# Energy Efficient Building Renovation in South East Europe

## A Regional Workshop on the Implementation of EU Directives in the Buildings Sector – Slovenia 8<sup>th</sup> May 2019









Sponsored by: **KNAUFINSULATIO** 



## **Welcome Address**



## **Barbara Hafner**

Marketing and PR Director Knauf Insulation



Implementation Workshop in South East Europe 8<sup>th</sup> May 2019



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## **Opening of the Workshop**



## Jernej Vernik

Head of EU Representative Office VELUX



Implementation Workshop in South East Europe 8<sup>th</sup> May 2019



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#### What: Facilitate Energy Efficient Building Renovation in South-East Europe

#### How: By addressing 3 key questions together

 $\rightarrow$  What are the key drivers local jobs, better environment, cleaner air and more comfortable homes?

→ How can national long-term renovation strategies best plan ahead and maximise impact?

→ How do we best finance the ambition of a highly energy-efficient building stock by 2050?









## **Current State of Play**



8<sup>th</sup> May 2019

THE EUROPEAN ALLIANCE OF COMPANIES

FOR ENERGY EFFICIENCY IN BUILDINGS

With support from:

## **Achieving our Aim: 3 Phases**

Session 1	Energy Efficient Buildings in South-East Europe	What are the key drivers local jobs, better environment, cleaner air and more comfortable homes?		
Break				
Session 2	National Long-Term Renovation Strategies	How can we best plan ahead and maximise impact?		
Lunch + Experience centre tour				
Session 3	Financing the Ambition	How can we best finance a highly energy-efficient building stock by 2050?		









## Session 1

## Energy Efficient Buildings in South-East Europe

What are the key drivers local jobs, better environment, cleaner air and more comfortable homes?

Welcome Address	Ms. Barbara Hafner	Marketing & PR Director, Knauf Insulation	
Keynote	Mr. Saša GALONJA, Head Slovenia	d of Construction & Spatial Planning, Ministry of Environment,	
Setting the Scene: Benefits	Mr. Adrian JOYCE, Secretary General, EuroACE		
European Commission View	Mr. Dimitrios ATHANASI	OU, Policy Officer, DG ENER	
Business Sector View	Mr. Vojko GOLMAJER, Go Mr. Darko BEVK, Comme	eneral Manager, VELUX ercial Director - Northern Balkans, Knauf Insulation	
Q&A + Open Discussion			









## **Keynote Speech**



## Sasa Galonja

Head of Construction Division, Ministry of Environment & Spatial Planning Slovenia













#### REPUBLIC OF SLOVENIA MINISTRY OF THE ENVIRONMENT AND SPATIAL PLANNING

SPATIAL PLANNING, CONSTRUCTION AND HOUSING DIRECTORATE

## NEARLY ZERO ENERGY AND SUSTAINABLE BIULDINGS IN SLOVENIA

# **EuroACE Conference**

Saša Galonja, Škofja Loka, 8 May 2019

## **TRENDS IN PUBLIC SECTOR (I)**

- Revision of existing Rules on energy performance of buildings:
  - New tougher requirement for envelope, systems in the building and use of renewables,
  - Use od new set of EN standards for calculation of energy use,
  - Reference building approach,
  - New set of climate data will be used and hourly method will be introduced,
  - No decision yet on mandatory use of calculation tool.

## **TRENDS IN PUBLIC SECTOR (II)**

- New "greener" requirements for public procurement of buildings
- use of wood,
- or one of established certificate systems can be used (LEVEL(S) DGNB; BREEAM...),
- Guidance document on sustainable (public/administrative) buildings is being developed, uses LEVEL(S) as basis,
- Subsidies and loans for reconstruction and refurbishment of existing buildings owned by municipalities and government

## **TRENDS IN PRIVATE SECTOR**

- Efficient use of energy has become common practise, especially for new homes,
- Use of wooden structures and wooden façade is becoming increasingly popular,
- Energy efficiency of multi-storey dwellings is being improved, less so in private onefamily houses,
- Deep renovations are less common or they are divided into many phases, in between indoor climate is not optimal,
- Eko sklad (Eco-fund) gives subsidies and loans to private persons for efforts in reaching over minimum state requirements on building elements, systems and new houses

## **SOME DOUBTS**

- Energy use is only a fraction of sustainable construction, but it seems that many people (including politicians) think both are synonyms,
- Fear of sick-buildings-syndrome,
- With "high-end" demands robustness is gone,
- Smart buildings concepts and solutions will need several iterations to become fully functional and will work seamlessly in the background,
- Introducing recharging infrastructure for electro-mobility is no problem for new buildings, but would be a nightmare for existing multi-family residential buildings – ownership problems,
- Buildings are so complicated we will need "user manual",

## **IMPACT ON INDUSTRY**

- Shift from new to reconstruction and reuse of existing building stock,
- More opportunities for micro and small construction businesses,
- Industry of thermal insulation materials, machinery for buildings and building automation..., they all must like the development of new energy policies and regulations as they will sell more,
- Producers and distributors of energy sources other than electricity are probably getting worried.

## **DEEPER AND DEEPER RENOVATIONS**

- It is not part of the scope of EPBD, but it only make sense that before or at the same time building is assessed and renovated as "deeply" as necessary. This possibly includes:
  - Improving mechanical stability (earthquakes),
  - Fire resistance,
  - Other safety requirements,
  - Functional improvements,
  - Acces for all...

#### Thank you for your attention!

Saša Galonja Sektor za graditev Direktorat za prostor, graditev in stanovanja, Ministrstvo za okolje in prostor Dunajska cesta 48, 1000 Ljubljana, SI – Slovenia (sasa.galonja@gov.si)

## **Setting the Scene**

What are the benefits for SEE of good implementation of EU legislation for energy efficiency in buildings



## **Adrian Joyce**

Secretary General EuroACE



Implementation Workshop in South East Europe 8<sup>th</sup> May 2019



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# **EuroACE Members (May 2019)**



#### More than...

- ...286,000 employees
- ...1,200 production facilities & office locations in Europe



## More than 1,200



More than 286,000







# **Policy Context**

### Paris Agreement 2015

Keep well below 2°C increase over pre-industrial temperature

Make efforts to stay below 1.5°C

## **Clean Energy for All European Package 2030**

Energy Performance of Buildings Directive (amended) Energy Efficiency Directive (amended) Renewable Energy Directive (recast) Governance Regulation (new)

### Long-Term Climate Neutral Strategy 2050

Eight scenarios modelled – none fully account for the potential in buildings









# **Benefits for South-East Europe**

## **Become Front-Runners**

Early implementation; Innovative approaches; Exchange of experiences and practices

## **New Direct Local Jobs**

Local, Permanent Jobs in Construction; Attract Workers Back from Other EU Countries

## **Comfort and Health**

We Spend 90% of our Time Indoors; Efficient Buildings are Comfortable and Boost our Health

## **Boost to GDP**

Estimate Increase in Construction Output in the EU is in a range from €200 to €670bn per year (from 2020)











# A strong EPBD transposed and implemented at national level

## **Contents:**

12 High-Level Recommendations

6 Chapters Covering Key Issues

# **Recommendations:**

- Resources and Technical Capacity
- The Crucial Role of Buildings
- Existing EPBD Implementation Efforts Must Continue
- Embedding Milestones and Measurable Progress Indicators into LTRS
- Fulfilling Consumer Needs
- Building the Knowledge Base Together
- It's All About the Money
- Continuous Communication
- You can't Maintain What You Don't Measure
- Integration Counts
- Calculate Energy Demand First
- Keep Everyone onside

## Long-Term Renovation Strategies

- Transform Building Stock by 2050
- Have Milestones
- Have Measurable Progress Indicators
- Address Worst-Performing Segments
- Consultation of Stakeholders

## Building Renovation Passports

- New Option for Member States
- Feasibility Study by Commission
- Comprehensive, Prepared with Owners
- Tailored, Independent, Motivating Advice
- Catalyst to Drive Action

## Financing Energy Renovations

- Link to Targeted or Achieved Energy performance
- Support Mobilisation of Investments
- Commission to Collect and Disseminate Best Practices

## Smart and Technology Equipped Buildings

- Inspection Regimes Amended
- Definitions Extended
- Building Automation and Control Systems Mandatory
- Smart Readiness Indicator to be Rolled Out
- Increased Transparency and Compliance

## Annex I – Measuring Energy Performance

- Put Energy Efficiency First
- Increase Comparability Across the EU
- Describe the Energy Needs
- Account for Additional Passive Factors
- Treat RES on a Non-Discriminatory Basis

# **Final Thoughts**

## **Start of New Cycle**

Transposition and implementation Incorporation of new issues

## **Changes at EU Level**

Elections in 2019 – new MEPs New Commission at end of 2019

## **Member State Actions**

Engage with stakeholders; Transpose and implement amended EU directives; Share

## Ljubljana Declaration

Statement of intent; A rallying call to bring actors together for progress



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## **Thank You!**

#### EuroACE

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## **View from the European Commission**

**Getting the EPBD to national level** 



## **Dimitrios Athanasiou**

Policy Officer DG Energy















EuroACE workshop in South East Europe

European Commission

Energy Efficiency in Buildings & Renovation

The view from the European Commission – getting the EPBD to the national level

Ljubljana, 8 May 2019

European Commission





https://ec.europa.eu/energy/en/topics/energystrategy-and-energy-union/clean-energy-alleuropeans



Smarter – ICT, smart buildings;

• Simpler;

European Commission



#### **Clean Energy for All Europeans: 8 different legislative proposals**

#### Political negotiations on the Clean Energy for All Europeans package have been concluded

- Energy Performance of Buildings
- Energy Efficiency  $\rightarrow$  32,5%
- Renewable Energy → 32%
- Governance Regulation
- Electricity Market Design
  - Electricity Regulation,
  - Electricity Directive,
  - Risk-Preparedness Regulation
- Rules for the regulator ACER

#### A major step towards completing the Energy Union and combatting climate change

- Keeping the momentum: We need approximately the same energy efficiency effort from 2020 to 2030 as from 2010 to 2020
- Union's commitment towards its international climate and energy goals in 2030 and beyond
- Endorse the Union's commitment under the Energy Union Framework to put 'energy efficiency first'
- Give investors the security that it is worth investing in energy efficiency, with positive impact on the technology costs and payback periods





#### The energy efficiency challenge for 2020



Energy consumption is **rising since 2014**, following an extended period of declining or flat consumption.

The distance to the **EU 2020 energy efficiency target** has been increasing.

Source: DG ENER based on Eurostat data

https://ec.europa.eu/energy/en/studies/drivers-recent-energyconsumption-trends-across-sectors-eu28



European Commission







Source: Eurostat

Relative change in primary energy consumption, primary energy intensity and GDP, 2014-2017



European Commission



#### The energy efficiency challenge for 2030






### Some interesting facts for the building sector

Buildings responsible for 40% of energy consumption and 36% of GHG emissions in EU Buildings to contribute significantly to **GHG emission reductions** of around 90% compared to 1990 by 2050

### 75% of the housing stock is energy inefficient

### **Construction rates / worse economic conditions**

- low demolition rates (0.1-0.2% per year)
- limited new construction activities (0.4-1.1% per year)
- very low refurbishment rates (0.4-1.2% per year)

Problems and drivers structuralmarket failuresregulatory failures



European Commission



#### **Evaluation of the EPBD**

**EPBD is effective** (will deliver the 60-80 Mtoe energy savings by 2020)

The overall architecture is working (especially for new buildings)

The NZEB sets a 'future-proof' vision for the sector and mobilise stakeholders accordingly

**Cost-optimality is an efficient approach to set energy performance requirements** 

**EPCs is a useful demand-driven** market tool

**Relatively limited regulatory** failures Opportunities for simplification

Decarbonisation of buildings in the long-term strategy

Modernisation in terms of technological progress towards 'smarter' buildings

Better linking them with financial support systems

Databases can be a key instrument for reinforced compliance





### **EPBD review: the process**





### Main outcomes of the revision

A strengthened Directive

- > Stronger long term renovation strategies for Member States, aiming at decarbonisation by 2050 and with a solid financial component
- > An optional **Smart Readiness Indicator** for buildings
- Targeted support to electromobility infrastructure deployment in buildings' car parks
- Enhanced transparency of national building energy performance calculation methodologies
- Reinforcement of **building automation**: additional requirements on room temperature level controls, building automation and controls and enhanced consideration of typical operating conditions



European



### Long-term renovation strategies (Article 2a)



Requirement for Member States to establish comprehensive strategies aiming at a highly efficient and **decarbonised building stock** by **2050** and at a cost-effective transformation of existing buildings into **nearly zero-energy buildings** 

More elements to be considered: energy poverty, market failures and barriers, split incentives, necessary skills, health and safety issues, wider benefits



Set up a **roadmap** with measures, **measurable** progress indicators and indicative milestones for **2030**, **2040** and **2050** 



Carry out a **public consultation** 

Financial component: facilitate access to appropriate mechanisms (effective use of public funding; aggregation; de-risking)

https://ec.europa.eu/energy/en/topics/energy-efficiency/energyperformance-of-buildings/long-term-renovation-strategies





### Electro-mobility (Article 8)



By **2025**, Member States will set **requirements** for a **minimum number of charging points** in **all** non-residential buildings with more than 20 parking spaces



**Simplification** of the deployment of recharging points (including with permitting procedure)



Requirement on the deployment of **ducting infrastructure** in new and major renovations of buildings of with more than 10 parking spaces

- 1 in every 5 parking spaces for non-residential buildings
- Every parking space in residential buildings



**1 charging point** per building for new and major renovation of nonresidential buildings with more than 10 parking spaces



Targeted **exemptions** (e.g. for SMEs)





### **Smart Readiness Indicator – SRI (Article 8, Annex Ia)**



**New article** advocates the introduction of an **optional** common Union scheme for rating the smart readiness of buildings

- Will characterize the ability of a building to manage itself,
- To interact with its occupants,
- And to take part in demand response and contribute to smooth, safe and optimal operation of connected energy assets
- The SRI will be established through two legal acts: delegated act for the definition and calculation methodology; implementing act for the technical modalities of implementation. By 31 Dec. 2019

Motivation: recognition of progress towards smart building systems and their added value for building users, energy consumers and energy grids

https://smartreadinessindicator.eu/



European Commission



Inspections & building automation (Articles 14&15, Article 8)



Thresholds for inspections are set up at 70 kW for both heating and air-conditioning systems



Alternative measures to mandatory inspections based on advice are kept, with ex-ante reporting to the Commission

Additional requirements on the installation of **building automation** and control systems by 2025 in large non-residential buildings



Additional requirements on the installation of **self-regulating devices** for room temperature level control in new buildings and when heat generators are replaced





### Towards better data (Article 10(6) and Article 8(9)



Requirement for **EPC databases** to allow gathering data for the (measured or calculated) energy consumption of buildings

This data shall be made available to building owners and for statistical and research purposes

Requirement to assess and document the performance of technical building systems when they are installed, replaced or upgraded



Complementary with the EU Building Stock Observatory: https://ec.europa.eu/energy/en /eubuildings





### Towards more transparency (Annex I)



Considerations for the calculations of Primary Energy Factors (PEFs)



National calculation methodologies must reflect the energy needs of a building in order to provide the **optimal comfort, indoor air quality and health conditions inside the building** 

Pursuing the optimal energy performance of the building envelope



Treatment of on-site and off-site RES on a nondiscriminatory basis



European Commission



### **EPBD** implementation (studies and contracts)



- Feasibility study (Article 19a of the revised EPBD)
- Standalone ventilation systems
- Optional building renovation passports



Smart Readiness Indicator <a href="https://smartreadinessindicator.eu/">https://smartreadinessindicator.eu/</a>

- Phase 1 Final report available (including summary version)
- Phase 2 starting in December 2018



Support to use of CEN EPB Standards <a href="https://epb.center/">https://epb.center/</a>



Comprehensive study on **renovation rates and NZEB uptake** in the EU

### **Energy Performance Certificates**

• Quality, Visibility, Usability

Finance measures on energy renovations





### The "Smart Finance for Smart building" Initiative



Smart Finance for Smart Building Initiative aims at unlocking investments and private financing through:

- Technical Assistance and Aggregation of projects
- De-risking
  - Effective use of public funding



### **Financing Initiatives**

- **European Local Energy Assistance** (ELENA) Technical assistance to develop large-scale projects
- **De-risking Energy Platform (DEEP)** database aiming at de-risking energy efficiency investments
- **EFFIG Underwriting toolkit** guide which aims to assist financial institutions to scale up their deployment of capital into energy efficiency
- Sustainable Energy Investment Forums
- Facilitate the **use of Energy Performance Contracting** for the public sector

https://ec.europa.eu/info/news/smart-finance-smart-buildings-investingenergy-efficiency-buildings-2018-feb-07 en





Guide on good practice in energy efficiency for Central and South Eastern Europe



# Main lessons learnt for the energy performance of buildings

- The building sector needs to use more innovative design and construction methods to build for high energy performance
- Large-scale building renovation requires holistic and attractive packages to be developed
- Collaboration of all players and stakeholders from the construction, energy and education sectors
- Training is necessary tailored to the needs of construction companies, workers and home owners
- Support from national authorities will now be key in the long-term roll out of existing and new energy efficiency training schemes in the construction sector

https://ec.europa.eu/easme/en/news/new-guide-goodpractice-energy-efficiency-central-and-south-easterneurope







#### Leveraging funding for energy efficiency in buildings in South East Europe

Jorge Núñez Ferrer

#### Abstract

This paper addresses the possibility of creating financial instruments so that large scale energy efficiency renovation programmes can be substantially financed by the private sector. Almed at decision-makers and those wishing to understand the issue, it avoids excessive technicalities. The paper presents some selected examples of financial instruments for energy efficiency that could represent possible blue prints for South East Europe. It concludes by proposing to develop variations of one of the simplest models to avoid ambitious, complex but ineffective instruments. A clear warning is given on the need for a careful ex-ante assessment of the legal framework, other barriers and the capacity of building associations to request loans on behalf of the owners. It also insits that business strategy development requires special attention.



https://www.ceps.eu/publications /leveraging-funding-energyefficiency-buildings-south-easteurope

### **Barriers to boost energy efficiency solutions**

- The appropriate regulatory framework
- A proper understanding of the market
- Energy poverty and low incomes
- Financial risks
- Lack of skilled workforce
- Split incentives and common decision-making

### **Sources of funding**

- European Regional Development Fund (ERDF)
- European Social Fund (ESF)
- Horizon 2020
- Project development Assistance Facilities

### The ESCO model and use of EPC

A basic financial instrument model for SEE



European Commission



# FINANCING THE FUTURE OF BUILDINGS IN CENTRAL, EASTERN AND SOUTH-EAST EUROPE

A REALITY CHECK OF CURRENT PUBLIC FUNDING ALLOCATION

### Challenges

- Make investing in demand-side infrastructure a strategic priority
- Overcome the lack of project proposals for demand-side projects
- Remove silos that are hindering effective governance of funding streams
- Reduce uncertainty to spur private investments

### Solutions

- Strategic measures
- Increase technical assistance
- Better governance
- Implement cross-cutting measures







POVERTY RISK | 2016

Source: Energy Poverty Observatory

https://www.energypoverty.eu/



European Commission



### Going beyond energy savings

Wider benefits of NZEB and highly energy performance buildings

- Health https://www.velux.com/health/healthy-homesbarometer-2018
- Comfort

.....

- Indoor air quality
- Lower bills
- Increased property value
- More demand
- Increased productive (for offices)











**ENERGY UNION** 





Policy officer, Buildings team of Unit C3 European Commission - DG Energy <u>dimitrios.ATHANASIOU@ec.europa.eu</u>



# **Views from the Business Sector**



# Vojko Golmajer

General Manager VELUX



### **Darko Bevk**

**Commercial Director Knauf Insulation** 



Implementation Workshop in South East Europe 8<sup>th</sup> May 2019



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# BRING / LIGHT TO LIFE THE VELUX VISION

To lead the development of **better living environments** with daylight and fresh air through the roof, and to be rated as the best in the eyes of our customers.

VELUX Slovenija, VELUX Croatia Vojko Golmajer



# BRING / LIGHT TO What we make

8



. .

.

6

# BRING / LIGHT TO LIFE What our customers buy

**VELUX**®







15

**VELUX GROUP PRESENTATION** 

# **STRIVE / FOR THE BEST**

### A decade of full-scale experiments







**19** 



**07** Green Lighthouse Copenhagen, Denmark

#### **08** Sunlighthouse Vienna, Austria

09 LichtAktiv Haus Hamburg, Germany

10 Maison Air et Lumière Paris, France

11 CarbonLight Homes Kettering, UK

12 Osram Culture Centre Copenhagen, Denmark

13 Guldberg School Copenhagen, Denmark

Albertslund Solar Prism Albertslund, Denmark 15 Russian Active House Moscow, Russia A

16 Solhuset Hoersholm, Denmark

17 ISOBO Aktiv Stavanger, Norway

**18** Future Active House Trondheim, Norway

**19** Smith Residence St. Louis, USA

Aller and The

20 De Poorters Montfoort, the Netherlands

21 Healthy Home townhouses Stjoerdal, Norway



22



# **BUILD / RESPONSIBILITY**

Sustainable Living in Buildings

#### Planet

Sustainable Living in Buildings is our commitment to people and planet.

Buildings

We engage with key stakeholders

*Products* ...and deliver products and solutions

#### People

...made to optimise human health and wellbeing and minimise environmental impact.



# **RENOVATION IS KEY TO ACHIEVE THE PARIS AGREEMENT**

of the total energy consumption in Europe is used in buildings of Europe's total CO<sub>2</sub> emissions are emitted by homes and buildings

36

%

9/10 existing buildings in Europe will still be in use in 2050



3 out of 4 European buildings are not energy efficient And current renovation rate is only 1-2% across Europe

The Healthy Homes Barometer 2017 reminds us that buildings are intended to create a healthy home for citizens. But it is alarming to read that **one out of six Europeans reports living in an unhealthy building.** 

Maroš Šefčovič, Vice-President, Energy Union European Commission **VELUX**®



### of our time is spent indoor

90%



### **EPBD 2018: HEALTH MUST BE CONSIDERED**

### Opportunity to integrate Indoor Environmental Quality (IEQ) and energy performance

Amended Energy Performance of Buildings Directive (EPBD, 2018/844) mentions that energy performance requirements defined by governments in all EU countries should optimise health, indoor air quality and comfort levels

#### Article 13 – health guidelines from WHO:

The 2009 WHO guidelines provide that, concerning indoor air quality, better performing buildings provide **higher comfort levels and wellbeing** for their occupants and **improve health**.

#### Article 14 – the upgrades of the existing buildings:

Member States should support energy performance upgrades of existing buildings that contribute to *achieving a healthy indoor environment...* 

#### Article 15 – measures to improve energy performance of a building:

It is important to ensure that measures to improve the energy performance of buildings do not focus only on the building envelope, but include all relevant elements and technical systems in a building, such as passive elements that participate to passive techniques aiming to reduce the energy needs for heating or cooling, the energy use for lighting, ventilation and hence improve thermal and visual comfort.

## Article 19 – the national renovation strategies focusing on all elements off a building envelope:

For new buildings and buildings undergoing major renovations, Member States should encourage high-efficiency alternative systems, if technically, functionally and economically feasible, while also **addressing healthy indoor climate conditions** as well as fire and seismic safety, in accordance with domestic safety regulations.



# **EXPLORATORY FACTS**

- Our productivity at work can rise by up to 15% if the indoor environment has adequate daylight, temperature and air quality\*
- Also learning abilities at schools are effected by indoor climate. It is estimated that learning abilities for school children can increase up to 15% in good indoor climate
- As societies, we should include healthy buildings in policy-making.

15%

productivity at work can rise if the indoor climate is healthy





# **EXPLORATORY FACTS**

- Around 80 millions of Europeans currently live in damp or mouldy dwellings, and this poses a major challenge for the health, economy and well-being of society\*.
- Unhealthy buildings contribute to these problems. Mould and damp dwellings nearly double the risk of developing asthma and allergy



of Europeans currently live in damp or mouldy dwellings



LIVING IN DAMP AND MOULDY HOMES INCREASES THE RISK OF ASTHMA BY

40%



# **COMFORT AND ENERGY EFFICIENCY DRIVE RENOVATION**

- Renovating to save energy is important. But so is renovating to improve well-being at home and good health\*.
- It is therefore a key that indoor comfort requirements are emphasized in the implementation of the amended EPBD and in LTRS to stimulate homeowners' private investments in energy renovation.







### **ACTION IS NEEDED**

- Energy efficiency & Healthy buildings To integrate wider benefits such as health, comfort, wellbeing into the design of national law.
- Revise building codes

Should ensure adequate levels od daylight, acoustics, ventilation, thermal comfort and indoor air quality.

Subsidies for renovation should include Indoor comfort parameters as well as energy savings to promote projects that also aim to improve health and wellbeing.





# SOME CONCRETE SUGGESTIONS...

#### WHAT?

- To ensure good daylight provision across the space
- to enable people to perform visual tasks efficiently and accurately

- To ensure **good indoor air quality**
- **•** ... and much more

### HOW?

- Transposition of new daylight standard EN 17037 as a common methodology for the evaluation of daylighting conditions in buildings throughout Europe
  - Revision of regulation Efficient use of Energy
  - Better requiremenst for daylight conditions
- The benefits of natural ventilation and natural ventilative cooling should be included in EU regulation as in national legislation and compliance tools.
  - Revision of regulation Efficient use of Energy



### **KEY NOTE**



We do not build to save energy, no matter how noble and important that aslo is.

# We build to shelter, and provide good conditions to live, study, work, enjoy and heal.

Pawel Wargocki Technical University of Denmark





# **Views from the Business Sector**



# Vojko Golmajer

General Manager VELUX



### **Darko Bevk**

**Commercial Director Knauf Insulation** 



Implementation Workshop in South East Europe 8<sup>th</sup> May 2019



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### EuroACE Workshop Slovenia – Energy efficiency & renovations of buildings





Darko Bevk, Knauf Insulation

### **Slovenia – Economic Situation and Market Expectations**





4.4 % UNEMPLOYMENT





INFLATION

19.9%

ISULATION

#### **GENERAL ECONOMIC INDICATORS**

GDP forecast for 2019:	+3,4%
Industrial production index 2018 vs 2017:	+4,6%
Industrial production index YTD:	+5,2%
Manufacturing confidence indicator y-o-y:	- 8,0%



### **Slovenia – Economic Situation and Market Expectations**



#### **CONSTRUCTION INDICATORS**

Value of construction works y-o-y: +18,7%

In April 2019 the construction confidence indicator was lower at the monthly level by 3 p.p. and compared to April 2018 by 13 p.p. It remained above the long-term average (by 26 p.p.).



### **Slovenia – Building Stock Potentials** and rate of renovations



**80 mio m2** – Residential building stock

**36 mio m2** – Non-residential building stock

65-70% of building stock needs to be renovated

**2,5%** - yearly rate of renovations for Single Family Houses

**3,6%** - yearly rate of renovations for Multi apartment houses

**3,0%** - yearly rate of renovations for Public buildings (Central government)

### **Slovenia – Current Subsidy programs for renovations**



### ECO FUND Slovenia (Eko sklad)

#### Eco Fund Tenders: Renovation co-financing tender, constant, long term

- Source: Big energy distributers on the basis of EED (36.5 Mio EUR)
  Climate change fund (47.5 Mio EUR)
- Amount in €: Loans 50 Mio

### Subsidies – 83 Mio (out of this 21.5 Mio allocated for sustainable mobility)

### **To whom:**

- Single family houses
- Multi family houses
- Public buildings New demonstration projects
- Private non residential buildings
- How: Co-financing of EE measures (subsidies: 20 50%)
- Measures: All EE Measures (EE of envelope, heating, solar...)

### **Slovenia – Current Subsidy programs for renovations**

### EC Cohesion Fund

### Cohesion Fund – Financial Perspective 2014 – 2020

- Source: EU Money from financial perspective 2014 2020
- Amount in €: approx. 200 Mio (2014-2023)
- To whom:
  - Public Buildings

### How:

- Private-public partnership (ESCO Model up to 40% co-financed from cohesion funds)
- Standard public procurement

### What:

All measures

### Expected Results:

- The renovation of 3% of public buildings owned or occupied by central government each year
- The renovation of 1.8 million m<sub>2</sub> of the floor area of buildings in the wider public sector between 2014 and 2023
- Improvement in the ratio between public funds invested and investment incentives in the public sector to 1:3

### Future – Issues, Proposals, Initiatives

### (NAUFINSULATION

#### **Positive facts**

- Creation of construction and renovation culture
- Constant availability of subsidies (Eko Fund)
- Creation of general EnEf awareness

#### Issues

- Balanced distribution of funds for specific EnEf measurement (envelope first)
- Balanced level / share of incentives for specific measurements (20-50%)
- ESCO renovations: limited number of capable companies
- ESCO renovations: main focus profitability of ESCO companies
- Pilot public projects mainly wooden based construction as the only acceptable sustainable approach





### **Q&A Session and Open Discussion**





Implementation Workshop in South East Europe 8<sup>th</sup> May 2019



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Implementation Workshop in South East Europe 8<sup>th</sup> May 2019



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### Energy Efficient Buildings in South-East Europe

### National Long-Term Renovation Strategies: Planning Ahead, Making Impact

Involving stakeholders in Long- Term Renovation Strategies (Croatia)	Ms. Diana HORVAT, Ministry of Construction and Physical Planning, Croatia
Alleviating energy poverty thanks to Building Renovation (Romania)	Mr. Mihai MOIA, Executive Director, ROENEF
Moving towards smart and technology-equipped buildings (Slovenia)	Mr. Damijan ČIŽIČ, Branch Manager, Signify Slovenia Mr. Andrej KASTELIC, Danfoss
0&A + Open Discussion	







### **Involving Stakeholders**

In long-term renovation strategies (Croatia)

### **Diana Horvat**

Ministry of Construction and Physical Planning Croatia













### Involving stakeholders in implementation of the Long-Term Renovation Strategy in Croatia

**STAKEHOLDER DIALOGUES** 



## **CROATIAN STAKEHOLDER DIALOGUES**

Predrag Stromar, dipl.pec

- ✓ First Croatian **Stakeholder dialogue for the** implementation of nZEB standard and the Long-term renovation strategy was held on 27 September 2018 as a side event of "Energy Efficiency in Buildings - for a Better Tomorrow" conference under MCPP's initiative
- ✓ Stakeholder dialogue is set up as broadbased expert dialogue, an all-round process involving relevant authorities, academic community, architecture, engineering and skilled crafts sector, construction industry
- $\checkmark$  All stakeholders who will join the dialogue will sign The Charter on co-operation towards decarbonised building stock by 2050





# **CROATIAN STAKEHOLDER DIALOGUES**

- ✓ A strong desire for more effective communication and cooperation between the state administration and the real sector
- ✓ Continuous cooperation is underway in the preparation of the Long-term renovation strategy for the Reconstruction of the National Fund of Buildings and the transition to the standard of building nearly zero energy buildings (nZEB)
- ✓ The signatories promote decarbonisation of buildings in their further activities
- ✓ So far, 32 signatories of the Charter!



### POVELJA

#### O SURADNJI U CILJU DEKARBONIZACIJE ZGRADA DO 2050. GODINE

M, potpisnici ove poveje, svjesni smo važnosti energetske učinkovitosti u sektoru zgradanstva, osobito uzimajući u obzir da se potrov 50% konačne potrobije energije u Hivatskaj i djelog Europskoj unij upotrebljava za grazje i halacije, od čaga 80% u gradam. Raž zajednickoga glotivostaj, u od trubu i upotrebljava za grazje i halacije u Urivatskaj i objek je potrov 50% konačne potrobije energije u Urivatskaj i odjekoj potrebljava je potrebljava potrebljava

britiske starje zařijeve tzv. u clatikovite odgovor, ali i introvnov savačuji u savrgiji kalo be se postoji ravedne ciljevi. Stoji optiskevnjem vorgeve ževim sekja natisnjeni savnjem in kontrukrana savačuji na tran drugovice stratogije obnove nasi nahog forda zgrada i presazik na standard grade grada grada gotove nute energie (PZER), kalo i podupit transformacju postojedo nači zgradu i uregrejsti voslovalnichvici telokarbotram in drugavla do zdžav. Dotine.

j postizanju energetskih i klimatskih ciljeva vodit čemo se primjenom načela "energetska učinkovitost na prvom mjestu" podupirući napročenje e nergetskih svejstava zgrada koma se doprnos postizanju zdravnji i upodrnjih životnih i nadrih upreta, smanjenju antistkih promjena "svjerani da zgrada boljni energitskih vojstava prizuža uvoći udobnost to knjih komarska.

Poseban nagasak stavljamo na konštenje obnovljvih izvora energije, kako kod projektranja i izvedbe novih, tako i kod obnove tre konstrukceja postojećih zgrada, vodoči začuna o optimalnej kombinaciji mjera enorgetski učinkovitosti i obnovljvih zvora enorgje imajući u vidu važnost energetske učinkovitosti i upotrebe obnovljvih izvora energije aktivno ćemo se zalagati za podzanje svijesi povisto i onvedomi prtavjima.

Kako bi se postgao energetaki visokoučinkowit i dekarboniztran fond zgrada i osiguralo da se Dugoročnom strategijom obnove ostavna potreban napredak prema troškovno udnikovitoj protvorta postogich zgrada u zgrada gotovo nute energije, osobito povealejem integralni kolovav, nastegić como divejte jane ampreno ta para sa cajismi negrana in mejerijem pokazutegina sapreška s obzrom na dugoročni cilj amagenja emelja stakonickih priorova LP Uza 80-95% do 2020. godine u uspoređalo 1980. godinom Spore smo chiperodo di uspanja u tvrigralnu uhovou zgrada stavejal divelja cilje ekonomske koroni da same protekom taljena in deveni sa postečni stakonosti, prihod porazbuna jačanje opće financijske stakinosti drave, povećnje BDP-a porast zpostjavnjen, na kontruturani rast vrijednosti nelerotnina, i razvig turizma, odnosno unaprijedenje gospodarstva u gotovo svim njegovim segmentama.

Promicati čemo jednaki pristup financiranju, dajući prednost fundu zgrada s najlošijim energetskim svojstvima, kao i građanima pogođenim energetskim siromaštvom.

Svjersi smo potrobe za uspostavom jaene veze između dugorobne stratoglje obnove i promicanja razvoja vještana i unapređenj obrazovanja u građevniskom sektoru i elektoru energetske uchleovitosti. Jugorobnom strategijom obnove nastojuč čemo data odgovore na pitanja zaštite od požara i rizika povezanih s pojačanom seizmit

одроб слатва владал слаточ павода, съто али бодито на рейкри завото рожата на конкоротисти в радините закоточни и пактично и пакти парато павото на стара на телерати и полно на облуже задаби. Учуват в і почовар і поче tehnologip takotor remgulujų zgradama da potporrogu sveikupru dekarbonzaciju gospedarstvo

tava u zgradama te e-mobilnost. Stoga, odlučni da ostvarimo navedene ciljeve pridružujemo se otvorenom dijalegu partnera i potpisujemo ovu povelju.

U Zagrebu, 27. rujna 2018. godine.

linistarstvo graditeljstva i prostornoga uredenja Fond za zaštitiu okulita i energetsku učirkovitos Prodrag Stromar, dipl.coc. Dubrako Ponoli, mog.ing.el.



✓ The Charter on co-operation towards decarbonised building stock by 2050 was signed by first group of partners:

- **O** Ministry of Construction and Physical Planning
- **o** Environmental Protection and Energy Efficiency Fund
- Croatian Association of Heat-Facade Systems Manufacturers
- $\circ~$  Croatia Green Building Council
- o nZEB Cluster





## THE FIRST STAKEHOLDER DIALOGUE



Workshop with the topics:

- ✓ Decarbonisation of building stock by 2050
- ✓ Smart Finance for Smart Buildings
- ✓ Electromobility
- ✓ One Stop Shop
- ✓ Automation and control systems in buildings
- ✓ Addressing fire safety and risks related to earthquakes (intense seismic activity)



# THE SECOND STAKEHOLDER DIALOGUE



 Workshop - The aim was to select criteria for determining vulnerable groups of citizens/Households affected by energy poverty



## THE SECOND STAKEHOLDER DIALOGUE



SELECTED CRITERIA ON THE WORKSHOP:

- $\checkmark\,$  Low household income / income per household
- ✓ Energy class of a building (QHnd i.e. heating needs)
- $\checkmark$  Guaranteed minimum fee
- ✓ Personal disability benefits
- ✓ Real consumption of particular energy product proven by invoices (in m2)
- Energy basket share in household's income (energy for heat, warm water, lighting and electricity included)
- $\checkmark\,$  Total household energy costs in comparison to total household income
- $\checkmark\,$  Retired people with retiremenet less than ...
- ✓ Single-parent families
- $\checkmark$  Recipients of a child benefit
- $\checkmark\,$  Total heat costs in comparison to total household income
- $\checkmark~$  Index rate of territory development

### THE SECOND STAKEHOLDER DIALOGUE







## THE THIRD STAKEHOLDER DIALOGUE



- The focus was placed on the application of modern solutions and rules in the field of protection against fire and seismic activity risks during energy building renovation
- ✓ Presenatations and panel discusion



### THE THIRD STAKEHOLDER DIALOGUE







 Croatia has given great attention to the section Other benefits of the implementation of the Long-term renovation strategy for Mobilizing Investment in Renovation of the National Building Stocks where is considered:

- $\,\circ\,$  the real estate value and esthetic external effects
- $\circ\,$  reducing health risks
- $\,\circ\,$  poverty and energy supply

2050













Ministry has recognized the importance of communication and therefore initiated Stakeholder Dialogues





## Thank you for your attention !

Diana Horvat, M.Arch.

Head of Department Directorate for construction, real estate assessment and energy efficiency in the building sector Ministry of Construction and Physical Planning Zagreb, Croatia Web: www.mgipu.hr Email: diana.horvat@mgipu.hr

### **Alleviating Energy Poverty**

Thanks to building renovation (Romania)



### Mihai Moia

Executive Director ROENEF













### ENERGY EFFICIENT BUILDING RENOVATION IN ROMANIA AND THE CHALLENGE OF ALLEVIATING ENERGY POVERTY

Energy Efficient Building Renovation in South East Europe, Knauf Insulation Experience Centre, Škofja Loka, Slovenia, 8th May 2019



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IN BUILDING









#### Population unable to keep home adequately warm by poverty status - % of population

	2011	2012	2013	2014	2015	2016	2017	2018
EU (28 countries)	22.0	24.5	24.1	23.5	22.7	21.0	18.4	:
Belgium	20.9	18.7	18.4	18.3	14.8	16.2	20.0	÷
Bulgaria	68.9	70.0	69.7	66.0 <sup>b</sup>	66.8	61.9 <sup>b</sup>	59.5	56.0
Czechia	13.4	15.3	14.6	15.6	13.5	13.0	9.2	:
Denmark	7.4	8.4	10.2	5.8	12.7	7.9	6.6	8.1 <sup>p</sup>
Germany	16.8	14.8	16.5	13.3	12.7	12.4	9.8	· ·
Estonia	8.1	9.6	5.7	3.7 <sup>b</sup>	6.1	6.1	8.1	:
Ireland	12.5	16.1	19.5	17.0	19.1	14.8	12.7	:
Greece	38.8	47.6	48.4	52.6	50.9	52.5	45.3	:
Spain	13.2	18.9	15.6	23.5	23.3	23.2	19.4	:
France	16.9	15.2	17.7	15.0	16.3	14.0	14.9	:
Croatia	22.5	23.9	24.0	24.3	23.7	21.7	20.3	:
Italy	36.1	44.0	40.4	38.3	35.9	32.4	29.1	:
Cyprus	46.3	50.6	51.0	47.5	49.2	49.0	46.8	:
Latvia	40.8	35.1	35.5	31.0	29.1	22.7	20.3	15.4
Lithuania	40.1	38.2	34.0	34.7	39.4	29.8	35.6	:
Luxembourg	2.2	2.2	4.5	2.0	3.3	4.0 <sup>b</sup>	3.9	:
Hungary	29.4	35.1	34.0	29.4	24.7	22.7	15.0	19.9
Malta	28.1	32.1	35.5	36.4	27.4	13.3	15.8	:
Netherlands	6.6	8.7	6.3	9.0	8.2	7.9 <sup>b</sup>	7.8	:
Austria	8.6	7.7	8.3	7.7	8.0	8.7	9.5	:
Poland	28.7	27.6	23.8	20.7	18.7	16.7	15.1	
Portugal	44.8	43.1	44.6	47.5	43.3	42.7	38.9	:
Romania	26.7	25.8	25.6	24.6	27.3	25.6	17.4	:
Slovenia	12.4	17.3	13.1	15.4	13.6	14.2	11.5	:
Slovakia	10.4	13.6	16.1	22.4	17.8	17.0	17.3	:
Finland	3.8	3.8	2.8	3.3	3.7	3.8	2.3	3.1
Sweden	4.3	4.0	3.9	2.9	2.5	4.6	5.3	· ·
United Kingdom	11.4	19.2 <sup>b</sup>	21.7	20.2	18.6	14.2	12.4 <sup>b</sup>	:
Iceland	3.7	3.5	2.7	4.4	2.9	3.6	:	:
Norway	4.3	2.3	3.6	2.3	2.4	4.5	3.9	:
Switzerland	1.4	1.0	0.7	2.6 <sup>b</sup>	0.8	2.0		:

Source: EUROSTAT, 2019



#### **Current status: Romanian housing stock**

- 8.1 million homes in Romania, distributed in 5.1 million buildings, SFH representing 61%;
- In the urban area, 72% of the dwellings are in city blocks, while in the rural area 94.5% of the dwellings are single-family houses;
- 37% of the homes in Romania are concentrated in just 2% of the residential buildings;
- The total living area has increased in Romania from 270 million m2 in 2000 to 425 million m2 in 2016;
- Most of the residential buildings were built between 1961 and 1980, in the absence of efficiency standards for the building envelope;
- About 53% of the residential buildings were built before 1970;
- In Romania, one out of seven families face serious housing problems, most often regarding poor quality of walls, floors, and window frames

#### **Construction period of the buildings stock**



#### Source: National Institute of Statistics, 2018

#### Best practices: UNDP/GEF Project: Improving Energy Efficiency in Low Income Housing and Communities in Romania (2011-2016)





Outcome 1: Romanian energy policy integrates fuel poverty issues and addresses EE needs in low income communities.

#### Best practices: UNDP/GEF Project: Improving Energy Efficiency in Low Income Housing and Communities in Romania (2011-2016)

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ENERGY EFFICIENCY IN BUILDINGS



**Outcome 2:** Supply of trained architects, building engineers, builders and auditors with EE experience expanded; municipalities in low-income regions have a better understanding of EE issues
Best practices: UNDP/GEF Project: Improving Energy Efficiency in Low Income Housing and Communities in Romania (2011-2016)





**Outcome 3:** Energy efficient buildings reconstructed with reduced fuel costs or using improved sustainable energy technologies in low-income communities

#### Best practices: UNDP/GEF Project: Improving Energy Efficiency in Low Income Housing and Communities in Romania (2011-2016)





**Outcome 4:** Data and information available for decisionmakers for designing programmes to address fuel poverty

	Project F	Period (2011- 2016)	10 year post-project (2016-2025)			
	MWh savings per year	Lifetime direct emission reductions (tonnes of CO <sub>2</sub> /yr)	Direct post-project emission reductions (tonnes of CO <sub>2</sub> /yr)	Indirect emission reductions (tonnes of CO <sub>2</sub> /yr)		
Outcome 1: Legislative amendments: expansion of the scope of energy efficient measures that would be financed by the National Thermal Rehabilitation Program, to empower municipalities on the selection of buildings for rehabilitation and EE measures to implement.	74,994	683,000	1,366,000	n/a		
Activity 3.1.1: Technical Documentation for 50 building types	0	0	n/a	36,700		
Activity 3.1.2: Boiler Replacements in 21 public buildings	427	11,440	n/a	22,800		
Activity 3.2.1: Insulation Programme for 43 public buildings	6,243	48,700	n/a	97,400		
Activity 3.3.1: Renovation of windows and doors of 7 Public Buildings	645	4,000	n/a	8,000		
Outcome 4: National Buildings Registry database	0	0	0	0		
TOTAL	82,309	747,140	1,366,000	164,980		







#### Energy savings of the thermal insulated buildings in Dolj and Hunedoara counties (MWh/year)





Dolj county

Hunedoara county











#### Main obstacles for carrying out building renovation programs:



#### Legislative

- > The existence of multiple authorities with responsibilities in the field and without a clear regulation framework;
- Lack of coordination of local development strategies with national strategies (sustainable development, renovation strategy, etc);
- Lack of regulatory framework for ESCOs and Energy Performance Contracts;

#### Economic

- Insufficient public funds and private investments in building renovation a high level of dependency on public grants;
- > The execution of low-quality renovation works;
- > Low demand of innovative technologies for building renovation;
- Improper assessment of the energy savings: extended benefits such as health, security and quality of air should be assessed over the lifetime of the investment;

#### Lack of skills and training

- Shortage of skilled workers using energy efficiency technologies and systems, as well as RES integration;
- > Lack of knowledge about energy efficiency measures and technologies at the level of the local administration;
- > Lack of knowledge concerning the procurement rules for buildings renovation;

#### **Proposed priority actions:**



#### Actions

- Focus on deep renovation and introduction of quality standards into the criteria for funding EE in buildings measures;
- Operating National Buildings Registry at national level and focusing on worst performing buildings;
- establishing a support scheme
  for the renovation of SFH
- developing the regulatory framework for ESCOs and the energy performance contracts;

#### Context

- Mainly shallow renovation projects;
- Launching procurement process using "lowest price criteria";
- Lack of knowledge concerning the use of innovative technologies and solutions;
- Lack of data concerning the actual energy performance of buildings;
- Lack of responsibilities at local level to report energy performance of buildings in NBR;
- Lack of real data analysis for the decision makers;
- Out of the 8,1 million homes in Romania, SFH represent 61%;
- Casa Verde Plus Programme is not active and requires a revision of the Guide for Aplicants;
- High potential in stimulating investments for increasing EE mainly in public buildings and public lighting;
- The statistic treatment of the EnPC and impact on public debt and public deficit;

#### Benefits

- Increase of comfort and air quality leading to preventing diseases and premature death;
- Increasing employment in the construction sector;
- Increasing efficiency of public spending;
- Increase of the energy efficiency of the building and energy savings;
- Energy managers reporting energy consumption in the NBR;
- Data and information available for decisionmakers in the process of elaborating new progammes and strategies;
- Reducing energy poverty;
- Low energy bills;
- Using EnPC guarantees the energy savings;
- Mobilizing private investment for increasing energy efficiency in buildings;
- Implementing deep renovation;
- Implementing modern and efficient technical solutions that contribute to the increase of energy efficiency;



## Thank you!

Mihai MOIA Executive Director

The Association for Promoting Energy Efficiency in Buildings – ROENEF

Email: <u>mihai.moia@roenef.ro</u> <u>www.roenef.ro</u>

# **Moving Towards**

Smart and Technology-Equipped Buildings (Slovenia)



## **Damian Cizic**

Branch Manager Signify Slovenia



## Andrej Kastelic

Product Manager Danfoss Trata, Slovenia



Implementation Workshop in South East Europe 8<sup>th</sup> May 2019



Sponsored by: **KNAUFINSULATIO** 





## Moving towards smart and technology-equipped buildings Building intelligence with light

Damijan Čižič, Škofja Loka 8th May 2019

# Challenge

We all spend over **90%** of our time **inside buildings** and 40% of this time in office

This sector consumes around **40%** of **all primary energy** produced in the EU

As a result, emits about **36%** of **energy-related CO<sub>2</sub>** into the atmosphere.

Part of the answer can be **smart lighting.** 



## Solutions perceived as being part of a smart building

Q1. In general, what kind of solutions do you perceive to be part of a smart building?

		7					
Lighting	85%	79%	(45%)	(74%)	47%	(74%)	73%
Central heating/ cooling control/ smart thermostats	77%	75%	42%	76%	39%	61%	60%
Security access control / entry solutions (doors, lock, etc.)	66%	68%	32%	68%	34%	64%	63%
Video surveillance / cameras	68%	54%	36%	68%	47%	57%	66%
Movement/ Presence detectors	64%	56%	13%	62%	30%	67%	54%
Zoned heating/ cooling	65%	30%	37%	66%	25%	52%	58%
CO2, smoke, humidity sensors	49%	54%	2%	69%	15%	50%	56%
Sun shading and sun blinds	38%	49%	1%	60%	21%	48%	58%
Solar panels	44%	33%	4%	62%	26%	55%	48%
Heat pumps	45%	33%	8%	56%	20%	53%	43%
Electricity storage	39%	28%	6%	49%	16%	56%	41%
Boilers	56%	11%	7%	50%	13%	38%	47%
Entertainment (Music/Video-Multiroom)	56%	10%	1%	54%	10%	35%	34%
Streaming of music & video	52%	16%	2%	49%	13%	36%	34%
Demand-response regulation	29%	6%	2%	52%	9%	31%	43%
Other	4%	1%	0%	0%	6%	8%	0%
Don't know	3%	1%	0%	3%	2%	3%	2%
Average number of products mentioned	8	6	2	9	4	8	8
Ν	200	201	200	200	100	100	200

Source: Installation Monitor European Electrical Installation Monitor – Q4 2017 (Theme: Smart buildings), March 2018



## The evolution of the lighting industry









# Conventional lighting

Analog lighting with on and off options

#### LED lighting

Greater efficiency and quality of illumination

# Lighting systems and services

Greater control and performance and the start of lightingbased business models

## The Internet of Things

The era of integrations and connected smart devices that enable data collection and create new data enabled services

# Delivering value beyond illumination

# Going beyond illumination

We are leading the ongoing development of connected lighting systems and services. By leveraging the Internet of Things, we are transforming buildings, urban places, and homes. We increase energy efficiency and manage working environments in a more environmentally friendly way.

We make cities safer and more responsive. We offer rich lighting experiences that make people feel safe, comfortable, focused, energized, and entertained. That's how we take light beyond illumination, and help improve the way the world works and people live.

# Connected lighting solutions for every application area

A connected lighting grid is a perfect foundation to make the world a better place to live. In cities, for instance, connected LED lighting can become an integral and future-proof smart city building block. In addition to energy efficiency, cost savings, and reduced carbon emissions, connected LED lighting can:



- Enhance safety
- Create more productive offices and workplaces
- Make public places and cities more enjoyable
- Lighting can be a foundation stone for smart/IoT applications

# Can you imagine lighting ....

Guiding shoppers in retail stores right to the items they are looking for?

**Facilitating a free flow of spectators** to concession stands in a stadium to increase crowd safety and maximize refreshment sales?

Tracking and locating high-value machinery and equipment in hospitals?

**Optimizing space usage** in offices and reducing real estate costs?

## Understanding the workplace evolution





## **Recognized people-centric** innovations in the new Skanska office



A recognized and certified human centric approach, which enabled the Spark office to become the first WELL certified building in the CEE region.



The lighting is fully integrated with the Building Management System (BMS) of the building providing new opportunities to enhance comfort as well as increase operational efficiency.



High level of employee comfort achieved through the option of customization of light settings.



LED technology reduces maintenance costs and electricity consumption further increasing the sustainability credentials of the building.





## **Controls make the difference**

The combination of:

- LED technology
- task turning
- occupancy dimming
- and daylight dimming

can led up to **80%** reduction in energy costs compared to the linear fluorescent lamps previously in place



## **1: Optimize operations**

- Comfortable, compliant office lighting
- Flexibility to fit different building and ceiling types
- Upgradeable<sup>\*</sup> with IoT sensors
- Reconfigurable and upgradeable<sup>\*</sup> lighting system to meet occupants' changing needs
- Open interfaces to ensure compatibility with other Interact offers and non-Philips luminaire brands

#### Identity

Comfort and wellbeing Activity-based working Space efficiency Flexible capacity Return on investment Sustainability



Tenants and building owners want comfortable, yet efficient, lighting which complies with regulations. They know that luminaire choice can have a significant impact on their operations.

These days, offices frequently make minor changes over time, so implementing them needs to be easy. They also need to be prepared for the future, anticipating changes in staff, new ways of working, growth technology innovations.

## **2: Enhance performance**

- Different luminaire form factors to suit different spaces
- A luminaire range that offers adaptable light intensity, warmth and distribution to suit different activities
- Light scenes to allow personal recipes
- Smart device apps to help employees find the space that best supports their activity
- Applications that offers insight into space usage
- Predictive analytics<sup>\*</sup> to optimize space usage in the office

Identity Comfort and wellbeing Activity-based working Space efficiency Flexible capacity Return on investment Sustainability



The nature of the workspace is changing. Employers are adapting to suit the tasks and activities of a more mobile and diverse workforce.

They want the workspace to be more effective and perform better, often with less available space per employee. They are looking into new technologies and ways of working to achieve this.

## 3: Enhanced engagement and wellbeing

- Well-being enhanced by light, without compromising comfort
- Natural light distribution for a healthy and inspiring working environment
- Self-learning system\* to provide the right light at the right time to supports the circadian rhythm
- Integrated environmental sensors to report on climate conditions in real time
- Open API to provide data to optimize the indoor climate
- Possible integration as part of an intelligent building ecosystem

Identity Comfort and wellbeing Activity-based working Space efficiency Flexible capacity Return on investment Sustainability



Companies want to create inspiring environments that help to attract and retain talent and allow employees to identify with the organization's culture. Creating a 'great place to work' can partially be achieved by optimizing the indoor climate (natural light, HVAC, temperature, etc) as recognized by the WELL Standard. This supports employee comfort, well-being and happiness, which influences performance. Current lighting solutions cannot deliver the benefits of natural light. What's more, building management systems lack the data to operate optimally and create a great place to work.



### Interact Office What is it?

Interact Office is software that – when combined with LED lighting and sensors from Philips and the Interact Office connected lighting system – can transform any office into a smart and sustainable workplace, making your building more efficient and supporting improved employee performance.

Insights from data collected allow you to understand how your office is used and make the most of its space. Use different light settings that facilitate collaboration, improve concentration and energize employees.



# Signify

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Product Manager Danfoss Trata, Slovenia



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Sponsored by: **KNAUFINSULATIO** 



# Active energy and comfort management in commercial buildings HVAC 4.0

#### **EuroACE Event 2019**

Andrej Kastelic 8.5.2019

# Mega trends







URBANIZATION

**ENERGY EFFICIENCY** 

DIGITALIZATION



ENGINEERING TOMORROW

# Energy Transition, Circular Economy & Co.

EU energy & climate targets 2030:

- 40% less GHG
- 32% Renewables
- +1.3%/a Renewables in H&C
- 32.5% Energy Efficiency
- Efficient + digital buildings
- Decentral electricity system + flexible market



European Commission









# EPBD: Energy efficency of buildings

- 1. Temperature control in the room
- 2. Efficient transfer of the energy from the source to the end user
  - Partial load (average working condition)
  - Hydronic balancing
- 3. BACS





# HVAC

### HVAC 4.0 For smart buildings

HE BAR BEEN

Comfort

- Pasive energy management
- Investment costs
- Room control, BMS optional

- Individual comfort (micro climate)
  - Active energy management
    - Overall costs
    - BMS control
      - Measured energy consumption
      - Remote access and control
      - **Continious commisioning**
      - Predicitive maintenance





**HVAC 4.0** 







# Active energy managemement in commercial buildings

## 1. AB-QM 4.0 – Pressure independent control valve

- Pressure independent control performance
- Full authority at any condition
- More comfort less energy consumption

### 3. Connectivity and data

- Plug and play BMS integration
- Multiple field devices on BUS (I/O)
- Energy management

#### 2. NovoCon S – digital smart actuator

- BacNET and Modbus communication protocols
- Remote functions, energy allocation
- SW configuration tool

#### 4. Danfoss energy Dashboard

• Energy allocation and energy usage per unit
### **1. AB-QM 4.0 – Pressure independent control valve**

#### **Before AB-QM**

- Complex designing
- Complex balancing
- Pressure and flow oscilation in the system
- Unstable room temperature

### **Advantages of PICV**

- Pressure independent control performance at any condition
- Easy selection, less commisioning, less components
- Improved comfort and less energy consumption





### **2. NovoCon S – Digital actuator**

#### **Before NovoCon**

- Analog control signal
- No remote functions

#### **Advantages of NovoCon**

- Modbus in BACnet communication protocol
- Remote functions
- Energy allocation
- Continious commisioning





ENGINEERING TOMORROW

### **3. Connectivity and data**

### **Energy allocation**

- Terminal unit, AHU, chiller
- BREEM points for energy efficient building
- Energy consumption comparison between units/room/floors

#### **Active energy management**

- dT control higher COP
- Continious commisioning





### 4. Danfoss energy dashboard





152 | AB-QM 4.0

### 4. Danfoss energy dashboard



ENGINEERING TOMORROW



# **AB-QM 4.0** and **NovoCon**, energy efficiency through lifetime of the building







154 | AB-QM 4.0



## ENGINEERING TOMORROW

## **Q&A Session and Open Discussion**





Implementation Workshop in South East Europe 8<sup>th</sup> May 2019



Sponsored by: **KNAUFINSULATION** &



## Lunch Break

Guided tours of experience centre will take place during lunch





Implementation Workshop in South East Europe 8<sup>th</sup> May 2019



Sponsored by: **KNAUFINSULATION** &



### Energy Efficient Buildings in South-East Europe

### Financing the Ambition of a Highly Energy Efficient Building Stock by 2050

Financing at regional level and the experience of ELENA Funding	Ms. Ines AHMIĆ, Project Manager, KSSENA – Institute Energy Agency of Savinjska, Šaleška and Carinthia, Slovenia
Financing building renovation through Energy Performance Contracting	Mr. Ivan SERIC, CEO, Institute for Energy Efficiency
Practical experience of Energy Performance Contracting	Mr. Danijel BENČIĆ, President of the Board, Rudan, Croatia

Q&A + Open Discussion









**VELUX**®

## **Financing at Regional Level**

And the experience of ELENA funding



## **Ines Ahmic**

Institute Energy Agency of Savinjska, Saleska and Koroska Slovenia













# EE RENOVATION OF PUBLIC BUILDINGS & THE EXPERIENCE OF EPC (Municipality of Celje - ELENA)

Ines Ahmić, Project Manager, KSSENA

8th May 2019 Škofja Loka, Slovenia



Zaved Energetska agencije za Savingsko, Saleško in Konstko Energe Reence of Savingska, Saleška and Konstka Region Konstka 37a / SI-3320 Delenge / Slavanija

# WHAT IS KSSENA?

- Expert organisation specialized in the field of energetics, with the emphasis on RES, RUE and project management
- Professional bridge between potential users (emphasis on the public sector) and suppliers of specialized energetic services/products
- Established in 2006 within the framework of Intelligent Energy Europe (IEE)
- Founders: Municipality of Velenje (MOV), Municipality of Celje (MOC), Municipality of Slovenj Gradec (MOSG) and Public utilities company (KPV)





# WORKING FIELDS OF KSSENA



KSSENR

Zavod Energetska agencije za Savingsko, Salatsko in Konstike Energy Agency of Savingska, Salatska and Konstika Repor Konstka 37a / Si-3320 Uelonje / Slavanija

## Long-Term Strategy for Mobilising Investments in the ENERGY RENOVATION OF BUILDINGS:

### Goals

- 2.9 million m<sup>2</sup> of Residential Building Stock to be renovated by 2020
- 9 million m<sup>2</sup> of Residential Building Stock to be renovated by 2030
- 1.8 million m<sup>2</sup> of Public Sector Building Stock to be renovated in 2014–2023 (180.000 m<sup>2</sup> of Government Sector included)



# Financial Framework for Government & Public Sector:





Zavod Energetska agencije za Savingsko, Salesko in Koroška Energy Agency of Savingska, Saleska and Koroška Pagion Koroška 37.a / SI-3320 Deliceje / Slavanija **Tender policies:** 





Zavod Energetska agencije za Savingsko, Saletsko in Koroško Energy Agency of Savingska, Saletska and Korotska Pagion Korotska 37.a 7.51-3320 Delicege 7. Slovanija

# FINANCIAL INCENTIVES FOR EE RENOVATIONS (Slovenia)

- Ministry of infrastructure
- Slovenian ECO found (EKO Sklad)
- Slovenian Investment Bank SID bank
- EIB European Local Energy Assistance (ELENA,

# •S)) Banka

ELENA European Local Energy Assistance European Investment Bank



REPUBLIC OF SLOVENIA MINISTRY OF INFRASTRUCTURE



**Eco Fund** Slovenian Environmental Public Fund



Zaved Energetska agencija za Savingsko, Saletsko in Koroško Energy Agency of Savingsko, Saletska and Korotska Pagion Korotska 37a / Si-3320 Delonge / Slavanija

# CALLS AND TENDERS BY Ministry of infrastructure

Central government projects: 14.07.2016 - 4.555.882 EUR 31.03.2017 23.02.2018 7.647.059 EUR 27.02.2019

#### Municipalities:

01.09.2016 - 10.588.235 EUR 24.03.2017 - 17.647.059 EUR 16.02.2018 - 26.470.588 EUR Pilot projects 2016

Wider Government Sector 20.07.2016 - 9.935.294,12 31.03.2017 23.02.2018 27.02.2019 14.117.647 EUR

Cultural herritage: 30.11.2016 - 2.000.000 EUR



Zaved Energetska agencije za Savingsko, Salesko in Konstko Energe Reence of Savingska, Saleska and Konstka Region Konstka 37a / SI-3320 Delenje / Slavanija

# ELENA –

# supporting investments in energy efficiency and sustainable transport

ELENA is a joint initiative by the EIB and the European Commission under the Horizon 2020 programme. ELENA provides grants for technical assistance focused on the implementation of energy efficiency, distributed renewable energy and urban transport programmes.

Established in 2009, the ELENA facility has awarded more than EUR 130 million of EU support triggering an estimated investment of around EUR 5 billion on the ground.



# ELENA may co-finance the preparation of investment programmes in the following fields:

- energy efficiency and building integrated renewable energy
- public and private buildings (including social housing), commercial and logistic properties and sites, and street and traffic lighting to support increased energy efficiency
- integration of renewable energy sources (RES) into the built environment e.g. solar photovoltaic (PV) on roof tops, solar thermal collectors and biomass
- investments into renovating, extending or building new district heating/cooling networks, including networks based on combined heat and power (CHP), decentralised CHP systems
- local infrastructure including smart grids, information and communication technology
- infrastructure for energy efficiency, energy-efficient urban equipment and link with transport



### **ELENA – overview (Project Development Services)**

- Refine Feasibility studies
  - Business Plans
- Technical studies (energy audits)
- Procurement/tendering/contracting
  - Additional technical staff
    - Financial structuring



Zaved Energetska agencije za Savingsko, Salesko in Konstik Energij Agencij ut Savinjsko, Saleska and Koreška Pagitin Koreška 37a / SI-3320 Unicege / Siguanija

# ELENA EOMO PROJECT -

Energy efficient renovation of Municipality Novo mesto, Kranj and Celje / Energy retrofit programme of public buildings in City Municipalities of Novo mesto, Kranj and Celje

191.295,42 EUR cofinancing from ELENA for Municipality of Celje

226.293,73 EUR total costs for Municipality of Celje



Zeurod Emergetska agencije za Sauvesko, Salesko in Keroško Emerge Reence of Sauveska, Saleska and Koroska Perjon Koroska 37a / Si-3320 Selenje / Slevenija

		Net value in EUR	GROSS value in EUR	Co - Financing - ELENA (EUR)
2017	BUILDINGS Detail energy audit and investment plan (23 buildings)	73.800,00	90.036,00	81.032,40
	PUBLIC LIGHTNINIG: Cadastre and			
2017, 2018	plan of public lightning + investment documentation	52.984,00	64.640,48	47.685,60



Net value in EUR		GROSS value in EUR	Co - Financing - ELENA (EUR)	
Investment documentation 126.784,		226.293,73	191.295,42	
Administrative and legal costs	58.702,66	71.617,25	62.577,42	
TOTAL	185.486,66	226.293,73	191.295,42	



Zaved Energetska agencija za Savingsko, Salesko in Koroško Energy Ryency of Savingska, Saleska and Koreška Region Koreška 37.a / SI-3320 Delenja / Slavanija

### Highlights of Energy renovation project of buildings:

23 Extended energy audits

### 2 sets of buildings (after economic and technical review)

•The first set of public buildings that will be deeply renovated with - investment and organizational measures. The project will be implemented through EPC and co-financed by the Cohesion fund (40 % EU co-financing).

•The second set of public buildings that will also have deep renovation and project will be implemented through public partner and co-financed by the Cohesion fund (40 % EU co-financing).



### First set of Buildings:

FIRST SET OF BUILDINGS		Area $[m^2]$	Energy source		Energy use intensity [ <i>MWh</i> ]		
				Before m	easures	After me	asures
				HE	EE	HE	EE
1	Celjski dom	4,062	Natural gas	379.51	128.44	142.11	106.04
2	Osnovna šola Hudinja	4,241	Natural gas	505.28	97.79	333.84	81.75
3	Vrtec Zarja, enota Živ Žav	998	District heating	191.22	93.99	100.67	76.84
4	Vrtec Zarja, enota Iskrica	888	District heating	124.79	81.42	61.54	72.42
5	Vrtec Anice Černejeve, enota Mavrica	1,092	District heating	182.48	83.55	93.79	63.25
6	IV. osnovna šola Celje	5,082	Natural gas	428.63	112.77	276.08	104.88
7	Vrtec Tončke Čečeve, enota Center	932	Natural gas	197.23	24.89	93.29	26.37
8	I. osnovna šola Celje, dislocirana enota	1,878	Natural gas	227.45	64.01	115.61	49.02
9	Osnovna šola Glazija	4,702	Natural gas	618.60	133.41	300.35	126.57
10	II. osnovna šola Celje	4,087	Extra-light heating oil	295.23	125.04	198.37	109.60



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### Summary energy and financial data for the first set of buildings:

Investment id:	Deep energy renovation of public buildings owned by the Municipality of Celje
Investment costs - constant prices (in EUR	2,843,581
Investment costs - current prices (in EUR)	2,880,548
EnPC period (vears)	15
EU co-financing (in EUR)	932,322
Public co-financing (in EUR)	209,772
VAT	512,777
Private co-financing (in EUR)	1,188,710
Reduction of CO2 emissions (in kg/a)	386,235
Estimated heat savings per year (in kWh and %)	1,434,726; 21,29 %
Estimated electricity savings per year (in kWh and %	128,625; 3,74%
Estimated heat savings per year (in EUR)	105,710
Estimated electricity savings per year (in EUR)	22,506
Participation of the public partner in savings (in %)	1%
Return on investment (ROI) (in years)	>35
elRR/C (in %)	0.85%
Return on investment (ROI) of private capital (in years)	15



### Second set of buildings (1/2):

SECOND SET OF AI BUILDINGS [n		Area [m <sup>2</sup> ]	Energy source	Energy use intensity [ <i>MWh</i> ]			
				Before measures		After measures	
				HE	EE	HE	EE
1	Vrtec Tončke Čečeve, enota Vila Gaberje	1,193	Natural gas	124.90	51.10	70.66	41.92
2	PP Kocenova ulica 4 - 8	1,623	Natural gas and extra-light heating oil	158.67	35.91	53.63	30.71
3	Vrtec Zarja, enota Ringa raja	608	Natural gas	71.57	25.61	28.07	19.79
4	PP Kidričeva ulica 3	1,672	Natural gas	102.12	41.36	33.50	36.82
5	PP Mariborska cesta 7	7,073	Natural gas	667.03	442.84	256.69	408.50
6	Glasbena šola Celje	2,232	Natural gas	196.71	67.72	152.90	58.91
7	Slovensko ljudsko gledališče Celje	3,656	Natural gas	340.05	80.31	118.26	73.16
8	Zavod CMLC	2,081	Natural gas	211.53	114.88	112.79	113.74



### Second set of buildings (2/2):

SECOND SET OF Area BUILDINGS [m <sup>2</sup> ]		Area $[m^2]$	Energy source	Energy use intensity [ <i>MWh</i> ]			
			Before measures		After measures		
				HE	EE	HE	EE
9	Muzej novejše zgodovine Celje	2,311	Natural gas and extra-light heating oil	120.46	109.55	53.45	82.71
10	I. osnovna šola Celje, glavna enota	3,252	Natural gas	317.50	40.26	179.1	26.1
11	Osnovna šola Frana Roša Celje	4,058	District heating	278.33	103.58	111.91	99.71
12	Nogometni stadion Arena Petrol	3,437	District heating	182.10	140.90	112.87	151.97
13	Dvorana Zlatorog Celje	9,972	District heating	607.20	367.10	520.32	566.04
14	Drsališče Celje	4,702	Natural gas	201.49	877.87	76.33	710.29
15	Zdravstveni dom Celje	10,633	Natural gas	1,250.62	948.54	682.42	804.44



### Summary energy and financial data for the second set of buildings:

Investment id:	Deep energy renovation of public buildings (15) owned by the Municipality of Celje
Investment costs - constant prices (in EUR	5,959,096
Investment costs - current prices (in EUR)	6,036,564
EnPC period (years)	-
EU co-financing (in EUR)	1,905,822
Public co-financing (in EUR)	3,000,951
VAT	1,048,202
Private co-financing (in EUR)	-
Reduction of CO2 emissions (in kg/a)	598,425
Estimated heat savings per year (in kWh and %)	2,287,527; 33.95%
Estimated electricity savings per year (in kWh and %	238,556; 6.93%
Estimated heat savings per year (in EUR)	171,626
Estimated electricity savings per year (in EUR)	27,142
IRR/C (in %)	-6.96%
Return on investment (ROI) (in years)	>35
Return on investment (ROI) of private capital (in years)	-



### Summary:

- Different types of buildings:
  - schools,
  - kindergartens,
  - administrative-office buildings and
  - buildings of wider social significance.

The entire set of buildings represents 3.976.635 kWh/a of annual reduction potential in energy use or 729,6 t/a of  $CO_2$  emission reduction. This way electricity and heat energy use would be reduced by 32 % according to the considered baseline situation.



### Summary:

- The total amount of considered investments is 8.802.678 EUR (This amount includes VAT and eligible costs for the preparation of documentation, realization and supervision of project implementation.)
- Total amount of eligible costs suitable for the tender of the Ministry of Infrastructure of the Republic of Slovenia is 7.095.360 EUR excluding VAT.
- Involvement of the contractor (EPC), where investment will be covered by the savings and partly by the municipality through a tender of the Ministry of Infrastructure.





Zavod Energetska agencija za Savinjsko, Šaleško in Koroško Energy Agency of Savinjska, Šaleška and Koroška Region Koroška 37a /SI-3320 Velenje / Slovenija

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## **Financing Building Renovation**

**Through Energy Performance Contracting** 

## **Ivan Seric**

CEO, Institute for Energy Efficiency

Croatia





With support from:





# Financing building renovation through Energy Performance Contracting

Ljubljana, 8. may 2019.
### Energy service vs renovation

In case of deep renovation energy service can include:

- Investment in building envelope
- Installment of equipment
- Replacement of renovated parts during the contract
- > Maintenance
- Operating heating, cooling, ventilation and airconditioning system
- Energy management
- Change of fuel
- Education of staff
- Investment in renewable energy sources



Energy service can make benefit from <u>interplay</u> of

different measures – removable and non removable Output of energy service are <u>energy savings</u> – not increase of value of the building

## WHY EnPC



A business based on future savings – "perpetum mobile" for economy

Does not reach significant volume without regulatory and policy development!

# Energy service and Energy Performance Contract (EnPC)

Energy Service Provider delivers efficiency improvement measures in a final customer's facility or premises

Energy performance contracting:

- energy service provider delivers energy savings to beneficiary on his facility or premises
- verified and monitored during the whole term of the contract
- energy service provider is paid for achieved savings

In an Energy performance contract (EPC) energy service provider (ESCO) is an investor on final beneficiary's premises, and beneficary "buys" savings achieved, not asset – significantly different from traditional investment process!

### The asset issue is currently a challange posing a danger to fundaments of EPC market!

ESCO assumes risks and benefits from the investment – economic owner of asset even if beneficiary remains a legal owner!

A regulatory framework is essential to define specifics of EPC!

## Development of relevant framework in Croatia

2012.	First EnPC contracts –	2012.
-------	------------------------	-------

- 2013. Development of Public buildings renovation programme 2014 2015
- 2014. EE Law, Ordinance on measurement and verification of savings
- 2015. Secondary legislation
- 2015. Grant programme from EPEEF
- 2015. First large project (hospital Križine Split) show success
- 2016. 33 projects negotiated
- 2016. Model contract for EnPC proposal
- 2017. Public buildings refurbishment programme 2016-2020 adopted
- 2017. Discussion about the model of support from EU funds beneficiary?

The question on beneficiary stopped further implementation of EnPC contracts!

### What was the problem?

Guidance Note on the Impact of Energy Performance Contracts on Government Accounts 2015.

*E(n)PC is imputed government debt* by default, "given the high likelihood that capital expenditure incurred in the context of EPCs would have to be recorded in government accounts anyway"

Public administrations hesitates to contract EPC - constrains in budget, EDP, public procurement issues

Rules in contrast with ESA 2010 provisions for economic ownership – if a majority of the risks and are transferred to the partner

Energy Efficiency Directive 2012/27/EU

EED 18.1.d) Member States shall promote the energy services market... supporting the public sector in taking up energy service offers

EED 5.7.c) "use, where appropriate, energy service companies, and energy performance contracting to finance renovations and implement plans to maintain or improve energy efficiency in the long term."

EED 5.1. 3 % of the total floor area ... occupied by its central government is renovated each year to meet at least the minimum energy performance requirements set in Article 4 of EPBD.

2015. EUROSTAT guidance note made it practically impossible to renovate public buildings via energy performance contracts – implementation of EED
19. September 2017. new guidance was issued – providing rules in which energy performance contracts can be used by government in line with ESA 2010
May 2019. a detailed Guide published by EUROSTAT and EIB

## EUROSTAT guidance 2017.

E(n)PC is recorded off governm ent balance sheet if:		ESCO is the economic owner of this asset – bearing most of risks and rewards of the investment
		ESCO carries out an initial capital expenditure to improve the energy efficiency of an existing facility
		The remuneration of the ESCO is determined by the energy savings achieved
		ESCO is responsible for the proper operation of the installed equipment – it bears the maintenance and refurbishment risks
		ESCO decides which asset is installed and when it should be replaced or changed
		no cash payment occurs at the time of return of the assets

If an EPC is combined with a factoring without recourse agreement, the government is deemed to be the economic owner of the EPC asset – government debt is imputed

## Implementation of EnPC

### Investment in non-removable assets

- Investment in "deep" refurbishment – building envelope
- Highest level of savings, available for default approach
- Creating economic activity (jobs) with no costs to government
- ESCO economic but not legal owner of assets
- Long payback periods
- Bankability problems
- Tax and accounting problems

#### Investment in removable assets

- Investment mostly in equipment
- Can include change of fuels
- A thin line between EPC and operating lease or imputed loan
- Procurement rules to define energy efficiency
- Measurement and verification as an ongoing process
- Security of supply for beneficiary

#### Investment in intangible assets

- No significant investment consultancy, awareness raising, operating etc.
- Very short payback period
- ESCO's benefit from changes in behaviour or operating
- Determining savings requires complex measurement and verification - EMIS
- Split incentives between ESCO and beneficiary
- Procurement based on ESCO's references – obstacle to market supply development

Measurement and verification systems tailored for different implementation options

### Measurement and verification

EMIS – energy management information system

- Data on actual energy consumption
- Data on baseline energy consumption
- Normalization of baseline consumption
- Metered savings = Baseline consumption (normalized) – actual energy consumption
- Can deliver evidence on metered energy savings

Investment in removable and intangible assets

MVP – measurement and verification protocol

- Methodology for calculating scaled savings
- Simple & efficient resource for settlement of disputes in energy service
- Can deliver evidence and verification for scaled energy savings

Investment in non-removable assets

## Verification of energy savings

#### P194

- Verification of savings can provide:
  - Basis for invoice for energy savings in EnPC
  - Settlement of disputes
  - Evidence for subsidy providers

If a strong verification process is developed in legislation, it can unlock potential for energy services in multiapartment buildings – verification to provide security for apartmant owners allow for energy service to be contracted with majority of coowners!

## **Options for subsidies**



subsidised for multi apartment buildings, unlocking enormous renovation potential!

# Subsidies for energy performance of buildings in Croatia



Proposal for changes in funding scheme – funding up to 100% in competitive process for ESCOs for both public and multiapartment buildings up to available amounts!

Criteria will be depending on total savings and investment/savings guaranteed

## Multi apartment buildings



How can energy efficiency be subsidized for multiapartment buildings? How can co-owners be safe from non-performance of renovation? Can EnPC be a tool for renovation of multi apartment buildings?

## Grants and financial instruments

### Grants

- If aimed at individual measures, not taking into account interaction of measures for "deep renovation"
- If level for "deep renovation" is pre-defined, either too high or too low

### Financial instruments

- Can deal with risks typicall for EnPC – guarantee schemes

State ait issues – GBER (art.39 §4.) allowes supporting only for building owners – **not ESCO's**, but ESCO assumes risks and rewards!

### Solution?

Competitive process of awarding EnPC, in line with Guidelines on State aid for environmental protection and energy 2014-2020 – ESCO's bid for the level of support!

# Competitive process – proposal for multi apartment buildings



**Basic rules for competitive process:** 

- ESCo's apply for grants
- ESCo's can ask for grants above savings guaranteed
- Grants considered to be a price in a tendering process
- Stardardised contracts used to protect co-owners
- > Full application of EUROSTAT rules ESCo an economic owner of invesment!

## Development of energy service market



Energy service market must be developed to apply competitive process Stringent rules and processes for government buildings can provide framework for renovation of multi apartment buildings – unlocking potential **Not possible if ESO's are not economical owners of investment – EUROSTAT rules!** 

# Ensuring consistency will bring to full scale implementation/roll-out

*Due to clear definitions* provided by EUROSTAT on *what is ESCO* market, *EU market for ESCO's can be created*, as it made clear distinction of Energy Performance Contract and other arrangements.

To make EU market **one market** it is necessary to:

**Develop** accounting standards: national accounting standard related to international accounting standards – defining taxing in the same way accross EU

**Regulation of energy service:** creating same terms and definitions for ESCO market

**Grants and Inovative financial instruments:** definition of investor, assets, liabilities, time of transaction and procurement rules are necessary for development of market based subsidies for ESCO's and dealing with state aid rules

**Enlarging the market:** ESCO's can renovate multitennant buildings in line with property laws

### Thank you for your attention!



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## Expert's background – Ivan Šerić

Name	Expert's Profile	Indicative Project Experience
	<ul> <li>Owner/founder in Investicijski inženjering d.o.o.</li> <li>Undergraduate degree in Economy from the University of Josip Juraj Strossmeyer</li> <li>Leading expert in energy efficiency regulation and energy service due to key involvement in energy efficiency law regulation in Croatia, and design and implementation of Programme of energy renovation of public buildings in Croatia – the most successfull application of energy service through private investment in public buildings</li> <li>Provided solutions for EUROSTAT for debt and deficit issues related to energy performance contracts for public buildings – removing a crutial barrier in implementation of energy efficiency policies on EU level</li> <li>Continutously advising public bodies in Croatia in implementation of energy service for buildings, where Croatia created more then 3000 jobs from savings, without public sector expenditure</li> <li>Defined all laws and bylaws for transpositon of EED in Croatia</li> <li>Developed and implemented Measurement and</li> </ul>	<ul> <li>Drafted Energy efficiency law (in force)</li> <li>Drafted Ordinance on measurement and verification of savings (in force)</li> <li>Drafted Ordinance on energy efficiency in public procurement (in force)</li> <li>Drafted Ordinance on Energy audits for large entreprises (in force)</li> <li>Drafted Ordinance on Energy savings obligations (draft)</li> <li>Drafted Ordinance on Energy management system (in force)</li> <li>Drafted Bill on Contracting and budgetary treatment of energy performance contracts for public buildings (in force)</li> <li>Drafted and implemented Programme of Energy refurbishment of public buildings (2012-2014, 2014-2016, 2016-2020)</li> <li>Drafted Methodology for ex-ante technical analysis of retrofitting potential of a building (in force)</li> <li>Involved in development of subsidy schemes for energy efficiency of buildings under OPCC 2014-2020</li> <li>Involved in Eurostat Task Force on Energy Performance Contracting resulting in new guidance note one energy performance contracts based mostly on his proposal</li> <li>Designed and implemented workshops for SEE countries (Serbia, Montenegro, Kosovo, Albania, Kosovo and Macedonia) on development of regulatory framework for energy efficiency in compliance of EED under organisation of European Energy</li> </ul>



Eco.

- Verification System in use in Croatia, providing efficient solution to many different energy efficiency
- Represented Croatia in DG Energy

Union

### **Practical Experience of Energy Performance Contracting**

#### In Croatia



### **Danijel Bencic**

**Board Member and EE Project Manager** 

Rudan















### ENERGY PERFORMANCE CONTRACTS EXPERIENCE FROM CROATIA

Danijel Benčić, Rudan d.o.o.



### Market leader in water & energy saving projects in Croatia







## First to use ESCO model in Croatia and still using..







### How did it all start for us..?







### List of EPC projects

ordinal number	EPC project	total investment (EUR)	ju subsidies (EUR) for	stified cost <sup>a</sup> national fu (%)	energy consumption before (kWh/annual)	energy consumption after (kWh/annual)	energy savings (kWh/annual)	savings (%)	CO2 before (t/annual)	CO2 after ( t/annual)	CO2 savings (%)
1.	KBC Split - Križine	8.248.729,63	2.976.791,34	36%	14.002.906,30	6.100.832,00	7.902.074,30	56%	4.839,96	2.059,95	57%
2.	OB Karlovac	6.477.732,79	2.546.601,36	39%	13.334.816,73	6.206.667,00	7.128.149,73	53%	3.932,79	1.212,71	69%
3.	KBC Split - Firule	19.771.460,66	6.423.751,69	32%	34.227.570,89	15.084.823,00	19.142.747,89	56%	9.940,00	3.763,71	62%
4.	OB Šibenik	5.462.153,95	2.105.263,16	39%	7.731.182,98	4.369.950,32	3.361.232,66	43%	2.378,76	1.213,73	49%
5.	Bazeni Poljud	6.716.070,31	2.564.102,56	38%	7.307.750,72	2.112.750,72	5.195.000,00	71%	2.127,65	706,63	67%
6.	KBC Split- Pulmatory	2.195.994,70	739.541,16	34%	935.581,00	251.100,00	684.481,00	73%	262,35	59,72	77%
	Total	48.872.142,03	17.356.051,27	36%	77.539.808,62	34.126.123,04	43.413.685,58	59%	23.481,51	9.016,45	64%



**HOLY TRINITY** 

**END USER – DEEP RENOVATED BUILDINGS OWNED BY PUBLIC** 





ISO 50001

### **Opportunities:**



Never better (programs, directives...)



Knowledge and experience on our side



Successfully conducted projects



**Financial market – cheap money** 





### **Conclusion – ESCO!**



Motivated to finish the project in shortest timeframe



Takes all the risk



Brings experience and knowledge



Proven good results



Dedicated to contribute to sustainability for future generations





### Thank you for your attention!

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### **Q&A Session and Open Discussion**





Implementation Workshop in South East Europe 8<sup>th</sup> May 2019



Sponsored by: **KNAUFINSULATION** &



### Conclusions

And signing of the Ljubljana Declaration



### **Adrian Joyce**

Secretary General EuroACE



### Jernej Vernik

Head of EU Representative Office VELUX











## Thank You! Keep up the good work!