

# Integrated Energy Contracting (IEC) (Renewable) Supply and Savings

Working Group Session 1.2

MS financial instruments designed to support public building renovation

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### **Public Buildings: Contracting models in the different** structures of administration



Federal Buildings (Military bases,



### **IEC:** Business models + scope of measures

ine Business models		Standard ENERGY SUPPLIER (UTILITY)	ENERGY SUPPLY CONTRACTING (ESC)	ENERGY PERFORMANCE CONTRACTING (EPC)
Typical products Value chai & measures	Primary energy	Secondary/ final energy	Useful energy service	Energy savings service
	Crude oil, natural gas, coal, 	Heating oil, electricity, district heating, biomass, 	=> M Wh: Heat, steam, cooling, compressed air: HVAC, CHP plants, solar systems, 	=> N Wh: energy management, controls, HVAC, efficient lighting, peak load management, thermal insulation, user motivaton,

...

### Introduction of the IEC-Model:

- 1. Building on ESC model
- Expand scope to savings in entire facility (HVAC, user motivation, building shell ...)
- 3. Simplified M&V:Savings calculations+ quality assurance



### Introduction of the IEC-Model:

#### **Combination of 2 objectives:**

- Reduction of energy demand through the implementation of energy efficiency measures in the fields of:
  - 1. Building technology (HVAC, lighting ...)
  - 2. Building shell (Insulation)
  - 3. Motivation of building occupants
- Efficient supply of remaining useful energy demand, preferably from renewable energy sources (district head, biomass, solar thermal energy, pv...)

#### IEC in Practice: Nursing Home Facility:

- Nursing home Bad Radkersburg/Styria
- Owner: Landesimmobiliengesellschaft (LIG) Steiermark
- Heated floor area: 5.800 m<sup>2</sup>

#### Initial situation:

- Inefficient light-fuel-oil boiler, high energy costs
- No insulation of building envelope
- Inefficient hot-water-conditioning
- No energy monitoring



Elderly home post IEC - Bad Radkersburg, Styria, Austria Source: Landesimmobiliengesellschaft Steiermark GmbH

### **IEC in Practice: Nursing Home**

#### Goals of building owner:

- Renewal + outsourcing of heat energy supply and financing
- Reduction of energy demand, -cost and CO<sub>2</sub> emissions through demand side energy efficiency measures

#### Measures (selection):

- Connection to district heating network (heat-sources geothermal + biomass)
- Solar thermal collectors, 150 m<sup>2</sup>, Hot water treatment with chemicals
- Upper floor ceiling insulation



LAPH Bad Radkersburg: Hydraulic Schema Source: Siemens, LEA, Connes 2010.09.22

### **IEC in Practice: Evaluation**

 9 (of > 30) Buildings were evaluated by FH Burgenland in master thesis on behalf of the state government (Land Steiermark/Fachabteilung 16/Referat Landeshochbau)

#### **Total energy results:**

- Heat energy savings: 3,514 MWh (19%)
- Electrical energy savings: 775 MWh (16%)







### **IEC in Practice: Evaluation - Savings**

**Cost savings:** 

- Heat cost savings: 315,600 EUR; Electrical energy cost savings: 92,700 EUR
- investment costs EUR 1,186,000 in addition to the annual expenses for management, services, maintenance and funding being cost-neutral

**Environmental impacts:** 

- conversion to renewable Energy: 4,400 MWh (75%)
- Reduction of CO2 emissions: 3,400 tons (79%)



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#### IEC in Practice: Evaluation - CO<sub>2</sub> avoidance costs



In the weighted average, the  $CO_2$ e avoidance costs are below the EUA certificate price (2009)

### **IEC in Practice: Evaluation - Interviews**



The evaluation of the interviews confirms that the project partners are overall satisfied with the projects

### **IEC in Practice: Evaluation - Multiple Benefits**

- Outsourcing of planning and risk in project implementation
- Energy monitoring and positive climate balance
- Elevation of external, often innovative implementation ideas, since a "different perspective" is involved
- The creation of regional jobs (e.g. installation companies, planning offices, employees of local heating companies)
- User motivation and sensitization of the user with regard to the "energy saving idea", partly also energy coaching

### For further Reading and References: Task 16 paper on Integrated Energy-Contracting Model

Bleyl, Jan W.

Conservation First! The New Integrated Energy-Contracting Model to Combine Energy Efficiency and Renewable Supply in Large Buildings and Industry in ECEEE Summer Studies, paper ID 1-485, Belambra Presqu'île de Giens, France June 2011

IEA-REDT Business Models for Renewable Energy in the Built Environment International Energy Agency Renewable Energy Technology Deployment (ISBN 9780415638685) 2013, download available at: http://iea-retd.org/wpcontent/uploads/2012/04/RE-BIZZ-final-report.pdf

Jan W. Bleyl-Androschin - Paper ID 485

Conservation First! The New Integrated Energy-Contracting Model to Combine Energy Efficiency and Renewable Supply in Large Buildings and Industry

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#### Abstract

Any renewable supply should first of all focus on energy conservation by evaluating all possible demand reduction hy renewants suppy moual prist of ait points on energy conservation by evaluating an possible domain reauction opportunities. Only afterwards the remaining domain is supplied as efficiently as possible - preferably from renewables. Otherwise climate protection goals are not achievable.

A good example for this thesis is the reduction of all electrical and thermal cooling loads including solar shading

One of the most urgent energy policy and energy economics challenges continues to be the search for suitable One or une most sugerst energy poincy and energy economics crasterges continues to re the search for suitable Tools' to execute energy conservation potentials. The level of success is far from satisfactory as the continuor toom to concute energy construction potentials. The level of success is far from satisfactory is the community acrease in final energy consumption reveals. Since the mid of this decade, Energy Service have climbed high on political agendas and have even reached the headline of energy legislation [2006/32/EC].

This contribution introduces a new, market based implementation model for energy efficiency and supply (prefera-Insectorization introduces a new, market based imprementation model for energy extracting and approv (preterm-by from recoverables), labelled as Integrated Energy Contracting (EC). IEC builds on the in many markets more by nom renewances, meetice as **Integrates nergy Contracting** (UCC). It: Courses on me in many markets more widely applied Energy Supply Contracting (ESC) model, but extends the scope of service to the entire facility in

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1. To unite energy conservation and (renewable) energy supply into an integrated approach 2. To discuss quality assurance instruments and simplified measurement and verification methods e.g.

3. The underlying goal is to increase understanding of different ESCo models as tools to implement

The impertying goas is to increase understanding of uniterest how moves as nown to implement renewable and energy efficiency projects and to discuss pros and cors, potentials, limits and added values The intention is not to question the EPC model, wherever it is marketable, which is predominantly in large public

a ne mneuton is not to question the first-involet, wherever it is functioner, which is predominantly in ange public sector buildings. Rather an additional ESCo approach for EE and RE projects shall be proposed in order to increase sector buildings. Kather an additional risk-to approach for Eth and Kit projects shall be proposed in order to in the saving potential of the ESC model, to decrease transaction and measurement & verification cost, to make has average potentiation user not-monte, no uncertaine summation and immediation are vertainment on vertainment performance based ESCo services available to smaller projects and to build on success of the ESC model to reach Besides discussing the new IBC model, we present results from pilot projects procured by Landesire

Detenses unknussing one next into intoise, we premare remain aroun proposes process or y cartaenammoorseragenes schaft Steiermark (Real Estate Company of the State of Styria), Austria: Experience from up to now eight projects schark Stetermark (rean instate company of the state of adyna). Austria, insperance from up to now eight projects has proven the feasibility of the IEC model. In addition to competitive energy prices, final nergy savings of up to has proven the reasoning of the 105, model, in addition to competitive energy prices, that energy savings of up to 30.% heat, 12.% electricity and 20.% water consumption have been achieved. In 2010, LIG's IEC activities have Subject to further experiences, the IBC model might be a solution, which is more widely applicable to combine

obeyes to nature sourcements, use and means in a source in an end of the source in a source wrately applicately to combine energy supply and delivery of EE potentials in large volume buildings and enterprise. Perhaps energy efficiency energy supply and derivery of 1:11 potentials to argo volume buildings and enterprises, version deriver will achieve higher market diffusion in combination with tenerable energy supply? And market a less technical with tensive nighter market outbases in communitism white fenemene energy supply / state mayre a sensive mean approach to verify savings and thus a simplification of (pseudo-levact, indirect saving measurements, would serve

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## Thank you for your Attention!

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