

E²volution

Executive Summary



Figure 1 The external shear walls of impregnated LVL express confidently the structural integrity and the flexibility of the layout to the outside

Our design starts with the dynamic line of the tree, growing from a solid base upwards. A strong trunk is feeding the branches for future growth.

The system is rooted in the Finnish forests. The sustainably grown timber is the base for laminated veneer lumber (LVL) that is engineered and manufactured some 100 kilometres away from the pilot site. The up 24m long ribbons are cut and configured to I- and box-sections for timber decks, walls and shear plates. These three prefabricated elements comprising surface treatments, fixings, insulation and membranes form for the core elements of our design, accomplished by the systematic build-up of layers and surfaces providing proven performance levels and a high degree of flexibility with respect to building typology and fit-out a family tree of options. The concept of choice and flexibility is accomplished by the “E2” standard for passive house level and “E2 plus” allowing a zero-energy and even plus energy standard.

The linear arrangement of the vertical load bearing elements allows the basic module of 7,5m to expand in all three dimensions: from townhouses, to row of flats up to urban blocks and 8-storey high-rises. The timber decks span freely over 10m for high degree of flexibility and responsiveness to future needs. The slender external shear plates growing from the foundations to the roof give the framework for arrangement of balconies, loggias and cabins. The strength and durability of timber is confidently expressed to the outside.

The idea of organic growth is inherent in our business model to bring “E2 systems” to market: it is starting from the development of the pilot site based on the current market situation and evolving into the Finnish and Scandinavian and subsequently into the Russian market - all managed and procured through the headquarters in Kouvola. While the business grows organically, the system grows by incorporating variable and flexible elements and finishes into the prefabrication process.

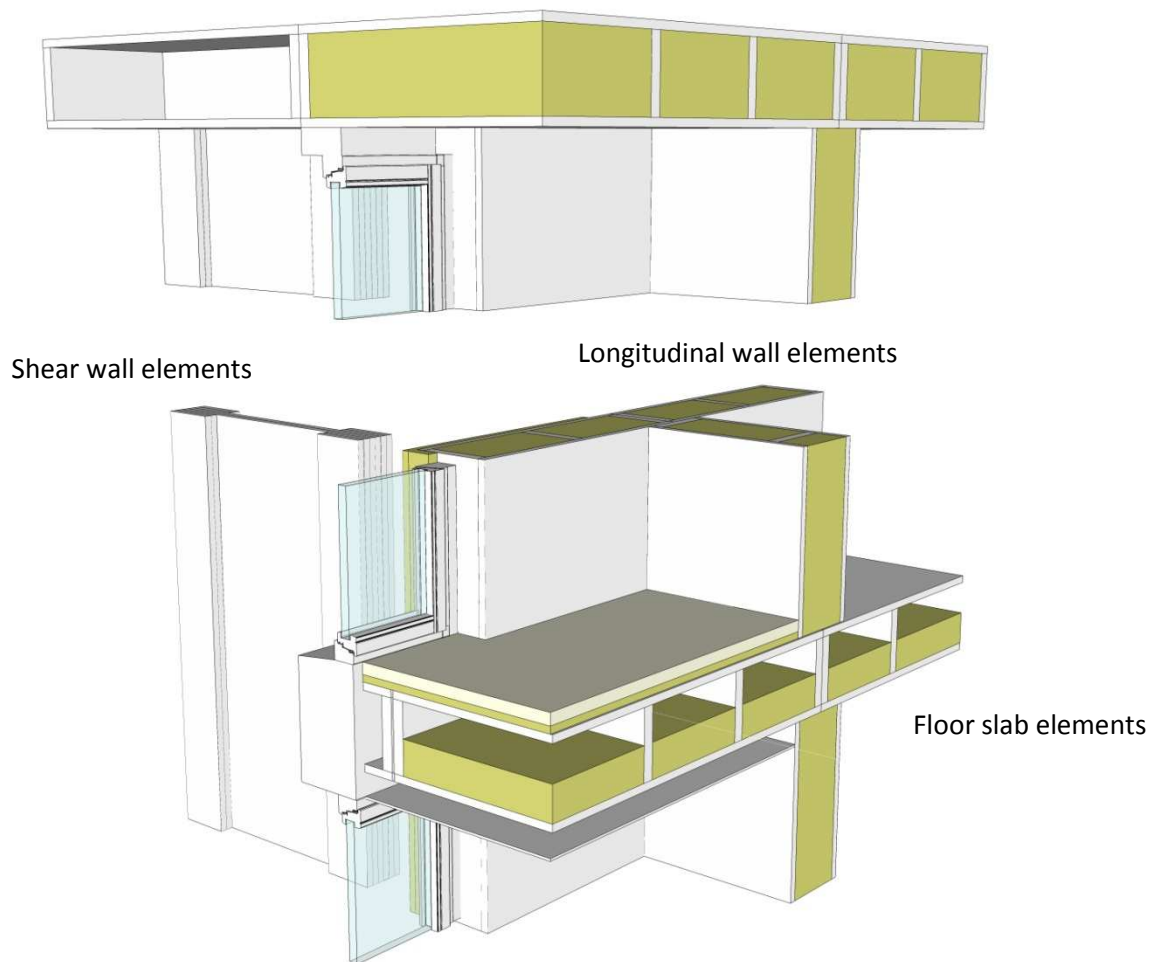


Figure 2 E2-systems at stage 1 comprise the three main prefabricated structural elements of walls, floors and respectively roofs with fixings and the systematic layered build-up of the envelope

We as a team are dedicated to evolve “E2 Systems” from here - the roots are put down to take timber construction up.

The main **economic** selling points

- Staged business case from development of pilot site (stage 1) over operation in Scandinavian market (Stage 2) to Russian market (stage 3)
- Estimated 1584 €/m² build cost for stage 1
- Estimated costs of 1450 €/m² for stage 2
- Core structural system is limited to 3 main components (decks, walls, plates), with high degree of flexibility for configuration
- The timber shear walls express confidently the new methodology
- Erection time of weather protected 7,5m bay of four storeys only 2 days
- E2-systems is designed and managed by headquarters in Kouvola for regional employment
- High degree of flexibility in facade design due to configuration of outdoor elements between shear walls (balconies, loggias, wintergardens)
- All timber core elements sourced and manufactured in Finland for Stage 1 and 2, reducing transportation costs and impacts

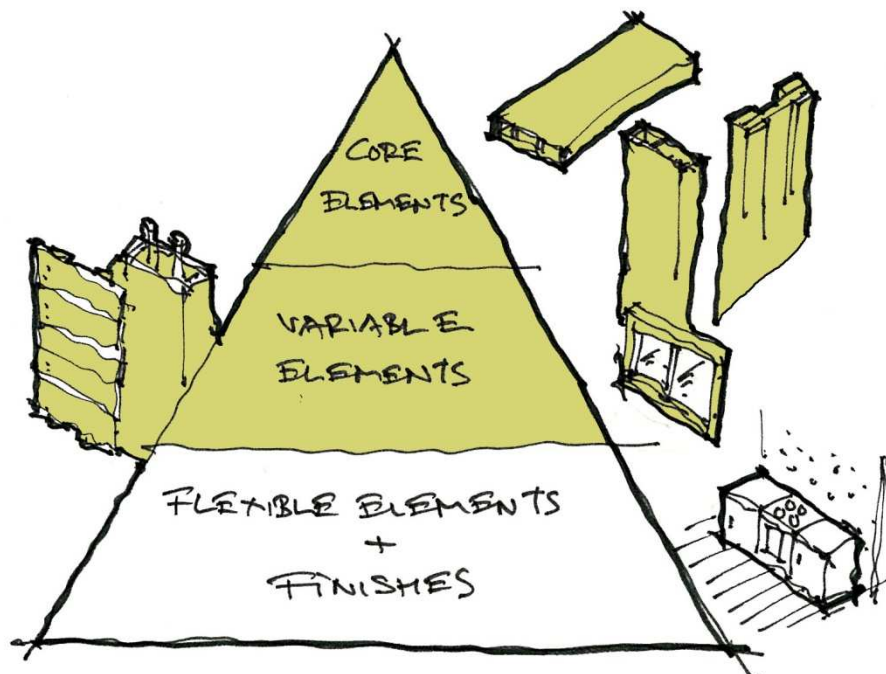


Figure 3 The staged approach of E²volution System

The main **ecologic** selling points

- The free span of 10m allows high degree of flexibility and responsiveness reducing Life Cycle Costs and Impacts
- The external structural elements (shear walls and balconies) effectively prevent overheating in the summer without obstructing the view, in the winter the shear walls reflect natural daylight into the building.
- The system lends itself to compact building layout and zoning and reliable detailing
- The consequent layering of wall and floor build-up provides fire protection of 60 min by encapsulation, acoustic performance of 55 Rw through decoupling of the finishes and a U-value for the walls of 0,12 W/m²K
- System design is based on production width of LVL for minimizing waste
- Almost entire timber for structure certified
- The GWP of core structure is -69 kg Co₂ / m² useable space