Case study - sharing experience: Presentation of the Croatian NEEAP

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Content of Presentation

- Background – *How it's made?*
- Energy efficiency improvement target
  - National and sector-specific
- Final energy demand projections – Business as Usual scenario
- Sector presentation of energy efficiency measures
  - Residential
  - Tertiary
  - Industry (non-ETS)
  - Transport
- Horizontal and cross-sector measures
- *What's next?*

Background for development of 1st Croatian NEEAP

How it's made?

Energy efficiency in Croatia before NEEAP

- Situation before:
  - **Lack of sound, clear and documented energy efficiency strategy fully harmonised with EU *acquis***
- Solution:
  - the Ministry in cooperation with UNDP Croatia initiated the development of **Energy Efficiency Master Plan for Croatia**
- EE Master Plan – basis for 1st National Energy Efficiency Action Plan (NEEAP)

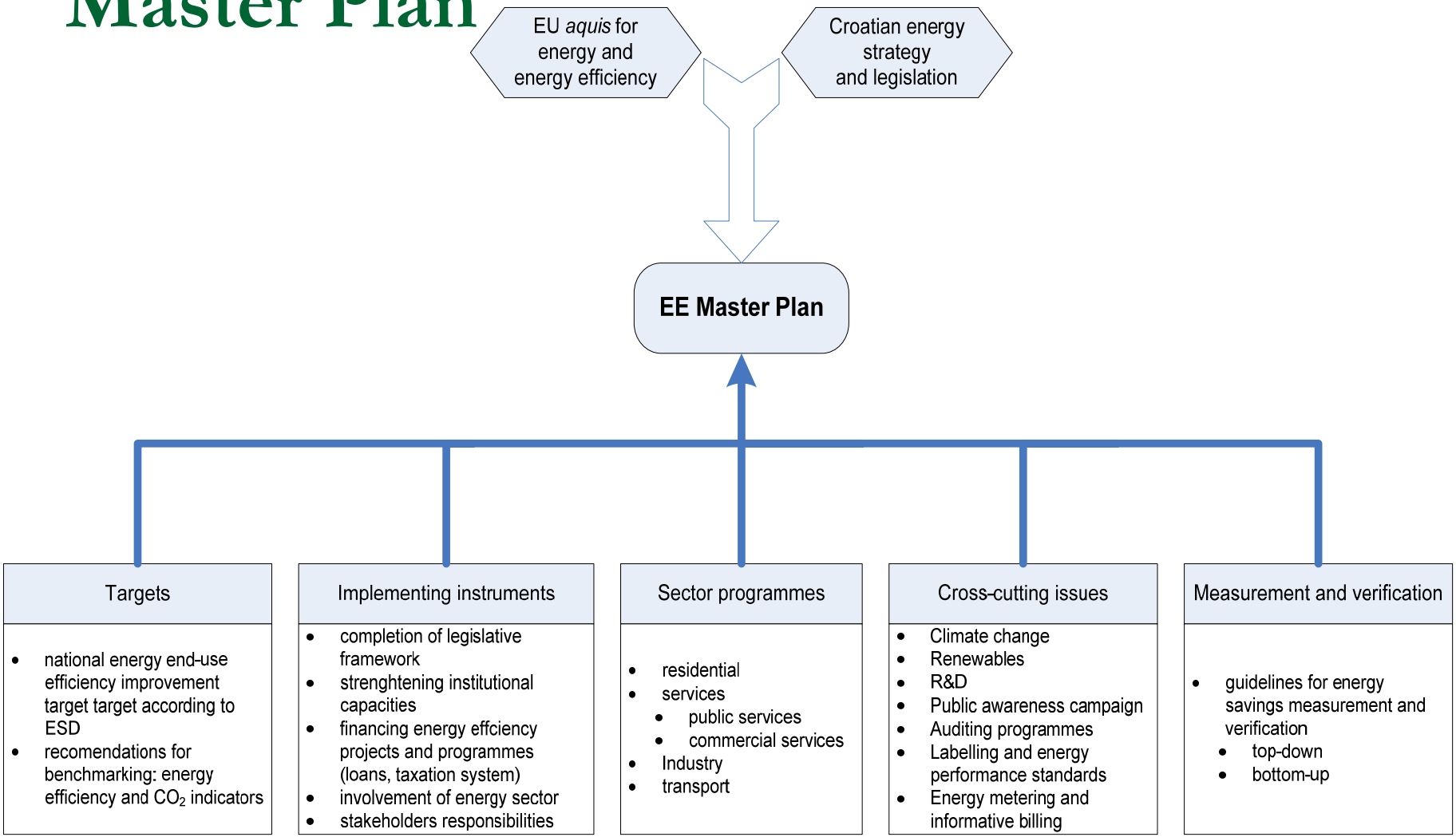
Why was EE Master Plan needed?

- **Lack of energy efficiency strategy** (programme) both on a national and local (regional) level with quantified goals for short-, mid- and long-term energy efficiency improvements
- **Incomplete legislative framework for energy efficiency** (energy legislation)
- **Insufficient administrative and institutional capacities** for implementation of energy efficiency strategy (programme)
- **Insufficient economic and financial support mechanisms** for energy efficiency (fiscal legislation, public procurement, etc.)
- **Lack of demand** for energy efficient products and services → underdeveloped energy efficiency market → need for information and promotional activities

Goals and outcomes of EE Master Plan

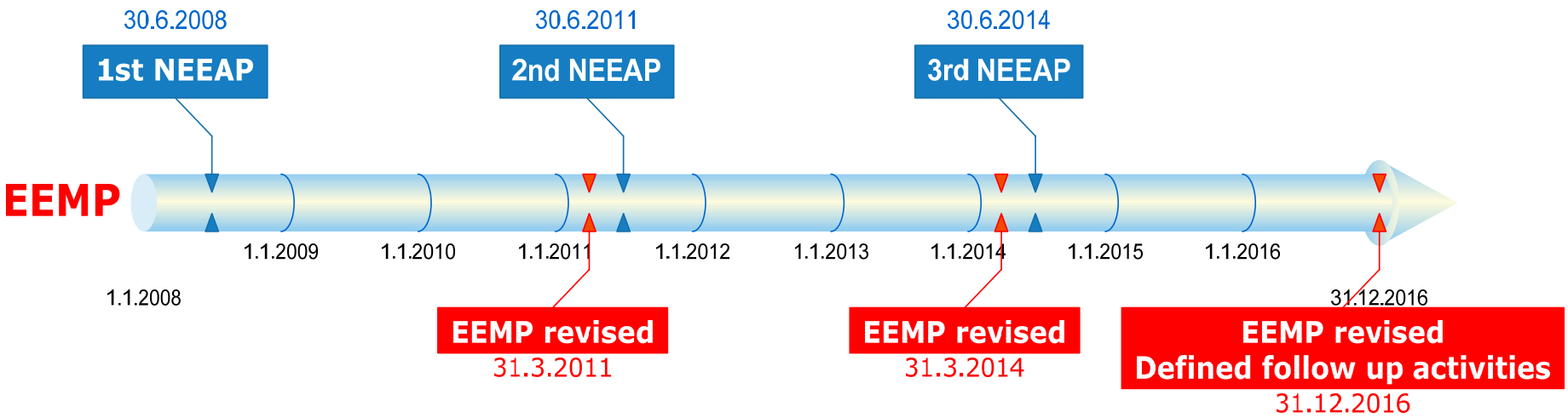
- To obtain a well-documented energy efficiency strategy for Croatia:
  - Definition of short-, medium- and long-term **quantified goals** for energy efficiency improvements on **the national level and separately, for every sector**
  - Identification of and elaboration on **all prerequisites necessary for successful implementation of defined action plan**, including identification of key **stakeholders** and definition of their role and responsibilities;
  - List of **eligible measures** for achieving defined goals **for every end-use sector**: residential, services, industry, transport;
  - Addressing **cross-sector** and **horizontal issues**;
  - Giving guidelines for **monitoring and verification** of achieved results in energy savings and reduction of greenhouse gasses.

Approach in development of EE Master Plan



Time period covered by EE Master Plan

- Corresponding to the energy end-use efficiency and energy services directive (ESD)
- EEMP is comprehensive basis for definition of policy instruments' mix that will achieve determined EE improvement target
- **Need for regular evaluation!**



What has EE Master Plan initiated?

- National Energy Efficiency Programme for Croatia (2008-2016) prepared and not yet adopted by the Government
- 1st NEEAP prepared and not yet adopted by the Government
  - For preparation the template from EMEEES project used
- Update/upgrade of Croatian Energy Sector development Strategy initiated
  - Green Paper prepared and public discussion finalised; finalisation and adoption by the Government pending
- Act on Efficient End-use of Energy adopted and enforced starting with 2009
  - Secondary (implementing) regulation to be adopted by the end of 2009

Annexes - EE Master Plan :

1. **Analysis of energy consumption in Croatia and setting up the national energy efficiency improvement target**

2. **Analysis of energy efficiency policy and regulation in Croatia**

3. **Proposal for the Agency for Energy Efficiency and Renewable Energy Sources** (Including : Draft work programme 2008-2010, Draft financial plan 2008-2010, Draft Statutes of the Agency)

4. **Analysis and recommendations for financial and fiscal framework for energy efficiency in Croatia**

5. **Recommendations for general (cross-cutting) policy measures**

6. **Sector programmes**

7. **Energy efficiency considerations on the supply side (energy sector)**

8. **Monitoring and evaluation of energy efficiency policy**
   - Measurement and Verification system -

Energy efficiency improvement target

National and sector specific targets

Methodology for national indicative target calculation

- Methodology defined in the Annex I of the Directive 2006/32/EC on energy end-use efficiency and energy services (ESD)
- Energy statistics on final energy demand were used from official annual energy balance
  - Based on five year consumption data, **average consumption** was calculated
  - **Consumption of industrial facilities that are envisaged to be included in EU-ETS was deducted**
- Definition of the **boundary between final inland consumption and the supply (or transformation) sector**
  - Only final energy demand is taken into account, which includes according to official energy balance: “industry”, “transport” and “other” sectors
    - “Other” includes households, services, agriculture and construction.
  - Thermal power stations, gasworks, petroleum refineries and district heating plants **are not taken into account** since they are part of the energy supply sector

Methodology for national indicative target calculation

- After calculating 5-year average final energy demand **9%** of that average was set as a national target
- **Important:** energy savings of every proposed energy efficiency improvement (EEI) measure were estimated to check if this target is reachable!
- **Conclusion:** even higher target could be set based on the estimation of EEI measures' potential → however, the target of 9% was kept due to uncertainties of estimation but also due to uncertainties in policy (politics) decisions
- **Problems** encountered in setting the EEI target– **data availability**:
  - Institution preparing annual energy balance not willing to share data in raw form
  - Very hard to obtain statistical data from Central Bureau of Statistics – Ministry was not able to get these data, but consultants were (for educational purposes)!

National indicative EEI target

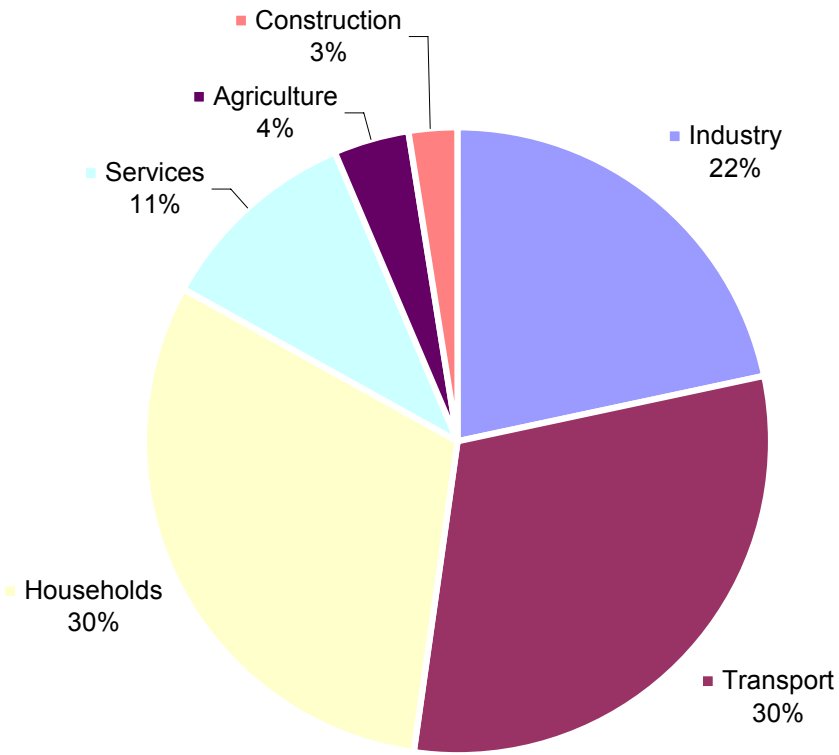
	Final energy consumption				
	2001	2002	2003	2004	2005
	Unit PJ				
Final inland energy consumption	**226.97**	**232.02**	**247.49**	**255.55**	**263.33**
Exemption: energy consumption in undertakings involved in activities covered by Emissions Trading Directive	25.40	23.32	22.79	27,60	27.63
Final inland energy consumption in scope of ESD	**201.57**	**208.70**	**224.69**	**227.95**	**235.70**
Industry	27.98	27.78	29.60	29.54	29.52
Transport	65.77	69.35	74.88	77.17	80.67
Other sectors	107.81	111.57	120.21	121.23	125.51

Average over 5-year period	**219.72 PJ**
9% energy saving target in 2016	**19.77 PJ**
Suggested target to be adopted (9% or higher)	**19.77 PJ**
Suggested target in 2010 (3%)	**6.59 PJ**

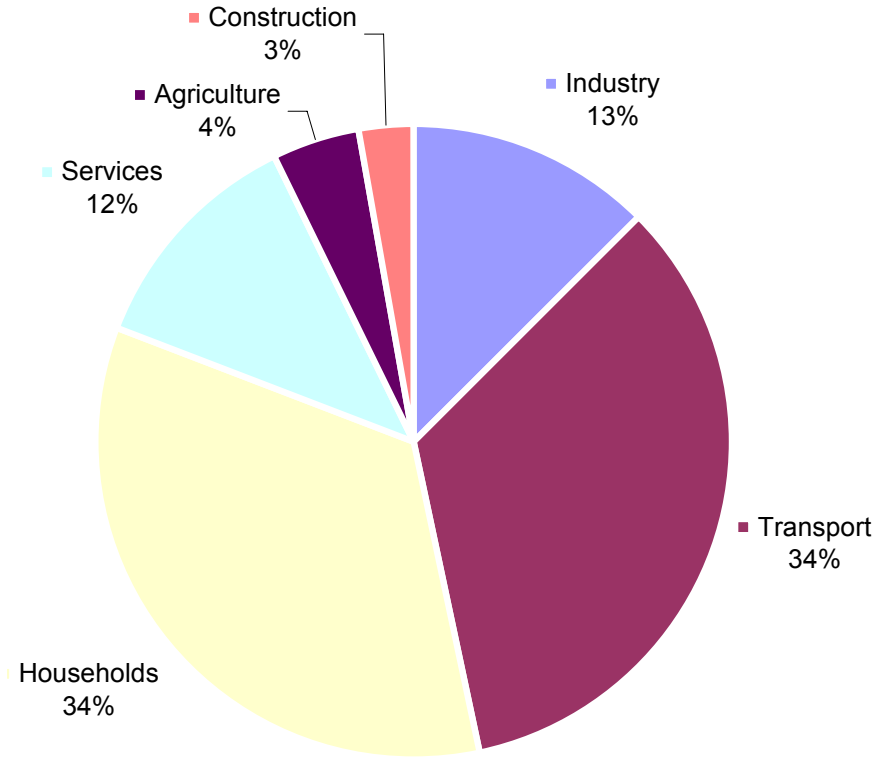
Sector-specific EEI targets

- National EEI target allocated to four main sectors: residential, tertiary, industry and transport
- Reason for allocation: to be able to monitor effectiveness of proposed measures at a more disaggregated level
- The sector allocation of the national target is primarily based on the following:
  - the proportion of individual sectors within the final energy consumption
  - the potentials for efficiency improvements and
  - the level of policy interventions in the sector

Allocation of national target to end-use sectors



Energy used by sectors as a percentage of total final energy consumption



Energy used by sectors as a percentage of energy consumption within the ESD

Allocation of national target to end-use sectors

Sector	*Target (PJ)*	*Allocation of the target*	*Estimated savings (PJ)*
Residential	6.72	34%	7.17
Tertiary	3.76	19%	3.68
Industry (non-ETS)	3.36	17%	4.05
Transport	5.93	30%	6.59
Total	**19.77**	**100%**	**21.49**

Final energy demand projections

Business as Usual scenario

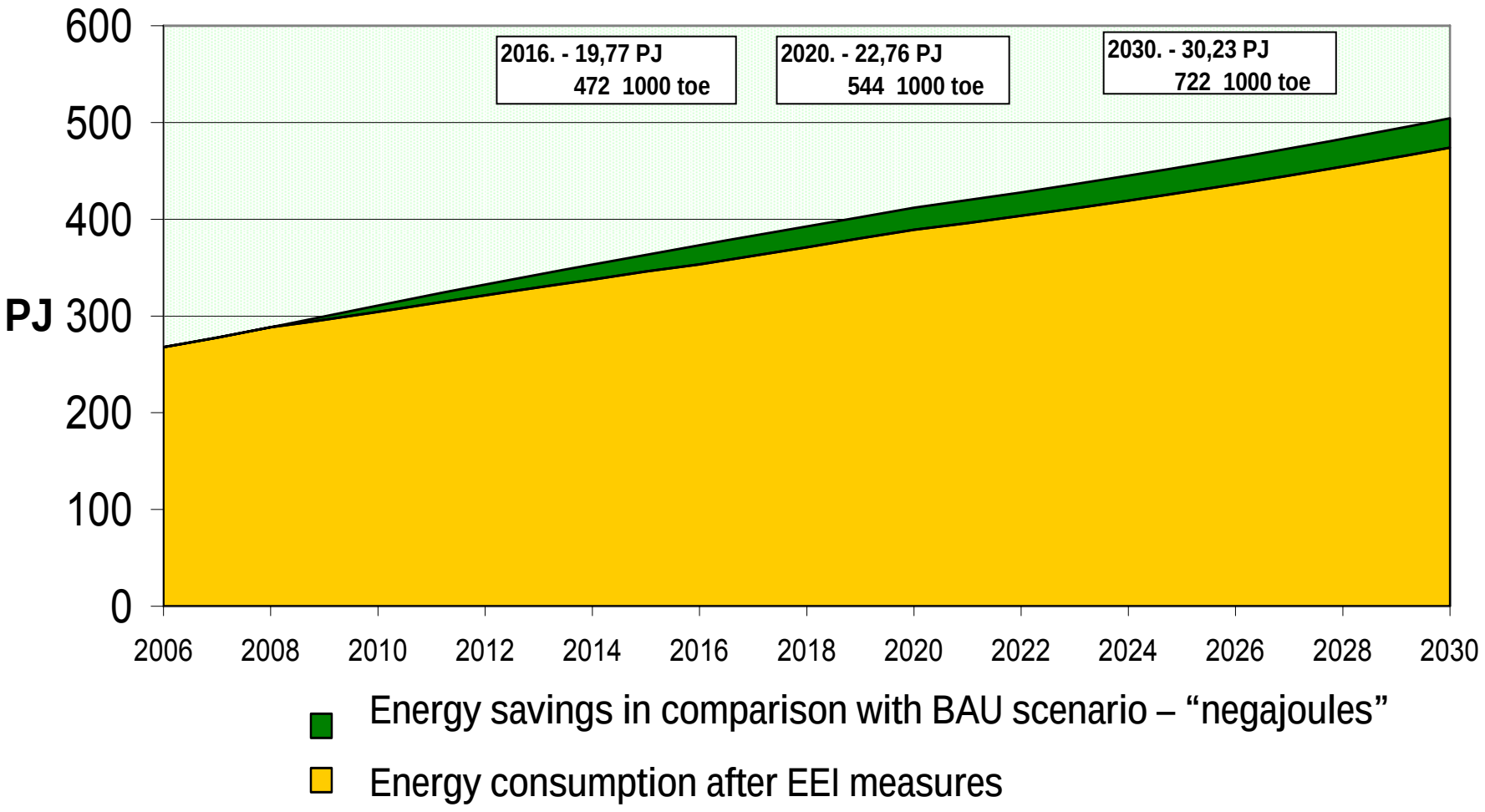
Business as Usual (BAU) scenario – approach in development

- BAU or baseline scenario:
  - includes existing trends and the effects of policies in place and/or in the process of being implemented by the end of selected year!
- BAU scenario of final energy demand in Croatia was determined within update/upgrade of Croatian Energy Sector Development Strategy
- Methods used for determination of BAU:
  - Trend analysis (energy consumption increase trend in the previous period)
  - Input – output (input: energy; output: GDP, value added in sectors)
- Sources of data:
  - Croatian Central Bureau of Statistics; ODYSSEE data base; EUROSTAT; Data base of vehicles from Ministry of internal affairs
  - Prognoses of economic development and expert judgement to link macroeconomic trends and energy consumption trends

Business as Usual (BAU) scenario (from new Energy strategy)

PJ	2006	2010	2020	Predicted growth rate 2006 - 2020 [%]	2030	Predicted growth rate 2020 - 2030 [%]
Industry	**58,86**	**67,11**	**84,43**	**2,6**	**103,09**	**2,0**
Transport	**85,36**	**103,65**	**135,22**	**3,3**	**152,59**	**1,2**
Other sectors	**123,40**	**139,85**	**189,95**	**2,8**	**115,72**	**2,8**
Residential	*77,66*	*83,69*	*99,47*	*1,8*	*245,16*	*1,5*
Tertiary	*28,09*	*34,50*	*57,60*	*5,3*	*81,51*	*3,5*
Construction	*7,39*	*10,59*	*19,52*	*7,2*	*31,79*	*5,0*
Agriculture	*10,27*	*11,07*	*13,37*	*1,9*	*16,13*	*1,9*
Total	**267,89**	**310,60**	**409,60**	**3,1**	**500,83**	**2,0**

Imapact of EEI measures defined in NEEAP (and EE Master Plan)



Sector presentation of energy efficiency measures

Residential
Tertiary
Industry (non-ETS)
Transport

General on sector EEI measures

- Four sectors covered:
  - Residential, tertiary, industry (non-ETS), transport
- Agriculture and construction not treated separately, although there are data on energy consumption in these sectors
  - These sectors have small percentage in the overall energy consumption
  - Specific development issues in these sectors (very fast growth in construction, stagnation and decrease in agriculture, hard to predict future developments)
  - Most of the cross-cutting and horizontal measures are applicable to these sub-sectors
- Table presentation
  - Summary of measures and detailed presentation (template form EMEEES project)
- Energy saving potential of every EEI measure is estimated
  - Estimation is based on the expert judgement and international experience collected through the MURE project

Sector programmes - residential

No	Title of the EEI measure	End-use EEI action targeted	Duration	Annual energy savings expected in 2016
Regulation				
1	Building codes and enforcement	Improved energy performance of buildings through use of better building materials like low-e windows, doors, thermal insulation materials, lighting and HVAC systems.	2008 - 2016	3.02 PJ of all fuel types
Information and mandatory information measures				
2	Information campaigns and network of EE info centres	Increased awareness and changed behaviour of end-users	2007 - 2016	1.51 PJ of all fuel types
3	Appliance and equipment labelling and energy performance standards	Increased market share of efficient appliances	2006 – 2016	1.13 PJ of electricity
4	Metering and informative billing	Increased awareness on energy use which provides incentive for energy savings	2008 - 2016	Not estimated
Financial instruments				
5	Financial support to natural persons for EEI investments	EEI actions related to all residential technologies, especially use of Renewable Energy Sources (RES) for heating purposes.	2009 - 2016	1.51 PJ of all fuel types

Sector programmes - tertiary

No	Title of the EEI measure	End-use EEI action targeted	Duration	Annual energy savings expected in 2016
Regulation				
1	Building codes and enforcement	Improved energy performance of buildings through use of better building materials like low-e windows, doors, thermal insulation materials, lighting and HVAC systems.	Ongoing. Will continue throughout 2008 - 2016	1.03 PJ of all fuel types
2	Inspections of boilers/air conditioning systems	Increased efficiency of boilers and HVAC systems in buildings	2009 - 2016	Not estimated
Information and mandatory information measures				
3	Information campaigns	Increased awareness and changed behaviour of end-users	2007 - 2016	0.51 PJ of all fuel types
4	"Energy Management in Cities and Counties" project	Increased efficiency of municipal and county facilities and offices	2007- 2016	0.60 PJ of all fuel types
5	"House in Order" project	Increased efficiency of state facilities and offices	2008 - 2012	0.60 PJ of all fuel types
6	Energy management and auditing in the commercial services sector	Increased energy efficiency in commercial offices and facilities	2009 - 2016	0.68 PJ of all fuel types
7	Certification of buildings	Improved awareness of measures and investments for efficiency in buildings	2009 - 2016	Not estimated
Voluntary agreements and co-operative instruments				
8	Green public procurement	Shift to energy efficient products and services for public sector	2008 - 2016	0.26 PJ of all fuel types

Sector programmes – industry

No	Title of the EEI measure	End-use EEI action targeted	Duration	Annual energy savings expected in 2016
Voluntary agreements and co-operative instruments				
1	Industrial Energy Efficiency Network (IEEN)	Increased awareness and knowledge regarding energy efficiency investments; including demonstration projects, training and education, M&T	2008 - 2016	2.89 PJ of all fuel types
2	Voluntary agreements with industry	Awareness and commitment within industry promoted	2009 - 2016	0.58 PJ of all fuel types
Information and mandatory information measures				
3	Auditing scheme for industry	Reveal potentials for EEI measures by requiring large consumers to perform audits regularly and by offering subsidised energy audits on a voluntary basis	2009 - 2016	0.58 PJ of all fuel types
4	High-efficient cogeneration	Implementation of feed-in tariffs for electricity produced from high efficiency cogeneration	2007 - 2010	To be estimated within an upcoming report on national cogeneration potential
Financial instruments				
5	CO_2 fee for large emitters	Revenues from the fee to be used for financing EEI measures in all sectors	2007 – 2016 To be abolished after the introduction of the ETS	Not estimated

Sector programmes - transport

No	Title of the EEI measure	End-use EEI action targeted	Duration	Annual energy savings expected in 2016
Regulation				
1	Introduction of European standards	Develop stringent standards for cars, so that newly bought cars are more energy efficient	2009 – 2016	2.21 PJ of diesel and gasoline
Information and mandatory information measures				
2	Information campaign on energy efficient behaviour in transport	Driving behaviour and purchasing behaviour - promoting more efficient cars and the use of alternative fuels	2008 – 2016	1.46 PJ of diesel and gasoline
3	Promotion of sustainable transport systems and efficient use of fuel in the transport sector	Promote modal shift to more energy efficient transport modes	2009 – 2016	1.46 PJ of diesel and gasoline
Financial instruments				
4	Promotion of cleaner cars	Increased use of electric and hybrid vehicles, use of alternative fuels (bio-fuels, LPG, CNG)	2010- 2016	1.46 PJ of diesel and gasoline

Horizontal and cross-sector measures

General policy measures and measures with effect in several sectors

Horizontal and cross-sector measures

Measure	Residential	Tertiary	Industry	Transport	Energy sector
CO_2 fee for large emitters		X	X		X
Building codes and enforcement / Certification of buildings	X	X			
Appliance and equipment labelling and energy performance standards	X	X	X		
Energy metering and informative billing	X	X			
Energy auditing programmes	X	X	X		
EE and RES credit line		X	X		X
Environmental Protection and Energy Efficiency Fund – financial support for EE, RES and clean transport	X	X	X	X	
Feed-in tariffs for RES and high-efficiency cogeneration		X	X		X
Strengthening energy efficiency in education	X	X			

What's next?

Monitoring and evaluation of NEEAP

Support in implementation of energy efficiency policy

Monitoring and evaluation

- **Every policy document is worthless if there is no system for monitoring and evaluation of achievements!!!**
- In Croatia, we need to:
  - Improve energy statistics, data collection (not only energy consumption data should be collected, but also data on influencing parameters) and especially data availability
  - Completely determine our energy balances according to Eurostat methodology
  - Calculate and monitor energy efficiency indicators according to ODYSSEE methodology (*top-down* approach) on national and sector level
  - Develop standardised methods for *bottom-up* energy savings calculations (parameterised ex-ante and standardised ex-post evaluation methods)
- Achievements should be reported on annual basis and documents updated accordingly!

Legislative and institutional support for NEEAP implementation

- Act on Efficient End-use of Energy already adopted and enforced
  - Secondary (implementing) regulation to be implemented in 2009 especially regulation on energy audits, M&V, IT system for monitoring energy savings and energy performance contracting in public sector
- Institutional setup
  - EE policy implementation responsibility of the Ministryy and EE Unit within the Environmental Protection and Energy Efficiency Fund

ENERGY EFFICIENCY AND DEMAND MANAGEMENT

Table of ADOPTED Acts

ADOPTED	
Laws	1. Physical Planning and Building Act (OG 76/07, 7/2007) 2. Act on the Environmental Protection and Energy Efficiency Fund (OG 107/03) 3. Act on Energy End-use Efficiency (OG 152/08) 4. Energy Act (OG 68/01, OG 177/04, OG 76/07, OG 152/ 08) 5. Act on the Regulation of Energy Activities (OG 61/01, 177/04, 76/07) 6. Act on Ratification of Memorandum of Understanding between the Republic of Croatia and the European Community on the participation of the Republic of Croatia in the Community Programme "Intelligent Energy-Europe Programme of the competitiveness and innovation framework programme (2007 to 2013)" (OG – International Agreements, 11/2007) 7. Act on Ratification of Energy Charter Treaty (OG – International agreements, 15/1997)

ADOPTED	
Appendix	1. Information on progress regarding guarantees of origin

ENERGY EFFICIENCY AND DEMAND MANAGEMENT

Table of ADOPTED Acts

ADOPTED	
Bylaws	1. Ordinance on Certification of Energy Performance of Buildings (OG 113/08, October 2008) 2. Ordinance on the Requirements and Criteria to be met by Energy Auditors and Energy Certifiers of Buildings (OG 113/08, October 2008) 3. Technical Regulation Concerning Energy Economy and Heat Retention in Buildings (OG 110/08, September 2008) 4. The Technical Regulations on Heating and Air-conditioning Systems of Buildings (OG 110/08, September 2008) 5. Ordinance on Energy Efficiency Requirements for Household Electric Refrigerators, Freezers and Combinations thereof (OG 135/ 05) 6. Regulation on Incentive Fees for Promoting Electricity Production from Renewable Energy Sources and Cogeneration (OG 33/07) 7. Regulation on the Minimal Share of Electricity Produced from Renewable Energy Sources and Cogeneration whose Production is Incentivised (OG 33/07) 8. Ordinance on the Use of Renewable Energy Sources and Cogeneration (OG 67/07) 9. Ordinance on Acquiring the Status of Privileged Producer (OG 67/07) 10. Ordinance on Energy Efficiency Labelling of Household Appliances (OG 130/07) 11. Regulation on Confirmation of the Energy Charter Protocol on Energy Efficiency and Related Environmental Aspects (OG – International Agreements, 7/1998)

ENERGY EFFICIENCY AND DEMAND MANAGEMENT

Table of ADOPTED Acts

ADOPTED	
Tariff systems	1. Tariff System for the Production of Electricity from Renewable Energy Sources and Cogeneration (OG 33/07)

ADOPTED	
Action plans	1. Action Plan to Implement European Directives on Energy Performance of Buildings in Croatian Legislation (Decree of the Government of the Republic of Croatia, April 2008)

ADOPTED	
Programmes	1. UNDP “Removal of Barriers for Energy Efficiency in Croatia“ (http://www.undp.hr) 2. UNDP "Energy Management in Cities“ (http://www.energetska-efikasnost.undp.hr/) 3. UNDP Energy Efficiency Programme for Buildings owned by Republic of Croatia “Put House in Order” (http://www.energetska-efikasnost.undp.hr/) 4. CARDS 2004 "Approximation of EU Renewable Energy Legislation and Energy Efficiency Labelling" – RELEEL (http://releel.mingorp.hr) 5. HEP- ESCO, WB / GEF Energy „Efficiency Project Croatia“ (http://www.hepesco.hr/esco/en/project/project.aspx) 6.UNDP „Info – Educational Campaign“ (http://www.undp.hr/show.jsp?page=82439)

ENERGY EFFICIENCY AND DEMAND MANAGEMENT

Table of DRAFTED Acts

DRAFTS (in the pipeline)		Deadline for adoption
Bylaws	1. Ordinance on General Conditions for Products' Eco Design	First Quarter 2009
	2. Technical Regulation on Requirements for Energy Efficiency of Fluorescent Illumination Silencers.	First Quarter 2009
	3. Ordinance to Determine Methodology of Calculation and Defining of National Framework Savings Objective in the Immediate Energy Consumption	Fourth Quarter 2009
	4. Ordinance on a Unique Energy Efficiency Information System	Fourth Quarter 2009
	5. Ordinance on Energy Audit	Fourth Quarter 2009
	6. Ordinance on Methodology for Measuring and Energy Savings Verification	Fourth Quarter 2009
	7. Ordinance on Authorization Issuing for Energy Audit	Fourth Quarter 2009
	8. Ordinance on Investment Treatment in the Energy Efficiency Measures Application	Fourth Quarter 2009

ENERGY EFFICIENCY AND DEMAND MANAGEMENT

Table of DRAFTED Acts

DRAFTS (in the pipeline)		Deadline for adoption
Rules	1. Methodology for Conducting Energy Audit in Residential and Non-residental Buildings (for issuing of Energy Certificate)	First Quarter 2009
	2. Technical, Environmental and Economic Feasibility Study of Alternative Systems for New and Old Buildings with a total Useful Floor Area Over 1000 m2	First Quarter 2009

DRAFTS (in the pipeline)		Deadline for adoption
Action plans	1. National Cogeneration Potential of the Republic of Croatia	First Quarter 2009
	2. Energy Efficiency Programme for Republic of Croatia (EEMP) 2008 -2016 (Master Plan)	First Quarter 2009
	3. First National Energy Efficiency Action Plan (NEEAP) 2008 – 2010	First Quarter 2009

DRAFTS (in the pipeline)		Deadline for adoption
Strategies	1. Update/Upgrade of the Energy Strategy and of the Implementation Programme of the Republic of Croatia GREEN PAPER, draft	First Quarter 2009

Thank you for attention!

Further information on Croatian EE policy

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