



ENERGY IN URBAN PLANNING AND IN RESTRUCTURING AREAS

# ***Protected zone SORELA Local Project in Havířov CZECH REPUBLIC***

*Monika Kwapulinska, MRA Havirov  
Tomas Vimmr, STU-K Praha*



DUBLIN CONFERENCE  
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# CZECH REPUBLIC



10,4 million inhabitants

79 000 km<sup>2</sup>

Continental climate

July 20°C

January -2°C

4,5 mil dwellings

1,3 mil in large panel houses

Average size: 76,3 m<sup>2</sup>

Average appt.age: 43 years

2,6 persons/dwelling



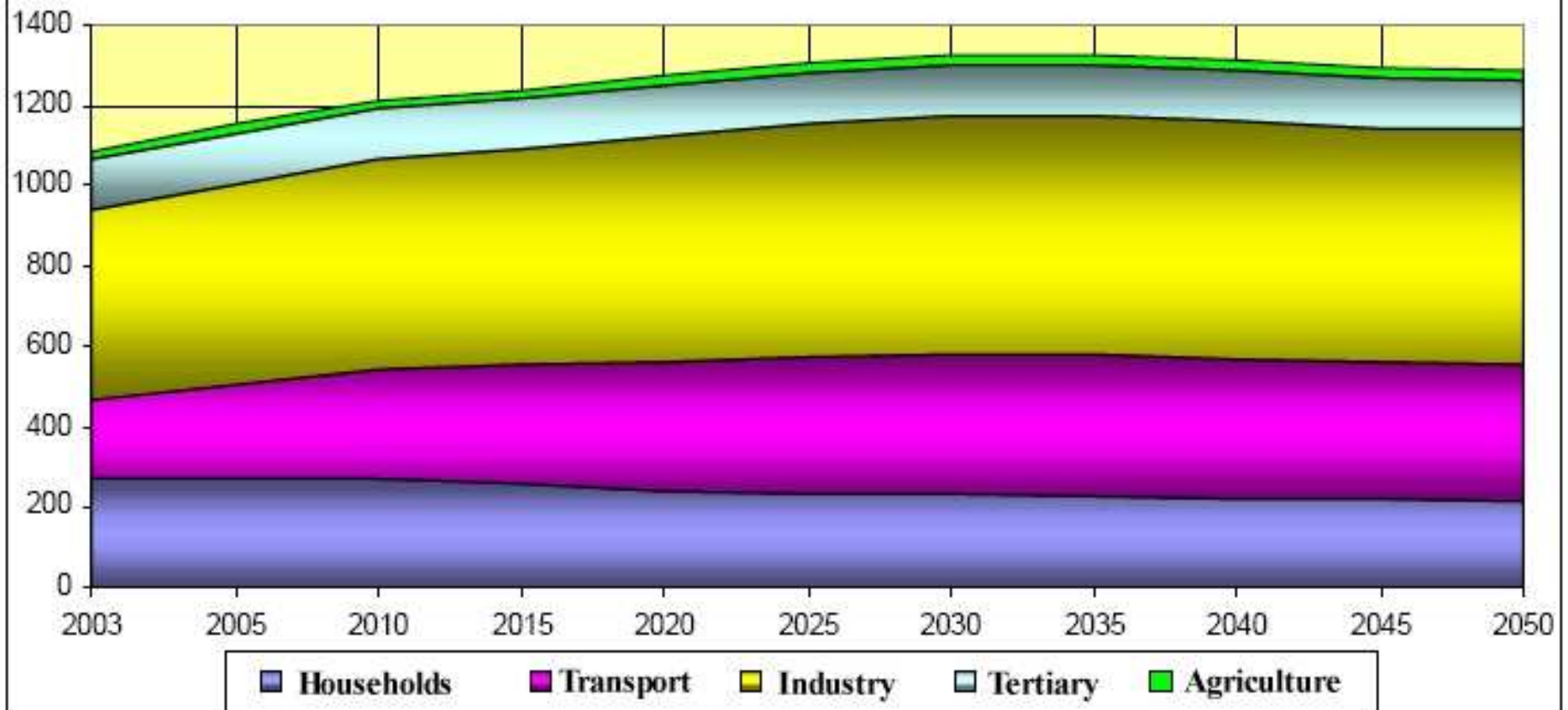
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# HOUSING IN THE CZECH REPUBLIC

The household sector is one of the largest users of energy in the CR, consuming 27% of final energy consumption (excluding energy used for transport).

# HOUSING IN THE CZECH REPUBLIC

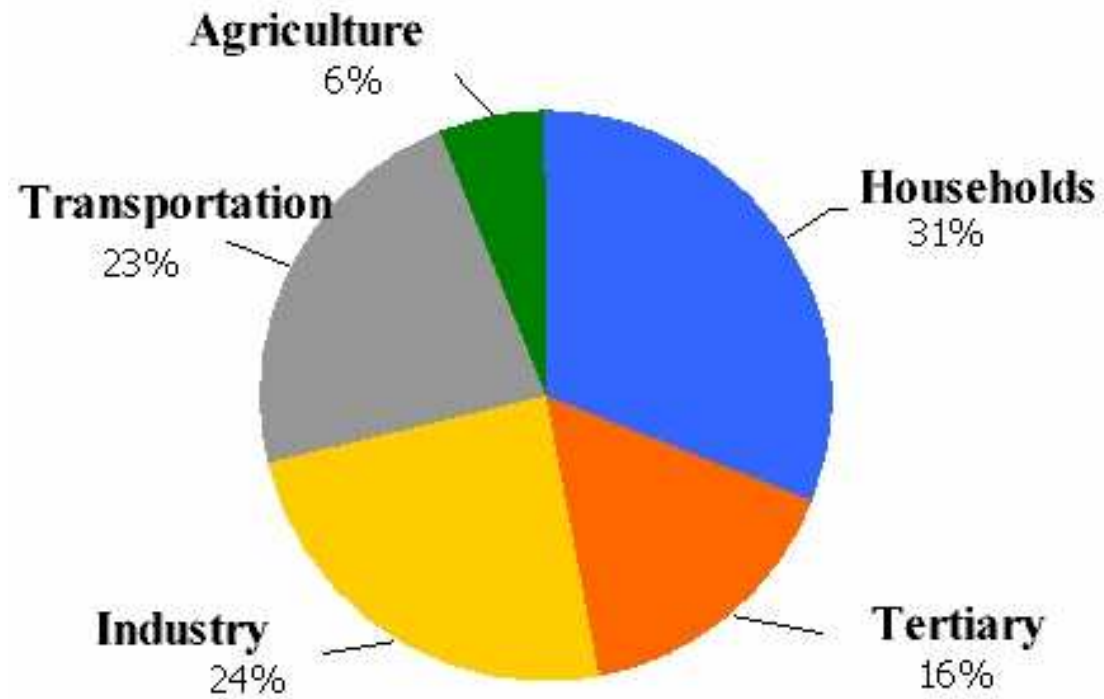
## Final Energy Consumption by Sector [PJ]



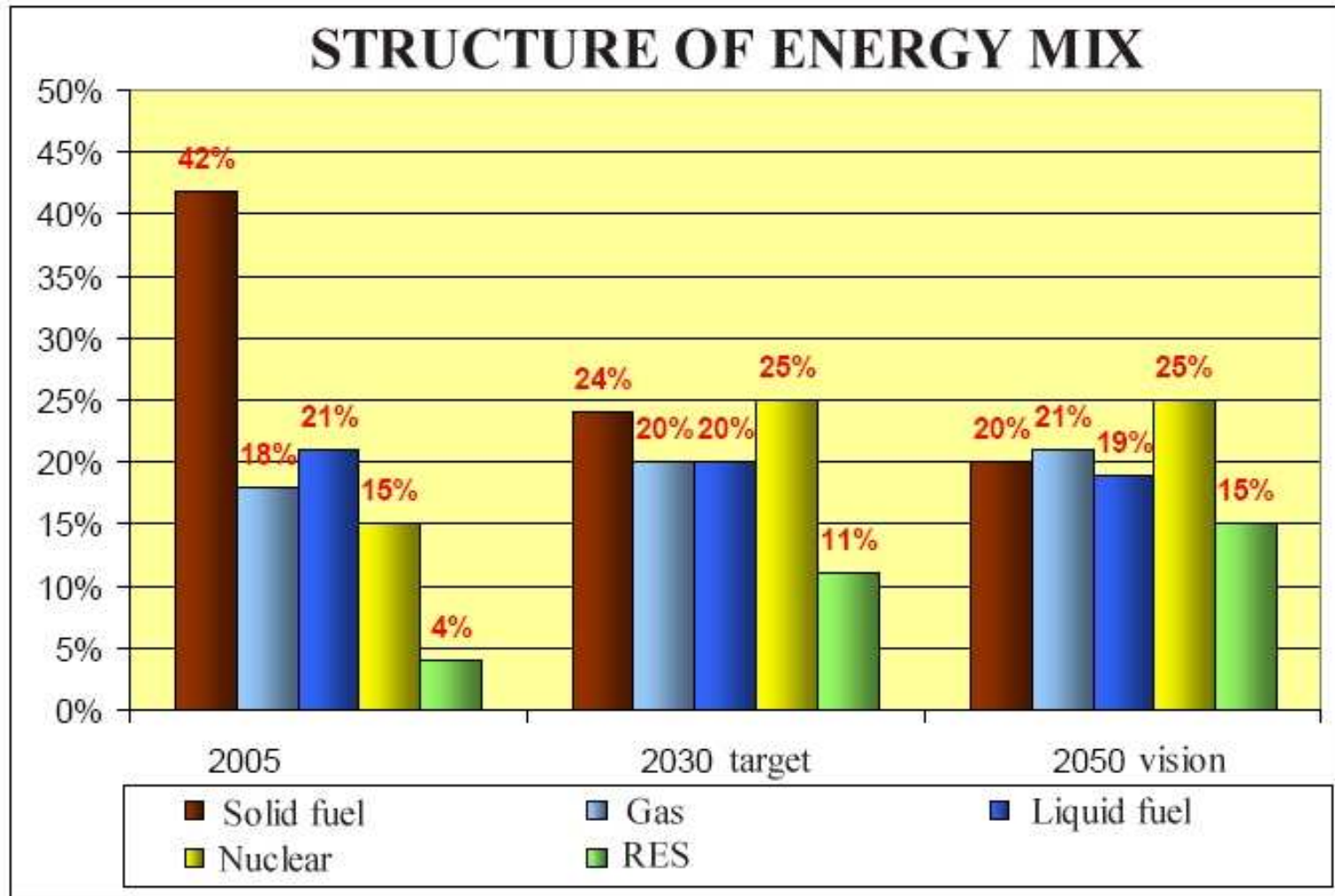


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# ENERGY SAVING POTENTIAL



# ENERGY MIX IN THE CR





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# HAVÍŘOV project context





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# HAVÍŘOV project context

- 83000 inhabitants, 3200 ha
- **Youngest city** in the Czech Republic, founded in 1955, however demographically **old** (average age over 40 yrs)
- High unemployment rate 12 % (Czech Republic 7,4 %)
- **90,4% housing stock built after 1945**
- Large panel and masonry standardized buildings
- High energy consumption, poor technical conditions
- **„Step by step“ Deregulation of rentals 2007-2010**
- Future increase of rentals - financial sources for renovations



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# MRA

- MRA – facility management company
- Management of 7665 municipal dwellings 23% dwellings of the city of Havirov
- **85% appts of MRA portfolio are regulated rentals (fixed low rents)**
- **MRA has no vacant regulated rental apartments available.** The demand is higher than offer. The allocation is based on the waiting list.



# PROJECT CONTEXT

- **SORELA** is a set of masonry buildings built in 1950's
- Facades are decorated with stucco, mouldings and sgraffitos in the style of **socialist realism**. Architects turned to Czech renaissance for inspiration (mouldings, gables, scratchwork). These houses are situated in Havirov in the city centre and along the main street.
- **In 1992 this area was declared** a landmark zone for its fine examples of socialist realistic architecture. The extensive housing estates integrate well with the surrounding greenery and with all necessary public facilities and equipment (shops, restaurants, cinema, culture house, playgrounds...).



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# PROJECT CONTEXT





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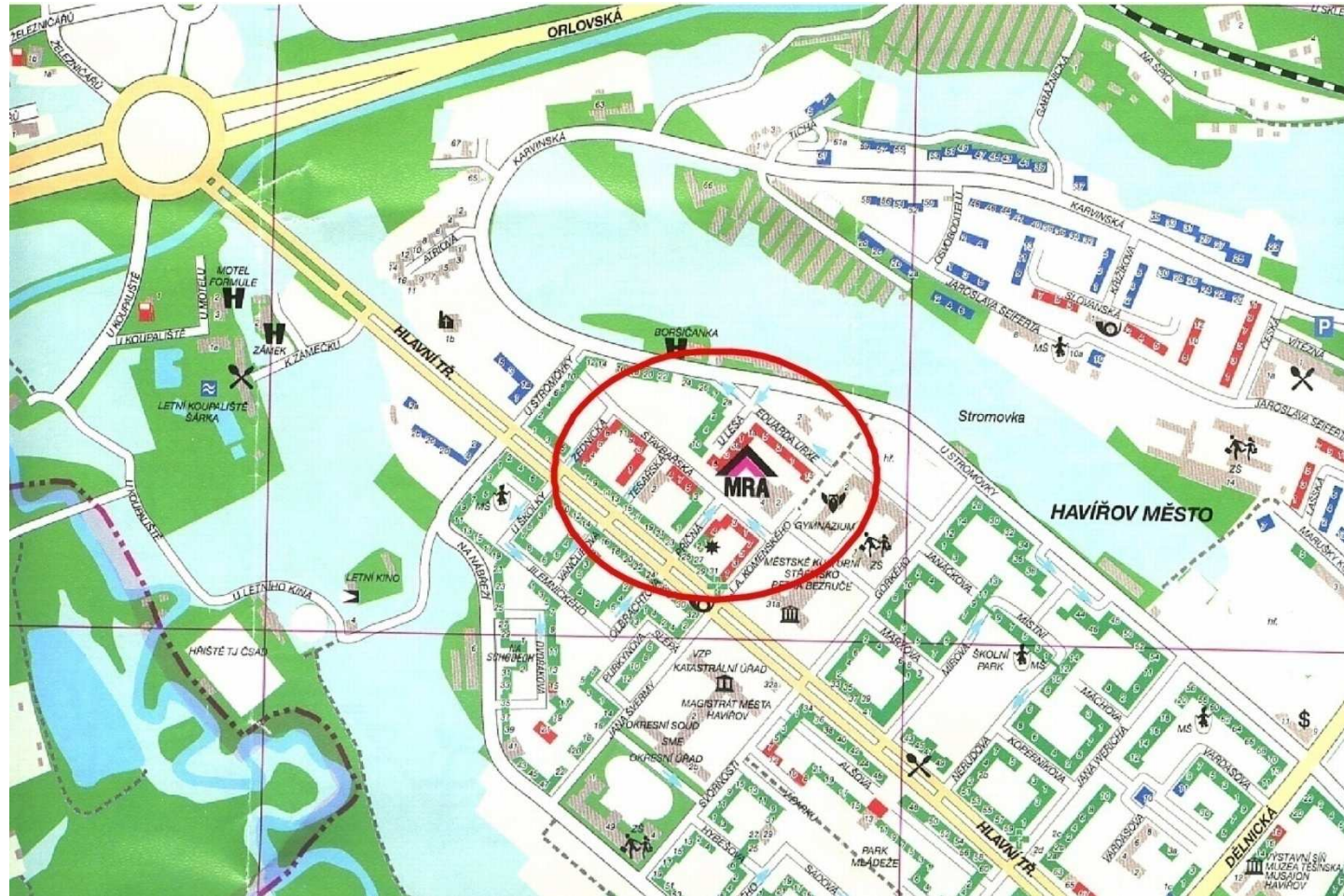
# SORELA CULTURAL





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# PROJECT CONTEXT





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# PROJECT DATA

- 11 Sorela buildings (220 dwellings+commercial spaces )
- Construction year : 1956
- Facility management by MRA.
- Financial sources for refurbishment : 2010 - 2014
- Type of building: standardised masonry buildings T13
- Total area of flats and non-residential spaces 14014 m<sup>2</sup>
- Number of floors of buildings: 4–5 storey with basement
- Roof: pitched roof, some buildings have attic apartments
- Double windows, wooden frames, each frame single glazed
- External walls made of bricks in thickness 450-600 mm

# PROJECT CONTEXT

## U-values of existing building parts

- walls: 1,2-1,4  $\text{W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$
- terrace roof: 0,9  $\text{W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$ ,
- pitched roof – no special requirement,
- last floor: 2,6  $\text{W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$
- floor above basement: 1,6  $\text{W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$
- windows: 2,7-2,9  $\text{W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$



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# PROJECT CONTEXT

- Average heating energy consumption :  
**175 kWh/ m<sup>2</sup>/ year**
- Average DHW consumption :  
**35 kWh/ m<sup>2</sup> /year**



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# PROJECT CONTEXT

## ***Energy infrastructure***

Energies delivered to the building :

- Heating water (District heating, HTS and NWR energy)
- DHW (District heating, HTS and NWR energy )
- Electricity (Severomoravská energetika, a.s.),
- Natural gas (Severomoravská plynárenská,a.s.).

**The buildings are heated with district heating system (local energy policy)**



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# PROJECT CONTEXT

## ***Stakeholders***

- **Tenants,**
- **City of Havirov** as asset owner
- **MRA** Agency, facility management & owner's representative
- **HTS** company, the heat distributor and owner of secondary heat distribution systems
- **Local authorities**
- Regional **Monument protection office**



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# PROJECT CONTEXT

## ***Interests and ambitions of parties;***

- The priority for MRA and Havířov City is to preserve the technical state of buildings. But the refurbishment is always done complex, which means it solves both the technical defects and the energy efficiency of the buildings.
- The energy is a secondary issue because the owner does not have the possibility to increase the cold rents proportionally to the decrease of the warm rents.
- Energy retrofiting strategy corresponds to recommendations from Energy Audits.



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# AMBITION FOR ENERGY/ CO<sub>2</sub>

## *Formulating ambitions*

- Energy efficiency and environmental issues are defined in the **Strategic development plan of the city** and in the territorial energy vision document. Also higher energy efficiency and CO<sub>2</sub> reduction defined as project targets would facilitate the access to subsidies (subsidy program „Zelená úspora“ – „Green saving“)
- **Legal regulations** define the minimum requirements for renovation projects. Minimum **U-values** are prescribed.



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# AMBITION FOR ENERGY/ CO<sub>2</sub>

## ***Inhabitants***

- MRA has an experience with tenants participation from other EU projects like SUREURO
- The municipality together with MRA would consider an agreement with tenants enabling them to be involved in planning, improving and monitoring the projects and clarifying issues



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# AMBITION FOR ENERGY/ CO<sub>2</sub>

## ***Final target***

- The final target is based on technical and economical feasibility of the project.
- One of the main environmental tasks is to reduce the energy consumption and CO<sub>2</sub> emissions .
- Few renovation options are always evaluated during energy auditing process. For each option energy savings, CO<sub>2</sub> reduction, investment costs, NPV, ROI are considered. The best rated options are recommended.
- For SORELA buildings the energy savings potential was evaluated about 30-40% per building.



# AMBITION FOR ENERGY/ CO<sub>2</sub>

## Tools and methods

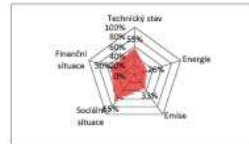
IS developed in the project ESAM was used as supporting tool.

### KARTA OBJEKTU

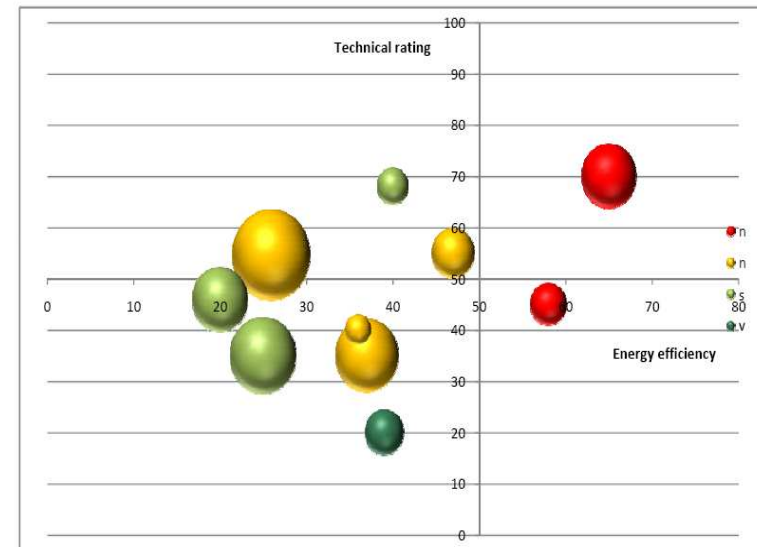
Číslo karty

xxxx

VLASTNÍK OBJEKTU	ADRESA	CP
	Mánesova 6, Hradec-Bábo	



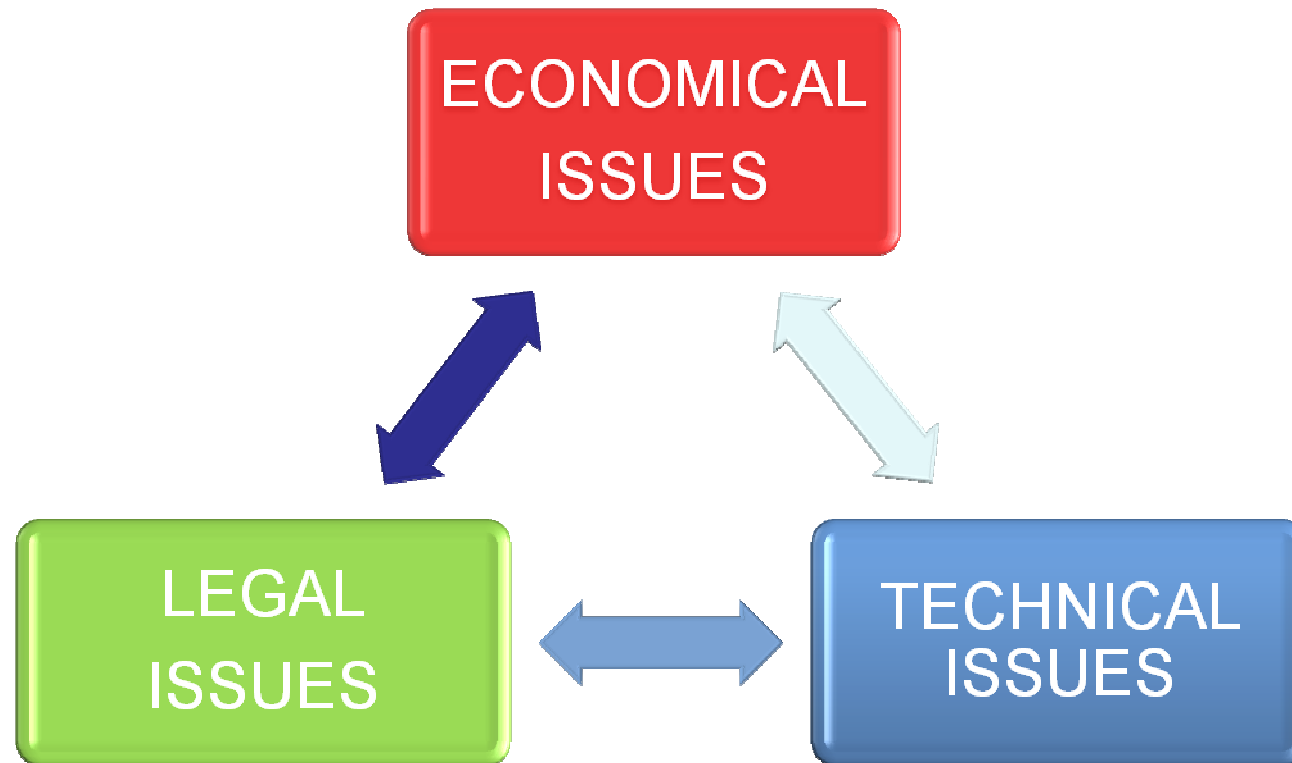
VŠEOBECNÉ ÚDAJE		ENERGIE		STAVEBNÍ ČÁST		OSTAŇNÍ			
					úsk		úsk		
Druh vlastnictví	M	Obecnostný prázor vytápěné části vytápěné části budovy (m3)	7592,8	Stav balkonů nebo lodžii	2	2,00	Stav výtahů	0	2,00
Počet bytových jednotek	36	Geometrická charakteristika A/V (m2/m3)	0,38	Stav střešního pláště (a krovy)	2	2,00	Stav rozvodů studené vody	3	1,20
Počet osob v objektu	79	Zastavěná plocha objektu (m2)	621,6	Stav obvodových stěn	2	1,50	Stav rozvodů kanalizace	3	1,20
Typologie	TU2B	Plocha podlahy	621,6	Stav atik, říms, a marlyzy	2	2,00	Stav plynovodu	2	2,00
Skládka sektu	KL-V-3KP	Plocha střechy	621,6	Stav střešních stěn	3	1,50	Stav rozvodů elektřiny	1	2,00
Počet nadzemních podlaží	4	Plocha plus částí obvodových konstrukcí	16,48	Stav vnitřních acových stěn	3	1,50	Stav zařízení VZT	0	1,00
Počet podzemních podlaží	1	Plocha otvorových výplňů	1230,07	Stav stropních konstrukcí	3	1,50	Stav otopné soustavy	3	1,20
Celkový počet sektu	3	Průměrná spotřeba el. energie (GJ/rok)	16,48	Stav základových konstrukcí	4	1,50	Stav zařízení a rozvodů pro ohřev TUV	3	1,20
Rok výstavby	1962	Průměrná spotřeba tepla na vytápění (GJ/rok)	936,67	Stav schodišť vnitřních	3	1,50	Technický stav	55%	
Tvar střechy	plocha	Průměrná spotřeba tepla na ohřev TUV (GJ/rok)	293	Stav schodišť vnitřních	2	1,20	Energie	26%	
Počet balkonů nebo lodžii	24	Průměrná spotřeba tepla na vytápění a ohřev TUV (GJ/rok)	1230,07	Stav okna	2	1,00	Emise	33%	
Druh vytápění	CZT	Měrná spotřeba tepla na vytápění a ohřev TUV (kWh/m2/rok)	192,7	Stav dveří	2	1,20	Sociální situace	65%	
Částka ve fondu oprav	680000,-	Emise (kg CO2/m2/rok)	60	Stav oplechování	2	1,30	Finanční situace	50%	



## **Saving of 30-40% of heating energy through following actions:**

- **Heat insulation of external walls** thickness 100 mm
- **New windows** with  $U = 1,4 \text{ W/m}^2\text{K}$
- **New entrance doors**  $U = 2,3 \text{ W/m}^2\text{K}$
- **Heat insulation of roof** thickness 100-120 mm
- **Heat insulation of basement ceiling** 60 mm
- Adjusting hydraulic balance of heating system
- Education on energy conscious behaviour through a leaflets
- Energy saving indoor lighting

# BOTTLENECKS





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# ECONOMICAL ISSUES

- Owner's budget
- Subsidy programmes available
- Rentals deregulation (Cold x warm rents)
- Energy prices
- Construction works, preservation, conservation and restoration prices
- Tenants purchasing power (many retired and unemployed)
- Absence of EPC



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# LEGAL ISSUES

## ***Legislation, standards and policies***

***National and local regulations are important for energy ambitions***

- *406/2000 Coll. Act on Energy Management*
- *180/2005 Coll. Act on use of renewable sources of energy*
- *State energy policy vision document approved by the Czech government in 2004*
- *Territorial energy policy vision document for the city of Havířov and surroundings approved by the Municipal Council in 2005*
- *regulation no. 425/2004, which determines content of the energy audit*



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# LEGAL ISSUES

## ***Territorial Energy Concept***

Legally binding document defining the use of district heating. No way to replace it by other energy options.



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# LEGAL ISSUES

- **Urban development plan** was approved in 1999. This plan is regularly updated through amendments.
- **Strategic development plan** and community development plan are also available.
- **Regulation scheme** - local set of rules and regulations defining the rules for the renovations and modifications of the buildings.



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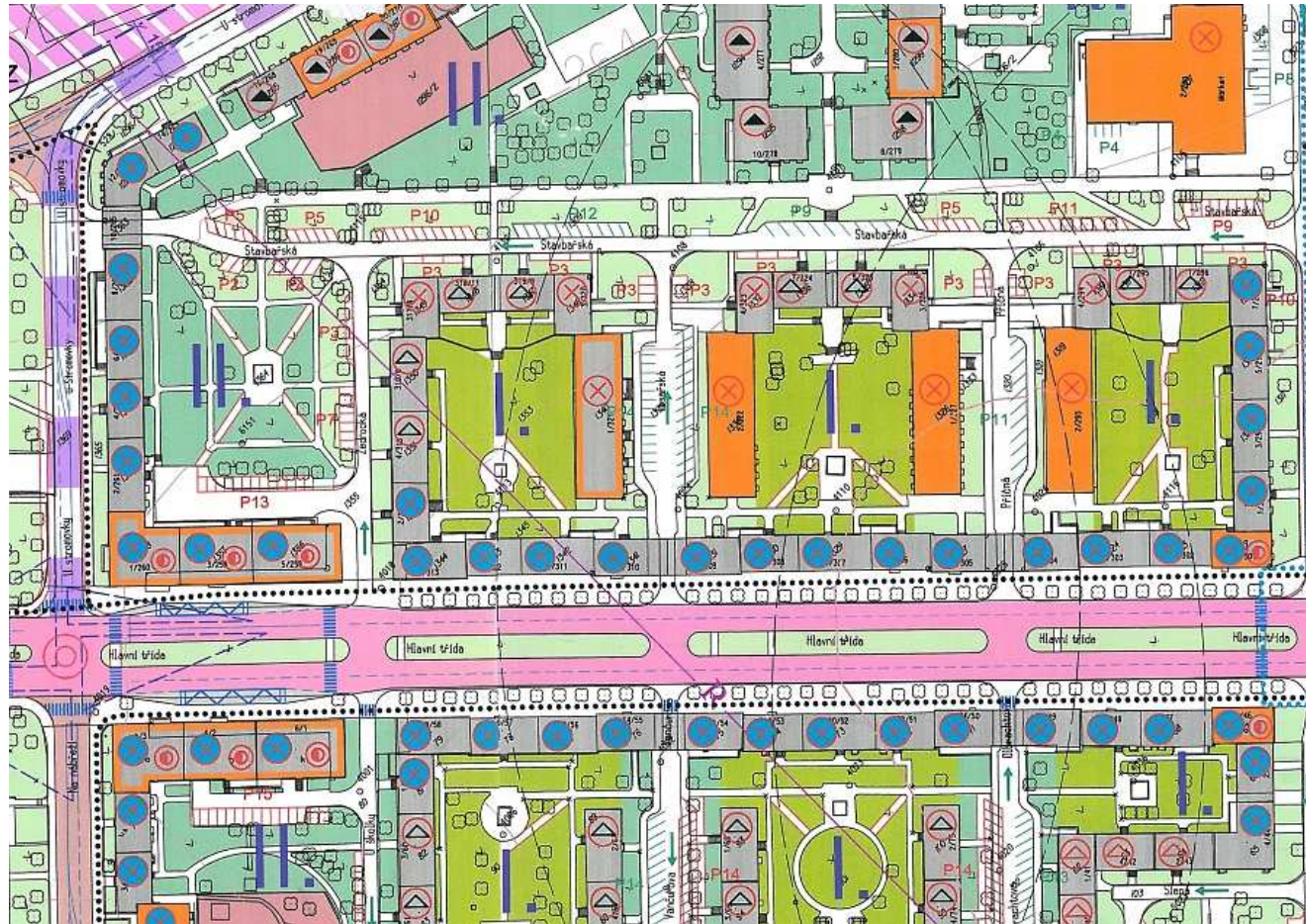
# LEGAL ISSUES

## ***Monument protection rules and guidelines:***

In 1992 SORELA was declared a landmark zone. Housing renovation guidelines are under preparation to reflect the monument protection requirements.

# LEGAL ISSUES

## *Regulation scheme*





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# TECHNICAL ISSUES

- Obstacles for ETICS
- Limited possibilities for use of RES
- Masonry load-bearing capacity limits
- New elevators vs layout of buildings
- Some materials cannot be used (monument protection restrictions)



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Thank you for your attention

