



SMART METERING BASED DYNAMIC DEMAND RESPONSE

Summary

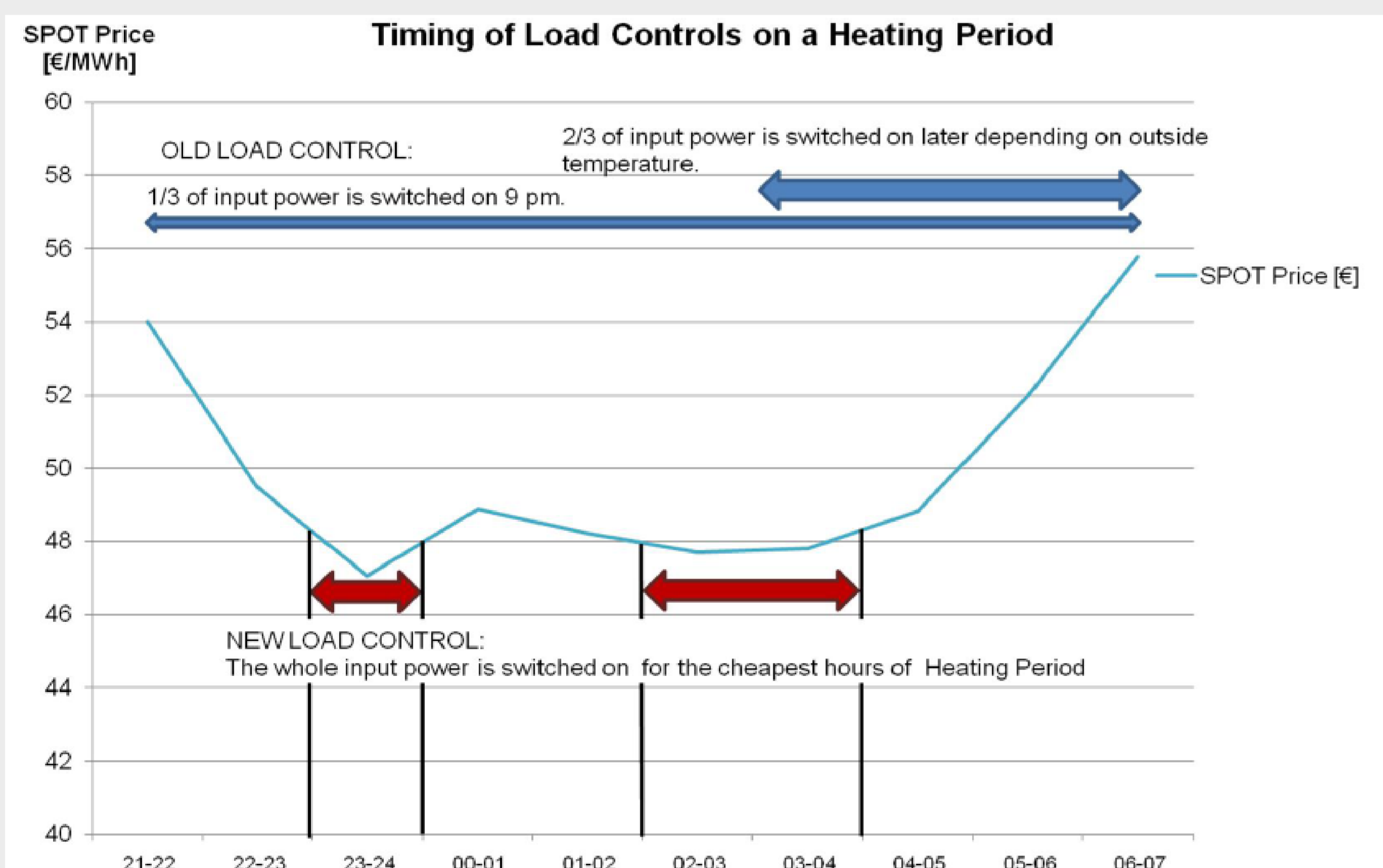
Dynamic market based demand response using smart meters was developed and implemented in large scale. Demand response reduces costs and risks regarding prices and reliability of the electricity market and system.

Background and objective

Demand side response enables smart grids, more distributed generation, full utilization of renewable energy sources, more electrical vehicles, and better security of the electricity system and electricity market. Thus it is an essential tool for reducing emissions and costs.

Dynamic load control via smart metering systems is developed to replace the traditional static time of use controls and tariffs. In addition to market price based Demand Response the solution developed supports many other load control needs.

Old static load control vs. the new dynamic control



Results so far (May 2013)

Two smart metering system vendors have implemented the dynamic demand response operating model developed.

Electricity retailers participating control the loads based on their needs using the messaging developed.

Helen Electricity Network started field trials in 2010-2011. By February 2012 about 500 consumers (10 MW) were connected and in February 2013 about 50 MW. All are full heating storage houses.

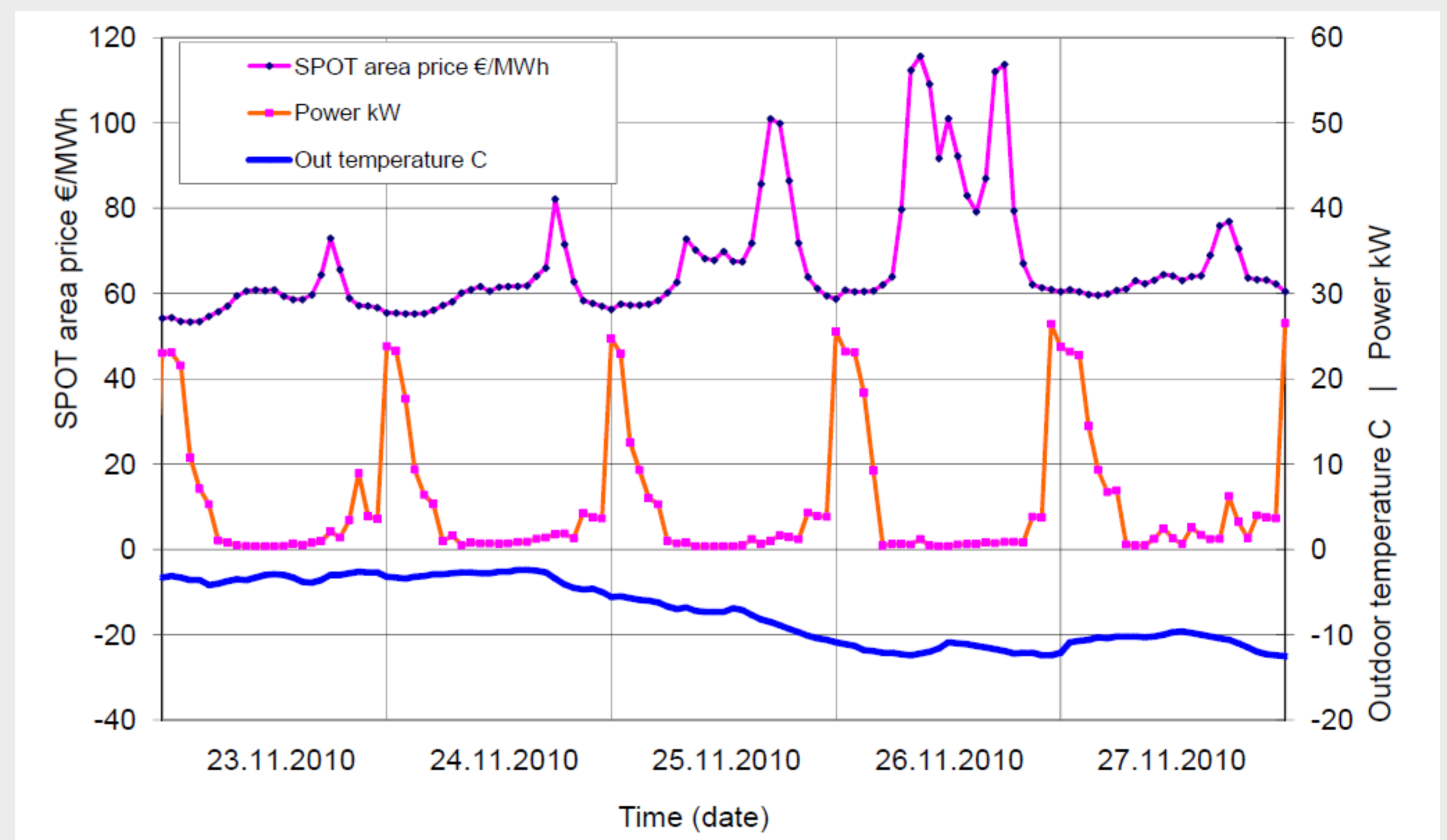
In December 2012 dynamic load control started with about 1000 consumers. Observed controlled power was about 17 MW and the total power of the customers was about 20 MW. (Some non-controllable consumption and lost control messages.)

Vantaa electricity network completed tests with 1 house and has started new tests. The houses have partial heating storage.

Fortum is completing a study on how the developed dynamic demand response model fits to their smart metering system.

SGEM helps E.ON Kainuu in direct load control field tests with about 7000 partial heating storage houses in time of use control. Test planning and data analyzing and modeling.

Some field test results, full storage



Continuation and collaboration

Analyze field test data and develop short term prediction and optimization models for the loads and dynamic responses.

Study and develop the approach in partial storage heating.

Promote wider adoption. More DSOs, Metering operators, smart meter vendors, and electricity retailers and aggregators.

Test performance regarding latency and reliability.

Continue collection of data for load and response models.

Promote harmonization of demand response messages.

Report the results.

Promote expansion to new DSOs, retailers and smart metering systems.

More Information

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