

New Forms of Financing Municipal Sustainable Energy Projects

ADEME Convention for Energie-Cités, 2006
*Task No.5 – Collection of best practices on new forms
of financing municipal sustainable energy projects*



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Executive Summary

Global challenges, climate change, peaking oil production and thus increasing concerns for energy security and climbing oil prices revealed that our current energy intensive, 'business as usual' practices are unsustainable.

At the same time, in the context of globalisation our soaring need for a balanced, equitable social and economic development, as well as urging responsibility to preserve our natural resources for next generations have valorised sustainable or intelligent energy management: the use of renewable energies and energy efficiency measures.

1. Energy Management in Municipalities

Municipalities have to meet diverse challenges to foster local growth, employment and providing their inhabitants with a clean and safe environment. Sustainable energy management integrated in urban and territorial planning, transport plans as well as facilities management can be a key means to achieve these multiple objectives.

1.1. Municipalities' Roles and Tasks in Sustainable Energy Management

However, energy management is often not even considered as a strategic task or responsibility of local governments, but simply treated as a task assigned to the local (or global?!) energy company. Local authorities considering sustainable energy management as strategic for local development and integrating it in their sectoral policies can gain a significant advantage to those neglecting this domain.

Municipalities play key roles and bear responsibilities in local energy management.^(Ref.2) They are at the same time:

- **Consumers and service providers** in their municipal properties and buildings.
- **Planners, developers and regulators**, setting the framework for local businesses and stakeholders.
- **Suppliers** of heat and electricity for their citizens and local businesses.
- **Advisors and motivators**, raising awareness and promoting sustainable energy for citizens and local businesses, stakeholders.

1.2. Typical Municipal Energy Management Projects

In the above roles, local governments carry out several permanent tasks and implement a broad variety of projects that usually involve both **intangible** and **physical investments**.

Often we tend to forget about the importance of the '**soft side**' or **immaterial side** of energy management, however, the first step is to have an 'owner', an *energy manager or team* responsible for energy issues, who prepares and organises investment projects, *energy audits* and *feasibility studies* as well as takes care of *awareness raising* and *training needs* for citizens and local businesses.

'**Physical**' sustainable energy investments can be carried out in two main areas. On the **supply side** projects concern either the improvement of the energy efficiency or transformation of energy from fossil fuels, using new technologies (combined cycle for example) or production from renewable energy sources. **Demand side** projects include investments in energy efficiency or target the rational use of energy (energy consumption management). The literature tends to consider also transformation technologies, such as cogeneration or trigeneration projects, such as urban heating systems on the demand side.^(Ref. 1)

Several project types on the demand side offer 'low-hanging fruits', i.e. considerable gains with short payback period. These are typically:

- Energy efficient refurbishment of municipal buildings or social housing. (In New Member States, especially block buildings built with industrialised technology belong here).
- Energy efficient modernisation of street lighting systems.
- Modernisation of outdated district heating networks.

Key motivations for such investments are to stop escalating expenses meanwhile providing an equivalent or better comfort and security.

*Our case studies presented in this paper will thus **focus primarily on demand side projects**. Not only because they are in the primary competence of local authorities (while supply side projects are often implemented by energy companies as owners of power plants and transformation facilities), but also because municipal properties, buildings have a high energy savings potential and therefore offer 'low hanging fruits' for energy and cost savings.*

2. Financing Sustainable Energy Management at Municipalities

2.1. Direct Investments in Energy Management

When talking about financing municipal energy projects we can talk about **financing direct investments** or indirect means for the **promotion and support** of sustainable energy management investments.

In case of **financing direct investments** we can distinguish between classical and innovative methods.^(Ref.1) Under '**classical**' **methods** we generally understand *equity (or self-) financing*, where project investors invest their own resources without using any external fund, or '*debt financing*' where investors borrow the money they invest, either in form of loans or by issuing shares. These methods are broadly applied but often cause difficulties for municipalities, who are required to provide guarantees or have a limited borrowing capacity.

This is why **innovative methods** for investment financing are gaining momentum today, offering more flexibility and reducing barriers to traditional methods. Three methods are considered as the most relevant or interesting in this domain:^(Ref. 1)

1. *Leasing*, when the loan is given in the form of a piece of equipment of which the lessor remains the owner. This can be an expensive form of financing and generally limited to a relatively common and clearly defined object, which limits its usability in case of more complex projects.
2. *Performance contracting* is a shared savings contract, where the Energy Services Company (ESCO) for a certain remuneration of its services guarantees a certain amount of energy savings to its customer. The investment can be financed either by the ESCO or the customer, or by a third party, a bank or a financial institution.
3. *Third party financing* involves, as its name says, a third party sponsor, generally a financial institution, which makes the investment based on the financial performance of the project and often guarantees the operation.

2.2. Incentives to Promote Sustainable Energy Investments

Classical financial incentives include *direct investment subsidies* paid to beneficiary investors, directly from the state budget or via public funds managed by national or local energy agencies, or local governments. *Tax incentives or voluntary agreements* are more market-conform means. Tax incentives can be applied:

- In a positive sense to encourage environmental friendly and sustainable energy investments in forms of: *tax exemptions, reduced level VAT* (eg. on district heating in several New Member States), *feed-in tariffs* for renewable energy or tax credits (eg. in France)
- In negative sense to discourage polluting or fossil-intensive technologies or practices, such as for example *energy consumption taxes or levies* (as in Denmark). This latter can serve as a basis for creating public funds (eg. Carbon Trust Fund in the UK).

We have to mention here also the *distortion effect* of certain public subsidies, if not applied carefully. Subsidized prices 'justified' by social or competitiveness reasons, for instance, gas price supplements for citizens or subsidized operation of coal-mining in certain economically disadvantaged areas are not only distorting the market providing counterproductive incentives by inhibiting longer term investments in energy efficiency and technological change, but they even risk to lock these segments in their current situation causing further backlogs, further economic and environmental waste.

Innovative methods combine efforts of the public sector (regulatory measures and financial incentives) to provide a leverage effect via mobilising additional resources of the private or economic sectors (incl. banks or public companies), to bring the rational use of energy into the normal market mechanisms. ^(ref. 1)

Several 'classical' public funds experiment also with innovative ways in order to become rather a catalyser, providing market-conform financing solutions for viable, self-sustaining projects. (eg. Carbon Trust's Venture Capital operations in the UK¹)

Public Private Partnerships (PPP) can be built and carried out in several ways that can complement each other. Opportunities are broad: from *reduced rate loans* ([Picardie](#)) supported by local/ regional/ or national authorities and granted by a financial institution, via *public-private investment funds* for rational use of energy, to creating the regulatory framework and *incentives for energy service companies* (as in the Czech Republic).

The following case studies will however refer to the known regulatory or financial incentives in their context, it is not aimed by this paper to analyse in detail and compare different national or local incentive schemes.

*For the sake of the 'broad picture' we placed each case study in a simplified cross review of financing opportunities for municipal sustainable energy management. ([ANNEX](#)) In this ultimately simplified overview we applied the above detailed categories of municipal roles and tasks in energy management, matching them with the applied financing methods. Financing opportunities are divided based on their ultimate source into two main parts; **subsidies and non-subsidies**. This guiding methodology was applied to discuss financing opportunities for local intelligent energy projects in the 3rd BISE Forum in Riga².*

¹ <http://www.carbontrust.co.uk/commercial/venturecapital/>

² [3rd BISE Forum](#), Riga, 25-27 October 2006. The forum, as well as the 'BISE process' has been supported by ADEME.

3. Public Policy Framework

Promoting and supporting innovative schemes, such as public private partnerships, ESCOs, performance contracting or third party financing brings us back to the importance of the appropriate legal framework that can dismantle inhibiting barriers, and foster new investments.

Local sustainable energy policies and schemes give a strong sign of municipal commitment to local businesses to invest in clean technologies. Barcelona's Solar Thermal Ordinance (OST) gave rise for clean hot water production and resulted in annual energy savings of almost 16 TWh. ^(ref:10) The scheme's effects however reached far beyond local, it became a model for the national legislation. A network of local authorities was also who pressured their national government in Bulgaria to introduce a national law on energy efficiency.

National legislation and related incentives can and should also give further impetus to local investments. In the Czech Republic for example two national legislations provided the legal framework for ESCO operations: due to the *Energy Conservation Act* and the *Act on Concession Agreements* (signed into law in 2006) the Czech PPP market is now gaining a critical mass. ^(ref: 11) Similarly the German *Renewable Energy Law (2000)* and its supporting feed-in tariff system made also local and smaller scale renewable energy investments economically viable. ([Berlin](#))

Certain issues however, require a broader cooperation and need to be treated at the European or International level. **European directives** and reinforcement of their national implementation are expected to drive further sustainable energy investments. Three directives influencing demand-management have special relevance for local energy management:

- The *Energy Performance of Buildings Directive (2002/91/EC)* aims at a greater transparency of buildings' energy consumption; implementation was due by 2006, but many countries face delays.
- The *Cogeneration Directive (2004/8/EC)* intends to give rise to combined heat and power production.
- The *Energy Services Directive (2006/32/EC)* aims to foster the ESCO market while requiring Member States to draft their energy efficiency action plans.

Finally, **international agreements** on climate change (UNFCCC, Kyoto Protocol) created the framework for the European Climate Change Program (ECCP) and the Emission Trading Scheme (ETS). Carbon financing mechanisms can be leveraged also by municipalities providing an incentive principally to reduce their emissions. ([Timisoara](#))

4. Objectives and Scope of this Paper

The **objectives** of this paper have been twofold:

- Provide a framework or cross-review of municipal sustainable energy management roles and corresponding opportunities for financing local projects.
- Provide a collection of good practices and demonstrate lessons to be learned from each other.

This paper contains **ten case studies from all over Europe, from 'Old' and 'New' Member States**.

New Member States possess a generally lower GDP, thus lower municipal funding opportunities, which are supposed to give a stronger impetus to search for alternative financing methods and establishing PPPs. ADEME has been supporting our actions via the 'BISE' process in 17 countries of New Member States and Candidate Countries, the Western Balkans and Ukraine. Within this process a conference was organised on 'Financing Municipal Sustainable Energy Projects' (Riga, October 2006). Outputs of this conference provided also a good basis for preparations and collection of these case studies. This collection of case studies has been prepared in the hope that some of these good practices and lessons learned from municipal experiences will be useful for further analysis or application for French municipalities.

5. Good Practices and Lessons to Learn from Municipal Projects

Overview of the case studies

1. Energy savings in primary schools via energy performance contracting
[Prague, Czech Republic](#)
2. Energy efficient retrofitting of street lighting, financed by municipal bond issuance
[Varna, Bulgaria](#)
3. Refurbishment of office lighting in Public Private Partnership with ESCOs
[Hodmezovasarhely, Hungary](#)
4. Refurbishment and small scale cogeneration in public buildings, financed via “intracting”
[Stuttgart, Germany](#)
5. Energy efficient refurbishment of dwellings via zero rate loans
[Picardie, France](#)
6. Modernisation of the municipal district heating system via carbon financing
[Timisoara, Romania](#)
7. Modernisation of the traffic control system by municipal funding scheme
[Stockholm, Sweden](#)
8. ‘Solar Roofs’ Initiative in public private partnerships
[Berlin, Germany](#)
9. Local stakeholders networking for planting of energy crops via municipal financing
[Podlaskie Voivodship, Poland](#)
10. Energy efficient retrofitting of district heating system by bank loans
[Nova Dubnica, Slovakia](#)

1. Prague (Czech Republic)

Project type	Energy Efficient Refurbishment of Primary School Buildings
Financing structure	Energy Performance Contracting (EPC)
	PPP, 100% private investment
Project description	4 primary schools were refurbished within a project running from 2000 until 2006. Using the EPC method, the private company (Siemens) invested into energy efficient measures, such as temperature sensors for radiators and replacement of windows.
Objectives	Energy Savings
Policy background / Incentives	In the Czech Republic there is a law on energy efficiency in place. In 2005, with legal assistance of the EBRD a law enabling PPP investments, making them more simple and transparent was implemented. ³ The Czech Ministry of Industry is also promoting EPC by <i>subsidising the preparation phase</i> . This subsidy is at the disposal of municipalities, schools or buildings serving for health services. The successful applicants are able to cover 75% (up to 5.000 EUR) of the costs required for the preparation phase of the EPC by using the subsidies they obtained.
Evaluation	Due to the investments, the energy consumption, thus energy costs of the four buildings decreased min. by 20%. The city can keep a fraction of the financial savings achieved, and a percentage of the financial savings serves for the repayment of the installed technology and work carried out by the ESCO.
Positive aspects of this form of financing	The municipality could finance this operation via an off-balance method, without the need to make any upfront investment. The selection criteria of the ESCO contractor were the payback time as well as the rate of guaranteed savings, which guaranteed foreseeable results. Up to 36% yearly savings was achieved during the project lifetime. The surplus savings were shared 50-50% between the municipality and the ESCO. The ESCO reinvested 50% of its share, i.e. 25% of the total surplus savings were re-invested into partial change of windows in one school building, new hydraulic layout of heating pipelines etc. The project lifetime (6 years) is relatively short, thus giving an opportunity for the municipality to benefit from the savings longer, without any necessary upfront investments right after the end of the project.
Issues and negative aspects	Via more careful planning and establishing a stronger negotiation position, the city could have eventually achieved a better position against the ESCO company, benefiting of a higher amount of the financial savings.
Next steps	Currently, the municipality of Prague is planning to continue with EPC contracts to further decrease the energy consumption in the above mentioned four schools as well as in other schools.
Contact at the municipality:	Ing. Marta Arazimova Head of the Department of Education and Culture Municipal Office, Cechticka 758, 143 12, Prague 4 - Modrany, Czech Republic +420 241 716 330 marazimova@p12.mepnet.cz

³ EBRD, 2005: Strategy for the Czech Republic: <http://www.ebrd.com/about/strategy/country/czechrep/strategy.pdf>

2. Varna (Bulgaria)

Project type	Energy Efficient Retrofitting of Street Lighting
Financing structure	Municipal Bonds Emission - 100% municipal investment (obligation) – organised by a financial institution
Project description	<p>The energy efficient modernisation of the Municipality of Varna started in 2002 and ended in 2003 with a payback period of 2 years and 9 months.</p> <p>In 2002, Varna Municipality issued the first municipal bonds for financing energy efficient modernisation of the city's street lighting system.</p> <p>The bonds were disbursed under private channels and the invitation to purchase them was sent out to approximately 50 potential investors. The bonds were sold within less than 24 hours.</p>
Objectives	Modernising the street lighting system at relatively low upfront costs and generating long term energy savings at the same time.
Policy background / Incentives	The Public Offering of Securities Act provides the necessary legislative framework and facilitates the issuing of municipal bonds in Bulgaria.
Evaluation	<ul style="list-style-type: none"> ▪ The total annual savings amounted up to 10 035 MWh, in financial terms: EUR 512.000. ▪ This financing type reduced the projects' payback period to 2 years and 9 months.
Positive aspects of this form of financing	<ul style="list-style-type: none"> ▪ Municipal bonds' issue proved to be a relatively cheap form of financing: the interest rate paid by the municipality was 9% while at the moment the bank's average interest rates were in the range of 12% to 14%. ▪ The project generated good cash flow with high financial parameters. ▪ The annual savings when the street lighting system is working at full capacity are almost equal to the annual expenditures before the refurbishment.
Issues and negative aspects	<ul style="list-style-type: none"> ▪ Municipal bonds emission requires a long and expensive preparatory work (obtaining the credit rating, working out an investment memorandum for the emission, waiting for the endorsement by the State Commission on Securities, selection of an intermediary investment broker), with a relatively precise estimation of the expected outcome. ▪ A major risk is also related to the sale of the municipal bonds: in case the subscription would have been unsuccessful in implementing the conditions envisaged in the memorandum (at least EUR 2 million collected within one month after the closure of the subscription), any collected amounts should have been paid back to the subscribers, together with the due interests charged by the bank. ▪ In case the emission has proved to be unsuccessful, the municipality would have incurred significant losses, since all the preparation costs of the emission and payment of the due subscription interests would be credited from the municipal account.
Next steps	No further plans in this direction. Municipal bonds emissions became expensive and not very appropriate for project financing. This is due to massive credit offers provided by the commercial banks together with the incentive of low interest rates for municipal investment credits (from 4% to 8%)
Contact at the municipality:	<p>Mr. Kiril Yordanov Mayor Municipality of Varna +359 52 600 616 kyordanov@varna.bg</p>

3. Hódmezővásárhely (Hungary)

Project type	Energy Efficient Refurbishment of Buildings - Indoor Lighting
Financing structure	Third Party financing, carried out by an Energy Services Company (ESCO)
Project description	The municipality of Hódmezővásárhely had no solvency to claim a credit; therefore it opted for a PPP construction without municipal contribution. It was a 9 years long rent construction.
Objectives	Achieving a modern and low cost lighting system without reducing the level of comfort by replacing existing components with more efficient alternatives.
Policy background / Incentives	The Hungarian Government launched a national programme (called: 'Light of Our Eyes > referring to our children) to promote public private partnerships, providing an organisational support (nation-wide tendering process) for PPP investments.
General Evaluation	<ul style="list-style-type: none"> ▪ Both lighting quality and energy efficiency improved. ▪ A cumulated 41% energy savings has been achieved. This means a 992 MWh/year energy savings (2000 operation hours/year).
Positive aspects of this form of financing	<ul style="list-style-type: none"> ▪ The municipality was able to change the outdated (20-30 years old) and weak lighting systems. ▪ After the modernisation the indoor lighting systems fitted to the quality standards and significant energy savings were achieved.
Issues and negative aspects related to this financing solution	<ul style="list-style-type: none"> ▪ Because the municipality used a credit for the works the investment turned out to be more expensive as if it had been if financed from own sources at present value. ▪ The municipality had to commit itself to the creditor institution for a long time. ▪ When the municipality will be the owner of the lighting systems, they will be outdated; therefore the municipality might have to start a new investment.
Next steps	The future plans involve the continuation of the retrofitting works: refurbishment of the buildings' envelope, replacement of windows, heating / cooling.
Contact at the municipality:	<p>Mrs. Ilona Fazekasné Czakó Energy Manager Municipality Hódmezőváráshely Hódmezővásárhely, Kossuth tér 1. Hungary 62/530-165, fax: 62-530-163 energia@hodmezovasarhely.hu</p>

4. Stuttgart (Germany)

Project type	Energy Efficient Retrofitting of a Swimming Pool – Implementation of a Cogeneration Plant
Financing structure	Internal Contracting (“Intracting”)⁴
	100% municipal funding, using a revolving fund structure.
Project description	At the “Sonnenberg” indoor swimming pool in Stuttgart a cogeneration gas engine was installed. The plant produces 5,800 hours/year in cogeneration, out of which annually approximately 300,000 KW electricity and 570,000 KW heat. The static payback period (calculated by taking into account the technical life-time of the equipment) represents 6.5 years. The project started in 2000. The investment costs of the cogeneration plant were about EUR 94,000.
Objectives	Achieve self-supply in heat and electricity in the swimming pool.
Financing scheme / Policy background	In 1995 the Stuttgart Environmental Protection Department in close cooperation with the Financial Department developed the “intracting” method for financing energy saving projects. This method is based on the idea of contracting but operates entirely within the city administration. It consists of a special budget item (a revolving fund) to which the cost savings are later returned. The Environment Department thus grants an earmarked, interest-free loan to the host department. The amount of the loan depends - as with the conventional Contracting - on the energy and cost saving potential. Today, the annual “intracting” budget represents approximately EUR 1.3 million in Stuttgart.
Evaluation	The annual savings obtained from the projects sum up to 13.900 MWh savings on heating, 1.850 MWh savings on electricity and 31.700 m ³ savings on water. The implemented measures lead to a total annual cost saving of EUR 1.1 million.
Positive aspects of this form of financing	<ul style="list-style-type: none"> • No additional costs of possible risks and no interest charged on the invested capital. • Lacking an external contractor, transaction and administration costs of contract management are substantially reduced. • Small volume projects can be promoted as well, which otherwise would not be attractive enough for an external Contractor. “Intracting” also offers the possibility for partial financing of projects. • The preparation period is minimised by the internal completion of the process, so that energy conservation measures can be implemented in a shorter time.
Issues and negative aspects related to this financing solution	<ul style="list-style-type: none"> • Calculation of the investment costs can lead to misleading profitability forecasts. • Cost estimation was delivered by an external engineering company. This turned out to be too high, and thus provisions showed no profitability for half of the economic life-time, therefore the “intracting” was evaluated as unfavourable. By using a rescheduling and cutting back on the technical side, costs were reduced and “intracting” approved.
Next Steps	8 more cogeneration plants were implemented using the “intracting” method.
Contact at the municipality:	Dr. Jürgen Görres, Office for Environmental Protection, Department for Energy Management Gaisburgstraße 4, D 70182 Stuttgart Tel: + 49 711 216 2912 Fax + 49 711 216 2413 Juergen.Goerres@stuttgart.de

⁴ A complete case study available on the [Energie-Cites website](#)

5. Picardie (France)

Project type	Energy Efficient Insulation of Dwellings
Financing structure	'Zero rate bank loans' supported by the Picardie Region
Project / Scheme description	<p>The loan is aimed to be used by tenants and owners for energy efficient insulation works – loft insulation mainly – in their dwellings built before 1982. Citizens are offered a maximum of EUR 6 500 and is the loan not subject to any income condition (target objective: SMIC⁵).</p> <p>To benefit from the loan, the private individual must send the loan application to the bank, with the seal of the company which will complete the work. The bank replies within 48 hours. The bank pays the company directly when the work is finished and after reception of the work certificate signed by both the customer and the company.</p> <p>The private individual pays no interest to the bank. The interest is paid by the Picardie Region. The regional budget sums up to EUR 1.8 million.</p>
Objectives	<ul style="list-style-type: none"> ▪ The regional allowance targets 25 000 households (dating from before 1982) during a period of over 5 years. ▪ The goal is to achieve 30% of economy on heating consumption, which accounts for approximately EUR 300-350 per annum for a house of 100 m².
Policy background / Incentives	Picardie Regional Council is supporting the thermal improvement of the dwellings in order to achieve household cost and energy savings. Launching the "Picardie Advantage Isolation" loan scheme, this financial incentive intends to change citizens' behaviours by influencing directly their purchasing power and contributing to the reduction of the greenhouse gas emissions ⁶ .
Evaluation	<ul style="list-style-type: none"> • The scheme was launched in June 2006, therefore it is too early to make an evaluation since until now only a few files were handled. • Moreover, it needs to be mentioned that a learning process during the implementation of this process is inevitable. • Today, a close contact is maintained with the building professional federations as well as with the partner banks.
Positive aspects of this form of financing	<ul style="list-style-type: none"> • This form of financing creates a leverage effect for the tenants/ owners of the dwellings. • The loan is offered at a zero interest rate to the end users, the interest being paid by the Picardie Region. • This operation should be invisible for the private individual from a financial point of view as the refunding period of the loan can be extended up to 84 months. Therefore, the sum that needs to be paid back reaches a lower or equal level to the savings made on the invoice for the heating services. • This loan with subsidized interest rate will re-launch the insulation market in Picardie and should generate a work volume estimated at EUR 100 million due to many prospective employment opportunities for the craftsmen and the building companies.
Issues and negative aspects related to this financing solution	Difficulties related to the public markets and to delays of various banking consultation services impose that the community mobilises its internal resources upstream (legal, communication etc) without fearing to be surrounded by usual partners (ADEME) or by partners that are more familiar with the financial dimensions of this type of project (specialised cabinets).
Contact at the municipality:	<p>Jean-Marc Pasquet Conseil Régional Picardie 11 Mail Albert 1^{er} B.P. 2616, 80026 Amiens Cedex, Picardie, France +33 (0) 322973586 jmpasquet@cr-picardie.fr</p>

⁵ Salaire minimum de croissance (minimum salary)

⁶ www.cr-picardie.fr/IMG/pdf/picardie_isolation_web.pdf
<http://www.cr-picardie.fr/spip.php?article1129>

6. Timișoara (Romania)

Project type	Energy Efficient Replacement of Heat-Only Generation Units
Financing structure	Carbon Credits: Colterm, the municipality owned district heating company (EUR 8 million) Bank Loan (EBRD: EUR 15 million)
Project description	The project represents a modernisation and an extension of the existing co-generation plant. By replacing outdated heat-only generation units with more environmentally-friendly gas turbines, Colterm S.A., the municipal district heating company will cut carbon dioxide emissions by approximately 120,000 tonnes per year ⁷ . These reductions will help produce up to EUR 4 million worth of carbon credits, which will be sold to the EBRD for the account of the Netherlands ⁸ . EBRD funds will be used to finance the installation of new gas and steam turbines with hot water recovery boilers for co-generation of heat and electricity. The loan will be guaranteed by the City of Timisoara.
Objectives	Increased efficiency and a more environmental friendly operation are expected to enhance the reliability and quality of supply of both electricity to the power grid and heat to the district heating network. Ultimately, generation and maintenance costs are expected to be reduced.
Policy background / Incentives	Kyoto protocol and its implementation > JI, CDM
Evaluation	The project only started in September 2006, therefore it is too early to make an evaluation.
Positive aspects of this form of financing	<ul style="list-style-type: none"> • The idea of generating and using carbon credits as payback means for the investment is an innovative approach that works greatly in favour of the company because it makes the project more financially viable. • A portion of Colterm's investment will be paid using an advance payment from the sale of carbon credits that will be generated by the investment. • Full cost recovery tariffs and increased transparency in billings will also improve customer satisfaction and encourage energy conservation.
Issues and negative aspects	Not yet known, since the project only started in September 2006.
Next steps	It is the first project in Romania to directly link the financing of a project with carbon credits. The sale of these credits is instrumental in making the project viable. It is a successful formula which should be considered in other cities, especially since district heating operators across many former command economies still require substantial restructuring
Contact:	Colterm str. Piatra Craiului nr. 3, Timisoara, Romania +40 0256 434 614 office@colterm.ro

⁷ To cut a similar amount of CO₂ using offshore wind-farm technology, an investment of around EUR 120 million would have been needed.

⁸ EBRD and the Netherlands reached a joint agreement in 2003 to help reduce emissions in Central and Eastern Europe.

7. Stockholm (Sweden)

Project type	Energy Efficient Transport Infrastructure - Traffic Signals
Financing structure	100% Municipal Investment
Project description	Municipality of Stockholm decided to replace conventional traffic signals by LED units at 530 signal control points, due to their energy efficiency and short payback period. The EUR 6 million project was completed by the end of 2001 with a payback period of 4.2 years.
Objectives	<p>The traffic signal system was equipped with ordinary incandescent bulbs, which have high energy consumption and are expensive to maintain as they need frequent replacement. The replacement was an ideal target for savings.</p> <p>The specific aims of the project were to:</p> <ul style="list-style-type: none"> • Use market forces via a large purchase to reduce the price of LEDs, which will help others to carry out similar projects without being dependent on subsidies. • Reduce the cost for management and maintenance and thereby encourage other improvements in the signal system. • Reduce energy consumption, bulb turnover and transport costs and thereby reduce the environmental impact of the signal system. • Increase public security through increased visibility and a reduced risk that signals are out of order. • Reduce maintenance on site and hence increase security for maintenance staff.
Policy background / Incentives	<p>Over the past 30 years Stockholm has consistently followed policies designed to improve the energy performance of the city and has devolved action at the local level - for example every department in the city has its own energy consultant.</p> <p>Once the market was liberalised and privatised, the municipality was obliged to pay for the electricity it used, thus it became interested in energy savings. The energy saving potential of this project is very significant, can easily be replicated and there is a clear financial benefit to the local authority. But the incentive was greatly increased by the changes induced by liberalisation and the change in the utility from a service mentality (providing electricity to the municipality as a service free of charge) to a business mentality (maximising sales and profits).</p> <p>One of the benefits of liberalisation is that it makes the cost of each service transparent and therefore encourages the user to reduce energy costs.</p>
Evaluation	Incandescent traffic lights required 6.4 million kWh where LED lights require 640,000 kWh. Annual savings consist of EUR 471,000 (electricity) and EUR 243,000 (maintenance), which sum up to a total of EUR 714,000.
Positive aspects of this form of financing	Once the municipality paid the bills, they took the necessary action to reduce the electricity consumption. Obviously, a clear relationship between investment costs and running costs was introduced.
Contact at the municipality:	Lars Söder Traffic Administrator, Stockholms Trafikkontor Trafiktjänsten, Box 8311, S-104 20 Stockholm +46 8 508 262 08 lars.soder@gfk.stockholm.se

8. Berlin (Germany)

Project type	Solar Energy Generation by using the Municipal Roof Area
Financing structure	Public Private Partnerships
Project description	In 2002, Berlin Municipality created the Solar Roof Initiative (Solardachbörse) to motivate the construction of solar power plants by private investors. About 80 buildings' roof space (schools, administrative buildings, sport complexes) are included in the initiative.
Objectives	To reduce greenhouse gases and save natural resources by harvesting solar energy from the idle roof area on 6000 municipal buildings.
Financing scheme / Policy background	Since 1 January 2004, Germany has raised feed-in tariffs for renewable energies. This made electricity generated by solar power plants more economically viable and has led to increased interest from private investors.
Evaluation	By early 2005, 25 private investors had shown interest in the Solar Roof Initiative. The first plants were installed in summer 2005. The number of potential investors is continuously increasing. The publicity and promotion surrounding the scheme has significantly increased awareness of solar energy among municipal employees and across the city as a whole.
Positive aspects of this form of financing	By using a PPP financing structure the municipality transferred the financing of the construction material and of the technical knowledge to private investors.
Issues and negative aspects	<ul style="list-style-type: none"> • At first, many private investors showed interest, but no concrete contracts were signed due to lower feed-in tariffs at that time and higher module costs. • After the increase in feed-in tariffs for solar power, there was increased demand for solar modules, which could not be met by the existing production capacity. Therefore, local market conditions within the solar industry in Germany have delayed construction of new solar power plants.
Contact at the municipality:	Wolfram Müller Senatsverwaltung für Stadtentwicklung Berlin/ Referat Klimaschutz Brückenstr.6, DE-10173 Berlin Tel: + 49 30 9025 2148 Fax: +49 30 9025 2509 wolfram.mueller@senguv.verwalt-berlin.de

9. Podlaskie Voivodship (Poland)

Project type	Rural Development – Cultivating of Energy Crops
Financing structure	Local Authorities + Energy Agency
Project description	Farmers do not always have access to the knowledge or support needed to cultivate and sell novel crops. In North East Poland, the Podlaska Agency helped overcome this barrier by organising information days and step-by-step seminars from November 2004 to March 2005. These taught 125 local growers how to inance, produce and supply crops in the 'green energy' market. Local energy entrepreneurs participated at the seminar.
Objectives	To reduce carbon emissions and dependence on fossil fuel imports by planting energy crops.
Financing scheme / Policy background	The Polish Government aims to produce 7.5% of power from renewables by 2010. This has already led to the development of a 50 MW biomass energy CHP unit in the region, and increased opportunities for co-firing at existing power sites.
Evaluation	As a direct result of this education programme, 200 hectares were planted with energy crops, and five new farms were using biomass energy, thus an expanding green energy market was created. Some of the area used for cultivation of these crops was previously wasteland, so the scheme offered improvements in land management and environmental benefits.
Positive aspects of this form of financing	<ul style="list-style-type: none"> • Provision of free venues by the local authorities in order to enable the organisers to keep costs low and maximise participation. • Socio-economic benefits to declining rural communities.
Issues and negative aspects	Financial support is still essential in many regions to make energy crop cultivation commercially viable for farmers. However, as the Podlaska Agency project demonstrates, simply opening up the channels of communication between farmers and energy companies can also yield impressive results.
Next Steps	It is planned to follow the first phase of seminars, with a second series of events. This will include site visits to existing energy crop producers and greater involvement from local energy companies, helping to tighten the links between local producers and buyers of biomass.
Contact at the municipality:	Podlaska Agency for Energy Starobojarska 15 Bialystok PL - 15-073 Tel: +48 85 740 86 83; Fax: +48 85 740 86 85 paze@pfr.bialystok.pl

10. Nová Dubnica (Slovakia)

Project type	Energy Efficient Retrofitting of District Heating System
Financing structure	Equity of Investor Bank Loan (partially covered by IFC guarantee)
Project description	The project consists in the construction of a 2x7 MW biomass boiler in the existing boiler house using wood chips and sawdust. Accompanying investments concerned upgrading of distribution grid (installation of compact exchange units and new circulation pumps). Total investment was around 3.1 M EUR.
Objectives	<ul style="list-style-type: none"> - To prevent disconnection of some clients - To make heat price stable - To minimize gas consumption by using biomass from the surrounding forests - To benefit from CO₂ reduction
Financing scheme / Policy background	<p>Heat price is regulated price by state regulatory office (URSO). Price consists of variable components (fuels) depends on actual consumption, fixed components (depreciation, interests, wages, operation & maintenance costs) recalculated to all consumers + reasonable profit that is limited and together with depreciation serve for debt service repayment and generation of new investments.</p> <p>Due to reduction of fuel costs, all customers may benefit from minimum increase of heat price</p>
Evaluation	<ul style="list-style-type: none"> - Company is achieving sound financial parameters as for profitability and cash flow generation that is sufficiently enough for debt service coverage - Company is able to produce all heat from biomass due to supplementary installation of 2 MW container boiler - Company improved a logistics of fuel supply by construction of large storage capacity for wood waste - Company diversified a portfolio of supplier
Positive aspects of this form of financing	<ul style="list-style-type: none"> - Bank loan enabled to realize complete switch of fuel base in period when gas prices boosted sharply, this helped to stabilize heat market - IFC guarantee compensated lack of equity which was below standard ratio
Issues and negative aspects related to this financing solution	<ul style="list-style-type: none"> - multi-source financing may lead to slower approval process
Next Steps	<ul style="list-style-type: none"> - Monitoring of projects with respect of - Further upgrading of distribution grid
Contact at the borrower:	TERMONOVA Nová Dubnica Tel.: +421 44 40 809, 810 Fax: +421 44 32 221

6. Conclusions

Innovative methods for financing investments

1. Energy performance of municipal buildings – especially in New Member States – often bad, thus their energy consumption is high. Not having the necessary funds for their refurbishment, municipalities continue to waste energy and money. Those, who **recognise the potential leverage of public-private partnerships and engage in third party financed** projects can realise substantial gains.
2. **Careful financial planning and cautiousness** when applying third party financing is essential to avoid bad surprise.
 - > In most cases, the term of an Energy Performance contract would be more than 5 years. However, a too long contract engagement to the ESCO or not properly evaluated credit needs can be harmful at the end of the project, leaving the municipality with an outdated facility by the end of the contract. ([Hodmezovasarhely](#))
3. In case of Energy Performance Contracting it is also important to properly evaluate the scope of the investment. **ESCO companies tend to ‘pick the low hanging fruits’**, providing large savings potential, while less profitable investments with longer pay-back time are not covered by the EPC.
 - > **Creating ‘Building pools’**, including buildings with higher and those with seemingly lower energy savings potential can be the optimal solution for managing this issue. A cooperation of several smaller municipalities, which do not dispose of many municipal buildings can also create such pools and achieve the minimum ‘economies of scale’ for an ESCO.
4. **Lack of commercial banks’ interest** in energy efficiency projects (due to a relatively long pay-back period) and **lack of soft loans**.
 - > In such cases national or **regional incentives and support** can be crucial to offer guarantee to make commercial banks interested in providing attractive loans for citizens. Such an incentive not only provides a market conform means of financing, but makes also energy efficiency competitive and commercially viable investment. ([Picardie](#))
5. Success or the innovative dimension of certain financing schemes lies within the successful **combination of different methods causing a leverage effect**.
 - > Using the municipality’s own money to invest in photovoltaics on municipal buildings’ roofs would not necessarily pay off without benefiting from national feed-in tariffs scheme ([Berlin](#)).
 - > Similarly, the bonds emission of ([Varna](#)) municipality would not have secured such a short pay-back period without the financial competence of the organising financial institution.
 - > Often projects need municipal co-financing; therefore a bank loan is simply not enough. Advanced payment from the selling of carbon credits could be used to partly finance the project ([Timisoara](#)).
6. **Internal vs. external financing** for investments?
 - > Applying external services providers, such as energy services companies adds additional administrative and transaction costs to the projects budget linked with the contract management as well as includes the additional cost (interest) of the external capital. Careful evaluation of these costs needed. In case of ([Stuttgart](#)) these costs could be successfully reduced by managing the contract internally within the municipality.

Policy frameworks, incentives and awareness

7. **National and regional regulatory support**, such as incentive schemes to establish public-private partnerships and further innovative support schemes are crucial to foster sustainable energy investments. ([Prague](#))
8. Once the supportive legal framework is in place, **raising awareness and knowledge of the financial sector** is crucial to engage them in third party financing and **of local authorities** to leverage on these opportunities.
9. **Transparent service costs** and a **clear relationship between investment costs and running costs** are driving factors for municipal energy savings.
10. **Learning from good practices and lessons** learned by others is not a shame!
> When France introduced its law on Energy Efficiency, it took an example of the Bulgarian Energy Efficiency Law.
11. The presence of **specialised human factor** (an energy manager or energy agency) in order to raise awareness of different stakeholders is of utmost importance. Simply communication and **organising different stakeholders** around a common objective can lead to impressive results. ([Podlaskie Voivodship](#))

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ANNEX: Cross review of the case studies presented

Role of Local Authority	Tasks to be Financed	European / International Grants	National Grants	Other Grants	Credits, Bank-Guarantees	Public-Private Investm.	Other Non-Grants
Consumer Service provider (municipal properties)	ENERGY AUDITS						
	FEASIBILITY STUDIES						
	ENERGY MANAGEMENT in MUNICIPAL PROPERTIES					School refurbishment in ESCO, Prague Indoor lighting refurbishment in ESCO Hodmezovasarhely , PPP in Berlin	Municipal Bonds Emission (Varna)
	TRAINING for energy managers						
Planner, Developer Regulator	EE REFURBISH. OF BUILDINGS				Bank Loans (Picardie Region)		Regional Investment, covering interest rates Picardie Region
	LOW ENERGY NEW BUILDINGS						
	ENERGY EFF. STREET LIGHTING						Municipal Investment in traffic light control (Stockholm)
	PUBLIC TRANSPORT						
Advisor Motivator	LOCAL ENERGY ADVICE OFFICE						
	CITIZENS' AWARENESS						
	EXCHANGES, NETWORKING						Municipal Investment (Podlaskie Voivodship)
Producer Distributor (DHC, Power Supply)	ENERGY AUDITS						
	FEASIBILITY STUDIES						
	RETROFITTING DHC				EBRD Loans (Timisoara) Bank Loans (Slovakia)		Carbon credits (Timisoara)
	NEW HEATING & COOLING PLANTS						Intracting (Stuttgart)