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Financing models for energy-efficient street lighting

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Outline

- Methodology
- Financing from public sources:
  - Self-financing
  - Federal budget
  - EU funds
- Financing from private sources:
  - Debt-financing
  - Financing by a private contractor
  - Financing by private partner with energy savings
- Mixed public and private sources
  - Project finance
- Conclusion

Methodology

- Data collection
  - Literature review
    - Publication databases, project websites
  - Interviews
    - Municipalities and companies owned by municipality
    - Energy service companies, manufactures of advanced lighting solutions, public and commercial banks and institutional investors
- Data analysis
  - Schematic structure including key actors and their roles
  - Project types could be financed by these models
  - Advantages and disadvantages
  - Case studies

Public sources: Self-financing

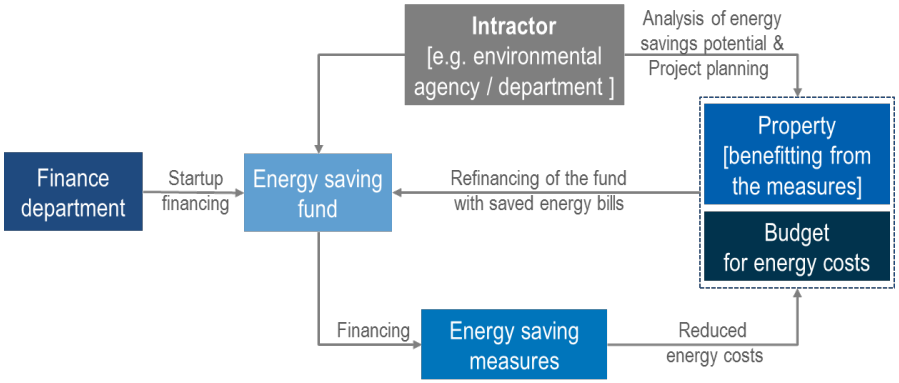
Traditional self-financing

- The financing model of such street lighting modernisation project is rather simple – a municipality:
  - identifies the investment need,
  - prepares a request for financing,
  - obtains its approval,
  - issues a tender to select a contractor, who conducts the retrofit.

- To minimize the burden on tax payers, the public sector could design and implement additional schemes to help raise the funds for the budget.
  - e.g. revolving funds - a municipality makes initial investment in street lighting upgrades and once it accrues saved energy costs, they are re-invested in new retrofit projects.

Intracting

Architecture



Advantages

- No external financiers.
- Projects that are too small or not interesting for private investors can also be covered.
- The model implies no interest rate on investment capital, reduced transaction and administration costs.

Projects financed with this model

- Building retrofits, street lighting, CHP plants, and renewable energy projects.
- The “intractor” department should have the right skills and expertise.
- Creating the fund or trust requires political support and commitment from the department(s) responsible for the budget

Disadvantages

- Municipality has to provide upfront capital.
- Projects will be carried on the municipality’s balance sheet and it will bear all related investment risks.
- Projects financed by the municipalities have less efficient structure as compared to those where private investors are involved.

Debt-financing

Debt-financing 1 - Loans

Debt-financing includes taking a loan or issuing bonds, and issuing a tender to select a contractor, i.e. an energy service company, which conducts the retrofit.

- **Low-interest or concessional loans** from the public (national or EU) budget:
  - EU budget / multi- lateral banks: EIB, EBRD, EEEF in cooperation with local commercial banks, are widely used for municipal lighting
  - In Germany, a dedicated programme of KfW bank for municipalities offers loans for energy efficiency street lighting at interest rates close to 0%.
  - In Croatia and Lithuania, the revolving funds are set up from the federal budget that provide loans and guarantees to municipal governments.
- **Commercial loans** at a market rate from commercial banks:
  - The interest rate, under which the loan is awarded, does not depend on saved energy costs but on the credit record of borrower.
  - In Hungary, the Erste bank provides tailored commercial loans to municipalities to finance energy efficiency infrastructure.

Debt-financing 2 - Bonds

- **A municipal bond** is a bond issued by a local government, or their agencies.
- *A bond is a debt* in which the authorized issuer (i.e. debtor – municipality) owes the holders (creditors) a debt and is obliged to pay interest (coupon) and/or to repay the principal at a later date, termed maturity.
- Potential issuers: states, cities, counties, redevelopment agencies, special-purpose districts, school districts, public utility districts, etc.
- **Extensive and costly preparation for issuing bonds** – obtaining a credit rating, approval by the national securities authorities, working with investment brokers.
  - Many countries have municipal bond agencies with high credit ratings, which aggregate the debt from multiple municipalities, issue bonds and sell them on the financial markets.

Examples: municipal bonds

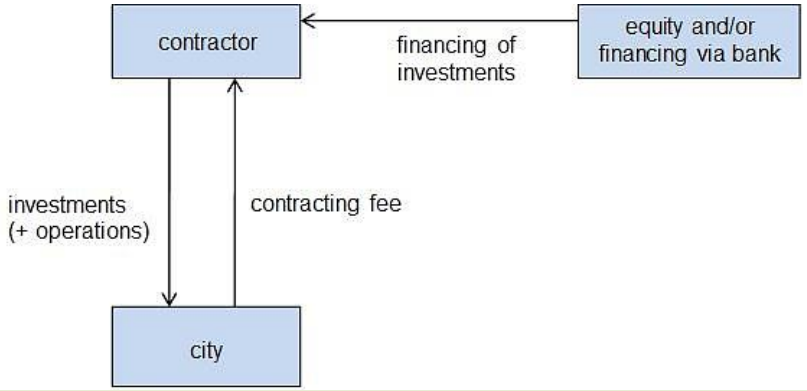
- **Europe** – national municipal bond agencies exist in Finland, Sweden, Denmark, Holland, Switzerland, and Italy.
- **Kommuninvest, Sweden –** a bond agency lending the funds to 260 local authorities to fund roads and renewable energy projects. In 2012 its target was to lend more than EUR 20 billion.
- **The Green Bond Programme of the city of Gothenburg, Sweden:**
  - Issued a 6 year 'green' bond to fund public transport, water management, energy and waste management projects.
  - EUR 0.46 billion – the total capital raised via financial markets.
- **Three French provinces** have also raised money via bond issuance to fund green social housing, renewable energy and energy efficiency projects.

Source: http://www.managenergy.net/

Financing by a private contractor

Simple contracting model

Architecture



Advantages

- For cities: the model usually is off-balance sheet.
  - Clarify this issue with the responsible authority, which the city has to report to.
- Specialised companies can be selected via the tendering process.

Projects financed with this model

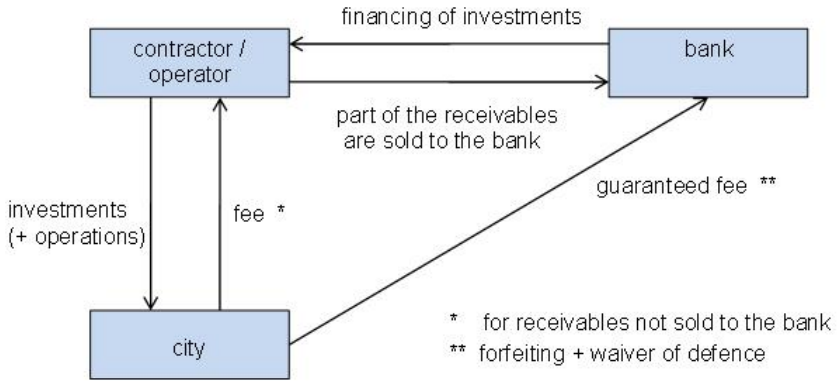
- The private partner is usually not responsible for energy supply and cannot use energy savings for financing
- Projects need to have a size, to justify the set-up of the model by the contractor.
  - EUR 0.5 - 1 million may be the minimum project volume.

Disadvantages

- For cities: high costs.
  - The contractor's capital is expensive vs cities' budget or low % loans.
- Restrictions in the availability of grants.
  - Sometimes, federal budget grants cannot be used for contracting models.
- For contractors: it's on-balance sheet.

Contracting model with forfeiting and waiver of defence

Architecture



Advantages

For cities:

- The model usually is off-balance sheet.
- Contracting with forfeiting and waiver of defence will have a lower interest rate, included in the contracting fee (because municipal money is low-risk).

Projects financed with this model

- The same as above
- However due to the higher complexity of the model, it might be a more difficult to find a bank financing projects below EUR 1 million.

Disadvantages

- Although the % rate is lower than in the simple contracting model, it is still higher than in low % rate lending programmes.
- The high complexity of this model
- A large part of the city's payments, e.g. the payments to the bank, have to be guaranteed, regardless of the project performance.

Contracting model with forfeiting and waiver of defence: Dillenburg, Germany

Challenge

- To find a specialist for the modernisation of street lighting , while the responsibility for operations would remain with the utility of Dillenburg.
- To spread the costs over a 12-year period

Contracting

- The contract was tendered in multiple steps:
  - an indicative analysis and concept,
  - a detailed analysis and concept.
- The final decision was based on the maximum reduction of annual costs for the city, consisting of the contracting fee and energy costs of the street lighting infrastructure.

Financing details

- Some 70 % of receivables were sold by the contractor to a bank, which then became a third partner to the contract in order to enable forfeiting and the waiver of defence.

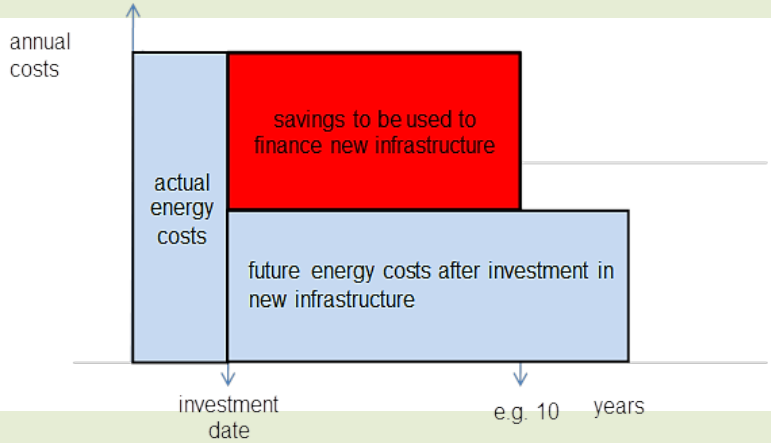
Additional element

- The successful bidder guaranteed a certain level of energy savings (minimum 52 %).
- If the contractor achieves higher savings, the additional savings are split between the city of Dillenburg and the contractor.
- The exact split was part of the successful offer.

Financing by a contractor through energy savings

EPC – guaranteed savings model

Architecture (time-optimized)



Advantages

- For the city
  - New, energy efficient infrastructure, without any peaks in public spending.
  - After expiry of the contract, the city benefits from the low operating costs.

Projects financed with this model

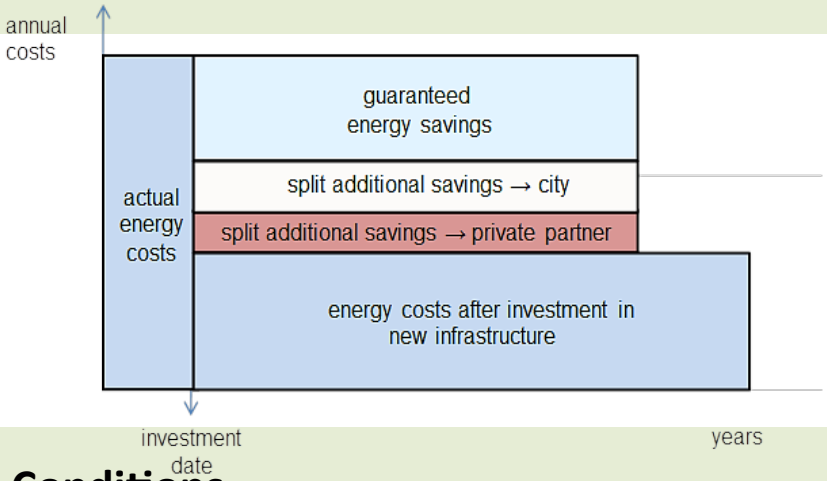
- The municipality or the private partner should be responsible for energy supply
- Projects with high energy cost savings because private partners do not favour long contacts.
- Municipalities should have sufficient funds to pay the same – or a slightly reduced - amount of money in total over the contract length

Disadvantages

- The model is difficult to use in CEE, where energy prices are low.
- A missing incentive for the private partner to reduce energy demand more than guaranteed in the contract.

EPC – shared savings model

Architecture



Advantages

- There is an incentive on both sides to consider and realise additional energy savings.
- This allows utilising additional financing resources becoming available during the running time of the contract, or realise new ideas for savings, potentially arising from new technological developments.

Conditions

- Projects with high energy cost savings because private partners do not favour long contacts.
- Municipalities should have sufficient funds to pay the same – or a slightly reduced - amount of money in total over the contract length
  - split between energy costs and payments to the private partner.

Disadvantages

- The model is difficult to use in CEE, where energy prices are low.

EPC – shared savings model: Neuen, Germany

Challenge

- 45% HPM lamps / 55% HPS lamps
- A complete replacement of HPM based luminaires by more efficient technology
- Energy savings of at least 40 %
- A limitation of investment needs due to budgetary constraints

Contracting

- The contract was tendered a 5-year contract for the operation of the infrastructure
- Several bids were received and evaluated based on the total operating and investment costs.

Financing details

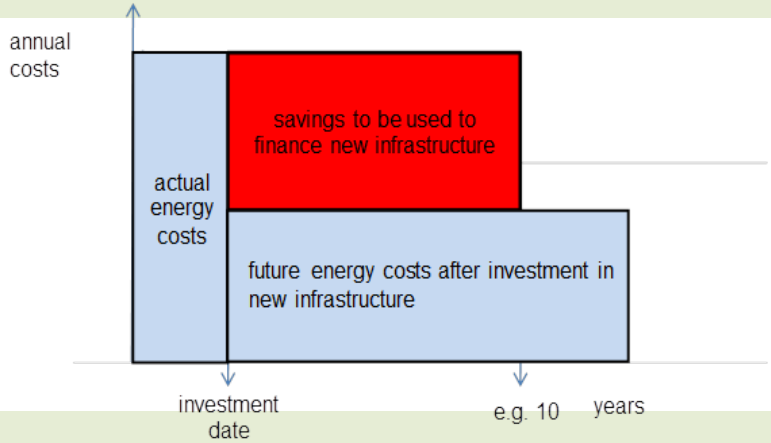
- Additional energy savings, on top of the 43 % being guaranteed, should be split 50% /50 % between the city and the private partner.
- Based on an electricity price per kWh fixed at the beginning of the contract, any additional energy savings were measured once a year.

Additional element

- As a result of this agreement, some additional investments in energy efficient technology were carried out in later years given higher energy cost savings achieved, proving the “win-win” character of the model.

EPC – modernisation with immediate savings of energy costs

Architecture



Advantages

- The key advantage of this model is the maximisation of energy savings.
- As new technologies often require less maintenance needs, corresponding costs are lower too, which should be reflected in the price offered by the private partner.

Conditions

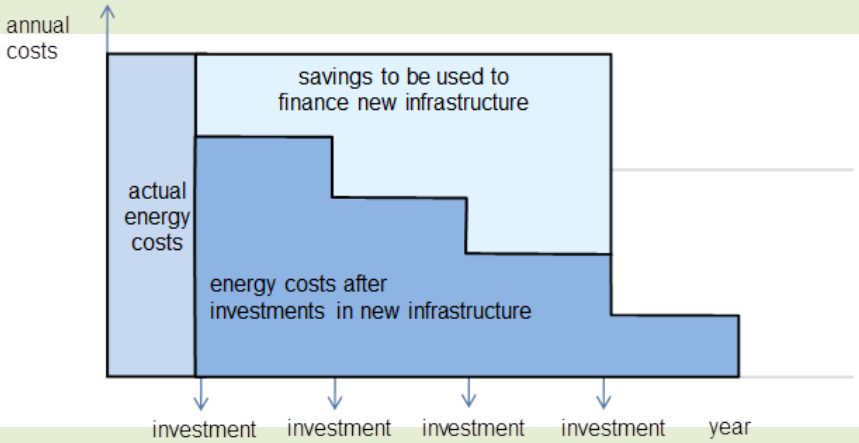
- The investment period is as short as possible, in order to benefit from the energy savings as soon as possible.

Disadvantages

- High investment costs in the initial phase .
- There will be a lot of modernisation activity in the city at the same time that may result in traffic congestion and public protests.
- The early realisation of the investment means that the entire infrastructure at the end of measure lifetime is “old” again.

EPC – model with staggered modernisation

Architecture



Advantages

- The city always has a reasonably modern infrastructure
- The peaks in investment needs and building activity are avoided.
- It is possible to focus on those projects with the worst energy efficiency first.

Conditions

- The investment period is stretched over time.

Disadvantages

- The major disadvantage is that energy savings, as well as the benefit of lower maintenance costs, will be achieved at a later stage than in the previous model.

EPC – shared savings model with staggered modernisation: Hilden, Germany

Challenge

- A key condition of this contract was a definition of a maximum average age, as well as a maximum age of any single luminaire and pole at fixed times (after 5, 10, 15 and 20 years).

Contracting

- The contract was tendered for all operations, including energy supply, and the modernisation of more than 5,000 luminaires, which is the vast majority of all existing luminaires, as well as the modernisation of some 2,400 poles.

Financing details

- The costs of electricity were split between the private partner (direct costs) and the city (indirect costs such as taxes, dues and grid access costs).

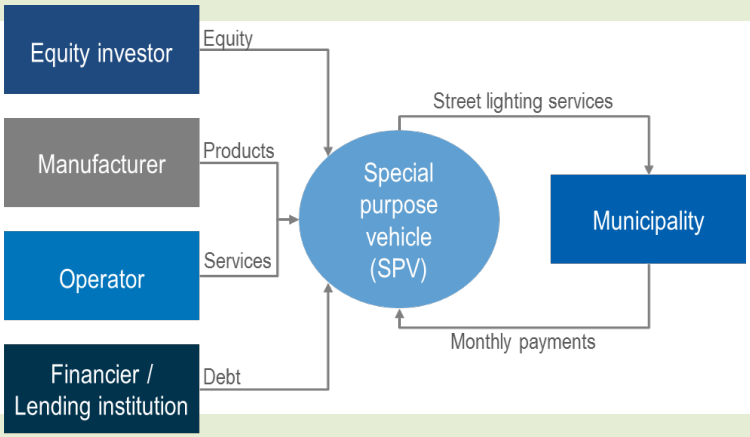
The winner

- The task of the winner was to select the right luminaires to be modernised at the right time, while taking the age restrictions into account.

Project finance

Project finance

Architecture



Advantages

- For cities:
  - the model is off-balance sheet
  - if private sector partners fail to deliver the services, there could be deductions , withholding of payments or penalties
- For both public and private sectors:
  - isolating the project risks within SPV.

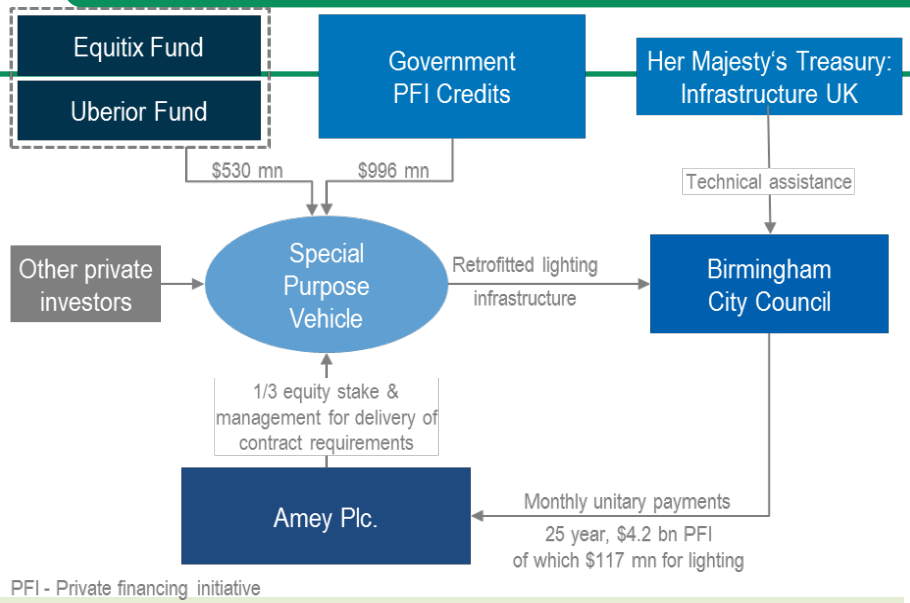
Projects financed with this model

- Projects with capital costs over EUR 20 million.
- Financially sustainable projects i.e.
  - Municipalities with good credit profile
  - Supported by grants, tax exemptions, tax-free bonds, or credits.
- This model implies long term contracting of private actors for operation and maintenance.

Disadvantages

- High transaction costs.
  - Creating a consortium of several municipalities could reduce these costs but will bring in new ones related to the consortium governance and structure.
- The model might also imply long time frames from project start to actual development.

Project finance: Birmingham, UK



PFI - Private financing initiative
Source: ESMAP 2016

Financing details

- Over the contract life time, the city pays to Amey Plc. monthly unitary payments .
- For the first 5 years of the contract, an independent certifier approves increases of monthly unitary charges by ca 4%.
- The contract foresees cases for deductions in payments by the city

Contracting

- The core investment - in the first 5 years.
- The rest - in the following twenty years.
- All assets are operated and maintained over the contract period of 25 years.
- Through the SPV, Amey Plc. is responsible for purchase, installation, and maintenance.
- The city can audit the performance of Amey

Additional element

- Funding
  - Grants from the UK government
  - Credits from two investment fund as well as other investors and debt providers
- Key drivers of the project success are
  - availability of national framework
  - availability of technical assistance.

Conclusion

Self-financing – the most simple model is to pay from the own funds of municipalities.

- The revolving scheme help raise the funds to the budget.

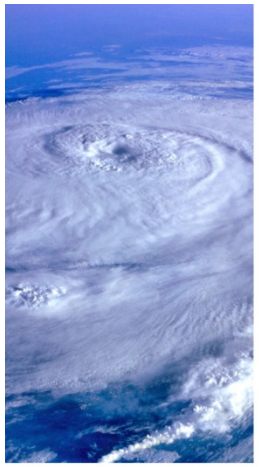
If own resources are limited, the municipalities can use:

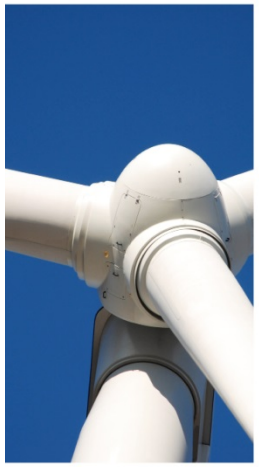
- **Debt-financing** – a low interest loan from a public lending program, a commercial loan from a commercial bank, or municipal bonds.
- **Financing by third parties:**
  - Contracting models
  - Energy performance contracting models
  - Project finance

Each model has its advantages and disadvantages as well as constraints to do with the economic, market, and legal conditions

Partners involved into the task

- Medimurje energy agency ltd., MENEA
- University of Applied Sciences: Technology, Business and Design, HSW
- PORSENNA n.g.o., PORSENNA
- Town of Čakovec, Čakovec
- Poltegor-Institute, Poltegor
- Bruno Kessler Foundation, FBK
- BSC, Business support centre Ltd., Kranj, BSC
- SWARCO V.S.M. GmbH, SWARCO
- University of Greifswald / IKEM
- TEA SpA, TEA
- City of Graz, Graz
- Municipality of Cesena, Cesena
- Hanseatic City of Rostock, HRO





Thank you!

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