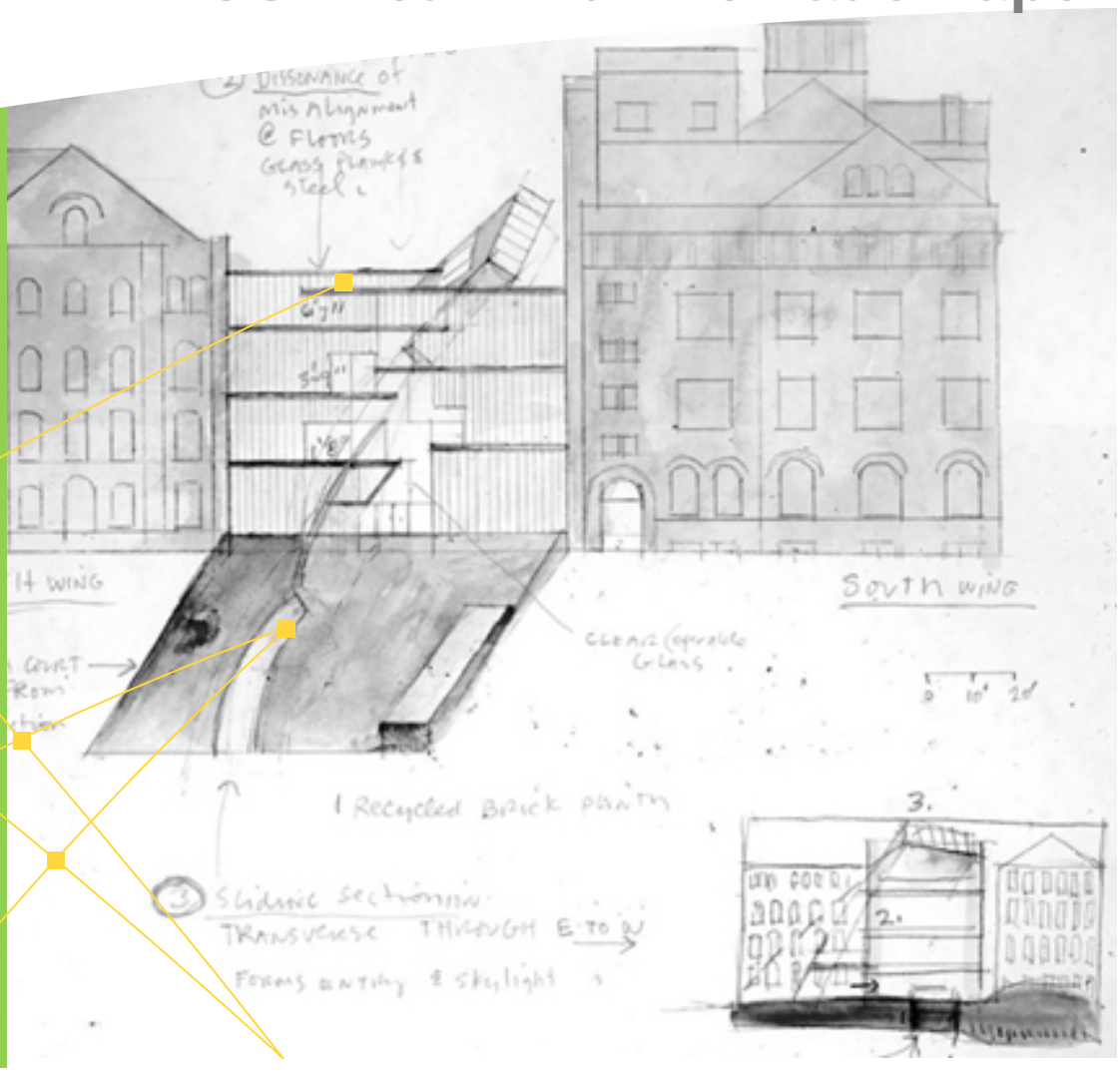
USEAct

Urban Sustainable Environmental Actions

USEAct Third Thematic Paper



Refitting and regenerating inhabited buildings and areas

Edited by

Vittorio Torbianelli

European Union
European Regional Development Fund

Connecting cities
Building successes

URBACT

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This third Thematic Paper is edited by **Vittorio Torbianelli**, UseAct Lead Expert.
It refers to the network activities and to thematic contributions from the partners, further thematic expert and URBACT experts.

Anna Arena, Maria Luna Nobile and Vincenzo Fusco, of the Lead Partner team, contributed to editing the paper.
Steven Holl drawing for the Pratt Institute project.

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FOREWORD

Vittorio A. Torbianelli
UseAct Lead Expert

This third thematic paper is dedicated to the “Theme 3” of the UseAct project.

As described in the Baseline Study (see Figure 1), Theme 3 refers to “Refitting and regenerating inhabited buildings and areas”.

Figure 1: The thematic structure for the Theme 3 of the Useact Project

Theme 3	Subthemes
Refitting and regenerating inhabited buildings and areas	3.1 Integrated, "regeneration-oriented" public strategies through refitting and maintenance of existing buildings in the urban fabric: residential blocks in central areas and historic centres
	3.2 Involve flat-owners to join refitting integrated strategies trough energy efficiency improvements

Source: UseAct Baseline Study

The main theme is divided into two further subthemes, relating to:

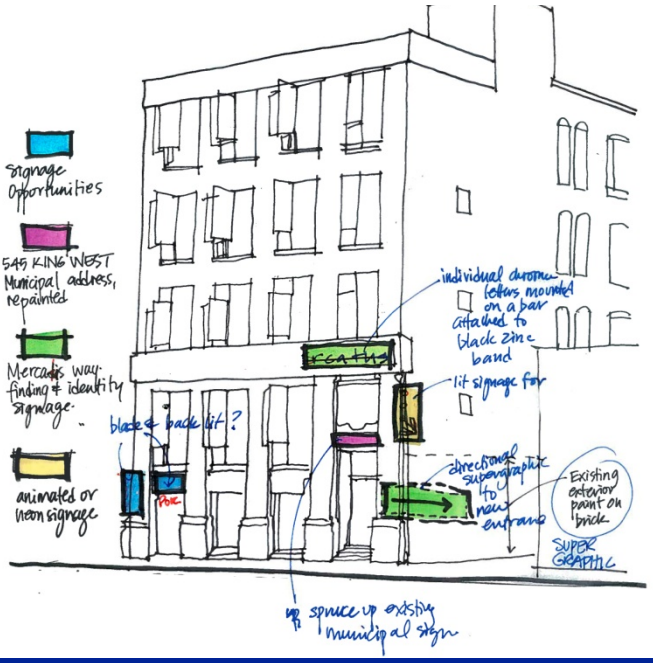
- “regeneration-oriented" public strategies through refitting and maintenance of existing buildings in the urban fabric: residential blocks in central areas and historic centres
- involving flat-owners to join refitting integrated strategies trough energy efficiency improvements

The actual USEAct project development has allowed focusing on further specific sub-issues, linked to the above mentioned topics, which appeared to be of high interest for UseAct partners.

This third thematic paper (as the previous ones) aims at focusing on sub-topics that are of specific interest by USEAct partners, maintaining a clear – but not rigid - link with the original thematic structure.

An example of this “flexible” approach to the original thematic structure is the attention paid to specific issues such as promoting new uses for heritage (residential) buildings. This specific issue represents an exemplary “thematic zoom” proposed by the partners themselves, faced during a Bilateral/Trilateral meeting held in Dublin.

Accordingly, as in the previous thematic papers, the chapters of this third paper do not replicate the general thematic structure, although strong ties are evident.



1 RETROFITTING PROGRAMS FOR ENERGY SAVING: LEARNING FROM CASES STUDIES

Sketch of proposed exterior graphics at 545 King St W, image courtesy of Quadrangle Architects

1.1 REFITTING AND REGENERATING INHABITATED BUILDINGS AND AREAS: STARTING FROM ENERGY

Within the context of the built environment, the term 'retrofit' has been used to imply substantive physical changes to a building or buildings (normally, mitigation activities to improve energy efficiency), and often linked to the concept of 'adaptation' (i.e. intervention to adjust, reuse or upgrade a building to suit new conditions or requirements). However, at a city level it can be argued that the term 'retrofit' is distinguishable because the defining characteristics of urban retrofitting are its comprehensive nature and large scale and its integrated nature

Dealing with energy efficiency and energy consumption trends: a case study in the UK

As clearly showed in the recent research carried out by Jomes, Lannon and Patterson (Welsh School of Architecture, Cardiff University)[1], energy consumption is still growing in Europe. Where we consider the UK as a representative European example, "despite measures to improve the energy efficiency of dwellings, over the last 40 years the overall household energy consumption has increased by about 12.5%.

"Heating is still the dominant energy use in housing, although in recent years there is an indication of a reduction in heating energy demand.

Improvements in heating energy efficiency have been offset by increases in indoor air

[1] Main Source: Phil Jones, Simon Lannon and Jo Patterson (2013), Retrofitting existing housing: how far, how much?, Building Research and Information, Vol. 41, No. 5, 532–550. Relevant parts of that article have been used in this chapter.

temperatures, by an average, with a shift to whole-house heating. Nevertheless, on the other side, there is a considerable increase in electrical demand for lighting and appliances which affects costs".

"Nevertheless, if the savings through insulation and heating efficiency improvements from 1970 onwards had not been made, then energy consumption would be around twice the current levels".

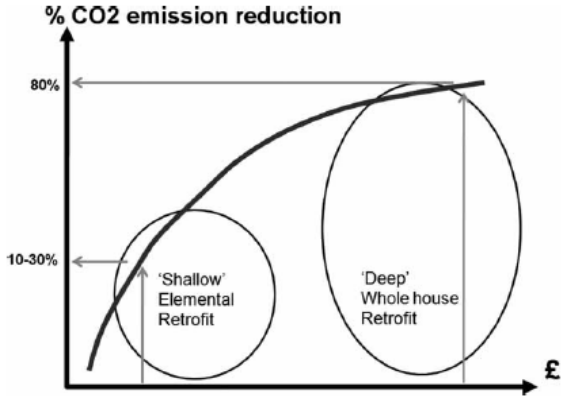
In general, measures have included loft insulation, double-glazing and more efficient boilers, measures that can be regarded as "easy tasks" (often colloquially referred to as 'low hanging fruit') and natural replacement.

"These are measures where occupants can generally see cost-effective real benefits, not only in greater energy efficiency, but also in increased thermal comfort".

"Measures can be implemented at an 'elemental' approach: individual measures, such as cavity-wall insulation, or a 'whole house' approach, which integrates a number of measures tailored to the specific property".

The trend in cost increase associated with going from relatively simple elemental 'shallow retrofit' measures to a multifaceted whole-house 'deep retrofit' approach is heavy, as showed in Figure 1.1.

Figure 1.1: Diminishing return in CO2 emission reductions



Source: Jones, Lannon & Patterson (2013)

As found by Jones, Lannon and Patterson, "multiple measures tend to follow the law of diminishing returns, where energy saving from a combination of measures is not necessarily the sum of savings from individual measures".

Improving knowledge about possible outcomes

As clearly showed in the mentioned article, an important factor is the ability to predict at a large-scale the impact (costs included!) of retrofitting with energy-saving measures.

Of particular concern is identifying the most appropriate package of measures to be applied to specific

"In order to assess the impact of upgrading the performance of existing housing Energy, Environmental and cost prediction are required.

Predicting cost and performances at "local level" is particularly important to carry on relevant policies in the field. This is, however, not an easy task and models are needed.

Figure 1.2 shows an example of a model adopted by a local community (Port Talbot, UK) to predict energy efficiency improvements.

Figure 1.2: Predicting impacts at «local area» level: the Port Talbot example

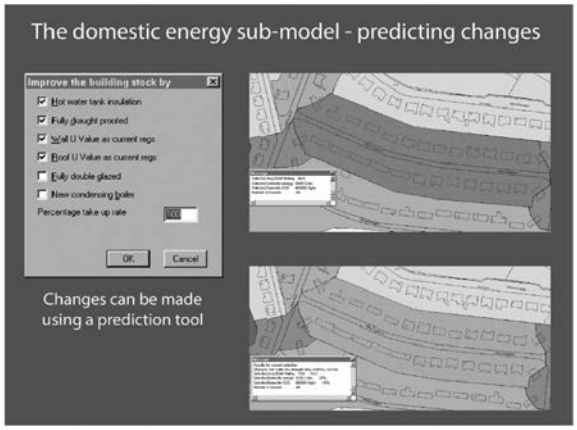


Figure 6 Output of the Energy and Environmental Prediction (EEP) model as a thematic map indicated energy demand at 'postcode' level for before (top) and after (bottom) energy demand condition, and the menu for applying energy conservation measures

Source: Jones, Lannon and Patterson (2013)

The prediction model (EEP) was used in Neath Port Talbot as a test-bed for its application.

EEP is based around a 'geographical information system' (GIS), which contains information on all the housing within a local authority area.

Standard Assessment Procedure "are needed to categorize buildings.

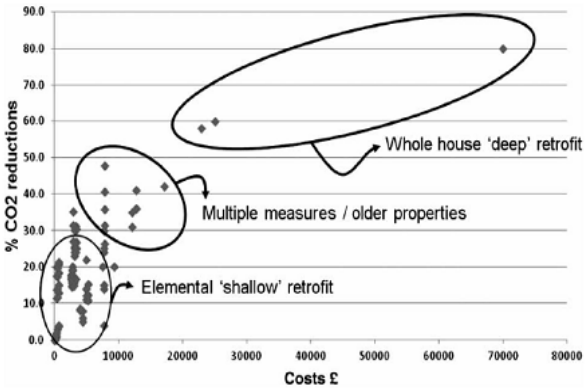
It is clear that prediction models adoption has to be embedded into actual retrofitting programs.

In Neath Port Talbot between 2004 and 2007, a large programme of energy-efficiency retrofitting of existing housing was carried out.

The “retrofitting technical and economic challenge”

As demonstrated by Jones, Lannon and Patterson, the Wales refitting programs (see Box above) clearly showed that, in general, attaining relevant energy savings trough refitting programs can be hindered by high costs/benefits ratios

Figure 1.3: Wales Refitting Programs - %CO2 reduction versus costs



Source: Jones, Lannon and Patterson (2013)

“Although the Wales scheme initially aimed to take a whole-house approach, the projects within the Warm Wales programme took more of an elemental approach, improving many properties with fewer measures. Majority adopted one measure only, because of the diminishing returns law”.

Difficult pay-backs are, in conclusion, a main challenge, as stressed by the scholars: “as the cost of measures rises in relation to predicted savings (partly due to the easy measures having already been applied), reasonable paybacks, assuming some sort of (current) loan system, become difficult to achieve”.

Key message is that it is unlikely to comply with strong targets (e.g. an 80% reduction in CO2 emissions) and that “realistic” retrofit standard targets” have to be established.

Another issue is related to the fact that calculations often do not reflect ‘take back’ due to higher temperatures, or ‘in use’ factors resulting in underperformance, both of which would reduce the energy savings in practice and make payback even more problematic.

In general, some lessons from the Wals experience can be learnt, Jones, Lannon and Patterson conclude. As a first, it is important to be able to target the most beneficial combination of packages of energy-saving measures and renewable energy supply, for specific house types or units, avoiding any “general approach”.

Adopting models for prediction framework (appropriate packages of measures can be targeted for specific house types) to achieve maximum savings in relation to costs, is important too, but it is not easy.

Moreover, there are ‘in-use’ factors now being applied to account for lack of predicted performance in practice, especially solid-wall insulation (better assessment of performance in use are needed).

It appears rather clearly that internal benefits are often too low compared to costs, thus wider benefits of large scale activities not specifically referred to the energy saving target (“externalities”) should be accounted to assure positive cost/benefit ratios.

In fact, there are additional benefits from whole-house retrofitting including improving the general aspects and quality of the building and, in more in general, improving quality of life of occupants, although these benefit can highly vary from case to case.

Many programs demonstrate the importance of including other socio-economic activities, such as job creation, start-up companies, training and benefits advice, within large scale retrofit programs, taking advantage of the opportunities provided through large-scale interventions.

The cost–benefits from these additional activities are not generally accounted for in retrofit programs, but they might be used to better target government support funding.

Wales Refitting Programs

This program was carried out by Warm Wales Ltd, a ‘not for profit’ community-interest company that delivers home energy-saving measures,

It particularly targets the poorer sectors of the community, and in many cases provides help for those who would otherwise not be eligible for financial support.

The main funding was obtained through the utility company National Grid (electricity and gas suppliers were obligated by government to achieve targets in domestic energy efficiency).

Other funding sources included the local authority.

All householders participating in the scheme were also eligible to request free benefits advice relating to government financial support (they were offered a home visit and help with the application process).

The Warm Wales Program of work included the installation of Cavity-Wall Insulation, External Wall Insulation (EWI), Loft Insulation (and loft ‘top-ups’) and Hot Water Cylinder Insulation Jackets. It also included a replacement boiler or full central heating system.

Figure 1.4: “Warm Wales”: pictures from the web-site

Source: Warm Wales

The ARBED scheme was initially set up to take a ‘whole house’ approach to install energy-efficiency measures and building integrated renewable energy supply systems

Around £60 million of funding from a range of sources, including the government, and direct funding from Registered Social Landlords and local authorities

Twenty-eight projects took place across Wales with work on site starting in April 2010 (more than 6000 homes)

Sources: http://www.warmwales.org.uk/

http://wales.gov.uk/topics/environmentcountryside/energy/efficiency/arbed/?lang=en

Main challenges of retrofitting programs

Many retrofits tend to demonstrate a continuing performance gap between predicted energy savings and actual energy savings.

Challenges include:

- highly variegated housing stock,
- a low rate of property turnover,
- disruption and inconvenience to occupants
- undesirable payback periods
- lack of occupant interest in energy efficiency,
- lack of a knowledgeable and competent workforce to advise homeowners and implement energy-efficiency strategies (balkanized character of the retrofit industry).

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What scale for long term «refitting» policies?

Retrofitting oriented policy frameworks are, in general, fragmented, with different regulations, incentives and programmes. Yet, large-scale urban retrofitting requires systemic change in the organization of built environment and infrastructure, and the integration of socio-technical knowledge, capacity and responses. In this sense, a focus purely on “buildings” leads to lack of strategic focus, in the long term. Existing infrastructure and the built environment tend to change very slowly because of ‘sunk’ investments that create path dependencies that can only be adjusted through strong and high-level governance and supporting policies. “In reality it is impossible to deal with deep “energy strategies” related to buildings without simultaneously tackling energy issues not only at the neighborhood but also at city levels, if there is to be any sense of coherence across energy policies.” (Stevenson, 2103). Yet,” the capability and capacity to mobilize the stakeholders necessary to steer complex long-term systems innovations across multiple socio-technical ‘regimes’ (housing, non-domestic buildings, urban infrastructure), scales (“building”, “neighbourhood”, “cityregion”), and domains (energy, water, resources use) coherently, and in a coordinated way, is currently extremely limited at a city scale” (Dixon & Eames, 2013). Coordination between energy policies at different scales has been hampered by political, operational and incentives regimes. Development of a complete new integrated perspective on long-term deep socio-technological systems innovation is required (Socio Technical Transition).

1.2 CONVINCING PEOPLE AND FINANCIAL INSTITUTIONS TO RETROFIT

Technical and economic challenges, discussed in the above paragraph, are just a facet of the "refitting" challenge. In reality, retrofitting is a part of a very complex system, with lots of moving parts. Social aspects play a key role and strong people engagement is definitely a strategic feature. Financial aspects are, moreover, another sensitive aspects[2].

The socio-technical perspective to retrofitting

As clearly recalled by Karvonen (2013), retrofitting cannot easily reduced to simple explanations (e.g. 'it's technology not people' or 'people are selfish') or simply policy approaches (e.g. 'just get the prices right' or 'it's just that financial incentives are needed') [3].

Householders often opt for increased temperatures rather than greater energy and cost savings: it suggest that people prioritize their comfort, convenience and aesthetics. Conversely, things that are important to occupants are often neglected in occasion of retrofitting programmes.

The Karvonen paper, on people feelings towards retrofit, shows that main concern is related to aspects such as providing access to the belongings and clothes (which were stored offsite!) or avoiding damage to the carpets.

"The phenomenological concepts of breakdown and ready-to-hand are key elements of the disruption the occupants experienced during retrofit. If retrofitted dwellings provide fewer affordances than before they are unlikely to be popular with occupants, as energy, in fact, is not a priority matter for many families.

Retrofit is a significant 'moments of change' when the occupants' activities and perceptions can shift dramatically. The social practices approach is particularly useful in recognizing that retrofit is neither simple nor can it be solved with a 'one-size-fits-all' approach.

Also the "sociological" perspective suggest that is important providing customized solutions to domestic retrofit that follow a community-based social practice approach.

The complexity of the retrofit problem means that solutions need to be specifically tailored to the building or group of buildings in question, through community based partnerships (Stafford et al., 2011) and to develop customized solutions to local groups of houses through facilitated engagement between occupants, housing providers, community groups, local authorities and construction professionals.

As the focus is on changes in the existing socio-technical configuration of materials, competences and images of domestic energy practices, information provision has to be considered as a key factor, as stressed by Karvonen.

Information strategies and tools are important, as showed in Figure 1.5 (from the Karvonen research paper), displaying recent examples of information campaigns related to refitting programmes in the UK.

Information provision and incentives are an important part of these programmes, but they should be complemented in "socio-technical" programs by further activities. These activities mainly are:

- Surveys (in families) and consultations with homeowners and occupants,
- Community events and activities
- Cost estimates and energy models at "area" level
- Coordination of building work
- Feedback with the occupants during works and after the work is completed, and long-term performance monitoring

[2] Main Sources of this paragraphs are the following research papers: Andrew Karvonen (2013), Towards systemic domestic retrofit: a social practices approach, Building, Research & Information, 41:5, 563-574; Malcolm Eames, Tim Dixon, Tim May c & Miriam Hunt (2013), City futures: exploring urban retrofit and sustainable transitions, Building Research and Information, Vol. 41, No. 5, 504–516; Tim Dixon and Malcolm Eames (2013), Scaling up: the challenges of urban retrofit, Building Research and Information, Vol. 41, No. 5, 499–503; Chris Tweed (2013), Socio-technical issues in dwelling retrofit, Building Research and Information, Vol. 41, No. 5, 551–562; Andrew Karvonen (2013), Towards systemic domestic retrofit: a social practices approach, Building, Research & Information, 41:5, 563-574

[3] A previous research outcome, by Lutzenhiser, (2008) is cited.

Figure 1.5: Information strategies in refitting programmes – examples in the UK

Table 2 Examples of information resources and demonstration projects on UK domestic retrofit

Centre for Refurbishment Excellence www.core-skills.com	A new education facility funded by private industry, Stoke City Council, Stoke College, and the Building Research Establishment (BRE) to train the domestic refurbishment workforce. The centre will eventually include an exhibition space for displaying building products and hosting events
National Refurbishment Centre (NRC) www.rethinkingrefurbishment.com	A joint initiative between the Energy Saving Trust (EST) and the BRE Trust to develop an online database of 500 refurbishment exemplars. The database provides the building sector with information on best practices and regulatory frameworks as well as quantitative and qualitative data on real-world projects
Low Energy Building Database	An online database with case studies of houses that participated in the Technology Strategy Board's Retrofit for the Future programme. Each case study includes technical information, brief descriptions and photographs
Great British Refurb Programme www.greatbritishrefurb.co.uk	A partnership between the UK Green Building Council (UKGBC), *Grand Designs* magazine and the World Wildlife Federation (WWF) that includes refurbishment case studies for homeowners and the building industry
Existing Homes Alliance www.existinghomesalliance.org.uk	A cross-sector partnership of experts and practitioners of domestic refurbishment providing reports and guidance to the building sector
The Green Register www.greenregister.org.uk	A not-for-profit organization that provides training to the building industry as well as a directory of accredited building professionals for homeowners
The Superhomes Network www.superhomes.org.uk	An online database of over 100 exemplar older houses that have achieved at least a 60% reduction in carbon emissions. The network hosts open days in March and September to provide public tours of some of the houses. The network also provides reviews of consultants, builders and suppliers, as well as courses and advice on refurbishment
Victorian Terrace Project at BRE www.bre.co.uk/podpage.jsp?id=2426	The Building Research Establishment's (BRE) 'flagship refurbishment project' will act as a laboratory for new products and design strategies for retrofitting existing houses
Birmingham Zero Carbon House zerocarbonhousebirmingham.org.uk	A home-grown demonstration project of an 1840s semi-detached house in Birmingham that has been refurbished by the homeowner to meet Level 6 (Zero Carbon) of the Code for Sustainable Homes

Source: Karvonen, 2013

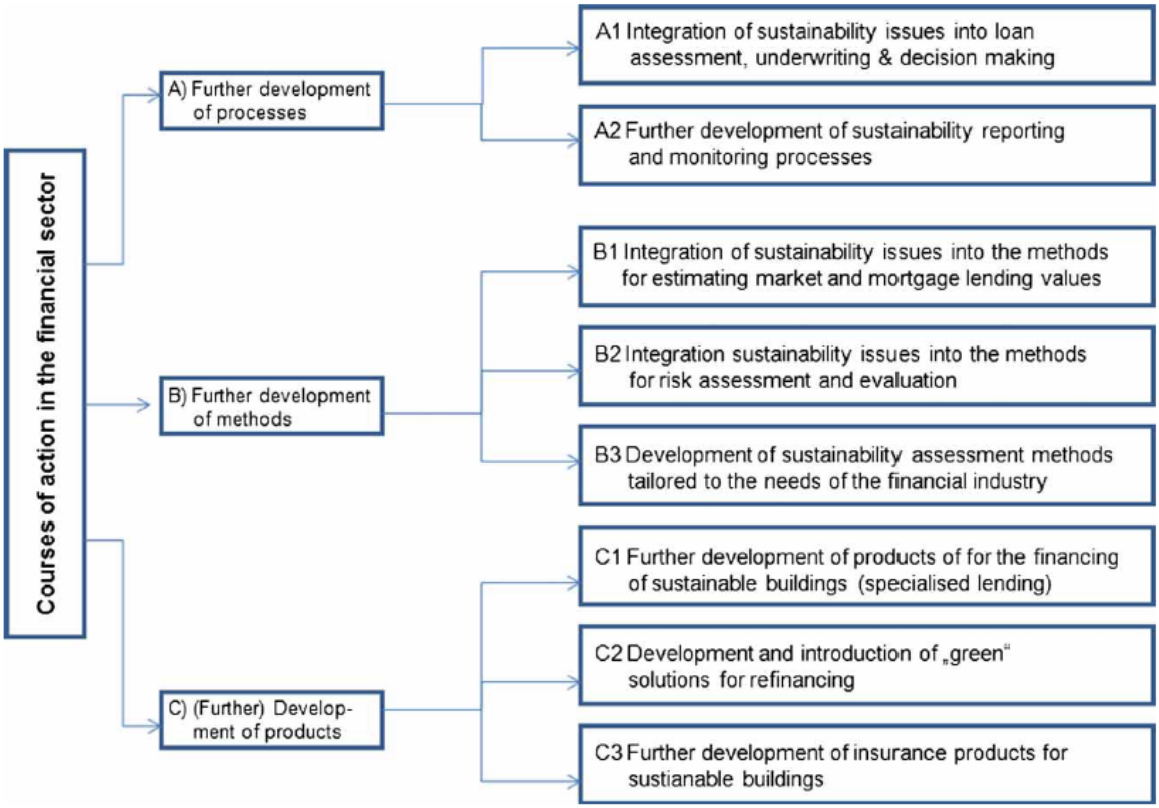
Retrofitting Innovation trough community learning: the Warm Zones UK case

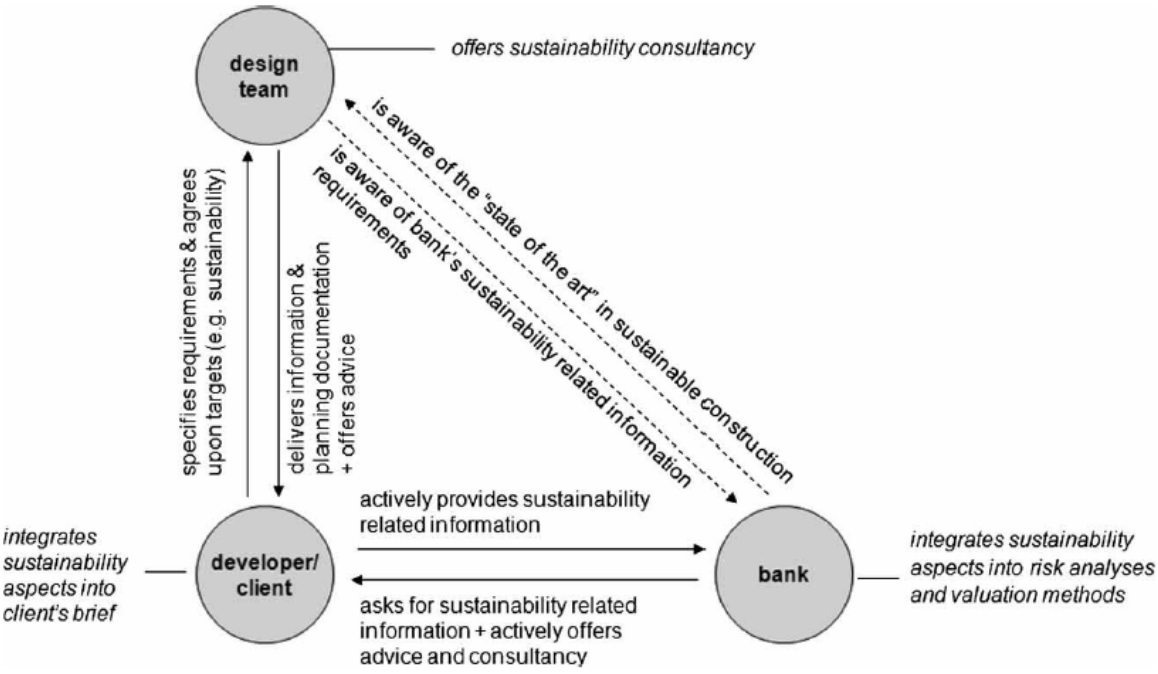
A larger example of innovation through community learning is "UK Warm Zones", a not-for-profit subsidiary of National Energy Action (Warm Zones, 2013).

A «Warm Zone" is a local or regional partnership that includes the local authority, energy suppliers, housing companies and other organizations from various sectors to coordinate and target domestic energy-efficiency strategies.

Source: http://www.warmzones.co.uk/

Figure 1.6: Stakeholders of the financial sector and possible relationships





Source: Lützkendorf, et al.(2011)

Innovating "financial institutions" [4]

Financial institutions are another "social" institution that need to be structurally oriented to refitting.Public sector usually tries to intervene, trough specific support, as personal carbon allowances combined with local authority-run 'Low Carbon Zone' improvement areas. However, such solutions require substantial government intervention and upfront investment for "energy related" infrastructures that are often not more available.

The real challenge here, is how to deliver these initiatives more effectively through the private sector or public–private partnerships. In practical terms, the need for realistic loan systems is required, with use of 'lifetime mortgages' funded through a 'green investment bank'. The Australian 'Green Lease' scheme, mentioned by Newton, (2013), is a remarkable example.

Generally, as acknowledged by Lee (2013), financial sector has not yet linked its existing processes for both commercial and residential buildings (e.g. risk management, assessing buildings' lending values and determining financing/insurance conditions) with the need to integrate sustainability aspects.

Figure 1.6 show the stakeholders of the financial sector in the "refitting" market arena and (below) relationships that should be established to guarantee new approaches in terms of coordination. However, banks and institutional investors have not yet created the financial instruments and infrastructure to provide external capital with easy access to investments in energy efficiency retrofits of commercial buildings.

Financial stakeholders' engagement will likely increase in the coming years in order to meet their very own interests and goals. However, the shifting of more sustainable practices into mainstream operation cannot be expected to happen in the short term. In any case, capital will only flow at acceptable terms and price into sustainable building-related activities if financial stakeholders can identify, price and/or mitigate associated investment.

Risk is another sensitive variable. Adequate risk management requires not only the further development of appropriate methods and processes for risk assessment and valuation, but also their widespread adoption and application in practice, which is a longer-term process.

[4] Main source of this paragraph is the research paper: Lützkendorf , Fan & Lorenz (2011) Engaging financial stakeholders: opportunities for a sustainable built environment, Building Research & Information, 39:5, 483-503

Readings

Retrofitting is, as clearly showed above, is a broad and challenging issue.

A "reading list", is provided below. Some of the papers and sources have been used for this chapter, some have not been mentioned but represent, in fact, remarkable sources on the issue.

Brenda Boardman, Achieving Zero: Delivering Future-Friendly Buildings, Environmental Change Institute, Oxford, 2012

Lützkendorf , Fan & Lorenz (2011), Engaging financial stakeholders: opportunities for a sustainable built environment, Building Research & Information, 39:5, 483-503

Peter W. Newton (2013), Regenerating cities: technological and design innovation for Australian suburbs, Building Research & Information, 41:5, 575-588

Malcolm Eames, Tim Dixon , Tim May c & Miriam Hunt (2013) City futures: exploring urban retrofit and sustainable transitions, Building Research & Information, Vol. 41, No. 5, 504–516

Andrew Karvonen, (2013) Towards systemic domestic retrofit: a social practices approach, Building Research and Information, Vol. 41, No. 5, 563–574

Phil Jones, Simon Lannon and Jo Patterson (2013), Retrofitting existing housing: how far, how much?, Building Research and Information, Vol. 41, No. 5, 532–550

Tim Dixon and Malcolm Eames (2013), Scaling up: the challenges of urban retrofit, Building Research and Information, Vol. 41, No. 5, 499–503

Chris Tweed (2013), Socio-technical issues in dwelling retrofit, Building Research and Information, Vol. 41, No. 5, 551–562

Lee Ann Nicol (2011), The role of institutional regimes in motivating change for sustainable housing Building Research and Information, 39(5), 459–472

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http://www.warmzones.co.uk/

http://www.warmwales.org.uk/

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URBACT II Operational Programme, Working Group, HOPUS, Housing Praxis for Urban Sustainability Baseline Study

URBACT II Capitalisation, Cities of Tomorrow Action Today, Building energy efficiency in European cities, http://urbact.eu/fileadmin/general_library/19765_Urbact_WS6_ENERGY_low_FINAL.pdf

Key message about retrofit

- **Refitting is not an easy tasks. Evidences demonstrate it well (failures are frequent!)**
- **Existing incentives are fragmented and do not always get successful results.**
- **Right predictions and right «refitting packages» are required, with improvements of «in use» implementation on broad areas.**
- **Very high local-case customization is required, but broad scale (city level but also governmental one) is definitely strategic – integrating different levels.**
- **Paybacks remain a problem: strong public involvement is still required.**
- **Socio-technical approach is needed, trough community based retrofitting programs; understanding “disruption” is important.**
- **Financial markets are not fully ready for the challenge: innovation (and time) is required to “connect” financial operators with the issue (assessing risks, etc.).**
- **Structural systemic «transition» (long term!) is needed to get more substantial targets at city level and at financial level.**

2 ADAPTIVE REUSE: FROM HISTORIC BUILDINGS TO URBAN AREAS

2.1 ADAPTIVE REUSE OF HISTORIC BUILDINGS: MAIN CONCEPTS AND CHALLENGES

Improving energy efficiency of existing buildings, trough refitting, is an important strategy to develop urban reuse.

However, energy efficiency improvement is just an aspect of “building reuse” and in many single cases and urban areas (as, in particular but not only, in historic buildings/districts) a more multifaceted “adaptive reuse” policy of existing building is required.

Main challenges of building retrofitting for energy-saving purpose have been discussed above, in paragraph 1.2.

Comparable (or even more problematic) challenges have to be overcome when the purpose of “refitting” is broader, including redefining the function of the building. This is the so called “Adaptive Reuse” (AR) issue.

AR can be broadly defined as “any building work and intervention to change its capacity, function or performance to adjust, reuse or upgrade a building to suit new conditions or requirements” (Douglas, 2006).

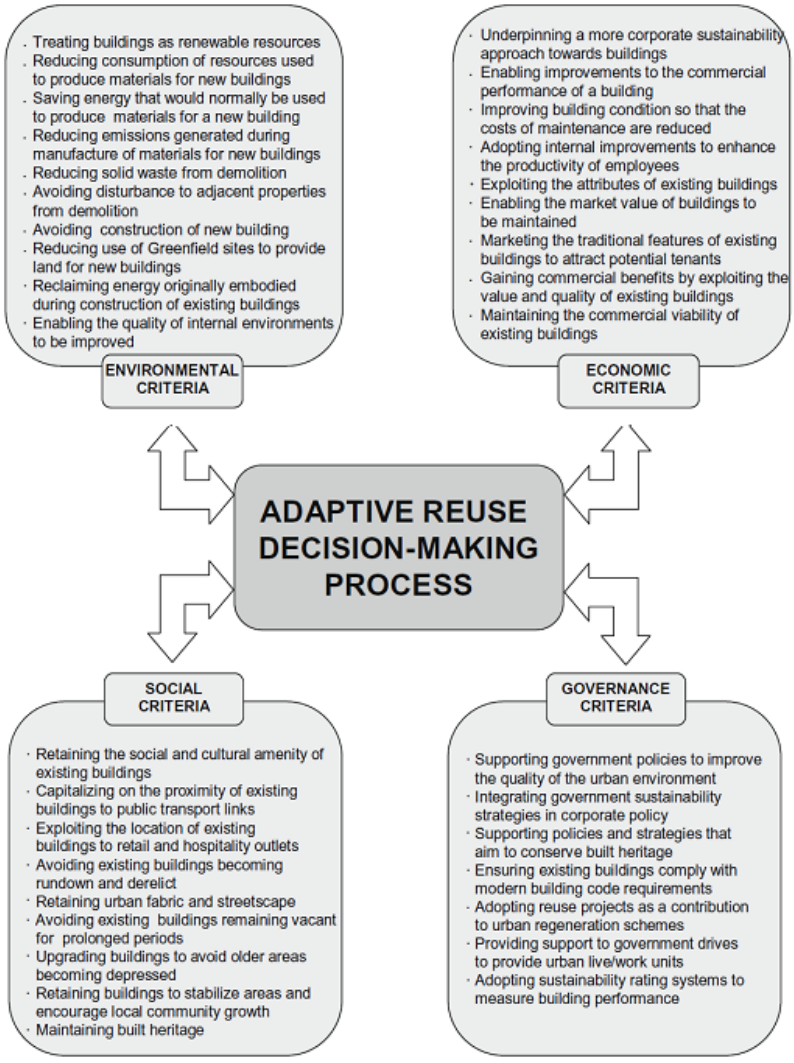
AR is a “process by which (structurally sound) older buildings are developed for economically viable new uses.

AR, clearly, often requires energy saving oriented refitting approaches as well, but it is different in nature.

Challenges for «Adaptive Reuse» of heritage buildings.

Heritage buildings (and districts) are one of the most relevant target for AR. As correctly pointed out by Bullen and Love, in a research paper on AR in Australia[5], when AR is aimed at heritage buildings, the new use should, in general, ensure the appropriateness of potential uses in the light of the assessment of significance and take into account the medium and long-term financial (and cultural) viability of the site. Balancing cultural significance and economic viability is one of the major challenges in the reuse of historic buildings (Murtagh, 2006). Market potential and benefit/cost ratio are both strategic variables for AR. The building condition, scope of refit, overall cost saving, value of the building and land should be all considered for the purposes of a private perspective cost-benefit analysis. As Bullen and Love affirm, AR works if the bottom line is fully measured i.e. that all the costs and benefits are factored in over the projected lifecycle of the building. Adaptive reuse may not be an economically viable option when the structure of a building requires extensive strengthening to be undertaken. Also for public authorities, there is a strong economic case for regenerating historic buildings, since the benefits relate not only to the individual building, but also to the wider area and community

Figure 2.1: Adaptive Reuse Decision Making Process. Source: Bullen and Love, 2010



Involving the community can build support for a project, help to avoid opposition later and may uncover unexpected resources. The success of many adaptive reuse projects can result in revitalization of a block or neighborhood.

[5] Bullen, P.A., Love, P.E.D. (2010) The rhetoric of adaptive reuse or reality of demolition: Views from the field, Cities 27, 215–224

Building Obsolescence and AR

In general, attributes that make a building suitable or unsuitable for adaptive reuse are the following ones.

- impact of adaptive reuse on stakeholders;
- circumstances in which adaptive reuse or demolition are considered (for not “designated” sites);
- effectiveness of adaptive reuse as a strategy to achieve sustainability (e.g. integration with energy saving refitting but also at “urban level”);

But more in general, the possibility to develop AR of a building basically depends on the degree of “obsolescence” of the building. Obsolescence should be considered as a combination of four obsolescence factors.

1) Physical obsolescence:

While all buildings experience natural decay over time, accelerated deterioration leads to reduced physical performance and obsolescence. Natural decay is not considered an attribute of obsolescence but rather of age.

2) Economic obsolescence:

The period of time over which ownership or use of a particular building is considered to be the least cost alternative for meeting a business objective governs investor interest and obsolescence based on economic criteria. Economic obsolescence can also include the need for location change.

3) Functional obsolescence:

Change in owner objectives and needs leads to possible functional change from the purpose for which a building was originally designed

4) Technological obsolescence:

The building or component is no longer technologically superior to alternatives and replacement is undertaken because of expected lower operating costs or greater efficiency.

5) Social obsolescence:

Fashion or behavioral changes (e.g. aesthetics, religious observance) in society can lead to the need for building renovation or replacement.

6) Legal obsolescence:

Revised safety regulations, building ordinances or environmental controls may lead to legal obsolescence.

Source: Langston & al. 2008

Discovering AR potential at urban scale Importance of inventories and “quick scans”

Facing the AR challenge by local administration require sound strategic approach, in particular when assets to be potentially reused are many.

Independently on the fact that buildings are or not “heritage”, may be useful ranking existing buildings in an organization’s portfolio or existing buildings across a city or territory, according to AR potential. Inventories can be powerful preservation tool for vacant or underutilized buildings. They can reveal potential developments to for-profit and nonprofit developers.

In order to be able to judge buildings on their potential for transformation, a “transformation meter” was developed by Geraedts and Van der Voordt (2003, 2007). Hek, Kamstra, and Geraedts (2004) developed an instrument called ‘programmatic quick scan’, which consisted of four phases.

For example, the so called “Adaptive Reuse Potential Model” allows assessing “*useful life”* of the building. It requires an estimate of the expected physical life of the building, the current age of the building, an assessment of the level(s) - from 0 to 20 - of physical, economic, functional, technological, social and legal obsolescence[6].

The need to take in consideration different “obsolescence” facets, is widely recognized, as showed in Fig. 2.2, published in a recent UK “guideline” on adaptive reuse[7].

Another model to assess the adaptive reuse potential is the so called «Adapstar» Model. As showed in the Fig. 2.3, a specific list of design criteria has been identified within this multi-criteria evaluation framework.

The model develops, among other, a new concept of ‘future building adaptive reuse’, which is now defined as a strategy to prolong the useful life of new buildings before they reach physical, economic, functional, technological, social, legal or political obsolescence. But it is clearly useful to assess ARP of existing assets, as well.

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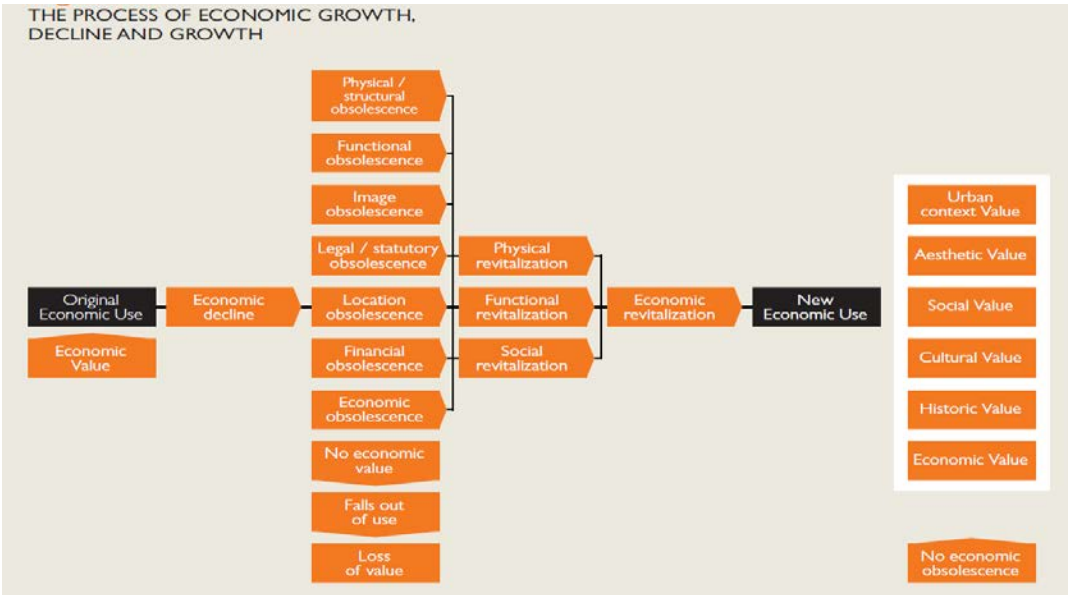
[6] For obsolescence classification and description of ARP Model see e.g.: Craig Langston, Francis K.W. Wong, Eddie C.M. Hui, Li-Yin Shen, Strategic assessment of building adaptive reuse opportunities in Hong Kong, Building and Environment 43 (2008) 1709–1718

[7] “*Heritage Works - The use of historic buildings in regeneration. A toolkit of good practice*”, British Property Federation, Deloitte Real Estate, English Heritage, RICS, 2013, http://www.deloitterealestate.co.uk/cmspages/getfile.aspx?guid=45fa1ce8-8a10-41af-95e9-f28a79b0dd20

Figure 2.2: The process of economic growth, decline and growth



Source: Heritage Works - The use of historic buildings in regeneration. A toolkit of good practice, 2013

Figure 2.3: Adapt Star Model criteria

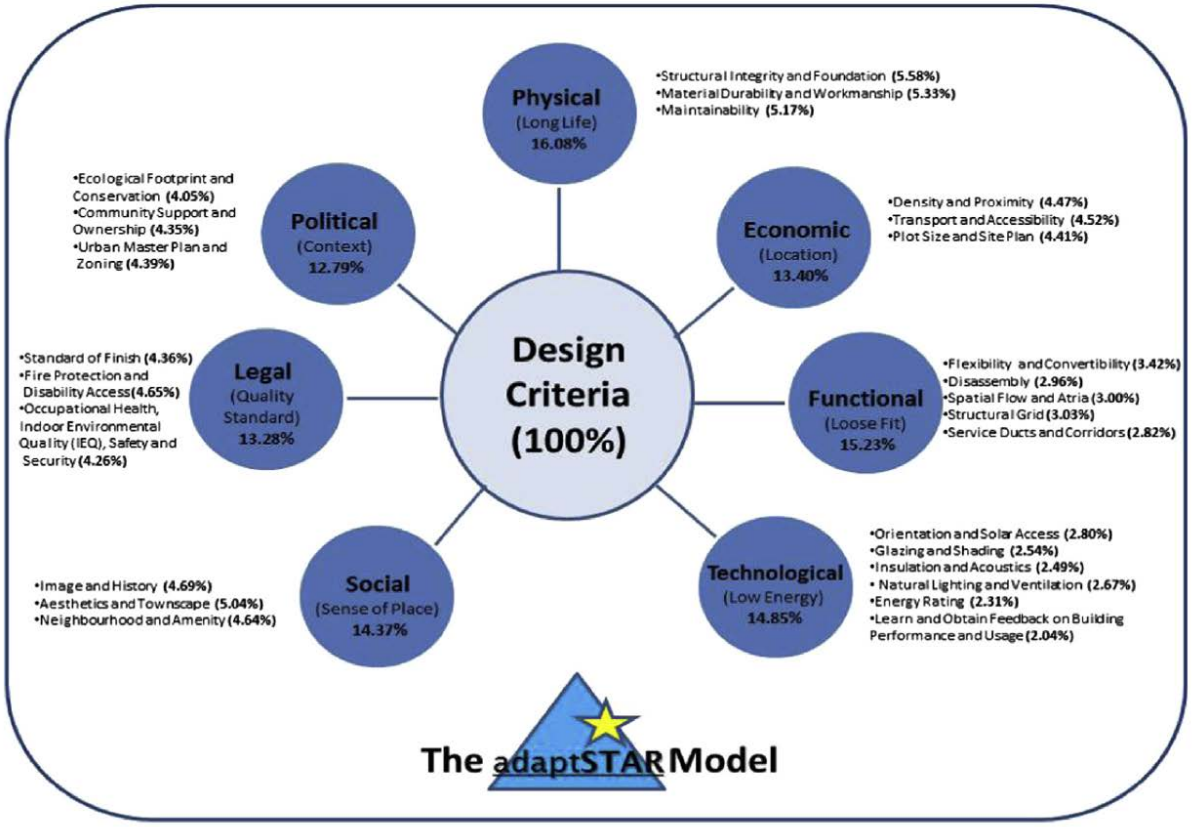


Fig. 1. The *adaptSTAR* model (final development).

Source: Conejos & al., Habitat International 41 (2014) 85e91

Free Riga – revitalizing movement of empty houses

Re-using residential buildings not always requires deep restructuring. Sometimes, “lighter” approaches could be sufficient.

Riga City Central areas are undergoing a “shrinking city” process, with a remarkable amount of empty houses resulting in the city area.

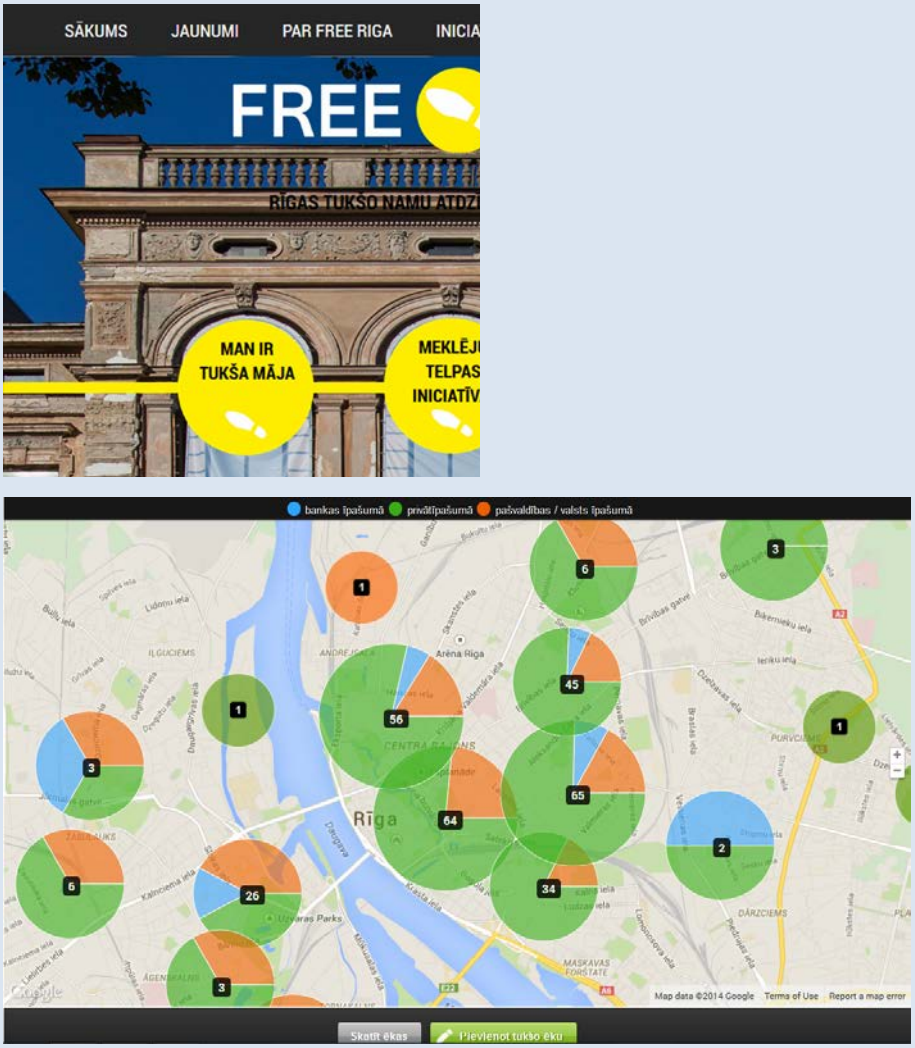
Riga ‘lost’ 1/3 of inhabitants during last 25 years. About 14 % of Riga’s buildings are empty or ‘idle’ for a long time and Inhabitants of the city do not live in Riga, since more and more people live in “Pieriga” municipalities, thus inducing heavy “urban sprawl” in the area.

To deal with this challenge, a bottom-up and “market based” answer has been proposed.

The initiative, called “Free Riga”, based on a web-portal, see Figure 2.5) provides tools to facilitate renting empty and unused houses.

Maps and information on un-occupied residential units are visualized, together other useful information and “networking” occasions.

Figure 2.5: Free Riga web portal



Free Riga also promotes temporary initiatives to reuse those assets (see for example the event “occupy me”), paying attention in particular to the requirements of creative industries.

Source: http://freeriga2014.lv/

2.2 "ADAPTIVE REUSE OF HERITAGE BUILDING: THE GEORGIAN HOUSES IN DUBLIN

"Georgian Dublin" is a collection of elegant landmark buildings in an urban setting of tall brick terraces. Dublin City Council is developing a multi-action strategy aimed at improving the adaptive-reuse potential of the "Georgian houses" built heritage in Dublin. The strategy is based on several activities related to pilot projects in different "Georgian Townhouses" and is focused on building knowledge and experience on how to deal with the multifaceted reuse challenge.

South Georgian Dublin Townhouse Reuse Study[8]

The South Georgian townhouse has a rich history of use within the city of Dublin. It has been considered by planners, architects and architectural historians as one of the more robust and resilient building and urban typologies, which the continual and diverse pattern of use confirms.

It also comprises the basic component of the distinctive urban set-pieces of internationally significant form and character within the historic centre of Dublin City.

The growing importance of the City's built environment and public realm to Dublin's success in competing against other capital cities for investment, tourism, is a key issue.

Georgian Dublin is perhaps the defining physical character of Dublin.

More than a tourist image, the Georgian city evokes a deeply urban city, full of fine proportioned and light-filled rooms and generous public gardens (squares) set within a calm, coherent "urbanscape". That this urbanity is well used and well tended is of significant importance to the wider City's well being.

This can facilitate the promotion of the South Georgian core as a place which can (continue to) accommodate quite a range and scale of uses.

Despite this long tradition and acknowledged importance, the ongoing suitability of the Georgian townhouse to accommodate certain uses is today being challenged.

This challenge has led to a growing public and policy concern over the future of the South Georgian townhouse.

The objective to support Dublin's designation as a World Heritage City (currently on the tentative list).

The study on "South Georgian Dublin Townhouse Reuse", carried on by Shaffrey Associates Architects, is an important initiative, therefore, to confront the apparent anomalies between a history of continuous and diverse occupation of the Georgian townhouse (comprising the full plot), a history which shows a relatively safe occupation, and, today's regulatory and economic context which appears to be limiting the potential for re-use.

As explained in next paragraph, the introduction of Disability Access Certificates has raised a number of conflicts between conservation objectives and compliance with accessibility regulation, and associated implications.

On the other side, after recent downturn, situation has moved from a severe fall-off in demand for property to a gradual revival and the South Georgian core is emerging slowly from a low-value base.

The continuing perception that these buildings are difficult to adapt may temper any property price escalation in the South Georgian core, which may be a positive situation in the long term. Moreover, evolving demographics and patterns of living and property use are further important variables.

In relation to the Conservation objectives issue, it should be recalled that statutory footing of conservation since 1999 has had a profound impact on the management of use and intervention within the South Georgian city.

This is supported by a growing knowledge base of research and survey, which ranges from the construction practices, materials and decorative finishes to the way in which the urban unit

[8] Main source of this paragraph is the presentation by Shaffrey Associates Architects, during the UseAct Bilateral Meeting on adaptive reuse of heritage buildings held in Dublin.

operated and the social city it supported. Many of these studies and significant inventories have been led by Dublin City Council.

The range of typology and condition is another important aspect of the project. There exists a range of historic typologies and plan forms, but also the extent and nature of alteration which has occurred over the years has to be considered.

Anyway, as showed in Figure 2.6, there are opportunity for diversifying internal uses of buildings and dealt with the "division of property boundaries" challenge.

Figure 2.6: Possible division of property boundaries

Source: Dublin City Council/Shaffrey Associates Architects

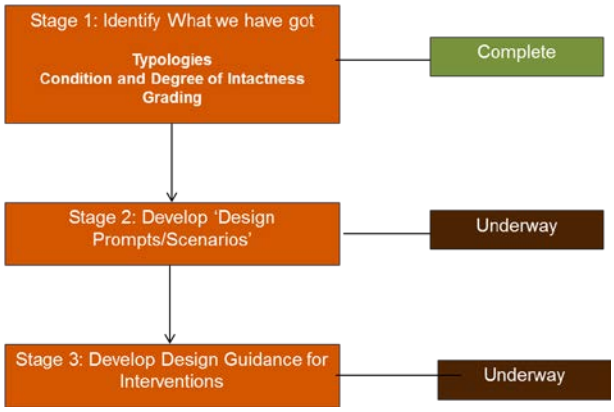
The erosion of the plot and the dominance of rear gardens/sites as car parking is another challenging issue. Compounding this is the premium value of car parking with the historic city centre.

The Pilot Project is related to broader initiatives, as the "Living City Initiative" and other incentives.

The recently expanded Living City Initiative offers the opportunity to incentivise strategic approaches and standards to be developed within the South Georgian Dublin Townhouse Re-use guidance document.

Figure 2.7 shows project structure and stages

Figure 2.7: "South Georgian Town Study" – development stages



Source: Dublin City Council/Shaffrey Associates Architects

From the technical point of view, emerging issues can be shortly summarized as follows.

Reusing Georgian Townhouses in Dublin - Emerging issues

- **Alteration of historic spatial sequences and hierarchies**
- **Accessibility** – vertical circulation – narrow basement areas (see next paragraph) - may lose historic water tanks
- **New stairs** – Part M TGD dimensions challenging to meet
- **Returns** – alterations or rebuild
- **Open space provision**
- **Division of property boundaries** – challenging if '**floor by floor'**
- **No car parking** (resident permits)

The study has clearly demonstrated that, a strategic approach, it is better to work with buildings characteristics than try to fit 'standards' into existing proportions.

This means that there is a strong need to work with Building Control Officers as well as planning and conservation.

From “people stories” to “conservation courses” in Georgian Dublin:

The Henrietta Street Conservation Plan

Among specific initiatives carried on by Dublin City Council to promote reuse of Georgian Houses, the “Henrietta Street Conservation Plan” has to be mentioned.

Henrietta Street is a place “full of history” and “people stories” in Dublin.

An accurate study about the story and socio-economic features of the place across time has been carried out and shared with inhabitant, to feed an “urban memory project” to collect and disseminate recollections and stories on tenement life beginning with Henrietta Street.

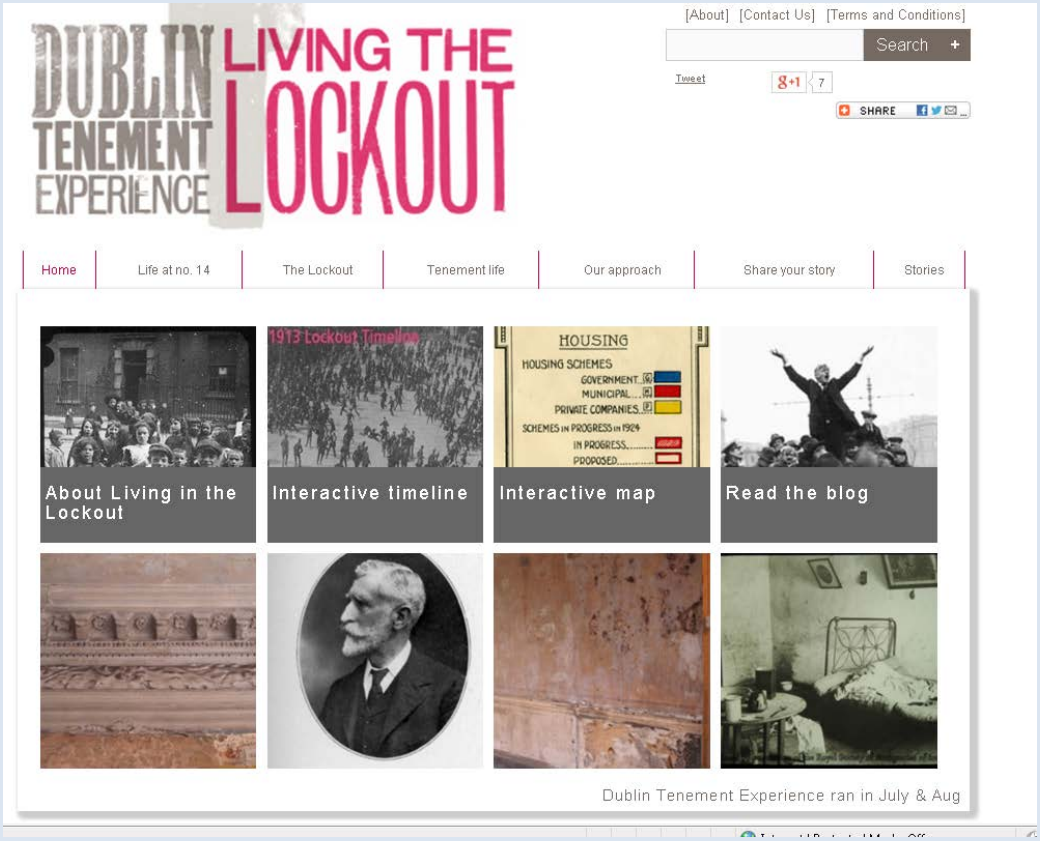
Themes which have emerged from initial research into tenement life are, just for example, “the invisible people”, the role of women, children, migration, cultural diversity and religion, education, employment and occupations and citizens.

Flexible exhibition/performance spaces with a digital self-guided exhibition and interactive website have been provided, in one building, to promote initiatives.

The house used to host the exhibition center (with space for temporary exhibition and performance) is the “primary artefact” and therefore low level installation of digital technology will be developed to allow the qualities of the house as object.

The “cultural” project is aimed at providing: immersive exhibition experience through digital exhibition and smart phone technology, people engaging and dynamic website, “Urban Memory Project” (potential collaboration with National Folklore Foundation currently being scoped), “Public events programme”, including talks, seminars, recitals on themes related to Georgian and Tenement Dublin (trough a website – see Figure 2.8, tours of cultural and architectural history of North Georgian Dublin, “Youth programme” and “Heritage trades programme.

Figure 2.8: The website of the “Dublin Tenement Experience” (Urban Memory Project).



Source: Dublin City Council / Urban Memory Project

The specific plan, for 2016, also includes delivery of other "tools" to be integrated into the project such us: the "Dublin City Council Advice to Homeowners" on how to maintain buildings, a "Decorative Plasterwork Guidance Document", a "Brick Pointing and Façade Finishes guidance" (see Figure 2.9), a "Conserve Your Period House" home-owners course and a technical guidance on "Energy Efficiency in Pre-1945 Historic Dwellings in Dublin City". These tools are useful to owner and building/refurbishment sector people to improve any kind of intervention on Georgian Houses in Dublin.

Figure 2.9: A page of the "Brick Pointing and Façade Finishes guidance"

Source: Dublin City Council

Universal Access to Georgian Heritage Buildings[9]

Within the general "adaptive reuse" target of Dublin Georgian Houses, one specific challenge is to make these heritage buildings accessible to everyone.

Accessibility is one important variable of the "reuse" matter, not only for technical and market reasons, but also for "social" ones. The Requirement is that People can safely and independently approach, gain access and use a building, its facilities and its environs. As understandable – see just for example Figure 2.10 – Georgian Buildings face several "access" challenges, starting from external steps.

Figure 2.10: External steps of a Dublin Georgian Building

Source: Dublin City Council

[9] Main source of this paragraph is the presentation by Dublin City Council (Mrs. Clare Hogan), at the UseAct Bilateral Meeting on adaptive reuse of heritage buildings held in Dublin.

In Ireland, in general building regulations apply to construction of new buildings, new extensions and material alteration to existing buildings. Under the 2007 Building Control Act - a new building or a building that has been altered or extended shall not be opened, operated or occupied unless permits related with accessibility has been granted by the building control authority.

It is interesting recalling the recent Roadmap to Disability Legislation in Ireland. Across the 2000 – 2010 period, Planning & Development Acts have developed, and in particular, "Advice series from DoAHG Access" to improve the accessibility of historic buildings and places along with "Architectural heritage protection guidelines" for planning authorities (see Figure 2.11).

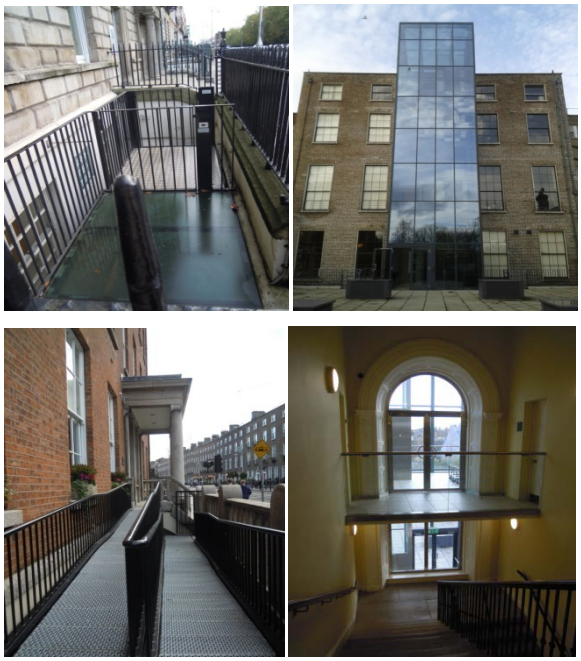
Figure 2. 11: Documents and guidelines produced by Irish Government related to Architectural Heritage and "Access"

It is clear that to achieve effective "adaptive reuse" targets, "getting the balance right" between contrasting exigencies is important. "Practicability" is a key word, since many critical aspects (as structural conditions of buildings, different ownership, use, specific planning conditions, etc.) have to be dealt with.

Concrete "accessibility issues" related to the typical Georgian building are usually related to the following features of such buildings: front: entrances generally raised above street level, accessed by granite steps, original wrought or cast iron railings, fire exits from basement, compact plan with vertical hierarchy of rooms, ornate staircases with ½ landing and return buildings at different levels.

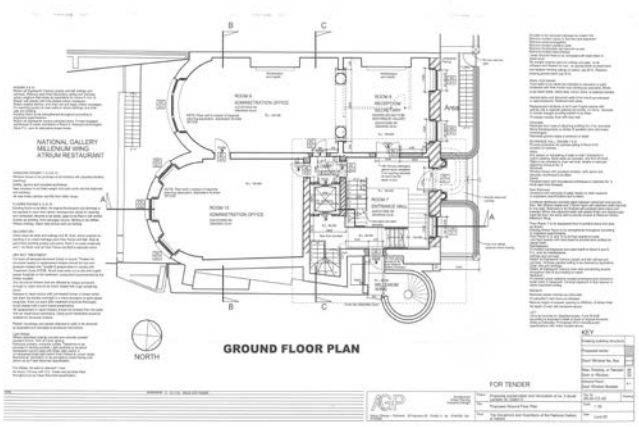
However, innovative "replicable" solutions can be applied, as demonstrate some "pilot cases" of reuse (see Figure 2.12).

Figure 2.12: Example of innovative solution to allow access to a Georgian Building in Dublin



Source: Dublin City Council

Figure 2.13: Dublin National Gallery Millenium Wing – and Lord Edward Carson's buildings



Source: Dublin City Council

The role of public sector in developing pilot solutions for accessibility has been relevant in Dublin. As the Disability Act 2005 applies to public bodies, they are required to ensure that the services provided to the general public are accessible to persons with disabilities. Heritage sites are included and a “protected structure” is defined as a heritage site. This means that any protected structure owned by Dublin City Council and open to the public must comply by 2015.

Clearly, developing high quality reuse projects often requires serious and “creative” design approach, with “audacious” solutions.

Recent reuse interventions (as the “National Gallery - Millennium Wing” or the “Lord Edward Carson’s buildings” showed in Figure 2.13, are eloquent examples.

Pilot projects, identification and testing of “replicable” smart solutions, guidance, and in depth analysis of opportunities to comply with (national) regulations trough “practicable” approaches are, in conclusions, strategies that can be stimulated and promoted by local authorities, but that require, at the same time, very punctual – site by site – activity and efforts, with involvement of high profile professionals.

Adaptive Reuse in Riga – Wooden Architecture

In Riga, 19th century wooden architecture represents a distinctive feature of the local urban heritage, although not several buildings survived until now.

Three recent cases of adaptive reuse of wooden buildings in Riga appear to be of particular interest to understand potentials and possible strategies.

Interventions took place respectively in the “Grizinkalns” areas (‘Koka Rīga’), in Kalnciema Street (residential building) and in Miera Street (“Creative quarter”).

Koka Riga is a small area in Riga, where the construction of wooden buildings was commenced in the seventies of the 19th century. Buildings are designed as the two-storey wooden tenement houses. In May 2013, a “wooden buildings renovation centre”, called “Koka Rīga’’ has been opened. It works as a “community centre” aimed at promoting intergenerational dialogue but also at stimulating reuse of other buildings in the area.

In Kalnciema Street twenty-three two-storey and one-storey wooden buildings, decorated with exquisite details are located.

This heritage represents an outstanding example of “classic” 19th Century wooden architecture in Europe. Buildings of the area are used for business and cultural events, aimed at – among others – to promote the area, within initiatives which are supported through a website.

Figure 2.14: Initiatives to reuse wooden architecture in Riga: Koka Riga (fig.a), Kalnciemaiela (fig.b), and “Miera Street” (fig.c)

Figure 2.14 a

Figure 2.14 b

Figure 2.14 c

In Miera Street houses can host various projects by local artists – galleries, clubs, workshops, cafes, hair saloons and small shops selling works by local artists. “Miera Street Republic” has been developing as the city’s newest art-district. Buildings located on cobblestone Miera Street were constructed between the 19th and the beginning of the 20th century.

Source: Riga Planning Region

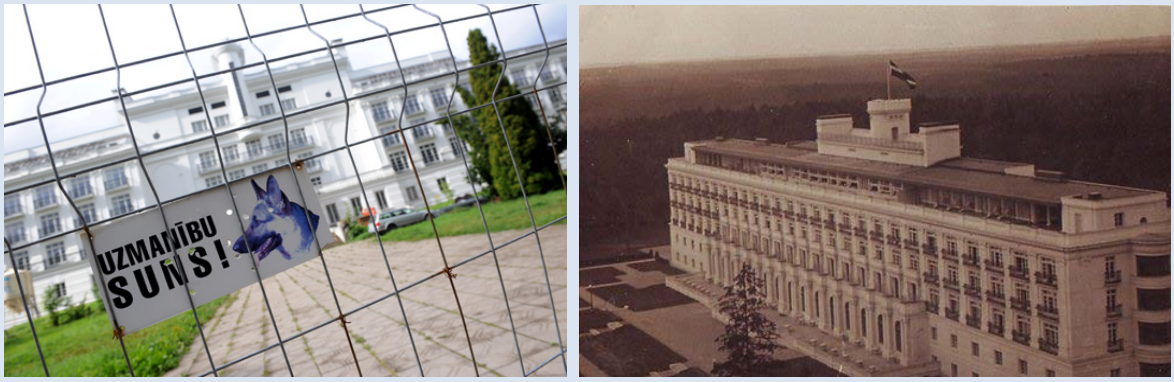
“Industrial” Heritage in Riga Region

Riga was the third largest industrial city in Czarist Russia. This explains the reason why in the area many vacant, industrial areas and objects from beginning of 20th century can be found.

Moreover, in Riga Region, at the beginning of 20th century, several “resorts” were built, as the large “spa resort” (sanatorium) in Jurmala, Kemeri, today abandoned.

More recent hotels, currently deprived, are also potential redevelopment sites.

Figure 2.22: Former “Liva Hotel” – Riga Region



Such is the case of the former “Liva” Hotel, which is now property of bank, after owner insolvency. There is no information about the actual condition of the building, which is in fact a “dangerous object”, with strong negative environmental impacts. Massive industrial buildings are also located in the region. The Ogres knitwear factory is a massive (partly) vacant brownfield, which is a legacy of the “Soviet time” Industrial system, that – until now – has not been redeveloped yet.

Figure 2.23: The Ongres knitwear factory – Riga Region

Source: Riga Planning Region

2.3 DIFFICULTIES AND SUCCESSES IN REUSING BUILT HERITAGE IN EASTERN EUROPEAN SETTINGS: FOCUSING ON NITRA CASE

Small and middle sized towns in Eastern European settings face specific challenges on reusing heritage buildings. Slovakia is exemplary. The governance system related to the Heritage Preservation and some “rigidities” of rules defining different categories of heritage do not fully comply real needs. However, further factor play key roles.

In Nitra, for example[10], main difficulties seems to be to “the low cultural awareness, education and ignorance of inhabitants”, that would require more interactive communication, although some small activist groups are active in Nitra. Low education in the field of heritage preservation is another challenge, but there are, on the other side, institutions that play important roles, as SAV and Department of Archaeology at the University of Constantin the Philosopher. Low education interest of young architects and engineers in heritage renovation is another factor discouraging adaptive reuse. Strong need of financing renovation and reconstruction of monuments and historic structures is rather evident, since financial burden including special requirements of the Regional Monuments Board is carried out by the owner.

This situation, which is common in many places in Slovakia tends to induce a mis-understanding of heritage values, and, as a consequence, the development of low quality “new” structures, along with rough intervention and devastation of heritage values, without any understanding of site values and “genius loci”. The problem is evident also in relation to the “Industrial heritage protection and preservation” issue, which is a specific and important issue in Slovakia.

Some positive example of adaptive reuse, anyway, can be mentioned. The Design Factory in Bratislava, which includes Prefabrication hall, Gallery and multi functional space can be considered as a success.

In Piešťany, the “Power station”, transformed into a gallery and museum is another good example.

Also in Nitra, some recent interventions tried to reuse industrial heritage buildings. Nitra had, in the past, a remarkable range of historically valuable industrial structures and complexes built in 18th–19th century, but nowadays just a small number has been preserved, as showed in Figures below:

Figure 2.15

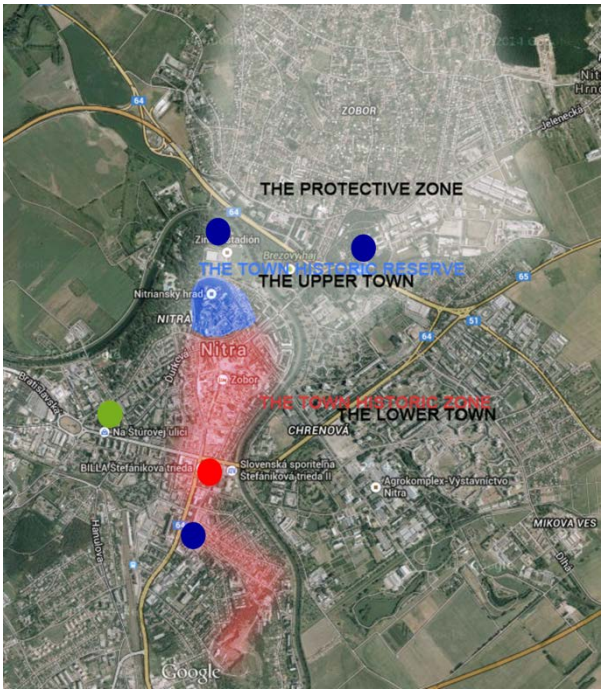
Figure 2.16

Figure 2.17

[10] See: Zuzana Holičková, City of Nitra, Presentation at Useact Dublin Bilateral/Trilateral Meeting

Among them, the Mlyny (Flour Mills), the Mestský pivovar (City Brewery), the Vodárenský objekt (Pumping Station) in the town park and the Kasárne (Military Barracks).

Figure 2.18: Industrial Heritage in Nitra



Appropriate redevelopment occurred only in some cases.

The case of Flour Mill, located in the city centre is exemplary as negative case. High pressure from the investor for complex demolition lead the way to creation of a new modern shopping centre. However, according to the Regional Monuments Board, this valuable structure should have been kept; but the investor ignored this request, demolition was done without any notice and just a fine has been charged.

Positives aspects of the intervention are that it has solved parking problems in the city centre and represents, anyway, a positive transformation of a former brownfield site into a more vibrant site. On the other side, however, negative aspects are tied to disruption of the historic structure and urbanism, loss of heritage values and outflow of people from the pedestrian zone in the historic city centre into the shopping mall.

Trafostanica (Power Sub-Station) in Nitra is a good example of adaptive reuse. Interest and initiative came from the investor that implemented a successful and sensitive conversion of the structure into an Art Gallery with coffee, Centre of culture and social life open for exhibitions, concerts, presentations, as showed in Figure 2.19

Another industrial heritage building, the Mestský pivovar (City Brewery) – see fig. 2.20 - is currently facing an adaptive reuse process, thanks to a Master plan elaborated and approved for the whole are of the former brewery. Conversion of some historic buildings with heritage value is a part of the project complemented by new structures of multifunctional and housing use. Regional Monuments Board was an important member of the project committee. The project, which has started in 2009, is under development and will provide a multifunctional complex including two housing buildings are finished. The most valuable brewery structures are still untouched.

Figure 2.19: Trafostanica (Power Sub-Station) in Nitra

Source: Municipality of Nitra

Kasárne (Military Barracks) is, probably, the most relevant heritage building in Nitra that could benefit from a deep adaptive reuse process. Barracks are a National Cultural Monument and a very important archaeological site. Built at the end of the 19th century for the military garrison force, it was one of the five military campuses in Hungarian Kingdom.

Currently, the site is without any function, and appears to be the largest brownfield derelict site in the city. The owners are Municipality of Nitra – 31 buildings, the Archaeological institute SAV – 11 buildings, and the Roman, Catholic Church, Nitra Bishopric, which owns the land (plots). Several architectural studies and university projects have proposed solutions in order to reuse the site with new functions.

Figure: 2.20: Nitra – “City Brewery” redevelopment

Source: Municipality of Nitra

Figure 2.21: Proposed redevelopment plan of the “military barracks” in Nitra

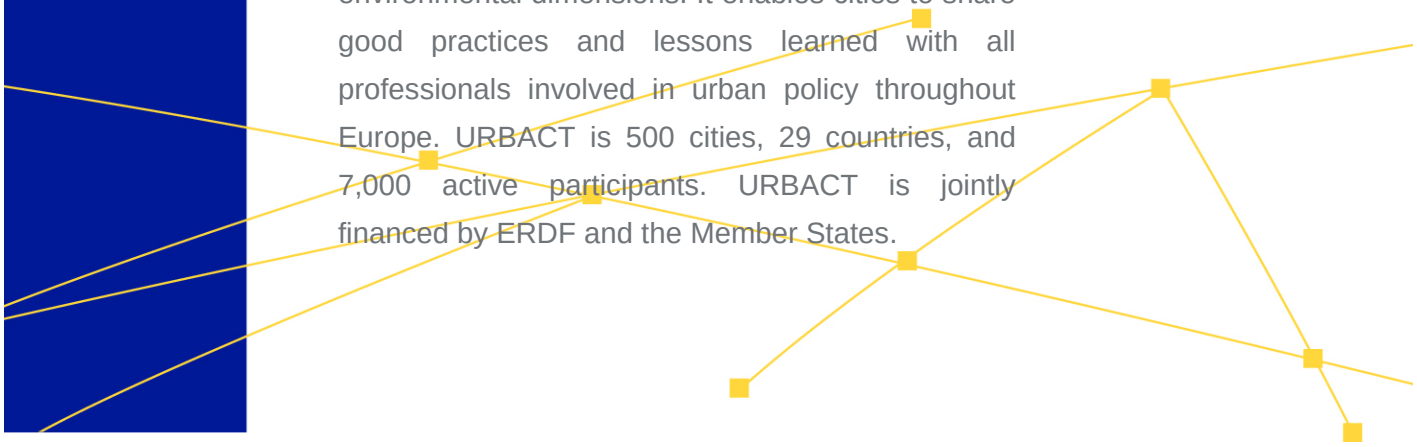
Source: Municipality of Nitra

Regeneration of old structures and park is required, but many questions should be answered. Is creative industry a solution for the site? Has to be carried on a brownfield regeneration? There is room for PPP, and if yes, how? URM (Sustainable development of cities) let imagine that there is the possibility of funding the project with 18-20 millions Euro (see Figure 2.21), but many questions have to be answered before.

URBACT II

URBACT is a European exchange and learning programme promoting sustainable urban development.

It enables cities to work together to develop solutions to major urban challenges, reaffirming the key role they play in facing increasingly complex societal changes. URBACT helps cites to develop pragmatic solutions that are new and sustainable, and that integrate economic, social and environmental dimensions. It enables cities to share good practices and lessons learned with all professionals involved in urban policy throughout Europe. URBACT is 500 cities, 29 countries, and 7,000 active participants. URBACT is jointly financed by ERDF and the Member States.



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