

Maintenance and Restoration Costs of Historic Buildings

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Definitions



heritage building: for the community valuable building in consequence of its age, unique character, or the linked intellectual values (theoretical category)

(protected) monument (listed building): by the state (representatives) declared value(s) of the building (state protection, local protection, etc.) (legal category)

historic building: contrary with the usual contemporary way of design and construction the structural or functional system of the buildings is representing a preceding (historic) period as a general historic value

Definitions



maintenance: ensuring good technical conditions of a building, with as many preventive interventions as it is possible

restoration: technical improvement and modernizing of buildings of deteriorated or out-of-date technical state

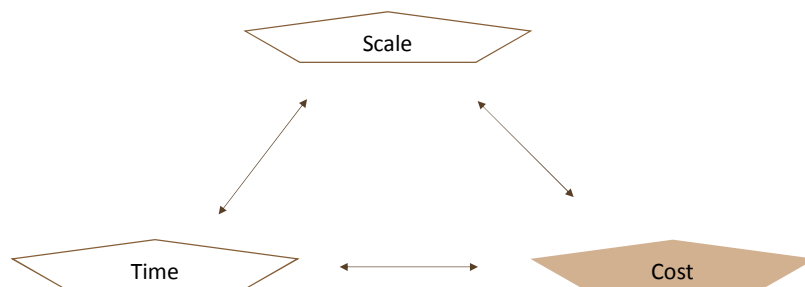
reconstruction: restoring and completing an existing building of deteriorated state

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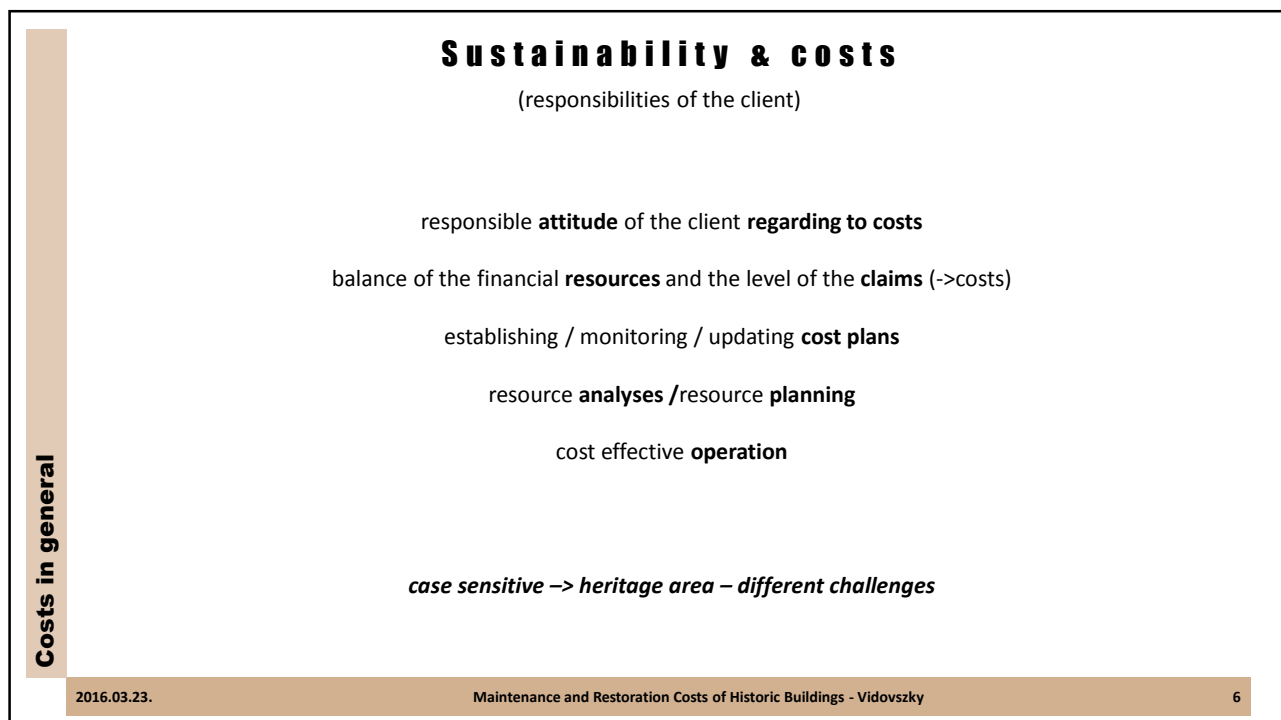
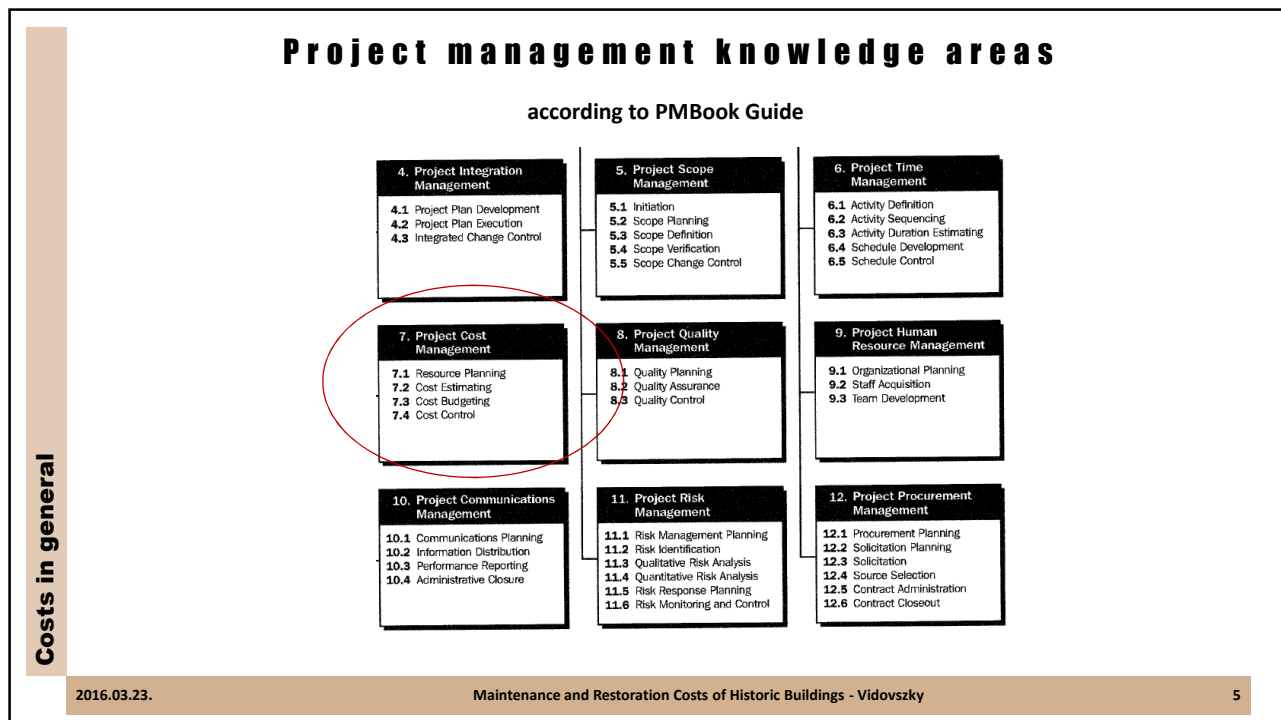
Cost - project constraint



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Costs in general

Cost information

- WBS = work breakdown structure
- resource needs
- resource norms
- estimated time of activities
- Information based on preceding projects
- company administration data (accounting, etc.)

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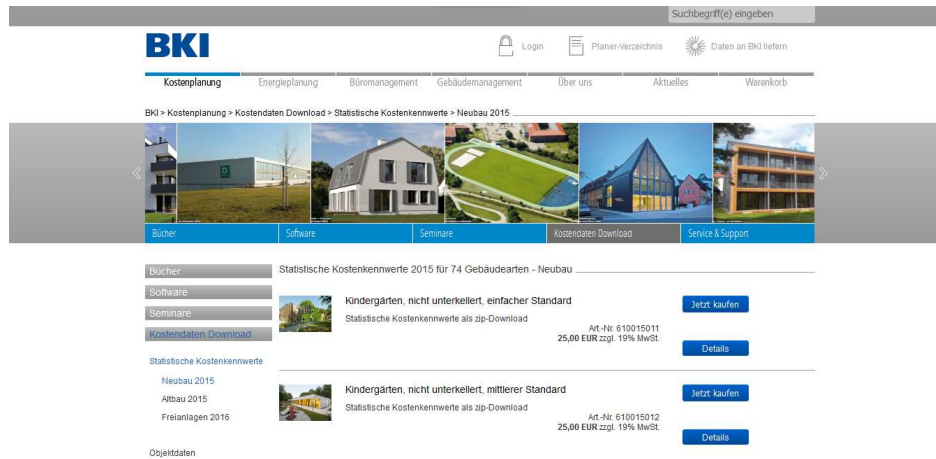
Costs in general

Cost information

- resource needs (e.g. calculating volume)
- resource norms (norm databases – e.g. ÉKS, ÉKN, ÉN, BKI etc.)
- estimated time of the work activities (volume x norm – by calculation)

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Advantages of the costs standards



Costs in general

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Cost information

Historic data

- **cost data** on the basis of preceding projects
- **company time norm system** (based on preceding projects)
- own **company cost norm system** (based on preceding projects)



Administrative data of the company

- **payment per hour**
- **company costs** (office, administration)
- **procurement** (method, system)
- **material and utensils** in store
- **technological preparedness** (expertise, tools)

Costs in general

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Costs in general	Investment costs	
	cost type	content
	1. service fees	expertices, planning fees, fee of the quality surveyor, etc.
	2. procedure fees, tax	Fees and dues, local taxes
	3. cost of the plot	building plot, public utilities, traffic
	4. construction cost	one or more item according to contract
	5. furnishing	installation, furniture, pieces of art
	6. operation costs	fees of the public services, cleaning of the building, maintenance, gardening
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Costs in general

Investment costs- DIN 276

100 building plot

200 preparation and exploration

300 building – building structure

400 building – building installation and electrical systems

500 garden and exterior establishments

600 furnishing and arts

700 overhead costs, services and other

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Investment costs – according to DIN 276

...as a template for WBS as well...

(level 100 in detail - sample)

100 Building plot	
110 Plot price (value)	
120 Incidental costs of ownership	
121 alignment	
122 cost of legal procedures	
123 notary costs	
124 estate agent pay	
125 duty	
126 valuation, and related expertise	
127 authorization fees	
128 plot alteration, withdrawal from cultivation	
129 other incidental expenses	
130 Liberation costs of the plot	
131 indemnification	
132 resolving form restrictions	
139 other	

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Investment costs – ÖNORM B1801-1

Fields of cost:

- 0: Basement
- 1: Exploration
- 2: Building – Superstructure
- 3: Building – Building installation
- 4: Building – Finishing works
- 5: Furnishing
- 6: Exterior establishments
- 7: Fees
- 8: Overheads
- 9: Reserve

Group of fields:

- 2+3+4 field = Building costs
- 1+2+3+4+5+6 field = Construction costs
- 1+2+3+4+5+6+7+8+9 field = Establishment costs
- 0+1+2+3+4+5+6+7+8+9 field = Total costs

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Advantages of the costs standards

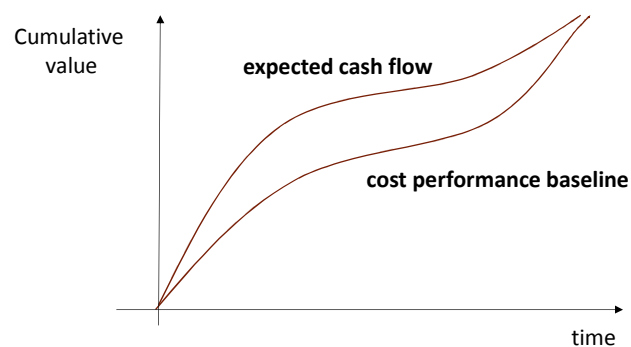
- comparability (e.g. in case)
- systematic conception-making (complex cost frame)
- supporting budgeting activity

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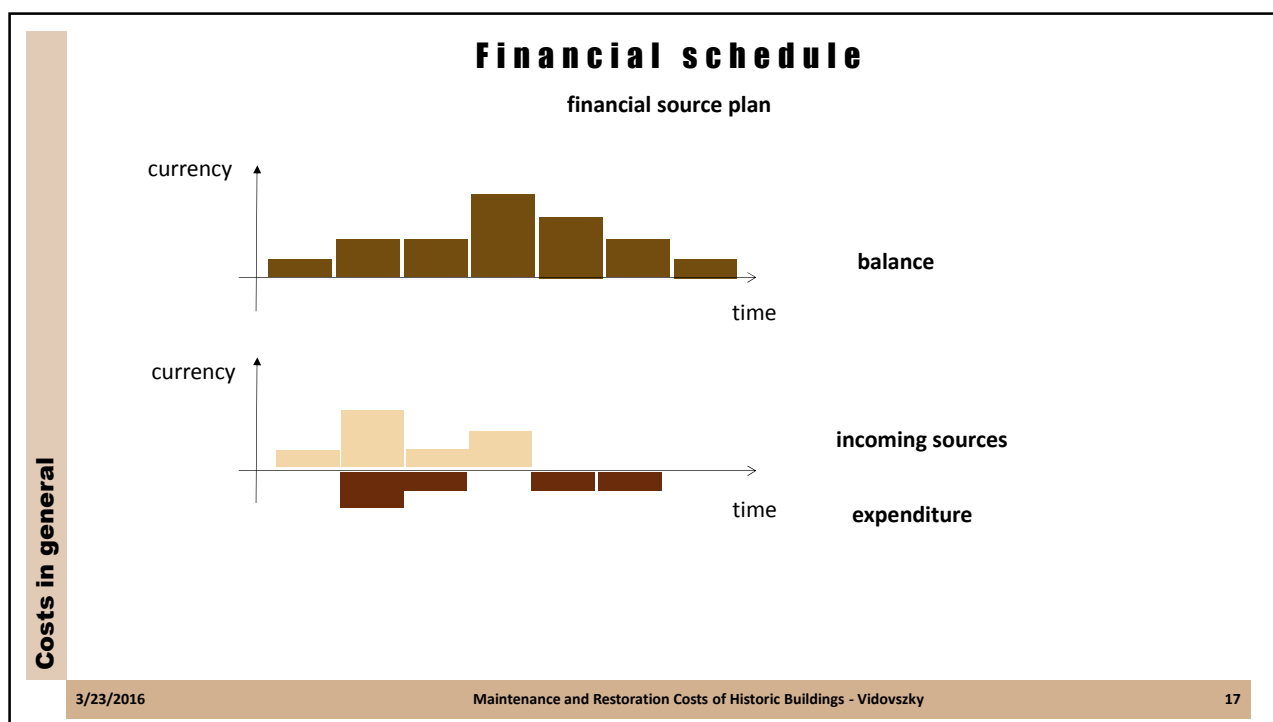
Cost analyses and financial planning



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Phases of cost analyses

Phase	Cost analyses	Basis of calculation	Method
1. preparation	Preliminary cost estimation	Architectural program	e.g. market benchmarking
2. start-up	Building model-based cost estimation	Draft plan, competition plan	e.g. surface based calculation – based on general cost norms
3. planning	Structural-based cost estimation	Building consents	e.g. structural element based calculation with structural element or construction activity related general cost norms
4. quotation	Detailed cost calculation	Construction plan or detailed technical specification (tender plan)	e.g. structural element and/or construction activity based calculation with structural element or construction activity related company cost norms (historic data)

Costs in general

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Cost analyses and financial planning

Phase of cost analyses	Basis of comparison	Phase of financial planning
1. preparation	Preliminary cost estimation	Preliminary financial source analyses
2. start-up	Building model-based cost estimation	Financial planning, preliminary financial schedule
3. planning	Structural-based cost estimation	Budgeting, detailed financial schedule
4. Quotation	Detailed cost calculation	Financial monitoring

Costs in general

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How and how not to treat our built heritage?



Costs in general

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How and how not to treat our built heritage?

The less you spend on maintenance the more you will spend at the end...

...on restoration...

...or as a loss...

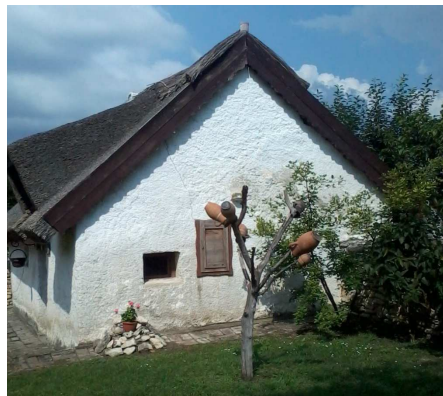
Costs in general

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Maintenance - Restoration



MAINTENANCE – ORIGINAL STATE

RESTORATION - CONVERSION

Costs and heritage buildings

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Fields of Maintenance



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Priorities in case of maintenance



Stability



Building hull, building installation



Preserving cultural goods

Inside surfaces and aesthetics



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Maintenance - restoration

Alteration – new function –
**optimization of the scale of the
intervention** (function close to
the original)

Keeping the **original** (usually
traditional) **structural system** -
use of historic materials

Preservation of the **existing
structures** as long as it is
possible



LOWER ENERGY CONSUMPTION

MORE EFFICIENT PRESERVATION

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Costs and maintenance

proper maintenance = **better architectural environment**



proper maintenance = **preserving original fabric**

proper maintenance = **cost efficiency**

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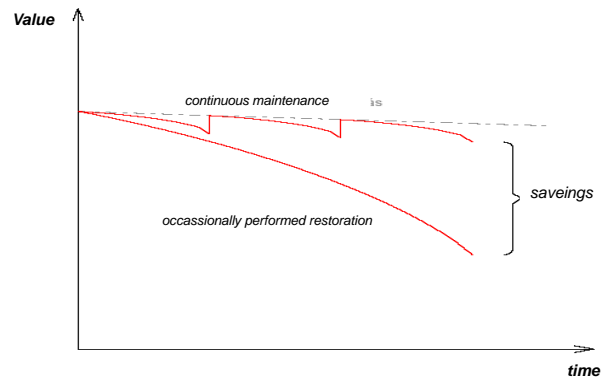
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Efficiency - Costs

theoretical model

Proper maintenance of historic buildings



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Efficiency - Cost

„pilot” project



Six historic buildings:

- + treadmill
- + weekend-house
- + two villas
- + tenement house
- + (small) church
- + different sizes
- + (more or less) different functions
- + for minimum of 15 years neglected

survey with the naked eye (report about the present state)

Reference building

- + regularly checked
- + continuous maintenance
- + calculating annual costs on the basis of the maintenance works of the preceding years,

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Efficiency - Cost

„pilot” project - results

compared cost

Building type	Annualized cost of the restoration after 15 years of negligence (EUR)	Annual average costs in case of regular maintenance (EUR)	Savings (EUR)	Savings (%)
treadmill	335	183	152,03	45%
cottage	2 359	1 337	1021,84	43%
smaller villa	2 518	2 095	423,72	16%
church	1 124	722	401,71	36%
larger villa	4 596	839	3757,56	82%
apartment house	2 555	419	2135,97	84%

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Efficiency - Cost

„pilot” project - results

Insufficiencies – questions to be solved

- stagnating norms
- small group of test samples
- inhomogeneous building stock

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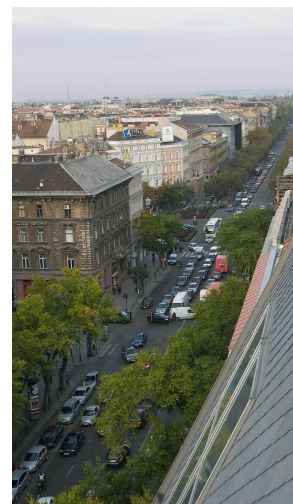
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Efficiency - Cost

large scale model



- + large scale work
- + homogeneous building stock
- + more significant control group



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Efficiency - Cost

model and reality

Costs of the restoration projects are strongly dependent on performance level ($150.000 - 2.000.000 \text{ Ft/m}^2 = 500 - 7000\text{€}/\text{m}^2$)

Even in case of continuous maintenance **necessary** to perform larger volume **restoration works** occasionally (e.g. because of the physical abrasion of the surfaces, war, revolution, natural disaster etc.)

The monitoring of **extended buildings** needs a development regarding to the methodology.

Below a **minimal sum of expenditure** not even the maintenance system works.



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Maintenance principles

consequences

The right attitude seems advantageous.



The monument monitoring system is likely to be supported by proper statistical and case data.



Maintenance principles


challenges

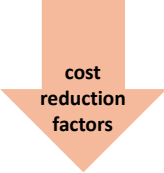
- no universally accepted principals
- missing guidelines and standards in the field
- modest financial sources of the owners
- missing expertise and professional staff

Costs and heritage buildings

Principals and guidelines

maintenance in general





cost
reduction
factors


- integration of maintenance aspects in planning process
- based on POE (post occupancy evaluation)
- durable materials, easy-maintainable surfaces

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Costs and heritage buildings

Cost increasing factors

at restoration of historic buildings



extra
cost
factors

- applying compatible historic materials – rare materials (low-scale production)
- conservation, maintenance plans
- lower technical performances - more sensitive maintenance
- applying historic technologies – time consuming activities
- need of specialists on every fields (designers, skilled workers, instaurators etc.) – smaller market segment - higher work fees
- need for collateral interventions (e.g. stone impregnation, solidifying, etc.)
- archeology (in case of protection)

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Heritage - challenge

at restoration of historic buildings

- compensation of extra expenditure - requirements for grants, tax reduction
- moral support – statement of higher prestige of the heritage buildings
- regulation of heritage protection –what is useful, tactful, etc. from the point of view of the community? where are the limits?

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Heritage buildings on the real estate market

Higher price – same price – lower price?

Is it worth to own/rent a heritage building?

Is it worth to restore a heritage building?

Is it worth/possible to convert a heritage building?

Does a heritage building mean a prestige?



Does a heritage building mean non-profitting expenditures?

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