

Attractive, Acceptable and Affordable deep Renovation by a consumers orientated and performance evidence-based approach

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Executive summary

The objective of the TripleA-reno Glossary of terms is to provide a shared ontology of keywords and topics within the scope of the project. The shared ontology is co-created from and with all the project partners, each contributing with relevant knowledge and inputs depending on their area of expertise. Terms are organized in alphabetic order; a list of key relevant terms is set, for which a synthetic description is provided. The glossary of terms is primarily intended for internal usage since it has the main scope to avoid confusion and misunderstandings along the course of the project. At the end of the project duration, the collection of terminology, reinforced by the necessary scientific and normative references will be capitalized in a public deliverable. This, to represent one of the possible exploitable knowledge-based results of the TripleA-reno coordination and support action at the EU level. The Glossary is furthermore intended as an open and iterative document that will be periodically updated based on the requirements and needs of the project partners.

Glossary of terms

A

Acceptable

This term refers to the TripleA-reno user-centric approach. The project aims at getting the “renovation motor running, with the end-user in the driver’s seat”. TripleA-reno will involve a various set of users in the co-designing processes and keep a constant communication flow between consumers and developers to assure design of people-centred products. The term acceptable reflects the idea of “user in the centre”. We usually also use the, more positive, term ‘satisfaction’ among residents. Another point is that the end user involvement is mostly done at community level. It is not a one-on-one relationship but more one-to-many (e.g., the landlord invites the residents of a flat to a meeting, the creation of sounding boards, energy ambassador groups, etc.) The creation of new interactions and relations at community level can be a positive (side) effect in this process. If managed well of course.

Affordable

This term means that by using the TripleA-reno decision support tools (i.e., dynamic, and user-centric business models) users can tailor their renovation and make informed and economically wise decisions. In TripleA-reno affordability reflects the idea of the business model and cost savings for the user. Affordability considers EU housing affordability criteria. See Housing cost overburden rate definition in ‘Living conditions glossary’ EU-SILC : ‘The housing cost overburden rate is the percentage of the population living in households where the total housing costs ('net' of housing allowances) represent more than 40 % of disposable income ('net' of housing allowances).¹ Housing costs include energy related costs. The 40 % is an indicator for the overburden rate. Generally, what is accepted to be a ceiling for affordable housing costs is around 30-35 % of disposable income. A second point to consider is that this housing cost ratio is often higher for low income and vulnerable groups in public/social housing. Therefore, including in our case where social tenants are included, the housing cost overburden rate for the population at risk of poverty (= people living in households where equivalised disposable income per person is below 60 % of the national median) would be another red flag regarding affordability.

Anthropology

Anthropology is a study of people throughout the world aimed at increasing our understanding of ourselves and of each other. It is concerned with the diversity of human cultures and societies, dealing with biological, material, symbolical, cultural, social, and other particularities that make us unique as human beings. Form a discipline that once was typically concerned with small-scale, technologically simple societies, anthropology evolved into a broad field of sub-disciplines. All of the anthropological sub-disciplines have two key elements in common - the focus on understanding the human condition and the methods (ethnography, participant observation, ...), that distinguish them from other disciplines of social sciences and humanities. In words of respected anthropologists, anthropology is "the most humanistic of sciences and the most scientific of the humanities" (A. L. Kroeber), a discipline that deals with large issues through studying small places (T. H. Eriksen) and the purpose of which is to "make the world safe for human differences" (R. Benedict).

API (secure)

Application Programming Interface. This is used to query separate databases in a secure way. In computer programming, an application programming interface (API) is a set of subroutine definitions and

¹ https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:Housing_cost_overburden_rate

communication protocols that allow a software module (a) to communicate and exchange data with another software module (b) without which (a) knows the internal structure of (b). If the communication protocol is portable on different frameworks, languages and operating systems, this approach has the advantage of implementing the communication between modules developed with different frameworks and different hardware platforms. Another advantage is to increase the modularity and therefore the reliability of the whole system. Finally, it allows to use already existing software modules of which the internal implementation is not known but only the functional specifications and therefore facilitate the reuse of already existing software, accelerating the production process of the software, very useful feature in the case of our project. An API can be for a web-based system, operating system, database system, computer hardware, or software library. A specific API can take many forms, but often includes specifications for routines, data structures, object classes, variables, or remote calls. The documentation for the API is usually provided to facilitate use and implementation. Of course, if the specifications of use of an API are public, all the problems related to security arise, as a hacker could use these specifications to enter and cause damage to the system. Therefore, it is necessary to foresee the implementation of protection techniques (Secure API), for which unfortunately there is not a single implementation, but there are only best practices of implementation with reference to the type of application to be developed

Applicability

Quality that evaluates usefulness, whether the system helps the user to achieve their goals and whether the system incorporates the functionalities that the user needs, and user-friendliness of the system.

Architectural value

The architecture of a building has a major impact on building performance outcomes. The spatial and material configuration of a building is one of the most important determinants of occupants' experience of comfort, security, and productivity, and how energy is used in the building to achieve this. Architects create bespoke designs integrating structural, technical, spatial and material solutions for each project that balance the passive and active measures required to control indoor environments that meet the long term needs of occupants.

Attractive

Attractive means one of the objectives of the project is to raise consumer awareness when it comes to behaviours in homes, by providing attractive personalized information on energy use, indoor environment, health, and lifestyle, by a set of ICT-based solutions (i.e., the gamification platform, virtual reality, energy, and 3D modelling etc.). Attractiveness is reflected i.e., in some of the elements of the gamification feature

Automated recommendations

Part of the simplified label, that translates relationships among the different energy, IEQ and well-being/health into recommendations for energy efficiency, increased comfort and health and deep renovation.

B

Behaviour

Behaviour can be understood as actions that people and other living organisms use to adjust to and live within their environments. In social theories, behaviour is often studied as actions performed by human individuals, who are informed, knowledgeable and make conscious decisions depending on the circumstances of a given time and space. In other words, social theories of behaviour often individualize

human behaviour and focus on casual factors and external drivers. This approach often dims the important contexts of social change, policies, and other processes, that provide the background for individual decisions in the first place. Therefore, the concept of behaviour should be understood as an analytical tool which provides us with a valuable perspective of an otherwise complicated real-life situations.

Benefits (co-benefits)

Improvements result of renovation projects that might motivate occupants to take part of the TripleA Reno project. For example, a benefit would be potential savings resulting from increased energy efficiency.

BIM Building Information Model

Construction of a model that contains the information about a building from all phases of the building life cycle (ISO 16757-1: 2015). A rich information model, consisting of potentially multiple data sources, elements of which can be shared across all stakeholders and be maintained across the life of a building from inception to recycling (reference NBS – National British Standards). Regardless of the formal definitions reported above, the following points should be considered that define the true essence of BIM.

- Building: BIM is not just about architecture. ‘Building’ should be considered as a verb ‘to build’ rather than the noun ‘a building’. The concept is relevant to any asset of the built environment including, railways, highways, bridges, tunnels, and utilities. It is also suitable for other sectors such as land surveying, landscape architecture, tunnelling and mining.
- Information: The sharing of structured information is at the very heart of BIM. An ‘information model’ consists in the 3D Model geometry, the non-graphical information, documents, and drawings. The Project Information model (PIM) is delivered during Capital expedite (CAPEX) and include project information data. The Asset Information Model (AIM) is the information model managed and maintained during Operating Expenditure (OPEX) and includes asset information.
- Model/Modelling: Building information management or modelling? Does the acronym refer to refer to model as a deliverable or is it modelling as the process of creating the deliverable? While geometric representation is important, we must be able to simulate the various facets of the design of an asset (structural, architectural, building services etc.), the construction of the asset and the operation of the asset

In TripleA-reno we need a portable representation of building components to exchange information between end-user, stakeholders, construction companies, professionals, etc. In the current state, BIM is the only way that allows us to do this operation and that allows us to open to the market of building components

BIM-Skills Matrix

A Qualification Framework developed in H2020 BIMplement, usable to connect tasks and related subtasks to Unit of Learning Outcomes, BIM-elements, and RIBA project phases

BUILD UP Skills

The BUILD UP Skills is an initiative from the EU commission for accelerating massive upskilling of the workforce required for sustaining the Built environment. Installing the technologies needed to make Europe's building stock greener requires a skillset that the construction industry can struggle to supply. BUILD UP Skills addresses this gap by training construction workers and preparing them to meet the challenges posed by new energy efficiency regulations.

Building renovation passports

Building Renovation Passports are documents that detail a step-by-step renovation roadmap for a specific building. The passports can be issued both in electronic or paper form and the renovation roadmaps can cover timeframes of 15 to 20 years.

Business model

A business model describes the rationale of how an organization creates, delivers, and captures value, in economic, social, cultural, or other contexts. In other words, it is a plan for how revenues and profit are generated. It explains what products or services the business plans to manufacture and market, and how it plans to do so, including what expenses it will incur. A business model lays out a step-by-step plan of possible actions for profitably operating the business in a specific marketplace. The process of business model construction and modification is also called business model innovation and forms a part of the business strategy. In theory and practice, the term business model is used for a broad range of informal and formal descriptions to represent the core aspects of a business, including purpose, business process, target customers, offerings, strategies, infrastructure, organizational structures, sourcing, trading practices, and operational processes and policies including culture.

Business module

The business module (also called economic and financial toolkit) is a software module that evaluates the most important financial variables of a deep renovation process, comparing different scenarios in order to assist the user in the optimal choice. From the point of view of the project, we will try to evaluate the variables according to the objectives of the different actors participating in the process.

C

Carbon intensity

Carbon intensity refers to the number of grams of carbon dioxide that it takes to make one unit of electricity (kilowatt per hour).

Citizen Energy Communities

According to EU Directive 2019_944, a Citizen Energy Community is a locally established voluntary legal not-for-profit entity for the purpose of energy generation, distribution, supply, consumption, aggregation, storage.

Co-Creator Platform

A digital environment in which stakeholders and the building sector cooperate in creating successful nZEB concepts

Community

A group of people working on or interested in a certain topic

Community building

Seeding and maintaining the community with as goal a healthy and sustainable community

Community portal

A digital environment which facilitates community interactions

Construction element (envelope)

A set of material components that together give rise to a construction. Specifically, construction elements of the envelope are those that separate indoor and outdoor environments.

Construction-phase

A phase in the construction process. Very popular are the so-called RIBA stages <https://www.ribaplanofwork.com/>

Consumer centred (customer centric) business models

Customer centric is a way of doing business with the customer in order to provide a positive customer-orientated experience before and after the business/economic and financial operation, in order to drive transparency and clear business, customer loyalty and profits. Customer centricity is not just about offering a great customer service, it rather means offering a solid base of experience from the very first stages of awareness, through the initial purchasing process up to the post-purchase phase. It is a strategy that is based on putting the customer first, and at the core of the business.

Consumers orientated (consumer oriented)

A service offered by companies that focus on the internal and external needs of business's customers. Consumer orientation establishes and monitors standards of customer satisfaction and strives to meet the clientele's needs and expectations related to the product or service sold by the business. While in the product-orientated marketing business owners can create products and then find ways to generate demand among consumers in the consumer-oriented marketing, business owners have to identify customer needs first and then create products that meet those needs. The latter approach is called the "market-pull" model of marketing, because it relies on consumer demand to "pull" the product to the marketplace, rather than having to push the product on consumers. Focusing on meeting a customer's needs rather than just making the sale can increase profits. When customers are happy, they will keep buying. Repeat customers mean more profits per person, as well as a decreased need to spend money chasing new customers. And happy customers will recommend the product to the people in their life. In other words, focusing on customer satisfaction can be a smart financial decision.

CPD

Continuing Professional Development (CPD) is a structured way of maintaining and developing your competence as a qualified professional by engaging in regular learning activities. CPD can be either structured or informal. "Structured" CPD will often be in a classroom, though it can also be through distance learning or online learning. Structured CPD activities will have clear learning aims and outcomes which will have been given to you by a teacher, speaker, or tutor. Informal CPD will usually mean quick, free, and self-directed activities, such as reading. It may not always be obvious that these informal activities are CPD, but if you can learn from them, they can help you to stay up to date in a general way.

CSA

Horizon 2020 calls can have different types of action and funding schemes. The type of action specifies the scope of what is funded, the reimbursement rate, and the specific evaluation criteria to qualify for funding. Coordination Support Actions (CSA) have the objective of accompanying measures such as standardisation, dissemination, awareness-raising and communication, networking, coordination or support services, policy dialogues and mutual learning exercises and studies.

D

Data hub

A central centre that facilitates the exchange of data between different IT systems. It can consist of a set of agreements such as API descriptions for decentralised data exchange (peer-peer) and a centralised form of data-management (a central database that replicates data from connected databases. In TripleA-reno the peer-to-peer version is our first choice

Decision making (support)

A system within the co-design app and/or the BUILD UP Skills advisor app and/or the Business modules that guides the users of the software or application to make the right decisions.

Deep Renovations

A deep energy retrofit is a cost-effective whole-building process that employs integrative design to attain larger energy savings compared to the ones achieved through the adoption of separate energy retrofit measures. According to the EU Energy Efficiency Directive, the deep renovation process represents a solution able to reduce both the delivered and final energy consumption of a building by a significant percentage compared with the pre-renovation levels; typically, more than 60% energy saving, while increasing user comfort and indoor environmental quality (IEQ) levels. Deep retrofits are cost-effective since higher energy performance is resulting in the lowest cost during the estimated economic lifecycle of the building, and quicker Return on Investment for implemented solutions through energy savings. However, the concept of "cost-effectiveness" in terms of direct economic payback would not be possible for all cases – i.e. in Mediterranean regions energy consumption is generally lower; this, alongside to fuel poverty cases, make it difficult to pay back the interventions in energy savings terms. The definition of deep renovation applies within the framework of major renovations, under two conditions: either more than 25% of the surface of the building envelope undergoes renovation or the total cost of the renovation of the building envelope or the technical building systems surpass for more than 25 % the value of the building. Typically, deep energy retrofits combine energy efficiency measures so that dramatic energy savings are achieved. These include, the integration of energy efficient façades with improved insulation, changing of windows to triple-glazed windows, HVAC systems with heat recovery ventilation, active energy components incorporating RES (Renewable Energy Sources) in the building façade and roof and energy harvesting equipment, moisture management, controlled ventilation and equipment, and solar control."

Delivered energy demand

(kWh/m² /yr) is the energy delivered to the building in the form of electricity, heat and fuel. It is the energy per 'carrier' supplied to the building, to satisfy uses within the building (heating, cooling, ventilation, domestic hot water, lighting, appliances, etc.). The delivered energy is generally the one metered by the utilities. Reporting is therefore to be as much disaggregated as possible into the energy used for heating, hot water, cooling, ventilation, and lighting.

Demand-driven

Demand-driven forecasting is a field of predictive analytics, which tries to understand and predict customer's demand to optimize supply decisions by corporate supply chain and business management. Demand forecasting involves quantitative methods such as the use of data, and especially historical sales data, as well as statistical techniques from test markets. Demand forecasting may be used in production planning, inventory management, and at times in assessing future capacity requirements, or in making decisions on whether to enter a new market.

Demo case

Each one of the six buildings that has been considered to represent the building sector (residential use and residential and business mixed-use). Each demo case is numbered and refers to a building located in different countries of Europe with its own characteristics. Characterization of the building is carried out. Then a first visit is made, and finally it is monitored to characterize the interior environment that exists.

Demo case holder

Person or team who supports each demo case and carries out the data stored in common templates before and after building renovation.

Design-phase

The design phase is according to the RIBA stages divided into concept, developed and technical design. The three design stages are prepared in accordance with Design Responsibility Matrix and Project Strategies to include all architectural, structural, and building services information, outline specifications, Cost Information and Project Strategies, specialist subcontractor design and specifications, in accordance with Design Programme.

Diary studies

Set of data provided by occupants about their subjective well-being and health. According to SSO protocol Subjective Well Being (SWB) can be defined as the experiences of pleasure and purpose over time.

Digital logbooks

Digital Building Logbooks can be seen as a valuable tool to improve the data availability on a variety of building stock indicators.

E

EED

The 2012 Energy Efficiency Directive established a set of binding measures to help Member States increase their energy efficiency performance. The Directive has been revised and made more ambitious over the past years and in 2021 another revision was announced, to support Europe meeting its goal to be the first carbon neutral continent by 2050.

ELENA program

The European Investment Bank's ELENA Facility provides applicants with funds and assistance to realise energy-related projects (buildings, mobility, energy generation) that leverage considerable private investment.

End-users

Co-creation can be understood as a process or strategy that brings different parties/stakeholders together to jointly produce a mutually valued outcome(s). Co-creation brings a blend of ideas from different people (who could also not be the direct users of the product/service) which in turn creates new ideas to the organization, project, association, society etc."

Energy efficiency first principle

Energy efficiency first is a guiding principle in European energy policies and defined in the EU's Governance Regulation. It considers energy efficiency as a source of energy that should be prioritised in planning and investment.

Energy Efficiency Obligation Schemes (EEOs)

EEO schemes are a legislative mechanism that obligates entities to meet energy savings targets across their portfolio.

Energy Performance Certificate

According to EPBD, the Energy Performance Certificate is a technical document prepared by an independent energy expert, which provides information on the annual energy consumption of a building or an apartment, in kWh/m²a dimension. An energy performance certificate must be issued whenever a privately owned real estate is sold or rented out. As for public buildings, all buildings larger than 250 sqm, occupied by public authorities, such as government offices or municipal offices, must have an energy performance certificate issued and clearly displayed. The certificate classifies buildings based on their energy consumption: energy performance class "AA++" is the best category, "JJ" is the worst one. The Energy Performance ensures comparison of different buildings and apartments in an objective way. It also gives suggestions on energy saving options.

Energy poverty

Energy poverty could be defined as "the inability to keep homes adequately warm", but there is no universal definition for the term. The 1991 UK definition is quite commonly used, which defines households as fuel poor if over 10% of income are spent on fuel "to maintain an adequate level of warmth".

EPBD

The European Energy Performance of Buildings Directive has considerable impact on how buildings in Member States are constructed and renovated. The Directive mandates that ambitious national long-term renovation strategies are developed, mandates that new buildings must reach "nearly zero-energy" standards and promotes the use of smart readiness indicators, amongst others. Consultations for EPBD revisions took place in 2021, to raise the Directive's ambition, and a legislative proposal is envisaged for Q4 2021.

ESCO

A natural or legal person that delivers energy services and/or other energy efficiency improvement measures in a user's facility or premises and accepts some degree of financial risk in so doing. The payment for the services delivered is based (either wholly or in part) on the achievement of energy efficiency improvements and on the meeting of the other agreed performance criteria (Source: Directive ENERGY PERFORMANCE CONTRACTING (EPC) 2006/32/EC)

Ethnographic research

Ethnography is the trademark methodology of anthropology. Its conventional primary method is participant observation, in which the researcher takes part in the daily activities, rituals, interactions, and events of a group of people as one of the means of learning the explicit and tacit aspects of their life routines (DeWalt and DeWalt 2002). In its traditional form, ethnographic research (fieldwork) lasts from 12-18 months. Transferred to corporate, business or industry settings, ethnography has proved to be highly valuable, but has often been perceived as time- and resource-consuming, or non-generalizable due to its focus on

individuals and small group (Jordan and Dalal 2006). For this reason, many contemporary researchers use various time efficient methods of ethnographic research. Such are ethnographical photography and film, which enable us to gather concentrated phenomenological detail and emplaced knowledge in a form that is easily representable and carries large capacity for interpretation.

European Building Stock Observatory

The EU Building Stock Observatory was established in 2016, seeking to increase the availability of reliable, consistent, and comparable data on Europe's building stock.

European Covenant of Mayors

Launched in 2008, the European Covenant of Mayors is a movement made up of thousands of local authorities that are voluntarily committed to achieving and exceeding EU climate and energy targets. To translate political commitment into action, Covenant signatories submit Sustainable Energy and Climate Action Plans (SECAPs) that specify baselines, outline key actions and that are underpinned by a robust monitoring and reporting framework.

European Investment Advisory Hub

The European Investment Advisory Hub was set up by the European Investment Bank and European Commission as a central port of call for various types of advisory and technical assistance services. It supports the identification and

EU umbrella associations

Association of local, regional, and national levels associations. An umbrella association coordinates the local, regional, and national levels members and acts as interface to the EU institutions for representing and defending the rights and interests of their membership and explore synergies with other EU level stakeholders. At the same time an umbrella association reports back to its members about the EU level developments. The main added value for the EU institutions is that many local, regional, and national level associations can be represented by a single voice.

Evaluation path

Set of tasks that evaluates the platform by the different pilots, according to the users, roles and functionalities envisioned or developed by each partner or related umbrella organization.

Evaluation theme

Specific evaluation of experiences and workflows by each partner. There are four evaluation groups: on boarding (getting users involved with the platform), decision making (helping users deciding on which renovation(s) undertake), quality assurance (tracking the realization of the chosen renovation strategy to ensure improvements) and follow-up (keep users involved with the TripleA-reno platform).

F

Focus group

Focus groups are moderated discussions which investigate what people think, believe, perceive, or feel instead of what they do or why they do it. There is an important difference between saying and doing, as well as doing research with one person or many. Focus groups may be relevant to product design research early in the design process, when researchers want to learn about people's initial thoughts and perceptions to generate ideas and encourage debate or the exchange of views.

Functionality

Task associated with the aim of each user or umbrella partner using TripleA-reno platform. Functionality answers the question "what would I use to get what I want?". Depending on what user wants there might be some options or others. It heads user to an specific tool.

G

Gamification engine

The gamification engine is a software application which glues together the other different software packages developed for TripleA-reno.

Different components of the gamified platform integrate through the engine to use shared game elements, allowing users and projects an overview of all accomplishments across the platform.

Game-design elements

Elements used in designing games, which can also be applied in other contexts. Examples of elements used are stories, levels, points, rewards (badges), and leader boards.

Game-principles

Principles used in game design, which are supported by game design elements. Examples include challenges, social connectivity (teams), competition and achievement.

Gamification features

See *game-design elements*.

Gamified platform

The gamified platform is the combination of the gamification engine and all connected software components: the project portal, morphological design wizard, labelling wizard, professional comfort label and the Build Upskills Advisor mobile app and web app.

H

Health

According to Collins Dictionary the health of something such as an organization or a system is its success and the fact that it is working well. On the other hand, as defined by World Health Organization (WHO), it is a "State of complete physical, mental, and social wellbeing, and not merely the absence of disease or infirmity." Health is a dynamic condition resulting from a body's constant adjustment and adaptation in response to stresses and changes in the environment.

Holistic approach

A holistic approach is characterized by the belief that the parts of something are intimately interconnected and explicable only by reference to the whole. A holistic approach means thinking about the big picture. An holistic approach is based on the knowledge of the nature, functions, and properties of the components, their interactions, and their relationship to the whole.

I

ICT-based solution

ICT (Information and Communication Technologies) is the infrastructure and components that enable modern computing. ICT refers to technologies that provide access to information through telecommunications, in that it is like Information Technology (IT), yet it focuses primarily on communication technologies. ICT includes the Internet, wireless networks, cell phones, and other communication mediums. Although there is no one single, universal definition of ICT, the term is generally accepted to mean all combined devices, networking components, applications and systems that allow people and organizations (i.e., businesses, non-profit agencies, governments, and criminal enterprises) to interact in the digital world.

Indoor air quality

Grade of air adequacy in the usable internal areas of buildings. It is measured with of two indicators: the assessment of three parameters of good quality indoor air, with reference to ventilation rate, CO2 levels and relative humidity; and the assessment of the concentrations of a target list of pollutants for source control that are commonly found in indoor air.

Indoor environmental quality

Condition of building environment that makes it suitable for living o developing any activity it is suitable for. It is obtained with some measurable parameters: air temperature, radiant temperature, relative air velocity, relative humidity, metabolic energy production, rate of mechanical work and basic clothing insulation, noise level and illuminance level.

Interviews

Interviews are conversations or debates on a certain topic with an intention of conveying and/or exchanging knowledge and beliefs, traditionally between a researcher and his informant. They usually take place face to face and in person, even though contemporary communication technologies enable conversations to happen by video-conferencing system. Interviews are often sound, or video recorded and later transcribed or at least interpreted, allowing the interview to proceed unimpaired of notetaking, but with all information available later for full analysis.

J

Just in time and just in place learning

Learning at the right moment and on the right place

K

Knowledge and information hub

A central storage or connection point for knowledge and information

L

Learning loops

A loop that enables learning within a project, within multiple projects and within a system. (See the GA for more information)

Level(s)

The European Commission's Level(s) framework provides a standardised approach to measuring the sustainability of buildings. The voluntary framework enables actors to measure, report, and share data on buildings more easily. Level(s) is seen as an important step to move closer towards understanding the whole life-cycle performance of buildings.

Local 'ambassadors'

Ambassadors in a specific municipality typically are managers of local renovation programmes but can include other specialist areas. These experts in local authorities tend to be embedded in climate & energy departments or work directly on housing and / or built environment issues. Being specialists in their field, they can potentially exert significant influence on political decision making in relation to policies and programs that seek to catalyse the sustainable transformation of building stock.

Low Carbon Certificates

The issuance of carbon credits is defined under Article 6 of the 2015 Paris Agreement. The mechanism lays the groundwork for international emissions trading, which places a monetary value on carbon and other greenhouse gasses.

LTRS

The formulation of Long-Term Renovation Strategies by European Member States is mandated in a key EU Directive (EPBD). LTRS must provide an overview of the national building stock, include policies and actions to stimulate deep renovation as well as to target the worst performing buildings, amongst others.

M

Market barriers

Market barriers, or Barriers to entry, are the economic terms describing the existence of high start-up or up-front costs as well as other non-economic related obstacles that prevent new competitors from easily entering an industry or area of business. Common barriers to entry include special tax benefits to existing firms, patents, strong brand identity or customer loyalty, and high customer switching costs. Some barriers to entry exist because of government rules or intervention, (or social acceptance, technical barriers, resistance from other market players, etc.), while others occur naturally within a free market.

Our project tries to overcome some of the most important barriers present in the deep renovation process, trying to stimulate the interest in deep renovation by the end user by putting it in direct communication with the other actors present in the process and making this process for as much fun as possible (gamification)

Market model

Market models refers to the specific social organization that exists between buyers and sellers. Numerous types of methods that are used in determining the effect of many different forces that can affect the performance of the market, including the economy and individual choices of investors or customers.

Measurement campaign

Planned set of measurements that demo case holders must complete in a period of time. They might fulfil some requirements and considerations to characterize the indoor environment.

Measurements

Task that is carried out during the stage of data collection for a demo case with the aim of obtaining data with sufficient precision to characterize the interior environment. Monitoring includes measurements for both air quality and comfort factors.

MEPS

Minimum Energy Performance Standards can set a lower threshold for the energy efficiency or energy demand of buildings and their introduction is currently being considered at European level, in the context of EPBD revisions.

Micro firms

Micro-enterprises (or micro firms) are commonly defined as small businesses that employ nine or fewer persons. In the renovation and construction sector many firms are of this size, which creates unique challenges with regard to training, quality assurance and their identification / inclusion in contractor lists for renovation support services.

MS

European Member States

Multidisciplinary approach

An approach to curriculum integration which focuses primarily on the different disciplines and the diverse perspectives they bring to illustrate a topic, theme, or issue. A multidisciplinary curriculum is one in which the same topic is studied from the viewpoint of more than one discipline. Frequently multidisciplinary and cross disciplinary are used as synonyms describing the aim to cross boundaries between disciplines. (Source: International Bureau of Education - UNESCO)

N

nZEB

Nearly Zero Energy Building. The general definition of nearly zero energy building (nZEB) was introduced in the Directive 2010/31/EU of the European Parliament and of the Council (EPBD recast) on 19 May 2010. According to the Article 2 of the EPBD recast, the nearly zero energy building means a building that has a very high energy performance, and the nearly zero or very low amount of energy required should be covered to a very significant extent by energy from on-site or nearby renewable sources. Beyond the general definition of nZEB, every Member State has its own, more precise definition for nZEB. Practically, it can be stated that the energy performance of nZEB is lower than the cost-optimal levels (nZEB is more energy efficient than cost-optimal building), and the differential Global Cost (ΔGC) is negative, so that nZEB is cost effective."

New European Bauhaus

The New European Bauhaus is an interdisciplinary initiative launched by the European Commission that explores and seeks to trigger the co-design of a shared vision for sustainable buildings (e.g. inclusivity, architectural quality and accessibility).

No-regret options measures

Energetic or sustaining measures that are not becoming obsolete when you take a next renovation step in the future (direct impact, future proof).



Occupant

Person or group that live in each residential unit, part of a demo case. They are involved in the obtaining data process.

On-bill finance

OBF schemes represent a promising approach to lower the initial investment cost burden of energy renovations and address split incentives issues. OBF allows utilities (or other parties) to cushion the impact of initial investment costs of energy efficiency measures for home or building owners, either via an on-bill loan or on-bill tariff structure.

One-stop-shop concept

A concept in which the end-user has one contact point for all nZEB related questions (one offer, one guarantee, one contact point). Dedicated citizen advice services, which aims at raising the awareness of homeowners about / promote the benefits of energy renovations and help them navigate the oftentimes fragmented renovation market (bringing together supply and demand).

Open platform

In computing, an open platform describes a software system which is based on open standards, such as published and fully documented external application programming interfaces (API) that allow using the software to function in other ways than the original programmer intended, without requiring modification of the source code. Using these interfaces, a third party could interact with the platform and integrate or add functionality. The opposite of the open platform is a closed platform that excludes those types of interactions. The open platform does not mean that it is an open source, however most open platforms have multiple implementations of APIs. An open platform can consist of software components or modules that are either proprietary or open source or both. An open platform implies that the vendor allows and supports the ability to perform interactions and integrations among users. Using an open platform, a developer could add features or functionality that the platform vendor had not completed or had not conceived. An open platform allows the developer to change existing functionality, as the specifications are publicly available open standards.

Open standards

An open standard is a standard that is publicly available and has various rights of use associated with it. There is no single definition and interpretations vary with usage. There are a number of definitions of open standards which emphasize different aspects of openness, including the openness of the resulting specification, the openness of the drafting process, and the ownership of rights in the standard. The term "standard" is sometimes restricted to the technologies approved by formalized committees that are open to participation by all interested parties and operate on a consensus basis. Open standards which specify formats are sometimes referred to as open formats. Many specifications that are sometimes referred to as standards are proprietary and only available under restrictive contract terms (if they can be obtained at all) from the organization that owns the copyright on the specification. As such these specifications are not considered to be fully open

P

PACE model

The so-called Property Assessed Clean Energy model is an approach to financing energy renovations, predominantly used in North America.

Pact for Skills

The Pact, launched in 10 November 2020, is a flagship action under the European Skills Agenda of the European Commission. It represents a shared engagement model for skills development in Europe.

Participant observation

A central anthropological research technique that consists of recording and interpreting information acquired through participation and observation (DeWalt and DeWalt 2000). Participant observation is not only relevant because it helps the researcher recognize what is happening in an investigated group; in addition, it relies on something more fundamental. The researchers who cooperate with others engage in symbolic transactions with them leading to insights derived from actively cooperating. (Atkinson, Coffey, and Delamont 2003). This cooperation helps researchers to partially assume the role of others and thus share something of perspectives that are intrinsic to social realities.

People

People (= human beings) are individuals who form groups, communities, and societies. In the context of TripleA-reno, they are considered as the carriers of practices (patterns of behaviour) and knowledge who form communities in favour (or against) renovation of buildings. They are also the agents, who in different ways (intentionally or unintentionally) influence the process of building renovation.

Performance evidence

TripleA-reno project title is "Attractive, Acceptable and Affordable deep Renovation by a consumers orientated and performance evidence-based approach". In this context the performance evidence refers to the following approach that is used in TripleA-reno project: (1) involving the occupants/consumers in the project and collect real performance data in use in the demo buildings, and (2) implementing methodologies on enhanced quality control of related projects like IEE QUALICHeCK and H2020 BIMplement"

Performance gap

Performance gap is a gap between actual performance and design intents. Primarily the performance gap means energy performance gap, when a building uses more energy than expected, but it can refer the overall building performance, which includes IEQ, when real indoor environmental parameters are worse than the designed values.

Pollutants

Substances that negatively affect health and some of them are commonly found in indoor air. During measurement, demo case holders will comply data about CO₂ concentration, TVOC, Formaldehyde, PM_{2,5} and PM₁₀.

Post-monitoring

Task developed after the monitoring campaign that includes initial checking documentation completeness and data validation and sending it to the task leader.

Pre-monitoring

Task developed before the monitoring campaign that includes an initial visit to residential units and monitors calibration

Primary energy demand

(kWh/m² /yr) is defined by Article 2 of the Energy Performance of Buildings Directive as 'the energy that has not undergone any conversion in the transformation process, calculated by energy carrier using a primary energy factor'. It is the energy that is required to generate the electricity, heating and cooling used by a building/residential unit. Reporting is disaggregated into renewable, non-renewable, and exported energy. This is so that the benefits of generating low carbon or renewable energy can be considered.

Primary energy saving

The Energy Performance of buildings Directive (EPBD) aims at reducing the primary energy consumption of buildings. According to EPBD, primary energy means energy from renewable and non-renewable sources which has not undergone any conversion or transformation process. Primary energy saving is reducing primary energy consumption. The primary energy factor (PEF) connects primary and final energy.

Private Quality Assurance framework

A framework consisting of a method and inspection protocols to ensure and prove delivered quality

Promotion campaigns

Promotion, awareness, and exploitation campaigns by the involved EU umbrella organisations, throughout Europe is the so-called 'The TripleA-reno Road Show'

Proven measures carrousel

A carrousel consisting of energetic or sustaining measures and concepts created with these measures. That have been proven. For example, a concept to renovate and sustain a pitched roof including the integration of PV. In that concept the measures are roof isolation, roof airtightness and solar PV integration

Q

Qualification schemes

A validated scheme with Unit of Learning Outcomes usable for education and training purposes

Qualitative objective

Qualitative means relating to the nature, standard or quality of something, rather than to its quantity. A qualitative objective is a subjective and hardly measurable result that a person or system aims to achieve within a time frame and with available resources. A qualitative objective might deal with increasing users' awareness on deep renovation or changing user perception of energy efficiency.

Quality and planning systems

A quality management system (QMS) is a formalized system that documents processes, procedures, and responsibilities for achieving quality policies and objectives. A QMS helps coordinate and direct and organization's activities to meet customer and regulatory requirements and improve its effectiveness and efficiency on a continuous basis. Quality management systems serve many purposes, such as: improving

processes, reducing waste, lowering costs, facilitating, and identifying training opportunities, engaging staff, setting organization-wide direction. Source: American Society for Quality (ASQ).

Quality control

According to ISO 9000:2015, quality control is the part of quality management focused on fulfilling those requirements related to quality. Quality is the degree to which a set of inherent characteristics of a product, service, process, person, organization, system, or resource fulfils requirements, which are needs or expectations that are stated, generally implied or obligatory.

Quantitative objective

Quantitative means relating to different sizes or amounts of things. A quantitative objective is a specific measurable result (amount of something) that a person or system aims to achieve within a time frame and with available resources. A quantitative objective could be amount of kWh/m².year saved.

R

Regional/local scale

Local scale generally refers to the context of a city, town, or village; while regional scale refers to the context of a region that includes lots of cities, towns and villages. Regional scale is bigger than local and smaller than national. However, this definition is really challenging as it depends on different aspects. According to IPCC, a definition of regional scale is difficult, as different definitions are often in different contexts. For example, definitions can be based on geographical, political, or physiographic considerations, considerations of climate homogeneity, or considerations of model resolution. Because of this difficulty, an operational definition is adopted in this chapter based on the range of regional scale found in the available literature. From this perspective, regional scale is here defined as describing the range of 104 to 107 km². The upper end of the range (107 km²) is also often referred to as sub-continental scale and marked climatic inhomogeneity can occur within sub-continental scale regions in many areas of the globe. Circulations occurring at scales greater than 107 km² (here referred to as planetary scales) are clearly dominated by general circulation processes and interactions. The lower end of the range (104 km²) is representative of the smallest scales resolved by current regional climate models. Scales smaller than 104 km² are referred to as local scale.

Reliability

Quality that evaluates whether the platform has behaved in the way users want. Participants will evaluate Reliability of TripleA-reno tools through the demos cases' buildings, by comparing expert inspections and monitoring results (in ex-ante and ex-post conditions, if possible) with prognostics from TripleA-reno system, for validation and fine-tuning purposes.

Renovation packages

An easy-to-understand commercial offer to an end-user, written in non-technical language which satisfies his/her requirement for comfortable living but at a higher energy-efficiency of his/her dwelling. The offer comprises the optimum combination of technologies to be installed in the most logical sequence, tailored to the type of dwelling, the state of the building, the geography in which the dwelling is located and socio-economic parameters. Offers are understood to entail the unburdening of the end-user, so he/she is assured of an agreed higher energy efficiency without having to worry about individual technology choices. (Source: REFURB H2020 project)

Renovation rate

According to Collins Dictionary, a rate is the speed at which something happens. Therefore, renovation rate is the speed at which the renovation of existing buildings occurs. Specifically, the amount of existing building floor area (m²) renovated annually with respect to the total existing building floor area (m²).

Renovation Wave

The European Commission's Renovation Wave Strategy, published in 2020, sets out a series of measures to at least double renovation rates in the next ten years, elevate energy and resource efficiency, enhance the quality of life of "building users", reduce GHG emissions, foster digitalisation and embed circularity principles in renovation.

RES

Renewable Energy Sources (RES) means non-fossil sources, namely wind, solar, aerothermal, geothermal, hydrothermal and ocean energy, hydropower, biomass, landfill gas, sewage treatment plant gas and biogases.

Residential Unit

Homes selected (a minimum of three) from residential units, so data can be extracted and analysed.

Road Show

A series of awareness raising events throughout Europe organised by the EU umbrella organisations involved in TripleA-reno. During these events the understandable labelling schemes of realized building performance after the renovation, as evidence for end-users on overall quality monitoring on energy, IEQ and health in an attractive, understandable way will be explained, as well as the available targeted CPD training for enhanced quality control. The main aim is to promote the platform and raise awareness of controllable benefits of a renovation. The EU umbrella organisations ACE, HE, REHVA, UIPI aim to organize at least 4 events each in differing EU MS, i.e., 16 events, with an aimed attendance of 25-50 people per event. ICLEI will organize one European event. This would result in 425-850 people reached. The audience groups differ by organization and represent their members.

Role

Function performed by each user or umbrella organization which TripleA-reno platform is intended to. Roles are classified as: end-user, professional, investor, builder, reseller or other (non-expert or expert users).

Roundtables on Construction

EU meetings served to discuss skills challenges with construction industry stakeholders, to identify comprehensive responses and mobilise actors under the Pact for Skills framework.

S

Self-inspection

Inspection by the involved worker itself. The worker who applies a material or installs a measure is performing an inspection of his/her own work

Self-instruction

An instruction that is notified to the involved professional and then successfully digested/followed. For example, a step-by-step installation manual

Sensor

Device or measurement instrument used by demo case holders in residential units to obtain interior environment data. It must be affordable and create minimal burden on the residential unit and its occupants during monitoring. A sensor allows the acquisition of data for a variable time, in fixed or variable conditions.

Simplified Label (sticker)

Combined energy and comfort indicators based on TripleA-reno combined labelling scheme presented in a simplified manner, according to non-expert users answers.

Single Sign On

Login once and share the login with all TripleA-reno software services

Smart Readiness Indicator

The smart readiness indicator was introduced in the EU's 2018 revision of the European Energy Performance of Buildings Directive (EPBD). The SRI is an optional EU scheme, billed as a "cost-effective means for creating healthy, energy-efficient and comfortable buildings", that Member States can introduce.

SMEs

Small and medium-sized enterprises.

Social rating algorithm

An algorithm usable to value or reward an activity performed by another human

System

A set of parts working together for the same purpose in charge of covering user's requirements, providing comfort, and ensuring safety. For example, a system would be, among others, control of heating and control of cooling.

Strategy on the Sustainable Use of Natural Resources

The Thematic Strategy on the Sustainable Use of Natural Resources was proposed by the European Commission 2005. It's overarching goal was the reduction of environmental impacts associated with resource use.

T

Technical partner

Organization that leads each demo case. Every technical partner must take care of administration and planning, and team designation and their responsibilities. They might designate the necessary team to ensure the proper development and the success of the monitoring campaign. Moreover, a technical partner is responsible for the selection of the equipment needed to carry out the monitoring according to minimum conditions established in the protocol.

Template

Document that establishes variables and methods so data can be collected, summarized, and interpreted in different locations and times by different teams. This way, data is homogenised and allowed for analysis. Templates are included in Annex 1 and must be filled in for every demo case.

Testing session

Activity developed by participant partners organised in groups during meetings on energy renovation. It will be used to better understand users' attitudes and responses to products designed in the project in the context of their home environments. The task will evaluate response of occupants to the interventions done in their homes (sensors and other equipment), effectiveness of tools informing them about IEQ, and possibility for establishing relationships with other stakeholders (building managers, contractors) facilitated by the platform.

Thermal comfort

Condition of mind which expresses satisfaction with the thermal environment. Dissatisfaction can be caused by warm or cool discomfort of the human body as a whole or by an unwanted cooling (or heating) of one part of the human body (International Organization for Standardization, 2005).

Third parties

Organisations originally not withing TripleA-reno projects

Top-down

Decided by the top and from there delegated to for example workers

Tool

Workspace used in TripleA-reno platform. It depends on the kind of user, its role, its experiment (purpose) and its functionalities.

Trans-European Energy Networks Regulation

The Trans-European Networks for Energy (TEN-E) is a policy to link energy infrastructure across the EU countries. It focusses on priority corridors and priority thematic areas to develop more integrated energy networks, whilst also providing funding for measures.

Transferability

Quality of system's applicability to other stakeholders outside the TripleA-reno project ecosystem. For this purpose, partner's expectations and needs will be collected as they are potential users of TripleA-reno system to account for stakeholders' views in the evaluation/fine-tuning process. Partners will organise focus-group meetings on energy renovation. The task will evaluate response of occupants to the interventions done in their homes (sensors and other equipment), effectiveness of tools informing them about IEQ, and possibility for establishing relationships with other stakeholders (building managers, contractors) facilitated by the platform.

U

User experience

User Experience (UX) refers to a person's emotions and attitudes about using a particular product, system, or service. It includes the practical, experiential, affective, meaningful, and valuable aspects of human-product interaction and product ownership. Additionally, it includes a person's perceptions of system aspects

such as utility, ease of use and efficiency. User experience may be considered subjective in nature to the degree that it is about individual perception and thought with respect to the system. User experience is dynamic as it is constantly modified over time due to changing usage circumstances and changes to individual systems as well as the wider usage context in which they can be found. In the end, user experience is about how the user interacts with and experiences the product.

User performance

Effectiveness of human-computer/human-product interaction. The quality of task outcomes achieved, for the costs that users incur achieving these outcomes.

User satisfaction

Customer satisfaction (often abbreviated as CSAT, more correctly CSat) is a term frequently used in marketing. It is a measure of how products and services supplied by an organization meet or surpass customer expectation. Customer satisfaction is defined as ""the number of customers, or percentage of total customers, whose reported experience with a firm, its products, or its services (ratings) exceeds specified satisfaction goals

User-friendly

User-friendly describes a product, device or software interface that is easy to use. It is "friendly" to the user, meaning it is not difficult to learn or understand. While "user-friendly" is a subjective term, the following are several common attributes found in user-friendly interfaces: 1) Simple. A user-friendly interface is not overly complex, but instead is straightforward, providing quick access to common features or commands. 2) Clean. A good user interface is well-organized, making it easy to locate different tools and options. 3) Intuitive. To be user-friendly, an interface must make sense to the average user and should require minimal explanation for how to use it. 4) Reliable. An unreliable product is not user-friendly since it will cause undue frustration for the user. A user-friendly product is reliable and does not malfunction or crash.

V

Value chain

A value chain is a set of activities that a firm operating in a specific industry performs to deliver a valuable product or service for the market. The concept comes through business management and was first described by Michael Porter in his 1985 best-seller, *Competitive Advantage: Creating and Sustaining Superior Performance*: "The idea of the value chain is based on the process view of organizations, the idea of seeing a manufacturing (or service) organization as a system, made up of subsystems each with inputs, transformation processes and outputs. Inputs, transformation processes, and outputs involve the acquisition and consumption of resources – money, labour, materials, equipment, buildings, land, administration, and management. How value chain activities are carried out determines costs and affects profits

Variable

According to Collins Dictionary a variable "is a factor that can change in quality, quantity, or size, which you have to take into account in a situation." Variables can be qualitative or quantitative, and discreet or continuous. For each demo case it is necessary to define, among others, air temperature, globe temperature, relative humidity, air velocity and CO2 concentration. TripleA-reno assumes some pair of variables related, e.g., energy consumption and measured indoor environmental quality, and others that must be investigated, e.g., energy consumption (EC) and conditioned indoor temperature (TintC).

Vlogs

A video blog or video log, usually shortened to vlog, is a form of blog for which the medium is video and is a form of web television. Vlog entries often combine embedded video (or a video link) with supporting text, images, and other metadata. Entries can be recorded in one take or cut into multiple parts. Vlog category is popular on the video sharing platform YouTube. TripleA-reno has its own YouTube channel to be used also for vlogs: <https://www.youtube.com/channel/UCr4h5FvJ6qUqus76JVNqB1Q>

Voluntary certification (scheme)

The energy performance certificate is a mandatory certification, but there are several voluntary certification system, like LEED, BREEAM, DGNB. These are much more complex schemes, which focus not only on energy aspects, but also on indoor environmental conditions, water efficiency, material usage, transportation, etc. The WELL voluntary certification system focuses on health and well-being in buildings."

W

Wellbeing

The well-being is not explicitly defined. Occupant well-being is affected by IEQ. Occupant well-being usually refers to satisfaction with the four main IEQ factors: indoor air quality, thermal comfort, acoustics, and lighting. Subjective well-being is the experience of pleasure and purpose over time. The component of pleasure, also denominated "hedonic" well-being, refers to such aspects as e.g., positive affect, life satisfaction, job satisfaction, psychological health, feeling of comfort, and satisfaction with work environment. The component of purpose, also denominated the "eudemonic" component of well-being, refers to such aspects as e.g., feelings of worthwhileness of one's activities, purpose in life, and personal growth. Well-being is achieved when maximizing both hedonic and eudemonic experiences. In TripleA-Reno, we are interested in hedonic well-being, and in particular, in the satisfaction with the indoor environment (the extent to which a person is satisfied with such aspects as lighting, noise, air quality, temperature, etc.); the satisfaction with control over this environment (the extent to which an occupant is satisfied regarding his/her personal control over such aspects of his/her indoor environment as heating, cooling, lighting, etc.; the occurrence of health symptoms (e.g., asthmatic problems, headaches, difficulties concentrating) due to the indoor environment².

White Certificates

White certificates are issued by an authorized body guaranteeing that a specified amount of energy savings have been achieved. Certificates are unique and traceable.

² Source: Smart and Sustainable Offices project. IDOCAL – University of Valencia.