Purification Technologies	2.6	10	2031	97%	4%	water/air
Lighting	2.3	12	1063	5%	2%	buildings
Green Architecture and Construction Services	1.9	15	3332	3%	7%	buildings
Public Mass Transit	*1.9*	*8*	*20664*	*58%*	-	
Green Chemical Products	1.4	16	983	33%	2%	
Biofuels/Biomass	1.3	11	856	21%	2%	energy
HVAC and Building Control Systems	1.3	20	2936	4%	7%	buildings
Green Consumer Products	1.3	14	3213	-5%	7%	
Recycling and Reuse	1.2	25	5123	89%	11%	
Pollution Reduction	1.1	28	337	66%	1%	
Nuclear Energy	1.1	20	2622	9%	6%	energy
Waste Management and Treatment	*1.1*	*39*	*13567*	*24%*	-	

Source: OECD 2013

It should be noted that the segments included in the list do not take into account suppliers of goods and services to green businesses and therefore, part of the sector is left out.

[1] http://next10.org/2014-california-green-innovation-index

ECO-INNOVATION SCOREBOARD

In this section we present a scoreboard elaborated by the Eco-Innovation Observatory of the[1] European Union. It is used to measure the performance of member countries in this field in relation to a European average. Evaluations are made using 16 indicators divided into 5 categories which largely cover the range of approaches in this field:

1. inputs which characterise investments in R&D and regional capacity in terms of research;
2. the scope of eco-activities, i.e. the number of companies involved in the efficient use of raw materials and in environmental management;
3. effects measured as the number of patents and scientific publications;
4. the results in terms of productivity of materials and the intensity of carbon emissions;
5. socio-economic results: exports, revenue, jobs in eco-industries.

Regarding eco-industries, companies are selected according to NAICS codes[2], including waste treatment, water management, environmental technologies, recycling, re-utilisation and recovery. This selection excludes companies involved in the production and storage of energy.

The *Scoreboard* is always based on sources such as Eurostat, EEA and other reputable statistical agencies.

Name of indicator
1. Eco-innovation inputs
1.1. Governments environmental and energy R&D appropriations and outlays (% of GDP)
1.2. Total R&D personnel and researchers (% of total employment)
1.3. Total value of green early stage investments (USD/capita)
2. Eco-innovation activities
2.1. Firms having implemented innovation activities aiming at a reduction of material input per unit output (% of total firms)
2.2. Firms having implemented innovation activities aiming at a reduction of energy input per unit output (% of total firms)
2.3. ISO 14001 registered organisations (per mln population)
3. Eco-innovation outputs
3.1. Eco-innovation related patents (per mln population)
3.2. Eco-innovation related academic publications (per mln population)
3.3. Eco-innovation related media coverage (per numbers of electronic media)
4. Resource efficiency outcomes
4.1. Material productivity (GDP/Domestic Material Consumption)
4.2. Water productivity (GDP/Water Footprint)
4.3. Energy productivity (GDP/gross inland energy consumption)
4.4. GHG emissions intensity (CO_2e/GDP)
5. Socio-economic outcomes
5.1. Exports of products from eco-industries (% of total exports)
5.2. Employment in eco-industries and circular economy (% of total employment across all companies)
5.3. Revenue in eco-industries and circular economy (% of total revenue across all companies)

RESOURCES-EFFECTS-RESULTS

Another interesting scoreboard is presented in a study by the Directorate-General for Regional and Urban Policy of the European Commission[3]. This is an example for R&D projects on sustainable energy. The authors insist on the necessity of a full monitoring and evaluation system using a variety of indicators defined according to objectives and measures implemented. They must allow regular monitoring of progress, impacts and results.

"Sustainable energy" here means the various measures to promote energy efficiency in industry, buildings, transport, land use. The example given here is by way of illustration; the specific characteristics of each project require adaptation of the selected indicators, of course.

The inclusion of "inputs" - financial resources and human capital - allows the effectiveness of measures to be evaluated by comparing the effects and results for one unit invested in different projects. The intermediate effects must be separated from the final results regarding the environment and eco-innovation and socio-economic results because they do not automatically go hand-in-hand. For example, an interesting indicator in the Innovation category is "the popularity of a new product in the local market": in fact, patents fees are in themselves a result which characterises the dynamism of R&D activities, but the final effect is translated by the performance of a product brought to market.

The number of carbon credits generated is another economic indicator. This is revenue which companies can receive on the emissions trading market if they reduce their emissions below the permitted level and can therefore sell their unused allowance. Activity on the carbon exchange can therefore be an additional gauge of competitive strength for companies.

[1] http://www.eco-innovation.eu/
[2] North American Industry Classification System
[3] Connecting Smart and Sustainable Growth through Smart Specialisation - A practical guide for ERDF managing authorities – EU, 2012

Example of a scoreboard for RDTI programmes[1] for sustainable energy

RESOURCE INDICATORS	OUTPUT INDICATORS	RESULT INDICATORS
		ENVIRONMENTAL
		CO2, SO2 reduced
		Air quality impoved
		(ECO-)INNOVATION
	Nb of patents in RES and EE filed	Application of patents in products and processes
€ allocated for R&D		Popularity (sales) of the new product on the local market
	Nb of publications on RES and EE topics submitted to journals	
Human effort invested (days)		Spin-offs based on the energy R&D project or initiative
Subsidy (in €) for each kWh of renewable energy	Nb of households with improved energy efficient properties	**ECONOMIC**
		Increase in energy efficiency savings in € %
Training courses (days/€)	Nb of SMEs received advice/training in energy management	Profit from sustainable energy projects in €
Organisational or regulatory means introduces		Nb of carbon credits generated
	Nb of cars/buses running on biogas	Increase in turnover, revenues and return on investment in €
		SOCIAL
		Nb of jobs created
		Improved mobility possibilities
		Improved quality of energy services
		Nb of new businesses created

INDUSTRIAL ECOLOGY

According to the representatives of the Eco-Industry Hub in Poitou-Charentes, **the lack of tools and indicators for evaluating industrial ecology and local projects (DEIT) is limiting their development[2].** Consequently the analysis and comparison of processes underway are not easy to carry out and the local benefits from these processes are not apparent.

This is why the competitive hub is proposing a set of indicators, divided into two categories, as a reference system:

- ***status*** indicators which evaluate the organisation of DEIT projects and the network of players (number of participants, typology of players, number of meetings / actions, etc.)
- ***performance*** indicators which evaluate the benefits generated by DEIT projects towards sustainability of the area (economy, responsible economy, water, materials, energy, greenhouse gases, etc.; these indicators are mainly concerned with the impact of each action implemented (industrial synergy, energy efficiency, decarbonisation of energy, eco-design, etc.).

The discussion led by the Eco-Industry Hub is based on a test called"Analysis and evaluation of the sustainability of industrial ecology and local processes"[3]. This study proposes 26 indicators, some of which concern economic development (the indicators selected by the author as technically identifiable and measurable are described here).

- reduction in the procurement of raw materials;
- reduction in the treatment and disposal of waste;
- reduction in energy consumption;
- reduction in procurement, maintenance, transport and storage of infrastructure, vehicles and flows;
- increase in the sales of co-products;

[1] Research, Technological Development and Innovation
[2] http://eco-industries.poitou-charentes.fr/thematiques-et-projets.php?p=ecologie-industrielle&id=299
[3] *Analyse et évaluation de la pérennité des démarches d'écologie industrielle et territoriale* (Analysis and evaluation of the sustainability of industrial ecology and local processes) - A. Dain 2010

- formation of companies (including SMEs and intermediate sized companies);
- creation of stable and diversified local jobs;
- creation of local jobs that are conducive to reintegration;
- the fight against offshoring of business.

Industrial ecology allows players to generate economic benefits by implementing synergies of substitution or sharing. Hence these indicators measure the sum of costs avoided and profits generated by implementing them for all participating companies.

The scoreboard is shown opposite.

A test for implementing this evaluation is carried out in a study by the Aube department in France. Over the past decades, the Aube region has gradually invested in waste treatment and recovery. Its geographical location near to the Paris area opens up the possibility of becoming one of the priority avenues for waste produced by the Paris conurbation[1].

DEIT scoreboard (A. Dain 2010)

Companies
Business start-up rate in the industrial and territorial ecology area (in%) in comparison to the national level
Evolution of the number of companies in the industrial and territorial ecology area
- Number of companies present - Diffrence in comparison to previous year - Number of companies created - Number of companies wound up
Employment
Evolution of the number of jobs within industrial and TEA stakeholders
- Number of jobs created [1] Number of jobs lost [2] - Balance [1-2]
Typology of contracts offered for new jobs created (in %):
- Temporary - Fixed term contracts - Permanent contracts
Level of education required to access newly created jobs (in %):
- None - Baccalaureate (or équivalent) - Short-term higher education (3 years or less) - Long-termhigher education (more than 3 years)
Geographical origin of new employees within ITEA stakeholders (in %):
- Residents of the region concerned - National citizens (from outside the region concerned) - Citizens of other countries
Unemployment rate in the ITEA (in% in comparison to the national average
Material and waste
Quantity of co-products reintegrated into the industrial system (in thousands of tons and millions of euros avoided
Responsible economy
Total annual economic benefits generated by the implementation of industrial synergies (in millions of euros)

Four economic indicators were measured at a regional level:

- The reintegration of co-products generates financial savings of EUR18,000 per annum;
- Total annual benefits for two companies which have established a synergy are estimated at EUR50,000;
- The rate of company formation is 15.5%, lower by 0.8% per person in relation to the French average (16.3%);
- The unemployment rate is slightly lower than the French average: 9.8% compared to 10.1% (Insee 2010).

It should be noted that this process is still very recent and its reputation still relatively unknown for it to influence parameters such as the unemployment rate or the rate of company formation.

The facility with which synergy was implemented between the two companies in question and which brought about the initial financial benefit is considered as very initiatory and promising. The development of future synergies will help to increase financial benefits and attract an even larger number of players to the DEIT programme.

An analysis of all qualitative indicators for the organisation and operation of the network of players underlines the fact that the current situation is favourable to the development of a sustainable industrial ecology process within the region.

[1] "*Développer la réflexe écologie industrielle dans l'Aube*" (Developing an industrial ecology response in the Aube) - www.projetdeterritoire.com

CONCLUSION AND OUTLOOK

There is insufficient pertinent, high-quality analysis of the economic benefits of the energy transition at the local level. The in-depth research we have carried out to identify authorities who have made progress in this field has enabled us to produce six case studies.

In many cases, the authorities that express a desire to conduct this type of analysis are still at an early stage in the process. And for those that are available it is necessary to critically examine the methods used and to be cautious regarding any conclusions drawn. For example, the increase in the price of property is said to be a positive effect of constructing (new or renovated) high energy performance buildings, however it may cause social exclusion.

Nonetheless, this study has made it possible to illustrate numerous socio-economic aspects of the energy transition and to confirm the positive effects locally.

It encourages authorities to take economic calculations into account in relation to their objectives and the monitoring of the results of projects carried out in this field. In addition they are encouraged to equip themselves with the means to systematically monitor socio-economic impact. This is one of the key ways to effectively channel financial resources, gauge public policies and initiate a transition to a green economy.

The diversity of the approaches used demonstrates that there is no single method for evaluating public policies on ecological transition. Each case is unique and should be approached in an appropriate manner.

For this reason we have made an effort to present a range of methodological approaches which authorities can use to conduct their own research and practically evaluate their programmes.

With this study, Energy Cities has laid the foundation for discussion, which it hopes to continue and expand on in the future with interested local authorities and voluntary partners. **There are a number of potential fields for further work brought to light by the study:**

- Set up a system to monitor the experiences of the authorities undertaking projects in order to improve our monitoring data;
- Collectively test existing methods, identify new ones and compare them, in order to issue recommendations for authorities;
- Improve approaches by drawing inspiration from the socio-economic impact methods used in fields other than the green economy field;
- Contrast socio-economic observations with Energy-Climate evaluations of policies (avoided CO_2, energy savings etc.);
- Integrate certain emerging industries which do not currently come under the green economy field, such as peri-urban agriculture for example, into the analysis carried out.

BIBLIOGRAPHY

This section supplements the study with a bibliography consisting of documents related to green growth, the economic impacts of changes in different areas, so the circular economy. The information brings together mainly English and French sources.

Green growth

Title	**Going Green: How cities are leading the next economy**
Author	LSE Cities / ICLEI / Global Green Growth Institute
Language	English
Year	2013
Nb pages	115
Level	ville
Key words	green growth, case study, survey, opportunites and challenges, economic impacts, governance, financing
Web link	http://lsecities.net/publications/reports/going-green-how-cities-are-leading-the-next-economy/

The report 'Going Green: How cities are leading the next economy' provides an up-to-date overview on the experiences of 90 cities around the world in the transition to the green economy.

The first part is a global survey of city governments that was conducted in the run-up to the Rio+20 conference and the 2012 Global Green Growth Forum in Copenhagen, in order to increase awareness of the strengths and weaknesses of cities as key contributors to this global green transformation. Its principal aim is to offer a fresh perspective on the environmental challenges that cities face along with the opportunities, progress and barriers to going green and fostering economic growth. The survey covers key aspects of green policies and the green economy, smart city technology, green policy assessment and urban governance.

The second part investigates in greater detail the experience of eight case study cities in facilitating green growth. Given the importance of integrating policies for delivering green growth, four cross-cutting policy programmes were examined, including (1) land-use and transport; (2) eco-districts and buildings; (3) waste, recycling and energy; and (4) electric mobility and renewable energy. Two case study cities were selected for each theme, allowing for comparative analysis, and exploration of how similar objectives are being pursued in different contexts, with different policy tools, and using different types of public-private partnership (PPPs).

Title	**Green Economy at Community Scale**
Author	Metcalf Foundation
Language	English
Year	2013
Nb pages	70
Level	city, local authority
Key words	économie verte, prospérité
Web link	http://lsecities.net/publications/reports/going-green-how-cities-are-leading-the-next-economy/

This report explores the concept of the green economy as a potential solution to multiple challenges including climate change, biodiversity loss, resource scarcity, and financial instability. It claims that for the most part, explorations of the green economy have until now mostly taken place at a national or international level. This report addresses the implications of the green economy at the local level. It analyses both the conceptual foundations for more sustainable community-based economic activities and the empirical evidence for

successful implementation of these ideas.
It is based on a vision of prosperity as both the shared, social dimensions of and the importance of longevity over time. The demands that this vision of prosperity places on the economic structure and institutions of the green economy designate four key elements of the green economy : the role of enterprise, the quality of employment, the structure of investment, and the nature of the money economy. Each of them is examined in a separate section, accompanied by illustrations from local examples and case studies. Together these explorations provide a coherent vision for the green economy at community scale.

Title	**Delivering change : How cities go low carbon while supporting economic growth**
Author	Centre for Cities
Language	English
Year	2013
Nb pages	42
Level	City
Key words	case study, economic advantages
Web link	http://www.centreforcities.org/assets/files/2013/13-12-16-Delivering-Change-Low-Carbon.pdf

The report provides pragmatic, practical and proven examples of how cities in the UK and across the globe are tackling the environmental and economic challenges they face.

It asserts that almost every UK city's economic development strategy recognises and prioritises low carbon growth in their longterm visions. However, many cities struggle with how to translate these visions and strategies into practical projects. The report aims at helping the cities to address these difficulties. It provides a co-ordinating framework which includes five types of interventions that cities can use to make going low carbon work for the city, its residents and businesses. It shows that the most effective city policies and projects focused on moving towards a low carbon economy are those that are locally tailored and make good economic as well as environmental sense.
This report uses a broad definition of the 'low carbon economy'. It includes not only the new activities and value created by low carbon focused businesses e.g. insulation-fitters, but also the jobs and savings that existing businesses benefit from in reducing carbon emissions. The framework is used to organise case studies which demonstrate that reducing CO2 emissions in a city can also create jobs and support the business environment. Whilst no single case study has all the answers, collectively they show the range of different and complementary approaches that cities can use in supporting low carbon economic growth.

Title	**Cities: the new green entrepreneurs**
Author	Green Alliance (Inside Track journal)
Language	English
Year	2013
Nb pages	20
Level	City
Key words	Sustainable city, economic advantages, financing, sustainable energy
Web link	http://www.green-alliance.org.uk/uploadedFiles/Publications/reports/Inside%20Track%2032.pdf

The authors of this Inside Track issue argue that UK cities share an aspiration to become more sustainable places and to develop greener economies. Despite the economic climate, UK cities are leading, facilitating and demonstrating great enterprise by investing in low carbon, resilient place-making. Their dynamism contrasts with many central government programmes which remain siloed and lacking in real drive.
This issue focuses on the new leadership cities are providing. It outlines the opportunities that cities must seize for their local communities, economy and businesses. It explains why cities play an important role in advancing sustainability, and disscusses the economics of resource efficient cities. The examples of Nottingham's long-term growth strategy based on green energy and London's project of regeneration of the Thames estuary illustrate UK municipal initiatives. Also the outcomes of city deals analysis are presented, showing that there is clearly a low carbon economic imperative integrated in local policies.

Title	**Enabling Local Green Growth : Addressing Climate Change Effects on Employment and Local Development**
Author	OECD LEED
Language	English
Year	2012
Nb pages	118
Level	city, county/region
Key words	green growth, emplyment, economic advantages, case study, survey
Web link	http://www.oecd.org/cfe/leed/49387595.pdf

Analysis of the impacts, challenges and opportunities associated with climate change at the local level and coordination of responses between governments, business, employment, educational and training agencies and households is critical if action on climate change is to be effective. A key theme of the report is integrating low-carbon initiatives with local economic development: linking local carbon reduction not only with the costs of abatement, but also through identifying and implementing new economic opportunities is central.

The report emphasises the local dimension of climate change and the importance of local action to attain the economic and in particular the employment benefits.

It draws on four case study analyses, including a survey of local businesses. These cities, and selective firm and institutional surveys, demonstrate specific challenges confronting very different types of locality. The report also draws on a number of learning models from public and private sectors in a number of countries. These learning models demonstrate innovative ways that local areas are integrating responses to climate change with new economic and employment opportunities.

Title	**Eco-innovation at the heart of regional development green for growth**
Author	European association of development agencies (EURADA)
Language	English
Year	2012
Nb pages	41
Level	county/region
Key words	case study, methodological framework
Web link	http://www.eurada.org/files/Sustainable%20Development/Eco-innovation-E%20%2012_11_09.pdf

The aim of the present document is to summarise both regional practices aimed at mainstreaming eco-innovation and eco-management concepts into regional development strategies, and the growth potential that these concepts represent for businesses and hence for regions, thanks to a wide variety of niche market opportunities.
For the purpose of the present document, the term eco-innovation is used to describe all industries and services that deliver reduced pressure on the environment or lower energy and raw material consumption. Such a wide range of activities should theoretically enable all types of regions to generate competitive advantages in this sector.
The report states that every key regional development stakeholder should progressively become aware of the long term economic advantage represented by regional eco-innovation or eco-management.

The key components of a few regional eco-innovation strategies are given with examples from UK, USA, France. Also the document proposes a framework for Eco-innovation Strategy Assessment Scoreboard and presents several eco-clusters' strategies (Europe, USA, Japan).

Title	**Connecting Smart and Sustainable Growth through Smart Specialisation : A practical guide for ERDF managing authorities**
Author	European Commission
Language	English
Year	2012
Nb pages	106
Level	city / local authority
Key words	case study, eco-innovation, sustainable energy, ecosystem service, circular economy, methodological framework
Web link	http://ec.europa.eu/regional_policy/sources/docgener/presenta/green_growth/greengrowth.pdf

To promote a more resource efficient, greener and more competitive economy it is clear that the way ahead has to include significant innovation: sustainable growth needs to go hand in hand with smart growth in order for the EU and its citizens to reap the full benefits of a switch to the green economy. Europe needs to reinforce synergies between smart and sustainable growth to deal with the climate change, environmental and energy challenges as well as growing resource scarcity. The presented Guide states that success in bringing about this shift to a low-carbon and resource efficient economy based on innovation will be determined to a great extent by decisions made at local and regional levels.

This Guide is a practical document with concrete recommendations and examples of good practice that show potential ways forward and to facilitate discussion between public authorities and stakeholders. It focuses on three thematic areas that are particularly relevant to sustainable growth: Eco-innovation; Ecosystems services; Sustainable energy.

Title	**Etude stratégique sur 3 filières de l'économie verte Energies Renouvelables, Recyclage Déchets, Eco-construction en Région Nord-Pas-de-Calais**
Author	cd2e
Language	Français
Year	2012
Nb pages	72
Level	région
Key words	metiers vertes et verdissantes, cadre méthodologique
Web link	http://www.cd2e.com/etudes-filieres-environnement

L'objectif de cette étude est d'approfondir l'analyse de 3 secteurs significatifs en région, dont deux d'entre eux (le recyclage et les énergies renouvelables) sont majoritairement liés aux « métiers verts», et le troisième (éco-construction) est plus lié aux « métiers verdissants ». Elle a servi à renforcer la connaissance sur les filières vertes acquises par le cd2e depuis plus de 10 ans, à «structurer » une méthodologie d'analyse et de suivi des filières en éco-activités, et aussi à positionner les niveaux de force et de « performance stratégique » des éco-entreprises régionales. Cela s'est traduit notamment par:

- identifier la chaîne de valeur permettant de caractériser et de mieux connaître chacune des filières étudiées ;
- évaluer le poids économique de ces filières vertes en Nord-Pas de Calais et les tendances observables entre 2004 et 2009 (l'étude a été achevée en avril 2013, période où les données de bilan disponibles étaient celles des années 2010-2011) ;
- obtenir une réelle vision du positionnement des acteurs en région ;
- situer les accompagnements actuels et futurs dans le cadre de la compréhension des atouts, faiblesses, risques et enjeux des filières et segments étudiés ;
- se doter d'une base de suivi des évolutions de ces filières.

Title	**Green Roads to Growth – Inspiration for local authorities**
Author	3F - United Federation of Danish Workers
Language	English
Year	2012
Nb pages	42
Level	various
Key words	survey, green sector, case studies, prospective assessment
Web link	http://www.energibyen.dk/fundanemt/files/Green_roads_to_Growth-netbrug.pdf

3F has collected information in this publication to serve as inspiration for local political initiatives that can boost the use of green technology and the creation of new jobs.

One of the most important issues on the current political agenda is to find out how to create growth and jobs in the wake of the economic crisis. Two answers given by this report are, to put it briefly, green jobs and green technology. It aims to spread news of good examples and generally provide inspiration for growth in this field. Some of the prime movers behind such growth are the 98 local authorities in Denmark. Seventeen of them were asked to describe what they have done locally to further green growth and what they are planning for the future.

They represent both small and large municipalities, politically both left and right, and geographically spread throughout the country. Despite their great differences, they have one thing in common: they are all at the forefront as regards green initiatives. Many of them have prepared a climate plan and have already started on – or are considering – energy renovation activities, investment in renewable energy and expansion of their district heating networks. And, in several of the municipalities, solar cells, wind turbines, wave power, biomass and algae projects are more than just empty words.

Green growth initiatives have a wide variety of impacts related to investments, cost reductions, first-mover advantages and much more.The effects of some initiatives are quantifiable, while the immediate impact of others is harder to measure. The report presents impact of selected initiatives on employment (prospective).

This publication seeks to help local authorities inspire each other across their boundaries and give the municipalities that lag a bit behind the input they need to embark upon the important job of speeding up local green growth. When finances are tight for many local authorities, this only makes the need for green growth greater and shows how important it is to choose the green path that can lead to growth and more jobs.

Title	**Green Roads to Growth – Ideas that create jobs and growth**
Author	3F - United Federation of Danish Workers
Language	Anglais
Year	2011
Nb pages	47
Level	various
Key words	action framework, actors survey, green sector, case study
Web link	http://groennejob.dk/~/media/Files/temaer_3f_dk/www_groennejob_dk/Dokumenter/Green_Roads_to_Growth_Ideas_that_create_jobs.pdf

Au cours des dernières années, le Danemark a perdu plus de 180.000 emplois dans le secteur privé Pour cette raison, 3F, le Syndicat des travailleurs danois, contribue régulièrement au débat en faisant des propositions détaillées pour le développement de nouveaux emplois dans une société en mutation. La question environnementale est un élément clé de ce débat sur les futures sources de revenus du Danemark. Pour créer « les routes vertes de la croissance » il est essentiel que tous les secteurs, les pouvoirs publics, les organisations et institutions s'associent étroitement pour tirer le meilleur parti du potentiel danois.

Pour cette publication, 3F a invité des entreprises, des organisations professionnelles, des municipalités, des pensions de retraite, des think-tanks et des organisations environnementales à suggérer des initiatives qui peuvent créer des emplois et de la croissance. La question qui leur a été posée était simple : Que faut-il pour relancer la croissance ? Chaque contributeur a eu l'occasion de présenter sa vision de la réalité. Les

contributions présentent de ce fait un faisceau de propositions variées qui convergent vers un développement vert ambitieux et durable. Quelques projets qui ont apporté des impacts quantifiables en termes d'emplois sont également cités. En conclusion, 3F a rédigé des recommandations qui analysent le coût des différentes initiatives et leur impact potentiel sur l'emploi.

Title	**Bâtir une économie verte pour le Canada : le rôle des municipalités**
Author	Fédération canadienne des municipalités (FCM)
Language	Français / Anglais
Year	2011
Nb pages	48
Level	ville / colléctivité locale
Key words	cadre d'action, domaines d'intervention, opportunités et enjeux, évaluation des retombées économiques
Web link	http://www.fcm.ca/Documents/reports/Building_Canadas_green_economy_the_municipal_role_FR.pdf

Les retombées sur l'économie et l'emploi des investissements dans l'économie verte se font sentir dans le secteur public comme le secteur privé, dans le secteur des biens comme dans celui des services, à l'échelle régionale, provinciale et nationale.Les municipalités se trouvent en première ligne de l'économie verte au Canada. Des politiques municipales judicieuses ont amélioré la qualité de vie et rendu les collectivités plus attrayantes pour l'investissement, les entreprises et les travailleurs.

Nous avons démontré du leadership dans la protection de l'environnement en :

- améliorant l'efficacité énergétique
- offrant des choix de transport durables
- traitant les eaux usées
- éliminant les déchets de façon sûre
- limitant la pollution atmosphérique et les nuisances qui en découlent.

Le moment est venu d'établir un meilleur partenariat entre les gouvernements municipaux et le gouvernement fédéral – et pour le gouvernement fédéral de mettre en place le cadre politique qui multipliera les bénéfices des actions municipales et positionnera le Canada pour le futur.

Ce rapport présente la voie à suivre pour les administrations municipales et le gouvernement fédéral afin qu'ils prennent des mesures dans leurs domaines de compétence respectifs, travaillent ensemble à positionner le Canada comme un chef de file mondial de l'économie verte, et réalisent les objectifs économiques et environnementaux nationaux.

Title	**Les villes, riches de leur environnement : la durabilité environnementale, socle de résilience économique et de bénéfice social**
Author	Fonds Mondial pour le Développement des Villes (FMDV)
Language	Français / Anglais
Year	2011
Nb pages	56
Level	ville
Key words	études de cas, stratégies, bénéfices socio-économiques
Web link	http://www.fmdv.net/fileadmin/templates/Durabilite___enviro.pdf

Cette publication du Fonds Mondial pour le Développement des Villes (FMDV) présente des exemples d'investissement volontariste de sept villes - dont Le Cap, Vancouver, Grand Lyon, Växjö - dans des stratégies et programmes responsables de préservation de l'environnement comme base d'une politique durable de construction de la résilience des populations et des territoires.

L'exemple de Vancouver est particulièrement intéressant dans sa stratégie puisqu'elle place «L'économie verte » comme moteur de croissance. La Stratégie de Développement Economique de la ville élaborée en 2011, accorde une place centrale à l'économie verte (3 à 6 % de croissance par an). Afin de positionner la ville comme

la «Mecque de l'entrepreneuriat vert », le plan d'action se donne comme objectifs chiffrés de doubler le nombre d'emplois verts en 2020 (base 2010) et de doubler le nombre d'entreprises engagées dans un processus de verdissement de leurs activités (base 2011).

Title	**La croissance verte - une opportunité pour le développement local et l'emploi**
Author	Etd - le centre de ressources du développement territorial
Language	Français
Year	2010
Nb pages	46
Level	collectivité locale
Key words	développement territorial, filières vertes, emplois verts, nouvelles compétences
Web link	http://www.projetdeterritoire.com/index.php/Nos-publications/Guides/La-croissance-verte-une-opportunite-pour-le-developpement-local-et-l-emploi

La « croissance verte » désigne la transition de notre économie vers un mode de production plus respectueux de l'environnement, moins consommateur en ressources naturelles non-renouvelables, moins émetteur de gaz à effet de serre et moins polluants.

Cette transformation, comme toute mutation économique, implique des changements pour les salariés : des créations / destructions d'emplois, des réallocations de main d'œuvre entre secteurs et au sein des secteurs d'activité et de nouveaux besoins en qualifications. C'est pourquoi les acteurs économiques et les structures en charge de la régulation du marché de l'emploi se penchent sur ces incidences en termes d'emplois et de qualifications. L'adaptation des marchés locaux de l'emploi à l'écologisation de l'économie est donc le point de départ de cette réflexion.

Cette note constate que la « croissance verte » apparaît dans la littérature savante, dans les discours macroéconomiques mais peu au niveau local, à de rares exceptions près, peu dans les propos des élus locaux, des agents de collectivités et des personnels en charge des politiques territoriales de développement économique et d'emploi. Elle présente comment des collectivités territoriales et des acteurs locaux de l'emploi, de la formation et du développement économique agissent pour faire de cette mutation verte qui s'annonce une opportunité de création d'activité et d'emploi pour tous.

Title	**Quel est l'impact de la croissance verte sur les emplois et les compétences ?**
Author	CODESPAR Rennes
Language	Français
Year	2010
Nb pages	32
Level	national
Key words	croissance verte, emplois verts, analyse bibliographique, étude de cas
Web link	http://www.codespar.org/uploads/media/27-2010-10-croissance-verte-et-emplois-codespar.pdf

La croissance verte désigne le processus de transformation de la société vers des modes de production et de consommation plus respectueux de l'environnement. Elle doit être appréhendée comme un processus global qui concerne tous les secteurs d'activités et l'ensemble de la chaîne de valeur. En ce sens, elle comprend les éco-activités mais ne s'y limite pas.

L'enjeu n'est pas tant de quantifier les emplois que de déterminer dans quelle mesure ils sont affectés par la croissance verte. En effet, on estime que le nombre d'emplois devant s'adapter est 20 fois supérieur au nombre d'emplois créés. La mutation verte sera effectivement source de croissance et de créations d'emplois à condition notamment que la population dispose des compétences nécessaires. Cela constitue un véritable défi en termes de gestion territoriale des emplois et des compétences.

Le rapport présente d'abord les facteurs favorisant l'émergence de la croissance verte, une comparaison des études sur l'impact de la croissance verte sur les emplois au niveau national (France) et une synthèse des travaux menés dans le cadre du Plan de mobilisation des filières et des territoires en faveur des métiers de la

croissance verte de CDGG par les comités de filière (perspectives, quantification, limites). Puis il fait l'analyse des enjeux en matière d'évolution des compétences et les défis pour les politiques publiques d'emploi. Enfin il traite sur le sujet de la prise en compte de la croissance verte sur le bassin d'emploi de Rennes.

Title	**Making the case for environmental integration: environment as an economic driver**
Author	Interreg IIIC GRDP
Language	English
Year	2006
Nb pages	24
Level	local authority
Key words	economic advantages, skills, resource efficiency, brand management, case study
Web link	https://www.mepa.org.mt/file.aspx?f=2670

The environment is a highly valuable capital asset, it is essential to our quality of life, and it must be carefully protected if our development is to be 'sustainable'. The protection of the environment is often seen as an end in itself, and as the domain of 'environmentalists', 'activists' and special-interest groups. This frequently leads to the assumption that the environment and the economy are at odds with each other – that economic growth inevitably damages the environment while environmental conservation curbs economic growth.

However, the environment can, and does, give rise to real economic benefits. The environment presents novel opportunities and can stimulate the economy to grow in new directions and ways. In this sense, the environment powers or drives economic growth. And this can help 'make the case' for better integration of environment and sustainability concerns into regional development strategies and programmes and ultimately lead to more sustainable development.

This report is therefore about getting programme managers and other key stakeholders to understand the value of environment to regional economies, so that environmental integration becomes an inherent part of programme management and implementation.

The report also collected examples from across the GRDP partnership where regional development programmes and projects have managed to combine environmental and economic aims into successful outcomes. These case studies come from UK, Italy, Malta, Austria, Spain.

Energy efficiency & renewable energy sources

GÉNÉRAL

Title	**Recognizing the Full Value of Energy Efficiency**
Author	The Regulatory Assistance Project (RAP)
Language	English
Year	2013
Nb pages	68
Level	-
Key words	energy efficiency, electircal energy, socio-economic advantages, cost benefit analysis
Web link	www.raponline.org/document/download/id/6739

Non-energy benefits of efficiency measures can be substantial. Excluding them from regulatory consideration enhances the potential for suboptimal economic, social, and environmental outcomes. This paper seeks to comprehensively identify, characterize, and provide guidance regarding the quantification of the benefits provided by energy efficiency investments that save electricity. It also provides a list of recommendations for regulators to consider when evaluating energy efficiency programs.

The study considers three categories of benefits:

- Benefits to the electric utility system;
- Benefits to the participating individual homes and businesses that install energy efficiency improvements;

- Benefits to society – the community, the region, the nation, or the planet.

These benefits are treated under principle cost-effectiveness tests used in the US. Non-energy benefits include operation & maintanance cost savings, additional disposable income, local employment and economic development ; health impacts, employee productivity, property values, consumer comfort.

Title	**Energy efficiency and economic growth**
Author	The Climate Institute / Vivid Economics
Language	English
Year	2013
Nb pages	16
Level	-
Key words	energy efficiency, economic growth, statistical methodologies
Web link	http://www.climateinstitute.org.au/verve/_resources/Vivid_Economics_-_Energy_efficiency_and_economic_growth_June_2013.pdf

The purpose of this report is to examine the causal relationship between energy efficiency and economic growth using advanced statistical methods. It aims to extract the impact of energy efficiency on energy productivity and, in turn, on output.

Twenty eight diverse economies over a period of three decades are analysed (considered as a whole) to ensure that the obtained results are applicable to a wide range of developed countries. This estimate is not applicable to each country individually.

The report confirms that improvement in energy efficiency contributes to higher economic output. A 1% increase in the level of energy efficiency causes a 0.1 percentage point increase in the rate of economic growth in that year. In addition, in face of rising energy costs and increasing taxation of emissions, including emissions from energy generation, energy efficiency can provide industries and countries with a competitive advantage.

Title	**Building Energy Efficiency in European Cities**
Author	URBACT
Language	English
Year	2013
Nb pages	52
Level	city
Key words	local action, building retrofitting, socio-economic advantages, opportunities and challenges, fuel poverty, financing methods, case study
Web link	http://urbact.eu/fileadmin/general_library/19765_Urbact_WS6_ENERGY_low_FINAL.pdf

URBACT is actively seeking concrete solutions to the six interlinked challenges that rank high on the agenda of European cities: shrinking cities, more jobs for better cities, supporting young people through social innovation, divided cities, motivating mobility mind-sets, building energy efficiency.

Cities can lead in the reduction of CO2 emissions and the fight against climate change. Buildings are the largest energy-consuming sector in the EU, and offer the largest cost-effective opportunity for savings. Enhancing energy efficiency represents one of the most important opportunities for Europe to expand economic growth and job creation. Relative to almost all other investments, retrofitting cost-effectively creates more distributed jobs and enhances economic activity, reduces energy costs for businesses and households of all income levels, reduces emissions and improves energy security.
Integrated urban strategies provide the means to tackle the various challenges faced by cities. These strategies must link together the social, environmental and economic policy dimensions.
This report is part of a series "Cities of Tomorrow: Action Today" that provides evidence of sustainable urban development strategies pulling together the environmental, social and economic pillars of the Europe2020, while also adopting an integrated and participative approach, essential in these times of scarce public resources.

Title	**Spreading the Net: The multiple benefits of energy efficiency improvements**
Author	OECD/International Energy Agency
Language	English
Year	2012
Nb pages	37
Level	micro, sectoriel, national, international
Key words	energy efficiency, socio-economic advantages
Web link	http://www.iea.org/publications/insights/ee_improvements.pdf

Improving energy efficiency can deliver a wide range of benefits to the economy and society. However, energy efficiency programmes are often evaluated only on the basis of the energy savings they deliver. Thus the full value of energy efficiency improvements in both national and global economies may be significantly underestimated. This also means that energy efficiency policy may not be optimised to target the potential of the full range of outcomes possible. Moreover, when the merit of energy efficiency programmes is judged solely on reductions in energy demand, programmes are susceptible to criticisms related to the rebound effect when the energy savings are less than expected due to other welfare gains.

The objective of this report is to fully outline the array of different benefits from improved energy efficiency and investigate their implications for policy design.

The report identifies outcomes produced at different levels of the economy: at the individual level (individuals, households and enterprises); at the sectoral level (by economic sector such as transport, residential, industrial sectors); at the national level (including macro-economic benefits, and benefits to national budgets); and at the international level (reflecting the international public good of these benefits). It also discusses possible rebound effetcts.

Title	**Towards a green economy : Cities investing in energy and resource efficiency**
Author	UNEP
Language	English
Year	2011
Nb pages	42
Level	city
Key words	sustainable city, socio-economic advantages
Web link	http://www.unep.org/publications/contents/pub_details_search.asp?ID=6219

This report makes a case for greening cities. It describes the environmental, social and economic consequences of greening urban systems and infrastructure and provides guidance to policy makers on how to make cities more environmentally friendly.

An introduction to the concept of green cities is followed by a presentation of related challenges and opportunities. Next come an analysis of the economic, social, and environmental benefits of city greening, and a summary of green practices across a number of urban sectors. The last section offers advice on enabling conditions for green cities.

Economically, the benefits include agglomeration economies, lower infrastructure costs and reduced congestion cost while reducing carbon emissions and other environmental pressure. Socially, the benefits include employment creation, poverty reduction and improved equity, and quality of life including improved road safety and community cohesion, among others. Environmental benefits are embedded in most of the economic and social benefits.

EVALUATION OF ECONOMIC IMPACTS

Title	**Renewable energies and their impact on local value added and employment**
Author	Institute for Ecological Economy Research (IÖW)
Language	English
Year	2014
Nb pages	10
Level	city / local authority
Key words	added value, job creation, sustainable energy, nput-output model
Web link	http://www.energsustainsoc.com/content/4/1/1

The economic rationale is a key incentive for local communities to become involved in renewable energy (RE). The study shows how substituting imported fossil fuels or final energy with RE sources creates opportunities at the local level to establish steps of the RE value chain, resulting in value added and employment in the respective region's RE sector.

The model follows the income approach to calculate value added which is decomposed into three components : (1) After-tax profits of the participating enterprises, (2) Net incomes of the employees involved, (3) Taxes paid on business profits and on adjusted gross employee income.

The model outputs the specific value-added and employment effects in euros per kW of installed capacity. On this basis, the effects can be quantified for various geographical reference areas (municipality, region, state, and country). To illustrate the effects of value added and employment in a typical municipality, the model was implemented for a model municipality in Germany (on the basis of average of installed capacity per capita, as well as an average manufacturing capacity in 2011, the year in question).

The results show that a total of 9.3 million euros of municipal value added was generated within the RE sector in the modeled average municipality in Germany in 2011. More than half of the value added in this industry consists of employee wages, followed by company profits. Approximately 166 workers in our average municipality were employed in the RE sector in 2011.

Title	**Economic Impact of EE Investments in the Southeast**
Author	Southeast Energy Efficiency Alliance (SEEA) / Cadmus Group
Language	English
Year	2013
Nb pages	64
Level	state (US)
Key words	energy efficiency, added value, employment, input-output model, IMPLAN
Web link	http://www.seealliance.org/wp-content/uploads/SEEA-EPS-EE-Report.pdf

The study estimates net employment and other economic impacts resulting from the Better Buildings Neighborhood Programs (BBNP) operation. State and region-level analyses were conducted with the Impact Analysis for Planning (IMPLAN) v3.1 modeling software, an input/output tool that characterizes spending patterns and relationships between households and industries.

SEEA supports residential, multifamily, and commercial investments in energy-efficient retrofit projects. The IMPLAN model utilizes built-in assumptions about the state-level economies within SEEA territory, including assumptions about industrial and household purchasing patterns based on real 2011 economic data. Moreover, it compares the effects of program-related spending on the economy to a hypothetical baseline picture of the economy in which the BBNP would not exist, and calculates the net impacts of the BBNP.

Key indicators showing the economic impacts of the programs are jobs, labor income, total value added and output.

Title	**Ermittlung der Wachstumswirkungen der KfW-Programme zum Energieeffizienten Bauen und Sanieren** (Détermination des effets sur la croissance des programmes KfW pour la construction et la rénovation énergétique)
Author	KfW / Prognos
Language	Allemand
Year	2013
Nb pages	82
Level	national
Key words	performance énergétique des bâtiments, emplois, bénéfices socio-économiques
Web link	https://www.kfw.de/Download-Center/Konzernthemen/Research/PDF-Dokumente-alle-Evaluationen/Wachstumseffekte-EBS-Endbericht.pdf

Dans une perspective de transition énergétique, cette étude prospective évalue la contribution à la croissance et à l'emploi, de l'investissement privé, financé par la KfW pour l'efficacité énergétique des bâtiments (anciens et nouveaux). Elle analyse les couts de rénovations par rapport aux économies d'énergie réalisées :

- parc de bâtiments neutres en carbone en 2050 avec une consommation d'énergie correspondant à 20 % des consommations actuelles
- 200.000-300.000 emplois par an, principalement dans l'artisanat régional
- réduction de CO2 cumulées de 67 millions de tonnes par an
- augmentation des recettes fiscales sur la croissance et l'emploi (EUR 95 milliards) qui alimenteront les aides (EUR 66 milliards)
- 0,4%de contribution au produit intérieur brut par an

KfW tire donc un bilan positif des programmes de construction et de rénovation énergétique. Ils sont un élément central de la politique énergétique du gouvernement fédéral afin d'accroître l'efficacité énergétique dans les bâtiments existants et la protection du climat.

Investissement total dans la rénovation à très haute efficacité énergétique : EUR 507 milliards :

- dont coûts généraux de la rénovation (couts obligatoires dans tous les cas) EUR 270 milliards
- dont les couts supplémentaires liés à l'efficacité énergétique : EUR 237 milliards
- économies réalisées sur les coûts de chauffage : EUR 361 milliards
- cela se traduit par un surplus de EUR 124 milliards

Investissement total pour la construction neuve y inclus l'efficacité énergétique qui est obligatoire : EUR 331 milliards

Investissement total nécessaire d'ici 2050 dans la construction résidentielle : EUR 838 milliards (rénovation et construction neuve).

Title	**L'effet net sur l'emploi de la transition énergétique en France : Une analyse input-output du scénario négaWatt**
Author	CIRED
Language	Français
Year	2013
Nb pages	41
Level	national
Key words	politique climatique, transition énergétique, modèle input-output, analyse prospective
Web link	http://www.centre-cired.fr/IMG/pdf/Quirion_2013-06-21_emploi_NW_scenarioCNR.pdf

Le rapport étudie l'impact sur l'emploi en France de la mise en oeuvre du scénario de transition énergétique construit par l'Association négaWatt (2011) qui prévoit un développement massif des économies d'énergie (par le biais de mesures de sobriété et d'efficacité énergétiques) et des énergies renouvelables entre 2012 et 2050.

Par rapport à 2010, ce scénario aboutit à une division par deux des émissions de CO2 d'origine énergétique en France en 2030 et à une division par 16 en 2050, sans capture-stockage du CO2, sans mise en oeuvre de nouvelle centrale nucléaire et en fermant les centrales existantes au bout de 40 ans d'exploitation au

maximum.
L'effet sur l'emploi de la mise en oeuvre de ce scénario est calculé en comparaison avec un scénario tendanciel qui prolonge les évolutions récentes et prend en compte les politiques déjà décidées. La méthode retenue consiste à calculer le coût des principales options techniques et organisationnelles retenues, à ventiler ces coûts entre les 118 branches de l'économie française et à multiplier ces coûts par le contenu en emploi de chaque branche. Ce dernier élément est estimé par une analyse input-output, ce qui permet de comptabiliser les emplois générés par la production de l'ensemble des consommations intermédiaires.

La mise en œuvre du scénario négaWatt aboutit à un effet positif sur l'emploi, de l'ordre de +240 000 emplois équivalent temps-plein en 2020 et 630 000 en 2030. La sensibilité des résultats aux hypothèses sur les prix de l'énergie importée, l'évolution de la productivité du travail, la répartition du coût entre ménages et administrations publiques, et enfin l'arbitrage consommation-épargne sont des aspects étudiés. L'effet sur l'emploi reste largement positif dans tous les cas.

Title	**Evaluation of the Potential of Green Jobs in Mexico**
Author	International Labour Organization (ILO)
Language	English
Year	2013
Nb pages	8
Level	national
Key words	foresight study, green jobs, , Decent Work Index, input-output model, net effect
Web link	http://www.ilo.org/wcmsp5/groups/public/---ed_emp/---emp_ent/documents/publication/wcms_236143.pdf

For the ILO, the concept of green jobs summarizes the transformation of economies, businesses, work environments and job markets towards a sustainable economy that provides decent jobs with low carbon consumption.

In Mexico there is a shortage of quantitative employment data related to productive activities destined to reduce carbon emissions and pollution, promote energy and resource efficiency, and prevent loss of biodiversity and ecosystem services. Thus, the ILO has undertaken the task to estimate for the first time the number and potential of green jobs in Mexico.

Title	**Mesurer la création de valeur d'un organisme HLM pour un territoire**
Author	DELPHIS
Language	Français
Year	2013
Nb pages	58
Level	National
Key words	Création de valeur, logement social, indicateurs
Web link	http://www.delphis-asso.org/sites/default/files/fichiers/2013_-_creation_de_valeur_-_manuel_web.pdf

Méthode et quinze indicateurs permettant aux organismes eux-mêmes d'évaluer leur propre impact dans leurs territoires d'intervention. Le cadre d'analyse et quinze indicateurs sont présentés et expliqués dans ce manuel. Un cas d'étude donne un exemple d'application concrète (voir aussi le dossier central du numéro de septembre 2013 de la revue Habitat et Société). Ce document a été élaboré dans le cadre d'un projet co-financé par l'Union Sociale pour l'Habitat et la Caisse des Dépôts, auquel ont participé 13 organismes HLM. Il visait à amorcer une réflexion sur l'impact global des organismes de logement social. Dans un contexte de pression croissante sur les financements publics, il était indispensable de mieux comprendre et mesurer et rendre compte des effets produits par l'action et l'offre de logements des organismes, en tenant compte des dimensions économiques, sociales et environnementales. La décentralisation en cours appelait à une analyse à l'échelle du territoire, en fonction des caractéristiques et dynamiques locales.

Title	**The number of Jobs dependent on the Environment and Resource Efficiency improvements**
Author	European Commission - DG Environment / Ecorys
Language	English
Year	2012
Nb pages	94
Level	EU-27
Key words	energy efficiency
Web link	http://ec.europa.eu/environment/enveco/jobs/pdf/jobs.pdf

The background of this study is the emerging discussion on how environmental protection and resource efficiency goes hand-in-hand with job creation. Improved use of resources will increase the competitiveness by reducing costs and improving processes. Moreover, improved technology provides a technological advantage which can be used and exported.

The research shows how 'greening the economy' can boost job creation in areas directly connected to the environment such as conservation, waste, water and air quality, often referred to as eco-industries.

The objectives of the study were:

1. To update existing studies on how many jobs are related to the environment;
2. To determine the competitiveness of EU eco-industries; and,
3. To provide examples of how jobs can be created by improving environmental performance and resource efficiency.

The results show the heavy influence of scope, methodology and data availability. However, whatever the choices about how to measure 'green jobs', the number seems to be increasing. The general trend is of a growing number of 'green jobs', with the majority dependent on the environment as an input.

Title	**How Many Jobs? A Survey of the Employment Effects of Investment in Energy Efficiency of Buildings**
Author	The Energy Efficiency Industrial Forum
Language	English
Year	2012
Nb pages	15
Level	national, EU
Key words	energy performance of buildings, employment investment ratio, bibliographical analysis
Web link	http://www.euroace.org/LinkClick.aspx?fileticket=3R8RB3xG_YU%3d&tabid=69

This report is an extract from a larger piece of research that was commissioned by the Energy Efficiency Industry Forum (EEIF) in order to assess the job creation potential of a particularly important piece of EU Legislation – the Energy Efficiency Directive (EED).

The key finding of the study is that, on average, we can expect that investing EUR1 million in upgrading the energy efficiency of our building stock will create 19 new direct jobs in the construction sector and that the vast majority of these jobs will be local and non-transferable, thus jobs that lead to economic vibrancy in the EU.

This report restricts itself to an analysis of a number of reputable studies that assessed the potential employment impact of investment in the upgrading of energy efficiency of existing buildings. 35 data points were collated from over 20 different sources spanning Europe and North America, mostly from the period 2006 to 2011.

Title	**Powerful impacts: Exploring the economic and social benefits of renewable energy schemes**
Author	APSE / The Centre for Local Economic Strategies (CLES)
Language	English
Year	2012
Nb pages	52
Level	city/ local authority
Key words	case study, socio-economic advantages, economic modelling
Web link	http://www.apse.org.uk/apse/index.cfm/research/current-research-programme/powerful-impacts-exploring-the-social-and-economic-benefits-of-renewable-energy-schemes/

APSE is a not-for-profit organisation representing around 250 UK councils providing front-line local government services. It has been working on highlighting ways to maximise the local economic benefit of public investment and promoting sustainable energy projects. This report is unique in bringing these two pressing agendas together and exploring the impact of renewable energy on local economies. At a time of austerity and recession, renewables and energy efficiency schemes represent a real opportunity to invest in local economic growth, with a government guaranteed funding mechanism.

The research uses specifically designed methodology to quantify the environmental, social and economic impacts of renewable energy schemes. Return on investment was assessed in terms of; payments from Feed In Tarrifs (FiTs); numbers of people employed and earnings generated; value of supply chains; workforce development, training and skills; as well as savings in carbon emissions.

This report provides clear evidence that renewable energy schemes can save money on fuel bills, help meet carbon reduction targets and generate income. They can also create jobs for those managing, installing and maintaining projects and throughout the supply chain, which has a knock-on impact on local economies. Case studies in this report demonstrate the impacts renewable energy projects are having across the UK on the local level.

Title	**Étude du potentiel d'emplois généré par le développement des énergies renouvelables dans les Ardennes**
Author	Stratergie / Pluricité
Language	Français
Year	2012
Nb pages	56
Level	département (France)
Key words	emplois, étude prospective, enquête, cadre méthodologique
Web link	http://www.ardennes.gouv.fr/IMG/pdf/Rapport_Ardennes_Emploi_ENR_Pluricite_Stratergie_Version_Finale_VF_cle11c5fb.pdf http://www.ale08.org/IMG/pdf/Etude_emplois_EnR_-_DDT_08.pdf

Un schéma de développement des énergies renouvelables des Ardennes

Pour estimer l'impact à terme du schéma, il s'agit d'établir la situation initiale de l'emploi dans les Ardennes, permettant de quantifier et d'analyser le secteur des énergies renouvelables à ce jour. Dans un second temps, il s'agit d'apprécier les perspectives de l'emploi du secteur, afin de traduire les objectifs de développement du schéma à 3, 5 et 10 ans.
Le rapport se base sur le croisement de deux éléments : les résultats des enquêtes qualitatives et la simulation économique de l'effet emploi. Une enquête a été conduite en vue d'analyser les emplois liés aux énergies renouvelables dans chaque structure, ainsi que les perspectives de développement. L'analyse qualitative a utiilsé comme référence l'étude « Marchés, emplois et enjeu énergétiques des activités liées aux énergies renouvelables et à l'efficacité énergétique - Situation 2007-2008 – Perspectives 2009 » réalisée par In Numéri pour l'ADEME en 2009.

Enfin, le rapport avance des préconisations pour développer l'emploi et dynamiser le secteur.

Title	**Impact on public budgets of the KfW promotional programmes "Energy-efficient construction", "Energy-efficient refurbishment" and"Energy-efficient infrastructure" in 2011**
Author	KFW Research / STE Research Report
Language	English
Year	2011
Nb pages	13
Level	national, regional, municipal
Key words	public budget, input-output model,
Web link	https://www.kfw.de/Download-Center/Konzernthemen/Research/Research-englisch/PDF-Dateien-STE-Reports/STE-Research-Report-April-2013-EN.pdf

The KfW programmes for the promotion of energy-efficient buildings and infrastructure provide low-interest finance for investment in energy-saving and CO2 reduction measures. This research report analyses the impact of the programmes on public budgets in year 2011. The analysis focuses on short-term budgetary effects, i.e. on the effects on budgets during the year in which the measure received support. In doing so it sets out the costs of the programmes and lists the additional revenues gained and reductions in expenditure achieved. The results are allocated to the appropriate administrative authority level (federal government, state or municipal).

The effects on public budgets of the short-term demand thereby generated were calculated using the STEIN model. This is an open static input output model, which was extended to incorporate a module that simulated effects on public budgets.

The increase in government revenues results from the rise in economic activities and employment which are induced by the promoted investments. The government receives most revenue from taxation on sales incurred by the investor, taxation on wages, and social security contributions, including the solidarity contribution. Taxation on company profits and property income is the next most important item.

A cautious assessment (using the overtime scenario with induced investment) reveals net benefits for public budgets in the 2011 funding year amounting to EUR 3,000 million. Using the most optimistic but also less probable alternative (the additional jobs scenario with promoted investment), net benefit to public budgets amounts to approx. EUR 10,000 million in 2011. In both cases, the relatively high ratio of commitment volumes to programme costs and, even more so, the ratio of investment to commitment volumes, are crucial to the overall result.

Title	**The Economic Contribution of the Renewable Energy and Energy Efficiency Sectors in the South West of England**
Author	Regen SW / DTZ
Language	English
Year	2010
Nb pages	21
Level	region/county
Key words	
Web link	http://regensw.s3.amazonaws.com/1282046376_675.pdf

The objective of this study is to calculate the contribution of the Renewable Energy (RE) sector and Energy Efficiency (EE) sector to the economy of South West region of England. The key objectives of the study are to:

- Identify the economic contribution of the RE and EE sectors to the South West economy in terms of jobs and Gross Value Added (GVA)1 in 2010, and compare this to previous studies
- Identify business attitudes towards the support services provided by Regen SW to organisations active in the RE and EE sectors

Environmental Technologies were identified in the South West Regional Economic Strategy as a priority sector for the region. Overall this sector offers significant growth potential, with much of the developments being driven by EU and UK environmental legislation. Renewable Energy and Energy Efficiency are significant sub-sectors within Environmental Technologies. The South West is well placed to take advantage of growth in these

sectors given its natural and knowledge assets.

In carrying this study, DTZ conducted a survey with 248 businesses and public sector organisations in the RE and EE sector in the South West Region, and then scaled up the results to estimate the size of the whole sector in the region.

Title	**Assessing the Multiple Benefits of Clean Energy Initiatives : A Resource for States**
Author	US Environmental Protection Agency
Language	English
Year	2010
Nb pages	198
Level	state(US)
Key words	economic advantages, case study, methodological framework, bibliographical analysis
Web link	http://epa.gov/statelocalclimate/resources/benefits.html

Chapter Five of the report is devoted to Economic Benefits of Clean Energy Initiatives. It argues that many studies have shown that when a state makes cost-effective investments in energy efficiency and renewable energy, the state's entire economy will benefit, and aims to help states understand the issues and methods for assessing the economic benefits of clean energy options.

The paper discusses direct, indirect, and induced macroeconomic effects on a state level, presents different analysis methods and provides a sampling of state macroeconomic analyses as case studies (New York State and Illinois).

Title	**Promoting Energy Efficiency : Best Practice in Cities**
Author	International Energy Agency (IEA), ICLEI
Language	English
Year	2008
Nb pages	33
Level	city
Key words	case study, cost efficiency analysis
Web link	https://www.iea.org/publications/freepublications/publication/cities_bpp.pdf

This working paper presents the results of a pilot study aimed at testing a method of collating, evaluating and reporting energy efficiency policy practice in cities. The pilot study involved:

- Developing a set of criteria for evaluating energy efficiency policies and measures;
- Designing a survey and distributing it to city authorities;
- Analysing results.

A key area that this project identifies as requiring urgent attention is the development of a common data management format for energy efficiency projects by cities administrations.

The project adopts a quantitative evaluation approach to compare programmes using defined metrics, including the cost-effectiveness of the programme defined by Return on investment. The initial investment required and the subsequent savings are discounted to values in the year the programme commenced and the return over 10 years compared to a benchmark of 0%. Thus the financial analysis highlights the excess return from the project compared to the return that could have been obtained by investing the money in long term bonds at the rate available in the year the programme commenced. The benchmark of 0%, indicating that the programme provided a net benefit, was exceeded in 8 out of 11 cases. The range of positive returns shown by the programmes assessed here was between 11% in Riga and 134% in Stockholm. In general, a higher rate of return is demonstrated in cases where the investment is made at the start of the project and the energy savings are high.

It is noted that further work is required in order to determine which measure of financial benefit is most appropriate for the full range of projects being implemented by cities.

Title	**Étude prospective sur le développement des activités et des emplois dans les secteurs de l'efficacité énergétique et des énergies renouvelables en Ile-de-France**
Author	ARENE
Language	Français
Year	2006
Nb pages	48
Level	région
Key words	analyse prospective
Web link	http://www.areneidf.org/medias/publications/Etude_prospective_sur_l3.pdf

La rapport affirme qu'au temps que les Régions françaises élaborent à tour de rôle des plans de Maîtrise de la Demande en Energie (MDE) et de développement des Energies Renouvelables (ENR), les enjeux sociaux de création d'emplois sont généralement cités en termes d'externalités positives, mais peu de projets cherchent en effet réellement à évaluer le nombre et le type de ces emplois. D'ailleurs pour bien préparer ce type de programme il est nécessaire de bien évaluer et anticiper les formations et mutations à prévoir.

Afin d'étudier plus précisément cette problématique, ADEME a mené une étude sur les perspectives de développement des activités et des emplois liés à l'efficacité énergétique et aux énergies renouvelables en Ile-de-France.

Dans le cadre de ce projet, une première phase a consisté à établir un panorama complet des activités du secteur de l'énergie en Ile-de-France, en déterminant la part d'emplois strictement liés à l'efficacité énergétique et aux énergies renouvelables. À partir de cet état des lieux, ont été évaluées les perspectives de développement de ces emplois suite à des programmes d'actions d'efficacité énergétique et de diffusion des énergies renouvelables dans la région à l'horizon 2010-2020.

Tous les impacts en termes d'emplois ont été exprimés en nombre d'emplois-ans par millions d'euros investis (HT) dans la mesure (surinvestissements). Ceci permet de comparer les impacts en termes d'emplois d'une mesure par rapport à une autre.

Title	**Energy efficiency and jobs: UK issues and case studies**
Author	Energy Saving Trust / Association for the Conservation of Energy
Language	English
Year	2000
Nb pages	48
Level	national
Key words	building energy efficiency, job creation
Web link	http://www.ukace.org/wp-content/uploads/2012/11/ACE-Research-2000-09-Energy-Efficiency-and-Jobs-UK-Issues-and-Case-Studies-Case-Studies.pdf

The study claims that improving energy efficiency in buildings is a particularly effective way to stimulate employment in the places where it is needed most, and to employ people who have the greatest trouble in finding jobs. It analyses seven energy efficiency investment programmes across UK. These case studies show the benefits of energy efficiency investment in terms of direct and indirect employment, increased training, and opportunities for people who have been in long-term unemployment. They also make an assessment of the cost effectiveness of the programmes in terms of energy savings.

Title	**Dollars from Sense. The Economic Benefits of Renewable Energy**
Author	U.S. Department of Energy / National Renewable Energy Laboratory
Language	English
Year	1997
Nb pages	24
Level	state (US), city
Key words	renewable energy, economic advantages
Web link	http://www.nrel.gov/docs/legosti/fy97/20505.pdf

This document illustrates the *direct* economic benefits, including job creation, of investing in renewable energy technologies – in contrast to usual arguments of RE proponents who focus on *indirect* economic benefits, such as the reduced health and environmental restoration costs stemming from their lower environmental impact, difficult to quantify.

The study defends two main reasons why renewable energy technologies offer an economic advantage: (1) they are labour intensive, so they generally create more jobs per dollar invested than conventional electricity generation technologies, and (2) they use primarily indigenous resources, so most of the energy dollars can be kept at home.

Circular economy & recycling

Title	**Écologie industrielle et territoriale : Les collectivités actrices de la transition énergétique et écologique**
Author	Etd - le centre de ressources du développement territorial
Language	Français
Year	2013
Nb pages	135
Level	localauthority, enterprise
Key words	circular economy, case study, opportunities and challenges
Web link	http://www.projetdeterritoire.com/index.php/Nos-publications/Guides/Ecologie-industrielle-et-territoriale-Les-collectivites-actrices-de-la-transition-energetique-et-ecologique

Le rapport affirme que les premières expériences portées à toutes les échelles d'action sont encore peu avancées, expérimentales et parcellaires, et que se fait jour le besoin d'un retour d'expériences sur ce qui a déjà pu être engagé, d'interroger les facteurs de réussite et d'échecs des premières initiatives et d'explorer des modalités d'intervention qui restent encore à mieux définir.

Ce guide a pour ambition d'apporter des éclairages et des éléments d'enseignements sur le rôle d'impulsion et d'accompagnement que peuvent jouer les collectivités territoriales à la lumière des premières expériences conduites à l'échelle nationale.

Il présente aussi l'analyse d'une quinzaine d'expériences dites « avancées » identifiées à toutes les échelles d'action.

Title	**Non-Labour Resource Productivity and its potential for UK Manufacturing**
Author	The Next Manufacturing Revolution/ Lavery Pennell/ 2degrees/ IfM
Language	English
Year	2013
Nb pages	164
Level	national
Key words	industrial manufacturing, resource productivity, socio-economic advantages, opportunities and challenges
Web link	http://www.nextmanufacturingrevolution.org/wp-content/uploads/2013/09/Next-Manufacturing-Revolution-full-report.pdf

Non-labour resource productivity concernes fields of circular resource use, energy efficiency, process waste reduction, packaging optimisation, transport efficiency and supply chain collaboration. This study presents opportunities to improve non-labour resource productivity which could enable a revolution in manufacturing and are estimated, conservatively, to be worth for the UK:

- GBP 10 billion p.a. in additional profits for manufacturers – a 12% increase in average annual profits.
- 314,000 new manufacturing jobs - a 12% increase in manufacturing employment.
- 27 million tonnes of CO2 equivalent p.a. greenhouse gas emissions reduction – 4.5% of the UK's total greenhouse gas emissions in 2010.

In addition, barriers to non-resource productivity have been identified and a programme to address these barriers has been developed in consultation with a range of multinational manufacturers, relevant government departments, NGOs and experts around the world.

Title	**Spurring Local Economic Development with Clean Energy Investments: Lessons from the Field**
Author	U.S. Department of Energy / The Center for Climate Strategies
Language	English
Year	2013
Nb pages	18
Level	city
Key words	energy efficiency, renewable energy, multiplier effect, case study
Web link	http://www1.eere.energy.gov/wip/solutioncenter/pdfs/clean_energy_investment_cases.pdf

Community-based efforts to improve energy efficiency or generate renewable energy can benefit a local economy with a range of direct gains and secondary effects. Many clean energy investments produce immediate economic returns to localities—and thus can be attractive options for local economic development organizations. Unfortunately, too often, clean energy and economic development investments are considered as separate or, worse, competing interests.

This paper is an introduction to how clean energy investments can be used to spur local economic development. The objective of the paper is to help local and state leaders recognize these returns and to understand the factors that shape these local economic impacts.

To illustrate the investments local governments and community organizations can pursue, as well as the returns they may enjoy, it offers examples of successful clean energy efforts from 4 US cities.

Title	**Économie circulaire: bénéfices socioéconomiques de l'écoconception et de l'écologie industrielle**
Author	ADEME
Language	Français
Year	2012
Nb pages	7
Level	national
Key words	compétitivité, attractivité de territoire, études de cas
Web link	http://ademe-et-vous.ademe.fr/sites/default/files/strategie-etudes/33/ademetudestrat33octobre.pdf

L'ADEME présente dans un numéro de "Stratégie & études" les bénéfices potentiels pour l'environnement et l'économie française de trois démarches complémentaires : l'écoconception, l'écologie industrielle et de nouveaux modèles d'affaires.

Ces démarches concernent a priori tous les secteurs d'activité en France et peuvent permettre le maintien de l'activité et des emplois dans des secteurs fortement concurrentiels, ainsi qu'un positionnement sur de nouveaux marchés créateurs d'emplois. Le rapport donne des exemples des démarches déjà mises en œuvre avec des actions concrètes et des retombées économiques perçues.

Title	**Earnings, jobs and innovation: the role of recycling in a green economy**
Author	European Energy Agency
Language	English
Year	2011
Nb pages	28
Level	European
Key words	recycling, employment, green economy, economic advantages
Web link	http://www.eea.europa.eu/publications/earnings-jobs-and-innovation-the

Promoting recycling offers important economic and social benefits: generating economic growth, fostering innovation, boosting employment, and helping secure access to critical resources.

This report explains the role of recycling in the green economy and examines the evidence of its contribution in Europe, focusing primarily on the economic benefits that recycling offers.

Title	**The Tees Valley Industrial Symbiosis Project Final Report**
Author	University of Teesside
Language	English
Year	2005
Nb pages	10
Level	region
Key words	project analysis, circular economy, industrial economy, employment
Web link	http://www.tees.ac.uk/docs/docrepo/clemance/TVISPSummaryReport.pdf

The Tees Valley Industrial Symbiosis Project ran from January 2003 to December 2004 with the aim of bringing together local companies to change their problematic wastes into useful resources and opportunities. This report describes the outputs gained from implementing this programme across the region.

Major achievements in this period have included 2 companies attracted to Tees Valley, 20 jobs created and 1600 jobs secured due to reduction waste disposal costs. In summary, the project met or exceeded all its contracted targets and had benefits far outreaching the Tees Valley.

Transport & town and regional planning

Title	**Evaluating active transport benefits and costs**
Author	Victoria Transport Policy Institute
Language	English
Year	2014
Nb pages	79
Level	-
Key words	Cost benefit analysis, transport needs, modal shift, evaluation tools, methodological framework
Web link	www.vtpi.org/nmt-tdm.pdf

This report describes methods for evaluating the benefits and costs of active transport (walking, cycling, and their variants, also called non-motorized and human-powered travel). It describes various types of benefits and costs and methods for measuring them. These include direct benefits to users from improved active transport conditions, and various benefits to society from increased walking and cycling activity, reduced motor vehicle travel, and more compact and multi-modal community development. It discusses active transport demands and ways to increase walking and cycling activity.

This analysis indicates that many active transport benefits tend to be overlooked or undervalued in conventional transport economic evaluation. More comprehensive economic evaluation may help other communities recognize these benefits and therefore overcome the political and institutional barriers to improving active transport. The report proposes guidelines for comprehensive active transport evaluation.

Title	**The Economic Benefits of Sustainable Streets**
Author	New York City Department of Transportation (DOT)
Language	English
Year	2012
Nb pages	43
Level	city
Key words	street planning, local shops, green value, methodological framework
Web link	http://www.nyc.gov/html/dot/downloads/pdf/dot-economic-benefits-of-sustainable-streets.pdf

Solving urban challenges has become the key to addressing global challenges: how can urban areas accommodate population growth and expand economic opportunity all while improving public health, environmental sustainability and quality of life?

New York City has been a leader in creating new models for sustainable urban development. One of the most visible elements of its agenda has been the transformation of the city's streets to safer, more attractive public spaces that better accommodate all users.

Given continuing economic and budgetary challenges as a result of the recent recession, making the connection between transportation policy and economic development is critically important. The basic hypothesis is that changes in travel patterns, spending patterns and neighborhood desirability caused by changes in the street environment can impact businesses' and property owners' bottom lines, most directly by affecting retail sales, but also by affecting retail rents, office rents, and commercial property values.

The study found street-level retail sales to provide the most direct and reliable indicator of the health of local businesses. The change in sales for locally-based businesses within the improvement sites before and after project implementation was compared to changes in the same period for the comparison sites, as well as the respective borough as a whole. This methodology was applied to a range of projects including pedestrian plazas, bike paths, intersection redesigns and bus rapid transit.

Title	**Good Practices In City Energy Efficiency: London, United Kingdom – Congestion Charges for Urban Transport**
Author	ESMAP, World Bank
Language	English
Year	2011
Nb pages	14
Level	city
Key words	congestion charges, cost-benefit analysis, socio-economic advantages
Web link	http://www.esmap.org/sites/esmap.org/files/London%20Final%20edited.pdf

This Case study concerns London congestion charge intoduced in 2003. This fee was meant to ease traffic congestion, improve travel time and reliability, and make central London more attractive to businesses and visitors.

According to analysis carried out by the City, traffic entering the charge zone was reduced by 21%; congestion by 8%; and annual fuel consumption fell by 44-48 million liters or about 3%. Emissions and accidentes reduction was also condiderable.

In terms of the program cost-effectiveness, the identified benefits exceeded the costs by more than 50 percent. In addition, the scheme brought a steady net revenue stream for transport improvements, of which 80 percent has been reinvested in improving public bus operations and infrastructure, with the rest spent on other transport measures such as road safety, roads and bridges, walking and cycling programs.

In total, the scheme's operating costs represent about 60 percent of its operating revenue, resulting in a positive net operating revenue stream for Transport for London (TfL). Including all the upfront capital investment costs, the net revenues from the scheme are lower, but the program still maintains a simple payback period of three years.

The global analysis with a monetized quantification of different impacts (including improved travel time and fewer accidents) reveals a benefit-cost ratio of 1,5:1 with the GBP 5 charge and 1,7:1 with the GBP 8 charge.

Title	**Compact City Policies: A Comparative Assessment – Final Report**
Author	OECD
Language	English
Year	2011
Nb pages	269
Level	city
Key words	compact city, sustainable city, town and regional planning, , socio-economic advantages
Web link	http://www.oecd-ilibrary.org/urban-rural-and-regional-development/compact-city-policies_9789264167865-en

This report aims to better understand the compact city concept, its role in today's urban contexts, and the potential outcomes of compact city policies. It examines compact city policies across the OECD in relation to green growth objectives and the role of indicators in tracking policy performance. It proposes key compact city strategies and ideas for achieving better outcomes and highlights governance challenges for implementing practical compact city strategies.

Importantly, the report argues that the compact city can contribute positively to economic growth and that it is important to see the compact city concept from the perspective of green growth and explicitly incorporate economic growth as an objective of compact city policy.

Six characteristics of compact city, which relate directly to its potential contribution to urban sustainability, are identified: i) shorter intra-urban travel distances; ii) less automobile dependency; iii) more district-wide energy utilisation and local energy generation; iv) optimal use of land resources and more opportunity for urban-rural linkages; v) more efficient public service delivery; and vi) better access to diverse local services and jobs. The potential contributions to environmental, social and economic sustainability are presented and discussed.

It is affirmed that compact city policies can play a key role for economic development in two ways. First, they can reduce governments' financial burden by making public service delivery more efficient. With successful compact city policies, governments can save public money and invest more efficiently or they can avoid tax increases that could be a heavy burden on the local economy. Second, successful compact city policies can not only remove barriers to economic growth (e.g. traffic congestion) but also stimulate economic growth by various ways.

The report also presents case studies of compact city policies in 5 OECD metropolitan areas : Melbourne (Australia), Vancouver (Canada), Paris (France), Toyama (Japan), Portland (United States).

Title	**Economic Benefits of Bicycle Infrastructure Investments**
Author	League of American Bicyclists
Language	Anglais
Year	2009
Nb pages	10
Level	city
Key words	promoting cycling, case study, socio-economic advantages
Web link	http://www.aarp.org/content/dam/aarp/livable-communities/learn/transportation/economic-benefits-bicycle-infrastructure-report.pdf

This article highlights the impact the bicycle industry and bicycle tourism can have on state and local economies, describes the need for bicycle facilities, discusses the cost effectiveness of investments, points out the benefits of bike facilities for business districts and neighborhoods, and identifies the cost savings associated with a mode shift from car to bicycle. The evidence demonstrates that investments in bicycle infrastructure make good economic sense as a cost effective way to enhance shopping districts and communities, generate tourism and support business.

Regions that have invested in bicycling have seen a beneficial impact on their economies as is shown by examples from several US states and from American and European cities.

Green value

Title	**Energy performance certificates in buildings and their impact on transaction prices and rents in selected EU countries**
Author	European Commission (DG Energy)
Language	English
Year	2013
Nb pages	158
Level	city, region
Key words	bibliographical analysis, econometric model
Web link	http://www.notaires.fr/sites/default/files/Etudes%20DINAMIC%20d%27apr%C3%A8s%20les%20bases%20Notariales%20BIEN%20et%20PERVAL%20.pdf

This study explores whether there is a link between the energy performance of buildings as expressed by Energy Performance Certificates (EPCs) and their value, whether rented or sold; in other words, whether or not the EPC energy rating of a property has an effect on the purchase or rental price when a property is listed or transacted.

The methodology involved first carrying out a literature review to identify existing evidence on the possible link between energy performance certification and the value of a building. A review was carried out of 22 studies that use the hedonic regression method to examine whether energy performance certification affects property values. This was followed by an assessment of EPC schemes in a selection of EU Member States and regions. Datasets were obtained for Austria (Vienna and Lower Austria), Belgium (Flanders, Wallonia and Brussels-Capital regions), France (Marseille and Lille), Ireland and the UK (Oxford). An econometric model was established and regression analysis carried out for each dataset, with results for both sales and rental sectors,

where possible.

The analysis of property transactions and listings from residential property markets in Austria, Belgium, France, Ireland and the UK, both sales and lettings, overwhelmingly points to energy efficiency being rewarded by the market. The only market where a positive relationship between energy efficiency and price was not found was Oxford (UK).

Title	**Valeur verte des logements d'après les bases Notariales BIEN et PERVAL**
Author	DINAMIC
Language	Français
Year	2013
Nb pages	68
Level	région
Key words	étiquette énergie, prix des logements, modèle économétrique,
Web link	http://ec.europa.eu/energy/efficiency/buildings/doc/20130619-energy_performance_certificates_in_buildings.pdf

L'étude présentée est une des premières en France à être réalisée à partir de données constatées, permettant de donner un ordre de grandeur de la valeur verte des logements. L'association DINAMIC a utilisé les bases de données notariales pour développer une méthode statistique permettant de chiffrer l'impact de l'étiquette énergie, issue des diagnostics de performance énergétique obligatoires en cas de vente, sur le prix de vente des logements. Les résultats sont répartis selon la zone climatique et montrent l'impact en pourcentage du prix équivalent au prix du bien de référence classé D.

Ce rapport présente les principaux résultats de l'analyse ainsi que leurs limites. L'amélioration de la qualité de la base de données, et particulièrement de son taux de couverture, devrait être une priorité pour bénéficier d'une analyse plus fine en limitant l'ampleur des biais statistiques rencontrés.

Title	**Etude économique sur la valeur verte de l'immobilier de logements**
Author	CERQUAL (association QUALITEL)
Language	Français / Anglais
Year	2011
Nb pages	88
Level	divers
Key words	analyse bibliographique, enquête, cadre méthodologique
Web link	https://www.qualite-logement.org/referentiels-et-documentation/observatoires-et-etudes.html

CERQUAL, filiale de l'association QUALITEL et organisme certificateur du logement a lancé début avril 2011 une étude sur le concept de la valeur verte des logements et de sa valorisation économique et financière. Cette étude qualitative est organisée en six parties. Les deux premières parties tentent de comprendre l'apparition de cette notion et de la définir. Elles font un état des lieux des différents travaux réalisés sur le sujet. Puis dans une troisième partie, l'étude s'attache à comprendre comment cette valeur verte est évaluée sur le marché. Ensuite, la quatrième partie se recentre sur le marché du logement en France en regardant les leviers existants de la valeur verte. Puis les deux dernières parties analysent le rôle et l'impact de la certification dans ce contexte avant de conclure sur des perspectives et propositions.

Les différents travaux réalisés à l'international sur le thème de la valeur verte ont été étudiés et analysés. En parallèle des rencontres avec des acteurs de l'immobilier (banques, ADEME, FNAIM, bulles de ventes, agences immobilières) ont eu lieu pour échanger sur le sujet et être au plus près des attentes et des besoins des personnes concernées. Dans l'optique de déterminer si l'affichage énergétique a un impact sur la valeur des biens, plusieurs experts ont été rencontrés et sondés à partir d'un questionnaire.

Indicators for green economy

Title	**Using indicators for green economy policymaking**
Author	UNEP
Language	English
Year	2014
Nb pages	62
Level	national
Key words	green economy, methodological framework
Web link	http://www.unep.org/greeneconomy/Portals/88/documents/PAGE/IndicatorsWorkingPaper.pdf

Policymakers and stakeholders often face resource and information constraints when it comes to implementing large-scale transformation. This paper has sought a response to the call for the UN system to provide guidance on how to use indicators in designing and implementing green economy policies at the national level, following a basic policymaking framework, namely, on the use of indicators as a tool for: (i) identifying priority issues, (ii) formulating green economy policy options (iii) assessing those policies, and (iv) monitoring and evaluating their implementation.

The goal of the paper is neither to propose new indicators, nor to identify a catch-all list of indicators to be used in the policymaking process. Instead, it acknowledges the unique geographical and socio-cultural contexts of individual countries, and provides a step-by-step guide on how to identify and use relevant indicators in designing and implementing green economy policies. In the same time, relevant examples are cited as illustration for key steps for policy evaluation.

Title	**Towards Green Growth: Monitoring Progress. OECD Indicators**
Author	OECD
Language	English
Year	2011
Nb pages	144
Level	national
Key words	green growth, methodological framework
Web link	http://www.oecd.org/greengrowth/48224574.pdf

Developing and implementing framework conditions that promote green growth requires a good understanding of the its determinants and of related synergies. It also requires appropriate information to support policy analysis and to monitor progress. Green growth has several dimensions, 'greening growth' and harnessing new growth possibilities from environmental considerations. By its very nature, such a process is not easily captured by a single indicator, and a small set of measures will be needed.

The set of green growth indicators listed in this paper is a starting point rather than a final list and will be further elaborated as new data become available and as concepts evolve. A central conclusion from the work on indicators is the measurement agenda that is drawn up at the end of the section. It provides the way forward towards addressing the most pressing data development needs in the area.

Four areas have been chosen to capture the main features of green growth:

- Environmental and resource productivity, to capture the need for efficient use of natural capital and to capture aspects of production which are rarely quantified in economic models and accounting frameworks.
- Economic and environmental assets, to reflect the fact that a declining asset base presents risks to growth and because sustained growth requires the asset base to be maintained.
- Environmental quality of life, capturing the direct impacts of the environment on people's lives, through e.g. access to water or the damaging effects of air pollution.
- Economic opportunities and policy responses, which can be used to help discern the effectiveness of policy in delivering green growth and where the effects are most marked.

An important measurement agenda remains, including the selection of a small set of headline indicators. The proposed set comprises about 25 indicators, not all of them measurable today.

Title	**iGrowGreen : Setting up an indicator-based assessment framework to identify country-specific challenges to promote greener growth**
Author	Eurostat
Language	English
Year	2011
Nb pages	58
Level	national
Key words	green growth, methodological framework
Web link	http://ec.europa.eu/economy_finance/db_indicators/igrowgreen/documents/user_manual_en.pdf

This note describes the methodology and functioning of iGrowGreen, an indicator-based analytical framework designed to assess Member States' policies to achieve their low-carbon and resource-efficient goals from an economic perspective.

iGrowGreen combines best available quantitative indicators to assess interactions between environmental policies and economic performance. In this way, it aims to assess fairly and openly country-specific green performance.

Four domains are defined as reflecting a key link from environmental performance to macroeconomic and fiscal considerations:

- Environmental taxation and fiscal consolidation
- Strengthening market functioning and competitiveness: energy, transport and sustainable use of resources
- Boosting new sources of growth
- Climate change and biodiversity

Within each domain, indicators are organised by policy area, corresponding to operational objectives for policy intervention, such as minimising environmental policy distortions or promoting a clean and efficient energy sector.

As regards data sources, iGrowGreen relies for most parts on data and indicators that are already used in coordination processes at the EU level. The EU27 weighted average (based on GDP) is used as the benchmark for all indicators. In addition, a feature in the iGrowGreen database allows users to easily choose alternative benchmarks, i.e. the EU15 average and the best 5 EU countries).

For any other business

Title	**California Green Innovation Index 2014**
Author	Next 10 / Collaborative Economics
Language	English
Year	2014
Nb pages	64
Level	state (US)
Key words	eco-innovation, employment, renewable energy, energy efficiency, methodological framework
Web link	http://next10.org/2014-california-green-innovation-index

By growing its clean technology economy, California demonstrates that economic prosperity and environmental protection are not mutually exclusive concepts.

The California Green Innovation Index provides data that show California's policies have helped create a foundation for innovation and removed early barriers to consumer demand.

The dashboard indicators track the state's progress in the low-carbon economy, energy efficiency, renewable

energy, clean technology innovation, and transportation, as well as the employment created by companies developing, installing and supporting clean technology. Tracking progress in multiple aspects of California's clean technology sector demonstrates how the state is maintaining its pacesetter position and reveals emerging areas of clean technology innovation.

Title	**Les Bonnes Pratiques "Investir, Epargner et Produire durablement" de l'Observatoire national des agendas 21 locaux**
Author	Observatoire national des agendas 21 locaux
Language	Français
Year	2013
Nb pages	49
Level	ville / collectivité locale
Key words	agenda 21, financement et partenariats, effets attendus
Web link	http://www.observatoire-territoires-durables.org/spip.php?article1675

Suite à un atelier «Investir, épargner et produire durablement, les territoires relèvent le défi», qui s'est déroulé en octobre 2013, l'Observatoire des Agendas 21 locaux édite un guide des bonnes pratiques mettant en lumière 6 exemples de pratiques innovantes pour financer des projets de développement durable :

- GRAND NANCY : Mutualisation des certificats d'économie d'énergie
- PAYS DE LA LOIRE : Financer l'économie locale grâce à l'épargne des habitants : l'emprunt obligataire
- LES HAUTS-PRES : D'un projet environnemental à une démarche de développement durable
- MENE : Un territoire 100% énergie renouvelable : Les innovations administratives et financières
- VALENCIENNES : L'hôtel de ville chauffé par les eaux usées de la ville
- VANNES AGGLO : L'opération renov'ee : Un guichet unique pour la rénovation de l'habitat

Les fiches présentent entre autre les résultats observés, parmi lesquels le développement de filières, création d'une dynamique territoriale, l'investissement attiré, création d'emplois et d'entreprises, production locale d'énergie, développement d'un pôle de compétences, réduction de la facture énergétique, les impôts locaux stabilisés, accès facilité à l'emprunt pour la ville.

Title	**Analyse et évaluation de la pérennité des démarches d'écologie industrielle et territoriale**
Author	A. Dain - Université de Sherbrooke, Université de Technologie de Troyes
Language	Français
Year	2010
Nb pages	116
Level	projet, collectivité
Key words	écologie industrielle, cadre méthodologique, développement durable, synergies industrielles, économie de fonctionnalité, étude de cas
Web link	https://www.usherbrooke.ca/environnement/fileadmin/sites/environnement/documents/Essais2010/Dain_A__13-09-2010_.pdf

Afin de réduire l'impact des systèmes industriels sur l'environnement, le concept d'écologie industrielle propose une dématérialisation de l'économie basée sur un découplage de la croissance économique et de la consommation de flux de matière et d'énergie. Pour être efficientes, les démarches d'écologie industrielle et territoriale doivent cependant être pérennes, c'est-à-dire posséder un réseau d'acteurs mature et engendrer des résultats positifs en matière de développement durable.

Ainsi, afin d'évaluer cette pérennité, cet essai définit un référentiel d'indicateurs, simple d'utilisation, pour l'analyse des démarches d'écologie industrielle et territoriale, tout en proposant une méthodologie d'utilisation.

Dans le cadre de ce projet, la DEIT de l'Aube a aussi été étudiée. En effet, l'exemplarité de son réseau d'acteurs en fait un cas d'étude très intéressant. Cependant, sa création récente ne permet pas encore l'obtention de résultats pertinents sur la durabilité du département de l'Aube.

Title	**Good Practices in City Energy Efficiency : Vienna, Austria – Municipal Eco-Purchasing**
Author	ESMAP, World Bank
Language	English
Year	2011
Nb pages	12
Level	city
Key words	public procurement, economic advantages, awareness raising
Web link	http://www.esmap.org/sites/esmap.org/files/Vienna_Eco_Buy_final_edited_11-9-11.pdf

The City of Vienna's ÖkoKauf Wien (EcoBuy Vienna) Program has developed an internationally recognized model for sustainable municipal procurement. Vienna annually procures a variety of products, goods and services worth more than EUR5 billion. The Program has established a comprehensive list of more than 100 ecological criteria, including energy efficiency (EE), recycled content, organic production, reduced toxic chemicals, low carbon production, etc., for purchasing goods and services in 23 categories.

Importantly, the project is implemented at the administrative and organizational level by using existing human and technical resources. ince most of the staff members involved in the Program are city employees and perform their ÖkoKauf tasks in addition to their other duties, theincremental administrative costs are negligible. As the Program deals with procurement of new items, the city does not incur any capital investment obligations.

Studies to quantify the energy, cost and emission savings as a direct result of the ÖkoKauf Program, as well as market transformation effects, are costly and, thus, have not been commissioned to date. Nevertheless, some direct benefits were documented. Vienna has achieved impressive results, with annual cost savings of about EUR17 million and 30,000 tons of CO2 emissions reductions. By the end of 2010, this translated into total cost savings of EUR204 million and emissions reductions of 360,000 tons of CO2.

Moreover, the Program was able to send powerful signals to the market and to citizens about the importance of sustainable living and bring about the availability of more ecologically-friendly products to the market.

Title	**Industrial Symbiosis in Kalundborg, Denmark : A Quantitative Assessment of Economic and Environmental Aspects**
Author	Journal of Industrial Ecology / MIT
Language	English
Year	2006
Nb pages	18
Level	project
Key words	industrial ecology, industrial symbiosis, survey, economic advantages
Web link	http://www.exima.dk/cases/Journal_of_Industrial_Ecology_1012239.pdf

The industrial symbiosis complex in Kalundborg, Denmark is the seminal example of industrial symbiosis, a study field concerned with resource optimization among colocated companies. In spite of this, there has been no in-depth quantitative analysis enabling more comprehensive understanding of economic and environmental performances connected to this case. In this article some of the central industrial symbiotic exchanges, involving water and steam, in Kalundborg are analyzed, using detailed economic and environmental data.

The data for this article are based on qualitative key-informant interviews, internal and external documents from the companies involved, and public statistical material.

It is found that both substantial and minor environmental benefits accrue from these industrial symbiosis exchanges, and that economic motivation often is connected to upstream or downstream operational performance and not directly associated with the value of the exchanged byproduct or waste itself. It is concluded that industrial symbiosis, as viewed from a company perspective, has to be understood both in terms of individual economic and environmental performance, and as a more collective approach to industrial sustainability.

Title	**Les Notes de l'ADEUS : La filière économie verte**
Author	Agence de l'urbanisme de Strasbourg (ADEUS)
Language	Français
Year	2012
Nb pages	12
Level	région
Key words	filière verte, éco-entreprises, emplois, cadre méthodologique
Web link	http://www.adeus.org/productions/les-indicateurs-de-ladeus-ndeg46-economie

L'Alsace est un territoire sensibilisé depuis de nombreuses années aux enjeux liés à la préservation de l'environnement, à la maîtrise des énergies et à la nécessité d'innover dans les domaines technologiques et énergétiques. Elle fait partie des régions pilotes pour expérimenter le plan Métiers de la croissance verte initié par l'État, qui vise à favoriser le développement des filières et métiers de l'économie verte en s'appuyant sur les initiatives existantes et les acteurs impliqués dans cette dynamique. La perception de la conversion écologique de l'économie comme d'un nouveau moteur de croissance se trouve alors placée au coeur des plans de relance pour redynamiser l'activité économique.

La Note cherche à décrire les réalités de la filière verte au niveau local, dans le contexte national du marché en croissance, au coeur d'une compétition mondiale. Elle donne la caractéristique de tissu économique, les profils des éco-entreprises, leur répartition par demaine d'activité et par taille, leur répartition territoriale, la dynamique d'emplois, le poids de la filière verte.

Pour évaluer le poids des activités vertes, deux méthodes ont été utilisées. La première s'appuie sur l'Annuaire des acteurs de l'économie verte de la zone d'emploi de Strasbourg constitué par l'ADEUS, sur la base de différentes sources. La deuxième exploite les Statistiques officielles centrées sur les activités et les métiers. Les nomenclatures retenues ont été proposées par le Commissariat Général du Développement Durable.

La Note pose également le contexte national et international. Elle présente alors l'interet de point de vue de cadre d'analyse du secteur vert.

Title	**Les Emplois Verts, une nouvelle opportunité d'inclusion sociale en Europe**
Author	Pour la Solidarité – think thank européen
Language	Français
Year	2012
Nb pages	211
Level	
Key words	économie solidaire et sociale, développement durable, synérgie, entreprises d'insertion, emplois verts
Web link	http://www.pourlasolidarite.eu/Les-Emplois-Verts-une-nouvelle

Les emplois verts générateurs d'emplois et de croissance sont plébiscités comme une des issues à la crise. Mais que recouvrent-ils exactement ? Qui concernent-ils ? Comment peuvent-ils être des vecteurs forts d'inclusion sociale ? Quelle place les structures d'insertion peuvent-elles prendre et occupent-elles déjà dans ce contexte ? Quel est le rôle du secteur de la construction en la matière?

Dans ce nouveau cahier, « Les emplois verts, nouvelle opportunité d'inclusion sociale en Europe », le think tank Pour la Solidarité répond à ces questions et complète son analyse par un enquête et une enquête de terrain menés auprès des structures d'insertion européennes. L'étude montre que les emplois verts sont aussi une opportunité pour les personnes en situation de précarité, celles dont le niveau de qualification est relativement faible et celles encore qui sont exclues du marché du travail.
Les emplois verts sont-ils un vecteur d'insertion sociale ? Pour le savoir, le think tank européen Pour la Solidarité a mené une enquête auprès de près de 200 entreprises d'insertion belges françaises, espagnoles, québécoises, suisses, britanniques et luxembourgeoises afin de :

- établir un état des lieux de la situation économique dans laquelle se trouvent les structures d'insertion ;
- tirer un bilan de leurs premières expériences dans les emplois verts ;

- analyser la perception de leurs dirigeants à l'égard des emplois verts et des opportunités qu'ils semblent offrir.

Il ressort assez clairement de cette enquête que les emplois verts constituent une voie de réorientation stratégique très intéressante pour les entreprises d'insertion. Près de 35 % des entreprises d'insertion qui ont déjà réorienté leur activité ont choisi de le faire dans des emplois « très verts » : agriculture, recyclage, énergies renouvelables ou encore entretien d'espaces verts. Ce chiffre monte à plus de 50 % si l'on inclut de manière plus large le BTP et les transports. Lorsque l'on affine l'analyse et que l'on cherche les raisons de cet engouement, on s'aperçoit que les emplois verts combinent un double avantage : d'une part, ils permettent de diversifier sans trop de difficulté les activités des structures d'insertion et de faciliter l'insertion des bénéficiaires dans la marché du travail « verdissant » et, d'autre part, ils ne nécessitent, dans la plupart des cas, que peu d'investissements.

Pour 75 % des structures d'insertion ayant fait l'expérience des emplois verts, le bilan est positif. Près de 90 % des structures interrogées affirment que les emplois verts seraient adaptés aux publics accueillis dans les entreprises d'insertion Les emplois verts semblent assurer une certaine viabilité économique des structures d'insertion et optimiser l'insertion des personnes éloignées de l'emploi.

L'étude de PLS jette un éclairage particulier sur deux publics rencontrant des difficultés sur le marché de l'emploi : les personnes handicapées et les femmes. Le but est de voir si les emplois verts constituent pour elles de nouvelles possibilités d'insertion. Un secteur potentiellement riche en emplois est également mis en exergue : l'éco-construction.

Title	**CONCERTO Socio-economic Assessment Report – Executive Summary**
Author	CONCERTO
Language	English
Year	2010
Nb pages	22
Level	city / local authority
Key words	project evaluation, methodological framework, socio-economic advantages
Web link	http://concerto.eu/concerto/images/library/content/CONCERTO%20-%20SOCIO-ECONOMIC%20IMPACT%20ASSESSMENT%20REPORT%20EXECUTIVE%20SUMMARY.pdf

The CONCERTO initiative was established in 2005 by the European Commission. Based on the concepts of sustainability, replication and cost effectiveness, it highlights the role and contribution of local authorities (primarily city administrations) as coordinators of integrated actions for sustainable urban development with a focus on energy issues.

This report affirms that what is technically and economically feasible is not necessarily ecologically or socially acceptable, and vice versa. As a result, the experience of different CONCERTO cities implementing different energy technologies and solutions needs to be placed into the appropriate socioeconomic contexts and explained in the perspective of existing restrictions (e.g. technological, societal, cultural, political, economic etc). It should also be explained in terms of diverse institutional settings, organisational structures and policy processes.

The report offers a preliminary assessment of the socio-economic impact in the various cities. The socio-economic evaluation addresses the quality, social impacts, added value and - in cer tain cases - risks associated with the energy services provided by the first generation CONCERTO projects in 26 communities. The assessment relies on a dedicated tool developed for this purpose for evaluating the societal and economic effect of the program's technologies and activities.

SOURCES RELATED TO THE CASE STUDIES

Copenhague, DK

Green Growth in Copenhagen - DAMVAD 2011
http://www.damvad.com/media/41107/green_growth_in_copenhagen.pdf

Copenhagen Beyond Green. The socioeconomic benefits of being a green city - Green Growth Leaders, Octobre 2011
http://greengrowthleaders.org/wp-content/uploads/2011/10/CPH-Beyond-Green.pdf

Measuring the Potential of Local Green Growth: An Analysis of Greater Copenhagen - OECD Local Economic and Employment Development (LEED) Working Papers, 2013/01, OECD Publishing.
http://www.oecd-ilibrary.org/industry-and-services/measuring-the-potential-of-local-green-growth_5k4dhp0xzg26-en

Copenhagen : Solutions for Sustainable Cities - Ramboll and City of Copenhagen, Octobre 2012

Copenhagen Cleantech Cluster Monitor – Oxford Research 2011, 2013
http://www.cphcleantech.com/home/publications/reports/ccc-monitor-2011

City of Copenhagen > Bicycle statistics
https://subsite.kk.dk/sitecore/content/Subsites/CityOfCopenhagen/SubsiteFrontpage/LivingInCopenhagen/CityAndTraffic/CityOfCyclists/CycleStatistics.aspx

Bruxelles-Capitale, BE

IEE PassREg : PASSIVE HOUSE REGIONS WITH RENEWABLE ENERGIES. Detailed description of the Success Model of Brussels – EnEffect
www.passreg.eu/download.php?cms=1&file=Success_Model_Brussels.pdf

Bruxelles Environnement : Info-fiches PLAGE
http://www.bruxellesenvironnement.be/Templates/Professionnels/Informer.aspx?id=32601

Site web de l 'Alliance Emploi-Environnement : Axe 1 – Construction durable
http://www.aee-rbc.be/axe-1-construction-durable/

Alliance Emploi-Environnement : augmenter le pouvoir d'achat via la création d'emplois et la diminution de la facture d'énergie. Discours d'Evelyne Huytebroeck, Ministre bruxelloise de l'Environnement, de l'Energie et de la Rénovation urbaine - 21 février 2013

AEE Rapport Pluriannuel 2010-2014
http://www.aee-rbc.be/uncategorized/le-rapport-pluriannuel-2010-2014-de-lalliance-emploi-environnement-en-ligne/attachment/140313_aee_chapeau_preview_entier/

Plan de prévention et de gestion des déchets – Bruxelles Environnement, 2010
http://www.bruxellesenvironnement.be/Templates/etat/informer.aspx?id=3080&langtype=2060

Brussels Waste Management Plan with waste reduction targets, Belgium – Pre-waste Factsheet 103
http://www.prewaste.eu/index.php?option=com_k2&view=item&id=256:103-ibge-waste-management-plan-with-targets&Itemid=94

Energy performance certificates in buildings and their impact on transaction prices and rents in selected EU countries - Bio Intelligence Service, Ronan Lyons and IEEP, 2013 for European Commission (DG Energy)
http://ec.europa.eu/energy/efficiency/buildings/doc/20130619-energy_performance_certificates_in_buildings.pdf

Kirklees, UK

Kirklees Warm Zone Economic Impact Assessment, Carbon Decent, 2011
http://www.kirklees.gov.uk/community/environment/energyconservation/warmzone/Kirklees_Economic_Evaluation.pdf

Kirklees Council Warm Zone - Learning for the future, KC Environment Unit, 2011
http://www.kirklees.gov.uk/community/environment/energyconservation/warmzone/warmzonemenu.shtml

The Prospects for Green Jobs to 2020, Final Report - Quantum Strategy & Technology, the BE Group and the University of Hull, 2011
http://www.carbondescent.org.uk/case_studies.php/56/kirklees_warm_zone_final_report

Kirklees Local Economic Assessment 2010/11
www.kirklees.gov.uk/you-kmc/partners/kirkleesPartnership/pdf/economicAssessmentA.pdf

Parliament - Science and Technology Committee - Written evidence submitted by Kirklees Council (CLC059)
http://www.publications.parliament.uk/pa/cm201314/cmselect/cmsctech/254/254we20.htm

Kirklees Council HECA Report 2013
http://www.kirklees.gov.uk/you-kmc/partners/other/pdf/homeEnergyConservationReport.pdf

Hannover, DE

Impacts régionaux du fonds enercity proKlima en termes de valeur ajoutée et d'emploi - Pestel Institut für Systemforschung e.V. - Hannover 2011
http://www.proklima-hannover.de/downloads/proKlima/4_proKlima_Evaluation_Bericht.pdf (allemand)

Synergies between environment and economy within a city administration – experiences - City of Hannover - Hans Mönninghoff
http://www.agenda21.de/images/stories/sustainable_hannover/SynergiesEnvironment-Economy.pdf

Hannover on the way to sustainability - City of Hannover, Department of Economic and Environmental Affairs – 2011
http://www.hannover.de/content/download/403383/8472798/version/1/file/Hannover+on+the+way+to+sustainability.pdf

IEE PassREg : Passive House Regions With Renewable Energies. The Success Model of Hannover – EnEffect
www.passreg.eu/download.php?cms=1&file=Success_Model_Hannover.pdf

Nolan County, US

Nolan County: Case Study of Wind Energy Economic Impacts in Texas – New Amsterdam Wind Source, 2008
http://www.moakcasey.com/articles/viewarticledoc.aspx/Nolan%20County%20Case%20Study.pdf?AID=168&DID=288

How Renewable Electricity Standards Deliver Economic Benefits - Union of Concerned Scientists, 2013
http://www.ucsusa.org/assets/documents/clean_energy/Renewable-Electricity-Standards-Deliver-Economic-Benefits.pdf

Texas Renewable Energy Industry Report - Office of the Governor, 2012
http://governor.state.tx.us/files/ecodev/renewable_energy.pdf

Worldwatch Institute : In Windy West Texas, An Economic Boom
http://www.worldwatch.org/node/5829

State Wind Energy Statistics: Texas - April 10, 2014
http://www.awea.org/Resources/state.aspx?ItemNumber=5183

A Profile of Socioeconomic Measures, Nolan County TX - Headwaters Economics, EPS-HDT 2014
http://headwaterseconomics.org/wphw/wp-content/uploads/print-ready-measures-pdfs/48353_Nolan-County_TX_Measures.pdf

Paris-IDF, FR

'Villes et croissance verte : Etude de cas de la région Paris/Ile-de-France', Kamal-Chaoui, L. et M. Plouin, Documents de travail de l'OCDE sur le développement régional, 2012/02, Éditions OCDE, Paris.
http://www.oecd-ilibrary.org/urban-rural-and-regional-development/villes-et-croissance-verte_5k9fd0f32lhj-fr

Lancement du plan filière éco-activités, Direction du développement économique, Conseil Régional d'IDF
http://www.iledefrance.fr/decisions/eco-activites-deviennent-filiere-prioritaire

Découvrir l'Île-de-France/Des filières économiques d'excellence/Eco activités
http://www.paris-region.com/decouvrir-lile-de-france/des-filieres-economiques-dexcellence/eco-activites

Défi Métiers - Emplois verts et verdissants
http://www.defi-metiers.fr/rapport-detude/les-professions-vertes-et-potentiellement-verdissantes-en-ile-de-france

Observatoire national des emplois et métiers de l'économie verte, Rapport d'activité 2012
http://www.developpement-durable.gouv.fr/L-observatoire-national-des,18551.html

ORDIF
http://www.ordif.com/public/article_interieur/derniere-etude-ordif.html?rub=15689

ADEME
http://www2.ademe.fr/servlet/getDoc?cid=96&m=3&id=65831&ref=23117&p1=B

OECD Regions at a Glance 2013
http://www.oecd-ilibrary.org/urban-rural-and-regional-development/oecd-regions-at-a-glance-2013_reg_glance-2013-en

C40 Case Study Velib
http://www.c40.org/blog_posts/c40-cities-houston-paris-and-tokyo-recognized-at-the-2012-ftciti-ingenuity-awards

Sites web

Pôle des Eco-Industries de Poitou-Charentes - http://eco-industries.poitou-charentes.fr/index.php

Etd, le centre de ressources du développement territorial - www.projetdeterritoire.com

EU Eco-Innovation Observatory - http://www.eco-innovation.eu/

CONCERTO - http://concerto.eu

OECD Greening cities, regions and communities - http://www.oecd.org/regional/greening-cities-regions/

OECD LEED Programme (Local Economic and Employment Development) - http://www.oecd.org/regional/leed/

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