

**Ice and snow is fun, some time**

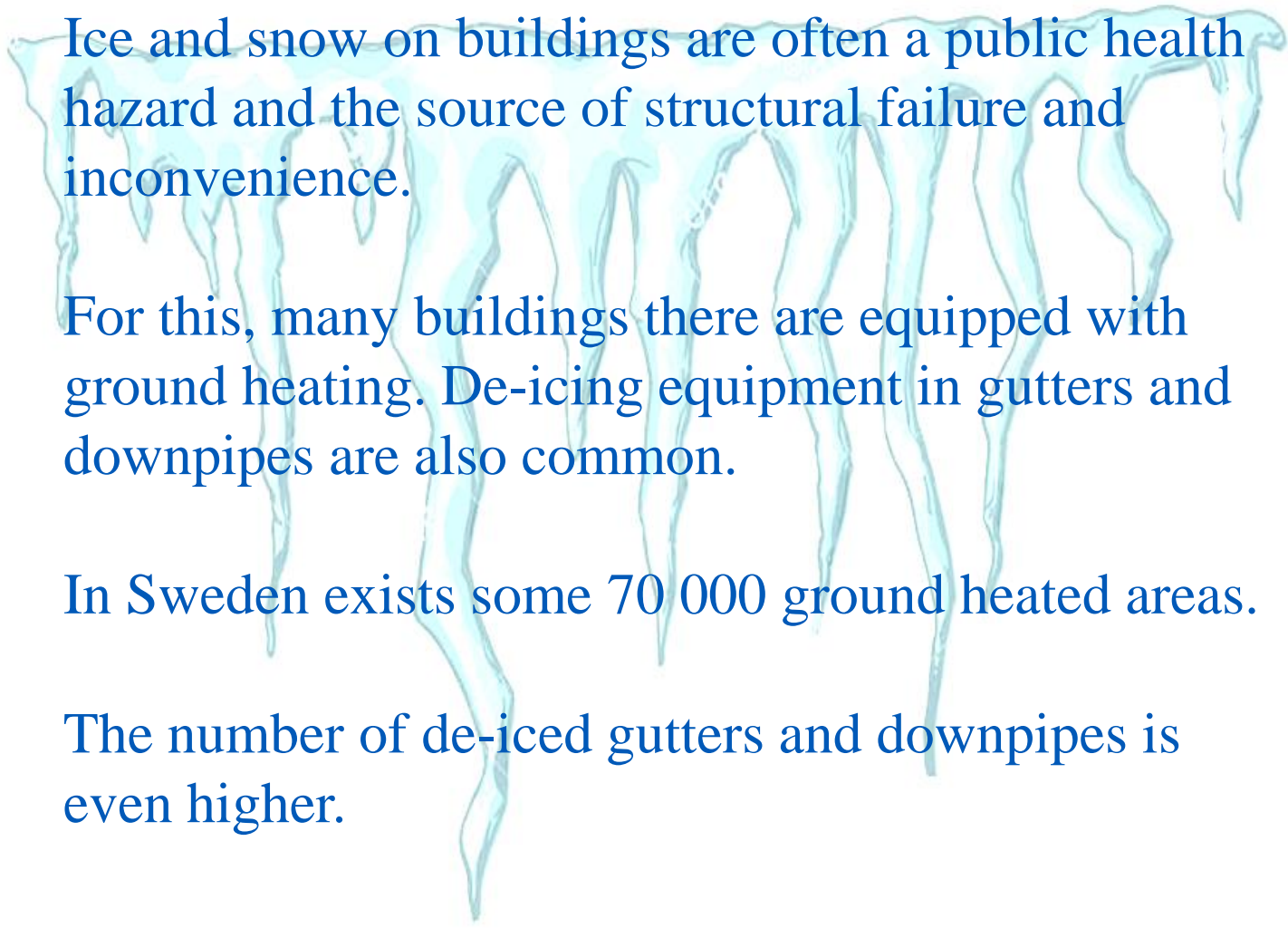


**But not always...**

# for ground heating



# Today



Ice and snow on buildings are often a public health hazard and the source of structural failure and inconvenience.

For this, many buildings there are equipped with ground heating. De-icing equipment in gutters and downpipes are also common.

In Sweden exists some 70 000 ground heated areas.

The number of de-iced gutters and downpipes is even higher.

# The Problem



The total energy consumption for de-icing is high, but most systems are small and not connected together. Therefore only low cost, inefficient control systems are used.

The energy consumption is 3-5 times higher than necessary. The situation is aggravated by the lack of maintenance.

Energy costs money and pollution.

# The effect of inefficient control



High energy consumption

De-icing turned on too late, sometimes not at all

De-icing operated for too long

Some times forgotten, on all year



# One example



Excessive ground heating.  
Still on five days after the icing event

# De-icing in gutter and downpipes



De-icing not activated but needed  
Two days later an accident occurred

# The Problem

The total energy consumption for de-icing is high, but most systems are small and not connected together. Therefore only low cost, inefficient control systems are used.

Sometimes the heating is on for too long, sometimes it does not start even as it is needed.

The energy consumption is 3-5 times higher than necessary. The situation is aggravated by the lack of maintenance.

Energy costs money and pollution.



# The vision



**To reduce the energy consumption better, more sophisticated control systems is needed.**

**Unfortunately these are more expensive and require more maintenance. Therefore it is difficult to mount these everywhere.**

**Our vision is a system of control centrals in a region sending wireless signal to subscribes to start and stop the heating.**

**The control central is situated high to give an early indication and beyond vandalism and spray from vehicles etc.**

# Other uses



Meteorological research  
Research on wind power, power lines  
and overhead lines  
Ice throw warning for wind power plants  
and buildings



# Thank you!



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