

25%

average energy
savings per year

ENGINEERING
TOMORROW

Danfoss

Case story | ASV automatic balancing valves

Improved comfort and **significant savings** on the energy bill

Too warm, too cold, and no chance to regulate the heating inside the individual apartment – those were the issues facing the residents in a 9-storey apartment building in Tallinn, Estonia. By upgrading the existing one-pipe system into a two-pipe system with automatic hydronic balancing, the residents now enjoy improved comfort and 25 percent savings on the energy bill.



Improved comfort and substantial energy savings for all the residents

It was the same every year. In January, when the winter was bitterly cold, the residents furthest away from the substation felt chilly. With envy they would watch the open windows from other apartments located close to the heat source. There the over-heating also caused discomfort.

The housing association owning the building decided to do something about the poorly balanced heating system. They were open to new, advanced solutions to provide better comfort for the residents. At the same time they wanted to increase the efficiency of the heating system and save on the energy bill. After careful considerations it was decided to replace the old one-pipe system with a brand new two-pipe system. The new system was equipped with Danfoss automatic balancing valves type ASV to ensure equal distribution of heat at all times throughout the entire building. At the same time, Danfoss thermostatic radiator valves type RA-N with sensors type RAW 5116 were installed in all apartments to allow individual heat control. In addition, all radiators were equipped with heat cost allocators for a fair allocation of heating costs.

Substantial energy savings paid back in only six years

Five years into the operation of the new two-pipe heating system, the documented energy savings amount to 25 percent on average through cold and milder winters. A significant part of the savings comes from the two-pipe solution and the perfect hydronic balancing achieved with the Danfoss ASV solution. The investment in new TRVs and individual heat allocators on all radiators also contributes to the savings as residents could now control their comfort and knew they had to pay their own share of heat consumption. This led to a huge change in user behavior in regards to heat consumption.

"The room-by-room control of the heating and the fact that the heat costs are now allocated to the individual apartment created a new awareness of energy consumption among the residents that were happy to see the savings on their energy bills. We are pleased to see how improved user comfort and energy savings go hand in hand. Since the new heating system was put into operation, we have received no complaints", says Housing Association Manager Anatoly Utjemov.



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Anatoly Utjemov,
Housing Association Manager



Yearly Energy Saving (degree day corrected)



Calculation of energy savings:

Year 2012

16% saving compared to 2011

Year 2013

25% saving compared to 2011

Year 2014

31% saving compared to 2011

Year 2015

30% saving compared to 2011

Year 2016

22% saving compared to 2011

Local weather/temperature conditions have been included in the calculation to make a more accurate savings calculation.

Easy commissioning

The energy renovation was designed by OU Dipro and carried out by Alice Grupp that was familiar with the advantages of the ASV solution supplied by Danfoss to previous projects.

"We have a lot of experience working with Danfoss automatic balancing solutions and are very satisfied with the simplicity of setting and adjusting the differential pressure. It makes the commissioning of the system fast and easy. Basically, you just have to set the correct design flow per radiator with the RA-N pre-setting valves, validate whether or not the required flows are achieved, and then your system is up and running within hours", says installer Igor Smolkov from Alice Grupp.

Advantages of Automatic Balancing Valves

Automatic balancing valves provide a simple, reliable and cost-effective way to create hydronic balancing in two-pipe heating systems. This was also the case in Tallinn where the ASV solution now secures an even flow in the system – even to the most remote apartments.

"The Housing Association wanted to improve comfort, reduce the energy bill, and avoid problems with noise on partial load operation in the tall building with many radiators. Therefore, they decided to go with the ASV valves from Danfoss due to the technical features and the documented benefits that would secure fast return on investment", says Marko Moring, Sales Manager Danfoss Heating.

6.1 years

payback time and
improved comfort
for the residents in
180 apartments

Savings:

Total investment costs [€]	117,595
Average energy savings per year [MWh/%]*	298/25%
Savings per year [€]	19,365
Energy price (MWh) [€]	65.00
Payback time [year]	6.1

* degree day corrected

“

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Igor Smolkov,
installer from Alice Grupp

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Danfoss ASV-P valve on return pipe (right) and ASV-I partner valve on supply pipe (left) covered with insulation caps.



RAW 5116 TRV sensor and RA-N valve with pre-setting.

Facts about the project:

- 9-storey apartment building with 180 apartments
- Located in Tallinn, Estonia
- Year of construction: 1986
- Year of renovation: 2011
- Total number of radiators: 671

Facts about the solution:

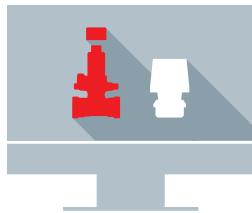
- Conversion from a one-pipe system into a two-pipe system
- 85 Danfoss ASV-P + ASV-I automatic balancing & partner valves; 40 x DN 15, 40 x DN 20 and 5 x DN 25
- 657 TRV sensors RAW 5116 and TRV valves RA-N DN 15

4 good reasons

to choose a Danfoss ASV automatic balancing solution

We recommend using ASV automatic balancing valves for balancing your 2-pipe heating system. The ASV automatically creates optimal hydronic balance within the system, whether under full or partial load conditions.

-  Fewer complaints
-  Increased indoor comfort
-  Lower maintenance costs
-  Lower energy bills



Learn more about
hydronic balancing at
hbc.danfoss.com



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