



Energy-efficient snow melting for gutters

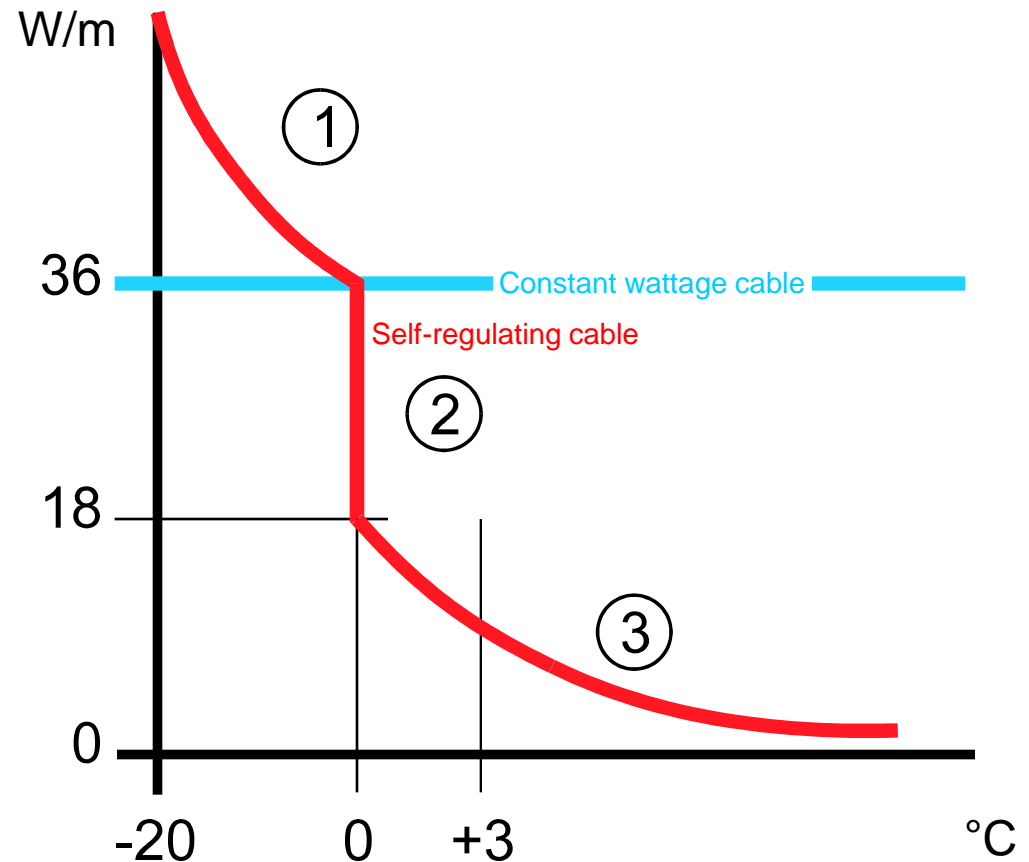
**Self-regulating heating cables
+ temperature & moisture
sensing control
= the most energy efficient solution**

tyco / *Thermal Controls*

The self-regulating effect provides energy savings



1. Heating cable in snow at high power
(more cold sensing spots in moisture (snow))
2. Snow melts and drains away.
Heating cable in dry air at half power
(less sensing spots in dry air)
3. Then heating cable self-regulates in dry air



The system is only switched-on
when moisture is present
and the temperature is below the set point



Temperature

		Temperature		
		Very low	Below set point	Above set point
Moisture	YES	OFF (no melting)	ON	OFF (rain)
	NO	OFF (dry frost)	OFF (dry frost)	OFF (dry, sunny weather)

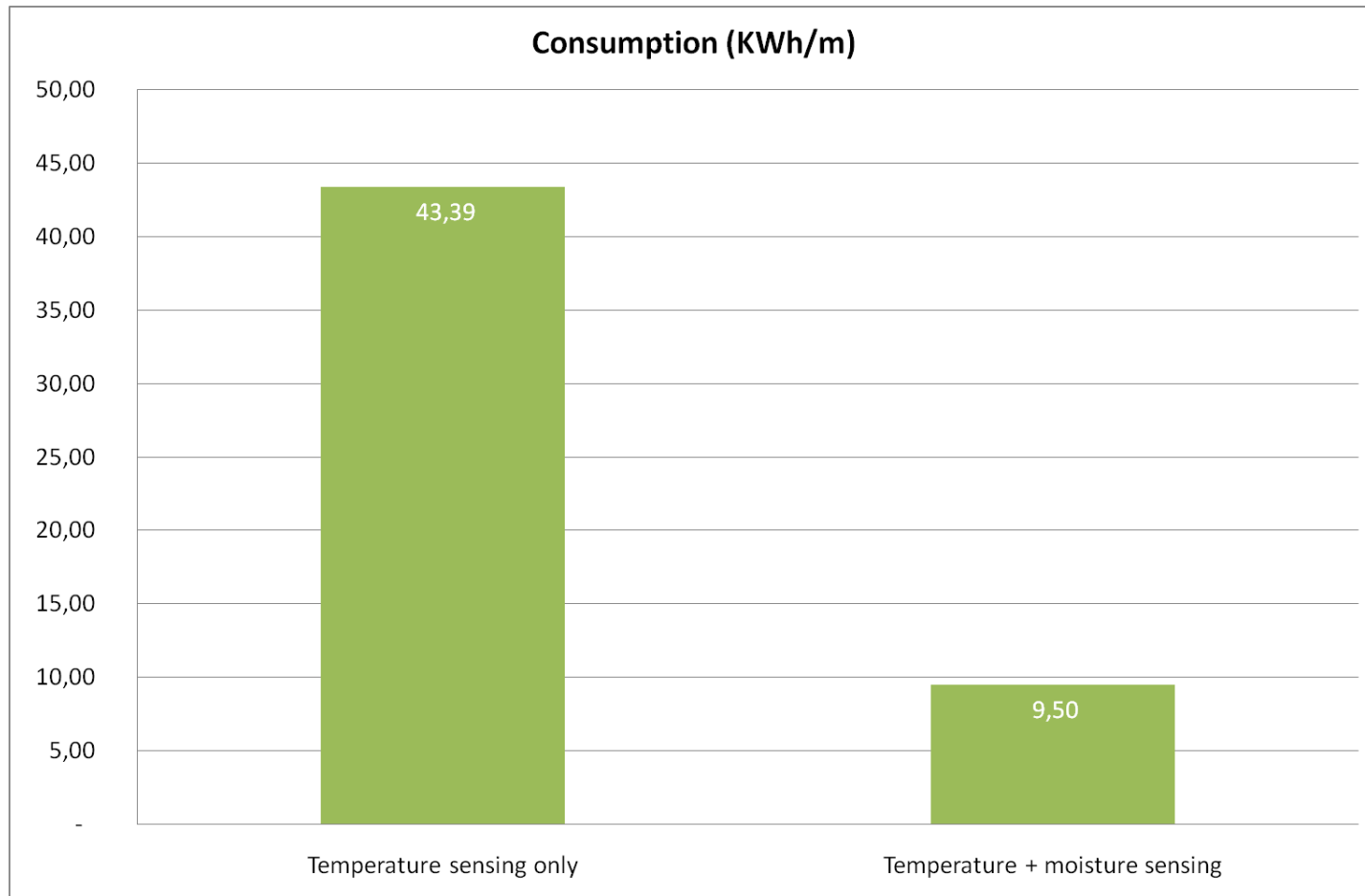
Raychem pioneered the use of a combined temperature- and moisture sensor 25 years ago



- Field test at CKW Ruopigen (CH)
- Compares the energy consumption of two gutter snow melting systems with a different control method
 - Temperature sensing only
 - Temperature + moisture sensing
- 4 month analysis
 - 5 Dec 1985 till 2 April 1986



Electricity consumption dropped by 78%



Measurement period from 26.2 - 5.3

Back-up slide:
78% savings in electricity consumption
83% savings in operation time



Data from CKW study

		Consumption (KWh)	Consumption (KWh/m)	Operation time (h)	N° of cycles
With moisture sensor	Heating cable (151 m)	1.362		310	48
	Moisture sensor	72		2.086	105
	Total	1.434	9,5	2.396	153
Without moisture sensor	Circuit 1 (131 m)	5.684		1.877	278
	Total (131 m)	5.684	43,4	1.877	278
	Savings	75%	78%	83%	83%