



## INTERACTIVE SESSION

Design your own circular renovation concept  
for social housing



**60 min**

1

Identifying local housing needs  
and available resources



30 min

## INSTRUCTIONS

- Participants are split in groups and are asked to map their local circular renovation context, with a focus on the social housing sector.
- Post-its are used to write and stick ideas into the canvas. The dimensions to be assessed are:
  - Local construction materials
  - Main energy sources
  - Financial support available
  - Common renovation methods
  - Features of the building stock
  - Climate needs
  - Knowledge, skills and awareness

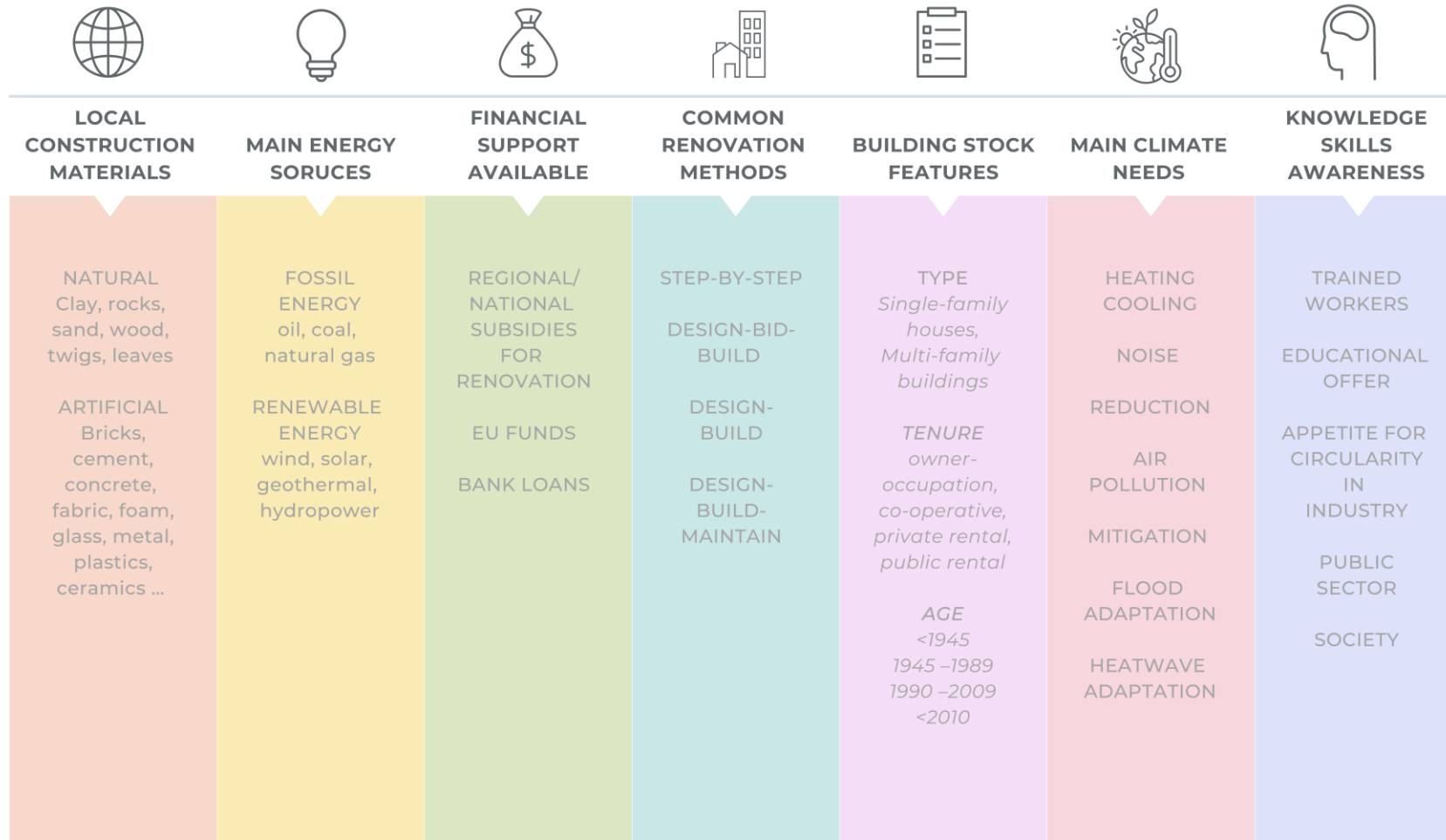
*This first exercise paves the ground for the second one, as it will allow participants to create an overall picture of the available resources, needs and readiness toward circular housing renovation in their region.*

*With this in mind, it becomes much easier to think of the most appropriate circular measures to be used for their own social housing renovation project.*



**IVE**  
Instituto Valenciano  
de la Edificación

# Mapping the local circular renovation context





2

Develop your own circular renovation concept



30 min

## INSTRUCTIONS

- For the second exercise, a set of poker-size cards are used to present all circular measures that have been developed to date by the technical suppliers of the HOUSEFUL and DRIVE 0 projects.

While some of these have already been installed and tested in real-life housing renovation scenarios, others continue to be work in progress.

Measure cards included a short description, an illustration and were classified into four groups: materials, water, energy and waste (see below a sample from each group).



**IVE**  
Instituto Valenciano  
de la Edificación

## MATERIALS

### Building materials passport

Materials passports contain information about the quality, origins and location of materials and products used in the construction of buildings and other construction objects. All in such a way that owners and/or managers of real estate and infrastructure always have up-to-date information on the financial and circular value, toxicity, demountability and reuse potential of the materials and products applied in their properties.



1

## DRIVE



Co-funded by the  
European Union



2

## MATERIALS

### Compost production

Kitchen scraps, yard waste and/or stabilised blackwater from anaerobic digestion systems can be used as compost for local gardening, substituting or competing with commercial compost.



3

## DRIVE



Co-funded by the  
European Union



4

## MATERIALS

### Biogas production

Solids from blackwater and organic waste from kitchens and gardens can be used to produce biogas. The generated biogas can be used for cooking or heating. The gas is stored in inflatable and impermeable fabrics. This energy storage can be further used for potential grid injection, or combustion in a natural gas boiler and can support the NZEB or passive house claim to reach full autonomy even in winter months.



5

## DRIVE



Co-funded by the  
European Union



6

## MATERIALS

### Biobased materials

A bio-based material is a material made from substances derived from living (or once-living) organisms. Using building materials based on natural and renewable sources is more sustainable and circular than materials based on finite and/or carbon intensive exploitation.



7

## DRIVE



Co-funded by the  
European Union



## MATERIALS

### Reusing existing building products and recycled materials

Reusing existing building materials can reduce emissions, but also help to retain the value of buildings over their lifetime and support the local economy. To increase reuse it is necessary to maximize the amount of valuable materials recovered by increasing the acceptance of Construction and Demolition Waste CDW – based products. E.g. CDW-derived materials can be effectively reintroduced in the production cycles of concrete and timber components with a replacement rate of 50-85 %.



## DRIVE



Co-funded by the  
European Union



## MATERIALS

### Local and/or certified circular materials

It is important to choose certified circular construction materials and products from the different seals available during the design phase that are available as close to the building as possible. The use of certified building circular material will be essential for the improvement of building circularity.



## DRIVE



Co-funded by the  
European Union



## MATERIALS

### Prefabricated products

Circular materials can be used to produce prefabricated, fully reusable buildings. It can be done by designing reusable building components to be produced in automated BIM controlled production processes. Prefab plug & play solutions have proven to be effective to come to a:

- Reduction of both renovation time on site and costs.
- Reduction of disturbance for occupants during the renovation works.
- Quality improvement by better quality control during the production process.





## DRIVE




Co-funded by the  
European Union



**DRIVE** 




Co-funded by the  European Union

16


**ENERGY**


**Energy smart meters**


A smart meter is another way you can potentially reduce your carbon footprint. Utilising one you can easily see how much energy you are using via a digital display, and so adapt your energy use accordingly. It also cuts out having to send meter readings to your energy company or have someone come to your house.



17

**DRIVE** 



Co-funded by the  European Union

18


**ENERGY**


**Energy efficient windows**


It is recommended the double-glazed casement, tilt-and-turn windows and HR+++ or HR++ glass (3 or 2 panes of glass separated by an insulating gas). Very well insulated windows help save energy and increase comfort.



19

**DRIVE** 



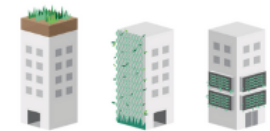
Co-funded by the  European Union

20

**ENERGY**

**Green walls and roofs**

A green roof or facade buffers and absorbs rainwater, insulates the home, increases biodiversity and reduces the heat island effect. Evaporating water cools the home and makes solar panels more efficient.





21


**ENERGY**


**Hot water, heat and/or cold generation**

It is important to replace Domestic Hot Water, heating and cooling systems using fossil fuels with others using renewable energy. It is advisable to install electrical systems and combine them with renewable energies. Biomass heating is also a desirable low-carbon heating option.



**DRIVE** 





Co-funded by the  European Union


**ENERGY**


**Renewable energies**

It is important to replace Domestic Hot Water, heating and cooling systems using fossil fuels with others using renewable energy. It is advisable to install electrical systems and combine them with renewable energies. 24 m² of solar panels (south) convert solar energy into 4,800 kWh of electricity that can be used in the home or fed back to the main grid. Roofs with a southeasterly to southwesterly orientation are often very suitable for PV panels.



**DRIVE** 




Co-funded by the  European Union


**ENERGY**


**Shading**

In the summer months, overheating can occur since direct sunlight enters through the windows. It is important to avoid the latter, by using sunscreens such as overhangs, slats, awnings, blackout curtains or deciduous vegetation.



**DRIVE** 



Co-funded by the  European Union



## WATER

### Water saving devices

Water is considered a renewable natural resource, however, there are factors, such as the inefficient use of water by society, pollution and over-exploitation of the main sources of supply, that lead to situations in which the water cycle water breaks or its quality is not suitable for human consumption, making this essential good a scarce commodity difficult to obtain. Thus, the demands for comfort and hygiene make it necessary to propose viable alternatives for saving water without losing quality, quantity and guarantee of supply.



31

## DRIVE



Co-funded by the  
European Union



32

## WATER

### Harvesting rainwater

There are many types of rainwater recycling systems, from the most simple water butt for garden use to a system that offers complete self-sufficiency without the need for utility mains water or sewage connections.

A typical system, somewhere in the middle of this range, will supply untreated rainwater for toilet, outside use and laundry. Water is collected from the roof, fed through a filter into a storage tank.



33

## DRIVE



Co-funded by the  
European Union



34

## WATER

### Monitor water consumption

A water meter is another way you can potentially reduce your water consumption. Utilising one you can easily see how much water you are using, and so adapt your water use accordingly.



35

## DRIVE



Co-funded by the  
European Union



## WATER

### Reusing greywater

Greywater is wastewater from non-toilet plumbing systems, such as wash basins, washing machines or showers. It can be separated with retrofitting measures in existing buildings. Greywater can be treated using innovative nature-based solutions for indoor application in multi-level green walls with minimum energy cost (<1.5kWh/m<sup>3</sup>) and disinfected using commercial O3/UV systems for >90% water reuse.



## DRIVE



Co-funded by the  
European Union



## WATER

### Reuse of un-segregated water

Wastewater can be combined in one single pipe with kitchen-shred organic waste from all floors of an existing building. The liquid fraction of this combined WW can be separated from the solid fraction with a separation unit. The liquid fraction can be treated with NBS indoor allowing >95% water reuse. The effluent water can further be disinfected and used for toilet flushing, urban gardening and compost production. The solid fraction can be used for biogas production.



## DRIVE



Co-funded by the  
European Union



## COMFORT

### Biophilia

Biophilia is our sense of connection with nature. It can change human attitude, behaviors and positively reduce the so-called 'Sick building syndrome', whereby people suffer from health symptoms linked to the buildings in which they spend time. The biophilic patterns can be designed for several purposes, such as lowering the temperature of indoor spaces, removing VOC particles, improving air cooling, and cleaning indoor and outdoor water.



43

## DRIVE



Co-funded by the  
European Union



44

## COMFORT

### Acoustic insulation

Noise affects people's well-being and has important consequences for their health. Sound insulation of buildings eliminates disturbance caused by common impact noise as well as airborne noise.



45

## DRIVE



Co-funded by the  
European Union



46

## COMFORT

### Building airtightness

Airtightness is an essential part of creating a healthy, comfortable, energy-efficient living environment. The main advantages are: save energy and heating costs which means less CO2 emissions, no structural damage due to hidden mould, better indoor air quality (dust, pollen, odours), less pollutants from outside, ventilation systems work more efficiently and better sound insulation.



47

## DRIVE



Co-funded by the  
European Union



48

## COMFORT

### Home and building automation

Having an intelligent house or building that uses tools such as domotics is a decision that brings not only personal benefits, but also collective ones and helps to make society aware of sustainability and the environment. The main objective of home automation is to provide comfort, well-being and security to all members of the family. Here, family habits and routines are merged with the system of lights, heating, locks, air conditioning and irrigation systems, among others, to contribute directly to energy saving and ecology.



49

## DRIVE



Co-funded by the  
European Union



## COMFORT

### Ecological paints

An ecological paint is made from principally vegetable or mineral-based raw materials which are renewable and non-toxic. An ecological paint therefore has a limited impact on the environment and is characterised by its absence of toxic substances for the user.



## DRIVE



Co-funded by the  
European Union



## COMFORT

### Indoor air purification

Indoor air quality (IAQ) is the air quality within and around buildings and structures. IAQ is known to affect the health, comfort, and well-being of building occupants. Poor indoor air quality has been linked to sick building syndrome, reduced productivity, and impaired learning in schools.



## DRIVE



Co-funded by the  
European Union



## COMFORT

### Indoor air quality

If you want to optimize the air inside the house, air monitoring will offer information about its quality: find out about an adequate device for this, to identify polluting substances and avoid putting your health or comfort at risk. CO2 is exhaled by people and is a suitable indicator to detect when it is necessary to ventilate.



## DRIVE



Co-funded by the  
European Union



# #circularhomes

- The measure cards are accompanied by a QR code showcasing a catalogue of circular products and suppliers associated with the different measures.

## CIRCULAR MEASURES AND PRODUCTS



MATERIALS

ENERGY

WATER

COMFORT

CIRCULAR HOMES | DRIVE 

DRIVE 



**IVE**  
Instituto Valenciano  
de la Edificación

- Based on the regional context drawn in the first exercise and the circular measures presented, groups were now asked to co-design a circular renovation concept for a social housing project.
- All circular measure cards shall be placed in their matching category area by the facilitator (materials, water, waste and energy).
- Participants pick the most appropriate cards based on the regional resources, needs and readiness previously identified and placed them in the middle of the canvas.

# MATERIALS

### MATERIALS

**Building materials passport**

Materials passports contain information about the quality, origin and location of materials and products used in the construction of buildings and other construction objects. All in such a way that owners and/or managers of real estate and infrastructure always have up-to-date information on the financial and circular value, toxicity, demountability and reuse potential of the materials and products applied in their properties.

### MATERIALS

**Building materials passport**

Materials passports contain information about the quality, origin and location of materials and products used in the construction of buildings and other construction objects. All in such a way that owners and/or managers of real estate and infrastructure always have up-to-date information on the financial and circular value, toxicity, demountability and reuse potential of the materials and products applied in their properties.

### MATERIALS

**Building materials passport**

Materials passports contain information about the quality, origin and location of materials and products used in the construction of buildings and other construction objects. All in such a way that owners and/or managers of real estate and infrastructure always have up-to-date information on the financial and circular value, toxicity, demountability and reuse potential of the materials and products applied in their properties.

### COMFORT

**Biophilica**

Biophilica is our sense of connection with nature. It can change human attitude, behaviors and positively reduce the so-called Sick building syndrome, whereby people suffer from health symptoms linked to the buildings in which they spend time. The biophilic patterns can be designed for several purposes, such as lowering the temperature of indoor spaces, removing VOC particles, improving air cooling, and cleaning indoor and outdoor water.

### COMFORT

**Biophilica**

Biophilica is our sense of connection with nature. It can change human attitude, behaviors and positively reduce the so-called Sick building syndrome, whereby people suffer from health symptoms linked to the buildings in which they spend time. The biophilic patterns can be designed for several purposes, such as lowering the temperature of indoor spaces, removing VOC particles, improving air cooling, and cleaning indoor and outdoor water.

### COMFORT

**Biophilica**

Biophilica is our sense of connection with nature. It can change human attitude, behaviors and positively reduce the so-called Sick building syndrome, whereby people suffer from health symptoms linked to the buildings in which they spend time. The biophilic patterns can be designed for several purposes, such as lowering the temperature of indoor spaces, removing VOC particles, improving air cooling, and cleaning indoor and outdoor water.

# DO IT YOURSELF

develop your own  
circular social  
housing renovation  
concept

### MATERIALS

**Building materials passport**

Materials passports contain information about the quality, origin and location of materials and products used in the construction of buildings and other construction objects. All in such a way that owners and/or managers of real estate and infrastructure always have up-to-date information on the financial and circular value, toxicity, demountability and reuse potential of the materials and products applied in their properties.

### WATER

**Water saving devices**

Water is considered a renewable natural resource, however, there are factors, such as the inefficient use of water by society, pollution and over-exploitation of the main sources of supply, that lead to situations in which the water cycle water breaks or its quality is not suitable for human consumption, making this essential good a scarce commodity difficult to obtain. Thus, the demands for comfort and hygiene make it necessary to propose viable alternatives for saving water without losing quality, quantity and guarantee of supply.

### COMFORT

**Biophilica**

Biophilica is our sense of connection with nature. It can change human attitude, behaviors and positively reduce the so-called Sick building syndrome, whereby people suffer from health symptoms linked to the buildings in which they spend time. The biophilic patterns can be designed for several purposes, such as lowering the temperature of indoor spaces, removing VOC particles, improving air cooling, and cleaning indoor and outdoor water.

### ENERGY

**Energy smart meters**

A smart meter is another way you can potentially reduce your carbon footprint. Utilising one you can easily see how much energy you are using via a digital display, and so adapt your energy use accordingly. It also cuts out having to send meter readings to your energy company or have someone come to your house.

# WATER

### WATER

**Water saving devices**

Water is considered a renewable natural resource, however, there are factors, such as the inefficient use of water by society, pollution and over-exploitation of the main sources of supply, that lead to situations in which the water cycle water breaks or its quality is not suitable for human consumption, making this essential good a scarce commodity difficult to obtain. Thus, the demands for comfort and hygiene make it necessary to propose viable alternatives for saving water without losing quality, quantity and guarantee of supply.

### WATER

**Water saving devices**

Water is considered a renewable natural resource, however, there are factors, such as the inefficient use of water by society, pollution and over-exploitation of the main sources of supply, that lead to situations in which the water cycle water breaks or its quality is not suitable for human consumption, making this essential good a scarce commodity difficult to obtain. Thus, the demands for comfort and hygiene make it necessary to propose viable alternatives for saving water without losing quality, quantity and guarantee of supply.

### WATER

**Water saving devices**

Water is considered a renewable natural resource, however, there are factors, such as the inefficient use of water by society, pollution and over-exploitation of the main sources of supply, that lead to situations in which the water cycle water breaks or its quality is not suitable for human consumption, making this essential good a scarce commodity difficult to obtain. Thus, the demands for comfort and hygiene make it necessary to propose viable alternatives for saving water without losing quality, quantity and guarantee of supply.

### ENERGY

**Energy smart meters**

A smart meter is another way you can potentially reduce your carbon footprint. Utilising one you can easily see how much energy you are using via a digital display, and so adapt your energy use accordingly. It also cuts out having to send meter readings to your energy company or have someone come to your house.

### ENERGY

**Energy smart meters**

A smart meter is another way you can potentially reduce your carbon footprint. Utilising one you can easily see how much energy you are using via a digital display, and so adapt your energy use accordingly. It also cuts out having to send meter readings to your energy company or have someone come to your house.

### ENERGY

**Energy smart meters**

A smart meter is another way you can potentially reduce your carbon footprint. Utilising one you can easily see how much energy you are using via a digital display, and so adapt your energy use accordingly. It also cuts out having to send meter readings to your energy company or have someone come to your house.

# ENERGY