

Energy efficient refurbishment

1.1 A SMART, EFFICIENT CLIMATE SHELL REFURBISHMENT SOLUTION



Fig 1: Refurbishment, Valla Torg, Stockholm

- **Decreased energy consumption by 60%**
- **Lower energy costs and reduced CO₂ emissions**
- **New installations creating a more balanced extends the lifespan of the buildings.**



Stockholm

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What is the solution?

This project concerns four fourteen-floor buildings and two four-floor buildings built in 1961. These buildings together host 324 apartments.

Just like most old buildings there are problems with thermal bridges and the fact that the climate shell is not airtight. This in combination with today's standard of desirable indoor temperature leads to high energy consumption, since the warm air leaks out and cold air finds its way in.

A lot of heat and energy is lost in the existing system of installations in our buildings, due to long distances of poorly insulated pipes for heating and water, as well as the absence of heat recovery.

Climate shell refurbishment of Valla Torg:

- Additional insulation by 80 mm to façade and 200 mm to basement walls.
- New type of construction for the roof with added insulation.
- New four glass windows with U-value 0,7 W/(m²K).

New installations of Valla Torg:

- Separate heat exchanger in every building for district- /geothermal heating.
- Heat pumps recovering heat from the exhaust air and transmitting it to produce heat and hot water
- Wastewater heat exchange system to preheat fresh water.
- Installation of "pipe in pipe" system to reduce hot water circulation losses
- Water-saving tap water fixtures to reduce water consumption
- Electricity saving measures
 - Low energy lighting fixtures for common spaces
 - Modern and more effective elevators
- Renewable energy: PV cells to produce electricity

How does it work?

In this retrofitting, external insulation is added to the whole building envelope in an ambitious manner and new windows and balcony doors will be installed with the best possible U-values for the project. This way there is control over incoming air.

Once finished, the only air intake will be under the windows right behind the radiators to warm the air up before it continues into the apartment. The air exits by exhaust ventilation and the heat is recovered by a heat pump on the roof.

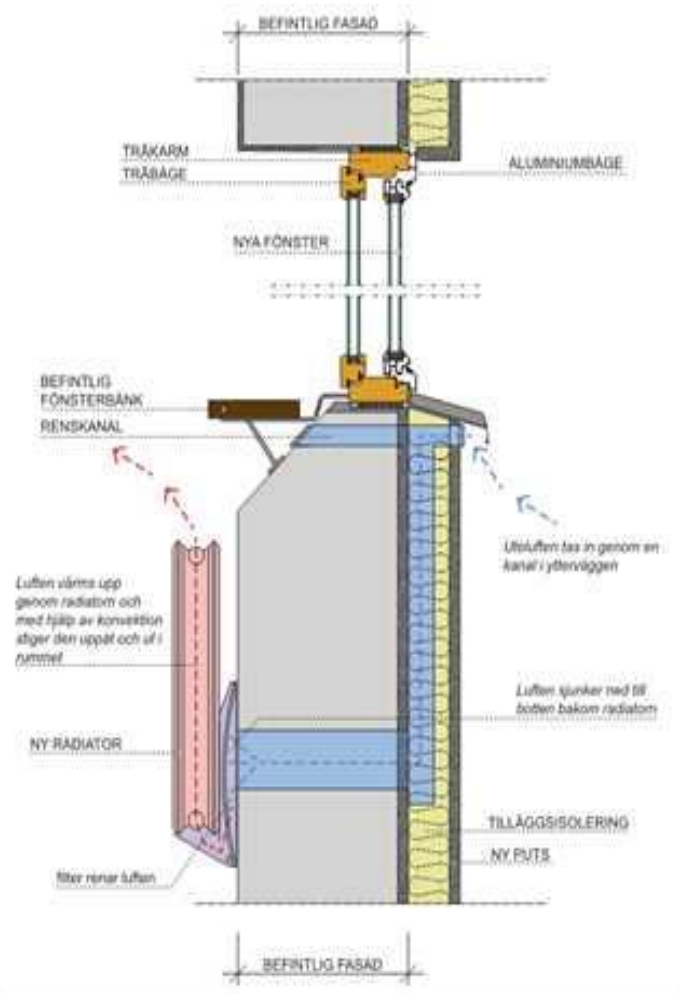


Fig 2: Ventilation diagram

The plumbing system will undergo significant improvement, and all new pipes are properly insulated and a system for wastewater heat exchange installed.

Instead of installing a traditional system with a circulation pipe parallel to the water pipe, the project will use a solution where the two are installed one inside the other, to minimize the surface where heat may escape and keep the water temperature high.



Fig 3: "Pipe in pipe" system

New substations and heat exchangers for district-/geothermal heating will be installed in every building. This way decreasing prior culvert losses is possible and users will have enhanced control of heating, hot water and ventilation heat recovery in each building.

The new modern elevators are more effective and lighting fixtures in common spaces will be replaced with more efficient ones with motion control. In addition to this, PV-cells will be installed on the roof

to provide renewable local energy for the building.

These smart installations combined will make the building require less energy and the consumed energy will be recovered in the best way possible.

Expected Impacts

Providing a good example for energy renovation of apartment buildings

Reducing environmental impact

Promoting sustainable economic development

Replication potential

This model of energy renovation can be replicated as a total or by selected parts.

The project sets a good example for different locations since it includes systems for district heating for five of the buildings, but also a system for geothermal heating for one of them. These systems can also be used for cooling, so which one to use for a follower depends on what the preconditions are on their particular site.

About GrowSmarter

GrowSmarter (www.grow-smarter.eu) brings together cities and industry to integrate, demonstrate and stimulate the uptake of '12 smart city solutions' in energy, infrastructure and transport, to provide other European cities with insights and create a ready market to support the transition to a smart, sustainable Europe.

GrowSmarter project partners



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