


ISOVER International Multi-Comfort House Students Contest 2014

Agenda

- History
- 10th ISOVER International Edition 2014
- Literature, documentation
- MCH Concept
  - What are customers expecting?
  - The “Definition”
  - Thermal performance criteria
  - Acoustic performance criteria
  - Pilot projects




History

ISOVER Multi-Comfort House Students Contest

- Dedicated to architecture students
- Started in 2005
- 2 stages:
  - national stages
  - international (best 3 projects from each country compete)
- In 2013:
  - 1000 students
  - > 100 universities

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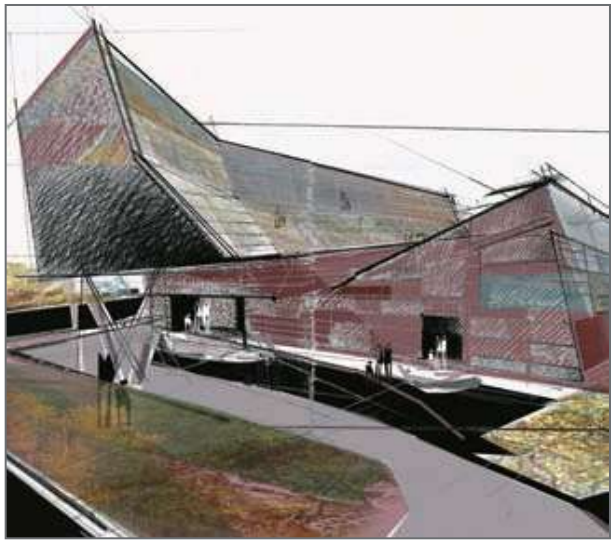
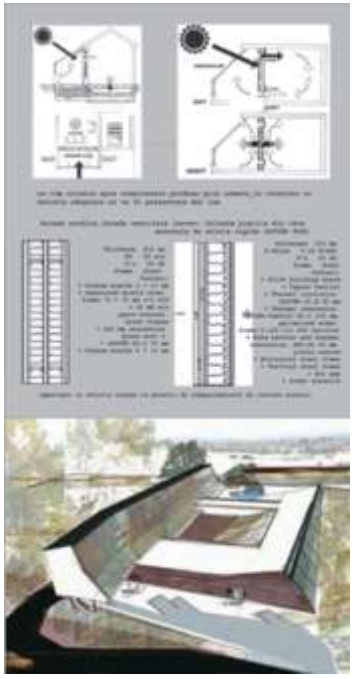
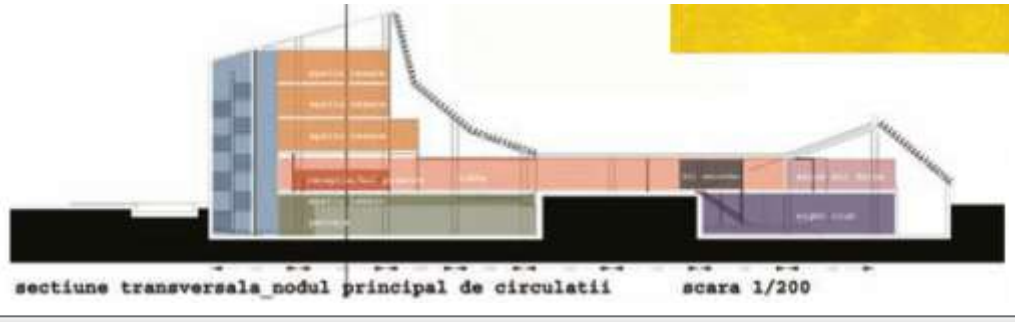
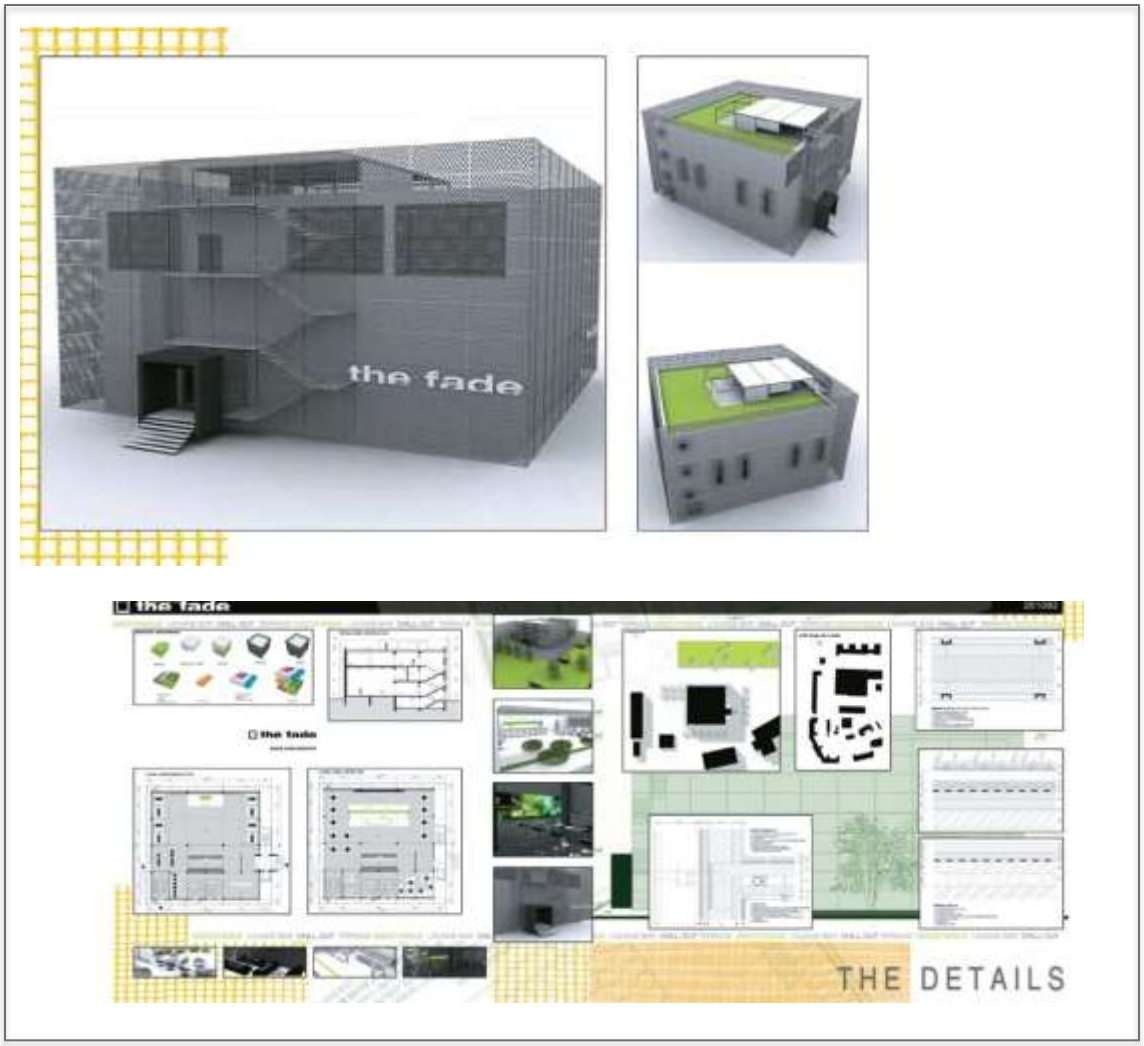
Edition 2005, Bansko, Bulgaria
Passive Hotel





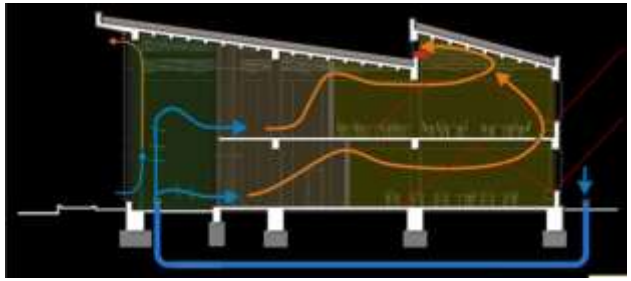


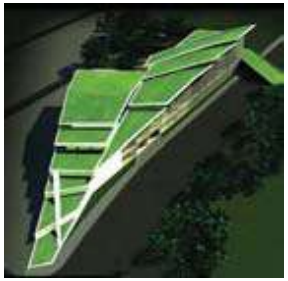
Edition 2006, Sighisoara, Romania
Renovate a construction hall to disco



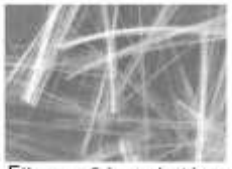
Edition 2007, Belgrade, Serbia
Detached house for one family

Edition 2008, Dubrovnik, Croatia
Multi Comfort House (MCH) School

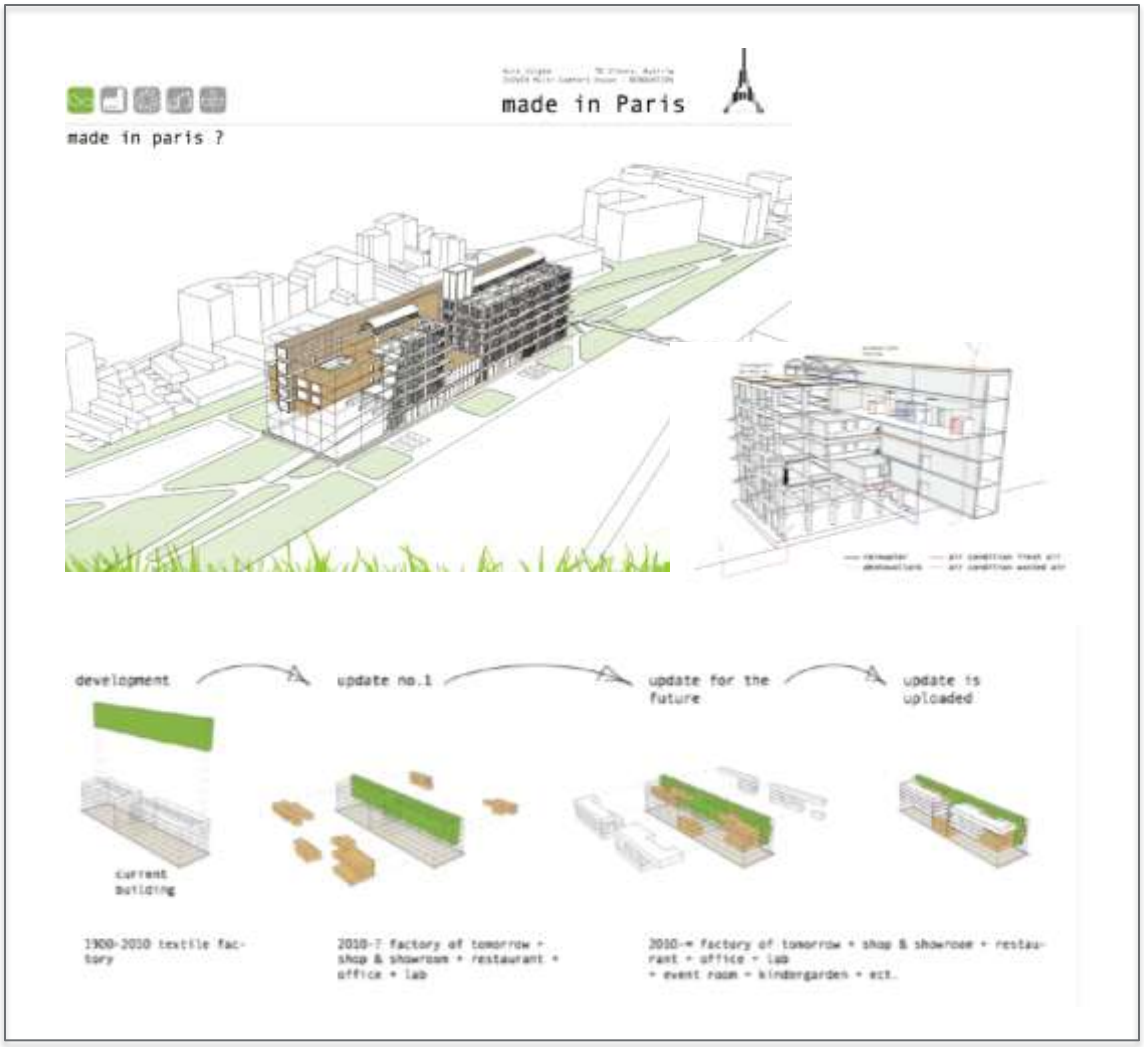




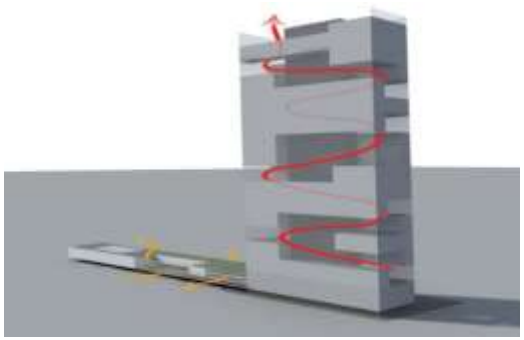
Edition 2009, Ljubljana, Slovenia
MCH Office Complex


Fibre of insulation

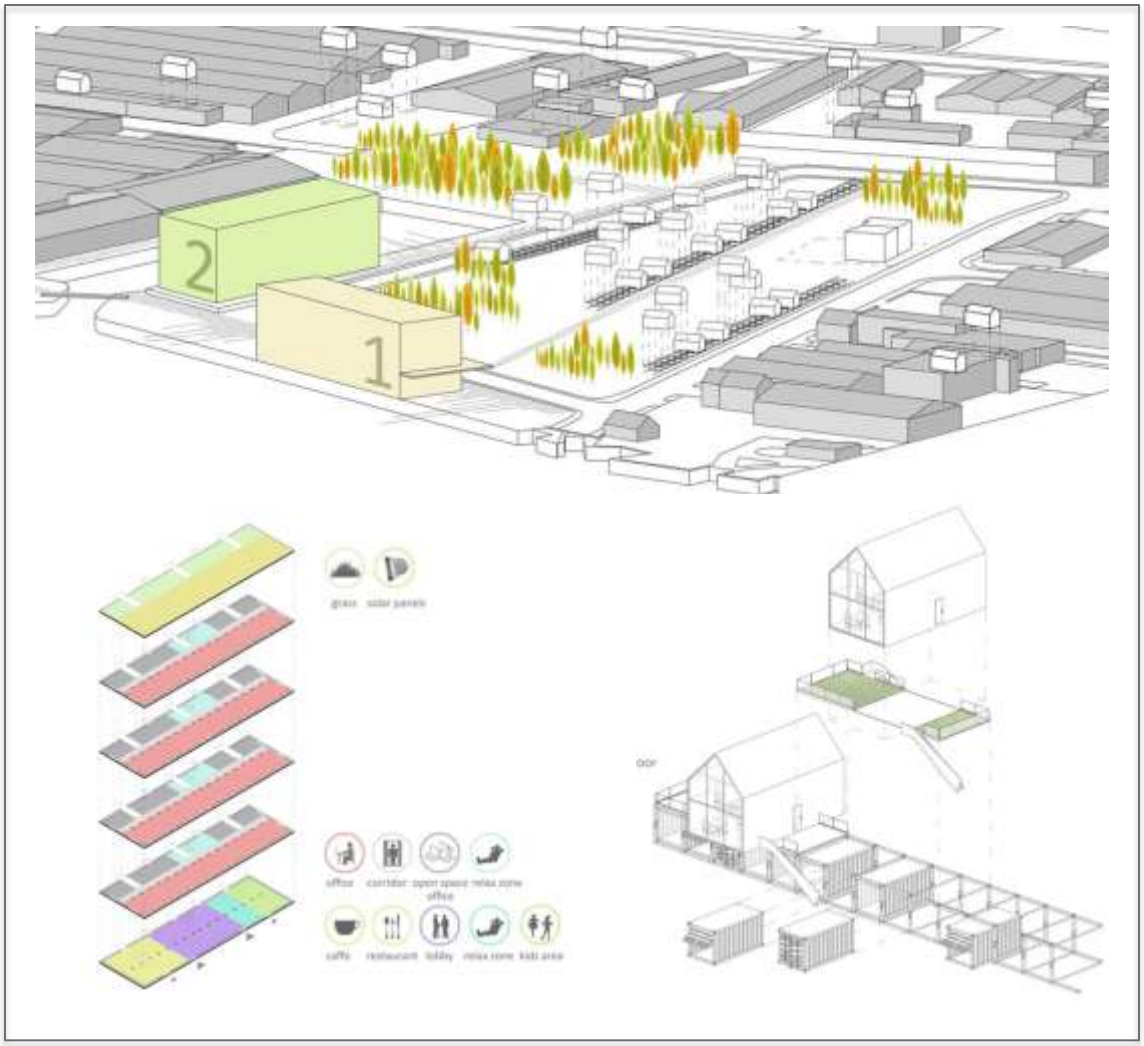
Edition 2010, Innsbruck, Austria
Renovate a post industrial building to MCH



Edition 2011, Prague, Czech Republic
Skyscraper to MCH level in Manhattan



Edition 2012, Bratislava, Slovakia
MCH Sustainable Community



Edition 2013, Belgrade, Serbia
Vision & Reality Glückstein Quartier

STADTMANNHEIM

Edition 2014,
School of tomorrow in Gaziantep

International Stage :
28-31 May, Bucharest, Romania

2023 TARGETS

Gaziantep Metropolitan Municipality prepared the first Climate Action Plan in TURKEY for decrease CO emmission and climate change effects.

DECREASING CO EMMISSION %20
DECREASING ENERGY CONSUMPTION %20




Edition 2014 – Contest Task

ISOVER Multi-Comfort House Students Contest

Form and organization of the competition

The ISOVER Multi Comfort House Students Contest is a 2 stage competition:

- **First stage – National Stages**
  - Takes place in each country were national Saint-Gobain ISOVER, CertainTeed and Izocam organizations are organizing the contest.
  - Up to three prizes will be awarded for the national stage. The project that won will receive an award at a presentation ceremony.
- **Second stage - International Stage**
  - The International stage of the competition it will be organized in the second part of May 2014. The exact date and location will be communicated by the beginning of October on **www.isover-students.com**.
  - The winners of the **National Stages** will be invited to this event, together with their professors. A maximum number of 3 teams from each country accompanied by one teacher per team can participate to the international stage. The final number of participants from each country will be decided by each local organization.
  - During this event the participating projects will be displayed at the exhibition for inspection and discussion. Furthermore, the authors of the project will have the possibility to explain the concept of the project to the jury and all the participants during a five-minute presentation. All presentations will be webcasted live on ***http://www.isover-students.com***
  - The presentations will be followed by the jury's deliberations and the award ceremony for the winners. The international jury will nominate the winners of the three prizes for the **International Stage**. In addition, the jury can award some special prices for extraordinary ideas provided by the participants.

ISOVER Multi-Comfort House Students Contest

Prize money

Each of the two stages of the competition can assign up to three monetary prizes for the first, second and third place. Additionally, other prizes might be awarded by the local organization.

- **First stage – National Stage:**
  - Information about the prizes of the national contest stage will be provided by the local ISOVER, CertainTeed or Izocam organizations.
- **Second stage – International Stage:**
  - 1st prize € 1,500
  - 2nd prize € 1,000
  - 3rd prize € 750
  - Special prize € 500

The organizer can decide to award more or less prizes than specified.

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ISOVER Multi-Comfort House Students Contest

Time schedule

Distribution of invitations for competition submissions as part of an information event:

September 2013

Closing date for registration for the national competition – See point 3.1

- *31st March 2014. Local organization can change this date to fit their local schedule. Please check this data with your local responsible person.*
- *All registrations have to be completed online at www.isover-students.com. Any participating team that fails to do so or provides incomplete or false information can be disqualified from competition.*

Online training

- *Several online trainings will be organized, starting October 2013 until March 2014. The exact dates will be communicated thru the official newsletter of the contest to all registered participants.*

National stages and award ceremonies

- *Completed by 1st May 2014. Local organization can change this date to better fit their local schedule. Please check this data with your local responsible person*

Submission of the material for the international stage - See point 3.2

- *Latest by 12th of May 2014.*

International Stage :

28-31 May, Bucharest, Romania

International stage and award ceremony:

- *The International stage of the competition it will be organized in the second part of May 2014. The exact date and location will be communicated by the beginning of October on www.isover-students.com*

ISOVER Multi-Comfort House Students Contest

National jury

The selection of the national winners will be carried out by a national jury. The composition of each national jury will be decided by the local implementing organization.
The following criteria will be used for awarding the prizes on national and international level:

A. Participation criteria
- **Minimum requirements:** Project that do not present the minimum required pieces as described in Point 2.5.1 will not be taken in to consideration

B. Judging criteria
- **Architecture: 40%**
  - Design and functional concept as well as the sustainability approach related to economic, ecologic and social aspects
- **Technical criteria: 30%**
  - Constructions comply with the Saint-Gobain Multi-Comfort criteria (thermal, acoustic and daylight targets) as well as fire safety strategy.
- **Construction details: 30%**
  - Quality and consistency of the proposed construction details with regards to building physics (thermal and acoustic bridges, airtightness and moisture management) and correct usage and mentioning of ISOVER, Certain Teed, MAG or Izocam products and solutions in the project

1.8. International jury

The international jury will consist of architects, ISOVER experts and specialists in energy efficiency constructions. The organizer can modify the number or the composition of the jury without any other prior advice. The members of the International jury will be announced at the International Stage.
The same criteria of evaluation like in the National Stages will be used for the International Stage.

ISOVER Multi-Comfort House Students Contest

1.10. Legal

Participants of the ISOVER Multi Comfort House Students Contest (the 'Competition') hereby undertake that any information/data contained in their projects does not interfere with the intellectual property rights of any third party, and that they either own or have full authorization to use and disclose such information/data.

Competition participants shall retain unlimited intellectual property rights on their projects.

However, the participants to the national stage or international stage competitions, regardless of their position (students, teachers, ISOVER employees, IZOCAM employees, CertainTeed employees or other attendees), hereby grant full and unrestricted authorization to Saint-Gobain Isover, CertainTeed and Izocam (the "Organizer"), free of charge, to use and publish their projects, project presentations and all material submitted by or representing the participants, including, but not limited to, photos or videos taken of the participants at the contest and/or material provided by the participants to the Organizer for the contest, for an unlimited period of time and for all media publication used by the Organizer.

Competition participants acknowledge that the decision of the jury is final. All participants hereby accept the incontestable and definitive nature of the jury's decisions.

By participating in the competition, the participants acknowledge and accept the conditions presented here.

1.11. Possible collaboration between participants and the City Administration of Gaziantep

The participants are informed that the representatives of the City Administration of Gaziantep will attend the International Stage.
The City Administration of Gaziantep might be interested by some of the exposed ideas in which case separate discussions between the City Administration and the authors will take place.

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ISOVER Multi-Comfort House Students Contest

2. Details of the task

2.1. General information about the area covered by the contest

Figure 1 - Site map

The school should fit to its surrounding natural and cultural environment. Emphasis should be placed on feasibility, which in turn requires structurally effective and cost-efficient solutions. The schools outside space should be designed in an environmentally friendly way, including pedagogical elements such as a bio-garden, biotope, playground, etc.

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2.2. Site and zoning requirements

The size of the whole development area is 10500m2. Maximum 50% of the land can be used for constructions. The maximum height allowed is ground level + one floor, with a maximum height of the construction at the top of 8m.

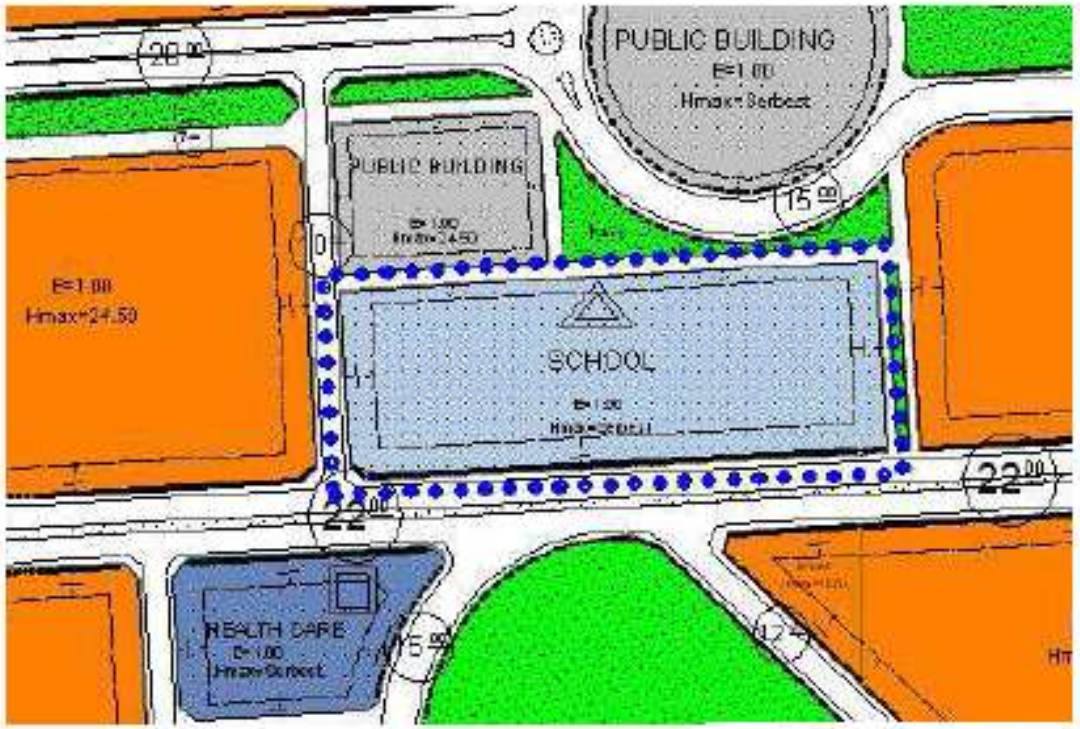

Figure 2 - Site

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ISOVER Multi-Comfort House Students Contest

2.3.1. School characteristics – Mandatory requirements for indoor functionalities design

As already mentioned the school should accommodate a number of 400-600 students. Each classroom should be designed with facilities for students with locomotors disabilities. The age split of the students is equally distributed with 25% from total number of students for each one of the four years of study.

Beside the classrooms the school should be fitted with facilities (laboratories) for the following activities

- music courses
- art courses
- foreign language courses

A sport hall should also be proposed in the design. The sport hall can be design as part of the existing school structure or as a separate construction. Adequate height (recommend a minimum 8m) should be taken in to account. Specific measures will be taken by the participants in order to provide a good acoustic indoor as well as a good level of light.

Separate sanitary groups will be proposed for girls and boys (recommended for each floor 16 toilets for students (8 for girls and 8 for boys), 2 toilets for disable students and 3 toilets for teachers). Also meeting rooms, rooms for teachers and storage facilities as well as any other spaces that the participants consider fit in order to have a good learning process should be taken in consideration.

The school program will start at start at 8.30 and will end at 14.20.The maximum number of courses per day is limited to six. One hour of study has 40 minutes and it is followed by a 10 minutes break except the case when is followed by the lunch break. One hour during the interval 12.30-14.30 is dedicated to lunch. Lunch time can be differentiated between classes for a better fluidity.

The school should be fitted with catering and cooking facilities (for vegetables from the garden)
The school design should allow the following schedule of courses to be held in good conditions

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2.3.2. School characteristics – Indoor free design

Participants will decide freely the number of classrooms they will proposed based on their choice for the number students that will learn in the school, the number of students allocated to each classrooms and the layout of the classrooms in accordance with their view of the school system of the future.

Participants will also decide freely for the number and type of the offices for the school personal both teaching and administrative as well as other spaces as they see fit (ex: storage spaces).

Within the scope of the project, participants are free to propose afterschool activities and or to design any other facilities that they see fit according to their vision of the project beside those already mentioned: library, internet and communications room, multifunctional hall (for lunch, cinema, theatre etc.), others, addressed both to the school program or afterschool activities.

These facilities can be designed separately or combined in the same building as the school or in separate building depending on the individual concept as long as the criteria about maximum surface of the land that can be constructed is respected and the design is considering also the Saint-Gobain Multi Comfort criteria.

2.3.3. School characteristics – Mandatory requirements for outdoor functionalities design

The minimum surface dedicated to outdoor functionalities (including access routes) is 50% of existing land. The following functionalities should be designed:

- Assembly place
- Playground
- Garden for agricultural production

2.3.4. School characteristics – Outdoor free design

The surface occupied by each of the functionalities mentioned at Point 2.3.3 as well as the layout and positioning will be decided by every participant based on their vision of the school and in accordance with the number of students.

Participants can propose any other outdoor functionality as they see fit as long as these functionalities respect the requested criteria.

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2.4. Type of construction, technical parameters

The high-performance thermal, acoustic, fire protection and daylight requirements have to be considered in order to achieve the Multi-Comfort criteria. A presentation of the Multi-Comfort concept is available for download at ***www.isover-students.com.***
In the course of the competition, lectures on this subject will be held at the faculties as well as online trainings.

The Multi-Comfort criteria for the residential function are presented below.

			SCHOOL	
			Gaziantep, Turkey	
HEATING ENERGY DEMAND (kWh/m²a)			< 15 kWh/m²a	
COOLING ENERGY DEMAND (kWh/m²a)			< 15 kWh/m²a	
AIR-TIGHTNESS n50 (V/h)			0.6 V/h	
DAYLIGHTING (Daylight autonomy % during functioning hours)			60%	
			Min.	Targeted
SUMMER COMFORT (Overheating % of functioning period)			10%	5%
ACOUSTICS	Between classrooms	***Airborne*** - $D_{nT,w}$+C(dB)	≥58dB	
		Impact - $L'_{nT,w}$+CI(dB)	≤ 45dB	
	Between music laboratory and classrooms	***Airborne*** - $D_{nT,w}$+C(dB)	≥ 63dB	
		Impact - $L'_{nT,w}$+CI(dB)	≤ 40dB	
	Exterior noise	Level of noise coming from outside sources	≤ 25 dB	
SUSTAINABILITY			EPD for all SG products	

Figure 3 – Saint Gobain Multi Comfort Criteria

Participants are expected to present in their design the main strategies they have used in order to achieve the criteria presented in "Figure 3 – Saint Gobain Multi Comfort Criteria".

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2.4.1. Construction

The construction method (load-bearing, wood, steel construction, etc.) can be chosen freely by the participants, but the integration of ISOVER, CertainTeed and/or Izocam products as parts of the construction build-up is mandatory.

ISOVER shall provide free planning assistance in the form of:

- Construction CAD details online data base: ***www.isover-construction.com***
  - First data base in the world containing more than 150 joint construction details, thermal bridge free for 4 different construction systems.
  - All these details have been certified by the Passive House Institute and using it assures thermal bridge free construction.
  - The access is free and the application provides: CAD drawings with different download options, components and products, key figures, isotherms, model and materials, air tightness concept.

Figure 4 – ISOVER Construction details

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2.5.1. Minimum requirements (mandatory)

The following minimum requirements for descriptions and plans must be considered. Participants are advised to choose appropriate scales for all drawings based on the poster sizes outlined in section 3.1 and 3.2 and the participant's individual design ideas and directions to allow appropriate detail and clarity to be reviewed by the judges.

Master plan

- Experience of learning in the school including the deployment of indoor/ outdoor facilities and connections with the neighbourhood.

School function

- All floor plans *(suggested scale 1:100)*
- Sections
  - *Longitudinal section (suggested scale 1:50)*
  - *Cross section (suggested scale 1:50)*
- Construction details:
  - *Roof, external wall, partition walls, windows, ground and intermediary floors details (suggested scale 1:20 / 1:10)*
    - *Attention should be accorded to thermal/acoustic bridges as well as to airtightness and moisture protection*
  - *Other details as see fit by the participants*
- Views, perspectives and/or photographs of physical models

Calculations

- **Annual heat demand**
  - *Calculation can be done using Designer v.2, Designer v.3 or calculation software PHPP.*
  - *Participants will insert a calculation overview in the project*

Figure 5 – ISOVER Designer v.2 overview

Falling to provide the requested information above will lead to the disqualification of the project from the competition.

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2.5.2. Description of the Design Concept

Beside the minimum requirements the participants are expected to provide sufficient information to allow the jury members to analyse:

- **Design concept and functional solution**
- **Strategy to achieve thermal comfort**
  - Example: construction U values, airtightness concept, HVAC system, passive/active shading measures, cooling, etc.
- **Strategy to achieve acoustic comfort**
  - Example: Constructions Rw and Ln,w values, classrooms acoustics, main measures for sound protection, etc.
- **Strategy to achieve indoor air quality**
  - Example: Proposed type of ventilation (mechanical and/or manual), ventilation blueprint, proposed solutions, etc.
- **Fire safety strategy**
  - Example: Evacuation path, separation, material fire reaction, etc.
- **Natural daylight strategy**
- **Energy supply and overall sustainable concept**

In order to explain the requirements mentioned above the participants can present: text, diagrams, calculations, drawings or information as they seem feat.

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ISOVER Multi-Comfort House Students Contest

3. Formalities for submission

The following formalities have to be fulfilled for the participation in the national stage and international stage of the ISOVER Multi Comfort House Students Contest 2013

3.1. Formalities for submission - National Stages

The participants can register online at: **www.isover-students.com**. All participants registered will receive the official communications via the official online newsletter. Any participating team that fails to register or provides incomplete or false information will be disqualified from competition

The exact way in which the projects will be submitted to the national stage as well as the final local stage schedule will be decided by the respective local organizations. The recommendation is to allow a maximum number of 3 posters in 84 x120 cm format.

The contact details for the local ISOVER, CertainTeed and Izocam organization can be found at ***www.isover-students.com/content/view/91/133/***

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ISOVER Multi-Comfort House Students Contest

3.2. Formalities for submission - International Stage

The formalities for the international stage shall be finalized by latest 12th May 2013. Each of the participant teams shall submit a CD to the ISOVER contact person in their country containing the following information:

1. *Project in electronic format with the following characteristics:*
   - PDF file version 9 or lower
   - Resolution 300 dpi
   - Dimensions of the poster 180cm x 80cm (height 180cm, width 80 cm).

Maximum number of posters that can be submitted for each team is 1 (one). The poster of each project will contain the following data:

- Team country (e.g. Austria)
- University (e.g. University of Ljubljana)
- Name of the drafter (or all names in the case of a team submission)
- National stage prize (e.g. 1st Prize)

This data will be used by the local ISOVER organization to print and prepare a roll-up display for each team for exhibition of projects during the international stage.

2. An electronic presentation of the project. The file will have the following characteristics:

- A single Power Point Presentation file
  - Extension PPT or (PPTX). Other file types will not be accepted.
- The file name should be: Country X_Y Prize, Name1_Name2_Name 3.
  - Example: Serbia, 2nd Prize, Ilian Dragutinovici_Igor Pancic
- Maximum dimension of the file, not archived, has to be less than 20 MB.
  - All presentations bigger will be cut to required dimension.

This file will be used during the international stage for the official presentation of the project in front of the jury.

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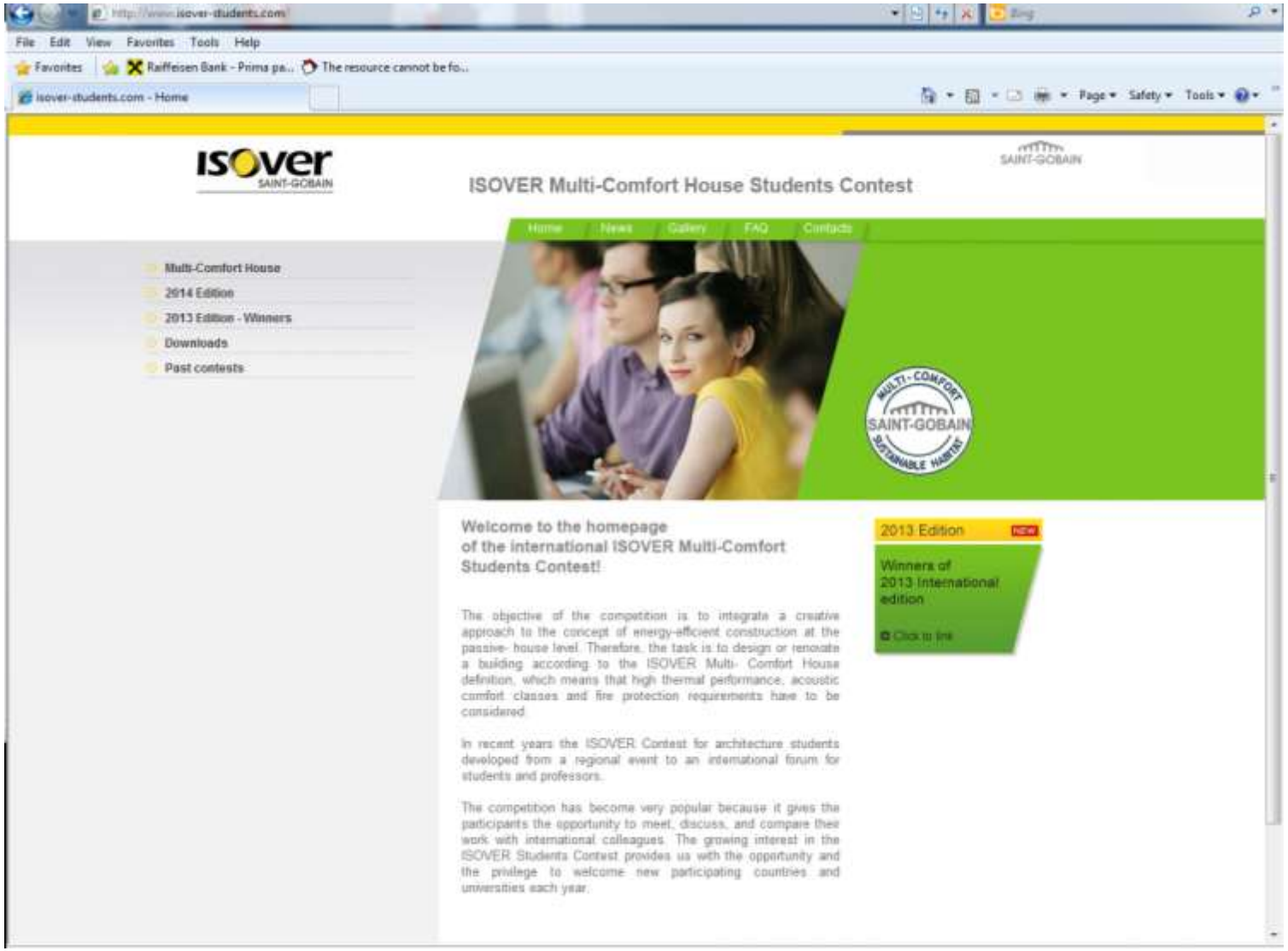
Literature, documentation

www.isover-students.com



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Past contests

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Past contests

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History of the ISOVER Students Contest

In recent years the ISOVER contest for architecture students has developed from a regional event to an international forum for students and professors.

The opportunity to compare their work, to meet and discuss with international colleagues are the reasons why the competition is so popular with the students and professors. In only a few years the number of participating countries has grown from five to eighteen: Austria, Bulgaria, Croatia, Czech, Estonia, Finland, Germany, Kazakhstan, Latvia, Lithuania, Romania, Serbia, Slovakia, Slovenia, Spain, Turkey, UK, USA.

Star of Communication

The idea of stimulating students to think about thermal and acoustic comfort and to learn about modern and proven solutions was also appreciated by the Saint-Gobain Corporation. In 2005 the project won the "Star of Communication" the prestigious award for public relations and communications. But even more the engagement of the students and professors demonstrates the importance of energy efficiency and related consequences on building design and provides us with the opportunity and privilege to participate with more countries each year.

Back

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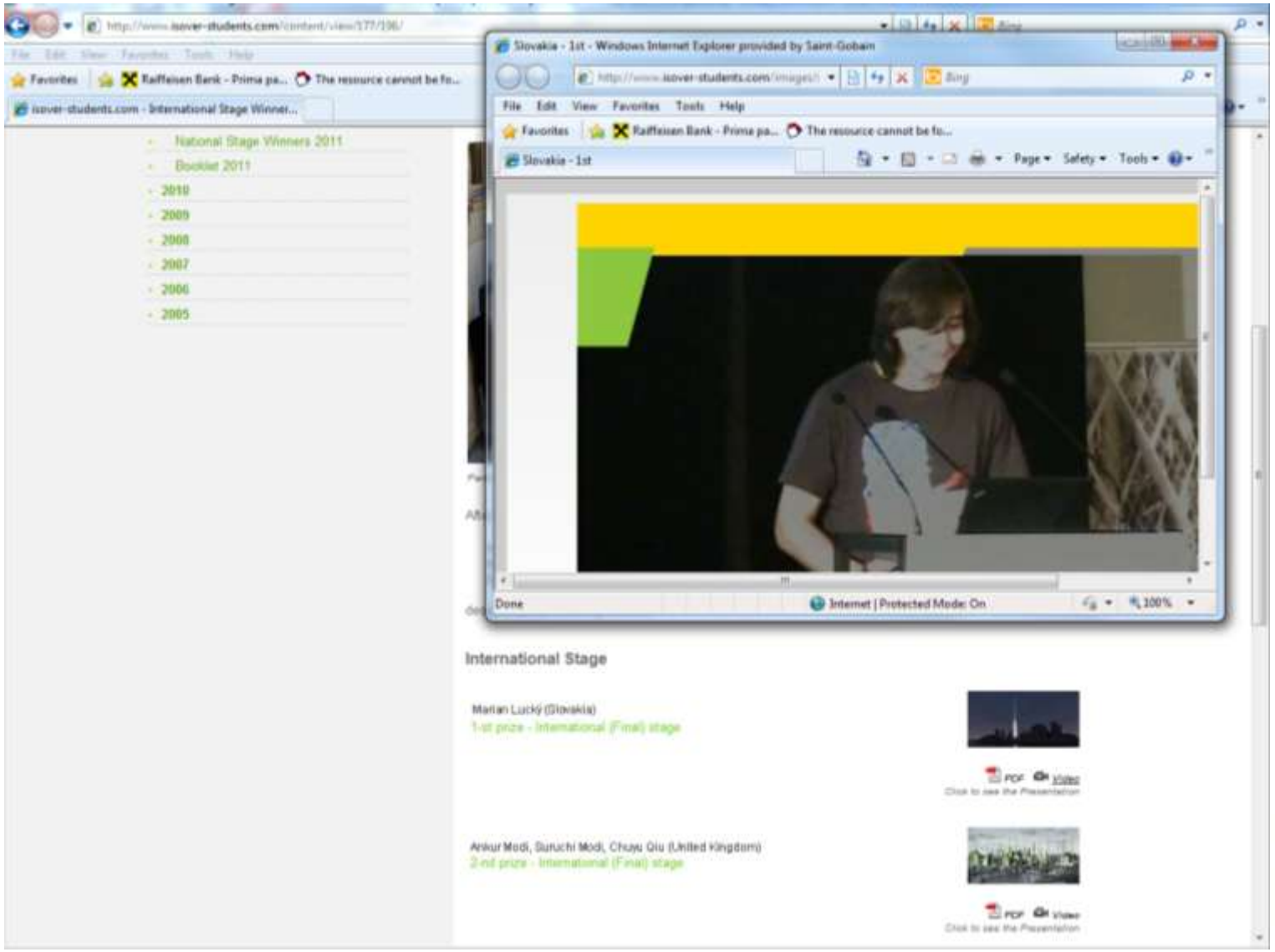

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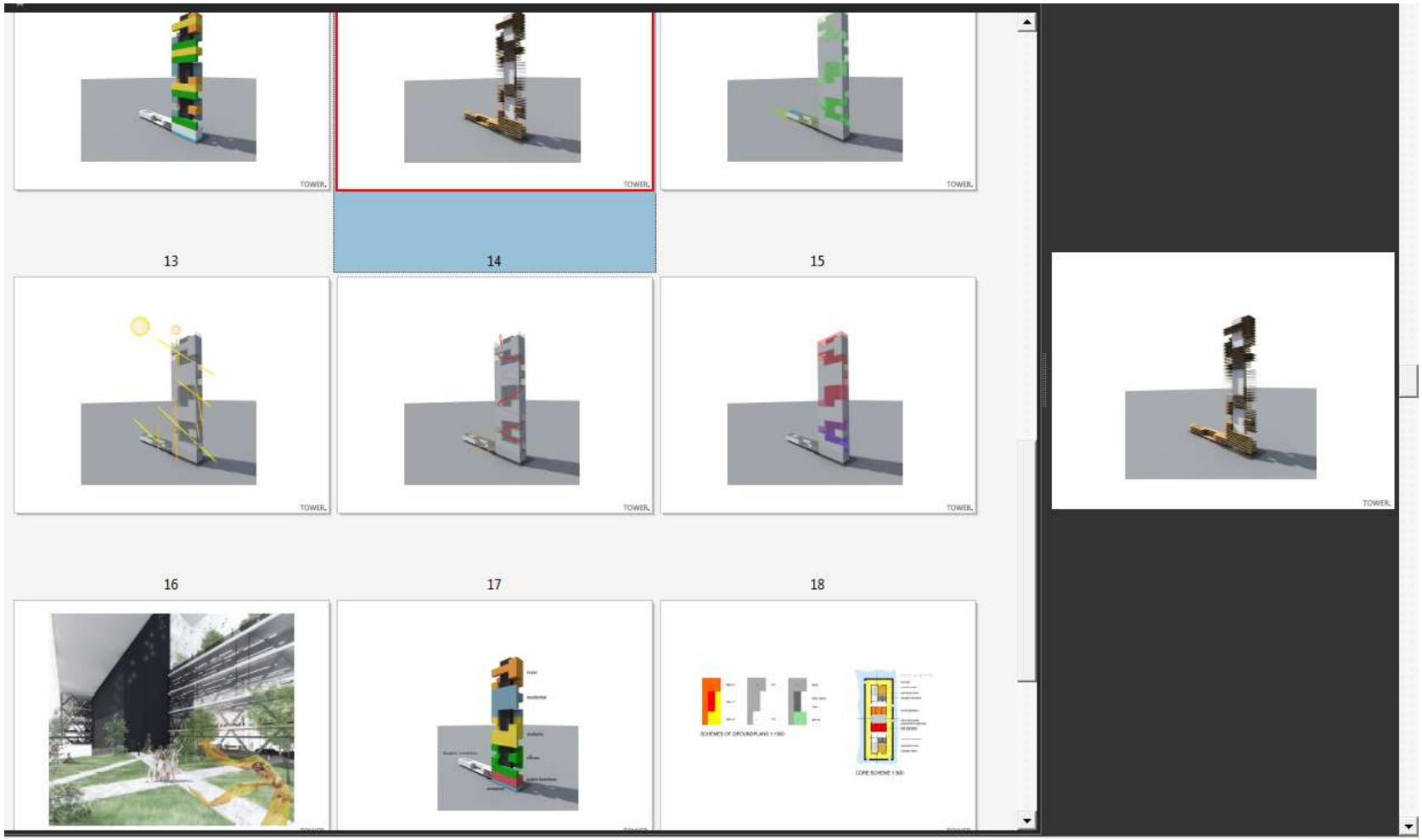

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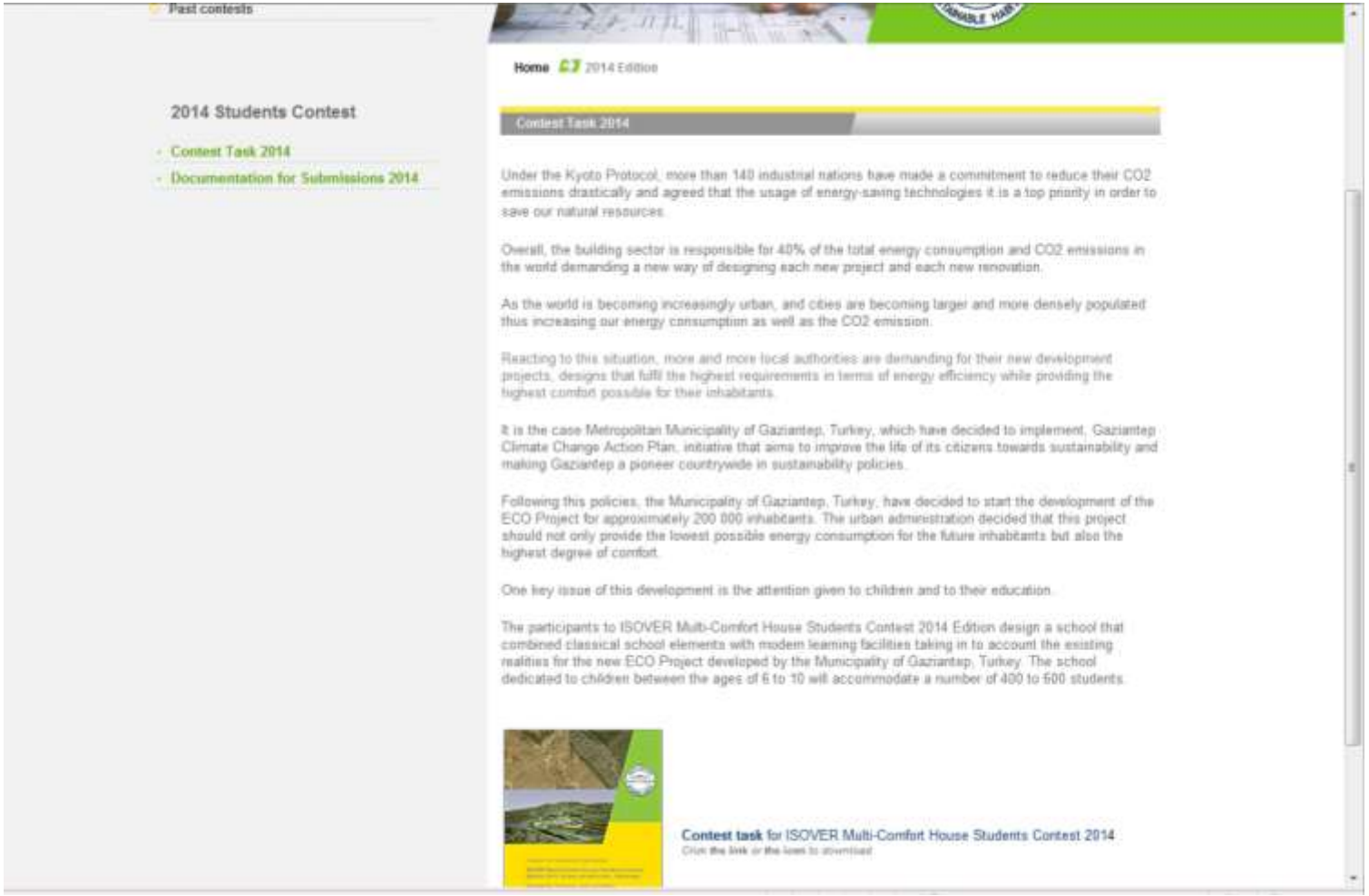

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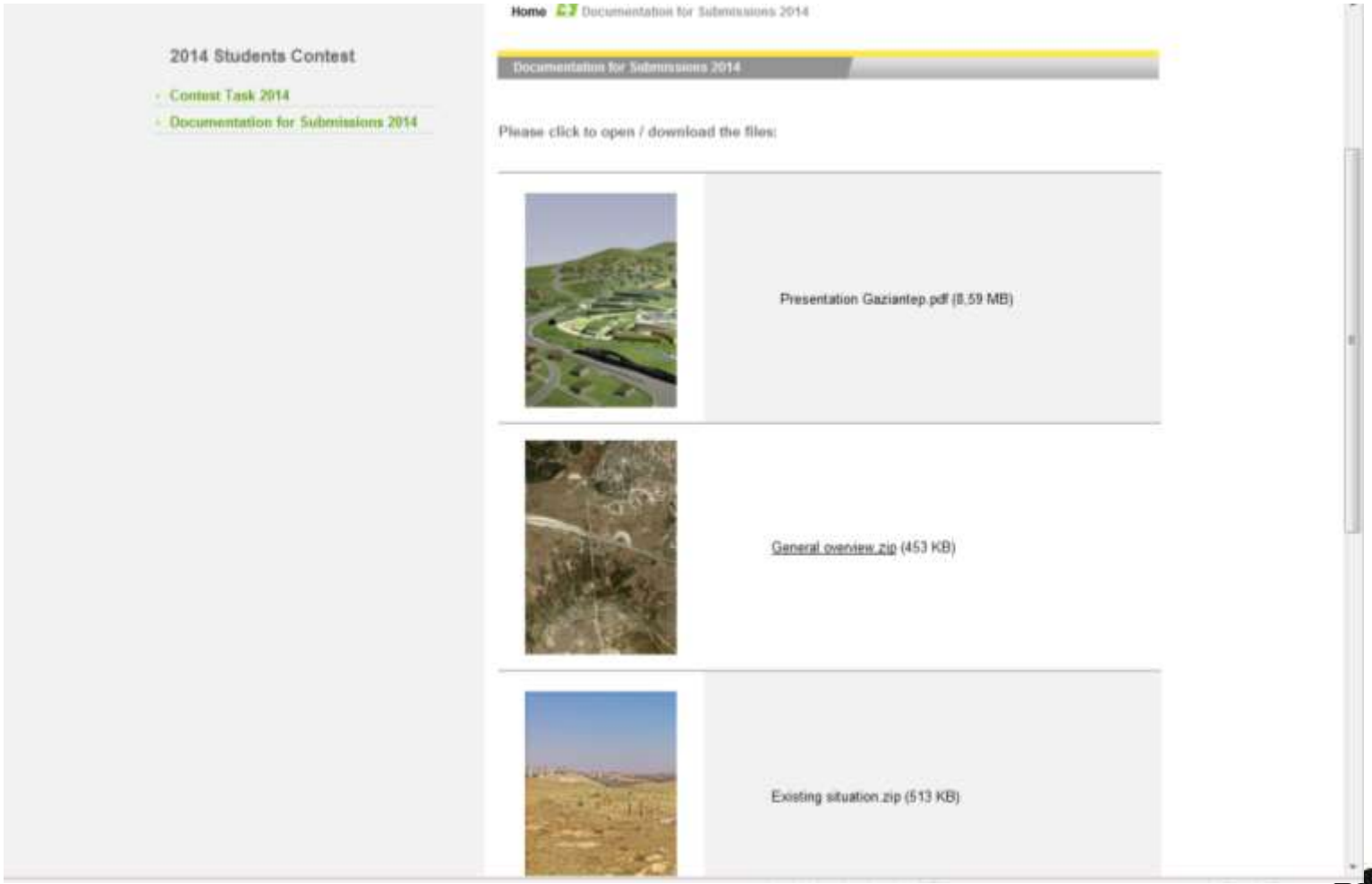

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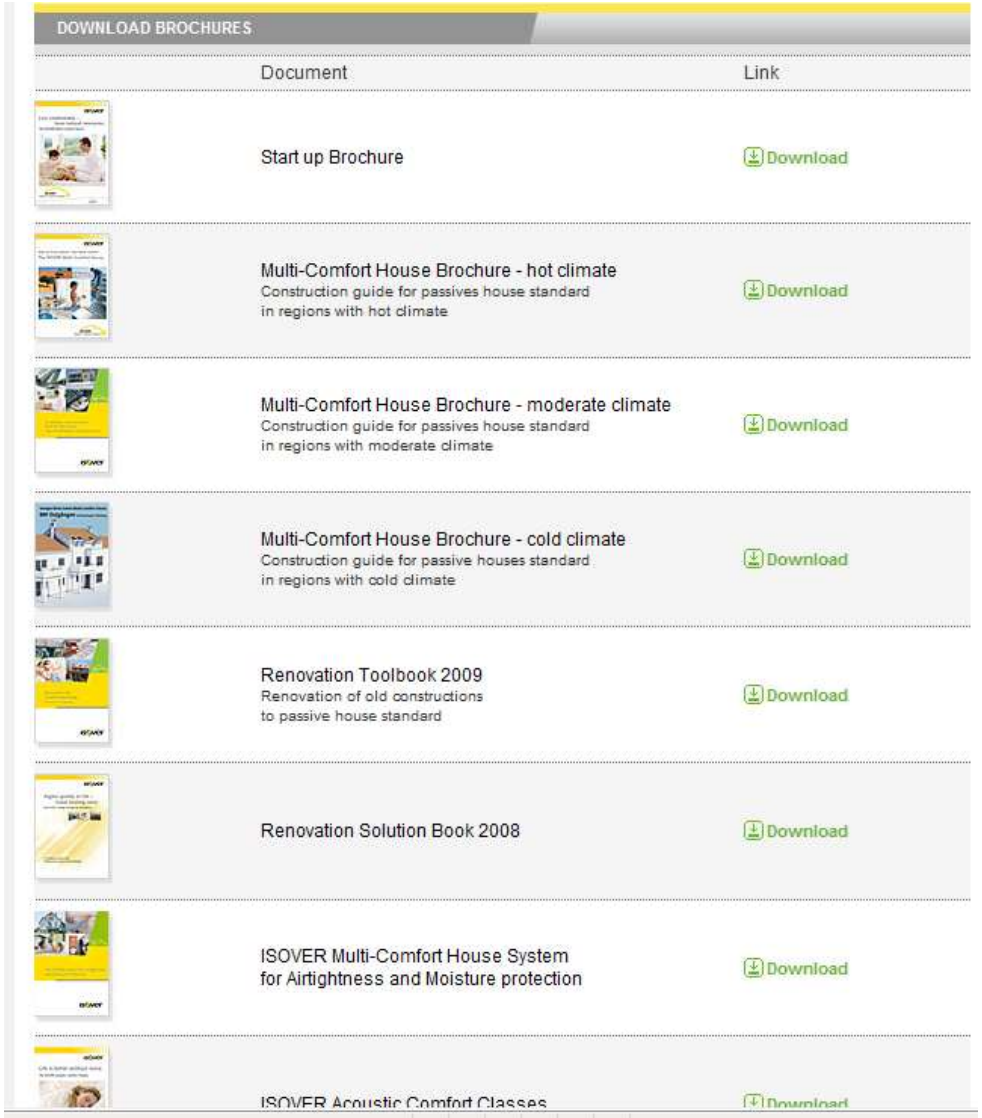

DOWNLOAD BROCHURES

Document	Link
Start up Brochure	Download
Multi-Comfort House Brochure - hot climate Construction guide for passives house standard in regions with hot climate	Download
Multi-Comfort House Brochure - moderate climate Construction guide for passives house standard in regions with moderate climate	Download
Multi-Comfort House Brochure - cold climate Construction guide for passive houses standard in regions with cold climate	Download
Renovation Toolbook 2009 Renovation of old constructions to passive house standard	Download
Renovation Solution Book 2008	Download
ISOVER Multi-Comfort House System for Airtightness and Moisture protection	Download
ISOVER Acoustic Comfort Classes	Download

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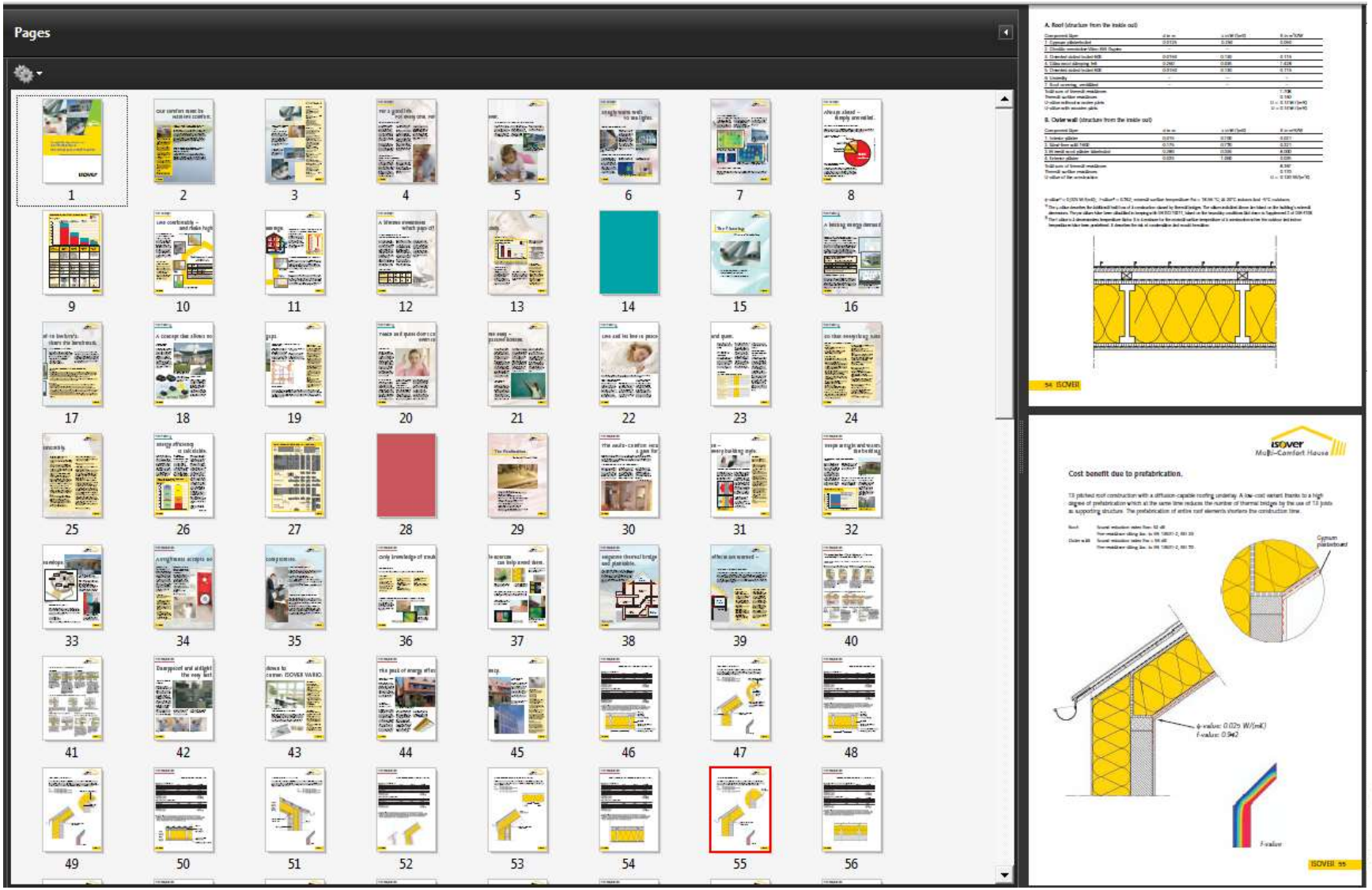

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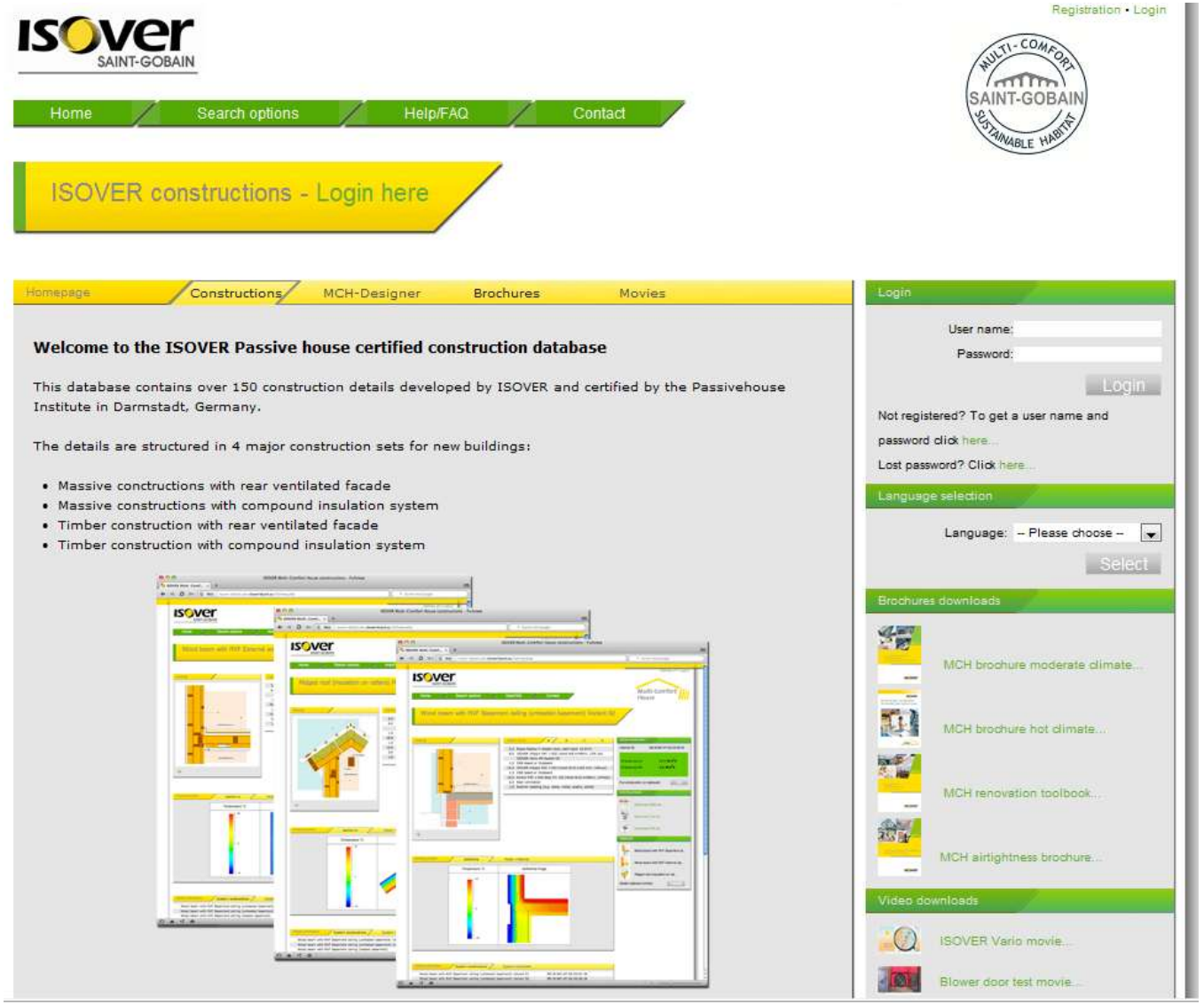
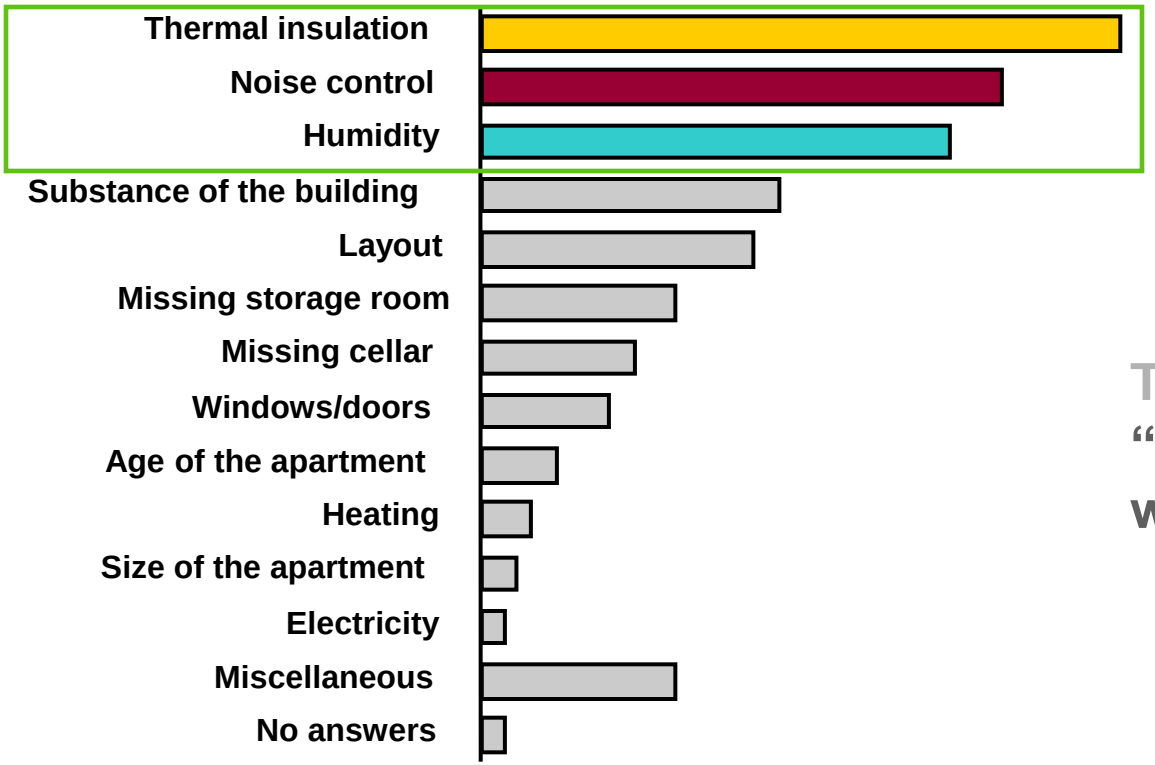


www.isover-construction.com

What are customers expecting?

The key (comfort) issues …
of building occupants are linked to insulation



The question:

“Which problems do you have with your apartment?”

Source: Survey of residential situation in Germany; Informationszentrum Beton, Köln

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Speaking about comfort

Speaking about comfort …

DESIGN

Design
importance of free design











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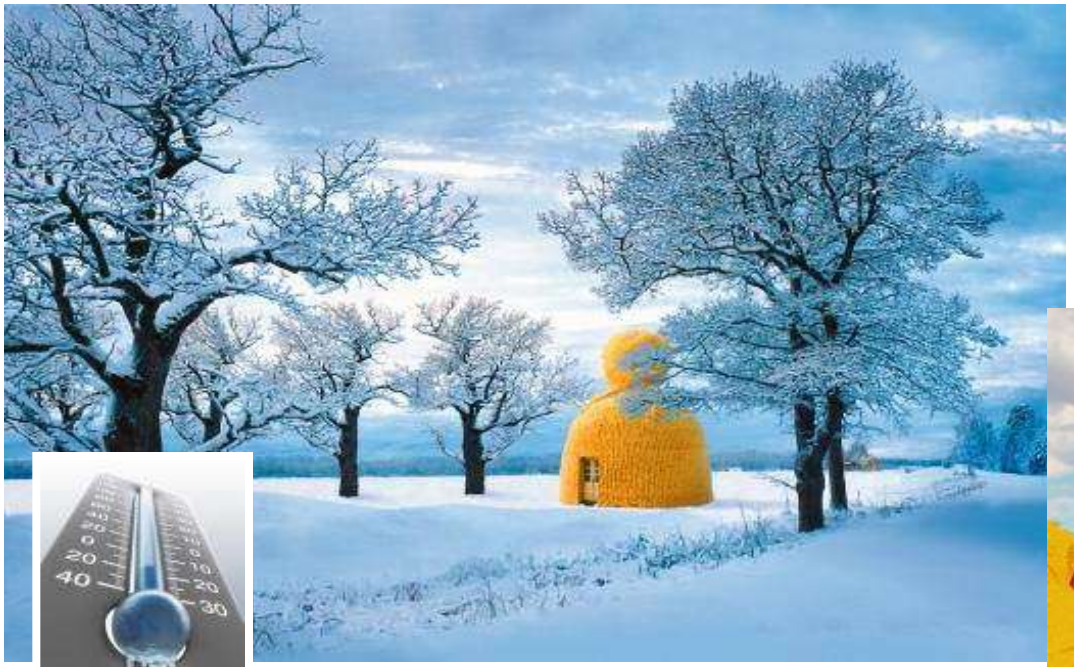
Speaking about comfort …



THERMAL COMFORT

ISOVER SAINT-GOBAIN

Thermal Comfort
effects on work performance

- **The perceived thermal comfort has a direct effect over the human body performances**

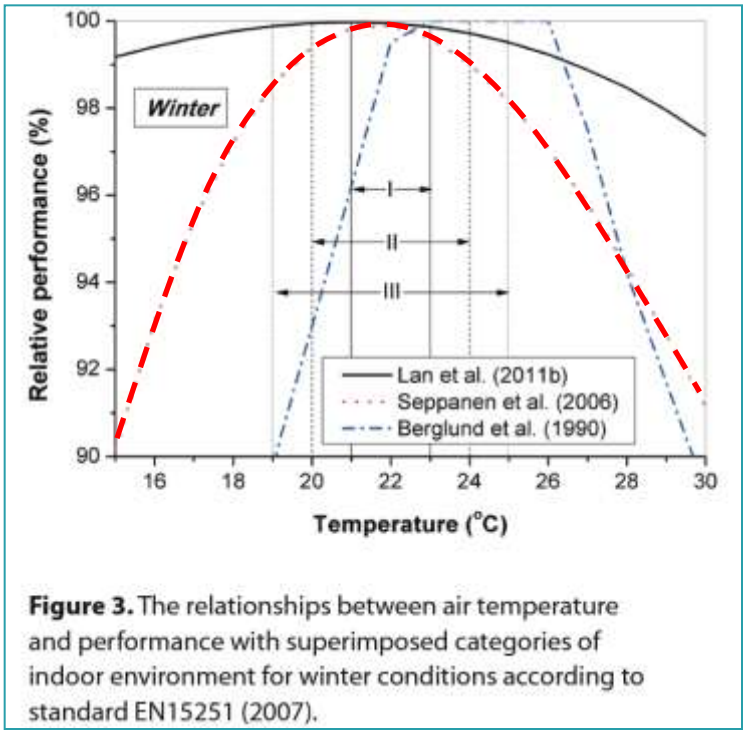


Figure 3. The relationships between air temperature and performance with superimposed categories of indoor environment for winter conditions according to standard EN15251 (2007).

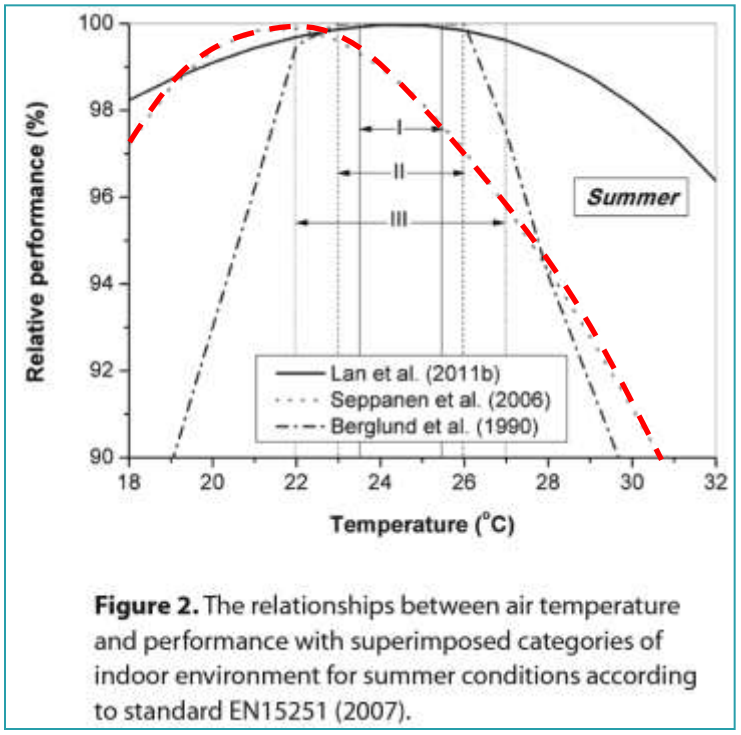


Figure 2. The relationships between air temperature and performance with superimposed categories of indoor environment for summer conditions according to standard EN15251 (2007).

Source :REHVA Journal – January 2012/ Optimal thermal environment improves performance of office work, Wargocki/Lan/Lian

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Speaking about comfort …

PEACE AND QUIET

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Acoustic comfort
effects on learning capabilities

These adverse effects can be …

- high blood pressure, mental stress, heart attacks, hearing damages
- 80 million EU citizens (20%) are exposed to unacceptable high noise levels, which lead to adverse health effects.
- It is estimated that further 170 million people are living in so called “grey areas” (55-65 dB(A)) where noise causes serious annoyance.

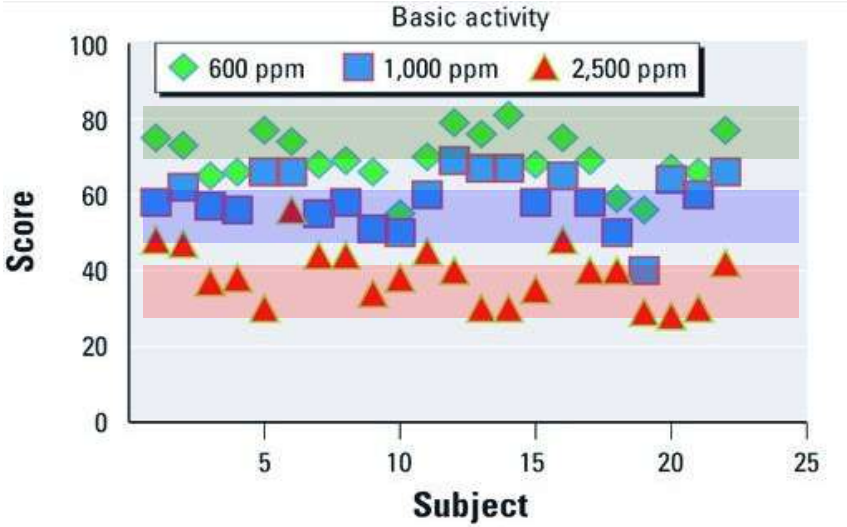
Strategy Paper of the CALM Network (DG Research of the European Commission – July 2002).

Speaking about comfort …

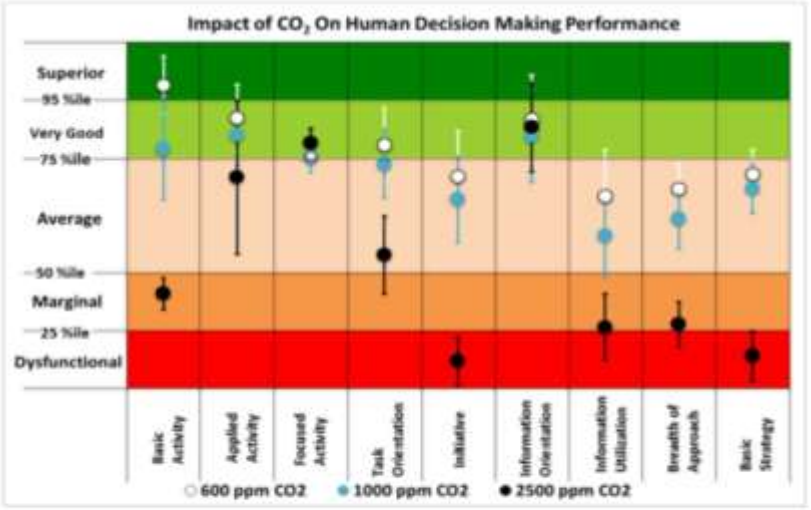
AIR QUALITY

Air quality
Negative effects of CO2 over human performance

- **High level of indoor CO2 have negative effect**
- significantly impair people's decision-making performance,



Source: Elevated Indoor Carbon Dioxide Impairs Decision-Making Performance, Berkeley Lab



Berkeley Lab researchers found that even moderately elevated levels of indoor carbon dioxide resulted in lower scores on six of nine scales of human decision-making performance.

Source: Elevated Indoor Carbon Dioxide Impairs Decision-Making Performance, Berkeley Lab

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Speaking about comfort …

LIGHT AND SPACE

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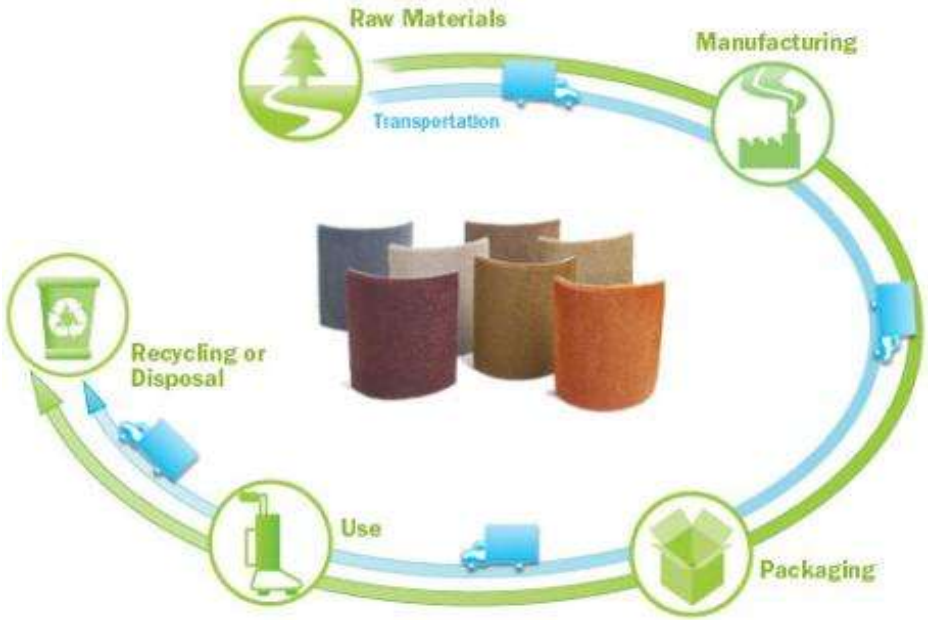
Visual comfort
effects on human well-being and comfort

- **Good level of natural light:**
- generates higher level of concentration and better short-term memory recall.
- up to 20% better performances in standardized test[1]
- faster progress on math tests by 20%[2]
- faster progress on reading tests by 25%[2]

1 : CEC study 1999
2 : Study San Juan Capistrano, California

Speaking about comfort …



SUSTAINABLE

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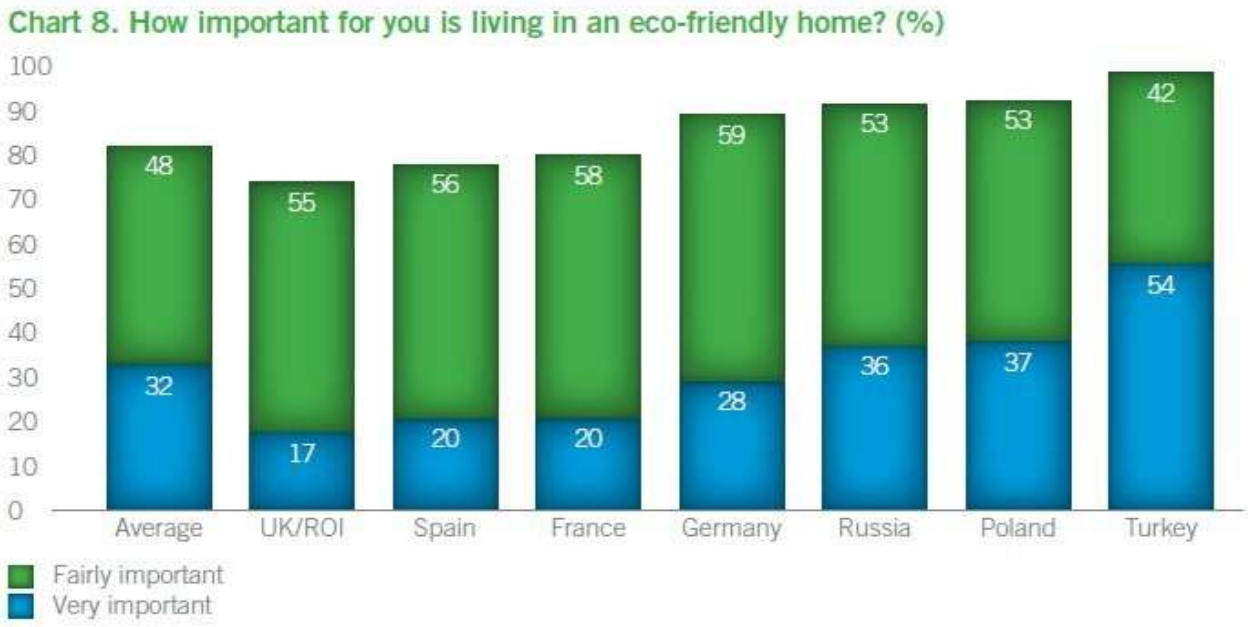
Importance of “eco-friendly” among home owners
Increasing everywhere

80%

say it is either “fairly important” or “very important” to them to live in an eco-friendly house



Source :Kingfisher’s European Home Report 2012

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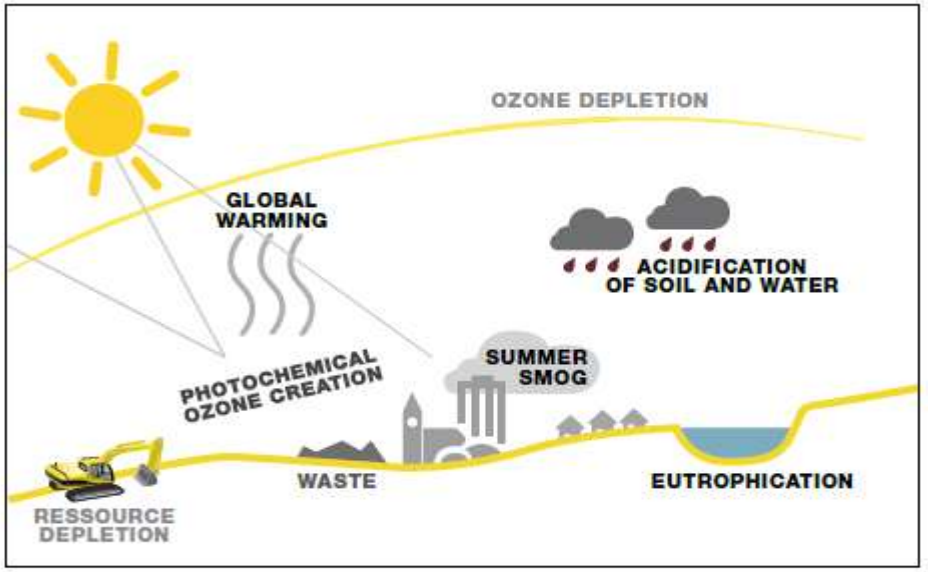
Sustainability

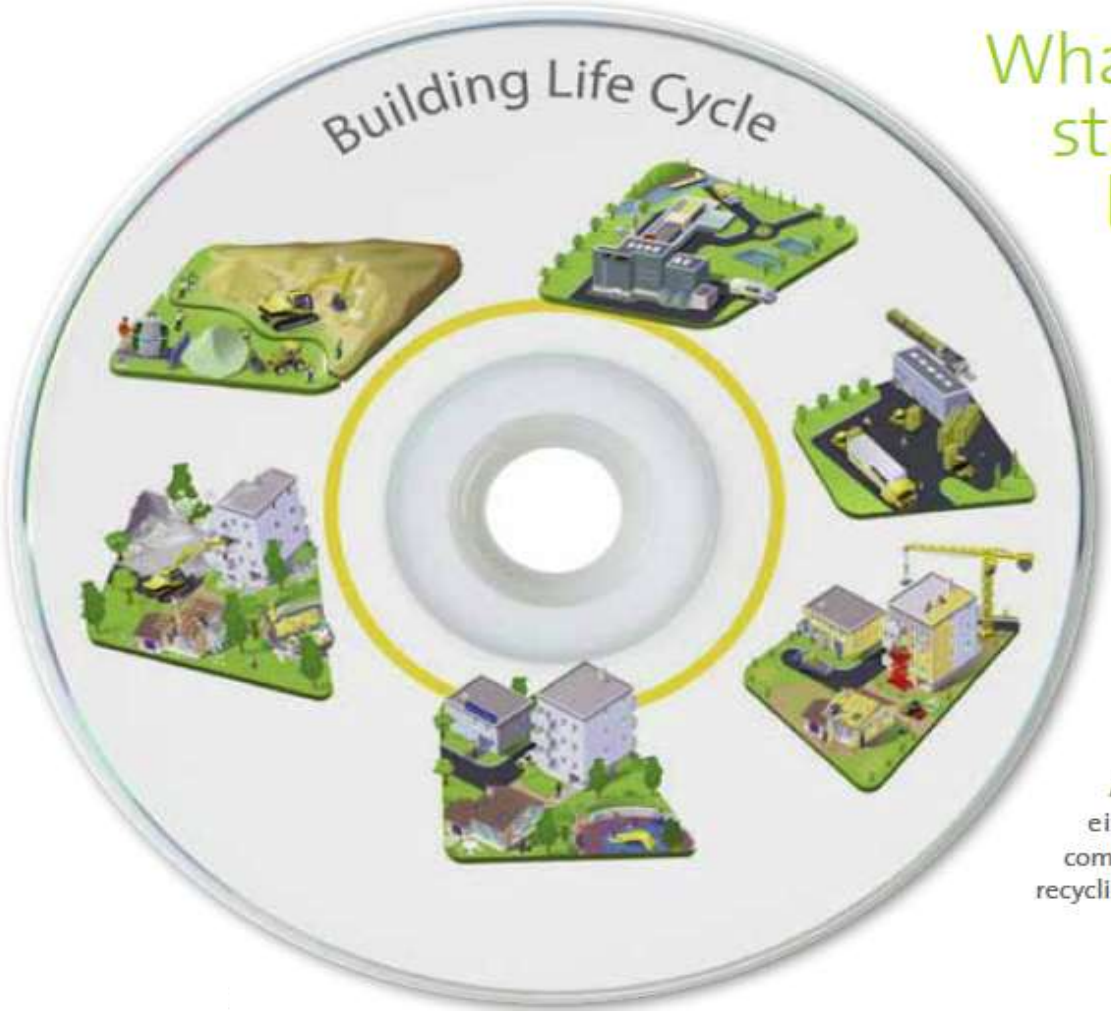
What are the environmental impacts?

All construction products, systems or buildings, have environmental impacts which are aggregated values of outputs or inputs:

- **Global Warming Potential** refers to long-term changes in global weather patterns – including temperature and precipitation – that are caused by increased concentrations of greenhouse gases in the atmosphere.
- **Ozone Depletion Potential** is the destruction by human-made air pollution of the stratospheric ozone layer, which shields the earth from ultraviolet radiation that's harmful to life.
- **Acidification Potential** is the result of human made emissions and refers to the increase in acidity of oceans, lakes, rivers, and streams – a phenomenon that pollutes groundwater and harms aquatic life.
- **Eutrophication Potential** occurs when excessive nutrients cause increased algae growth in water, blocking the underwater penetration of sunlight needed to produce oxygen and resulting in the loss of aquatic life.
- **Photochemical Ozone Creation Potential** happens when sunlight reacts with hydro-carbons, nitrogen oxides, and volatile organic compounds, to produce a type of air pollution known as smog.
- **Depletion of Abiotic Resources** refers to decreasing availability of nonrenewable natural resources due to human activity.



Sustainable Insulation Solutions
LCA - a lifecycle perspective



What are the different stages of the building Life Cycle?

The building Life Cycle starts at the **product stage:** raw materials are extracted and processed, secondary raw materials are selected; everything is transported to a plant where the products will be manufactured.

During **the construction stage**, building products are transported from the manufacturing plant to the distributors and to the building site, and installed into the building.

Once construction is complete, the **use stage** begins, including the maintenance, repair or replacement of the installed products.

At the end-of-life stage, the building is either deconstructed or demolished; its components are processed for reuse, recovery, recycling or disposal as waste.

Sustainable Insulation Solutions

Raw Materials

What is at stake?

- ISOVER glass wool is traditionally manufactured with sand, abundant in nature.
- Reducing extraction from quarries helps to protect the biodiversity.

Increased use of recycled glass

- To significantly lower the consumption of sand, the ISOVER glass wool batch contains up to 80% of recyded glass (58% in average).

ISOVER, sustai
insulation solu

Sustainable Insulation Solutions
ISOVER commitment

1. LCAs for all ISOVER products.
The principles of LCA are embedded in our DNA. We have carried out our first LCAs in the early 90's. We have decided to promote the use of LCAs in the building industry, to carry out LCAs and EPDs according to ISO 21930 or EN 15804 standards for all our products, to use them in our eco-innovation policy and to communicate actively on the results.

2. Third party verified Environmental Product Declarations
To give confidence in our communicated LCA results, we commit to have our EPDs verified by an independent third party.

3. Transparent communication
You can recognise our commitments for Life Cycle Assessments and verified Environmental Product Declarations with the "EPD verified" pictogram:

This pictogram lets you identify products with LCA results available through 3rd party verified EPDs.

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Speaking about comfort …

EASY to RUN and MAINTAIN

Multi-Comfort House Concept
The “Definition”

The Multi-Comfort House Concept
holistic approach

- is designed to minimize **energy demand for heating and cooling**
- is based on the **passive house** concept, combining **bioclimatic** design and a high-performing building **envelope**
- ensures optimal thermal **comfort** (during winter *and* summer)
- will lead to significant energy **savings**
- offers excellent **acoustic** based on Acoustic Comfort Classes
- ensures permanently high **indoor air quality**
- provides **visual comfort** due to excellent day lighting autonomy
- ensures **fire protection and long-term durability** of the construction
- is **sustainable** by taking into account environmental, economic and social factors over its complete life cycle

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The Multi-Comfort House Concept
holistic approach

- is a **construction concept** for new buildings and renovation
- fits for **all building segments**: residential and non-residential
- can be applied in **all climate zones**
- allows great **flexibility in building design**, both externally and internally
- is compatible with **all types of constructions**: massive or light-weight, on- or offsite (prefab)
- is achievable with **reasonable costs**, being economically viable due to its very high long-term energy savings and reduced need for maintenance
- provides **excellent comfort** of living

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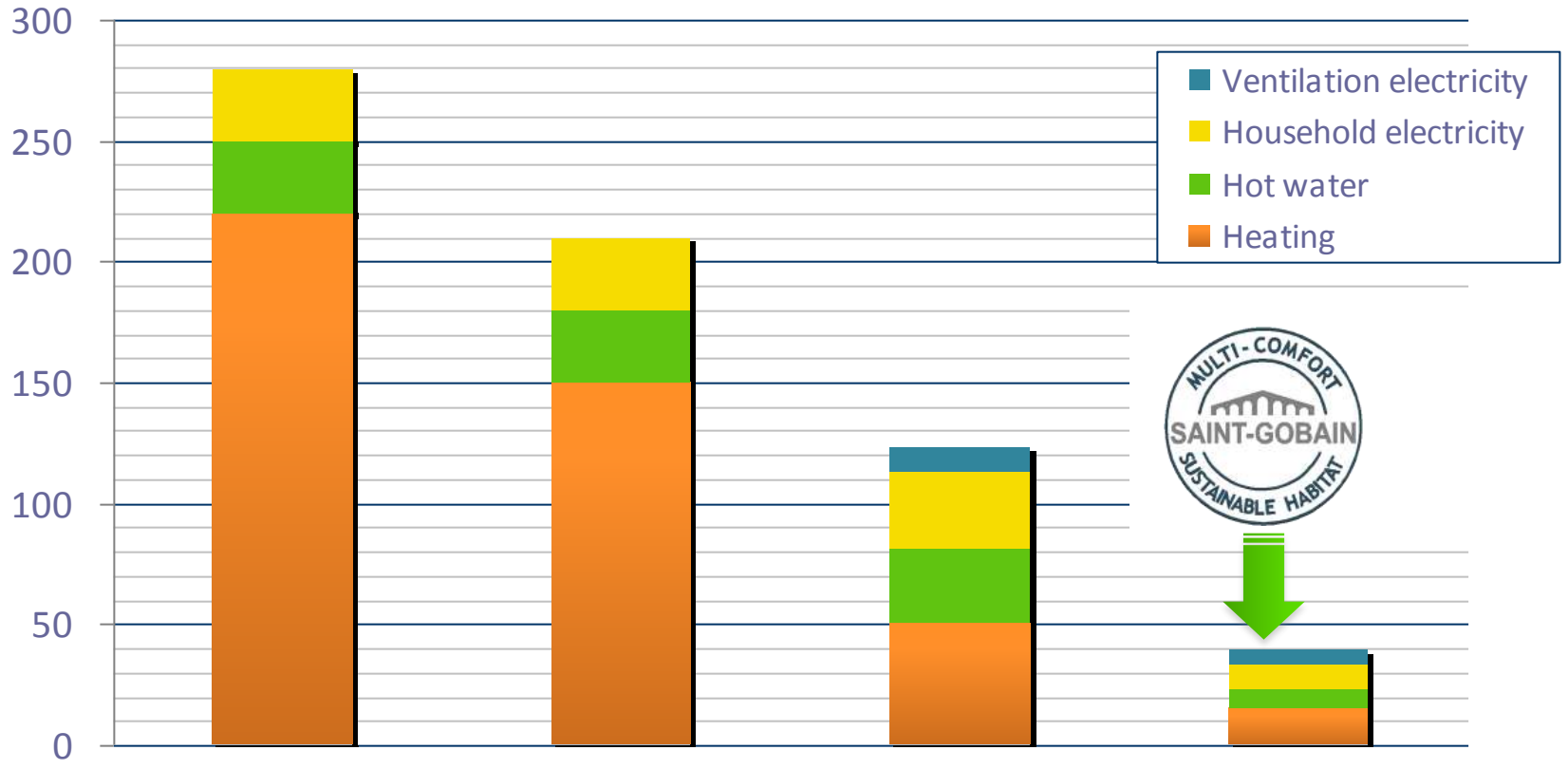
The Multi-Comfort House Concept
Criteria at a glance

			HOUSING	
			Cold & Moderate	Hot
HEATING ENERGY DEMAND (kWh/m²a)			New < 15 ; Renovation < 25 (1)	
			or future next local regulation level	
COOLING ENERGY DEMAND (kWh/m²a)			New < 15 ; Renovation < 25	
			or future next local regulation level	
AIR-TIGHTNESS n50 (V/h)			0.6	1.0
DAYLIGHTING (Daylight autonomy %)			60% (3)	
			Min.	Targeted
SUMMER COMFORT (overheating % of season)			10% (2)	5% (2)
ACOUSTICS	Between dwellings	***Airborne*** - $D_{nT,w}$+C(dB)	≥58dB	≥ 63dB
		Impact - $L'_{nT,w}$+CI(dB)	≤ 45dB	≤ 40dB
	Between rooms of one dwelling	***Airborne*** - $D_{nT,w}$+C(dB)	≥ 45dB (4)	≥ 48dB (4)
		Impact - $L'_{nT,w}$+CI(dB)	≤ 50dB	≤ 45dB
	From exterior noise	Rural & Urban – L_{den}	25 dB	20 dB
SUSTAINABILITY			EPD for all SG products	

Multi-Comfort House Concept:
Thermal performance criteria

Energy savings – comparison of buildings



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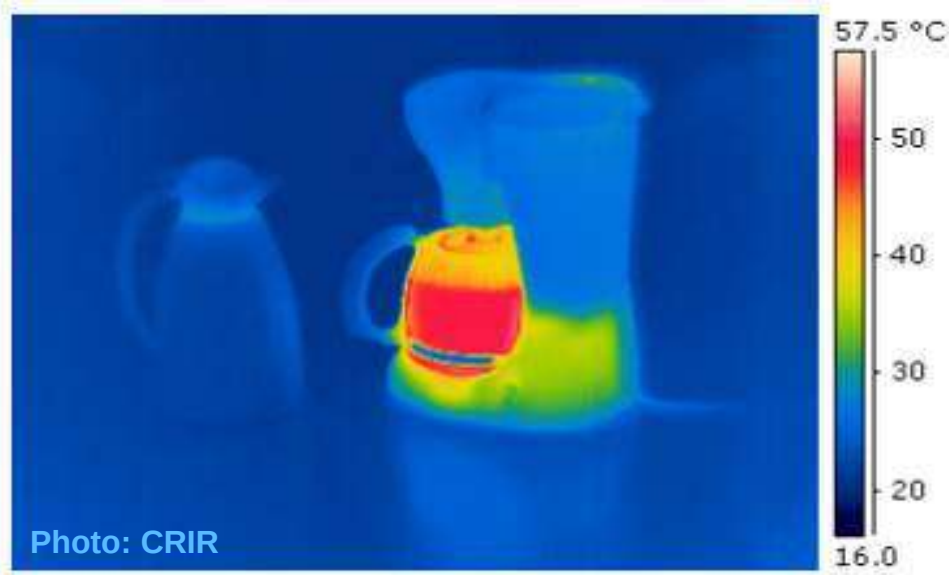
What is the Passive House principle?

From active to passive heating using insulation

Passive:
Keep it warm through insulation

Active:
Keep it warm by heating with energy

Low tech –
low maintenance



Passive:
Keep it warm through insulation

Active:
Keep it warm by heating with energy

A well insulated house is not visible

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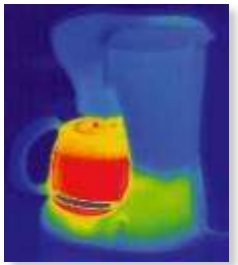
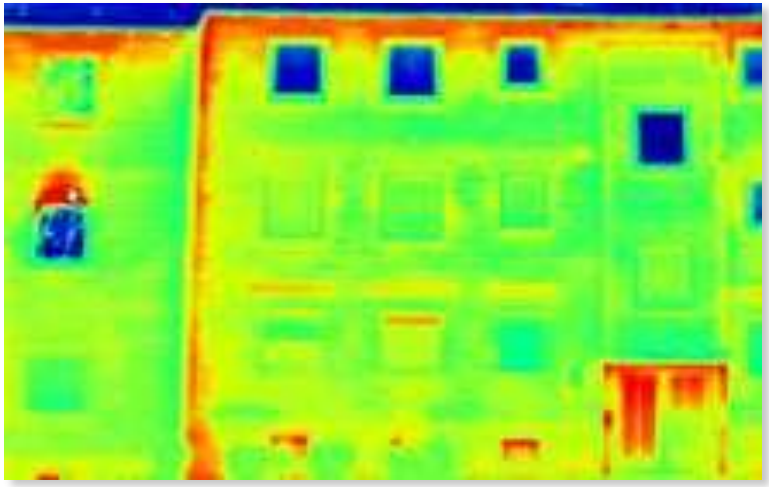
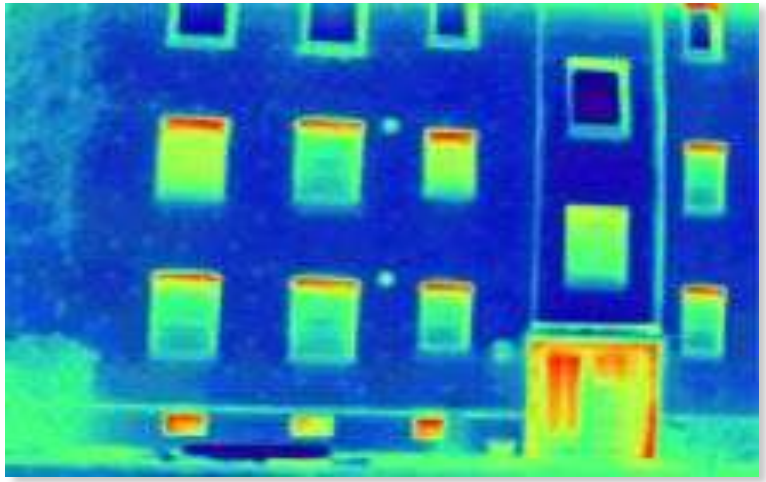
What is the Passive House principle?

From active to passive heating using insulation







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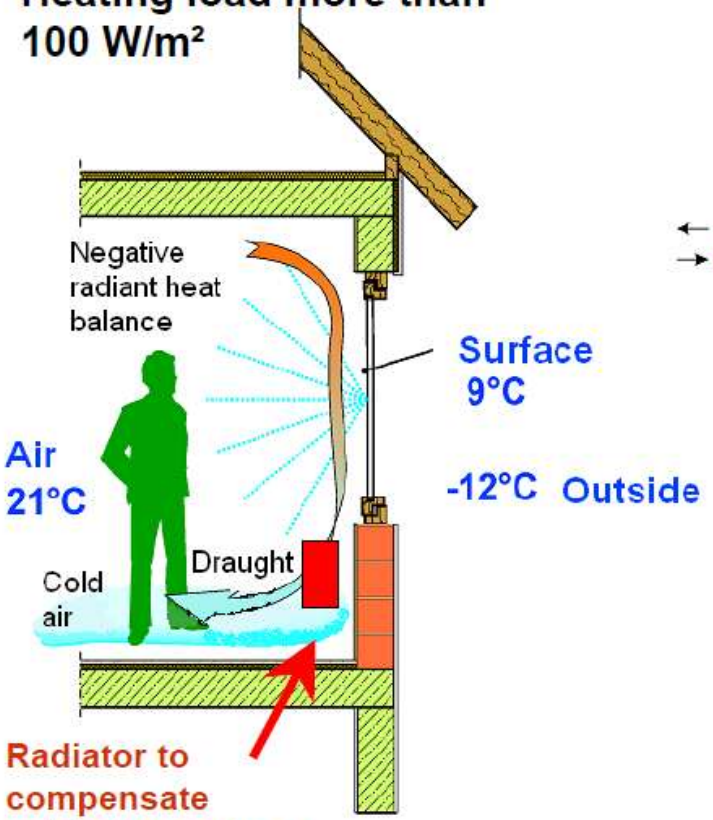
Heating load in building stock versus Passive House

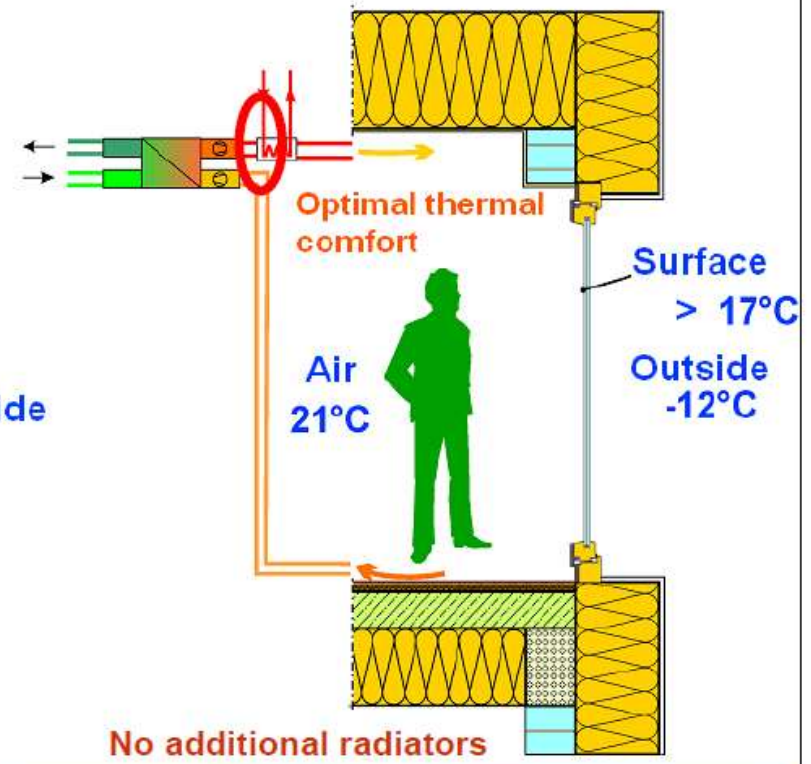
Building Stock

Heating load more than
100 W/m²



Passive House

Heating load only
10 W/m² 'without' heating



PH-criteria derivation via the supply air heating load

- How much heat can be provided by the supply air system?

Hygienic condition for the supply air : $\dot{V} = 30\ m^3/h/Person$ do not exceed this value

Typical occupancy : $A = 30\ m^2/P$ in Germany currently $> 35\ m^2/P$

Temperature limit for the supply air : $\Theta < 50\ °C$

Temperature of the supply air after HR : $\Theta \approx 17\ °C$

Maximum possible temperature increase : $\Delta\Theta \approx 30\ K$

Maximum possible heating load (exemplary calculation for 4 persons in 120 m²) :

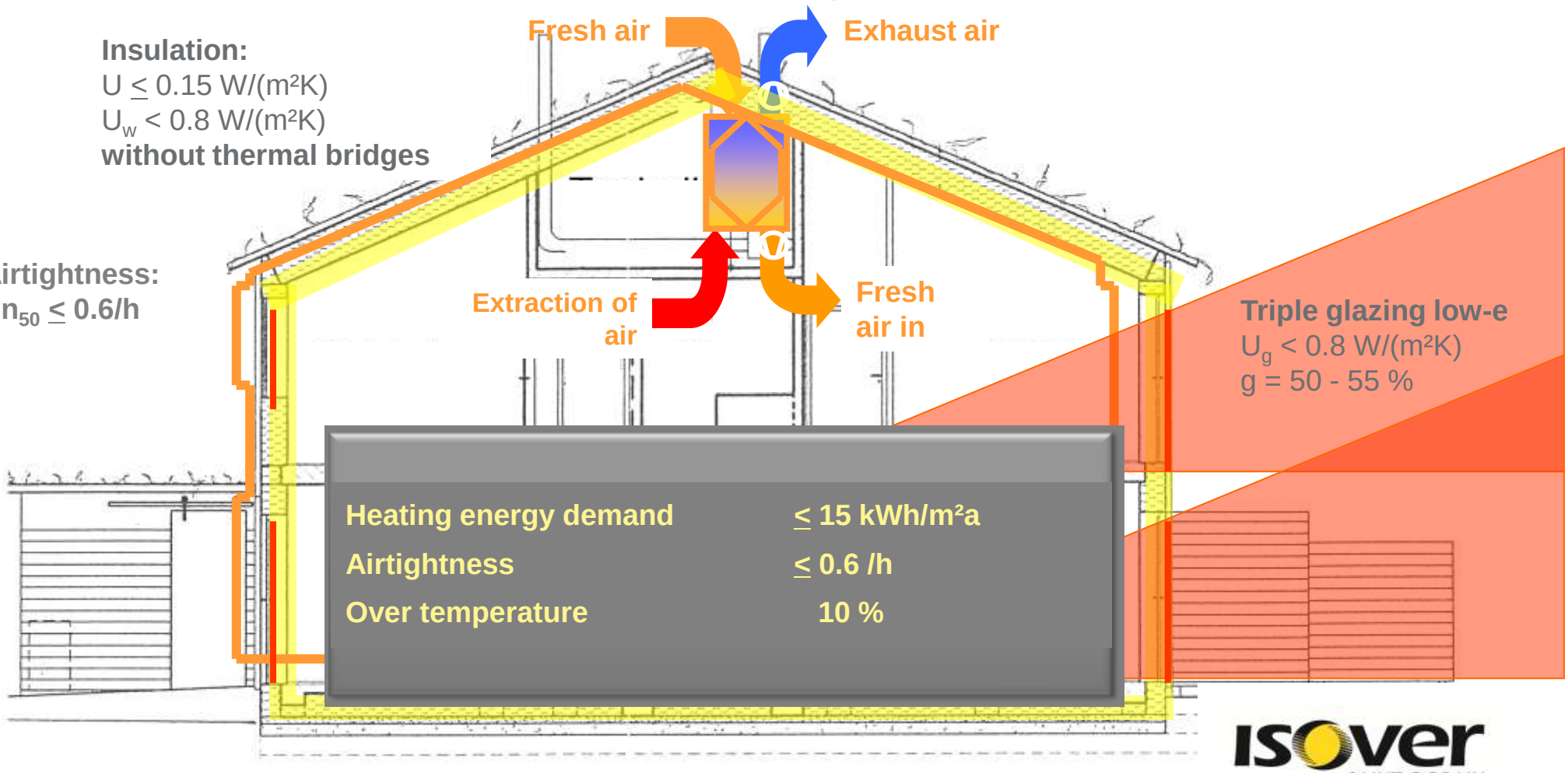
$$p_{heating} = \dot{V}/A \cdot \Delta\Theta \cdot (\rho \cdot c_p)$$
$$= 30/30\ m^3/h/m^2 \cdot 30\ K \cdot 0.33\ Wh/K/m^3$$
$$= 10\ W/m^2$$

MCH Criteria - moderate climate, new residential building or similar usage

Ventilation min. 75% recuperation of heat

Insulation:
$U \leq 0.15$ W/(m²K)
$U_w < 0.8$ W/(m²K)
without thermal bridges

Airtightness:
$n_{50} \leq 0.6$/h



Triple glazing low-e
$U_g < 0.8$ W/(m²K)
g = 50 - 55 %

Heating energy demand	**≤ 15 kWh/m²a**
Airtightness	**≤ 0.6 /h**
Over temperature	**10 %**

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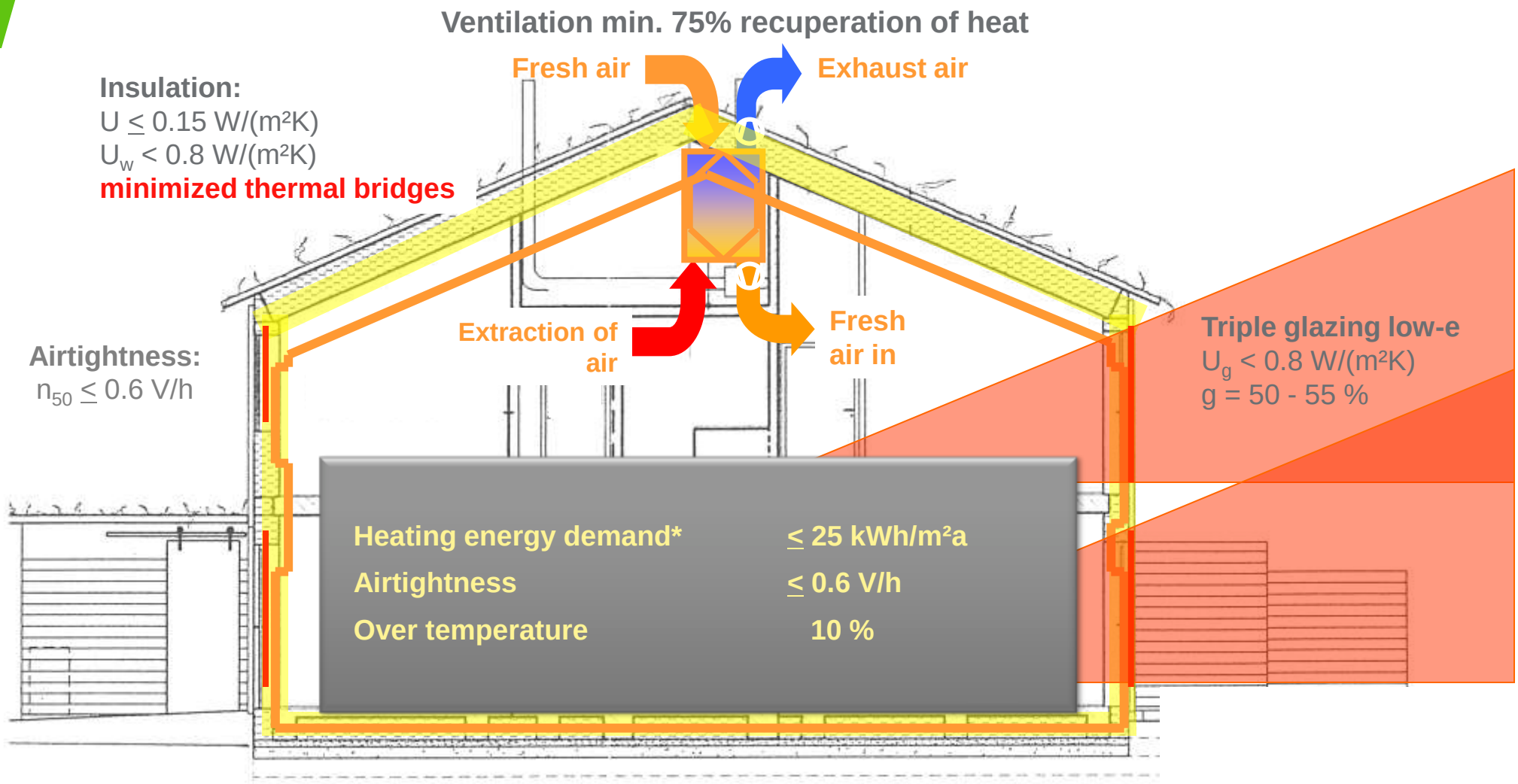
MCH Criteria – moderate climate, renovation, residential buildings or similar usage

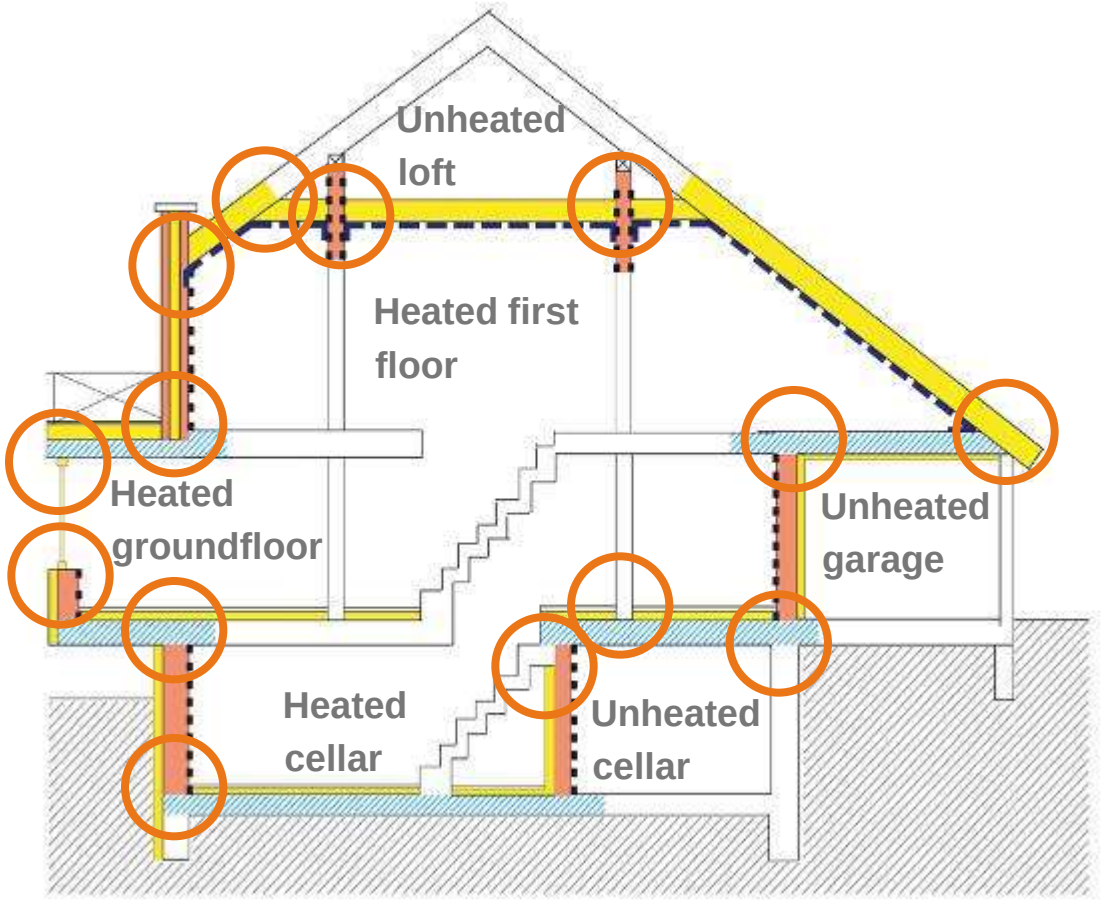


* Tentative heating and cooling energy demand or U-values of components on Passive-House level

Thermal bridges …
are weak points which have to be minimized

Thermal bridges are most frequently found around:

- foundation slabs
- basement ceilings
- upper edges of walls (roof area)
- wall penetrations between heated and unheated areas
- balconies, landings and other cantilevered elements
- windows and roller shutter boxes
- rafters and support posts
- stairs



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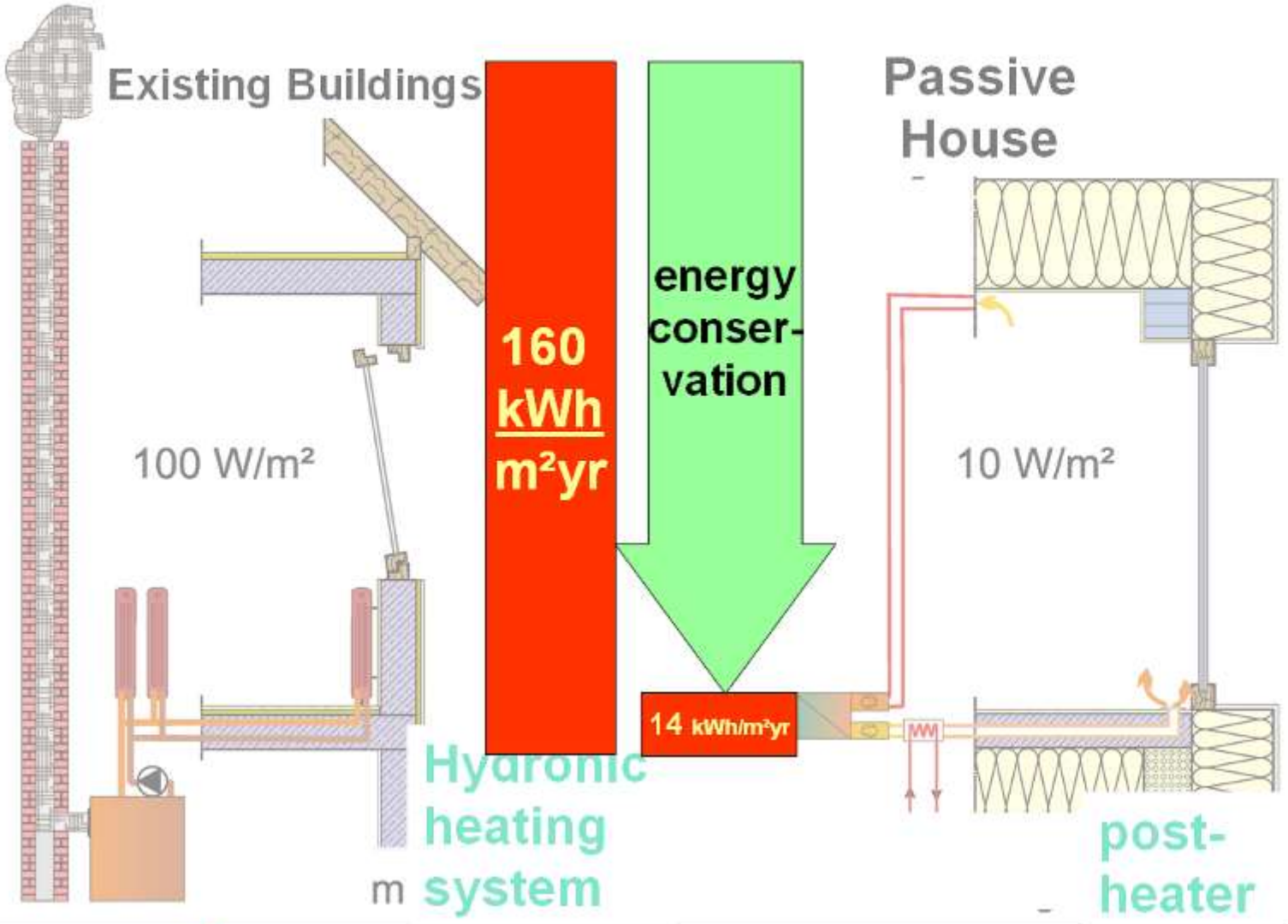
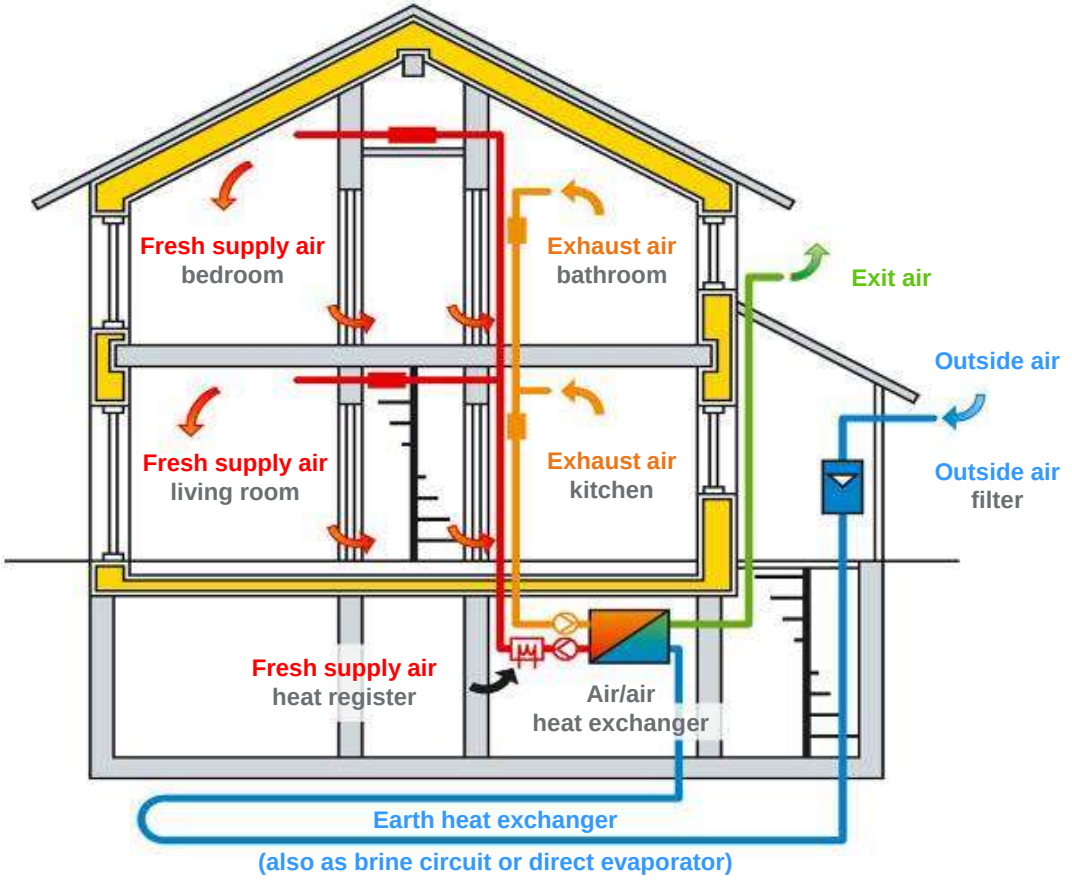
The basic principle



Multi-Comfort House Concept:
Indoor air quality

High Indoor air quality …
is essential for the health and well-being

- Recommendation: Fresh air supply of 30 m3 per person per hour.
  - This is based on a CO_2 concentration of **max. 1,500 ppm**. For some activities even lower levels of **800 ppm** are recommended (schools, offices)
- Such air quality requires a high rate of proactive fresh air exchange.
- Controlled ventilation of a building provides an adequate supply of but the ventilation system can only work efficiently when ensuring a high level of building air tightness.
- Filters of controlled ventilation system remove dust, pollen and other harmful substances



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Multi-Comfort House Concept:
Airtightness and Moisture protection

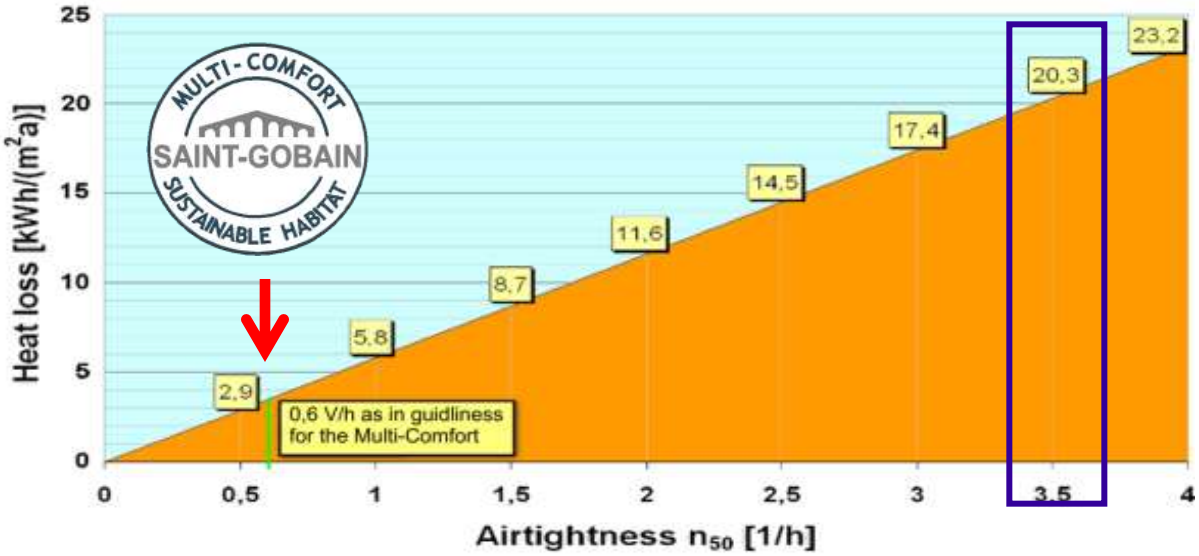
Airtightness and Moisture protection
avoiding enormous heat losses

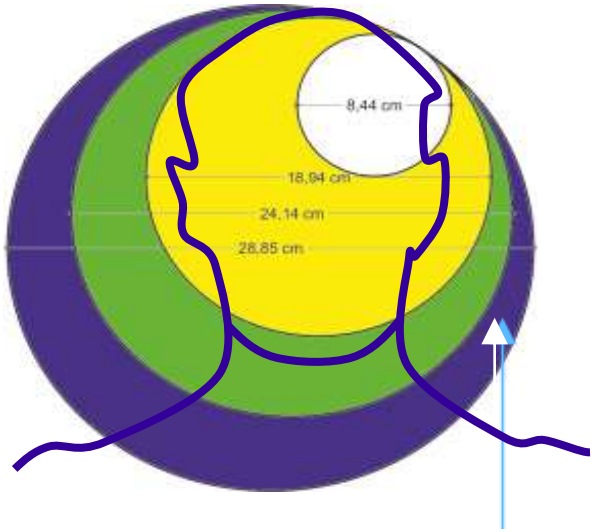
Moderate & Cold climate

- n_{50} = 0.6 means that a maximum of 60% of the complete building air volume can escape per hour through leakages

Hot climate

- n_{50} = 1.0 means that a maximum of 100% of the complete building air volume can escape





Equivalent hole size for air permeability n_{50} (vol/h)

7; 5; 3; 0,6

For single family house or dwelling of 300m³

Leakages
...can create other problems

- Air leakages can cause structural damage in a building
  - When damp, warm air leaks through gaps and cracks into colder areas of the building, the vapour it contains can condense into water. This condensate provides an ideal habitat for moulds and other fungi.

ISOVER Multi-Comfort House:
Daylight performance criteria

Daylight performance criteria
Daylight Autonomy

- **Daylight Autonomy % (DA 300l, 8-20h)**
- **Should be reached for rooms where activity takes place during day:**
  - kitchen, living room, home office
- **The Daylight autonomy calculated as follows:**
  - With a min luminance level of 300 lux , between 8 AM and 8 PM
  - Percentage of year when the minimum luminance level is met by daylight alone
- **Luminance level of 300 lux allows to comfortably perform tasks such everyday activities as:**
  - reading, cooking, make up, dining,

Window North facing: DF = 2%

Window South facing: DF = 2%

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Multi-Comfort House Concept
Acoustic performance criteria

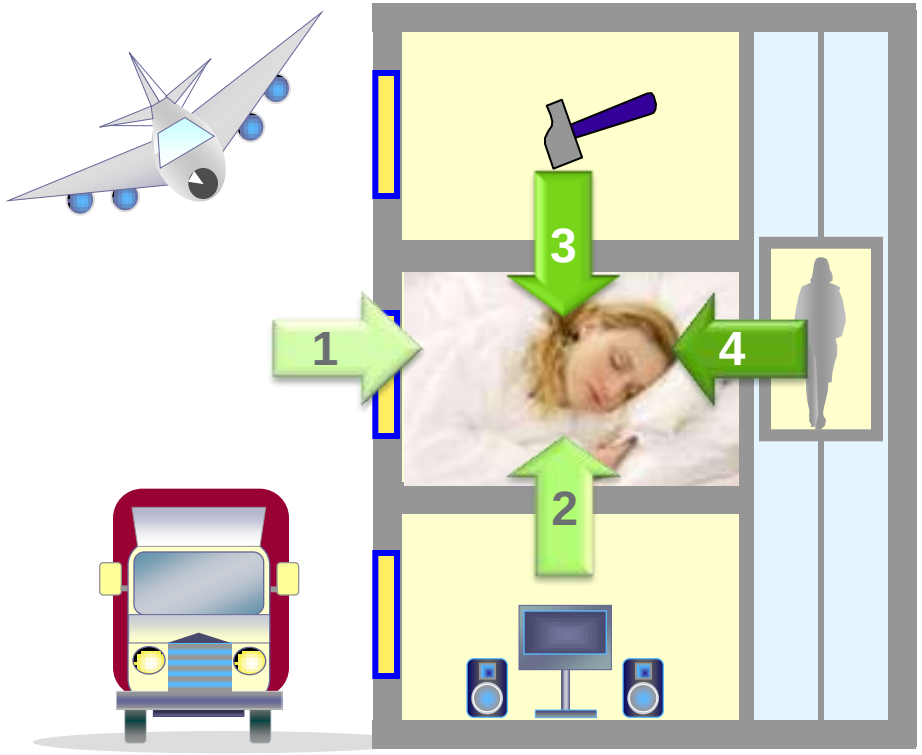
The **Source of noise** in buildings ...
can be located outside, but as well inside.

1. Exterior noise
from road traffic, trains and airplanes.

2. Air born noise
from inside the house such as conversations, hi-fi, television, etc.

3. Structure born noise
from footsteps, objects falling on the floor, house hold equipment, etc.

4. Noise from technical equipments
from heat and ventilation, lifts, water pipes, etc.



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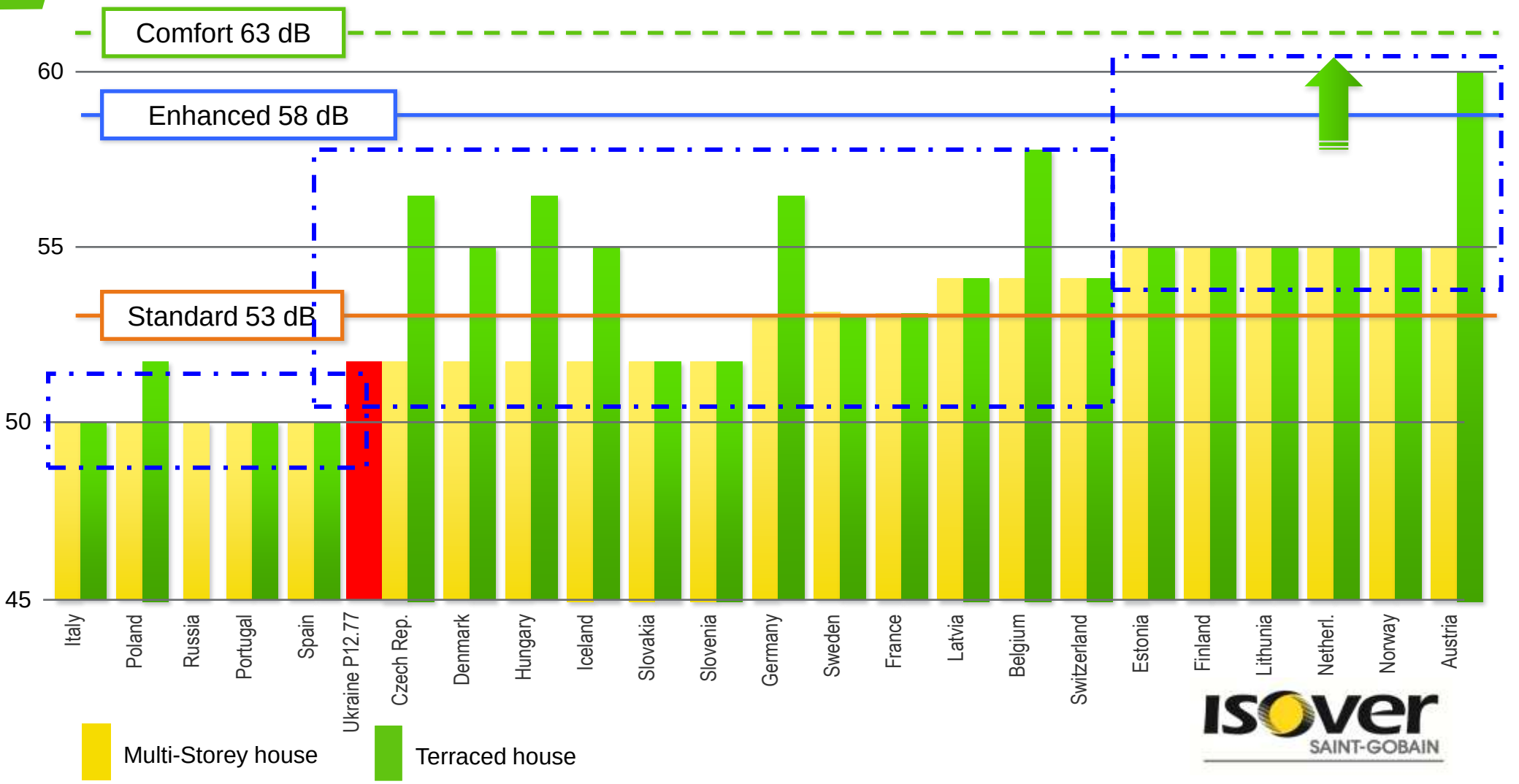
Airborne Sound Insulation in Europe



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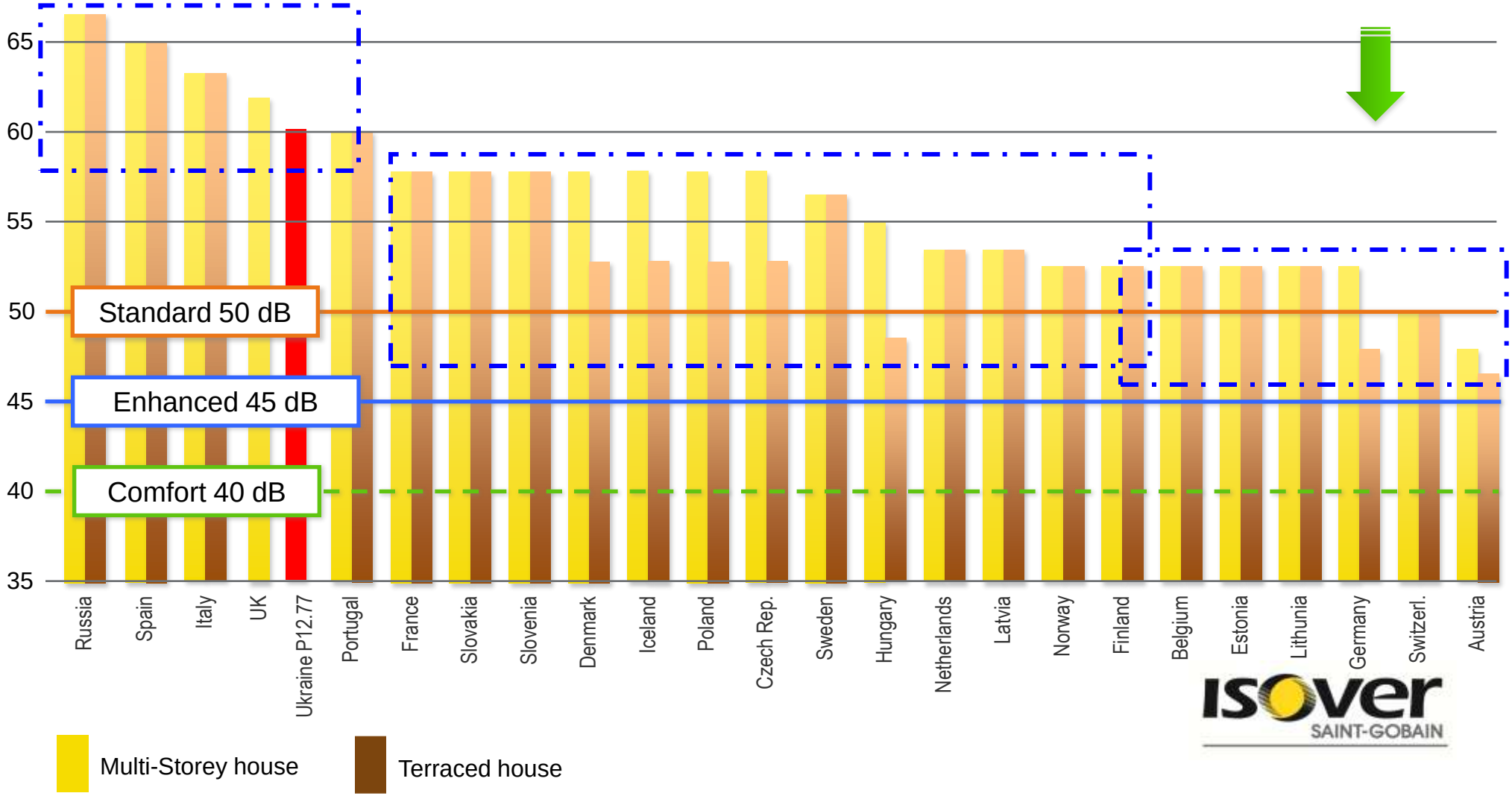
Impact Sound Insulation in Europe



Acoustic comfort – the Acoustic Comfort Classes.

Class	”Music“	”Comfort“	”Enhanced“ *	”Standard“
Airborne sound insulation between flats $D_{nT,w} + C$ (dB)	≥ 68 ($C_{50-3150}$)	**≥ 63**	**≥ 58**	≥ 53
Airborne sound insulation between the rooms of one flat (without doors), also incl. one-family houses $D_{nT,w} + C$ (dB)	≥ 48	**≥ 45**	**≥ 40**	≥ 35 **
Impact sound insulation between flats $L'_{nT,w} + C_{1,50-2500}$ (dB) ***	≤ 40	**≤ 40**	**≤ 45**	≤ 50
Impact sound insulation withina flat, also incl. one-family houses $L'_{nT,w} + C_{1,50-2500}$ (dB) ***	≤ 45	**≤ 50**	**≤ 55**	≤ 60

* Minimum requirements for row houses
** If requested
*** For a transitional period: L’nT,w + CI, values lower by 2 dB

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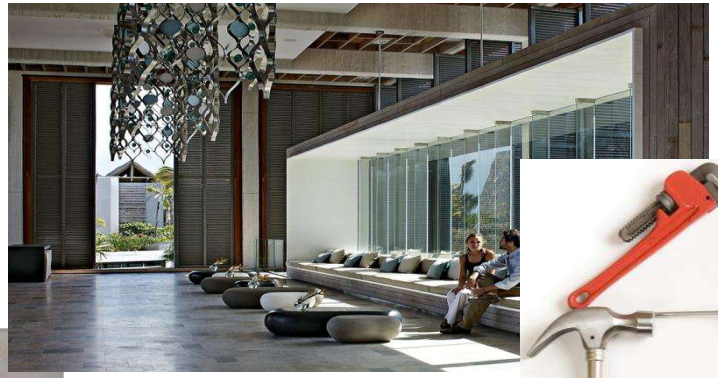
Speaking about comfort …



Multi-Comfort House
Pilot projects

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Denmark:
Komfort Husene – 10 different house types

- Construction movie available at www.isover-construction.com










Romania:
Twin-house / University Bucharest

SAINT-GOBAIN GLASS

weber

Rigips SAINT-GOBAIN

ISOVER SAINT-GOBAIN

Germany:
Multi family house – concrete & prefab façade elements Frankfurt

The biggest Passive house in Germany

- 149 dwellings, 4 shops, garages
- over 20,000 m² built area

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France:
Single family house - wooden prefab / Limoges

- **Construction movie available at www.isover-construction.com**

Placo®

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Czech:
Single family house - masonry / Pardubice

Japan:IBARAKI
Single family house


Certificate

Quality Approved Passive House

Canada:
Austrian House for the Olympic / Vancouver

Rigips SAINT-GOBAIN

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Germany:
Single family house renovation / Mannheim

- Construction movie available at www.isover-construction.com

	Before refurbishment	After refurbishment
Heating energy demand	320 kWh/m^{2}a	11 kWh/m^{2}a
Monthly heating costs for office and residential	EUR 375	EUR 29.17
Annual CO_2 emissions for the total building	89 tons	8 tons

weber

Rigips

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Belarus:
Single family house – wooden frame/ Minsk

Тип здания:
Сущ. здание ☐
Новое здание ☑

Год строительства: 2012
Год реконструкции: -----
Расчётная площадь здания: 200 м²

CO_2 2,7 т/год

ЭНЕРГЕТИЧЕСКАЯ МАРКИРОВКА ЗДАНИЯ

Классификация энергоэффективности здания	Класс здания
Полезная энергия	кВт ч/м² год
A++	
A+	
A	A 25
B	
C	
D	
E	
F	
Распределение по бытовым нуждам:	кВт ч/м² год
Отопление	25
Горячее водоснабжение	19
Электроэнергия	15

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THANK YOU !

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