



WP 4: INTEGRATING CARBON REDUCTION IN DECISION MAKING AND KEY BUSINESS PROCESSES

Business Cases, Procurement, Financing and Capacity-Building

Executive Summary

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The partners of this project are:

- STIB (Brussels, Belgium) as lead partner
- moBiel (Bielefeld, Germany)
- RATP (Paris, France)
- RET (Rotterdam, The Netherlands)
- TfGM (Manchester, UK, formerly GMPTE)

The Ticket to Kyoto project is co-financed by the INTERREG IVB North West-Europe Programme.

Notice

This document and its contents have been prepared and are intended solely for the five Ticket to Kyoto partners (moBiel, RATP, RET, STIB and TfGM) for their information and use in relation to the Ticket to Kyoto project, WP4 – Optimising policies and regulations for CO₂ reduction in the public transport sector.

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Executive summary

Ticket to Kyoto

The Ticket to Kyoto project has been established to reduce CO₂ emissions in public transport through more environmentally friendly behaviour and changes in infrastructure. The project's five partners are:

- moBiel, Bielefeld, Germany;
- RATP, Paris, France;
- RET, Rotterdam, The Netherlands;
- STIB (Project Lead), Brussels, Belgium; and
- TfGM, Manchester, United Kingdom.

The project took place over four years (2010 to 2014), co-financed by the INTERREG IVB North West-Europe Programme. Its key goal is to *"introduce the principle of low CO₂ emissions as the new standard for public transport providers"*.

WP4 - Optimising policies and regulations for CO₂ reduction measures

To reach this goal the project has identified five key actions plans delivered within a series of five work packages (WP). Atkins was commissioned to assist the partners with WP4 - Optimising policies and regulations for CO₂ reduction measures.

WP4 focuses on the interactions between public transport operators and authorities and their stakeholders, including local government, suppliers, maintenance operators, as well as the policy and legal context within which they operate.

The work was undertaken in two stages:

- An initial study undertaken in 2011/12 identified a set of 10 recommendations for partners to optimise *"policies and regulations for CO₂ reduction measures"* within their context;
- This report presents the result of work undertaken in 2013/14 to further develop four of the recommendations included in the 2012 report:
 - Recommendation 2 - Improvement to business cases process and guidance (all partners);
 - Recommendation 3 - Capacity building and tools (TfGM);
 - Recommendation 6 - Using ESCO and EPC models (RET and TfGM); and
 - Recommendation 8 - Including GHG performance in procurement process (all partners).

Business case processes and guidance (R2)

T2K partners regularly use a range of appraisal indicators including some or all of the following: payback period (often required to be less than three years, with up to six years accepted in some cases), Discounted Cash Flow (DCF), Net Present Value (NPV), Benefit Cost Ratio (BCR), Internal Rate of Return (IRR), full life financial impact on organisation, Life Cycle Cost (LCC) or Total Cost of Ownership (TCO). Some partners noted that although DCF analysis is generally used, simple payback (without DCF or any further analysis) is sometimes used on smaller projects. Some partners have developed spreadsheet templates or specialist software to undertake the financial appraisal element of the business case.

Environmental (and wider) impacts are not always included in these business case/appraisal processes however and energy use (electricity or fuel) is often considered only as part of wider operating costs rather than identified as a separate cost in the financial analysis. This seems to be especially true for smaller projects or projects which do not require any external funding (for example from another public body or government department).

Partners generally expressed interest in further developing their business case and appraisal techniques and standards to improve consistency and comparability and take account of wider impacts such as energy use and associated emissions where possible. However, some expressed the view that the process should not become too onerous as staff resources are limited and some projects are relatively small. The principle of “proportional appraisal” should be applied – where the effort required to include a benefit (or disbenefit) outweighs the advantage of taking it into account, it should not be quantified but a qualitative assessment can be included instead.

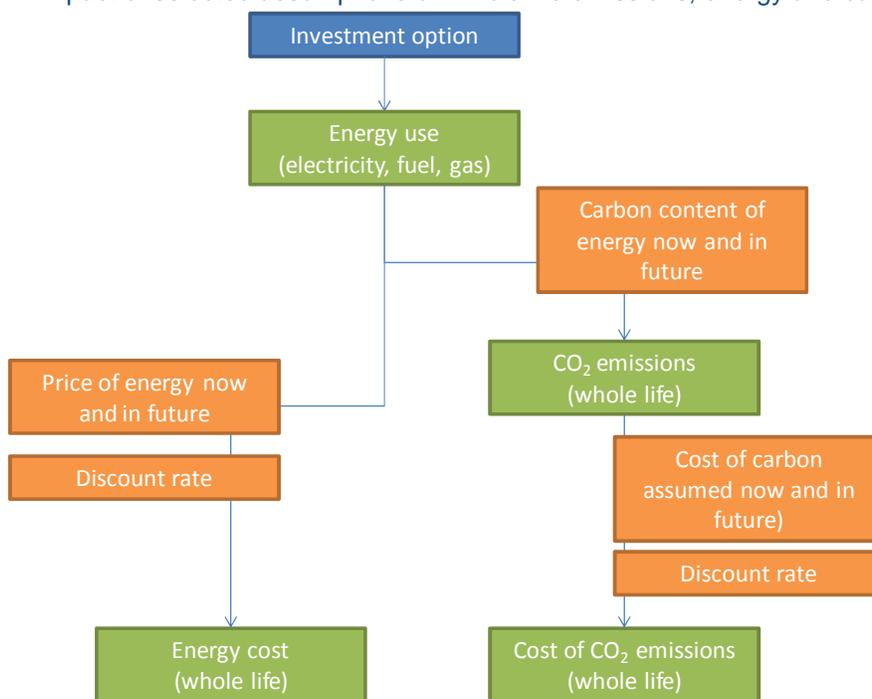
Appraisal methods and assumptions

The choice of appraisal method and/or indicator can have a significant impact on the energy efficiency (and related carbon emissions) of a project or organisation. For example, although easier to calculate, the simple payback period tends to be overly simplified to assess options with a long term impact on energy use and maintenance costs.

DCF analysis and the use of holistic methods such as TCO and LCA do not however guarantee an energy efficiency friendly appraisal. Appraisal results can be significantly influenced by the assumptions made to support the calculations, as shown in Figure E.1. It is therefore important that key assumptions used in appraisal processes are clearly identified, used consistently (to enable comparison between investment options) and can be tested to identify any (unintended) bias against energy efficient/ low carbon options. This study considers the impact of assumption selection with regard to:

- Appraisal period;
- Discount rates;
- Future energy prices;
- Carbon intensity of energy used; and
- Cost of carbon.

Figure E.1: Impact of selected assumptions on whole life emissions, energy and carbon costs



Appraisal template

Work undertaken under WP4 included the development of a spreadsheet tool to show examples of best practice for projects financial appraisal, focusing on how energy use and associated carbon emissions and costs can be expressly considered in the analysis.

The spreadsheet tool is provided to T2K partners with this report and provides partners with the “dashboard” required for them to visualise how energy and carbon data can be included in the appraisal and business case process.

Summary of findings and next steps

Partners generally expressed interest in further developing their business case and appraisal techniques and standards to improve consistency and comparability and take wider impacts such as energy use and associated emissions into account. Table E.1 provides a summary of partner progress so far and next steps in the development of business case processes to support energy efficient investment.

Table E.1: Summary of findings and next steps by partner

| T2K partner | Business case processes and guidance – Summary of findings and next steps |
|-------------|--|
| moBiel | <p>Established appraisal methods, including government guidelines used for larger projects</p> <p>Importance of appraisal/business case process remaining simple and “proportionate”</p> <p>Next steps - Limited need for further developments linked to review of assumptions used (e.g. linked to the planned change of energy mix in Germany)</p> |
| RATP | <p>Established financial appraisal methods and dedicated software includes consideration of energy use and resulting emissions but methods and software are not used systematically. It often depends on the project manager’s level of awareness with regard to energy use and emissions</p> <p>Some assumptions based on government guidelines but need for data on projected changes (energy cost, carbon intensity, cost of carbon) and existing assumptions need to be updated in some cases</p> <p>Next steps - Need to better include environmental considerations (energy, carbon) in dedicated tool and to ensure that tool is used widely/consistently; need to require further support on assumptions and projection from government agencies</p> |
| RET | <p>Project management methods established (based on Prince 2) but limited inclusion of energy use/carbon consideration in financial appraisal at present</p> <p>Appraisal process needs to remain simple to be undertaken by project managers who might not have financial appraisal knowledge but needs to be more consistent</p> <p>Next steps – Enhance current processes and formats to better include consideration of energy use and associated emissions</p> |
| STIB | <p>Project management methods established. Financial appraisal methods under review and further development being undertaken</p> <p>Appraisal assumptions linked to energy and emissions and tools being developed in parallel to WP4 work, building on good practice and information exchange from T2K project</p> <p>Next steps – Finalising new appraisal methods and assumptions and ensuring consistent use across the organisation</p> |
| TfGM | <p>Established project management and business case/financial appraisal methods, including government guidelines used for larger projects</p> <p>Spreadsheet tool available for project managers</p> <p>Strong set of appraisal assumptions developed at national level (energy prices, carbon intensity, shadow cost of carbon)</p> <p>Next steps - Limited need for further developments linked to resources and the need for decision-makers to develop further knowledge of energy/environmental issues</p> |

Including GHG performance in the procurement process (R8)

Building on existing practices and guidance, this part of the study explored how the GHG/sustainability performance of services and products purchased by T2K partners could be improved through the procurement process.

The Chartered Institute of Purchasing and Supply (CIPS) proposes the following definition for sustainable procurement: “*socially and ethically responsible purchasing which aims to minimise the organisation’s environmental impact (including through the supply chain) and deliver economically sound solutions*”.

The European Commission defines Sustainable Public Procurement (SPP) as public authorities seeking to achieve the appropriate balance between the three pillars of sustainable development - economic, social and environmental - when procuring goods, services or works at all stages of the project. Green Public Procurement (GPP) is defined as public authorities seeking to procure goods, services and works with a reduced environmental impact throughout their life-cycle.

The principles of sustainable procurement should result in reduced environmental damage and costs by:

- Questioning the need to buy;
- Reducing quantities;
- Saving energy, water and resources;
- Promoting re-use and recycling; and
- Minimising risk (e.g. negative publicity, environmental risks).

At the European level, new public procurement directives were adopted by the European Parliament in 2014 and Member States have to transpose the directives into national law by January 2016. Two key objectives of the reform were to facilitate taking account of environmental, social and innovation factors and to provide more flexibility in procedures and timelines, complemented by greater use of e-procurement. The new directives give greater prominence to LCC as a means of calculating costs, including the cost of environmental externalities such as GHG emissions, with the methodology to be indicated in advance in the tender documents.

There is a wealth of resources available at European or national (and in some instances regional) level to support project managers and procurement teams in developing specifications which aim to minimise environmental impacts. This includes the European Commission’s common GPP criteria, which provide examples of criteria and requirements for purchasing authorities to use, in line with Eu regulations.

T2K partners are generally aware of these resources and are generally committed to sustainable procurement. All partners have identified some examples of the application of sustainability criteria to their purchases. Partners however noted that delivering their commitment to sustainable procurement requires staff resources and buy-in from procurement and legal teams, who can be risk averse, for example when considering the use of new requirements in specifications.

Table E.2: Summary of findings and next steps by partner

| T2K partner | Including GHG performance in the procurement process – Summary of findings and next steps |
|-------------|--|
| moBiel | Established approach Next steps - Limited need for further developments |
| RATP | Established approach and good practice examples provided Next steps – Further progress in including environmental considerations (energy, carbon) in procurement process, supported by business case/financial appraisal developments |
| RET | Established approach and good practice examples provided Next steps – Enhance current processes to better include consideration of energy use and associated emissions |
| STIB | Established approach supported by regional requirements and good practice examples provided Next steps – Enhancements linked to progress with appraisal methods and assumptions to be applied consistently, including for the procurement process |
| TfGM | Established approach based on national framework Next steps - Limited need for further developments mainly linked to resources and the need for buyers, project managers and procurement officers to develop further knowledge of energy/environmental issues |

Third party involvement – using ESCO and EPC models (R6)

RET and TfGM expressed an interest in further investigating the potential for using Energy Service Companies (ESCOs) or Energy Performance Contracts (EPCs) within their organisation. Background information on ESCOs/EPCs was updated and presented to RET and TfGM at workshops, where the barriers to energy efficiency investment and the potential to involve third parties were discussed.

Definitions

The European Commission defines the various models considered as follows:

- **Energy Service Company (ESCO)** - a natural or legal person that delivers energy services and/or other energy efficiency improvement measures in a user's facility or premises, and accepts some degree of financial risk in so doing. The payment for the services delivered is based (either wholly or in part) on the achievement of energy efficiency improvements and on the meeting of the other agreed performance criteria;
- **Energy Performance Contracting/Contracts (EPC)** - a contractual arrangement between the beneficiary and the provider (normally an ESCO) of an energy efficiency improvement measure, where investments in that measure are paid for in relation to a contractually agreed level of energy efficiency improvement; and
- **Third Party Financing (TPF)** - a contractual arrangement involving a third party (in addition to the energy supplier and the beneficiary of the energy efficiency improvement measure) that provides the capital for that measure and charges the beneficiary a fee equivalent to a part of the

energy savings achieved as a result of the energy efficiency improvement measure. That third party may or may not be an ESCO.

Additionally, **Energy Supply Companies (ESCs)** were also discussed with RET and TfGM, where third party invest in low carbon/renewable energy equipment on behalf of a customer and recovers the cost of the investment by selling the energy produced to the grid (and providing low carbon energy to the customer).

Benefits and drawbacks

Table E.3 presents a summary of benefits and drawbacks from ESCO and EPC models. This shows how third party involvement might help to address some key barriers to energy efficiency investment for public transport authorities but can also be difficult to implement within the public transport sector. ESCOs would generally be expected to charge an additional 8 to 10% (when compared to in-house delivery) although it can be difficult to identify this additional charge where an ESCO provides finance as well as technical expertise (what is cost of capital and what is technical expertise cost).

Table E.3: ESCO and EPC models – Summary of benefits and drawbacks

| Benefits | Drawbacks |
|---|--|
| Access to capital/credit for energy efficiency investment | Loss of control of equipment and plant (installing, maintaining) |
| Reduced energy costs and emissions | Resistance within the organisation against outsourcing |
| Reduced technology risk | Lack of in-house expertise to establish EPC type contracts and manage the long term relationship |
| Financial risk reduced or transferred | Lack of supplier expertise in transport sector (relatively new sector in the UK) |
| Reduced search and transaction costs | |

The ESC model usually involves a third party delivering low carbon/renewable energy (e.g. wind or solar). The financial case for this type of investment strongly depends on the price of energy, including any subsidies/support tariffs and/or Certificates of Origin available. The financial case might vary between energy sources as prices and incentives are likely to differ. Table E.4 presents a summary of benefits and drawbacks from ESC models.

Table E.4: ESC model – Summary of benefits and drawbacks

| Benefits | Drawbacks |
|--|--|
| Access to capital/credit for renewable energy investment | Loss of control of equipment and plant (installing, maintaining) |
| Reduced energy costs and emissions | Requires long term commitment from land/building owner |
| Reduced technology risk | Resistance within the organisation against outsourcing |
| Financial risk reduced or transferred | Lack of in-house expertise to establish this type of contracts and manage the long term relationship |
| Reduced search and transaction costs | Lack of supplier expertise in transport sector |

Next steps

RET and TfGM identified a limited scope for potential third party involvement, as shown in Table E.5, and agreed that they would continue to watch developments in this emerging sector as they might need third party support in the future.

Table E.5: Summary of findings and next steps by partner

| T2K partner | Using ESCO and EPC models – Summary of findings and next steps |
|----------------|---|
| RET | Parallel study undertaken to review the potential for renewable energy investment for RET (technologies and investment options) Limited need for third party involvement, mainly linked to technical expertise Next steps – Development of renewable energy strategy based on parallel study recommendations and keeping abreast of developments in the ESCO/EPC and ESC market in the Netherlands |
| TfGM | Limited need for third party involvement mainly linked to technical expertise and potential for further involvement identified with new build projects Next steps - Investigate the possibility of involving a third party in the development and delivery of a new build project to deliver additional energy efficiency/renewable energy investment; keeping abreast of developments in the ESCO/EPC and ESC market in the UK transport sector |
| Other partners | Limited scope and need for third party involvement due to a range of factors Next steps – Keeping abreast of developments in the ESCO/EPC and ESC market |

Capacity building and tools (R3)

Some T2K partners identified the issue of the lack of staff resources with the skills and capacity to implement energy efficiency and sustainability recommendations as a key barrier. TfGM decided to act on this issue by developing a tool to assist buyers, project managers and contract managers in considering energy use and associated carbon emissions as well as wider environmental and sustainability issues when planning a project or procuring equipment or services. The RET team has therefore been involved in the early stages of the tool's development.

Purpose of the tool

The purpose of the tool was discussed at an initial workshop with TfGM staff in March 2014 and is summarised below:

- Focus on small projects, maintenance programme (as another TfGM tool is being developed in parallel, considering large construction projects);
- Support consideration of energy use, carbon and wider environmental impacts across the organisation's activities;
- Support legal compliance by identifying potential areas where advice might be required;
- Improve personal responsibility for considerations beyond a specialist Environmental Team;

- To be used by buyers, project/contract managers and project teams;
- To provide a proportional approach (e.g. light touch for small projects but addressing low value/high risk and cumulative effect issues if possible).

Tool structure

The tool has been designed to prompt buyers, project managers and contract managers to consider the potential environmental and sustainability impacts of decisions they make related to projects, maintenance and purchasing. It prompts users to consider impacts from two different perspectives:

- Considering potential issues arising from a project or planned purchase from the environmental/sustainability impact perspective – inviting a high level reflection on the most relevant issues and what can be done to avoid or mitigate them; and/or
- Considering potential issues and mitigation measures by type of material or service to be used or procured – encouraging a detailed consideration of the potential to reduce the impact of small projects and purchases on a day-to-day basis through the use of specifications and labels.

Next steps

The tool has been developed specifically for TfGM and therefore focuses on the UK context (legal requirements and government commitments). It would however be possible to adapt the tool to reflect the context of other T2K partners, especially as many references included in the tool are relevant at the European level.

Partners are likely to want to review the tool developed for TfGM once it is completed and might decide to adapt it for their own use or retain some of the information included in the tool for their own guidance.

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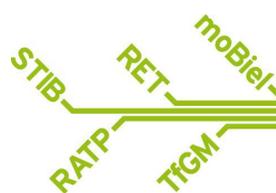
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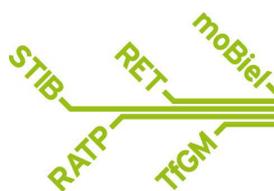
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