

# **Telenor Fornebu (Oslo) plant**

## **Intelligent variable air volume controllers in the most innovative working environment of Scandinavia**

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## The most innovative working environment of Scandinavia

The most innovative working environment of Northern Europe is currently under construction in Fornebu (Oslo). Over 7000 Telenor employees, currently working in more than 35 branch offices of the greater Oslo area, will have their workplaces here in the year 2002.

Telenor is a Norwegian telecommunication company experiencing strong growth in various European countries as well as in Southeast Asia. The company is considered Norway's leading supplier of vocal, knowledge, and entertainment information by means of a broad product range of modern communication media.

Future success will depend on creativity, imagination, and innovation. This is particularly true in the development of new information and communication technologies. The trend for designing new workplaces at Telenor therefore goes in the direction of networks, away from hierarchical structures.

In conventional office buildings, 30% of workplaces are consistently vacant because employees are absent due to holidays, illness, or on business trips. For this reason, each employee will only have a rolling desk in this building. The working environment will be selected every morning in keeping with needs. This increases flexibility in case of project work and correspondingly reduces the building costs.

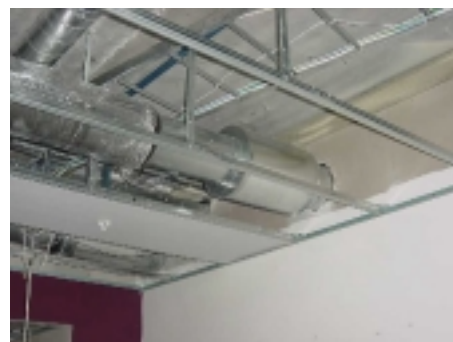
Björn Sund, chairman of the Telenor board of directors, is in charge of the Fornebu project. Planning began with an architectural design competition in the spring of 1998. At present, more than 1000 experts are working on the building site. The first rooms will be ready for occupancy as early as November 2001. Hand-over of the entire turnkey project will be on October 31, 2002.

## The best indoor air quality

For many years already, indoor air quality has been of prime importance in Scandinavia. Remember that some people spend up to 90% of their time either at home or at work indoors. Scientific proof is accumulating for the fact that the air inside a building may be more polluted than the outside air.

For this reason, it is absolutely indispensable that the outside air be passed into the interior via high-quality filters. This is best assured with a central ventilation plant. In the present project, each room is supplied with sufficient clean air. Depending on the use of each room, air-conditioning is provided either via variable air volume (VAV) controllers or cooling beams or a combination of these two systems.

Since the building is located directly on a fjord, the cooling energy is coming from the sea. The cold water can be processed without a refrigerating machine via heat exchangers (energy economizers).



VAV controller in the intermediate ceiling

## Variable air volume controllers in the network

In building sanitation technology, actuators, sensors, and controllers were networked via a LonWorks system. Data from different branches are mutually used for optimal operation. For instance, motion detectors will detect the presence of people and light so as to make use of the variable air volume controllers as needed. Multiple use of sensors is also possible.

The VAV controller used in this context is the new Belimo Compact NMV-D2M. Several VAV controllers are integrated into a network with a LonMark-certified UK24LON from Belimo. This provides the following advantages:

- Possibility of central diagnostics and adjustment of the variable air volume controllers on the electric panel of the zone distribution.
- Clear interface between systems integrator and air-conditioning company.
- Supply voltage and communication between the UK24LON and the NMV-D2M is via a commercially available, 3-core cable.
- All data from the VAV-Compact NMV-D2M are available to the other participants in the LonWorks network, such as current air volume, alarm signals, and fault indications. To achieve this, all functions of the VAV-Compact NMV-D2M are pictured on the LonWorks side via the network variables of the Functional Profile 8110 "Damper Actuators."

Operation of the "room thermostat" is controlled at the personal PC workplace. Depending on where a workstation logs in, the corresponding room operation terminals are assigned. This is a further supporting argument for the use of bus technology in HVAC installations.

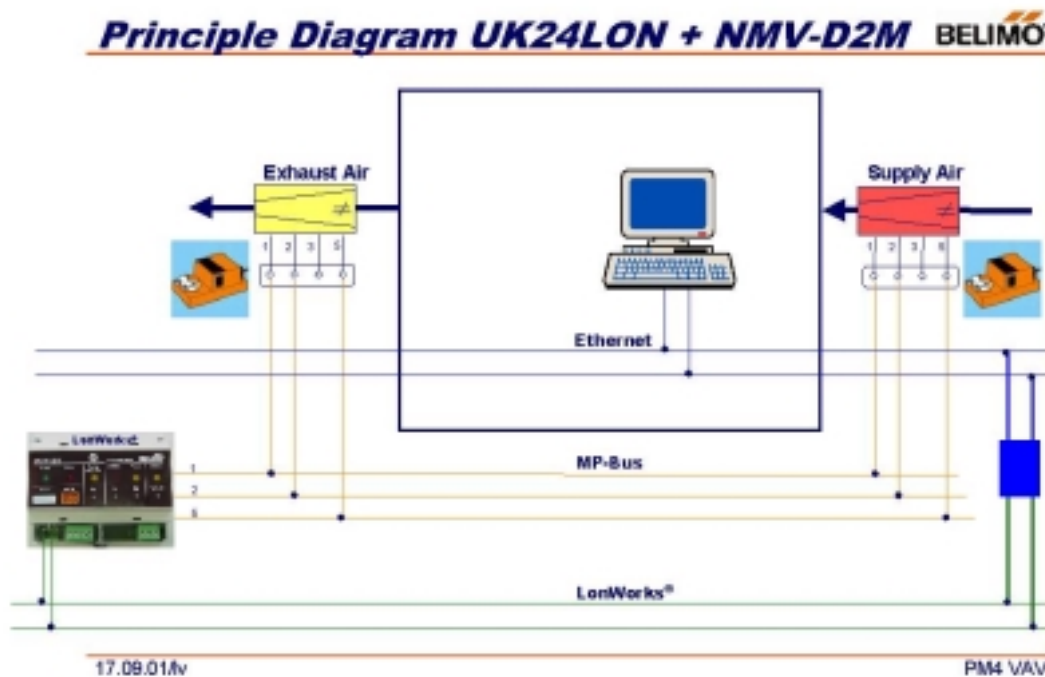


Central adjustment and diagnosis of VAV controllers with UK24LON

## Plant specification

The VAV plant was realized with the following automatic control components:

- Variable air volume controller: Belimo NMV-D2M control equipment
- LonWorks interface: Belimo UK24LON
- HVAC control components: TAC Xenta
- Room control: Via Ethernet with workstations



## Norway – leader in bus-technology?

As the country with the highest density of ISDN subscribers, Norway may certainly also be considered one of the leading countries applying bus technology in HVAC installations.

Another Telenor project was already successfully concluded in Bergen in the year 2000.

In that project, a LonWorks network integrated more than 4000 nodes to cover the functions of access control, break-in/fire alarm, heating/ventilation, lighting, and shading. At that time, Belimo bus components were chosen as state-of-the-art. Over 1900 Belimo VAV-Compact units were incorporated into the network via 950 UK24LON.

Let us take the Norwegians as a role model. In the past century, they showed us where to find the North and South poles, and now they are setting new yardsticks for healthy and ecological buildings.

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