

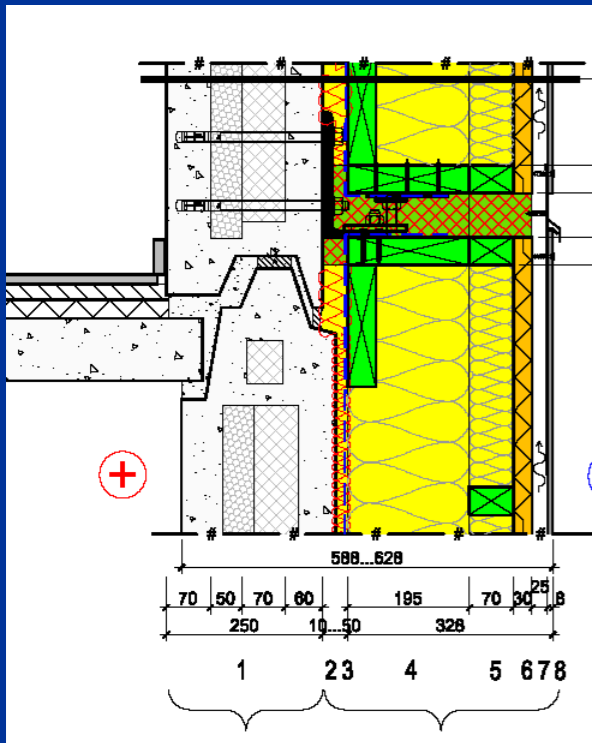


Tehaselise rekonstrueerimise õppetunnid

Pilootprojektide esimesed tulemused

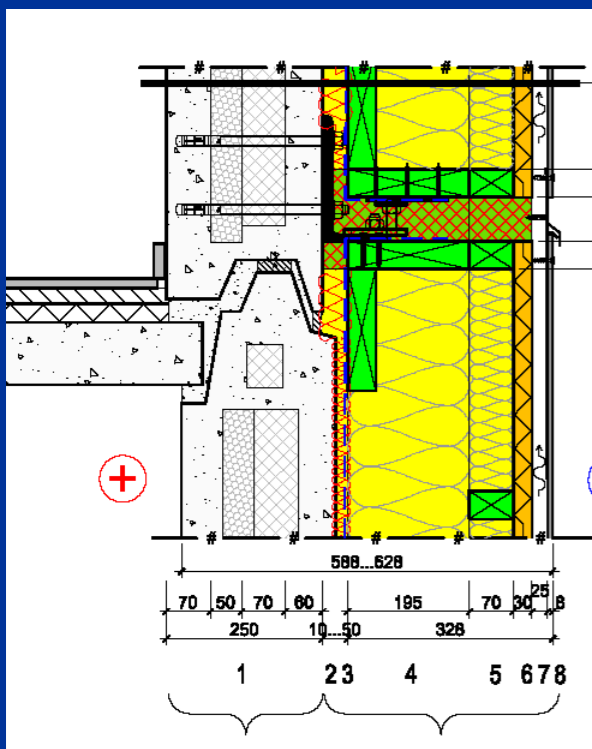
Mis on tehasealine renoveerimine?

- Tehases toodetakse lisasoojustuselemente



Mis on tehaseline renoveerimine?

- Lisasoojustus-
elemendid
tuuakse
objektile









Tegelikud kulud tööloikude kaupa (koos km)

Tööloik	€	€/m ²
Lisasojustuselemendid koos paigaldusega. Sisaldab ka aknaid, fassaadi katet, tõstetehnikat.	425 849	166
Ventilatsioon.	118 764	46
Küte.	65 012	25
Vesi ja kanalisatsioon.	45 022	18
Elekter.	44 736	17
PV paneelid.	45 997	18
Uued rõdud.	44 234	17
Keldri hüdroisolatsioon ja soojustamine.	49 102	19
Sisetööd. Sisaldab kipsi töid, maalritöid ja aknalaudasid.	124 223	48
Uus katus koos pööningu soojustamisega.	113 880	44
Uued välisuksed ja tuulekoja ukсед.	19 727	8
Kõik ülejäänud kaasnenud kulu: projekteerimine, laser-skaneerimine, prügivedu, rendi seadmed, juhtmine jne.	199 454	78
Kokku	1 296 000	505

**TAL
TECH**



TIMBECO DRIVE 



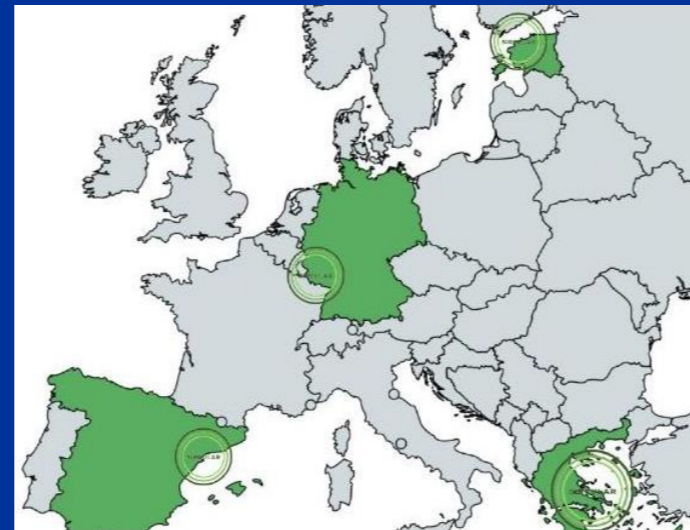
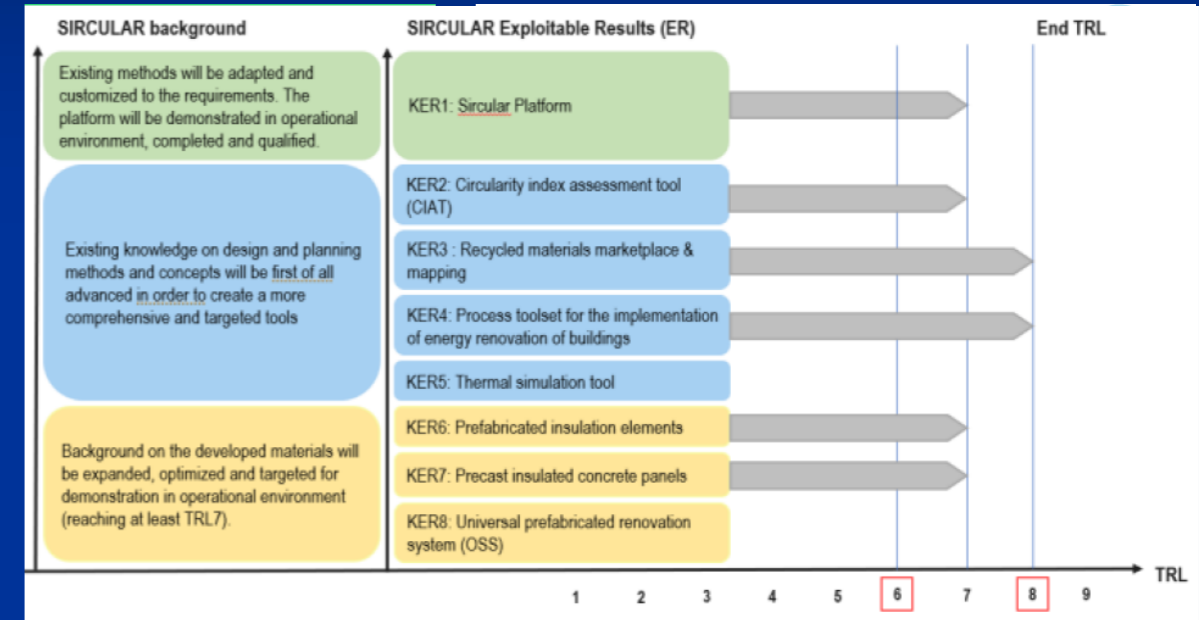
PILOOTPROJEKTID

SIRCULAR



- Sustainable and Integrated people cent**RiC** sol**U**tions for bui**L**ding dec**A**rbonisation and circularity

- 22 partnerit, 6 riiki
- 5 pilooti
- Eestist:
 - Tallinna Tehnikaülikool
 - Balti Vara
 - EKÜL
 - TREA



SIRCULAR



SIRCULAR

kesksed

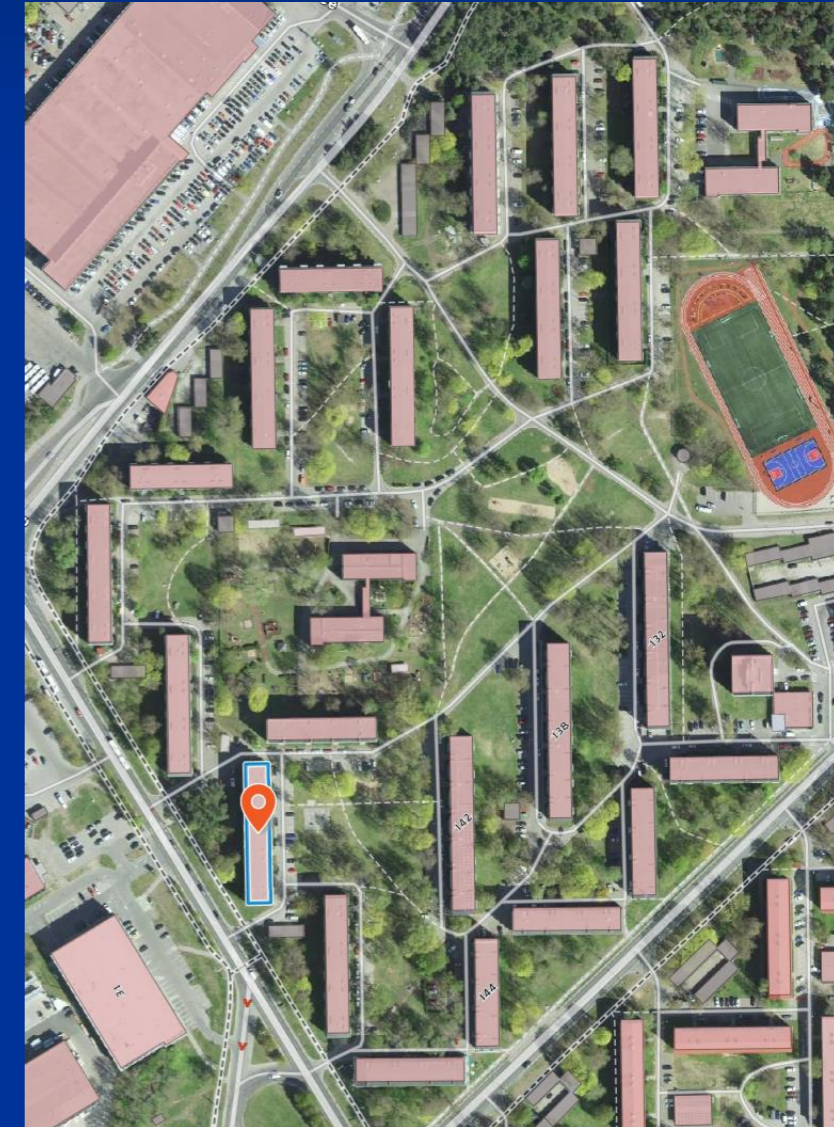
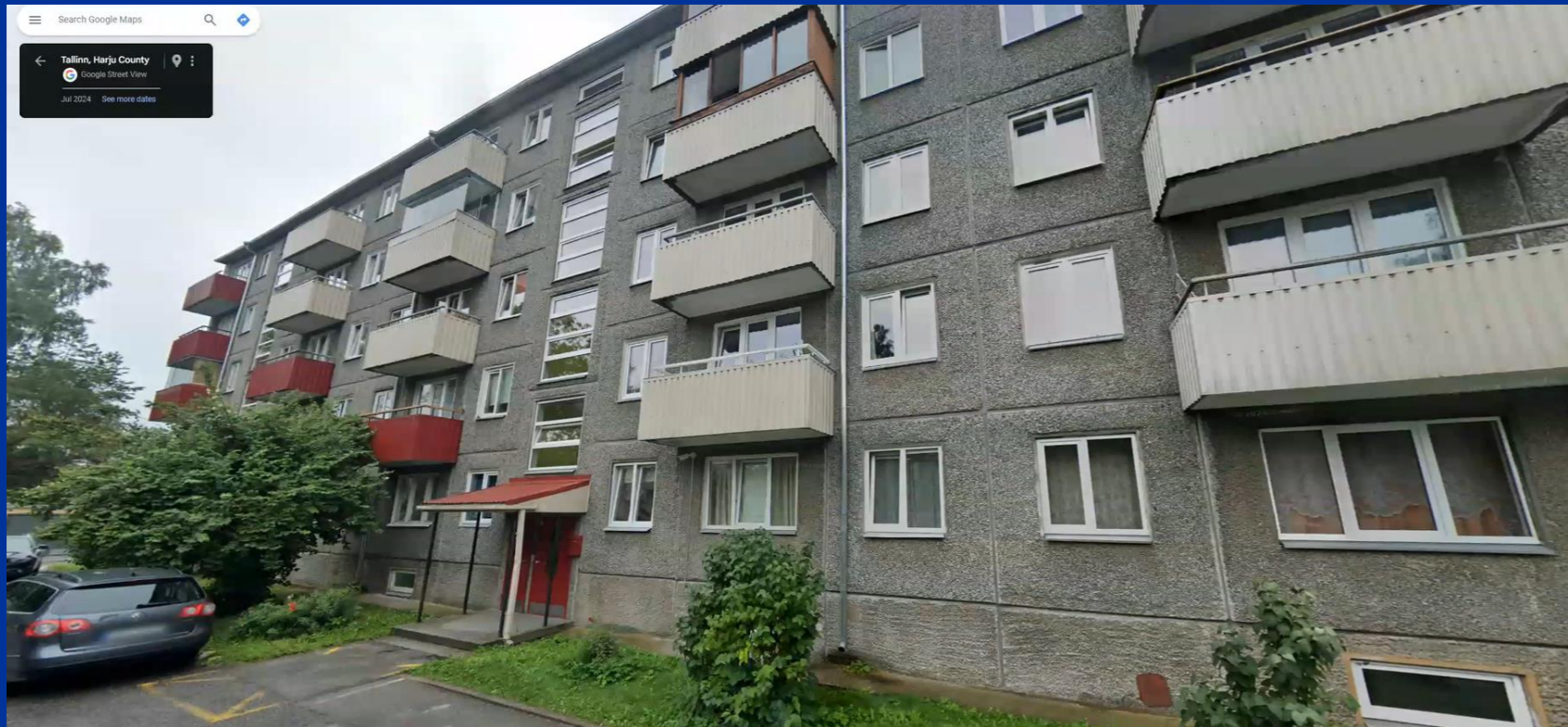
- Tallinna Linnaplaneerimise Amet tutvus esitatud eskiisiga ning otsustas kooskõlastamiseks esitatud **eskiisi lükata tagasi**. Liftide osas oleks meie Mustamäe linnaosa üldplaneering ei takista majade arhitektuurse välimuse muutmist liftide/rõdude vms lisamise läbi, aga sellisel rekonstrueerimisel **tuleb läheneda nõ kvartalipõhiselt ja pakutav lahendus peab sobima üldplaneeringuga**. (Mustamäe linnaosa üldplaneering p 5.1 lk 57: Paneelilamute ümberehitamisel/rekonstrueerimisel (s.h. rõdude kinniehitamised ja otsaseinte soojustamised) **tuleb koostada fassaadilahendus tervele hoonele** lähtudes kvartali olemasolevast üldilmest (fassaadimaterjalid, -elemendid). Olevast kvartali arhitektuursest **üldilmest oluliselt erineva fassaadi või ehitusmahu muudatusettepaneku korral tuleb koostada kogu muudatusettepanekuga visuaalselt seotud ala fassaadilahendus**).
- laiendamise puhul tuleb arvestada esmane soovitus, et kuivõra hoonestuse välisilmet, siis oleks meie Tallinna Linnaplaneerimise Amet kui hills



SIRCULAR



- Ühistu peab omal kulul naaberkoonete kogu kvartali fassaadilahendused? 22 korterelamut...
- Hoovist nähtavad korterelamud? Aga need on juba renoveeritud ...

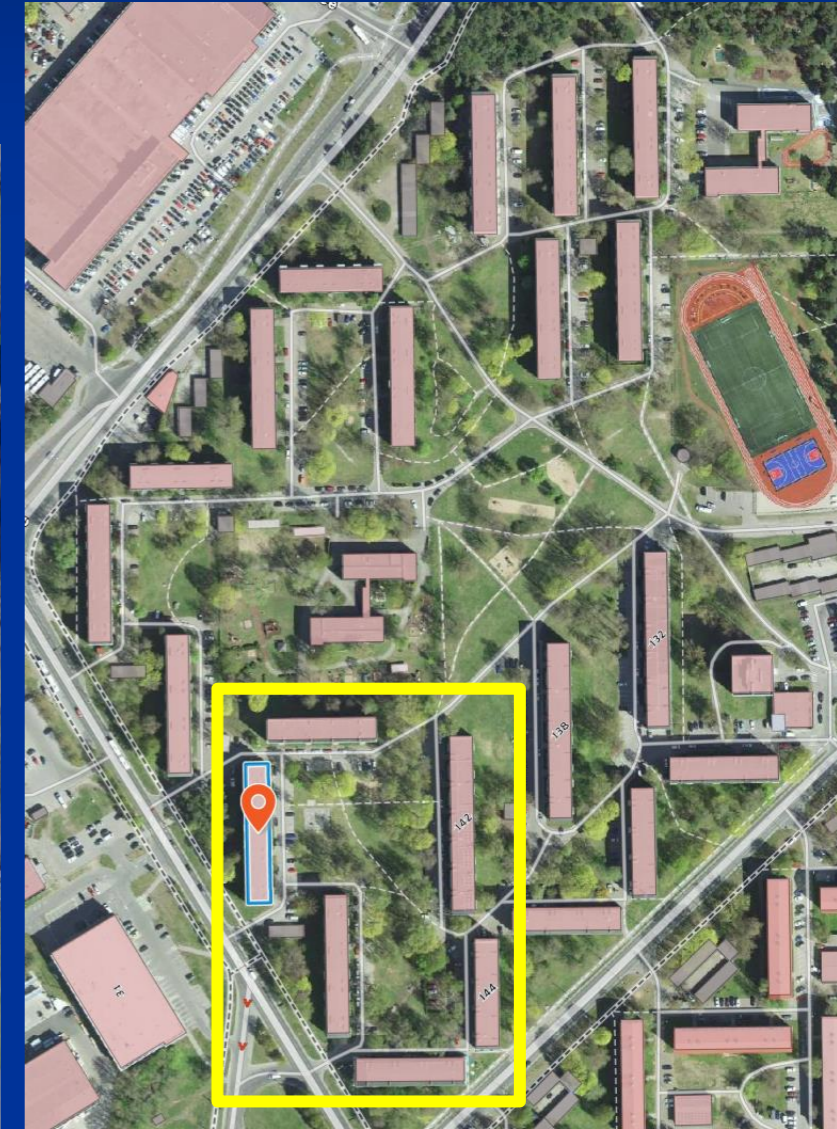


SIRCULAR



SIRCULAR

- Kui naaberhooned on renoveeritud, kas siis ligipääsetavst parandada ei tohi?



DRASTIC



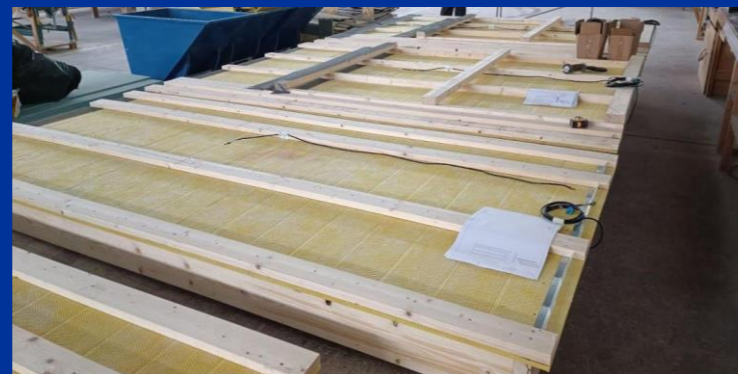
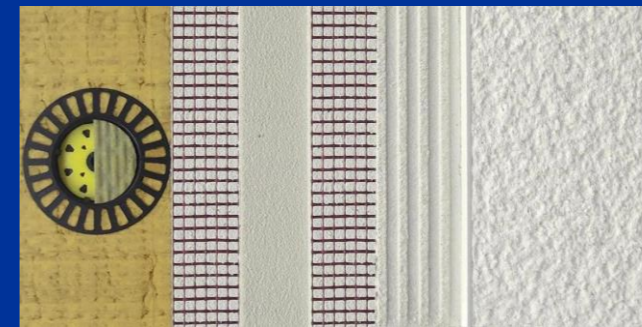
DRASTIC

Demonstrating affordability, sustainability and circularity

■ Demonstrating **Real** and **Affordable** Sustainable Building Solutions with **Top-level** whole life cycle performance and **Improved** **Circularity**

- 23 partnerit, 8 riiki
- 5 pilooti

Balaguer, Spain
Düsseldorf, Germany
Honefoss, Norway
Rapla, Estonia
Saint Denis, France



DRASTIC



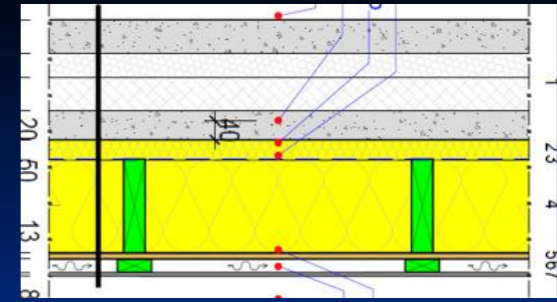
DRASTIC

Demonstrating affordability,
sustainability and circularity

- Demonstrating **R**eal and **A**ffordable **S**ustainable Building Solutions with **T**op-level whole life cycle performance and **I**mproved **C**ircularity



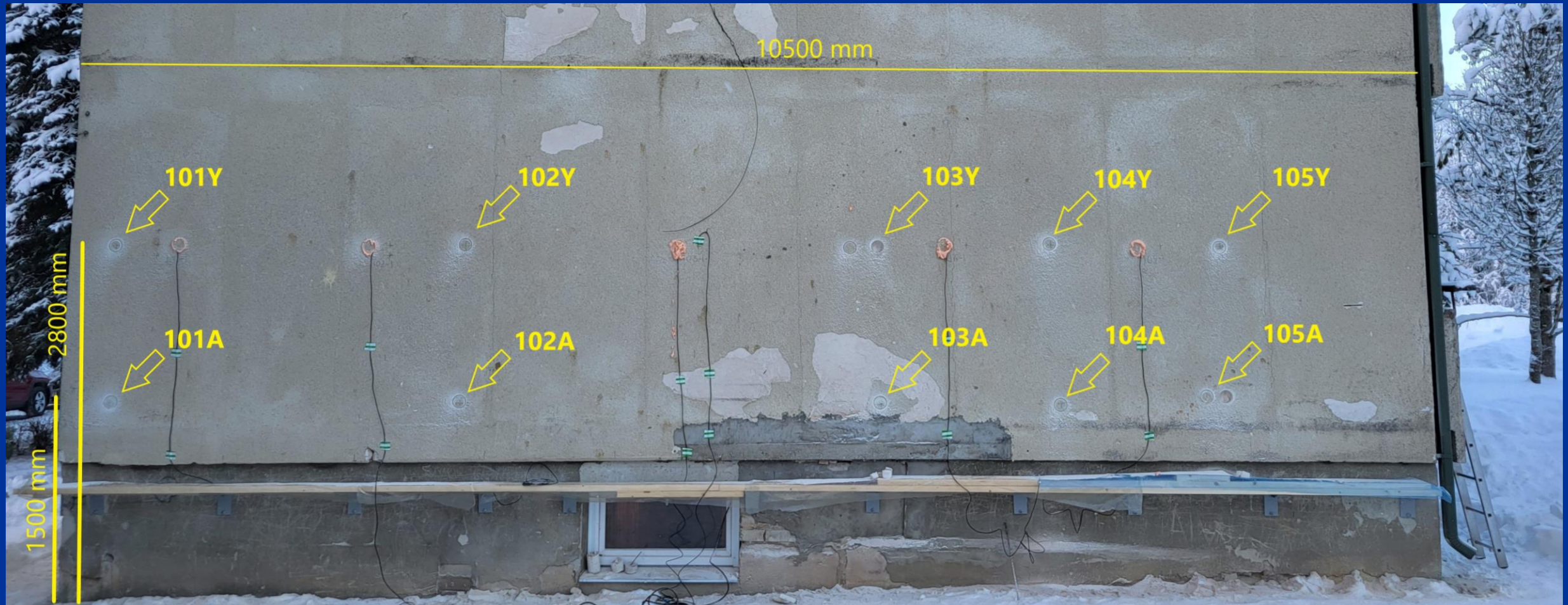
DRASTIC



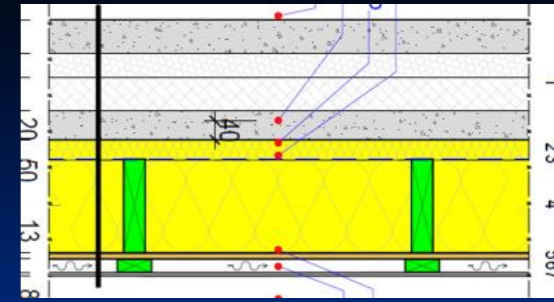
DRASTIC

Demonstrating affordability,
sustainability and circularity

- Auru- ja õhutõkkekihi mõju ja toimivuse analüüs (5 erinevat tüüpi/elementi)
- Elementide kinnitus- ja paigaldusviisid

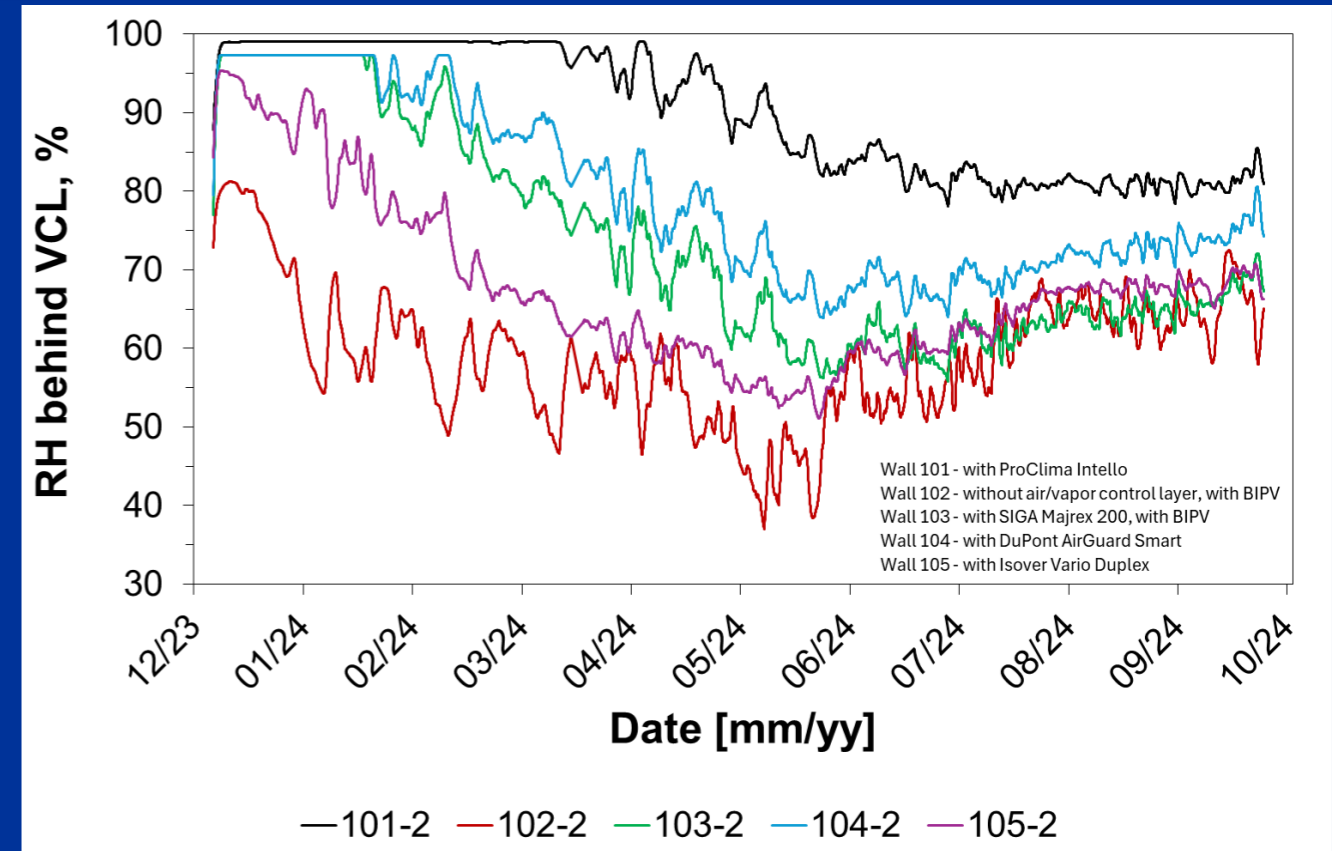
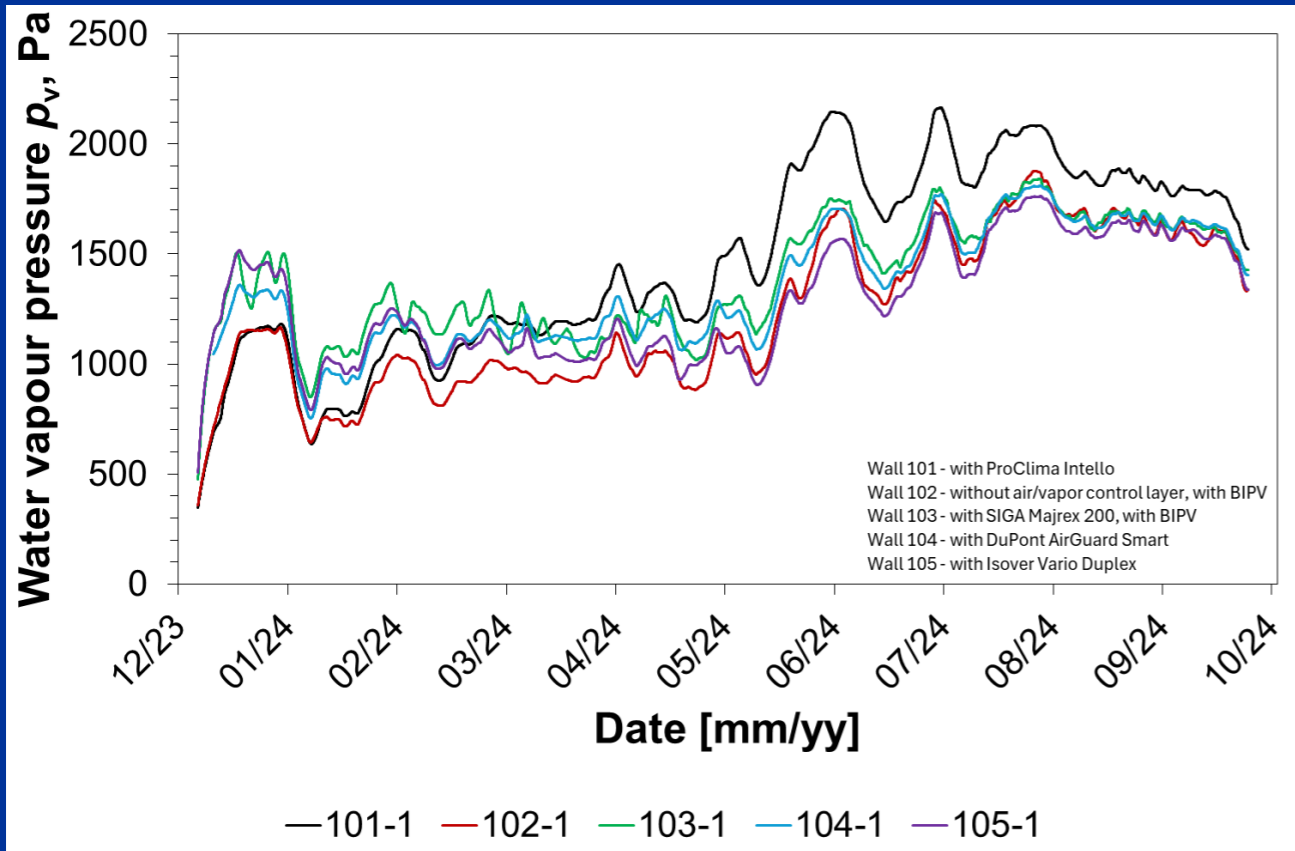


DRASTIC



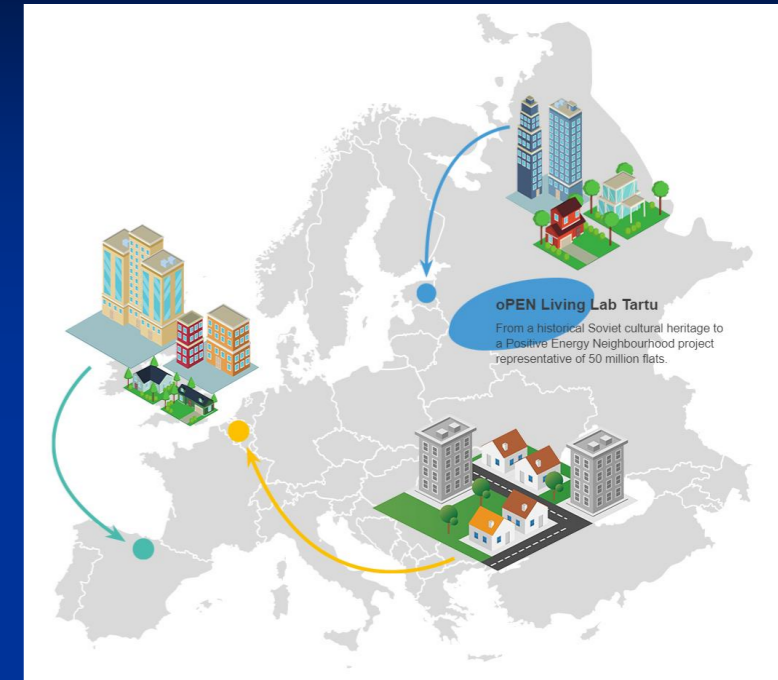
Niiskuse ümberjaotumine soojustatavas (ol.olevas) seinas

Niiskuse ümberjaotumine aurutõkke ja ol.oleva seina vahel



oPEN Lab

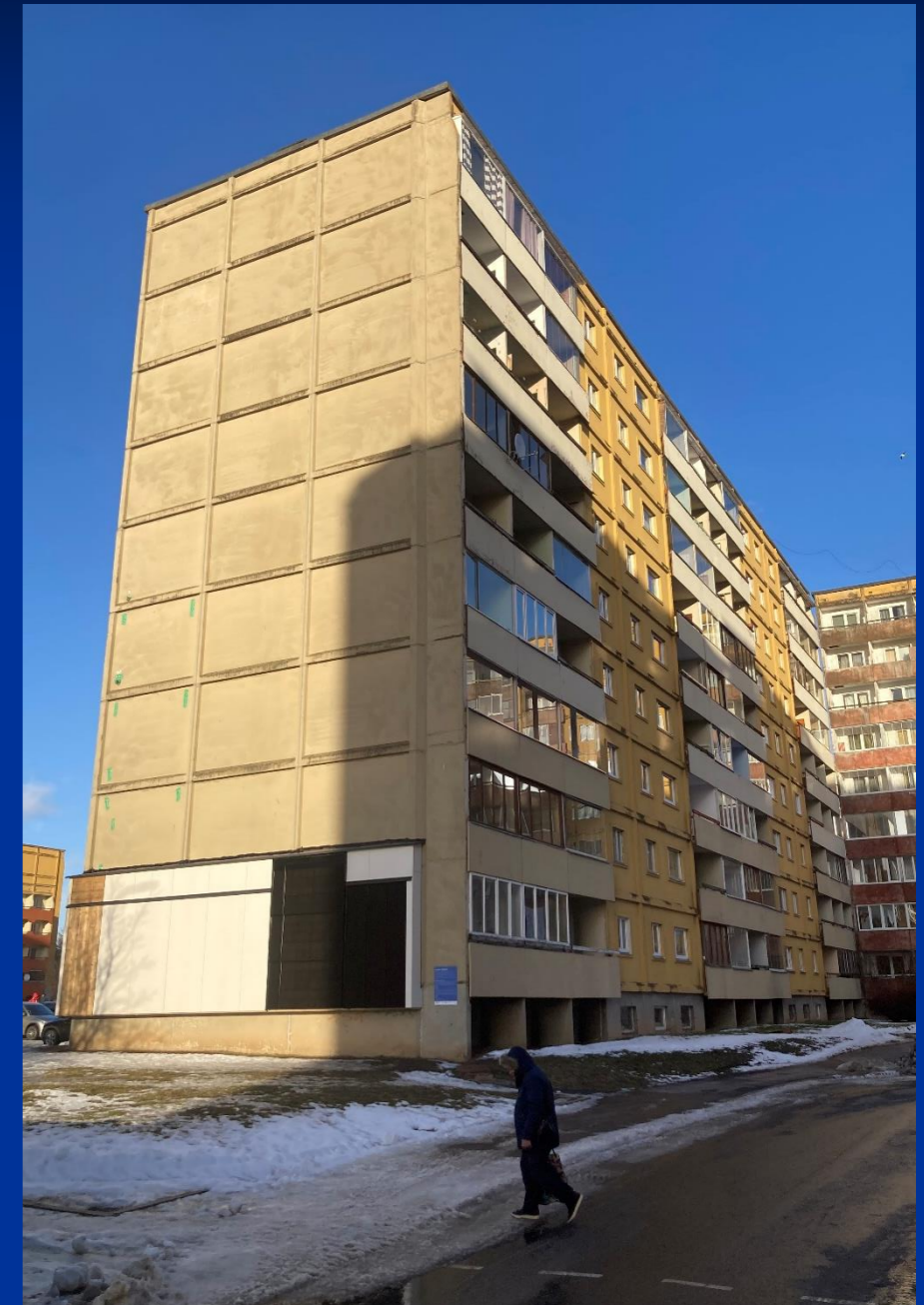
- Open innovation living labs for Positive Energy Neighbourhoods
- 32 partnerit, 7 riiki
- 3 pilooti - piirkonda



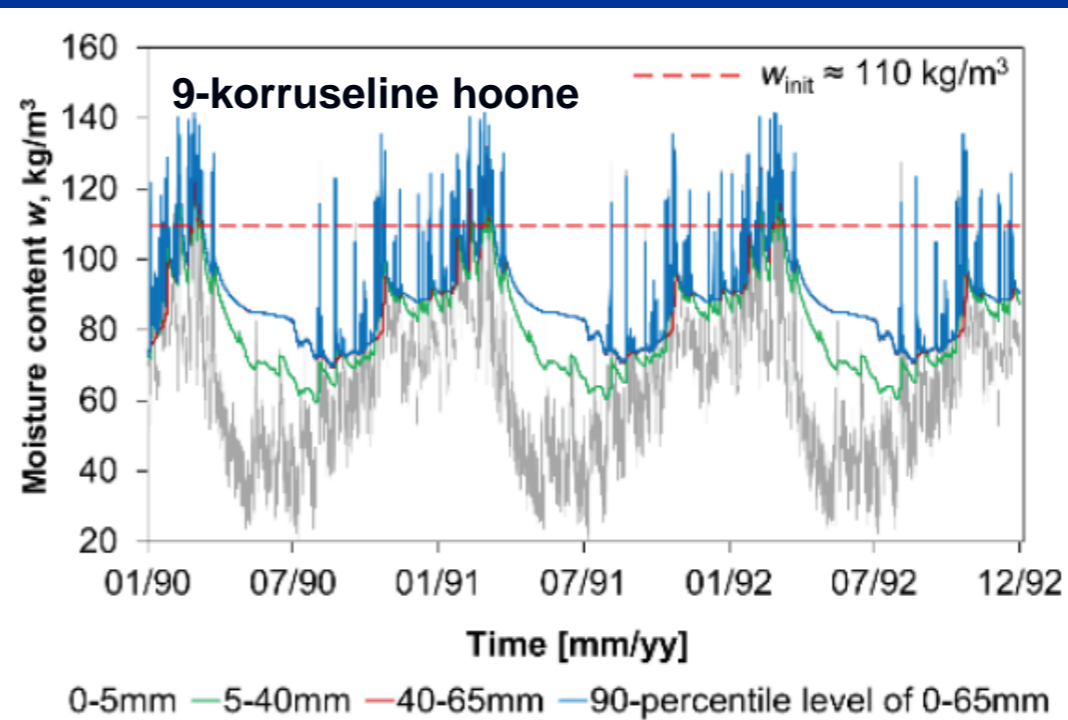
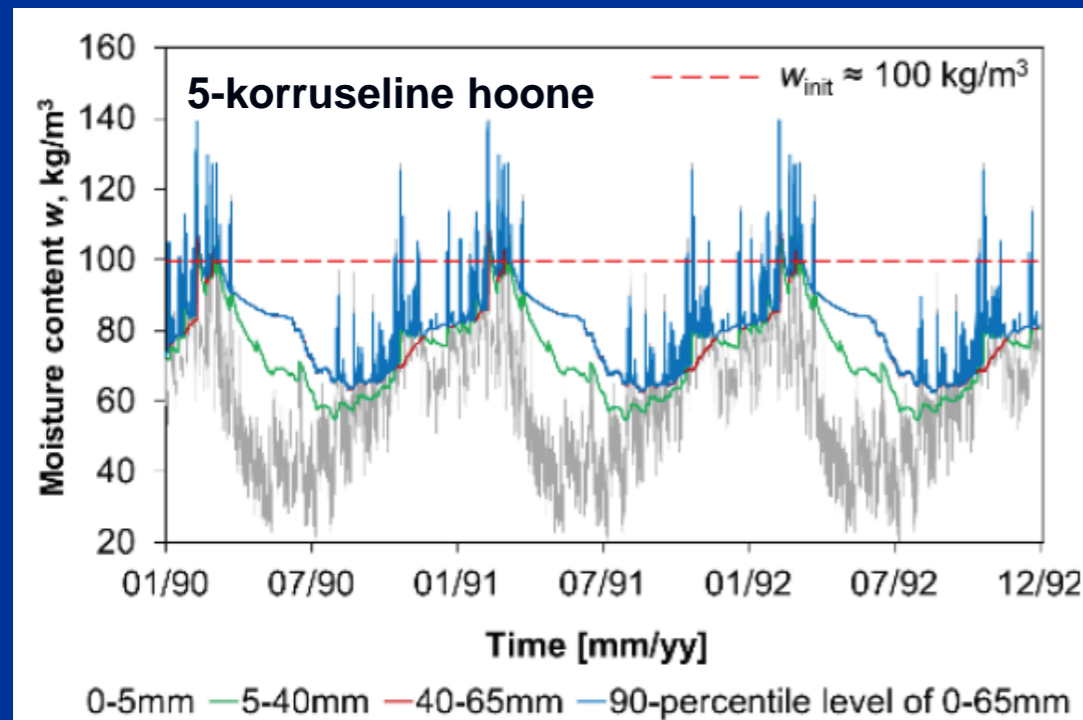
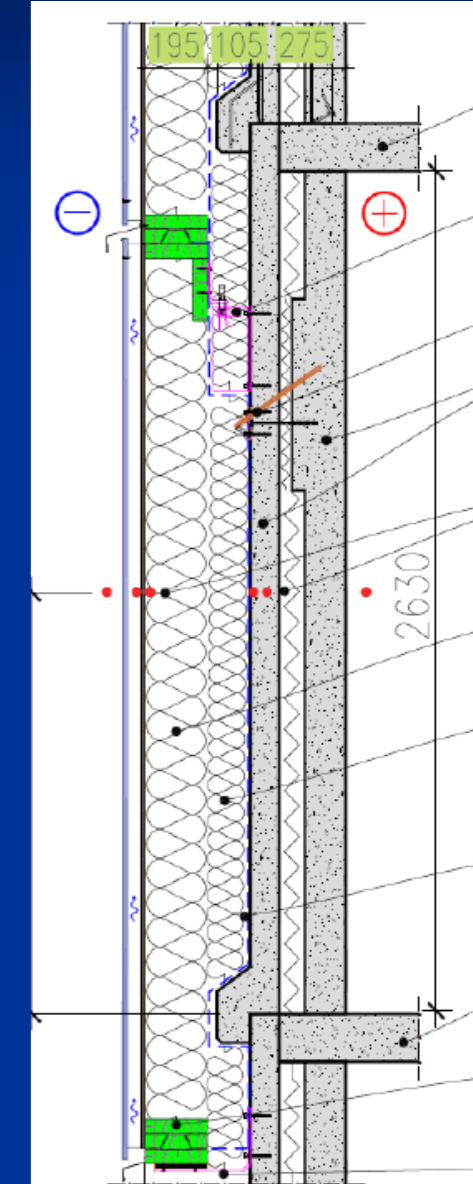
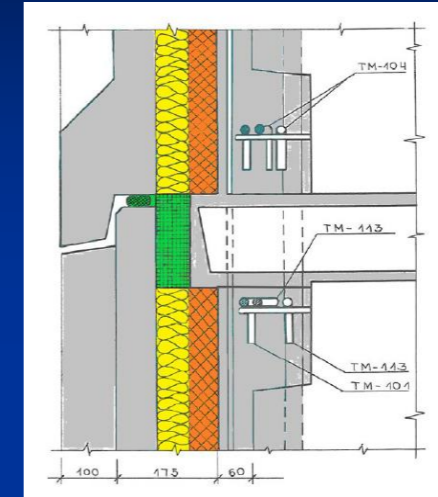
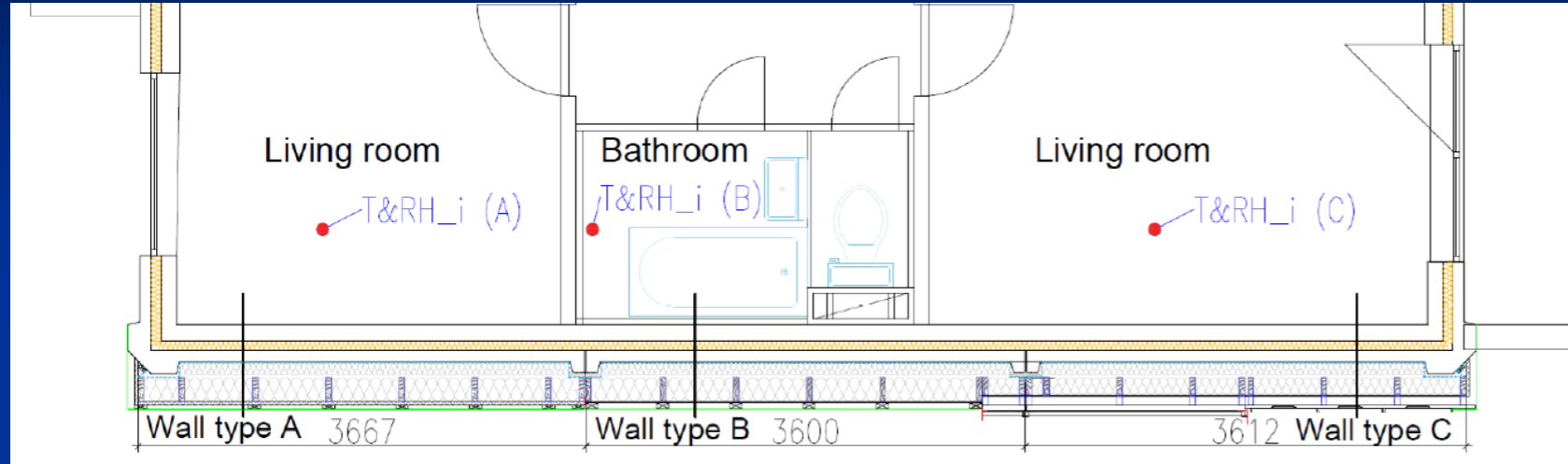


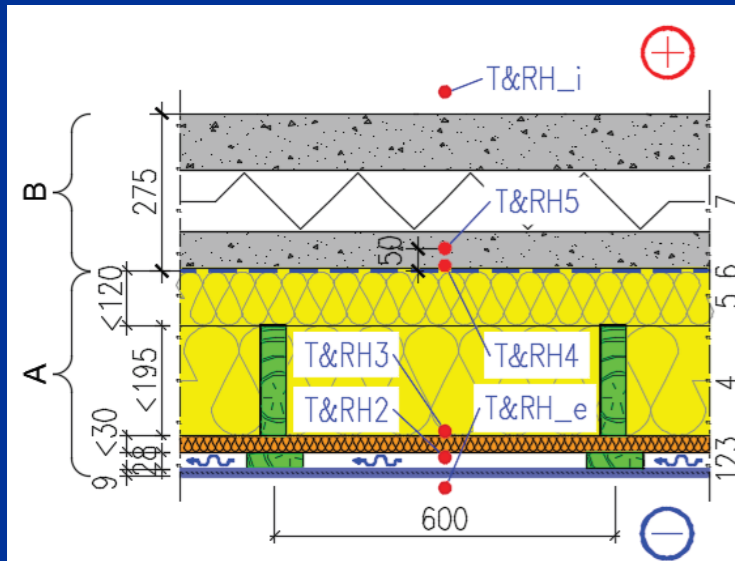
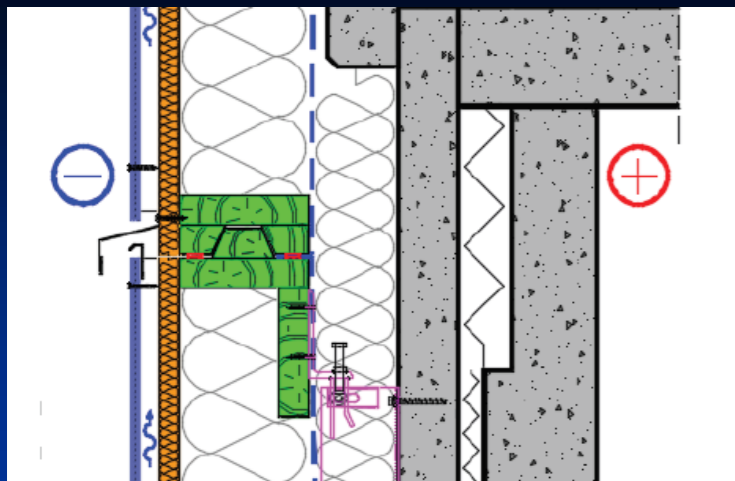
oPEN Living Labs

- Lisasoojustuselemendi prototüüp
- Erinevad fassaadikatted, kinnitused ja tarindid



oPEN Living Labs

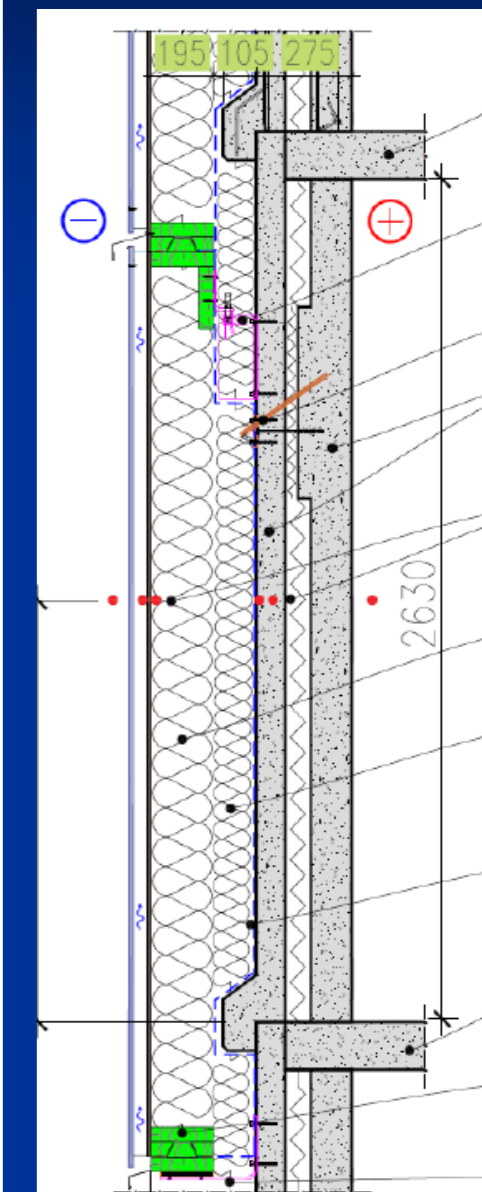




A. Prefabricated insulation element
B. Original concrete panel wall

1. Facade board 9mm
2. Airgap / vertical battens 28mm
3. Wind barrier <30mm
4. Timber frame / min.wool <195mm
5. Buffering min.wool <120mm
6. Air&vapour control layer 0.2mm
7. Original concrete wall 275mm

1	2	3	4	5	6	7	8	9	
See Fig. 5 for the locations of the critical points analysed	Air and vapour control layer and its S_d -value (m)								
	0.03	0.2 – 5	0.3 – 14	0.5 – 25	0.8 – 35	0.1	0.2	2.0	
	Air and vapour control layer	Air and vapour control layer with varying water vapour resistance				Gypsum board without paper	Fiber cement board	OSB	
		Membrane, thickness 0.2–0.3 mm				9 mm	12 mm	12 mm	
Critical point	Wind barrier – sheathing membrane ~0.2 mm ($R \approx 0.00 \text{ m}^2\text{-K/W}$)								
T&RH4	Yellow	Yellow	Yellow	Red	Red	Yellow	Yellow	Red	
T&RH3	Green	Green	Green	Green	Green	Green	Green	Green	
	Wind barrier – fibre cement board 9 mm ($R \geq 0.03 \text{ m}^2\text{-K/W}$)								
T&RH4	Green	Green	Yellow	Yellow	Red	Green	Green	Red	
T&RH3	Green	Green	Green	Green	Green	Green	Green	Green	
	Wind barrier – gypsum board without paper 9 mm ($R \geq 0.05 \text{ m}^2\text{-K/W}$)								
T&RH4	Green	Green	Yellow	Yellow	Red	Green	Green	Red	
T&RH3	Green	Green	Green	Green	Green	Green	Green	Green	
	Wind barrier – RW/GW board with windtight facing $\geq 13 \text{ mm}$ ($R \geq 0.40 \text{ m}^2\text{-K/W}$)								
T&RH4	Green	Green	Yellow	Yellow	Red	Green	Green	Red	
T&RH3	Green	Green	Green	Green	Green	Green	Green	Green	
	Wind barrier – wood fibreboard $\geq 22 \text{ mm}$ ($R \geq 0.45 \text{ m}^2\text{-K/W}$)								
T&RH4	Green	Green	Yellow	Yellow	Red	Green	Green	Red	
T&RH3	Yellow	Yellow	Green	Green	Green	Green	Green	Green	



Tehaselise renoveerimise riiklik piloot

KMT**PREFAB** ESTNOR

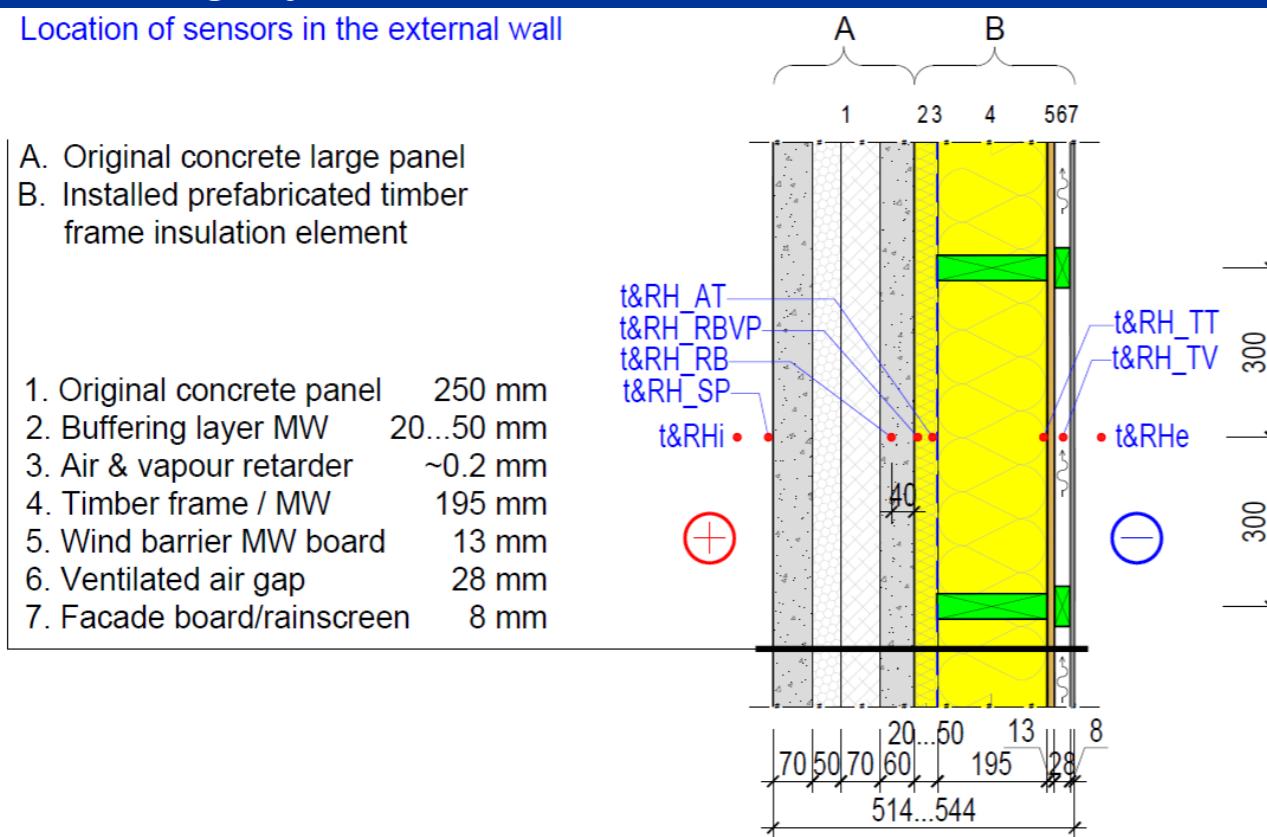
- Toetusmeede avati 2021
- Meetmes kokku 4 erinevat tüüpi vanemaid (enne 2000) korterelamuid
- Lepingud sõlmiti 19 korterelamu renoveerimiseks üle Eesti
- Lähteülesanded, uuringud, projekteerimine 2021 – 2022
- Elementide tootmine tehastes ja elamute rekonstrueerimine 2023 – 2024



Tehaselise renoveerimise riiklik piloot

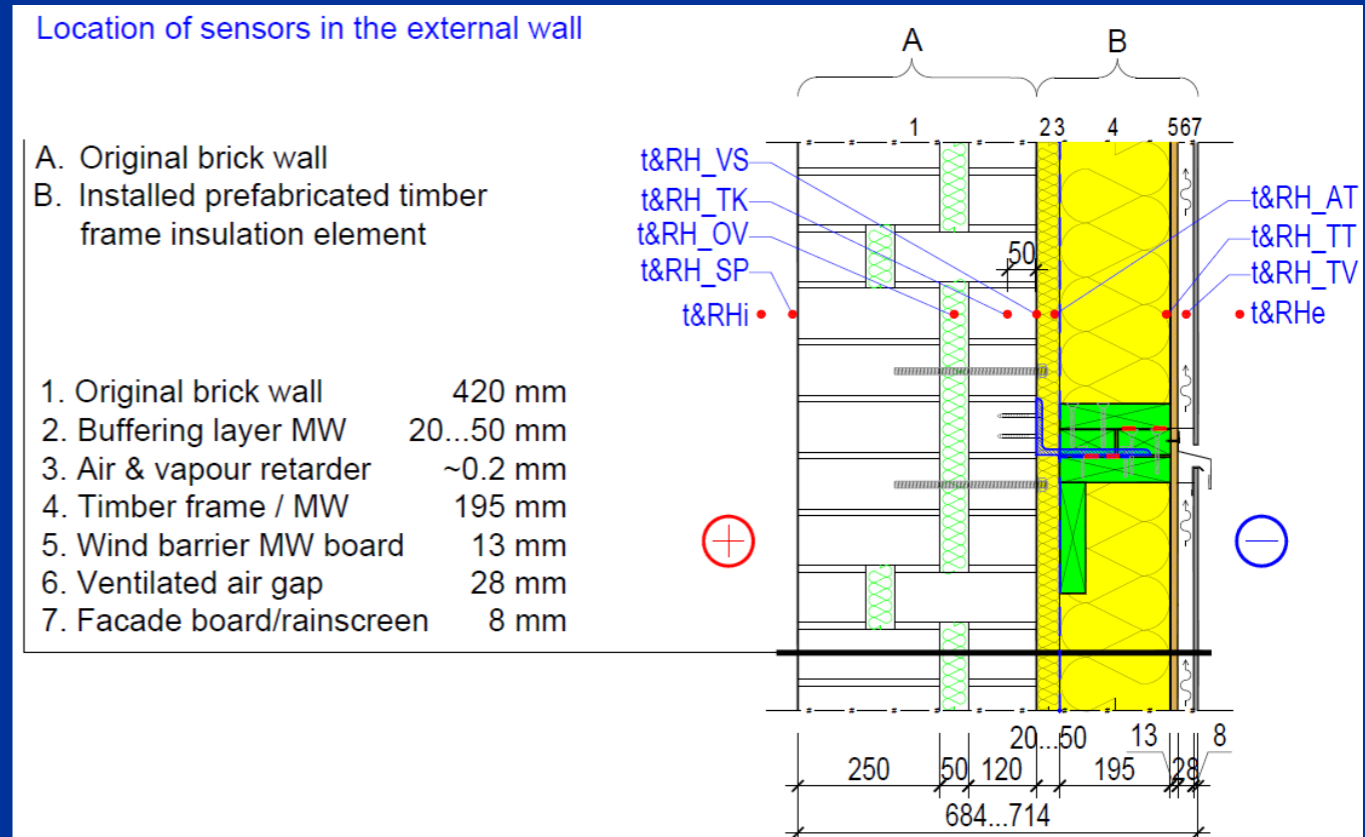
Hor.lõige ja andurid uuritud r/b seinas

Location of sensors in the external wall



Vert.lõige ja andurid uuritud tellisseinas

Location of sensors in the external wall



Tehaselise renoveerimise riiklik piloot

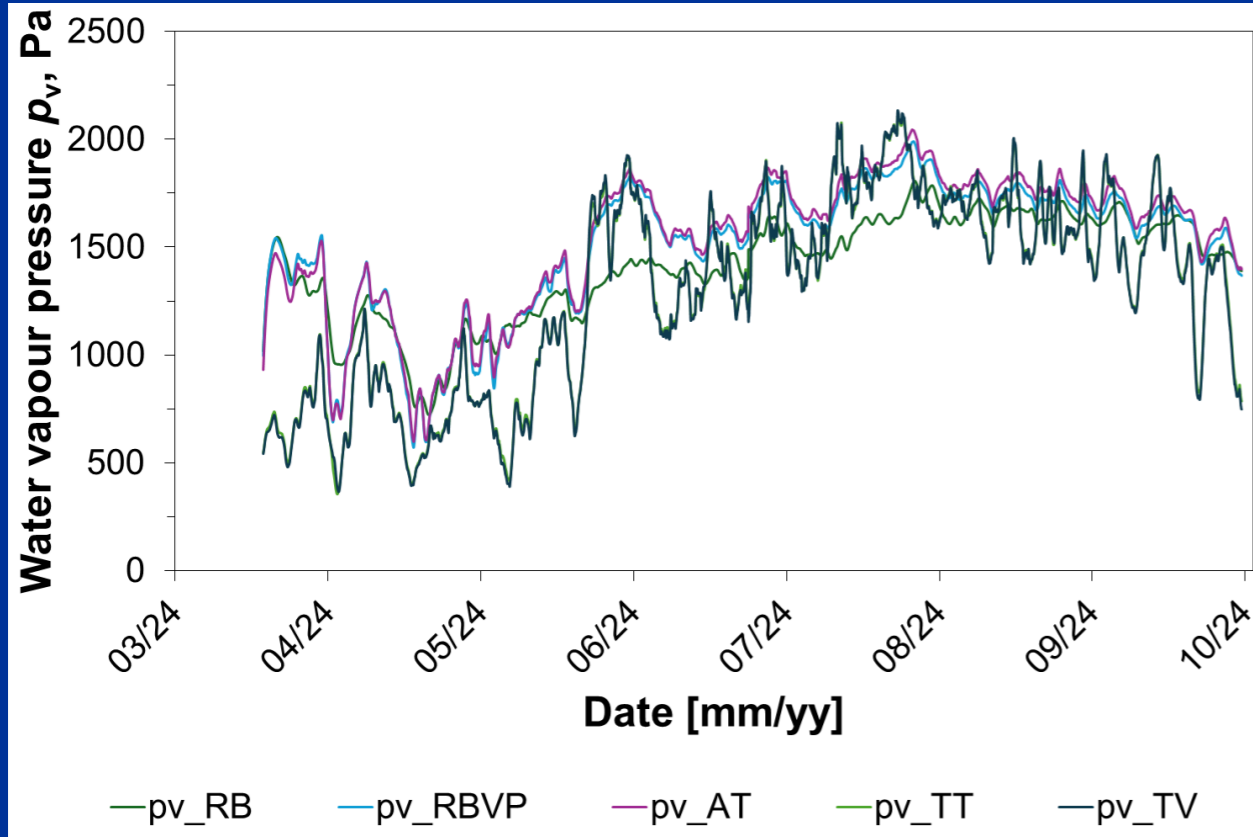
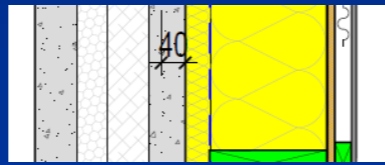
KMT

PREFAB

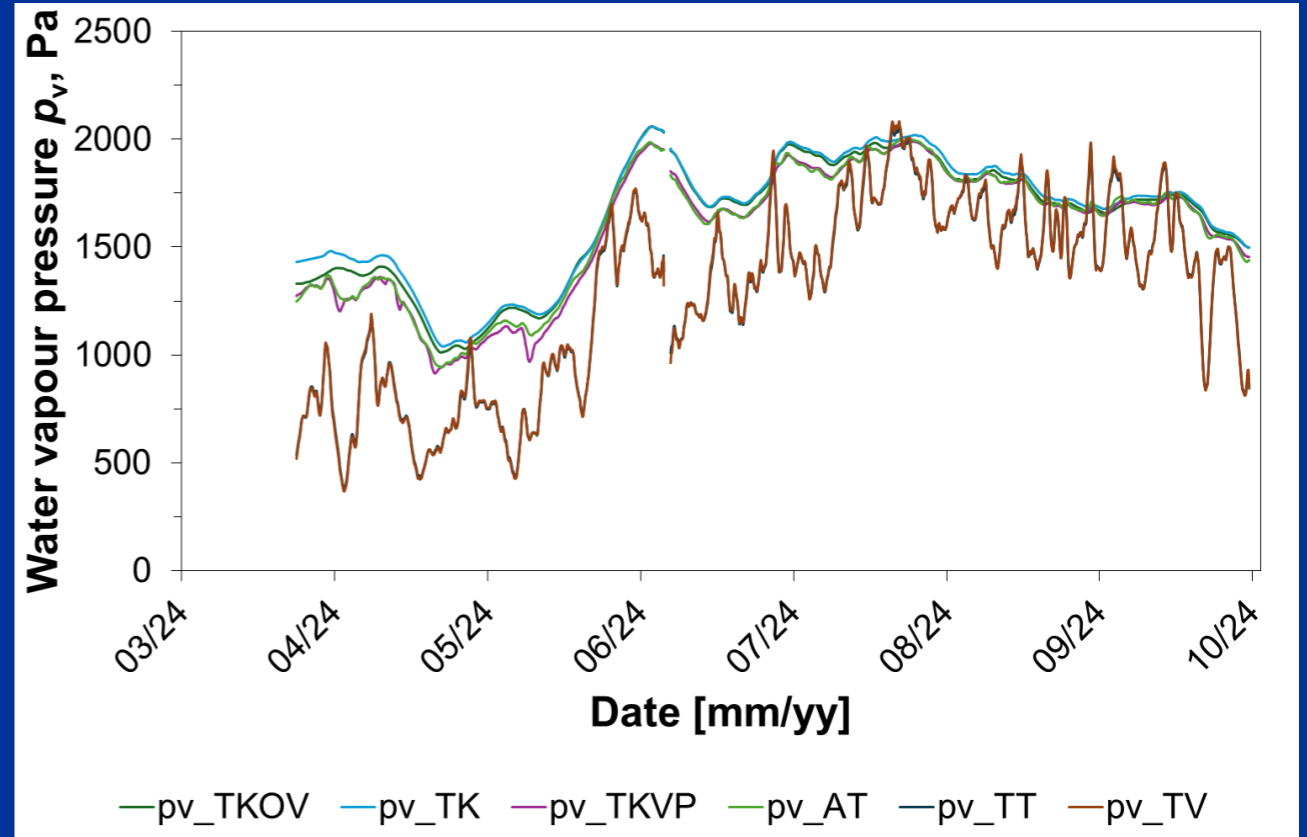
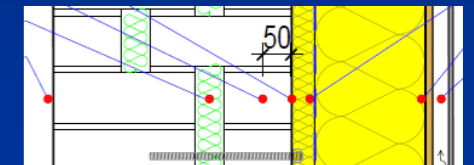
ESTNOR

- Niiskuse ümberjaotus elemendis ja seina kuivamine

Raudbetoon välisseinaelement



Tellissein



SoftAcademy

- Demonstrating a model of collaborative pre-fabricated reinvention of modernist districts into cozy living environments



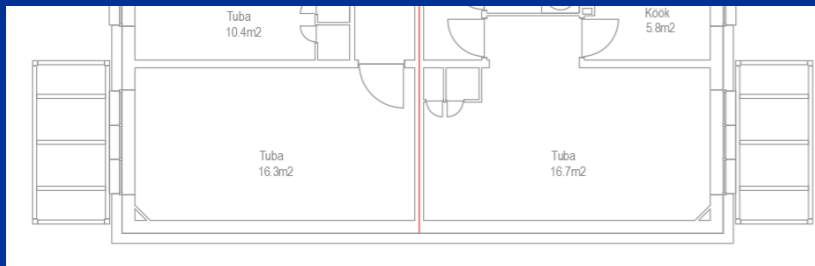
SoftAcademy

- Ehitus-
jätmed

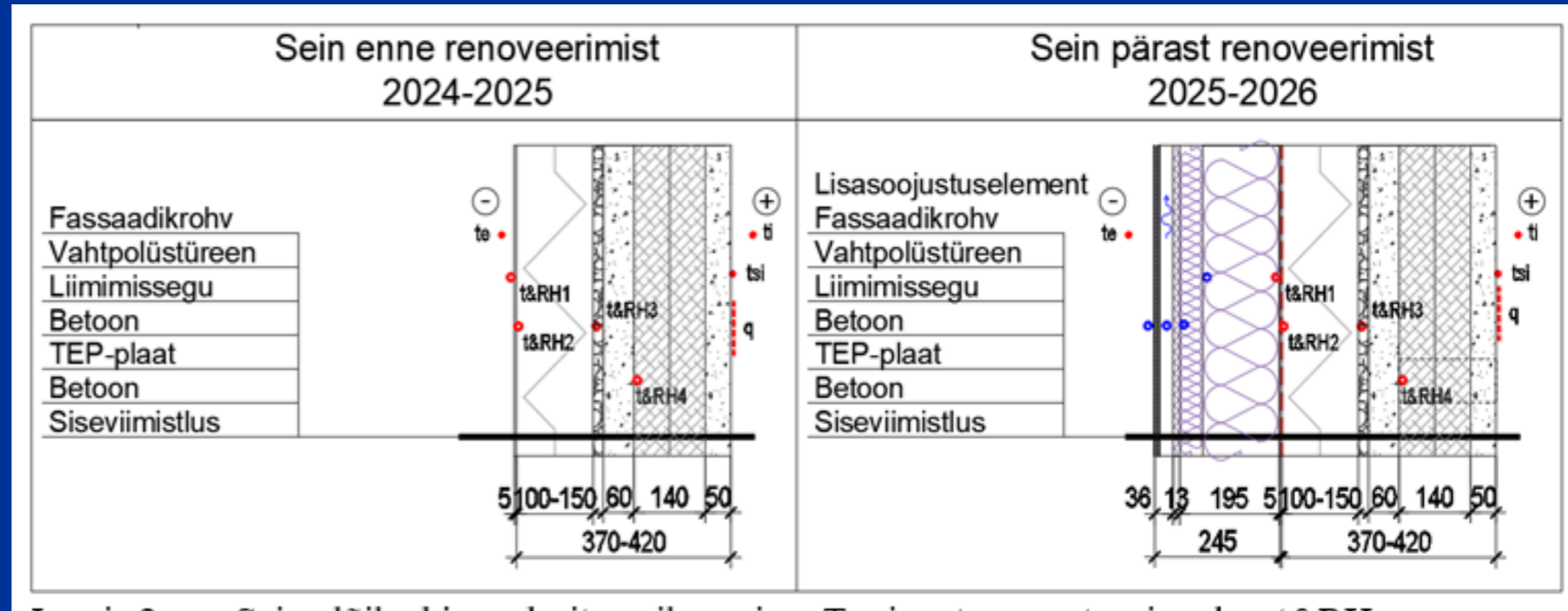


SoftAcademy

■ Mõõtmised algavad kohe



- Temperatuuri ja suhtelise niiskuse andurid paigaldatakse:
 - Fassaadikrohvi välispind (paigaldus õuest);
 - Soojustuse fassaadikrohvi vahele (paigaldus õuest);
 - Soojustuse ja ol.oleva välisseina vahele (paigaldus õuest);
 - Võimalusel ol.oleva välisseina väliskooriku ja soojustuse vahele (paigaldus toast või õuest);



Võta ühendust, uurime välja

targo.kalamees@ttu.ee

+372 56 284 007