



Energy Efficiency in the Public Sector

Overview and Selected Case Studies

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Anke S. Meyer

World Bank Consultant





Why EE in the Public Sector?

- ◆ **Save energy, money, pollution, and carbon**
 - ↗ – Large, cost-effective savings potential (>20%)
 - ↗ – Longer time horizon
- ◆ **Market presence**
 - ↗ – Public sector is large % of GDP, 10-20%
 - ↗ – Biggest energy user in most countries
 - ↗ – Biggest buyer of energy-using products
- ◆ **Market leadership (influence buyers & sellers)**
 - ↗ – Implied endorsement of EE products & services
 - ↗ – Example for others





Potential Targets in the Public Sector

- ◆ Federal administration
- ◆ States
- ◆ Municipalities
- ◆ Hospitals
- ◆ Schools etc
- ◆ Office buildings
- ◆ Military facilities
- ◆ Prisons
- ◆ ...
- ◆ Existing buildings retrofit and systems
- ◆ Government purchasing
- ◆ New construction - *not in this presentation*
- ◆ Public services (water/ wastewater, district heating, lighting, transit) – *not in this presentation*





What can be achieved?

◆ USA

- **Super Energy Saving Performance Contracts** under FEMP have resulted in **\$1.9 billion project investment** by 19 agencies in 46 states between 1998 and 2006. **Energy cost savings of \$5.2 billion with net savings of \$1.5 billion**
- **Energy-efficient purchasing** by federal and non-federal government agencies has resulted in estimated **energy cost savings of US\$ 1 billion/year**

◆ Berlin Energy Saving Partnership (ESP)

- Performance Contracting (incl. financing) in 19 pools of 500 public real estate complexes with about 1400 buildings (since 1996)
- Baseline: annual energy costs of €37 million for energy consumption of 749,197 MWh/a
- **Investments: €43 million**
- Energy Efficiency: **26% average savings**
- Annual CO₂ Reductions: 60,484 tons
- **Annual Financial Savings: €10 million**





Barriers to Public Sector EE

◆ Policies and Regulations

- Procurement policies
- Annual budget cycles

◆ Public End-user

- No incentive to change or take risk
- Lack of information
- No discretionary budget for upgrades or special projects
- Split incentives, incl. issues about ownership of cost savings





Laws and Regulations: Procurement/budgeting

Issues

- Well-defined projects required for tendering
- Tender criteria may require least cost award
- Budgeting is an annual cycle and may not allow multi-year contracts

Possible Solutions

- Only basic project description w/ baseline
- Life-cycle cost (LCC) or Best Value instead (NPV/RoR)
- Start w/ one-year projects and with experience allow to move to multi-year contracts

Examples: UK (value for money), France (flexible budgeting), Mexico CONAE/USAID EE Bidding Program; see Canada FBI case study





Laws, Regulations and (Dis-)Incentives

Issues for Public End-user

1. No incentive to change or take risk
2. Lack of information (data and technical specs)
3. No discretionary budget for upgrades or special projects
4. Split incentives, incl. issues about ownership of cost savings
5. Competing policies or organizational needs (domestic content etc)

Possible Solutions

1. Legal requirements to incorporate EE criteria in investment/purchasing decisions (US, UK)
2. Computer-based info, tied to EE labels; standard documentation; LCC methods; purchase specs; standards
3. Leasing, 3rd party financing
4. make institutions/ departments semiautonomous; allow part of savings to be retained
5. Clear policies

See Coleman (2007) for details





Financing Options 1

1. Internal appropriations

- Standard: request funds, get allocation, conduct project
- Revolving internal loan fund: designate funds and assign them to pool; Example: “Intracting” in German cities (combination with energy performance contracts, EPCs; see case studies)

2. Debt financing

3. Finance from savings





Financing Options 2

2. Debt financing

- Standard: take out loan or issue bond, get proceeds, conduct project
- Examples: World Bank EE Loans for hospitals/ schools in Serbia, schools in Lithuania and Kiev/Ukraine, DH systems in many ECA countries and China (some problems with counterpart funding)
- Lease: get equipment, pay as you go from operating (not capital) budget (Example: tax-exempt lease-purchase agreements in the USA – often used as underlying financial instrument in an EPC)

3. Finance from savings





Financing Options 3

3. Finance from energy savings

- Standard: Public sector entity makes one contract with ESCO, another with 3rd-party lender for loan; interest rate depends on credit record of borrower and not on savings stream
- 3rd-party-financed “performance contract”: Public sector entity makes contract with ESCO and ESCO makes contract with 3rd-party lender such that payments are contingent on savings occurring; “performance risk” may raise interest rate
- Utility-financed energy services contracts and rebate programs (e.g., US for state and municipal facilities)





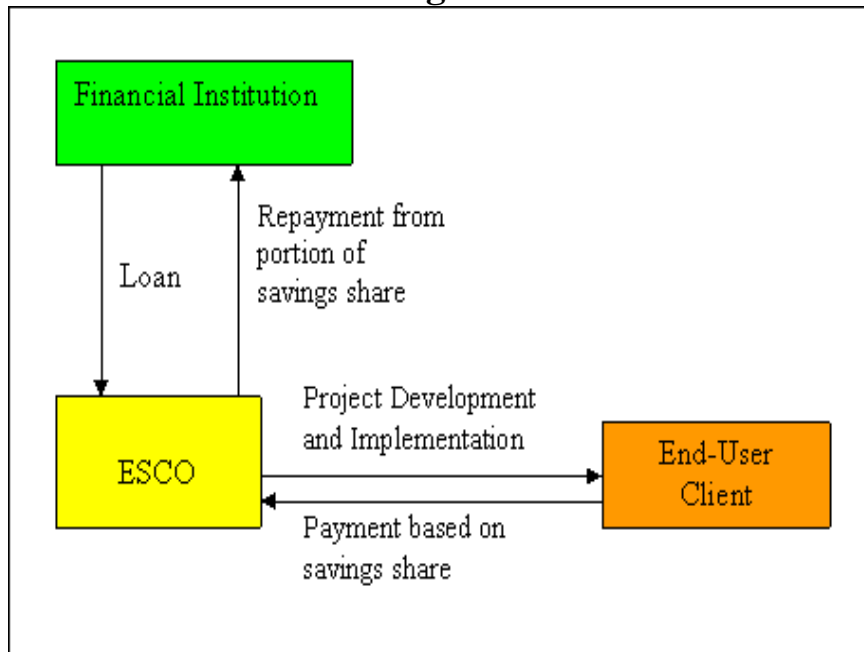
ESCO Involvement and/or PPP

- ◆ Energy Service Company (ESCO)
 - Offers technical (and financial) services to end-users in the identification, packaging and implementation of EE projects
- ◆ Energy Performance Contracts
 - ESCO assumes technical, performance (and financial) risks
 - Shared Savings
 - Guaranteed Savings

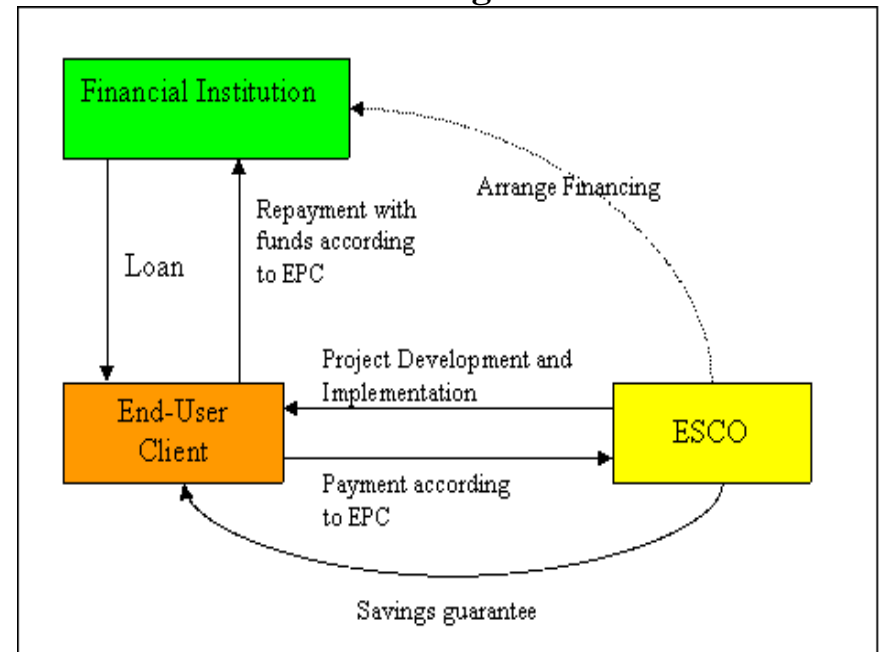


Energy Performance Contracting Models

Shared Savings EPC Model



Guaranteed Savings EPC Model





ESCO Involvement and/or PPP

◆ Pros:

- Performance-based contracts shift technical risks to third party
- Service contracts with financing options allow for EE investments when budgetary constraints exist (see *Hungary and Berlin case studies*)

◆ Cons:

- Procurement rules may not allow multi-year EPCs
- Tender criteria may require least cost award
- Small number/inexperience of ESCOs
- Experience of public sector agencies to provide EE services (e.g., “Intracting” in German cities)





Intracoting or public internal performance contracting (PICO)

- ◆ Similar to performance contracting, but under in-house "third-party" financing or EPC scheme. The role of the ESCO is taken by a unit of the customer itself, e.g. the technical department of a municipality. This unit acts like an ESCO, delivers the financial and technical service, and the remuneration takes place through cross payments of budgets between the two separate organizational units of the same public administration.
- ◆ **Financing:** Establishment within the administration of an internal revolving fund which provides the financing for initial EE investments and is refilled by the cash flow from energy cost savings, i.e. the customer department pays back the investment.
- ◆ Applications in Germany and Austria (see Stuttgart case study)





Lessons Learned – Public Sector TPF

A market for TPF in the public sector could be established under the following conditions:

- ◆ A legal framework that allows public entities to enter into such contracts
- ◆ Public customers that are convinced that the instrument is useful and affords a win-win situation
- ◆ ESCOs able to offer the services needed where necessary
- ◆ Independent experts for the management of project development and tender procedure
- ◆ Standard documents offering transparency of procedures





Issues in Public Purchasing

The following areas should be explored as a minimum during the development of a public EE purchasing program (PROST):

- ◆ development of common purchase specifications and LCC methods
- ◆ a learning-by-doing exercise where procurement officers practice to write call for tenders, and to evaluate these tenders, based on the purchase specifications
- ◆ a limited number of products relevant for as many administrations and countries as possible should be selected
- ◆ pilot projects would identify current practices and propose a reform for the energy-efficient procurement *within* institutions
- ◆ development of common information material and simple “how-to” guides based on the experiences of the pilot action





Lessons Learned: EE purchasing

- ◆ Policies and targets are necessary, as well as rules and regulations
- ◆ Adopting policies and rules is not enough; their communication is necessary, along with tools and information that make it easy to comply
- ◆ LCC analysis may work for large purchases, but most equipment is bought in much smaller quantities. A simplified method is needed for majority of small or medium-size purchase decisions, such as a recommended efficiency level, energy-efficient “quality mark” (like Energy Star), or an approved list of qualified, efficient products, linked to an EE label
- ◆ The more buyers who use the same efficiency levels, the better
- ◆ Seek active involvement of the private sector (manufacturers to ESCOs) in selling EE products to the government
- ◆ Update program in response to changing technologies and market conditions





Conclusions

Public sector EE activities:

- ◆ Offer high rewards in terms of energy savings and energy cost and emission reductions
- ◆ Require some changes in legal/budgetary frameworks under most implementation arrangements
- ◆ Frequently require additional sources of funding (3rd party)
- ◆ Offer opportunities for private sector participation (ESCOs, manufacturers, contractors, installation co.)
- ◆ Are TA intensive in preparation and implementation
 - Independent experts for the management of project development, tender procedures; development of standard documentation offering transparency of procedures
- ◆ Can contribute to market transformation





How to get started with Public Sector EE?

- ◆ Seek high-level support
- ◆ Pursue written policy (objectives, strategies, responsibilities)
- ◆ Set goals (savings, investments, means)
- ◆ Take advantage of leveraging possibilities (external financing, piggy-backing on non-energy initiatives)
- ◆ Start small, do well and expand
- ◆ Evaluate to improve programs and to obtain funding and expand

(based on PEPS 2007)





Case Studies

In this presentation

- ◆ Kiev Public Buildings EE Project
- ◆ **Hungary Szemünk Fenyé Program**
- ◆ **Berlin Energy Saving Partnerships**
- ◆ Canada Federal Buildings Initiative
- ◆ Intracting in Stuttgart/Germany
- ◆ EE leases in the US

Other presentations

- ◆ Serbia Public Buildings EE Project
- ◆ US FEMP/Energy Star: Purchasing and SuperESPCs
- ◆ Public Purchasing China/Mexico (PEPS)





Case Studies: Kiev Public Buildings EE Project

- ◆ **Financing:** \$18.29 million IBRD loan to the national Government, onlent to Kiev City government.
- ◆ Investments were focused on public buildings (healthcare, educational and cultural) owned by Kiev City State Administration (KCSA). EE measures were evaluated in advance to determine those with the highest economic rates of return and easiest and quickest implementation.
- ◆ Implementation was through a Project Implementation Unit (PIU) within KCSA by means of supply&installation contracts.
- ◆ **Components:**
 - EE improvements in 1,302 institutional buildings, with a floor space of about 5.1 million square meters: heat meters, heat substations, radiator reflectors, weather stripping,... (estimate \$26.2 million – actual \$20.5)
 - Technical audits and design of retrofits, institutional support program, financial audits (US\$ 4 million)





Case Studies: Kiev Public Buildings EE - Results

- ◆ Energy savings and emission reductions: 17% reduction of annual energy consumption (2004), expected to go up to 26% when investments are functional year-round starting in 2006
- ◆ Development of an EE industry fostered: manufacturing of EE components, supply and installation companies, technical audits and design.
- ◆ Capacity building in international procurement, financial management, monitoring and verification of energy savings, and in promoting public awareness about EE, and development of a training program in energy conservation issues for building managers and district administration officers responsible for O&M of the new equipment.



Case Studies:

Hungary “Szemünk Fenyve Program”

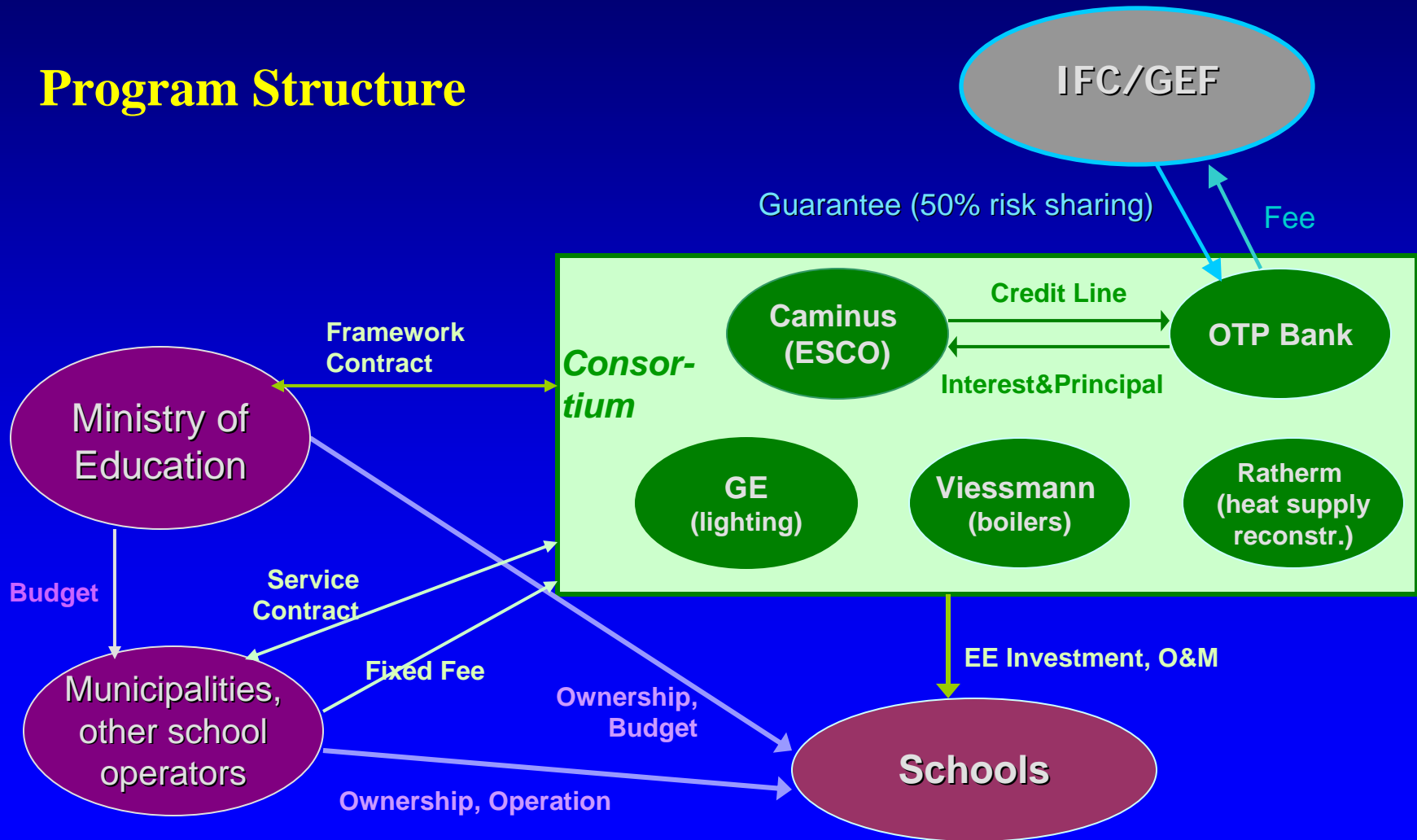
- ◆ Modernization of indoor-lighting and heat supply in municipal and budget educational institutions, based on multiyear service contracts
- ◆ Investment of \$250 million in 5 years, financed by winning bidder
- ◆ Central tender by Ministry of Education: select the best value-for-money ESCO provider which will offer off-balance-sheet no recourse financing to the client; selection based on scoring system with technical, pricing, experience, terms of financial package, etc., indicators
- ◆ Winner is offered access to the entire market; no further public procurement is necessary as major terms and conditions have been negotiated centrally
- ◆ Winner: Consortium of Caminus (ESCO, leader), OTP Bank, GE (lighting supply), Viessmann (gas boiler supply), RATHERM (heat supply reconstr.)
- ◆ IFC/GEF provides \$150 million guarantee package (50% risk sharing) to OTP, which in turn provides credit line (€180 million) to Caminus

Source: http://www.accessmylibrary.com/coms2/summary_0286-17364719_ITM; IFC



Case Studies: Hungary Szemünk Fenyve Program

Program Structure





Case Studies: Berlin Energy Saving Partnerships

- ◆ Retrofits for large local government-owned buildings, by setting up special contracts between building owners and ESCOs to be financed by the ESCO and paid back through guaranteed savings
- ◆ 19 pools of 500 public building complexes with about 1400 buildings (since 1996); baseline: energy costs of €37 million; guaranteed investments of €40 million; guaranteed net savings: 25%; guaranteed annual budgetary savings: €3.4 million; contracts 10-14 years; use of project managers to support the client during project preparation, public tendering process, contract award and project controlling
- ◆ Assessment criteria for contract award: guaranteed savings, remuneration, budgetary reduction, bonus if additional savings; time of contract, investment volume, operations management, concept for end-user motivation, reduction of CO₂ emissions (NPVs)



Case Studies: Berlin Energy Saving Partnerships





Case Studies: Berlin Energy Saving Partnerships

◆ Results:

- Investments: €43 million (light fittings, energy control system, insulation etc)
- Energy Efficiency: 26% average savings per building pool (1 building pool includes an average of 20 buildings); 749,197 MWh/a energy consumption baseline
- Annual CO₂ Reductions: 60,484 tons
- Annual Financial Savings: €10 million

http://www.nycclimatesummit.com/casestudies/energy/energy_berlin.pdf

A similar approach has been proposed by the Clinton Climate Initiative during the New York Climate Summit in May 2007 for implementation in 16 cities worldwide





Case Studies: Canada Federal Buildings Initiative (FBI)

- ◆ FBI allows federal departments to contract ESCOs under Energy Performance Contracts with the ESCO providing the financing. EPCs under Can\$25 million can be concluded without Treasury Board's approval (except for 1st contract >Can\$1 million). Departments have the option of either immediately sharing in energy savings or deferring them until the conclusion of an EPC.
- ◆ Natural Resources Canada (NRCan) manages the program
 - promoting the concept to individual agencies,
 - organizing training for agency staff in developing projects with ESCOs,
 - providing model contracts and bid packages,
 - maintaining a qualified bidders list of ESCOs, and
 - helping federal organizations identify the specific training needs of facility operators and managers and by assisting in the creation of customized training plans

<http://www.oe.nrcan.gc.ca/communities-government/buildings/federal/federal-buildings-initiative.cfm?attr=28>





Case Studies: Canada Federal Buildings Initiative (FBI)

◆ Procurement and Expenditure Management Policy

- Departments need not conform with the Treasury Board's policy concerning capital plans, projects, and procurement as long as they follow the FBI management framework. Consequently, limits concerning Preliminary Project Approvals and Effective Project Approvals do not apply to departments entering into EPCs.
- The present Expenditure Management Policy gives departments wide latitude in switching funds from one expenditure item to another. Consequently, energy savings (both shared savings and those accruing at the end of an EPC) can be directed towards other priority areas within a department.

◆ Results to date:

- Retrofits of 7500 federal buildings
- Can\$265 million private sector investments
- Can\$38 million in annual energy cost savings.
- Additional benefits: improved building comfort, healthier, more productive workplace, reduced greenhouse gas emissions by 250 kilotons.





Case Studies: Intracting in Stuttgart/Germany

- ◆ The energy management unit within the city's Department for the Environment is responsible for EE in 2000 city-owned facilities. It takes the role of an internal ESCO and offers energy services to other units of the municipal administration. The internal offers draw the technical know-how of the building surveyor's office and supplementary energy audits, and they are backed with economic cost/benefit calculations by the environmental department. This forms the basis for internal negotiations between the customer department and the environmental department, acting as an ESCO. When an internal energy service agreement has been concluded, the environmental department undertakes an investment in energy saving measures that are implemented by the city's construction department.
- ◆ Within the administration, an new internal revolving fund for energy efficiency investments has been established.
- ◆ A total of Euro 3.32 million has been invested in 158 individual projects between 1995 and 2001. The 158 measures conducted by the end of 2001 yield total annual cost savings of Euro 0.7 million, compared to an energy bill of Euro 35 million in 2000. The annual savings generated by the projects amount to 12,300 MWh heat, 1,500 MWh electricity and 31,700 m³ water.

http://www.reneuer.com/upload/STUT_EN_M.PDF





Case Studies: EE Leases in the US

- ◆ Municipal lease-purchase agreements (“municipal leases”) are exempt from federal income tax (i.e., leasing companies are) and their interest rates are therefore lower than those on a taxable commercial lease purchase agreement
- ◆ Neither lease nor lease payments are considered debt since lessee’s payment obligation ends if lessee fails to appropriate in future budgets the funds needed to make lease payments (“non-appropriation”) – therefore lease payments can be made from the energy savings in the operating budget
- ◆ Municipal leases are often used as underlying financial instrument in an EPC
- ◆ Examples: Mississippi EE Lease Program; Oklahoma K-12 School Energy Loan/Lease Program; Iowa Public School EE Project Lease Program
- ◆ <http://www.energystar.gov/ia/business/easyaccess.pdf>





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