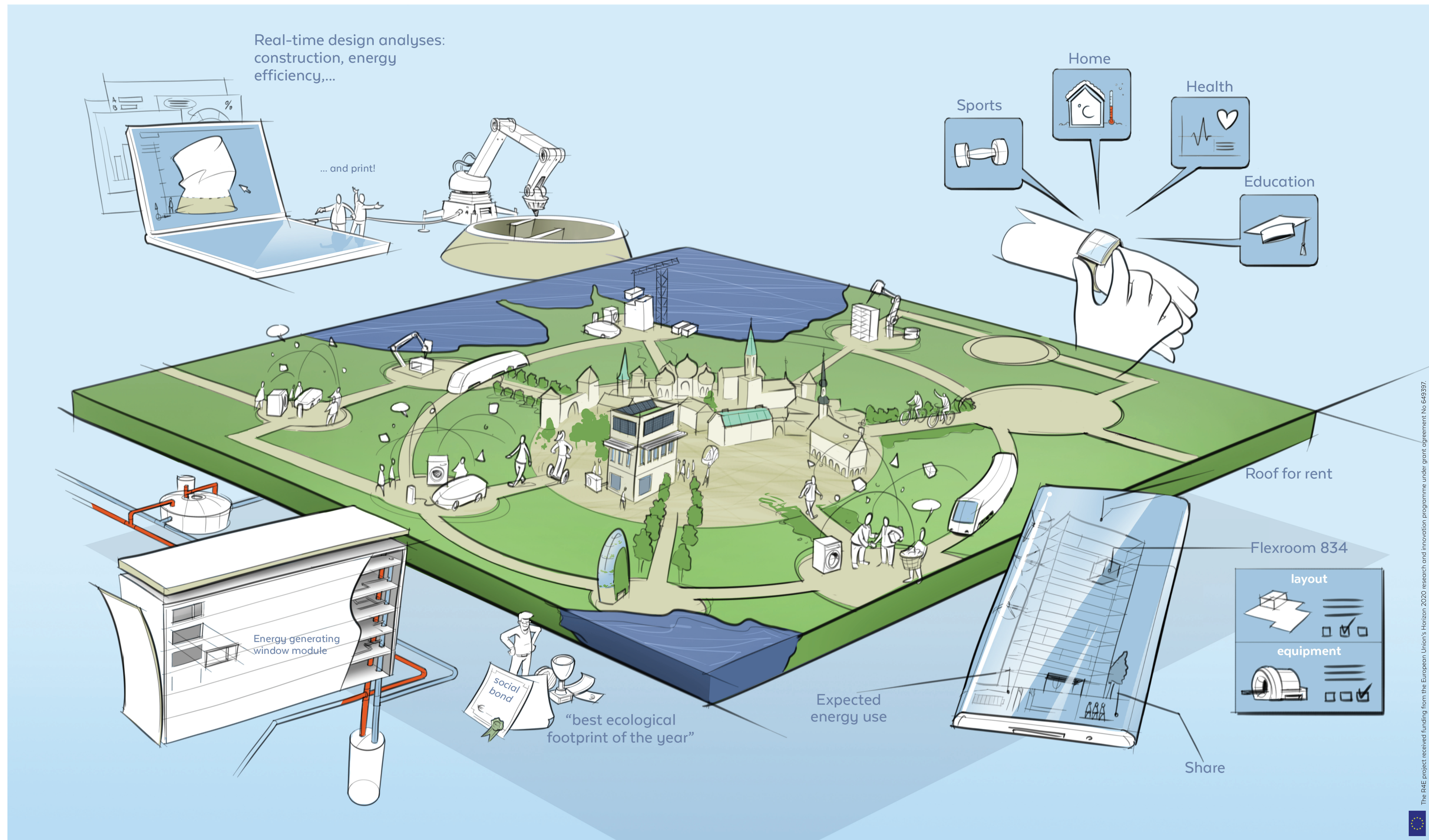


## SMART BUILDINGS AND SMART PEOPLE IN ENERGY-NEUTRAL TALLINN 2050

In 2050, people in Tallinn value sustainable behaviour and renewable energy. They take individual responsibility for energy saving, and the remaining energy demand is affordable for all. Renewable energy sources such as heat pumps, biofuels and energy from the sea enable a CO<sub>2</sub>-neutral city.

All existing buildings have had a far-reaching renovation and modernisation, with respect for their historical heritage. All the energy systems are automated and connected. Smart materials and equipments contribute to an energy-neutral city.

Integrated and flexible city planning values an energy-efficient smart city. Planners have the knowledge and awareness to work at an integrated system level. Their work takes into account all relevant issues, and provides the flexibility to adapt to changing situations. These policies are implemented through specific, integrated district plans.



Elements of the desired future scenario are:

### Distributed services

Services in Tallinn are distributed in decentral hubs around the city, with logical clusters of services according to the needs of the people in the area. The hubs are connected by free (self-driving) public transport and light traffic highways for safe and comfortable commuting by (e-)bike. Households enjoy sharing facilities for sauna, laundry and mobility. The newest technologies for generating electricity and charging devices are widely available.

### Prefab building modules

Buildings are constructed and renovated with prefab building blocks using state-of-the-art, sustainable and energy-efficient materials. Smart technical systems are integrated in the modules, so technical rooms are small. The blocks allow flexible additions to buildings to add extra space or change functionalities (e.g. accommodating changes in schools). New technologies such as 3D printing allow high flexibility and custom design for architectural freedom.

### Smart public services

Public services (home care, medical care, sports training, education etc.) are remotely accessible. Smart solutions enable service delivery at home (e.g. measuring blood pressure). An integrated system (like a web portal) offers access to services from all companies, and makes it easy to search for and find the right ones. The use of artificial intelligence allows tuning to individual needs, and providing useful services and incentives (e.g. comparing ecological footprints).

### Flexible use of public buildings

Public buildings (schools, churches, theatres) in Tallinn are used intensively. People can book rooms, buildings and equipment for different purposes through an online portal, e.g. using schools in the evening for computer training for adults, yoga classes in a gym or office rooms for short-term rental by start-ups. The buildings are showcases of energy efficiency and provide energy for the community (e.g. as carriers of PV panels for shared use) and energy education.

### Sophisticated renovation

All buildings are deeply renovated with the newest technologies for energy efficiency, and are connected to CO<sub>2</sub>-neutral district solutions for heating and electricity generation. Flexible funding schemes and incentives (e.g. tax breaks or prizes) drive people to achieve the highest saving with the best indoor climate through renovation and behavioural change. Local government demonstrates and encourages good practice, and provides temporary housing during renovation.