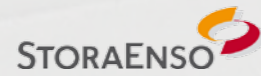


Contact information



Kimmo Liljeström, development manager
kimmo.liljestrom@optiplan.fi
Optiplan Oy
P.O.Box 48 (Mannerheimintie 105)
FI-00281 Helsinki
Tel. +358 50 325 4639



Duncan Mayes, Development Director
duncan.mayes@storaenso.com
Stora Enso Timber Oy Ltd
P.O.Box 39
FI-06101 Porvoo
Finland



Petri Heino, Managing Director
petri.heino@puuinfo.fi
Puuinfo Oy
P.O.Box 284 (Snellmaninkatu 13)
FI-00171 Helsinki
Finland
Tel. +358 40 554 6431



Tuomas Seppälä, development engineer
tuomas.seppala@ara.fi
The Housing Finance and Development
Centre of Finland (ARA)
P.O.Box 100
FI-00521 Helsinki
Finland
Tel. +358 40 822 0728



Jari Virta, Development Manager
jari.virta@kiinteistoliitto.fi
Kiinteistöliitto
Annankatu 24
FI-00100 Helsinki
Finland
Tel. +358 9 166 761



Kyösti Heino, Development Manager
kyosti.heino@woodpolis.fi
Woodpolis
Puusepänkatu 3
FI-88900 Kuhmo
Finland
Tel. +358 44 710 5081



TEKNILLINEN KORKEAKOULU
TEKNISKA HOGSKOLAN
HELSINKI UNIVERSITY OF TECHNOLOGY

PRA cluster in
Helsinki University of Technology (TKK)
P.O. Box 1000 (Otakaari 1)
FI-02015 TKK
Finland
Tel. +358 9 4511
Fax. +358 9 465 077
www.tkk.fi

Chair of Wood Construction:
Pekka Heikkinen, professor,
M. Sc. (arch)
ark.6b@kolumbus.fi
TKK Department of Architecture
Chair of Wood Construction
P.O.Box 1300 (Otakaari 1 X)
FI-02015 TKK
Tel. +358 50 517 4727

Laboratory of Structural Engineering and
Building Physics:
Jari Puttonen, professor, Dr. Tech.
jari.puttonen@tkk.fi
The Laboratory of Structural Engineering
and Building Physics
P.O.Box 2100
FI-02015 TKK
Tel. +358 9 451 3676

Laboratory of Wood Technology:
Matti Kairi, professor, Dr. Tech.
matti.kairi@tkk.fi
Laboratory of Wood Technology
P.O.Box 6400
FI-02015 TKK
Tel. +358 9 451 5654

Kimmo Lylykangas, teacher, M. Sc. (arch)
kimmo.lylykangas@arklylykangas.com
Tel. +358 40 582 9439

Anna Kaila, assistant
anna.kaila@tkk.fi
Tel. +358 45 678 5583

Hannu Hirsi, laboratory engineer
hannu.hirsi@tkk.fi
Tel. +358 9 451 3715

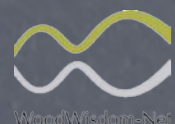
Erno Huttunen, exercise assistant
erno.huttunen@tkk.fi
Tel. +358 9 451 6110

www.tesenergyfacade.com

TES Energy Façade is a research project, which aims at developing a method for energetic renovations of the building envelope, based on wood-framed prefabricated facade elements. TES method is targeted to the refurbishment of existing building stock built from 1950's to 1980's. The project aims at creating prototype solutions as well as a basis for a construction system that could be utilized European-wide.

TES Energy façade method brings prefabrication in the renovation projects. As a result, the renovation costs are more predictable, the duration of the renovation project on site is considerably shorter and the building envelope can be up-graded using different kinds of façade materials.

Prefabrication is based on modern methods for measuring, such as photogrammetry and laser scanning. Furthermore, the precise measuring data of the target building is used for 3D-model, which is used for designing the renovation with pre-fabricated components and, finally, for maintenance. In the project, the workflow (the chain of production from the measuring to the assembly) of the renovation process is systemized and optimized.



TES Energy Facade

Timberbased element systems for improving energy efficiency of the building envelope

TES Energy Façade

Timberbased element systems for improving energy efficiency of the building envelope

ERA-NET "WoodWisdom-Net – Networking and Integration of National Programmes in the Area of Wood Material Science and Engineering"

The renovation of the existing building stock for saving energy is one of the biggest challenges for the building branch. TES Energy Façade project develops new solutions for renovation, utilizing prefabrication and modern measuring technology.

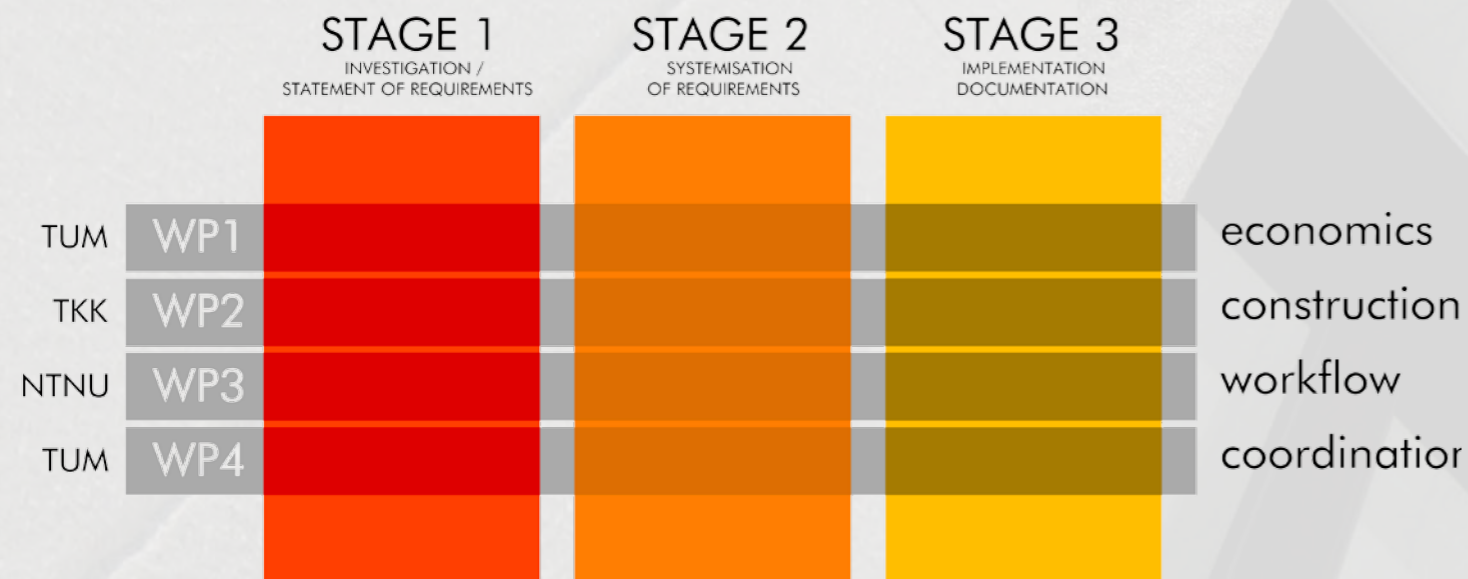


TES partners in a project meeting in Munich (from left):

Erno Huttunen (TKK), Kyösti Heino (Woodpolis), Kimmo Lylykangas (TKK), Alexander Gump (Gump & Maier GmbH), Birgit Sudbo (NTNU), Dag Einar Olsen (Arkitektstudio Bodo AS), Merja Laitinen (ARA), Holger Halstedt (Trebyggeriet AS), Marküs Böhling (Ambros Holzbau), Hermann Kaufmann (TUM), Knut Einar Larsen (NTNU), Matti Stenroos (Woodpolis), Pekka Heikkinen (TKK), Knut Ragnar Holm (NTNU) and Frank Latke (TUM).

TES Energy Façade is a co-operation project between three universities: Technische Universität München (TUM), Norwegian University of Science and Technology (NTNU) and Helsinki University of Technology (TKK). Other project partners are enterprises and other organisations from 3 participating countries, aiming at implementation of the new renovation methods in the emerging markets.

TES Energy Façade project is coordinated by Technische Universität München (TUM), where the project leader is professor Hermann Kaufmann.



The duration of the project is 24 months. It was launched in the January of 2008. The total budget for the project is about 700 000 euros, of which the share of the Finnish research activities is 190 000 euros. As part of the European WoodWisdom-Net programme, it is based on international research co-operation but financed by national funding organisations. The Finnish research activities are funded by TEKES and the participating enterprises.

The research subject calls for multi-disciplinary approach. The TES research at TKK is carried out in PRA co-operation, which means co-operation of three TKK chairs in teaching and research:

- Chair of Wood Construction (Department of Architecture)
- Laboratory of Structural Engineering and Building Physics (Department of Civil and Environmental Engineering)
- Laboratory of Wood Technology (Department of Forest Products Technology)

Also the Laboratory of Heating, Ventilating and Air-Conditioning as well as the Institute of Photogrammetry and Remote Sensing participate the project.

The new solutions developed in TES project are utilized in a pilot renovation project in the city of Oulu, where a 8-storey high student dormitory building *Pohjankaleva* is renovated aiming at reducing the demand for heating energy down to the passive house standard. The owner of the building is PSOAS, *Pohjois-Suomen opiskelija-asuntosäätiö*, which was founded in 1971 to manage student housing in Oulu. Currently, PSOAS owns apartments for more than 5,100 students.

Passive house is a voluntary standard for energy efficient building. In the project PEP – *Promotion of European Passive houses*, VTT suggested a definition for Finnish passive houses, where the requirements are:

- Heating energy demand max. 20 – 30 kWh/m²/a (depending on the location)
- Air tightness of the building envelope n₅₀ max. 0.6 1/h
- Total primary energy consumption 130 – 140 kWh/m²/a

The research results and the experiences of the pilot projects will be reported in the end of 2009

The Finnish research team in TES project meeting (from left): Erno Huttunen, Juha Lehto, Kimmo Lylykangas, Anna Kaila, Hannu Hirsi and Jukka Piironen.



The renovation of Pohjankaleva building aims at reaching the Finnish Passive House level, where the heating energy demand after renovation is max. 30 kWh/m²/a. The location of the Oulu pilot building is 65° 02' N

