

# PROCURING INNOVATIVE AND SUSTAINABLE CONSTRUCTION

## EUROPEAN PUBLIC AUTHORITY SNAPSHOTS

Accompanying publication to:  
*Procuring innovative and sustainable construction –  
A guide for European public authorities*



## AN SCI-NETWORK PROJECT PUBLICATION – SUSTAINABLE CONSTRUCTION AND INNOVATION THROUGH PROCUREMENT

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## 1 INTRODUCTION

Public authorities across Europe are increasingly looking at innovative solutions within public construction works as a way to both reduce the environmental impacts of the public building stock, and to drive down costs.

This snapshot collection has been produced by the SCI-Network, Sustainable Construction and Innovation through Procurement, which connects public authorities looking to procure innovative and sustainable solutions within their construction projects. It is designed to accompany the main publication from

the SCI-Network: Procuring innovative and sustainable construction - A guide for European public authorities, available from the project website at [www.sci-network.eu](http://www.sci-network.eu).

The guide is designed to help public authorities optimise their procurement processes to best encourage such innovative outcomes in construction procurement. The snapshots presented here are structured along the same categories as the guide, allowing for quick access to the topic you are interested in. Next to the title, you can also find a list of specific topics (or “tags”) which are covered by the snapshot. At the end of this publication, an index also helps you to navigate.

We would like to thank all public authorities who agreed to be featured in this collection – real life examples are one of the best ways to inspire innovative and sustainable procurement!

You can also find a searchable version of this collection online at [www.sci-network.eu/snapshots](http://www.sci-network.eu/snapshots).

## 2 BEING AN "INTELLIGENT CLIENT"

### 2.1 PASSIVE SOCIAL HOUSING IN SOUTHWEST FINLAND

#### TAGS:

- Early Market Engagement
- Energy Efficiency
- User involvement
- Ambitious targets
  - Teamwork
- External expertise
  - Passive House
  - Residential

In 2009, Right of Occupancy Housing of Southwest Finland Ltd, a housing company owned largely by the nearby cities, started a joint development project in the City of Naantali with relevant stakeholders. The objective of the project was to plan and implement the first semi-detached and terraced house in Finland which fulfils the Finnish passive house criteria. The project was funded by the Housing Finance Development Centre of Finland (ARA). The expertise of the procurement team was ensured by selecting expert partners through an open tender procedure in January 2010. The expert partners for the planning phase included an energy expert, a head designer and a contract consultant. Both separate tenders and consortia were accepted and the final winners consisted of three separate consultants. The tenders were evaluated according to the innovativeness of the work plan, professional characteristics, expertise of the tendering organisation and pricing.

The Finnish Association of Building Owners and Construction Clients, RAKLI, held two procurement clinics for the potential constructors and technology suppliers. Procurement clinics are open, interactive workshops to facilitate market dialogue between potential service providers, consultants, contractors and investors. In the workshops, the procurement

problems are analysed and recommendations given for solving the problems. Eleven suppliers participated in the clinics that played a major role in the project. During the clinics it became evident that the plans were unrealistic in relation to the budget. It was not possible to exceed the predefined price without losing customers, thus the costs needed to be cut. The originally planned energy sources were too large and economically ineffective for a passive house with low energy needs. Consequently the energy source was changed from the planned heat pumps or bioenergy into direct electricity and solar collectors. The original plan also included one-storey buildings, which were now replaced with two storey buildings. The higher buildings allowed more residential squares inside the expensive outer shell. However, the total number of residential square metres did not increase notably and it was still less than the town plan would have allowed for.

The clinics also included a customer satisfaction survey. The housing development team, representing inhabitants of the *Right of Occupancy Housing of Southwest Finland Ltd*, was also present at the clinics, and commented on the plans also later on. The future inhabitants will be trained in energy-saving measures and their opinions and energy consumption will be surveyed. The procurer was satisfied with the results of the procurement clinics, although the method was fairly time consuming.

Without the clinics, the project would not have been able to maintain its budget. It was especially beneficial that the wishes and background information of the potential users were documented and analysed. The construction of the housing area started at the beginning of 2012 and the buildings are likely to be finalised by the end of March 2013.



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- [www.rakli.fi/linkit/uutiset/uutisaraklista/20091203vaso/default.aspx](http://www.rakli.fi/linkit/uutiset/uutisaraklista/20091203vaso/default.aspx)
- [www.sci-network.eu/resources/case-studies/](http://www.sci-network.eu/resources/case-studies/)



## 2.2 ADVICE SERVICE FOR MUNICIPALITIES IN VORARLBERG, AUSTRIA

### TAGS:

- External expertise
- Energy efficiency

The Umweltverband (Environmental Association) Vorarlberg offers support to all 96 member communities in the province of Vorarlberg in the renovation and construction of sustainable public buildings.

If a municipality wants to renovate or build in an energy-efficient and eco-friendly way they will be supported by experts through the whole planning, tendering and building process. This is done in four modules:

### MODULE 1 “PREPLANNING”:

- Development of specific energy-efficient and environmental criteria
- Formulation of an „eco – programme“
- Optional: support in conducting an architectural competition

### MODULE 2: “PLANNING AND TENDERING”

- Development of a material-, construction and energy concept
- Environmental check of the call for tenders
- Creating eco-criteria for each call for tender by using the database, [www.baubook.info/oea](http://www.baubook.info/oea)
- Assistance for questions about procurement law

### MODULE 3: “CONTROL AND EXECUTION”

- Information for craftsmen
- Checking the product declaration list of the manufacturers
- Approval of product declaration list

### MODULE 4: “CONTROL OF SUCCESS”

- Product control at the building site
- Various measurements (blower door test, indoor air quality,...)

This service has been used in over 50 projects in Vorarlberg. It has proven particularly helpful for smaller local authorities, that may not have the technical knowledge in construction or procurement but wish to build and renovate sustainably. For buildings that have been built or renovated with the support of the Environmental Association Vorarlberg, energy savings of around 70% and a reduction of indoor air emissions of 90% have been achieved.



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## 2.3 SUSTAINABLE UN HEADQUARTERS DEVELOPMENT IN COPENHAGEN

### TAGS:

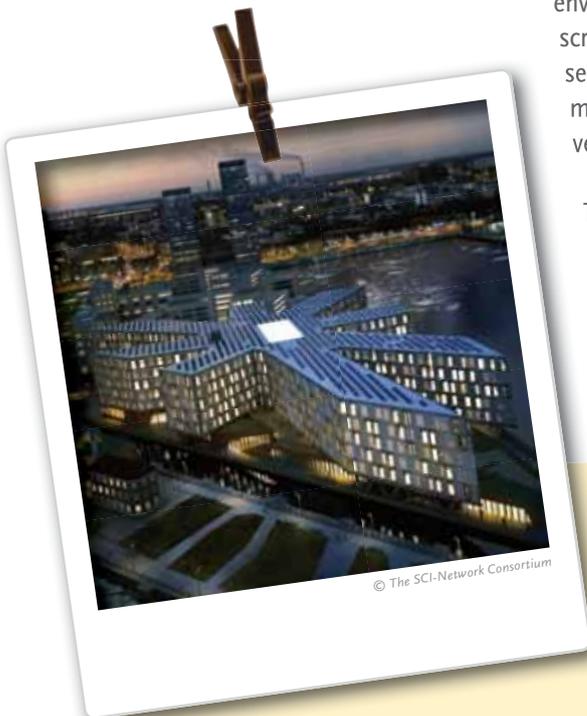
- Energy Efficiency
  - Certification / assessment schemes
  - Ambitious targets
- Integrating design & build
- Architectural competition
  - Water
  - Offices

A new headquarters for six United Nations' organisations is being developed in Copenhagen, Denmark from 2010 – 2013. The building has a gross floor area of 50,000m<sup>2</sup>. A design and build contract was signed with the winning contractor. The contractor was selected through an international architectural competition between five companies following an open pre-qualification stage.

The building is designed and constructed to achieve energy consumption below 50 kWh/m<sup>2</sup>/year. As such, the developing company was awarded the EU 2012 GreenBuilding Partner award for this project. Furthermore, the building is aiming to achieve a LEED Platinum certification<sup>1</sup>.

The building will be using recycled rainwater for toilet flushing, cooling will take place with sea water, all lighting and indoor climate will be automatically controlled with individual user adjustment options. Despite large window areas, the building envelope is highly insulated, and provided with efficient exterior automated solar screens. The roof will house a significant photovoltaic panel system. For strict security reasons, the building is constructed on an isolated island linked to the mainland through one bridge, which will be accessible by foot, bicycles and small vehicles only. Consequently, no parking is provided on site.

This case illuminates the complex and emergent character of the demand side in construction under which innovation has to take place. Thus, procurement has been undertaken in a highly complex organisational form with multiple user organisations, extensive role separation, overlapping roles between the regulatory system and the developing company, and repeated changes in the ownership structure over time.



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<sup>1</sup> [www.usgbc.org/DisplayPage.aspx?CategoryID=19](http://www.usgbc.org/DisplayPage.aspx?CategoryID=19)



© Cofely/GKG Architecture/Région Alsace

## 2.4 MANAGING COMPLEX CONTRACTS IN ALSACE, FRANCE

### TAGS:

- Energy efficiency
- External expertise
- Energy performance contracting (EPC)
  - Public-private partnerships (PPP)
  - Alternative contractual models
- Schools

In region of Alsace in France there is a strong political will for sustainable development; the region is also an innovation hotspot. The regional authority is the owner of all 75 public high schools, covering 1.5 million m<sup>2</sup> and is responsible for construction and maintenance. Annual energy costs for the schools was €10 million (gas, wood and electricity), and the region decided to explore the possibilities for energy performance contracting (EPC), as a way of reducing energy costs without a major upfront investment budget. In EPC energy efficiency renovations are financed mainly through the energy savings achieved. As Alsace region had little experience with EPC or public private partnerships (PPP), it was decided to bring external expertise in to assist. The services of a technical, a legal, and a financial expert were procured to assist in developing the most suitable contractual and procurement model.

Ultimately a PPP was negotiated covering 14 high schools in the region and running for 20 years. The total value of the contract is €64.6 million. For the first three years of the contract, the experts are still available to ensure that the contract is being carried out optimally for the public authority – consulting, for example, on changes due to different use patterns from those initially planned. The experience in this case is very positive, as getting in external expertise has helped to considerably minimise risk, as there is a danger of exploitation by potential suppliers in such complex contracts unless the authority acts as an “intelligent client”. As such, it is well worth buying in external expertise to assist.



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- [www.sci-network.eu/fileadmin/templates/sci-network/files/Resource\\_Centre/Case\\_Studies/Case\\_Study\\_Alsatian\\_High\\_Schools.pdf](http://www.sci-network.eu/fileadmin/templates/sci-network/files/Resource_Centre/Case_Studies/Case_Study_Alsatian_High_Schools.pdf)



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## 2.5 MEETING THE NEEDS OF THE COMMUNITY IN CLEVERLEY, UK

**TAGS:**

- *Early market engagement*
- *User involvement*
- *Community benefits*
- *Infrastructure*

Opened in 2008 this project is a unique and multi award winning combination of sea defences, protecting around 7,700 homes, and a low carbon seaside resource for locals and visitors to enjoy.

Pursuing sustainability, innovation and collaboration this project was delivered ahead of time and below budget. The 1.3km development along the coast was developed in close consultation with residents and visitors in an effort to determine what amenities they would like to see in place. This resulted in facilities that have catalysed regeneration and sustainable development, including 5 helical wind turbines generating 20 MW of energy each year to power the café as well as LED lighting along the promenade.

Early market engagement aided the inclusion of social and economic benefits in the procurement and construction; this helped contribute to ensuring the first two phases were completed in half the programmed time, meaning that risk of flooding in the most vulnerable areas was drastically reduced during construction. Close and early engagement with the local supply chain meant that 150 jobs were created locally including a new concrete moulding factory to produce the pre-cast sections. This factory remains a going concern with 40 full time staff.



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- [learning.environment-agency.gov.uk/courses/FCRM/CoastalIssues2/pdf/caseStudy\\_NorthWest\\_A.pdf](http://learning.environment-agency.gov.uk/courses/FCRM/CoastalIssues2/pdf/caseStudy_NorthWest_A.pdf)

## 2.6 USER AND CONTRACTOR INTERACTION – THOR HEYERDAHL COLLEGE, LARVIK, NORWAY

### TAGS:

- Teamwork
- User involvement
- Integrating design and build
- Alternative contract models
- Community benefits
  - Schools

The Norwegian Thor Heyerdahl School of Advanced and Further Education was inaugurated in 2009. It was one of the largest new schools in Norway, including a sports arena for 4,000 spectators. The ambition of the construction project was that the new school would act as a social and educational lighthouse project with the help of innovative architectural solutions. The purpose was to enhance equality in society by mixing students from different social classes, ages and fields of study.

The Norwegian interactive model for construction procurement was applied by Vestfold County Council. In 2002, the County Council created a small internal project team, which was responsible for developing, planning, designing and implementing the project. The size of the internal project team varied between three and five people. The team was led by a former headmaster together with engineers and economists. It was the first time for the Vestfold County Council and the project team to utilise the interaction model.

The interaction model is based on a partnership and it focuses on the skills that the different actors in a construction project possess and how they can be exploited for the benefit of the project. In this model one of the most important characteristics is that the contractor participates in the planning of the building.

The project was realised by a turnkey-contractor, which was in this contract a single-purpose company consisting of the main contractor, other contractors, architects and engineers. The Vestfold County Council evaluated the competitors based on both proposals and by interviewing the proposed turnkey-contractor groups. The purpose of the interviews was to evaluate whether the group was balanced, motivated and prepared for the project. The interaction model applies a principle of “open book” which means that there should be full disclosure, transparency and access to all documents for all parties. The interaction model and the open book principle were integrated into the procurement documents.

The facility managers and end-users were also involved in both the design and construction phases. The employees of the school appointed a representative who worked full time on the project to ensure that their needs were integrated into project planning. A group of facility managers, who participated in the design process, was also established. Vestfold County found the interaction model to be successful in encouraging teamwork and reducing conflicts. The excellent collaboration between the different participants was one of the reasons for the good project results.

The project resulted in a well-functioning student environment, which increases cross-disciplinary activity. The main achievement of the project was the 35% reduction of space, in comparison to other similar school projects at the time. Space was reduced from approximately 20 m<sup>2</sup> per student to 14 m<sup>2</sup> per student. The initial goal for energy efficiency of 100 kWh/m<sup>2</sup>/year had to be updated to 130 kWh/m<sup>2</sup>/year during the project in order to deliver the school in time and in budget. However, the latest reports show current consumption below 110 kWh/m<sup>2</sup>/year due to adjustments in technical systems and in the use of the building.



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## 2.7 WORKING WITH THE LOCAL ENERGY AGENCY IN AVIGLIANA, ITALY

### TAGS:

- Energy efficiency
- External expertise
- Energy performance contracting (EPC)
  - Alternative contractual models

The City of Avigliana issued a tender in 2009 for HVAC<sup>2</sup> and SHW<sup>3</sup> energy services, with the support of the Energy Agency of the City of Turin. As the first Italian City to approve the SEAP (Sustainable Energy Action Plan) required of signatories of the "Covenant of Mayors", the city wished to set an example of good practice for the citizens.

The three year contract was for the collection of data on the energy performance of the city building stock, together with maintenance requirements and an assessment of end user needs. The contract was planned to provide the necessary baseline and preparation for future third party financing contracts. The tender was awarded the Best Green Tender Award 2010 from CompraVerde Forum. The winning contractor agreed to:

- Provide the city with all energy audits and building certifications, using the same software used by the city and the Energy Agency, in order to ease data analysis
- Provide the city with free access to all data collected by the energy service company on energy consumption, indoor temperature and maintenance of the buildings in real time

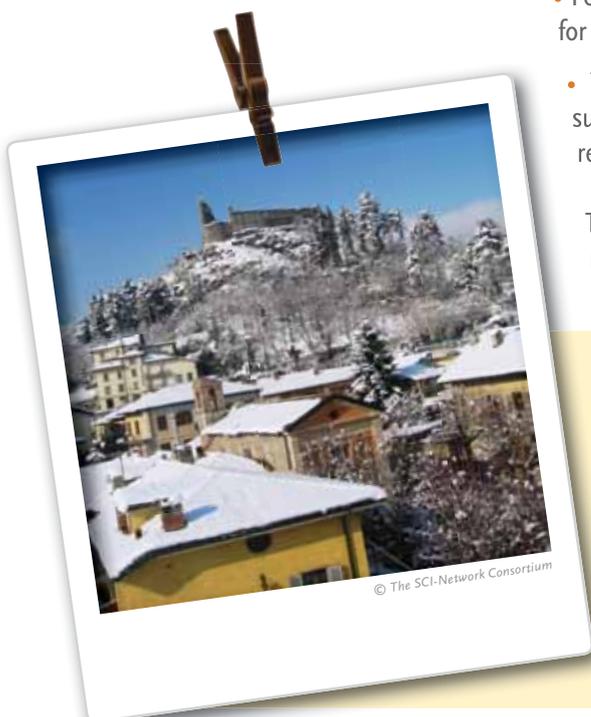
The city then took the option of transforming this contract into a so-called "energy service plus" contract, which allowed third party interventions directly to begin retrofitting immediately, rather than waiting to tender again at the end of the existing contract. This was the first such transformation carried out by a public administration in Italy. Negotiations were assisted by the Turin Energy Agency, and lasted over a year, in order to discuss and optimise the retrofit of each building, and fine tune the legal and financial aspects of the new contract.

The contract, signed in 2011 and running for 25 years, guarantees a minimum global energy consumption reduction of 29%. The upfront investment costs of €674,461 to retrofit 10 buildings, was provided by private investment to be repaid over the course of the contract from the energy saving. The annual payment of €224,327 from the city, covering energy costs and maintenance services, remained the same in the two contracts, the investment of the contractor being financed with the energy savings.

As the potential savings are up to 40%, further points were included in the contract to deal with savings beyond the 29% guaranteed:

- For savings from 30 to 35%, the contractor will receive 60% of the extra savings; for savings exceeding 35%, the contractor will receive 75%;
- The City of Avigliana is entitled to carry out additional energy saving and substitution measures for any building, with the corresponding saving being received by the City itself.

The Energy Agency will support the City of Avigliana until the result of the retrofits are monitored and validated.



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- [www.comune.avigliana.to.it/servizi/ambiente\\_energia.php](http://www.comune.avigliana.to.it/servizi/ambiente_energia.php)

<sup>2</sup> Heating, ventilation and air conditioning    <sup>3</sup> Sanitary hot water

## 2.8 CAPACITY BUILDING FOR PROCURING INNOVATION IN TURIN, ITALY

**TAGS:**

- *Teamwork*

The City of Turin has an overall target to reduce CO<sub>2</sub> emissions by over 40% by 2020 and is committed to the procurement of innovative products and services by the administration. One priority of the Torino Smart City Initiative, launched in 2011, is to promote innovation in the region, particularly smart and clean technologies, and includes a focus on “administrative innovation”.<sup>4</sup>

From November 2011 to March 2012 a training programme was established by the city on how to foster innovation at each stage of the procurement procedure, with a focus on the construction sector.

The course was designed following a preliminary analysis of gaps and needs. It consisted of 28 training hours, spread over 7 half day sessions, and covered three main skills areas:

1. Strategy setting (2 half day sessions)
2. Legal and administrative issues - including procurement procedures and contractual models (2 sessions)
3. Techniques and technological skills - including techniques for understanding and engaging with the market (early market engagement techniques), and the presentation of innovative products, techniques and services in the field of sustainable construction and ICT (3 sessions)

The multidisciplinary course was targeted at departmental heads in the works and services sector. However it was also open to experts from other public authorities, with staff also attending from the Region of Piedmont, the Province of Turin, the Turin Chamber of Commerce, local public utilities (transport, water, energy, ICT), the University of Turin, and the Polytechnic of Turin. 75 people regularly participated in the training course, with 80% coming from the municipal administration itself. The course focused strongly on the promotion of interdepartmental co-operation, and establishing the clear link with the Torino Smart City initiative and other relevant activities.

The course has also led to the identification of a showcase project for the development of model procedures and procurement documents. The PROLITE project, running from 2012 – 2015, will carry out PPI activities in the field of public lighting. A multidisciplinary project team will be established and interested colleagues will be able to follow the preparation activities and documentation through the collaboration platform being established. Further training is also planned for 2012-2013.



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<sup>4</sup> The City of Turin is strongly committed to become a “smarter city”, fostering a sustainable, intelligent and inclusive urban growth. Turin's path to become a “Smart City” started in 2009, when the City Council took the decision to take part in the initiative of the European Commission **Covenant of Mayors** (2009) and – as one of the first Italian cities – started the Turin Action Plan for Energy (2010). This plan included an inventory of main consumption sources at city level and defined a set of activities in the building and transport sectors (public and private) with the final objective to decrease CO<sub>2</sub> emissions by up to 41,9% by 2020. The Torino Smart City Initiative has then been officially launched in 2011 and represents the new innovation policy framework for the overall territory and institutions, providing new way for collaborative actions in the field of R&D led economic development with a special regard to the smart & clean technologies. The strategy is focused around 5 vertical priorities – sustainable energy; sustainable environment and planning; sustainable mobility; ICT for better public services; social cohesion and innovation - and two horizontal ones: administrative innovation and city-users involvement. Furthermore, to face the challenge of the European initiative Smart City, Turin has recently begun a redefinition of its administrative structure through the Torino Smart City Foundation for a Sustainable Development, an integrated and flexible platform, gathering all relevant local key-actors aimed at the co-planning and the sound management of innovative solutions for the territorial development.



## 2.9 OTHER RELEVANT SNAPSHOTS

- 3.7 – *Increasing Recycled Content in Construction, Bristol, UK*
- 5.1 – *Renewal of the Koemarkt in Purmerend, The Netherlands*
- 5.4 – *Co-operating in design - National University of Ireland, Galway*
- 5.7 – *Public-private partnership for a Kindergarten in Vinovo, Italy*
- 5.15 – *Low energy day care centres through EPC, Porvoo, Finland*
- 6.1 – *Whole life costing for a swimming pool in Olhão, Portugal*

## 3 SETTING TARGETS AND REQUIREMENTS

### 3.1 SUSTAINABLE REFURBISHMENT OF A 1960S BUILDING IN WINCHESTER, UK

**TAGS:**

- Energy Efficiency
  - Certification/assessment schemes
- Ambitious targets
- 1960s renovation
  - Water
  - Offices

Like many UK municipal buildings Hampshire County Council (HCC) headquarters building Elizabeth II Court, formerly Ashburton Grove, was constructed in the 1960's with typically associated poor environmental and aesthetic standards. For a refurbishment contract HCC targeted and achieved BREEAM<sup>5</sup> Excellent status. Completed in June 2009, Elizabeth II Court is now cited as an example of best practice by the Carbon Trust<sup>6</sup> as one of the UK's leading low-carbon buildings, and crowned 'Sustainable Project of the Year' at one of the UK's top building awards. The retrofit has reduced the life-cycle carbon impact to less than half of an equivalent modern mechanically ventilated newly built office.

Removing internal walls and providing an open plan environment has reduced energy costs for light and ventilation as well as improving the working space, allowing for flexible working and thereby an increased occupancy. Improved water efficiency ensures water use is no greater despite a 70% increase in users. The increased occupancy has also allowed HCC to curtail their use of less efficient buildings elsewhere, creating further financial and environmental benefits.

Maintaining the internal concrete structure saved 50% of the embodied energy associated with building construction. High performance facades provide both a modernised exterior and enhanced insulation. A new engineered natural ventilation system along with other sustainable solutions including a staff 'Users' Manual', have reduced energy costs and carbon consumption by over 50% per occupant on a like-for-like basis. HCC targeted reducing CO2 emissions matching those of new build energy efficient offices in the UK.



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**FURTHER INFORMATION:**

- [www.rics.org/uk/](http://www.rics.org/uk/)
- [www.architecture.com/SustainabilityHub/Casestudies/3-ElizabethIICourt.aspx](http://www.architecture.com/SustainabilityHub/Casestudies/3-ElizabethIICourt.aspx)

<sup>5</sup> Building Research Establishment Environmental Assessment Method: [www.breeam.org](http://www.breeam.org) <sup>6</sup> [www.carbontrust.com](http://www.carbontrust.com)



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### 3.2 STATSBYGG GHG CALCULATION TOOL FOR CONSTRUCTION, NORWAY

#### TAGS:

- Energy efficiency
- Certification/assessment schemes
- Ambitious targets
- Passive House
- Tools
- Offices

In 2006 Statsbygg, the Norwegian government's building commissioner and property manager, started to develop a comprehensive model for calculating the greenhouse gas (GHG) emissions of buildings.

Klimagassregnskap.no is a free, web-based and holistic model which calculates the lifetime GHG emissions of the building, covering the materials used in construction, emissions from the construction phase, energy use in the operation phase as well as transport of goods and people who use the building. In March 2011 version 3 was launched, which includes also greenhouse gas emission calculations of a reference building.

The tool assists in identifying the sources of emissions and estimating their amount, and can be therefore used to provide a comparison of different options. Service life, material types and the electricity mix have all been demonstrated to play an important role in the calculations.

The model is now used by a number of actors in the construction industry in Norway, with several hundred user accounts and projects, and experiences show that emissions can be reduced by 30–50% compared with the reference/current practice. Statsbygg aims to use the tool to set targets in all of its procurement activities, and requires designers and contractors to use the tool throughout the entire project. Two major government sponsored construction programs aimed at developing carbon neutral urban areas, "Fremtidens Byer" (Future Cities) and FutureBuilt, require greenhouse gas calculations to be carried out using klimagassregnskap. The tool is also used for the greenhouse gas calculation section in the Norwegian adaptation of BREEAM (BREEAM NOR).

The utilisation of the tool begins at an early stage, and the GHG impacts of at least two alternative project solutions are analysed to enable ambitious energy goals to be set. Good choices for design and materials must be made as early as possible in the project, often before detailed data exists for the project. Additionally, it is recommended to specifically request materials with lower embedded carbon emissions, together with appropriate documentation. Again experiences demonstrate that such products are available if actively demanded, and that such demands help to encourage more environmentally friendly production methods, such as energy efficiency or recycled materials, and greater availability of documentation on products.

A few practical examples of application:

- For the extension of The High North Research Centre for Climate and the Environment (Framsenteret) in Tromsø, the tool was used to assist in determining the target energy requirements.
- For the construction of Oslo's new National Museum GHG emissions, calculated using Klimagassregnskap, formed part of the evaluation of the architectural competition, where the overall target was to achieve a 50% GHG reduction.

- For the Papirbredden II Knowledge Park development in Drammen, consisting of both office and educational buildings, the buildings were required to meet passive house and A-energy class criteria. In addition, climate friendly construction materials and good bicycle parking conditions are required. Klimagassregnskap was used in the preliminary project phase as well as during design and construction. The calculation revealed that the highest emissions came from the concrete and underground structures. A new assessment was carried out on the positioning of axes and columns, which led to the conclusion that the number of columns could be reduced. An assessment was also carried out on the use of prefabricated elements such as basement floors instead of in situ casted structures. This resulted in a considerable reduction in the use of concrete.



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**FURTHER INFORMATION:**

- [www.statsbygg.no/FilSystem/files/miljo/miljopublikasjoner/klimagassregnskapRapport-eng.pdf](http://www.statsbygg.no/FilSystem/files/miljo/miljopublikasjoner/klimagassregnskapRapport-eng.pdf)
- [www.statsbygg.no](http://www.statsbygg.no)



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**3.3 SUSTAINABLE ENERGY EFFICIENT FIRE STATION, HAROLD HILL, UK**

**TAGS:**

- Energy efficiency
- Certification / assessment schemes
- Ambitious targets
- Sustainable construction materials
- Water

This award winning London fire station boasts numerous sustainability innovations and can trace its heritage back to the London Fire Brigade's station design briefing. Established in 2009 this document provides the framework for any new build or major refurbishment fire station, covering all design considerations, including environmental factors and an aspiration for the BREAAAM Excellent ranking. Also, the design briefing states buildings should aim to maximise the use of original construction as far as possible, reduce use of water and energy, and generate green energy where possible and practicable.

Utilising 80% of the original structure, the building also features a number of energy saving measures and achieves 42% less energy use than the average London fire station. Features include; photovoltaic panels for electricity generation, solar heating, CHP, grey water recycling and motion and daylight sensor control to help lower energy use. In the specification and evaluation process a number of environmental elements were stipulated including the use of 'A-rated' white goods, FSC approved timber and contractors were also requested to be part of the 'Considerate Contractors Scheme' which sets out a code of practice for participants covering neighbourliness, accountability, safety, and environmental responsibility. These were all factors that helped ensure the building and its occupants were quickly integrated in to the local community and following post-occupancy assessment BREEAM Excellent status was achieved.



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- [www.breeam.org/page.jsp?id=473](http://www.breeam.org/page.jsp?id=473)
- [www.london-fire.gov.uk/haroldhill.asp](http://www.london-fire.gov.uk/haroldhill.asp)

### 3.4 COMMUNICATING AMBITION FOR 'THE HIVE', UK

#### TAGS:

- Energy efficiency
- Certification/assessment schemes
- Ambitious targets
  - Public-private partnerships (PPP)
- Alternative contractual models
- Competitive dialogue
  - Water
  - Offices

The Hive is a new build collaboration between the University of Worcester and Worcestershire County Council. Opened in July 2012, this is a unique building with high sustainability targets, which were all clearly defined at the project's inception. A comprehensive 160 page Detailed Design Statement (DDS) shared with potential bidders prior to pre-qualification communicated the critical elements of the building's sustainability and performance aspirations.

This document also detailed assessment methodologies including various national benchmarks and tools for sustainability such as BREEAM's water use calculator. The project was developed as a PFI contract (Private Finance Initiative – a form of PPP). Targets were clearly defined and ongoing negotiation through the PFI Competitive Dialogue process allowed bidders to see and share the vision from the outset and contribute to the development of the building by putting forward solutions before the real design work took place.

An ambitious CO<sub>2</sub> emissions target of 15.8 kgCO<sub>2</sub>/m<sup>2</sup> was outlined in the DDS and targets such as this became Key Performance Indicators in the operating contract. Galliford Try, the PFI contractor, is legally bound to meet these targets or risk financial penalty.

The building makes innovative use of water – housing the County's invaluable historic archive means that parts of the building must be strictly temperature controlled all year round, which demands a lot of energy. However with the River Severn only around 300m from the site the DDS encouraged potential bidders to consider this resource. This has resulted in a solution that utilises river water in the summer to cool the building and in winter some heat is drawn from the river to enhance underfloor heating. This collaboratively developed measure is a major contributor in achieving the building's exceptionally low CO<sub>2</sub> output.



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**FURTHER INFORMATION:**

- [www.wlhc.org.uk/documents/Water\\_Management\\_Case\\_Study.pdf](http://www.wlhc.org.uk/documents/Water_Management_Case_Study.pdf)
- [www.worcestershire.gov.uk/cms/property-services/strategic-projects/the-hive-project.aspx](http://www.worcestershire.gov.uk/cms/property-services/strategic-projects/the-hive-project.aspx)
- [www.thehiveworcester.org](http://www.thehiveworcester.org)



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### 3.5 URBAN REGENERATION IN TURIN WITH HIGH ENVIRONMENTAL STANDARDS, ITALY

**TAGS:**

- *Energy efficiency*
- *Ambitious targets*
- *Sustainable construction materials*

In 2011 the City of Turin developed an ambitious and detailed set of environmental guidelines for the regeneration of the Barriera di Milano district. This Integrated Program for Urban Development (PISU) covered 15 construction projects with a total investment cost of €35 million, co-funded by the European Regional Development Fund within Region Piedmont ERDF Operational Programme 2007-2013. responsible for procuring construction contracts were invited to include some common environmental criteria from the planning stage onwards for all procurement activities related to the regeneration programme.

Two types of criteria were developed:

- Environmental criteria for the improvement of local environment. These criteria significantly influence the design and imply a different concept at the planning stage. They are designed to reduce local pollution and improve the usability of the final space, affecting overall environmental comfort and improving the habitability of the area. They cover aspects such as aesthetic/architectural quality, the management of surface stormwater, use of local trees, green roofs and facades, noise, and the durability of the materials used for surface coating.

- Environmental criteria related to the life cycle impacts of construction elements (technology, product or material), covering for example, the use of recycled materials, or the energy requirements of heating and lighting systems

The first criteria were used to guide the design of the projects, while the latter were included in the tendering process, in order to promote the choice of products/techniques/technologies that are as innovative and environmentally friendly as possible.



In addition, all bidders for construction work are asked to offset the CO<sub>2</sub> emissions caused by the construction activities themselves. Environmental considerations make up a major element in evaluating offers, including an assessment of the environmental quality of products and materials to be used, and the environmental management of the construction site.

One of the construction projects was the development of the new urban park of Spina4, on an area of 43,000 m<sup>2</sup> formerly occupied by car-industry buildings. Many sustainable features were included in the design based on the set environmental guidelines – for example photovoltaic panels, photocatalytic paving, LED lighting, and the use of recycled materials.

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### 3.6 TARGETING COMMUNITY BENEFITS IN PRISON CONSTRUCTION IN SCOTLAND, UK

#### TAGS:

- Early market engagement
- Community benefits

To ensure social sustainability considerations were embedded in the Phase 2 development of Shotts Prison the Scottish Prison Service (SPS) specified the requirement for contractors to consider Community Benefits. Working in partnership with North Lanarkshire Council (NLC) a Pre-Qualification Questionnaire (PQQ) was developed which specifically tested bidder experience of including community benefit involvement within construction projects.



The key areas focussed on were Recruitment and Training; Involvement of Small and Medium Sized Enterprises and Involvement of the Third (Voluntary) Sector. The NLC hosted a ‘Bidders’ Forum’ with SPS to provide background to the requirements on existing regeneration and other Community Benefit programmes operational in the local area. NLC also supported the SPS procurement process by providing specific questions for inclusion within the Invitation to Tender along with an example format of an ‘Employability and Skills Plan’. Bidders were requested to address these elements which were assessed as part of the tender evaluation process.

The winning contractor (Laing O’Rourke) for the design and build contract (awarded in December 2010) outlined a number of community benefits provisions that will be undertaken during the construction project. These include: 16 employment opportunities for people who have been unemployed for over 12 months; work based training weeks and local sub-contractor engagement in support of the primary contract. Laing O’Rourke were proactive in meeting with the SPS prior to works commencing and engaging with proposed sub-contractors to outline requirements, which included the delivery of a breakfast seminar to prospective supply chain companies. Throughout the process the Laing O’Rourke Project Manager has been actively engaged in driving the Community Benefits agenda with SPS and NLC. Outcomes achieved include 8 higher level apprenticeships, 10 labouring jobs created and a number of existing apprenticeships sustained through the project



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**FURTHER INFORMATION:**

- [www.sps.gov.uk/Contracts/procurement-policy-and-processes-within-sps.aspx](http://www.sps.gov.uk/Contracts/procurement-policy-and-processes-within-sps.aspx)



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### 3.7 INCREASING RECYCLED CONTENT IN CONSTRUCTION, BRISTOL, UK

#### TAGS:

- *Ambitious targets*
- *External expertise*
  - *Sustainable construction materials*
  - *Schools*

Bristol's Building Schools for the Future PFI programme consists of four new schools with a value of around £120 million. The local authority was keen to include significant recycled material in construction and commissioned the Waste Resources and Action Programme (WRAP) to conduct market research into local suppliers and materials. This survey found that at least half the materials necessary to construct the buildings could be sourced with above average recycled materials at cost-competitive rates.

Detailed analysis using three secondary school designs revealed that total recycled content of over 15% could be achieved at no extra cost. This gave Bristol City Council the confidence to include a minimum requirement for recycled materials in their Invitation to Negotiate. Combined with other waste reduction initiatives, Bristol City Council calculated the reduced waste disposal costs, avoidance of landfill tax and lower material wastage delivered an overall cost saving estimated at £650,000 (around €820,000). This good practice has been promoted in model procurement documentation and replicated by other Local Authorities in the Building Schools for the Future programme, resulting in thousands of tonnes of materials being diverted from landfill.

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#### FURTHER INFORMATION:

- [www.gpsj.co.uk/view-article.asp?articleid=158](http://www.gpsj.co.uk/view-article.asp?articleid=158)
- [www.wrapni.org.uk/content/recycled-content-case-study-secondary-schools-bristol](http://www.wrapni.org.uk/content/recycled-content-case-study-secondary-schools-bristol)
- [www.marleyeternit.co.uk/Case-Studies/Bridge-Learning-Centre.aspx](http://www.marleyeternit.co.uk/Case-Studies/Bridge-Learning-Centre.aspx)
- [www.wrap.org.uk](http://www.wrap.org.uk)



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### 3.8 LONDON OLYMPICS ORGANISING COMMITTEE, UK

**TAGS:**

- *Ambitious targets*
- *Sustainable construction materials*
- *Offices*
- *Sports facilities*

The bid for the London Olympics made a commitment to host the world’s first truly sustainable Olympic and Paralympic Games. The London Organising Committee of the Olympic and Paralympic Games Ltd (LOCOG) have identified the most effective way to support this commitment was to embed sustainability within the procurement process from the start. The LOCOG ‘Invitation to Tender (ITT) for the provision of goods and services’ sets out a clear vision and objectives for suppliers: ‘LOCOG will place a high priority on environmental, social and ethical issues when procuring the goods and services needed for the Games’ and refers them to the Sustainable Sourcing Code for guidance.

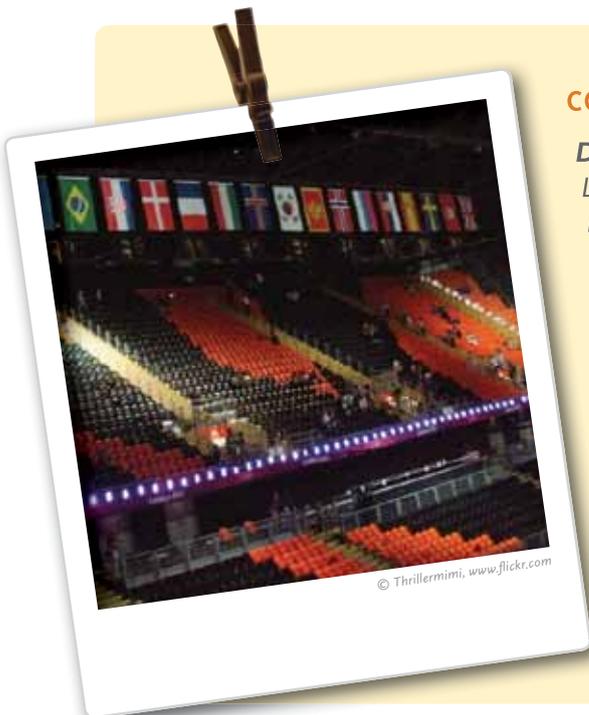
In terms of construction LOCOG procurement focuses on temporary structures and ‘overlay’ for venues to make them Games-ready. Examples of sustainability requirements include sourcing of materials, timber and timber products in line with LOCOG policies and compliance with labour practices, diversity and inclusion requirements. For example all timber and timber products must be from a known origin with credible evidence of legal harvesting and FSC or PEFC certification. Targets have also been set to ensure 20% of materials purchased by LOCOG for venues, by value, are from recycled or secondary sources. Additionally there is a target for 90% of materials, by weight, arising from installation and deconstruction of temporary structures and overlay to be reused or recycled.

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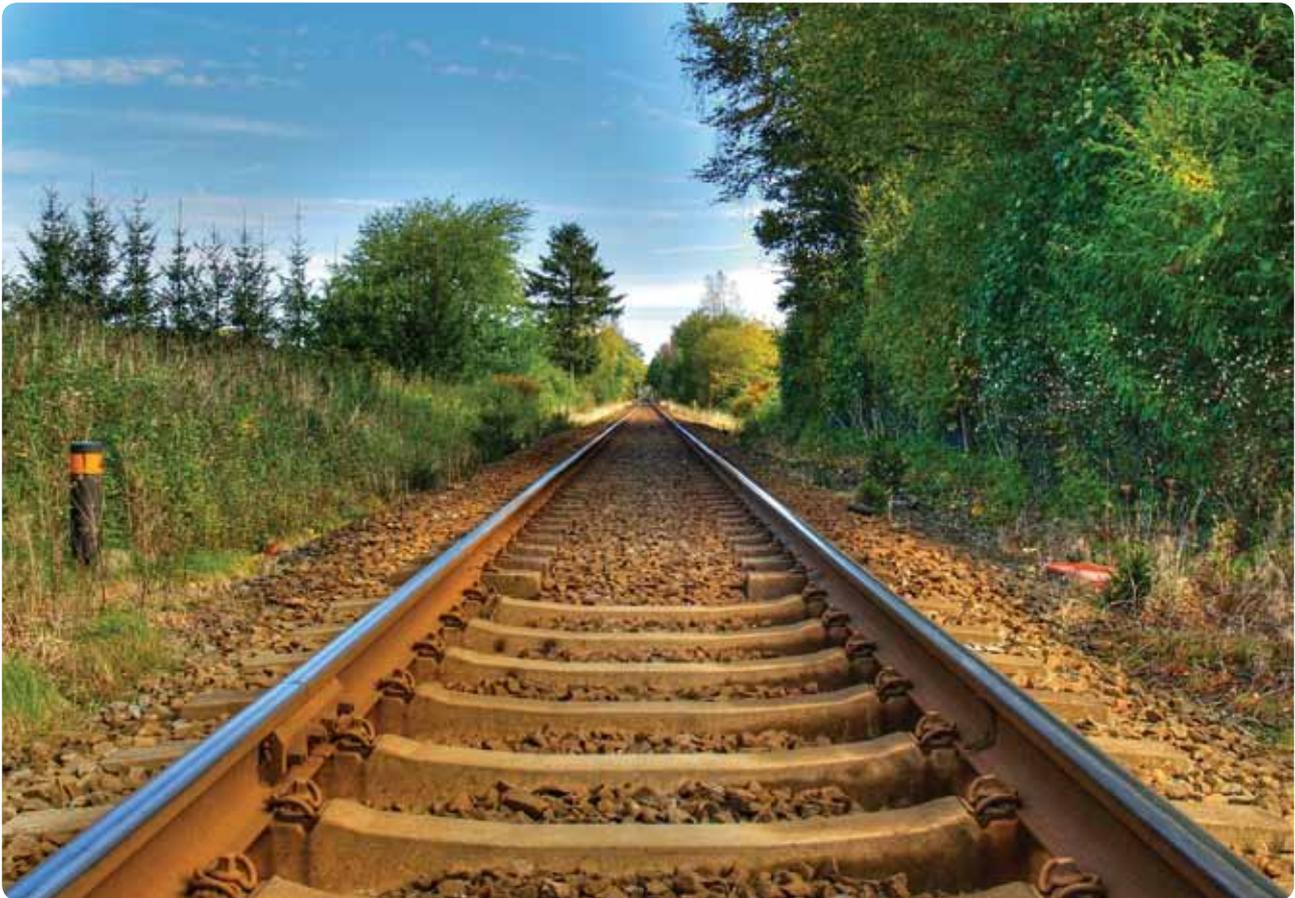
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**FURTHER INFORMATION:**

- [www.london2012.com/documents/locog-publications/london-2012-sustainability-plan.pdf](http://www.london2012.com/documents/locog-publications/london-2012-sustainability-plan.pdf)
- [www.london2012.com/documents/imported/locog-itt-part-1.pdf](http://www.london2012.com/documents/imported/locog-itt-part-1.pdf)
- [www.london2012.com/documents/locog-publications/sustainable-sourcing-code.pdf](http://www.london2012.com/documents/locog-publications/sustainable-sourcing-code.pdf)
- [www.london2012.com/publications/london-2012-sustainability-report-a-blueprint-for-change.php](http://www.london2012.com/publications/london-2012-sustainability-report-a-blueprint-for-change.php)



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### 3.9 THE DUTCH CO<sub>2</sub> PERFORMANCE LADDER, PRORAIL, THE NETHERLANDS

**TAGS:**

- *Certification/assessment schemes*
- *Tools*
- *Infrastructure*

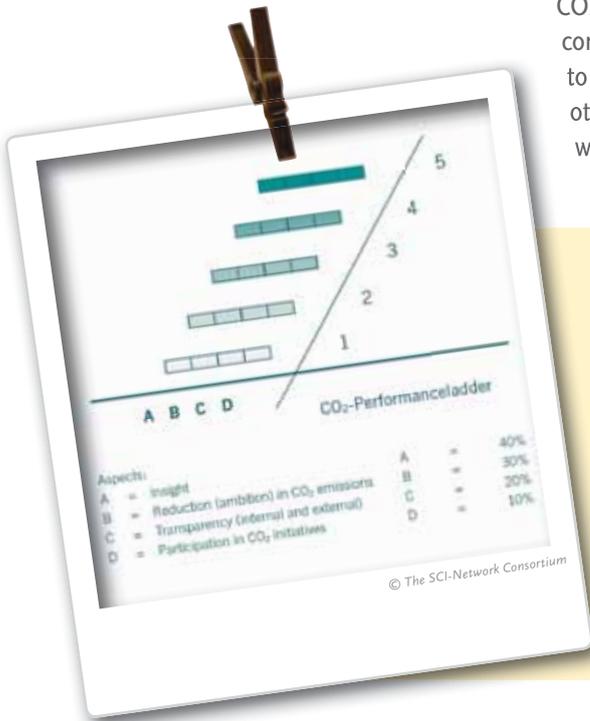
There were several projects during 2011 at various locations in the Netherlands that were concerned with the renewal and maintenance of the railway. Prorail, the Dutch railway maintenance company, initiated the CO<sub>2</sub> performance ladder, with the aim of stimulating contractors to reduce their production of CO<sub>2</sub>. The ladder has five maturity levels. Each level has a set of standard requirements as follows; insight into the company's (and its partners') CO<sub>2</sub> emissions; reduction of CO<sub>2</sub> emissions; communication on CO<sub>2</sub> and energy saving and involvement in (other) initiatives to reduce CO<sub>2</sub>. To achieve the highest levels, a company has to participate in innovative activities that demonstrably reduce CO<sub>2</sub> emissions.

In any procurement process a company is rewarded for its efforts to reduce CO<sub>2</sub> in the tender process and may gain greater chances to win contracts through a virtual discount on its bidding price. The level of virtual discount is determined by the level of maturity attained within the ladder, e.g. a company that has achieved the fifth maturity level is given a greater virtual discount than those that have achieved level four.

As such, the ladder stimulates the reduction of CO<sub>2</sub>, but does not regulate the way the reduction must be reached. Therefore, companies are free to explore the most appropriate solutions for the reduction of CO<sub>2</sub> for their own business. This approach ensures that opportunities for innovation are not locked out and that companies can achieve maturity levels in their own way. It is expected that larger companies will not only drive CO<sub>2</sub> reduction through use of innovative measures but also to participate in knowledge sharing networks, thereby improving the performance of all organisations participating in the ladder.

In addition companies are given opportunities to participate in each other's initiatives by sharing their experiences, giving support, and applying the outcomes. Although the choice of measures is free, the ladder demands ambitious efforts from companies. Effects are substantial, and appear in projects in an economically attractive way.

As a result of this programme, awareness of how CO<sub>2</sub> reductions can be achieved has risen within Prorail, and also among all the contractors. Importantly for the public authority, the virtual discount has not resulted in higher pricing. After the success of Prorail, the highway agency (Rijkswaterstaat) and several local authorities (e.g. the Municipality of Almere) have used the CO<sub>2</sub> performance ladder in their procurement. Many of the Netherlands' larger companies have reached the fifth level of maturity, and make a continuous effort to stay on this level. Several SMEs have also reached the fifth level (although others have claimed it to be too difficult for them). The CO<sub>2</sub> performance ladder will be further evaluated and upgraded in 2012.



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**FURTHER INFORMATION:**

- [www.CO2-performanceladder.eu](http://www.CO2-performanceladder.eu)

**3.10 OTHER RELEVANT SNAPSHOTS**

- 2.1 – *Passive social housing in southwest Finland*
- 2.3 – *Sustainable UN Headquarters development in Copenhagen, Denmark*
- 4.1 – *Driving innovation in heating technology in Oslo schools, Norway*
- 4.2 – *Low carbon concrete for the London Olympic Park, UK*
- 5.2 – *Innovative renovation of a 1960s office in Weiz, Austria*
- 5.5 – *PPP for a Passive House school, Germany*
- 5.7 – *Sharing the risks and savings in Jyväskylä, Finland*
- 6.1 - *Whole life costing for a swimming pool in Olhão, Portugal*
- 6.2 – *Life cycle approach for kerbing in Wakefield, UK*





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## 4 WORKING WITH THE MARKET

### 4.1 DRIVING INNOVATION IN HEATING TECHNOLOGY IN OSLO SCHOOLS, NORWAY

#### TAGS:

- Energy efficiency
- Early market engagement
- Ambitious targets
  - Whole life /Life cycle costing
  - Schools

Oslo City Council decided in January 2008 that fossil fuel use in Oslo's schools should be phased out by the end of 2011. In January 2009, the city started to look for alternatives: renewable, optimal and innovative solutions for substituting fossil fuels. The challenge was to assess what the market could deliver as innovative solutions, as experiences with existing products and solutions were poor.

The city of Oslo identified the challenge and formulated some suggestions on how the market could possibly contribute to solving it. It invited stakeholders to a dialogue conference to find the best alternatives to fossil fuels in the heating of schools. Through the dialogue conference the city gained a lot of useful information, which was then applied in preparing a tender for heating solutions for use in Oslo's schools. The tender process also began with a workshop for suppliers, where the tender documents were presented and the different suppliers could discuss joint solutions.

Twelve proposals were submitted to the tender competition. The evaluation criteria included, amongst others, life cycle cost, management reliability, degree of innovation and the transferability of the suggested solution to different schools. Four winners were selected offering solutions involving biogas, solid biofuel, heat pumps and solar energy as well as process innovation. The city was very satisfied with the result: the competition came up with many solutions that were not available on the market before the process started. Up to then, for example, biogas had been mainly available for vehicles only. The innovation related to heat pump technology has now been commercialised by the developer, providing a solution for optimising the use of different energy sources and storing heat. The procurement clearly created a new push for the market to innovate new heating solutions.



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## 4.2 LOW CARBON CONCRETE FOR THE LONDON OLYMPIC PARK, UK

### TAGS:

- Early market engagement
- Ambitious targets
- Sustainable construction materials
- Sports facilities

The Olympic Delivery Authority (ODA) set a number of sustainability targets to be met for all construction activities, including:

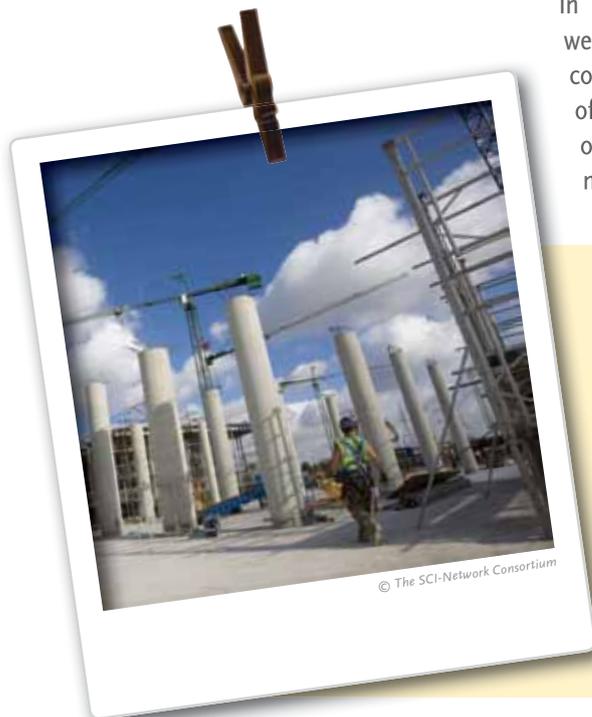
- Construction materials (by value) comprise at least 20% recycled content;
- 25% of aggregate used will be recycled;
- 50% of materials (by weight) will be transported to site by sustainable means (e.g. rail);
- Energy-efficient, low emission vehicles will be used on-site.

For the Olympic Park the ODA initially estimated that 500,000m<sup>3</sup> of ready-mixed concrete with an associated 1 million tonnes of aggregate would be required. The pre-qualification questionnaire and subsequent Invitation to Tender (ITT) for concrete supply used a balanced score-card approach to evaluate tenders. The tender questions were worded to encourage the supply chain to identify opportunities within the marketplace and to deliver innovative solutions to meet the ODA's sustainability targets listed above.

In total 20% of the weighting of the technical assessment in the tender evaluation was applied to meeting sustainability requirements. The concrete supplier proposed a number of mix designs that met the ODA sustainability requirements, in particular considering alternatives to cement and the use of secondary aggregate. The concrete supplier demonstrated a clear commitment to meeting and exceeding the ODA sustainability targets. The ODA determined that the best approach to meeting sustainability requirements was to establish a single ready-mix concrete batching plant on site to supply all the Park concrete needs. This greatly reduced the number of deliveries to site and ensured continuity of supply for all contractors.

The ODA Sustainability team led numerous workshops for contractors at different project stages. An initial meeting was held with project teams and the concrete supplier technical team prior to the specification of ready-mix concrete and contract award. The aim of the workshop was to introduce project teams to the potential contribution sustainable concrete mix designs could make to project sustainability targets such as recycled aggregate content and total recycled content.

In total almost 22% (170,000 tonnes) of recycled and secondary aggregate were used in approximately 450,000m<sup>3</sup> of ready-mix concrete poured during construction of the Park. An average cement substitute of 32% and transportation of aggregates by rail contributed to a reduction of 24% in the embodied energy of the concrete (30,000 tonnes CO<sub>2</sub>e) and eliminated over 70,000 vehicle movements.



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### FURTHER INFORMATION AND ACKNOWLEDGEMENTS:

- [learninglegacy.london2012.com/publications/the-procurement-and-use-of-sustainable-concrete-on-the-o.php](http://learninglegacy.london2012.com/publications/the-procurement-and-use-of-sustainable-concrete-on-the-o.php)





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## 4.3 TIMBER-FRAMED RESIDENTIAL AREA IN LINNANFÄLTTI, TURKU, FINLAND

### TAGS:

- *Early market engagement*
- *Sustainable construction materials*
- *Residential*

The timber-framed housing estate, planned in the Linnanfältti area in Turku, is a national lead project for the promotion of timber building and construction. Parties to this project include the City of Turku, a private real estate development company and three construction companies. The land is owned by the City of Turku and the private real estate company, both with a 50% share of the land. The aim of the project was that it would simultaneously enable the City of Turku to meet its housing needs and provide builders an opportunity to develop international business opportunities for timber construction.

A quality-based design competition was organised to stir up inspiration and imagination. However, the project experienced some severe challenges after the selection of the contractors. The problems started from a disagreement in what should be defined as “wood construction”. It turned out that the boundary conditions for wood construction were not sufficiently clarified in the tender documents. In the original tender documents it was only stated that the facade of the building should be from timber and the load-bearing structures primarily made of wood.

In order to properly define these boundary conditions, a separate workshop series was organised for the project participants. The workshops resulted in a contract where the planning principles of the modern timber-framed area are specified, and where the boundary conditions are specified. These stated that:

- Facade material must be wood;
- Exterior walls, ceilings, floors, walls between the apartments and the internal walls must be timber-framed;
- Stone structures are accepted only in basements, bomb shelters, elevator shafts, stairwells, underground car parks as well as in structures facing the ground, such as the base floor.

The Linnanfältti project and the related workshop series have ultimately helped to develop business networks, innovative techniques and technologies, and promoted the business concept of wood construction in the industry.

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## 4.4 PROCUREMENT PROSPECTUS, WAKEFIELD, UK

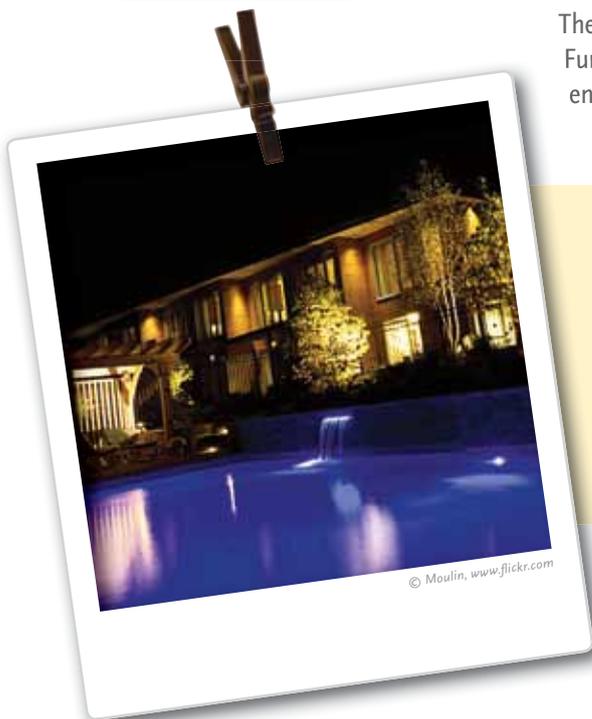
### TAGS:

- Early market engagement
- Sports facilities

In May 2010 Wakefield Council (UK) started to develop a strategy to procure a highly energy efficient lighting system for a new swimming pool and leisure complex.

Recognising that there were significant innovations in the field of lighting, Wakefield made a procurement prospectus available to the market providing details on their proposed project and inviting suggestions from all tiers of the supply chain to come forward with innovative proposals.

The most promising responses to the prospectus were followed up with workshops. Furthermore a directory of businesses that responded was published online to encourage partnering between suppliers in preparation for the call for tender.



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## 4.5 OTHER RELEVANT SNAPSHOTS

- 2.1 – Passive social housing in southwest Finland
- 2.5 – Meeting the needs of the community in Cleverly, UK
- 3.7 – Increasing Recycled Content in Construction, Bristol, UK
- 3.6 – Targeting community benefits in prison construction in Scotland

## 5 CHOOSING YOUR PROCUREMENT MODEL

### 5.1 RENEWAL OF THE KOEMARKT IN PURMEREND, THE NETHERLANDS

**TAGS:**

- *User involvement*
- *Integrating design and build*
  - *Infrastructure*
- *The Netherlands*

In preparation for the 600<sup>th</sup> anniversary of the municipality of Purmerend in 2010, it was decided to redevelop the historic Koemarkt (market square). Rather than use a traditional, single-stage, lowest-price, lump-sum tendering approach, a decision was taken to procure based on the Most Economically Advantageous Tender.

A 'cost led procurement' approach was used whereby a maximum budget of €2.4 million was set, with contract award to be based solely on quality. Furthermore, as it was necessary to be ready in time for the anniversary celebrations, any tenderer was required to commit to a fixed date of delivery. The client used a two-stage design and build contract and employed a consultant to support them on use of this type of contract as the public authority had little experience of this previously.

The tender procedure used for this project involved a prequalification process following which the top five bidders remained; these five integrated bid teams were invited to develop a preliminary design from which the list was reduced to three tenderers; these three bid teams produced a detailed design; from these designs a winning bidder was chosen. An interesting element of this procurement process was that the local population of Purmerend was invited to choose the winner in a referendum. Two local SMEs businesses launched a consortium to bid for the contract and were ultimately successful with their knowledge of the local community.

As a result of using this procurement methodology, the project targets were achieved. In addition, the early feelings of scepticism that existed among some members of the internal departments of the public authority were transformed into enthusiasm and pride over the course of the project. Furthermore, communication with stakeholders increased project support, and advice from local residents resulted in advantageous design changes. This level of local support and involvement had not been anticipated but was welcomed by both client and supply side project partners, demonstrating as it did significant local buy-in.

All project targets were achieved. The project was €3,000 under budget. This included a bonus of €15,000 built into the contract for early delivery which was successfully achieved by the contractor.



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## 5.2 INNOVATIVE RENOVATION OF A 1960S OFFICE IN WEIZ, AUSTRIA

### TAGS:

- Energy efficiency
- Certification assessment schemes
- Ambitious targets
- Integrating design and build
- Offices

The headquarters of the District Authority of Weiz is located in an office building constructed in 1964. Due to new requirements concerning function, fire protection and energy demand, comprehensive renovation was necessary.

Before procurement took place a comprehensive study of the building was conducted to develop a detailed and ambitious energy concept, with the target of achieving the A+ Austrian energy certificate. This provided the basis for the whole procurement process. This showed that the high energy consumption for heating was mainly caused by the poor thermal quality of the building shell (u-values) and inefficient HVAC (heating, ventilation and air conditioning) systems.

Procurement was carried out in two stages. The first step was the procurement of planning and design services (architect, specialist consultants). The restricted procedure was used, where selected architects and specialist consultants had to show their experience in the field of energy efficient renovation through reference projects – a requirement of critical success to the project.

The second step involved tendering for construction work and building services (HVAC, electrical services, etc.). As required by Austrian procurement law, this was done through an open procurement procedure. At this stage the architect and the specialist consultants employed in the first step were responsible for the technical (environmental) specifications of the tendering documents and also for the checking the compliance of the bids. They developed detailed technical specifications for the construction work (materials, u-values, specifications for an innovative facade solution, etc.) and the building services (e.g. output power and performance of the HVAC system). For the innovative façade element tender a detailed, technologically neutral specification was developed (u-value, fire protection requirements, etc.). This was developed with a specific technology in mind (GAP Solution Façade), but it was left up to bidders to offer the most appropriate solution.

Following renovation, completed in 2011, the building is expected to have a reduction of the energy demand for heating and annual CO<sub>2</sub>-eq. emissions per m<sup>2</sup> of about 80%. Detailed energy monitoring is being carried out to evaluate the renovation measures.



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## 5.3 CHURCH VILLAGE BYPASS, SOUTH WALES, UNITED KINGDOM

### TAGS:

- *Integrating design and build*
- *Sustainable construction materials*
- *Community benefits*
- *Infrastructure*

In 2007/08 the Rhondda Cynon Taff County Borough Council tendered for the design and construction of the 7km Church Village Bypass, which involved five major civil engineering contractors.

The Welsh Assembly Government (WAG) confirmed funding for the scheme in March 2008 and proceeded to utilise an Early Contractor Involvement methodology for project delivery. This involved establishing a partnering approach to design and build, in which the main contractor (Costain) was engaged before the detailed design stage and completion of statutory processes, to assist in planning the project and estimating its cost.

Costain reviewed the original outline plans as part of a value engineering exercise and proposed a revised scheme which identified savings of £37 million (€46.5 million) and 51% reduced carbon emissions compared to the original scheme, through a number of initiatives, including:

- Imported stone and primary steel being at least 60% recycled content
- 70% recycled aggregate, from local suppliers
- As the scheme went through old landfill sites permission was sought from the Environment Agency to use materials from these for the scheme, including 300,000 tyres and 80,000m<sup>3</sup> of pulverised fuel ash

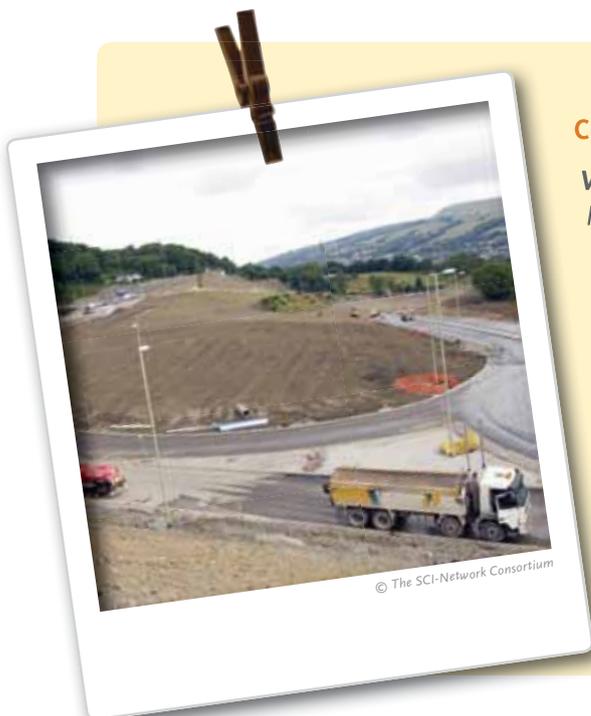
The revised scheme was presented at a public exhibition and outlined the numerous benefits including a reduction in visual impacts through extensive planting and the use of bunding to reduce traffic noise. Additionally Costain worked closely with the Council and Constructing Excellence in Wales to consult with the public and key stakeholders to develop a Community Benefits Plan which aligned with the Council's own Community Plan. On completion of the project in 2010, three months ahead of schedule and £1 million (€ 1.24 million) under budget, a total of 90% of waste had been diverted from landfill and 70% of the bypass had been constructed from locally sourced recycled aggregate. The local community was kept informed and involved throughout the project by utilising newsletters and information notices along with a dedicated website and visitor centre. Additionally 75 jobs were created for long-term unemployed during the project and more than 90% of sub-contracts were awarded to local companies based in South Wales. The project has won numerous awards and is part of Constructing Excellence in Wales' Demonstration Project Programme.

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- [www.cewales.org.uk/awards/2011-award-winners-case-studies-2/waste-minimisation-church-village-bypass/](http://www.cewales.org.uk/awards/2011-award-winners-case-studies-2/waste-minimisation-church-village-bypass/)
- [www.ceequal.com/awards\\_103.htm](http://www.ceequal.com/awards_103.htm)
- [www.bitc.org.uk/resources/case\\_studies/afe3005.html](http://www.bitc.org.uk/resources/case_studies/afe3005.html)
- [www.wao.gov.uk/assets/englishdocuments/Transport\\_English.pdf](http://www.wao.gov.uk/assets/englishdocuments/Transport_English.pdf)





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## 5.4 CO-OPERATING IN DESIGN – NATIONAL UNIVERSITY OF IRELAND, GALWAY

**TAGS:**

- *User involvement*
- *Teamwork*
- *Integrating design and build*
- *Schools*

From 2006-2011 the National University of Ireland, Galway undertook the development of a New Engineering Building. This landmark project involved the development of a new facility to unite five engineering disciplines (previously spread across 13 locations) under one roof on campus. A key aspect for the university was that the building should act as a ‘Teaching Tool’ for engineering technologies and principles, delivering both value for money and value in ongoing benefits in terms of educational development. Design and construction were contracted separately for the project. The design team was procured through a competitive public procurement process, resulting in individual appointments for core design, project management, and cost management services. The main contractor was procured through OJEU public procurement, utilising the restrictive process.

The result is a world class example of innovative and sustainable design. The client has an exemplar building that provides a holistic 21<sup>st</sup> century learning environment. This was achieved through a co-ordinated approach by the team across the whole project, with key team members and stakeholders involved as necessary to ensure successful delivery of the project. In regards to the building design, the University’s staff, building managers and end-user occupants were invited to engage with the design process, so that their specific requirements were integrated into the final design. The contractor also input into discussions on design and buildability to ensure the quality of the final building. A collaborative team approach resulted in the project being delivered on programme. Collaborative working practices such as co-ordinated communications protocols and an electronic document management system were utilised during the design and construction stage to ensure the latest information was available to relevant individuals.

This approach also led to cost savings and added value being realised across the project. The project also achieved a rating B1 in Ireland’s energy classification scheme (BER) through implementation of sustainable initiatives such as rainwater harvesting, a biomass boiler, and ground-source heat pumps.



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## 5.5 PPP FOR A PASSIVE HOUSE SCHOOL, GERMANY

### TAGS:

- Energy efficiency
- Ambitious targets
  - Passive House
  - Public-private partnership (PPP)
    - Alternative contractual models
  - Competitive dialogue
    - Schools
  - Sports facilities

Many parts of eastern Germany have been suffering from population decrease since the 1990s. In the County of Oberspreewald – Lausitz, this led to amalgamation of several schools. Looking to turn a crisis into an opportunity, the county and local towns decided to build a new campus, SeeCampus Niederlausitz, to also act as a communication hub for the local population and fulfil high environmental and socio-economical demands. The project involved the construction of four school buildings, three school gyms, a sporting complex, and a rental centre for educational media.

Given the heavy investment costs, it was decided to establish a public-private partnership (PPP) for the design, build, financing and operation for a period of 30 years. In addition to the traditional operation of the technical services and infrastructural facility management (cleaning, maintenance, caretaker service) the school catering and operation of the publicly accessible cafeteria as well as maintenance of IT equipment (including IT support and network administration) were also transferred to the private partner.

One of the main goals of the project was to achieve the passive house standard, with specific penalty clauses included in the contract for non-fulfilment. Criteria were developed in collaboration with the Passive House Institute in Darmstadt, including a maximum heating demand of 15 kWh/(m<sup>2</sup>a).

To select the private partner a negotiated procedure was used, with elements of competitive dialogue. Bids were requested based on an initial design (itself prepared through an architectural competition), with a strong element of the evaluation related to concepts for achieving the Passive House standard, and reducing construction costs.



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- [www.seecampus-niederlausitz.de](http://www.seecampus-niederlausitz.de)
- [www.passiv.de](http://www.passiv.de)



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## 5.6 PUBLIC-PRIVATE PARTNERSHIP FOR A KINDERGARTEN IN VINOVO, ITALY

**TAGS:**

- *Public-private partnership (PPP)*
- *Alternative contractual models*
- *User involvement*
- *Schools*

In 2008 the municipality of Vinovo needed to build a new kindergarten. It was decided to use a specific form of Italian public-private partnership (PPP), called Leasing in Costruendo. This process involves tendering jointly for the design and build, as well as the financing of the construction – to be provided by a partnership between a funder (a financing organisation such as a bank) and a construction company.

Ultimately the process leads to two separate contracts:

1. A leasing contract with the funder of a set duration, over which period the authority will pay leasing fees (capital and interest) for the use of the building, once building work is complete. At the end of the leasing contract, ownership of the building passes to the authority.
2. A design and build contract with a construction company, managed by the financing organisation.

Under this scheme design and construction work is carried out by the construction firm, and financed and overseen directly by the funder. This strong partnership between funder and construction firm helps to guarantee the quality of the works. The scheme also has the advantage of reducing identification of funding and the procuring of design and construction into one single stage.

The construction was completed in one year, which is an unusually a short term for this type of contract. In addition the winning construction company worked directly with teachers in certain elements of sustainable design such as furniture, equipment location, external common areas and building appliances. They were also provided with information on the use of innovative energy equipment.



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## 5.7 SHARING THE RISKS AND SAVINGS IN JYVÄSKYLÄ, FINLAND

### TAGS:

- Energy efficiency
- Alternative contractual models
- Water
- Schools

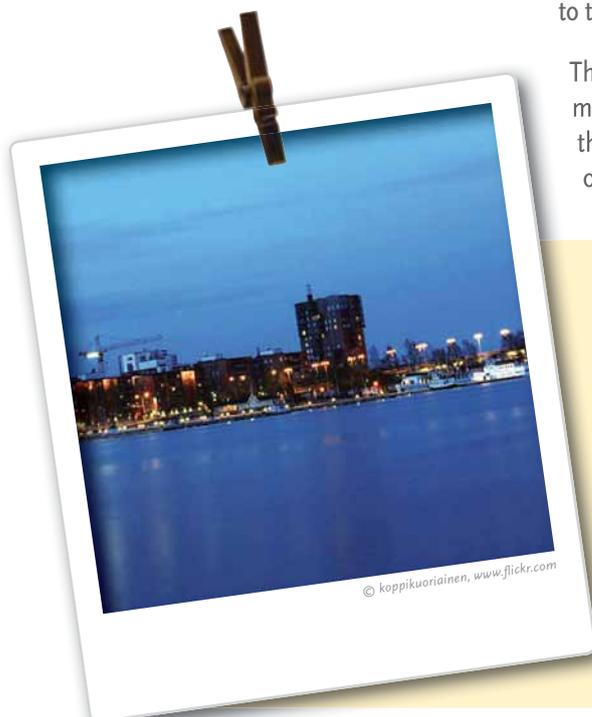
In 2010 the City of Jyväskylä started a project called Jyväskylän Optimi aimed at enhancing innovation and promoting life cycle thinking in procurement. The innovative procedure was piloted with the construction project of a school and day-care centre where specific targets for energy efficiency and sustainable development were included. It was decided to tender for a contractor to design, build and also operate the facilities to enhance efficiency. The negotiated procedure was used.

The essential new element in life cycle procurement was to transfer the risk of exceeding the agreed limits of energy consumption from the customer to the service provider. The limits for heating energy, electricity (excluding user electricity demand such as lighting, other appliances etc.) and water consumption as well as the payment terms and price risk

for exceeding the limits were established in the service contract. If, on the other hand, consumption is below the limits set, the savings are shared 50/50 between the customer and the service provider.

For example, if the heating energy consumption of the buildings exceeds the established limit, the service provider pays the extra energy use, including carrying the price risk. On the other hand, the customer carries the risk of increasing energy unit prices for the energy consumption below the limit set in the contract. Every calendar year, in January, the customer and the service provider balance out the previous year's actual energy unit cost against the corresponding amount of energy according to the risk-sharing mechanism described above.

The mechanism has proven its role as an incentive to design and implement the most energy efficient buildings possible. In addition, the contract encourages the use of the property as energy efficiently as possible due to the 50/50 division of savings. The contract was signed in autumn 2011, and it will last until 2033.



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- [www.slideshare.net/Tekesslide/opetuksen-ja-pivkodin-toimintaympristn-uudet-innovaatiot-ja-elinkaaritavoitteet](http://www.slideshare.net/Tekesslide/opetuksen-ja-pivkodin-toimintaympristn-uudet-innovaatiot-ja-elinkaaritavoitteet)



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## 5.8 DESIGN, BUILD AND OPERATE THROUGH COMPETITIVE DIALOGUE, COLLESALVETTI, ITALY

**TAGS:**

- *Public private partnership (PPP)*
- *Alternative contract models*
- *Competitive dialogue*
- *Sports facilities*

In 2011 the municipality of Collesalveti (Province of Livorno) published a tender for the award of a 45 year concession for the design, build and operation of an existing multi functional sport centre called “Cittadella dello Sport”.

The municipality invited construction companies to join a two phase competitive dialogue procedure, based on an initial plan of the sport centre prepared by the authority. Companies were pre-selected to participate on the basis of their technical and financial capability.

In the first phase, each pre-selected company was invited to propose amendments to the initial project proposed by the municipality, helping the public authority to make the final investment technically and financially sustainable, also suggesting possible different functions compatible with the sport area. These submitted proposals and amendments were checked and compared by the municipality, and on the basis of this the best solution to meet the needs was identified.

In the second phase, the same companies were then invited to tender for the construction work and operation based on the revised plans. The contractor was selected through the most economically advantageous tender (MEAT) procedure. 15% of points in the evaluation were according to the environmental quality of the final plan – specifically covering the efficiency of heating, cooling and electricity systems, the inclusion of green spaces and pedestrian and cycling access.



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## 5.9 PARTNERING TO DEVELOP RENEWABLE ENERGY, AGUÇADOURA, PORTUGAL

### TAGS:

- *Alternative contract models*
- *Sports facilities*

In May 2011, Aguçadoura district within the Portuguese Municipality of Póvoa do Varzim, entered into a partnership with a commercial developer of renewable energy supplies.

The district contributed 50% of the investment costs for the installation of photovoltaic and thermal solar panels on the roof of the local leisure centre (located in the district school). The other 50% was provided by the company 'Eficiência Real'.

The solar panels will provide both hot water and electricity for the building, with the surplus electricity being sold commercially to the national utility company EDP for the period of 15 years. Revenues are to be shared by the district and 'Eficiência Real'.

The total investment was nearly €40,000, including photovoltaic panels for energy production, 36 thermal panels and a steam boiler and other equipment for water heating; reducers for taps and showers were also installed to save water. The project will reach its break-even point by the end of 2019 (a pay-back period of 8 years).

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## 5.10 EPC FOR SOCIAL HOUSING – EMILIA ROMAGNA, ITALY

### TAGS:

- *Energy efficiency*
- *Energy performance contracting (EPC)*
- *Alternative contract models*
- *Competitive dialogue*
- *Residential*

The Emilia Romagna public housing association ACER carried out a pilot in the framework of European FRESH project<sup>7</sup> in 2011 to demonstrate that energy performance contracting (EPC) can be used for upgrading energy efficiency in the social housing sector on a large scale.

The pilot site consists of 13 public dwellings built in 1981 in the town of Reggio Emilia in a quarter called which needed complete renovation to improve both comfort and energy efficiency. ACER, the management entity of the buildings, acted as the leading authority in the process on behalf of the tenants.

The EPC was awarded to an ESCo (Energy Services Company) through the competitive dialogue process. The final 12 year contract included a guarantee of 35% energy savings per year. This would be sufficient to repay the initial investment costs, cover winter fuel bills, and provide a fee for the ESCo, as well as providing an immediate 7% reduction in tenants annual energy bills. Any savings exceeding 35% during the duration of the contract will be evenly shared between ESCo and the residents. At the end of the 12 year contract, all benefits will accrue to the tenants. To reduce the risk of default by tenants, ACER provided a guarantee to the ESCo.

<sup>7</sup> [www.fresh-project.eu](http://www.fresh-project.eu)

The competitive dialogue procedure based on open, performance-based specification was deemed successful in allowing the ESCo to optimise its offer, with final proposals differing considerably from the original proposal.

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- [www.fresh-project.eu/pilot\\_sites/italy/](http://www.fresh-project.eu/pilot_sites/italy/)
- [www.acer.re.it/AcerHomepage/Archivionotizie/2012/ giugno/materialeconvegnoFresh/tabid/634/Default.asp](http://www.acer.re.it/AcerHomepage/Archivionotizie/2012/ giugno/materialeconvegnoFresh/tabid/634/Default.asp)



**5.11 BUNDLING BUILDINGS FOR EPCS IN BERLIN, GERMANY**

**TAGS:**

- Energy efficiency
- Energy performance contracting (EPC)
- Alternative contract models
  - Schools
  - Offices
  - Sports facilities

The City-State of Berlin has used energy performance contracting extensively for systems engineering in existing buildings. As there is no financial flexibility in undertaking the projects directly, this has proven a good way to achieve energy savings.

To avoid the energy service providers taking on only quick wins, different buildings are bundled into so called “building pools”, each covering different types and standards. It has typically proven successful to have buildings from one administrative unit in the same pool.

There are more than 1300 buildings covered by the projects in total. The largest group are schools, followed by kindergartens and office buildings, but fire stations, sports facilities and other public buildings are also covered. The savings achieved vary across pools from 15% to 35%.

The contracts are awarded through a negotiated procedure. A rough estimate of the individual saving potentials is developed by the bidders during the tendering process. After the contract is awarded, a detailed analysis is developed, at the cost of the contractor. The contractors are responsible for the cost of refurbishment, operations, maintenance, inspection, systems management and continuous optimisation.

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## 5.12 RE:FIT, RETROFITTING PUBLIC BUILDINGS FOR MINIMAL OUTLAY IN THE UK

### TAGS:

- Energy efficiency
- Energy performance contracting (EPC)
- Alternative contract models
- Schools
- Offices
- Sports facilities

The Greater London Authority (GLA) has created the RE:FIT Building Energy Efficiency Programme, a procurement framework providing a turnkey contracting model that greatly accelerate retrofits to reduce energy use in public buildings and allow public sector organisations to make substantial cost savings. RE:FIT is an ambitious and far reaching scheme designed to provide a convenient and consistent pathway to retrofitting buildings with energy conservation measures. Focussing on energy efficiency, energy reduction and green energy creation RE:FIT is now available to all public organisations in London and the UK.

Piloted in London the RE:FIT programme initially incorporated 42 buildings in the Greater London Authority. This innovative approach adopts Energy Performance Contracting (EPC) – where modifications to a building are financed by energy savings made over time. Energy Service Companies (ESCOs) will install energy conservation measures in identified buildings and guarantee annual energy savings over an agreed payback period. This Energy

Performance Contracting model transfers the risk of performance to the ESCOs as they must guarantee the energy savings to be made over the agreed payback period, typically around 7 years. At the end of the payback period savings continue to benefit the building's owner. A wide range of energy saving measures have been installed on buildings to date including draught proofing, heat recovery, solar thermal, secondary glazing, voltage optimisation, cavity wall insulation and combined heat and power.

The 42 buildings in the pilot identified CO<sub>2</sub> savings of 28% on average and these savings were gained for minimal outlay, the improvements being paid for over the life of the contract and the risk being taken on by the ESCo. The establishment of the RE:FIT framework of companies reduces the procurement cost of this type of retrofit and contributes toward overall affordability, there are now around 140 organisations in the pipeline for RE:FIT.



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- [www.london.gov.uk/priorities/environment/climate-change/energy-efficiency/buildings-energy-efficiency-programme](http://www.london.gov.uk/priorities/environment/climate-change/energy-efficiency/buildings-energy-efficiency-programme)
- [www.ecologic.eu/files/attachments/Projects/2358/presentation\\_caujolle-pradenc.pdf](http://www.ecologic.eu/files/attachments/Projects/2358/presentation_caujolle-pradenc.pdf)



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### 5.13 RENOVATION OF MINISTRY BUILDINGS THROUGH PPP, THE NETHERLANDS

**TAGS:**

- Energy efficiency
- Public-private partnership (PPP)
- Alternative contract models
- Offices

In 2010 in the Netherlands, the Ministry of Finance decided to renovate the main Ministry of Finance headquarters building following complaints about the technically outdated climate system. In addition to the renewal of the air conditioning and heating, the building facades also needed to be adjusted as preliminary works revealed that the structure of the building was outdated and inflexible. After consultation with the Building Agency, it was decided to address all these building faults at the same time and furthermore to adapt the building to modern demands.

This building was the first successful use of a public-private partnership (PPP) in the retrofit of a government building. The main reason for choosing PPP as a project financing route was to enable the public authority to access the state of the art knowledge within the supply side while mitigating risk and reducing future maintenance costs over a 25 year contract period.

The Ministry of Finance was built in 1975 and is an excellent example of brutalism in the Netherlands. However, it did not satisfy the needs of a modern ministry. After extensive renovation, the building now offers office space to 1,750 employees over seven floors. It includes meeting rooms, a library, restaurant, underground parking and sports facilities. The renovation has done much to embed the building in the urban fabric by developing a welcoming central entrance. One of the courtyards is now part of the public domain, and is also an inviting – partially covered – winter garden designed on the corner of Short Voorhout. There is also an atrium which acts as the ‘heart’ of the building. The ventilation and lighting has also been modernised. Improvements to heat and cold storage and an ingenious double-skin façade have contributed substantially to energy savings, even though the building has more than 250 workstations. The building also meets the Dutch National Package Plus programme for sustainable buildings.



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- [www.rijksoverheid.nl/ministeries/fjn/organisatie/het-gebouw](http://www.rijksoverheid.nl/ministeries/fjn/organisatie/het-gebouw)



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## 5.14 ROTTERDAM – EPC FOR SWIMMING POOLS, THE NETHERLANDS

### TAGS:

- Energy efficiency
- Energy performance contract (EPC)
- Alternative contract models
  - Competitive dialogue
  - Sports facilities

The City of Rotterdam has set the target of achieving a 50% reduction in CO<sub>2</sub> emissions by 2025. In 2010, as a pilot initiative, the Real Estate Management Department of the Development Corporation Rotterdam (RE DCR), tendered for an energy performance contract (EPC) covering nine swimming pools, with payments based on actual energy savings delivered.

The 10-year EPC contract, which also included responsibility for maintenance of the facilities as well as operation, was awarded through the competitive dialogue procedure. This procedure was decided upon due to the uncertainty of the contracting authority regarding potential energy saving measures, and the complexity of possible payment and pricing structures. Energy bills were analysed and checked against real consumption. The baseline measurements and preliminary analysis of potential improvements indicated that a 10 year payback period would be sufficient. The award of the contract was based on the energy savings offered by the tenderers.

The winning contractor (Strukton) guaranteed annual energy savings of 34%, with savings beyond this to be shared by the city and the contractor. The initial investments in energy saving measures will be paid back through the energy savings made over the 10 year contract period. The city pays periodic compensation to ESCo based on the actual delivered savings (bonus/penalties) and annual maintenance budgets.

The inclusion of maintenance responsibility within the contract makes sense as the contractor has a clear incentive for ensuring newly installed equipment is performing correctly and achieving energy savings. The pilot will now be rolled out across the city.



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## 5.15 LOW ENERGY DAY CARE CENTRES THROUGH EPC, PORVOO, FINLAND

**TAGS:**

- Energy efficiency
- Energy performance contract (EPC)
- Alternative contract models
- Competitive dialogue
  - Schools

In 2010 the City of Porvoo initiated a project to develop a day care centre based on the consideration of the full life cycle of the building. A central aim of the project was additionally to enhance competence amongst city procurement staff in handling life cycle objectives within a construction project. Clear project goals were set relating to energy efficiency other sustainability aspects, and in establishing long term contractual relationships.

The contract was awarded through the competitive dialogue process, which involved seven contractors. The procurement procedure required allocation of time and resources, but all parties found it worthwhile in optimising arrangements.

The contract was made between three parties: the city of Porvoo as the building owner, a finance company to provide the funding, and the service provider responsible for design, construction and maintenance for the following 20 years. The service contract established guaranteed limits for heating energy and electricity demand, as well as payment and funding terms and price risk. Energy demand was ultimately set at 40% lower than the original goal set by the city. This will be annually monitored. Another sustainability requirement was flexibility for alterations if the user needs change.



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## 5.16 OTHER RELEVANT SNAPSHOTS

- 2.3 – Sustainable UN Headquarters development in Copenhagen, Denmark
- 2.4 – Managing complex contracts in Alsace, France
- 2.6 – User and contractor interaction –Thor Heyerdahl College, Larvik, Norway
- 2.7 – Working with the regional Energy Agency in Avigliana, Italy
- 3.4 – Communicating ambition for ‘The Hive’, UK
- 6.1 – Whole life costing for a swimming pool in Olhão, Portugal
- 6.3 – Integrating WLC into strategic partnerships, DSTL, UK

## ⑥ LIFE CYCLE/WHOLE LIFE COSTING

### 6.1 WHOLE LIFE COSTING FOR A SWIMMING POOL IN OLHÃO, PORTUGAL

**TAGS:**

- *Energy efficiency*
- *External assistance*
- *Ambitious targets*
- *Whole life/life cycle costing*
- *Alternative contract models*
- *Sports facilities*

In 2011 the Portuguese Municipality of Olhão in the Algarve – in an effort to diminish their dependency on fossil fuels and taking on consideration for whole life costing (WLC) methodologies – developed a plan to install renewable energy equipment in several of its buildings. In June 2011, a thermal system was implemented in the municipal swimming pool comprising of 50 solar panels which will provide heating of the water for the swimming pool, and other equipment in the building.

The Municipality recognised that it required support to procure using whole life costing as it did not possess the skills and knowledge within its own team to make such decisions without external help. As such it identified a local government agency, the Regional Agency for Energy and Environment of the Algarve which had the necessary expertise and with whom partnering was possible. The Agency comprises of several regional and national entities, charging low rates for services due to its not-for-profit status. The resulting procurement process, managed by the Agency, saw the appointment of a specialist company to deliver installation and management of the equipment and systems required.

The procurement process had specific WLC requirements embedded within it, looking at the life-time expectancy and quality of proposed equipment. Each of the applicants for the tender process provided different budgets with different quality standards. By using WLC the real cost of competing bids could be thoroughly assessed leading to a financial and environmentally sustainable project.

The project encompassed a sustainable approach to construction, enabling not only a reduction in energy consumption, but also the use of clean energy in direct substitution for natural gas. The maintenance operations are also reduced, leading to further savings over the life of the facility. Furthermore, for a total investment cost of €85, 000, the new system will enable the public authority to achieve annual savings of €15, 000 that were previously spent in natural gas, resulting in approximately six years of payback. From a financial perspective the payback is relatively short, but environmentally the positive benefits are not only in the reductions on CO<sub>2</sub> emissions, but also in overall energy consumption as the new equipment has enhanced efficiency capabilities.



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## 6.2 LIFE CYCLE APPROACH FOR KERBING IN WAKEFIELD, UK

### TAGS:

- *Ambitious targets*
- *Whole life/Life cycle costing*
- *Sustainable construction materials*
- *Infrastructure*

Wakefield Metropolitan Council traditionally used pre-cast concrete kerb edgings when building or maintaining its 1,400km road network. The Council recognised there may be an opportunity to use alternative products that would lessen the risk of injury to its staff, make use of waste material that would otherwise end up in landfill sites, and provide a better service to its road users by reducing road disruption time.

By using whole life costing principles, the Council determined that a product called Durakerb offered better value for money than comparable cheaper traditional products, despite a 235% higher purchase price. This whole life costing approach took account of delivery, use, and disposal costs, in addition to the purchase price. The Council also identified the potential social, environmental and economic impacts and costs throughout the product's lifecycle when evaluating the range of products offered by suppliers.

The Council used an output performance specification when requesting supplier tenders for kerbing. Instead of tightly specifying the traditional pre-cast concrete kerb edging, the performance based specification enabled a proposal for the lightweight Durakerb edging made from entirely recycled materials to be considered. The lightweight construction improved health and safety associated with manual lifting and vibration from cutting and shaping as well as the need for lifting machinery while the product also improved durability.

Environmentally, the use of Durakerb also enabled a 73% reduction in carbon emissions from transportation of the kerbs, due to much lower weight and the ability to transport 1248 units of Durakerb per load rather than 364 units of traditional concrete (247kgCO<sub>2e</sub> rather than 925kgCO<sub>2e</sub>) while embodied carbon per unit was also 17% less (8.7kgCO<sub>2e</sub> rather than 10.5kgCO<sub>2e</sub>).



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### FURTHER INFORMATION:

- [www.wakefield.gov.uk/NR/rdonlyres/F91F754B-EAB9-4173-97C5-387F3681A39F/o/Whole\\_Life\\_Costing.pdf](http://www.wakefield.gov.uk/NR/rdonlyres/F91F754B-EAB9-4173-97C5-387F3681A39F/o/Whole_Life_Costing.pdf)



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## 6.3 INTEGRATING WLC INTO STRATEGIC PARTNERSHIPS, DSTL, UK

### TAGS:

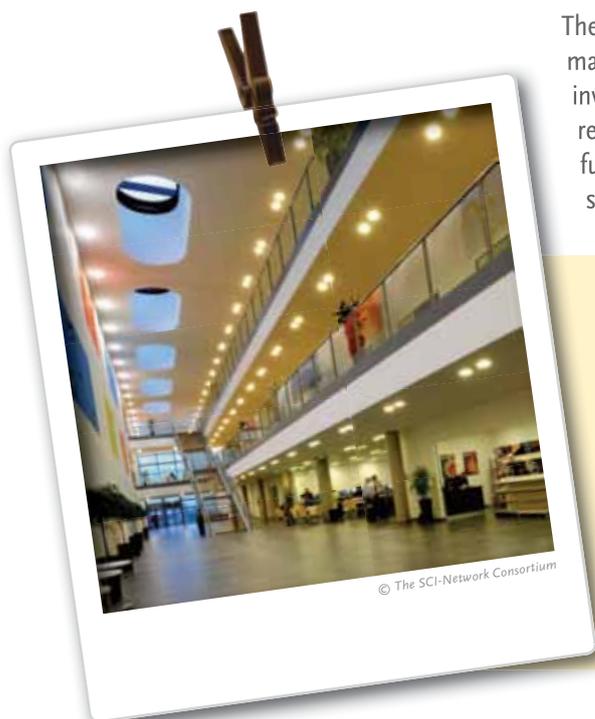
- *Whole life/Life cycle costing*
- *Public-private partnership (PPP)*
- *Alternative contractual arrangements*
- *Offices*

The Defence Science and Technology Laboratory (DSTL) selected Serco for a 15 year strategic partnership contract called 'Project INSPIRE', aimed at providing and supporting new and refurbished laboratory and office accommodation. Bidders were required to provide comprehensive answers to a number of questions, including: 'Describe your approach to energy saving and sustainable development for all aspects of your proposals'; 'Describe how you will provide a travel and hospitality service'; and 'Provide your proposals for health and recreational facilities'.

Serco is responsible for providing comprehensive facilities management services across DSTL's estate for 15 years from August 2006, and for the first 2 years Serco also managed the design and build of new facilities and refurbishment of others. The innovative new facilities and supporting services ranged from laboratory set-up to travel management services.

A model was prepared in order to illustrate likely future expenditure required on both buildings of the project (new build and a refurbishment). The formal report for DSTL was structured according to the headings in ISO 15686 – Part 5 (whole life costing).

The main benefits of this focus on life cycle costs were twofold: firstly the facilities management provider was able to show to their client that they are planning to invest during the operation and maintenance stages and they are planning the relevant expenditure and secondly Serco gained a practical insight into not only future costs but also their timings so they could plan their financial strategy to suit.



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### FURTHER INFORMATION:

- [www.defencemanagement.com/article.asp?id=180&content\\_name=Defence%20Estates&article=4499](http://www.defencemanagement.com/article.asp?id=180&content_name=Defence%20Estates&article=4499)
- [www.dstl.gov.uk/downloads/19-12-08.pdf](http://www.dstl.gov.uk/downloads/19-12-08.pdf)



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## 6.4 GAS-POWERED GENERATORS FOR THE OLYMPIC VILLAGE, LONDON

**TAGS:**

- Whole life/Life cycle costing
- Infrastructure

A whole life costing approach was used in determining the appropriate type of temporary electricity generators to be used during construction of the Olympic village in London. The financial, social and environmental implications of the different options were assessed. As a result, gas-powered generators were selected.

Despite costing more to hire, gas-powered generators have significantly lower fuel costs than diesel generators. In addition, the reduction in lorries for fuel delivery helped reduce road nuisance and congestion.

Carbon emissions of the alternative technologies were also considered, with a monetary value attached to emissions based on the the Department for Environment Food and Rural Affairs (Defra) published Shadow Price of Carbon. Gas generators were estimated to produce 10,470 fewer tonnes of CO<sub>2</sub> than the diesel generators – a 22% reduction. An overall economic cost saving of around £13 million (€16 million) was achieved.



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**FURTHER INFORMATION AND ACKNOWLEDGEMENTS:**

- [learninglegacy.london2012.com/publications/the-role-of-the-construction-supply-chain-in-delivering.php](http://learninglegacy.london2012.com/publications/the-role-of-the-construction-supply-chain-in-delivering.php)

## 6.5 OTHER RELEVANT SNAPSHOTS

- 4.1 – Driving innovation in heating technology in Oslo schools, Norway

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## THE SCI-NETWORK

The SCI-Network, Sustainable Construction and Innovation through Procurement is a growing European network of public authorities working together to:

- explore European best practice in construction procurement
- and identify how best to encourage innovation and sustainability

This guide has been produced on the basis of a series of reports and recommendations developed by European working groups on a series of relevant topics.

[www.sci-network.eu](http://www.sci-network.eu)

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