POINT HEATING – ENERGY SAVING

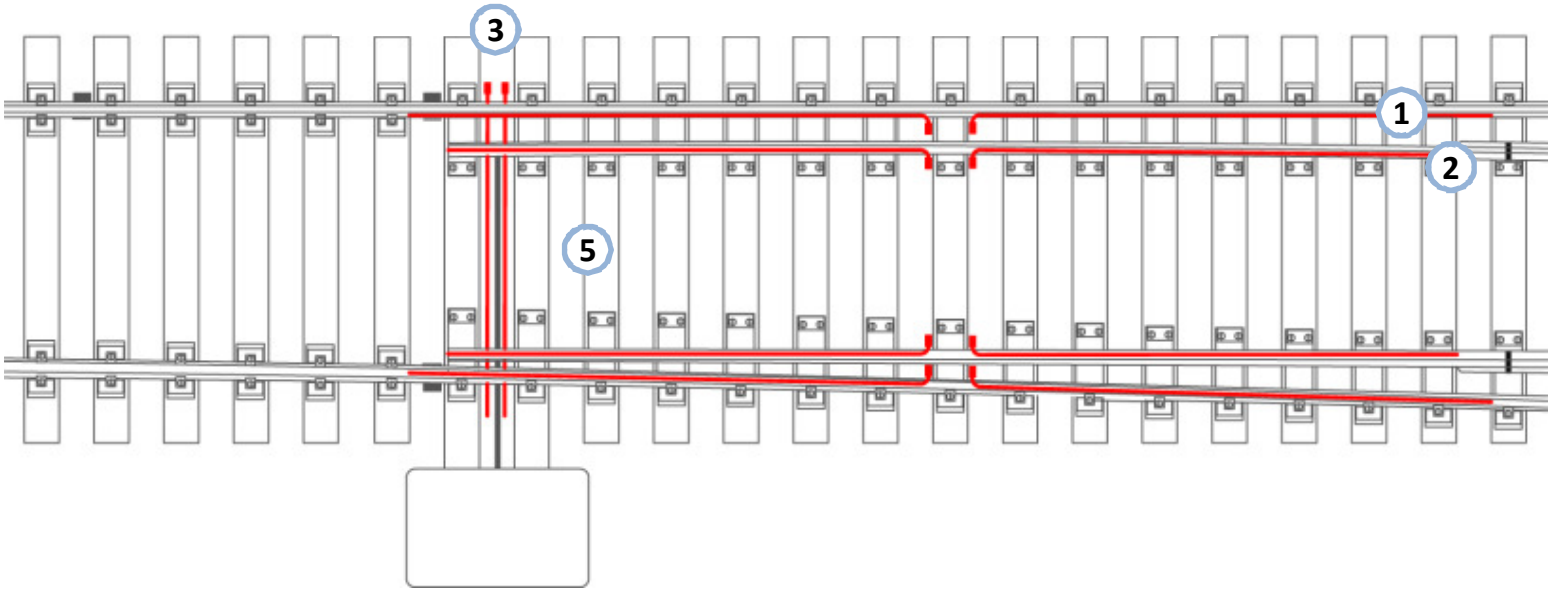
Frank Islin
Dipl. Electronic Engineer
Product Manager - Railway

Why Multi Weather Mode Control ?

SAN Electro Heat a/s

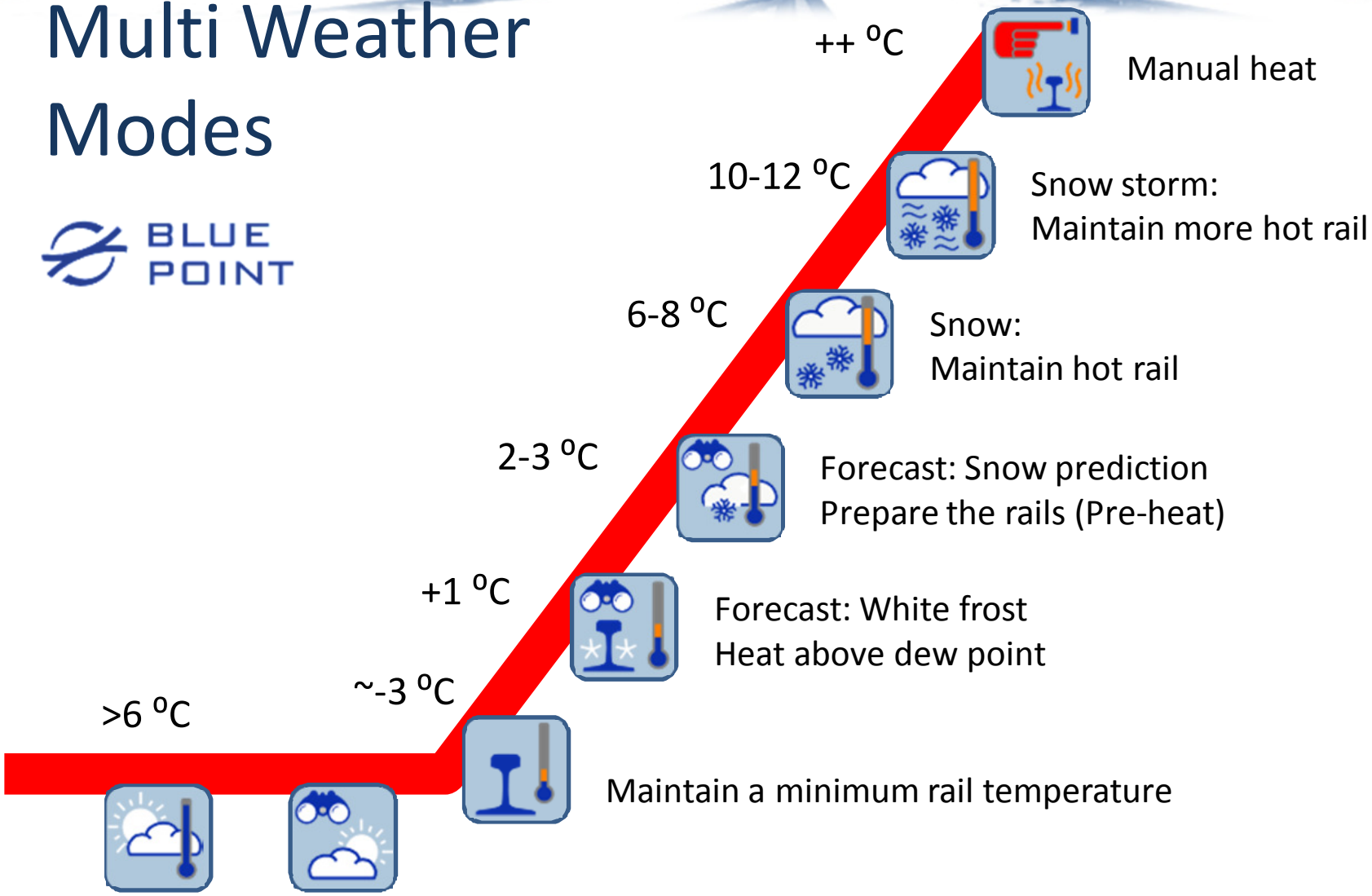
Heating a switch point

1. Stock Rail heating
2. Switch Rail heating
3. Switch/control mechanism heating



SAN Electro Heat a/s

Multi Weather Modes

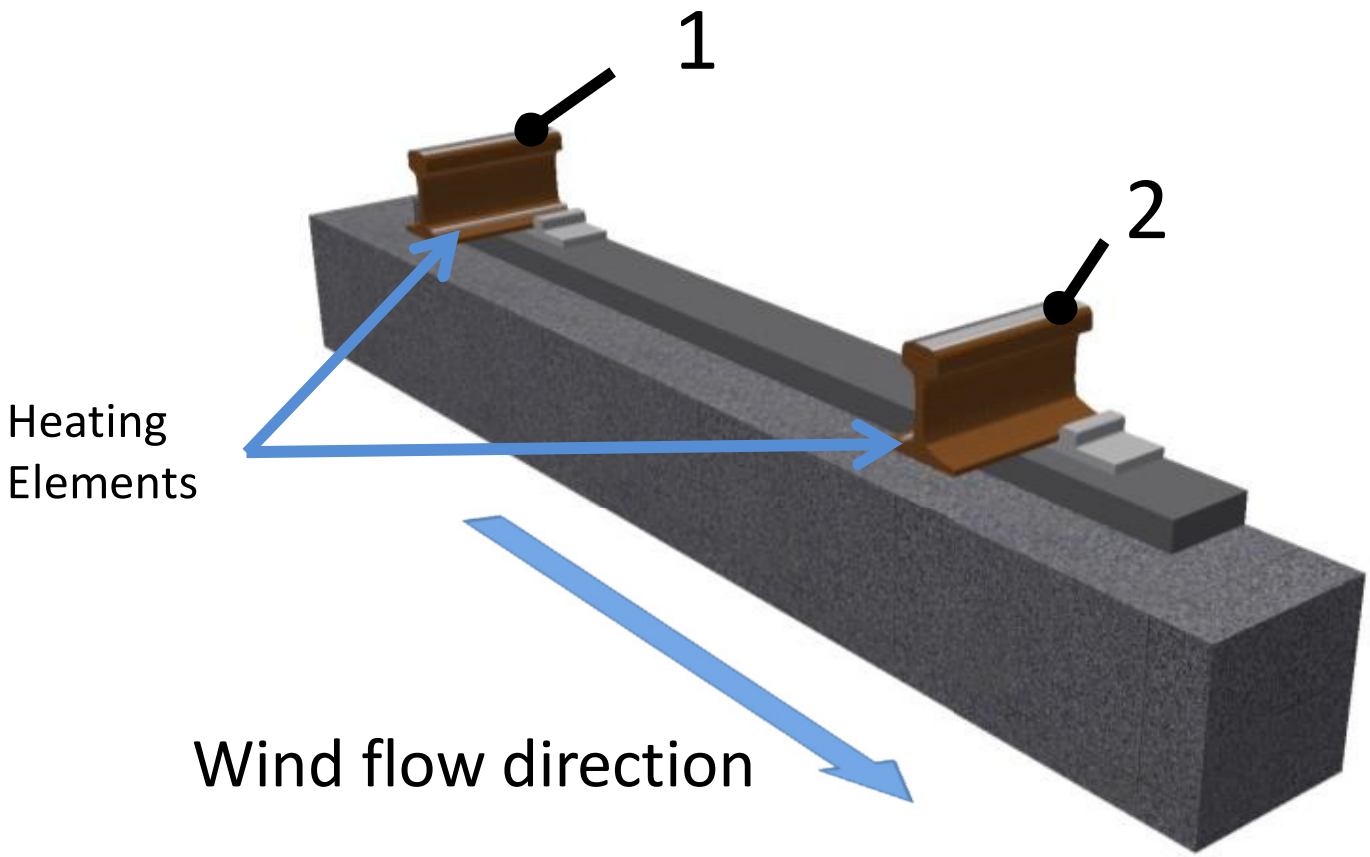


SAN Electro Heat a/s

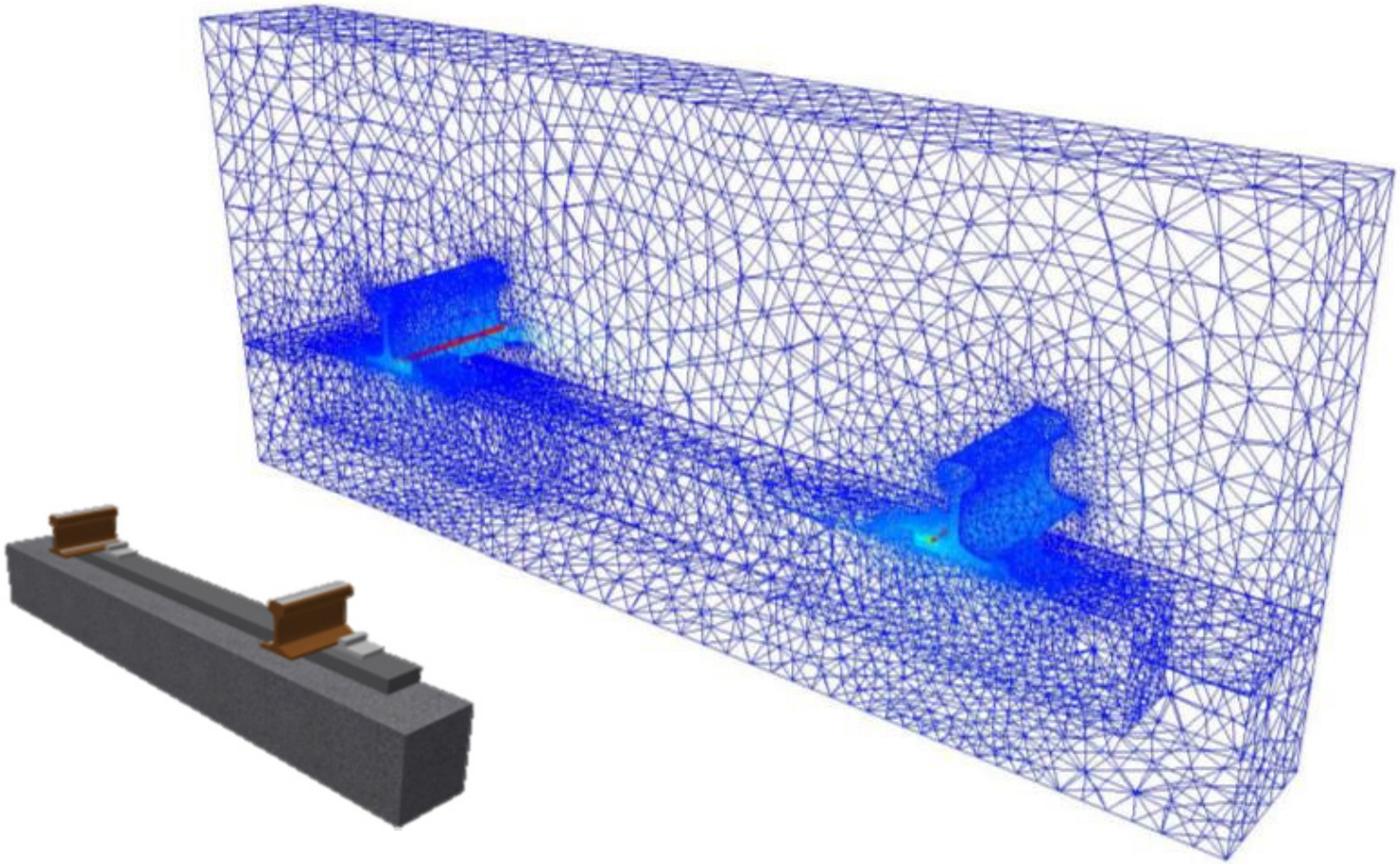
Is it really neccesary
with all these modes ?

Show me evidence !

Simple Track Model !

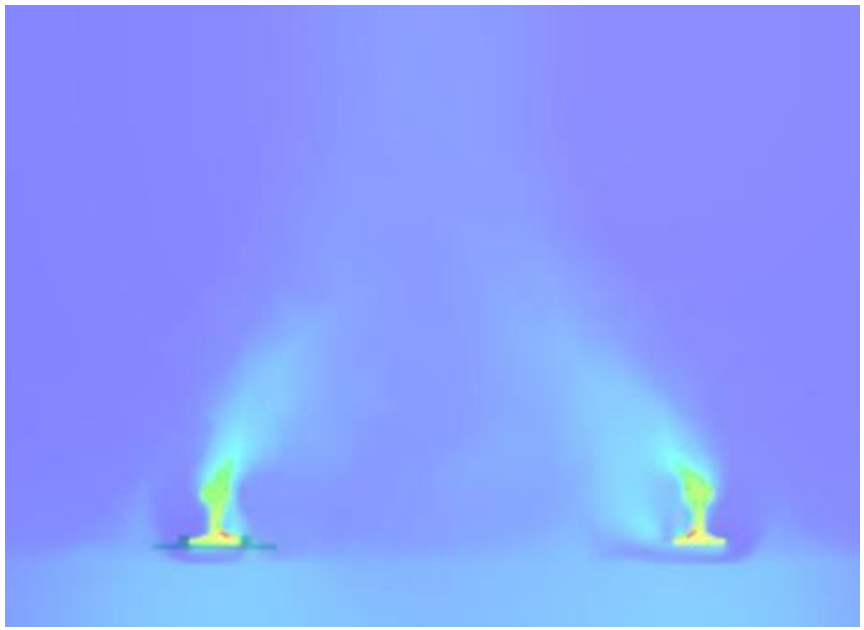


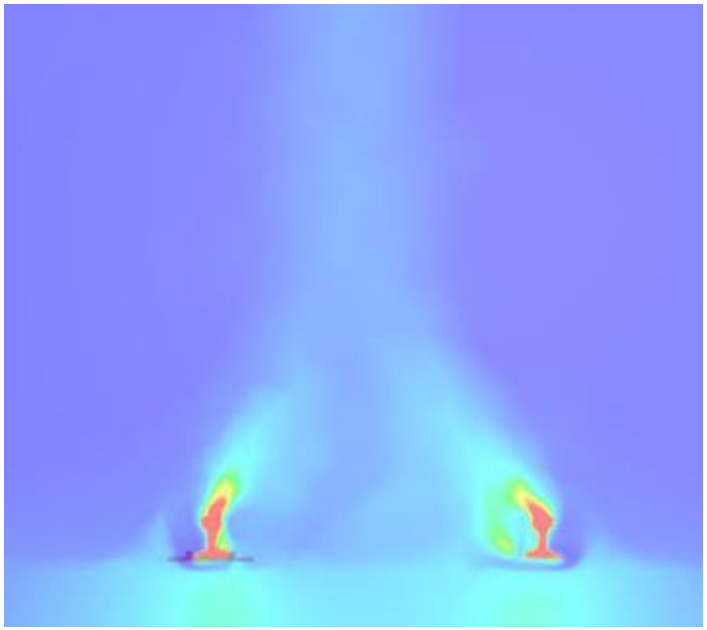
Simulation Grid



SAN Electro Heat a/s

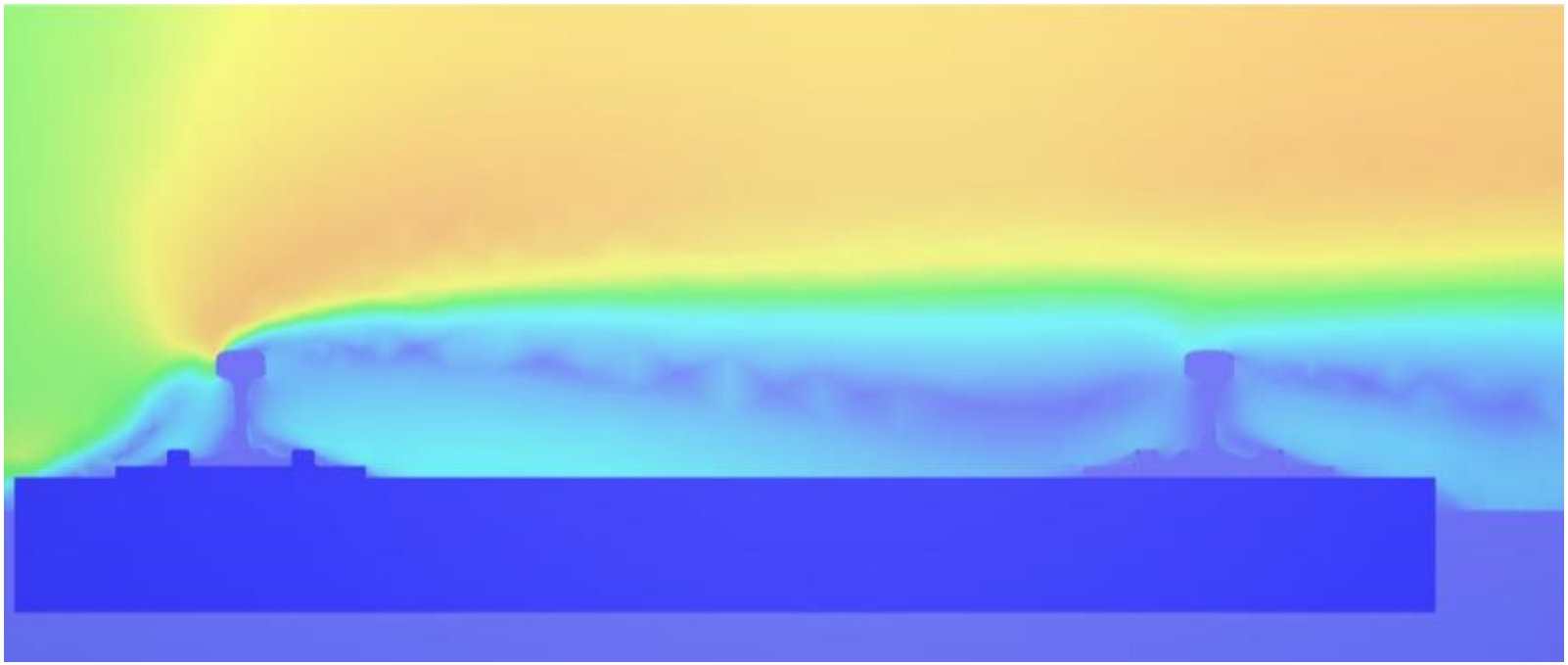
Rail Temperature Simulation





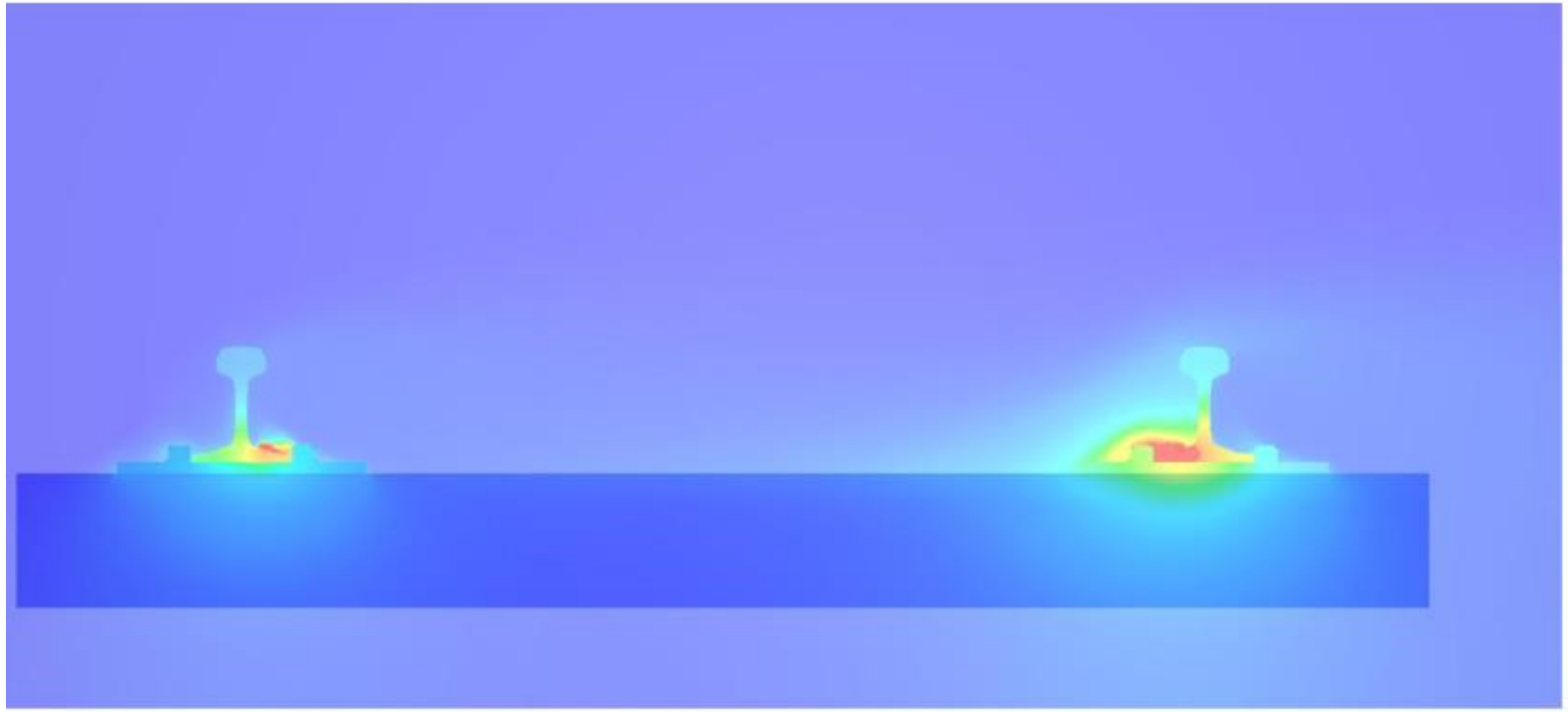
Heating profile at 0 m/sec

Wind Flow Simulation

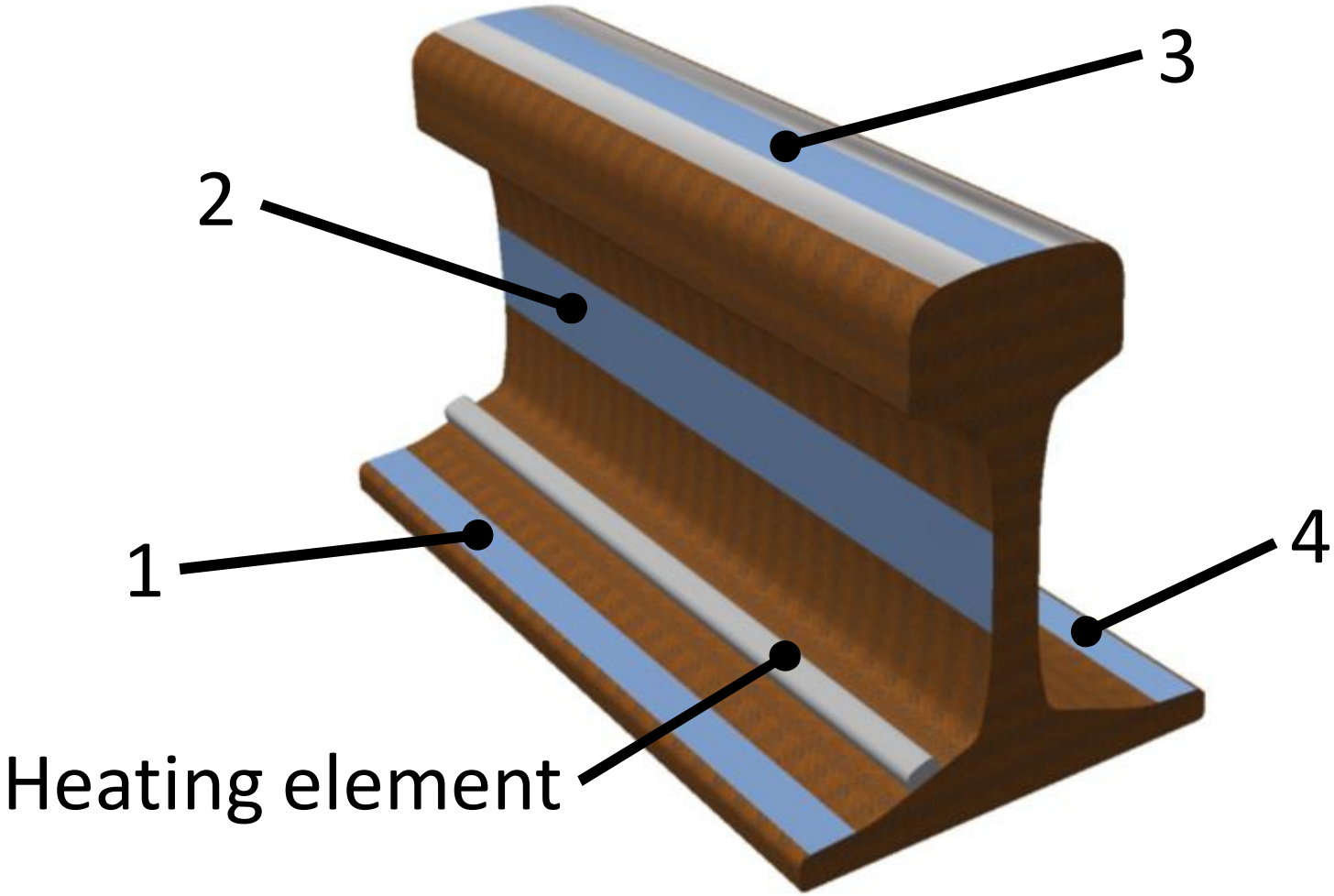


Flow profile (10 m/sec)

Rail Temperature Simulation

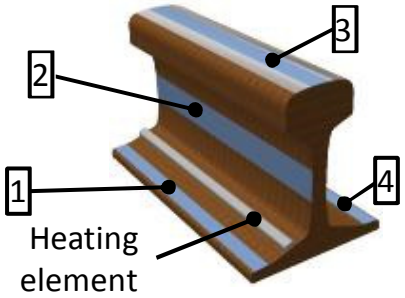


SAN Electro Heat a/s



SAN Electro Heat a/s

Power: 300W/m Air: -5°C



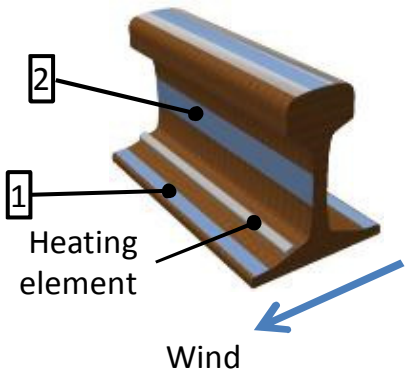
Rail no. 1

Wind Speed	T_1	T_2	T_3	T_4
[m/s]	[°C]	[°C]	[°C]	[°C]
1	15,4	8,9	5,5	10,1
2,5	10	3,9	1	4,7
5	5,1	0	-2,4	0,4
7,5	2,7	-1,5	-3,4	-1,2
10	1,4	-2,2	-3,8	-2

Rail no. 2

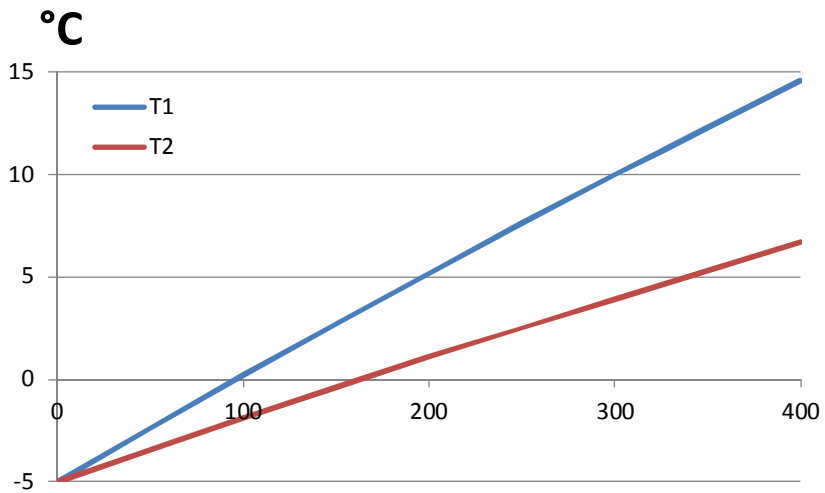
Wind Speed	T_1	T_2	T_3	T_4
[m/s]	[°C]	[°C]	[°C]	[°C]
1	18	11,1	7,4	13,7
2,5	10,9	5,4	2,5	7,4
5	5,3	1,2	-1,1	2,4
7,5	3	-0,4	-2,4	0,5
10	1,6	-1,3	-3	-0,6

Wind: 2,5 m/sec Air: -5°C



Rail no. 1

Power	T_1	T_2
[W/m]	[°C]	[°C]
0	-5	-5
100	0,2	-1,9
200	5,2	1,1
300	10	3,9
400	14,6	6,7



Δ 20 W/m per °C

Δ 34 W/m per °C

W/m

SAN Electro Heat a/s

Business case - Magdeburg

Temperature

3x winter season average

Hour	Air temp.	Temperature used
158	≤ 3	2,75
175	≤ 2,5	2,25
154	≤ 2	1,75
502	≤ 1,5	0,75
1.025	≤ 0	-2,50
471	≤ -5	-6,00

Precipitation

3x winter season average

Average Winter Data		
Precipitation Hours	h	291
Precipitation events		53
Average snow per event	h	5,5
Precip + Wind > 4 m/sec	h	54

Additional

Case information

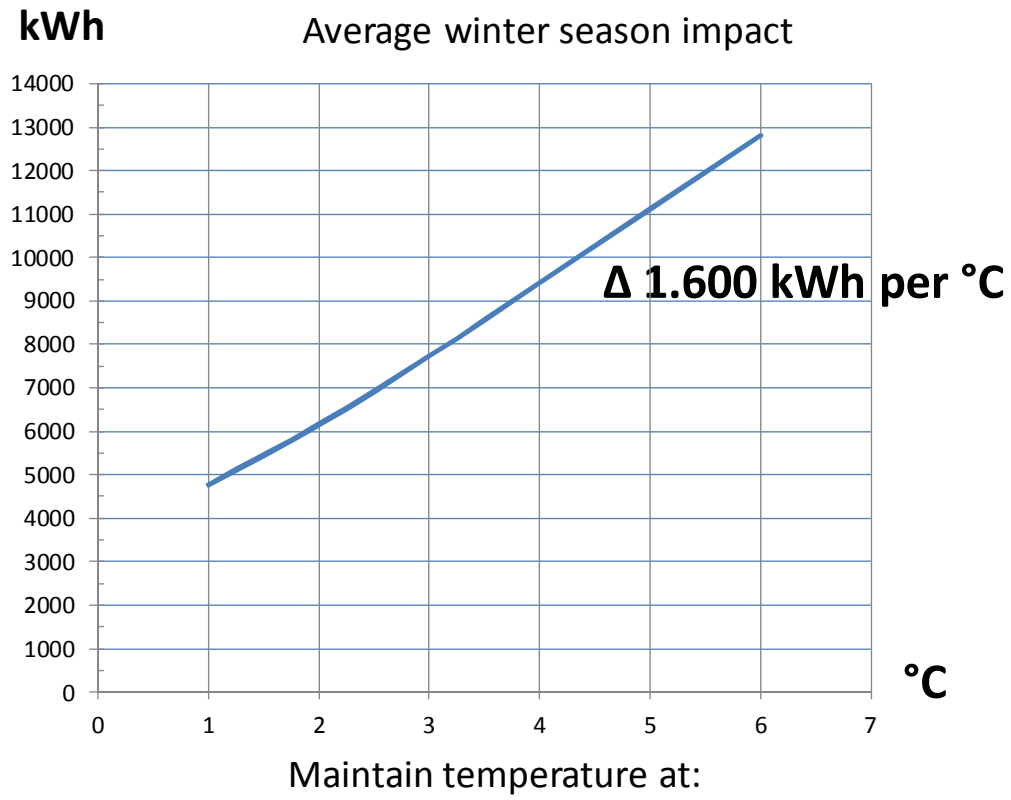
Switch Point Heating Data
R300 1:9
2x10 meter heated
34w/m per °C
Average wind 2,5 m/sec
Snow warning below 3 deg.C

SAN Electro Heat a/s

Business case - Magdeburg

Hour	Air temp.	Temperature used
158	≤ 3	2,75
175	≤ 2,5	2,25
154	≤ 2	1,75
502	≤ 1,5	0,75
1.025	≤ 0	-2,50
471	≤ -5	-6,00

Switch Point Heating Data
R300 1:9
2x10 meter heated
34w/m per °C
Average wind 2,5 m/sec
Snow warning below 3 deg.C



SAN Electro Heat a/s

Business case - Magdeburg

Switch Point Heating Data

R300 1:9

2x10 m

34w/m

Average

Snow w

Averag

Precipit

Precipit

Average

Precip +

Hour

158		
175	≤ 2,5	2,25
154	≤ 2	1,75
502	≤ 1,5	0,75
1.025	≤ 0	-2,50
471	≤ -5	-6,00

kWh

Average winter season impact

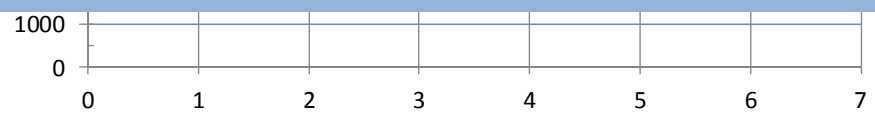
°C

1 kWh @ 0,1 €

1000 turn outs R300

Anual saving per °C

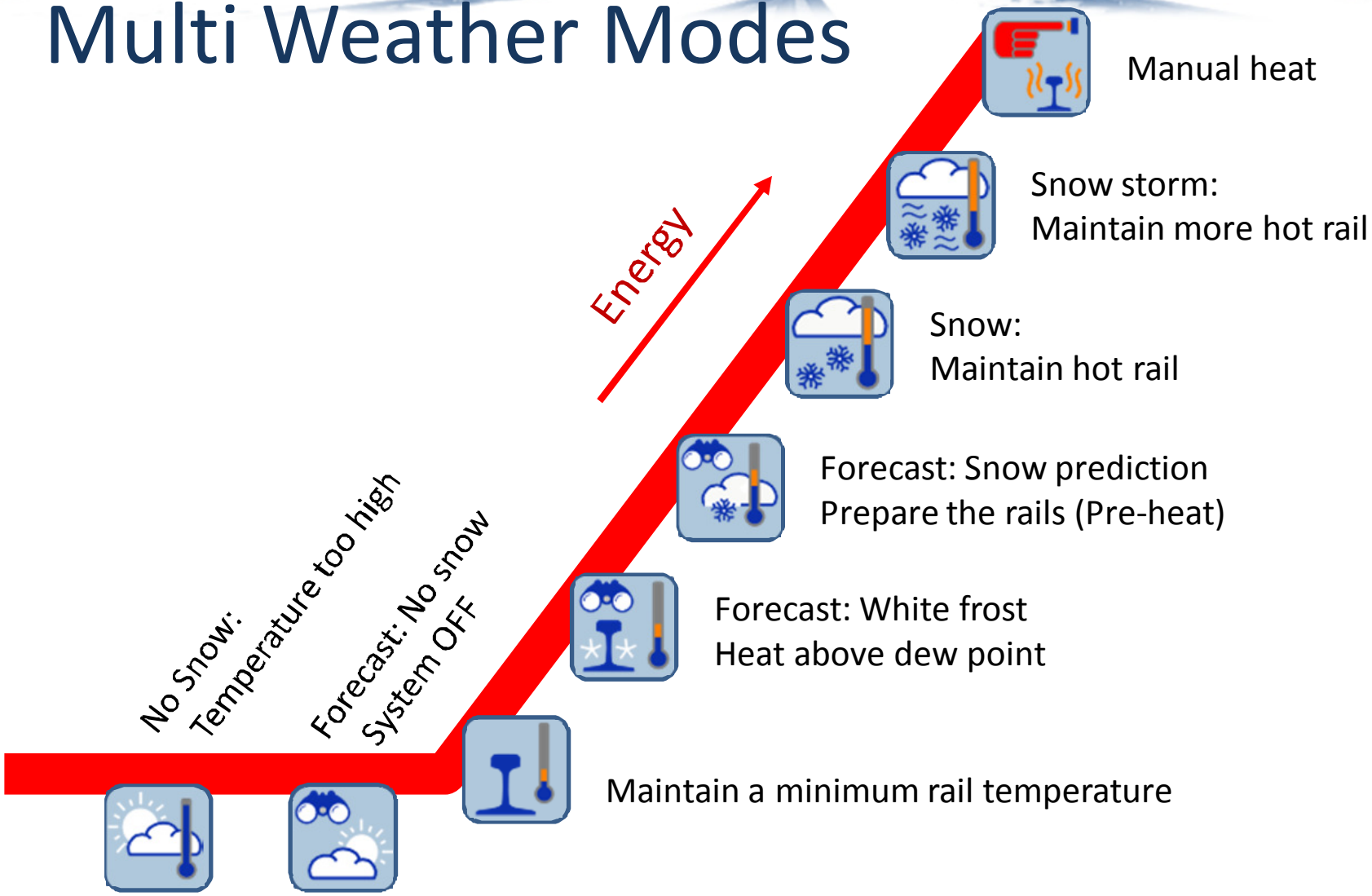
160.000 €



Maintain temperature at:

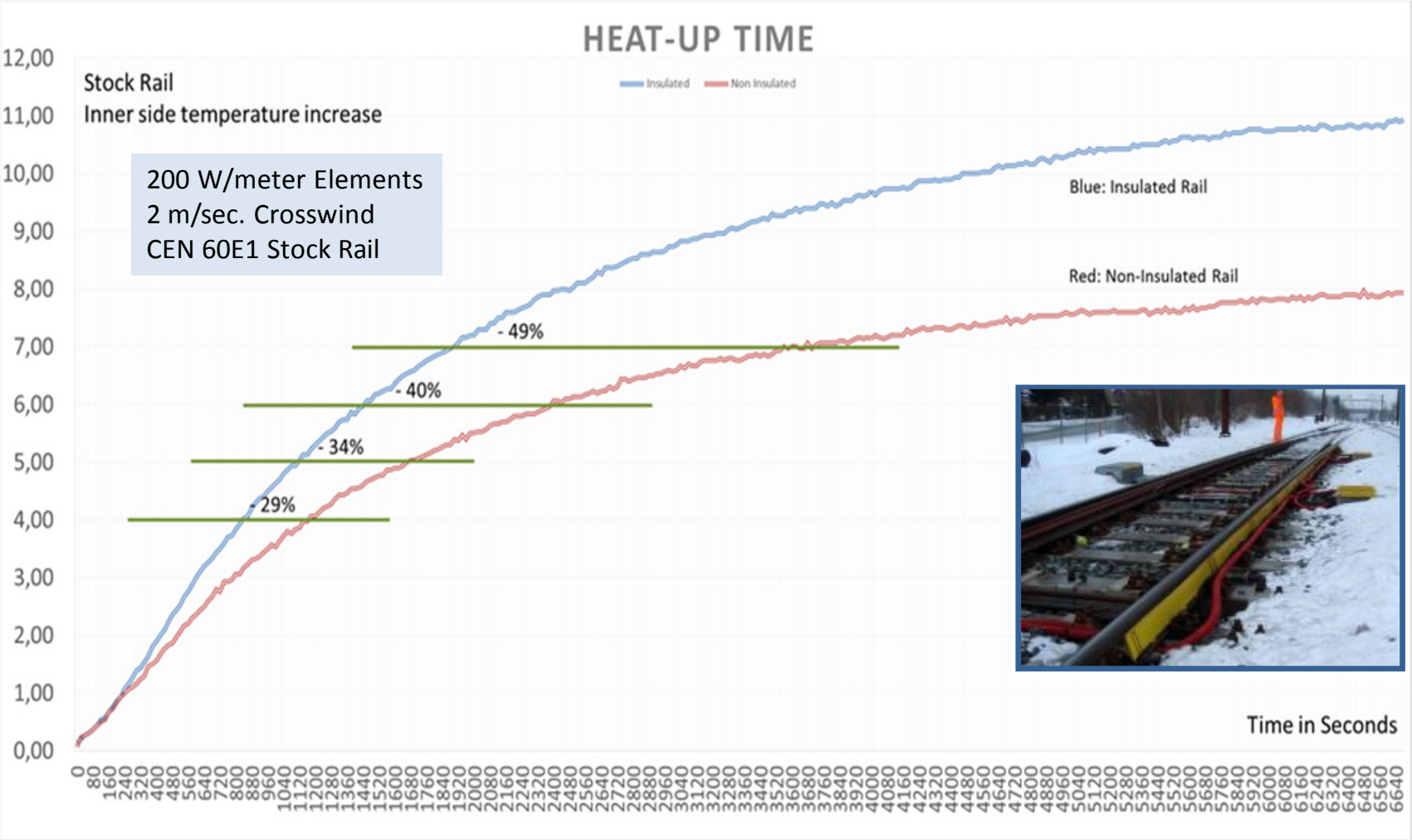
SAN Electro Heat a/s

Multi Weather Modes



SAN Electro Heat a/s

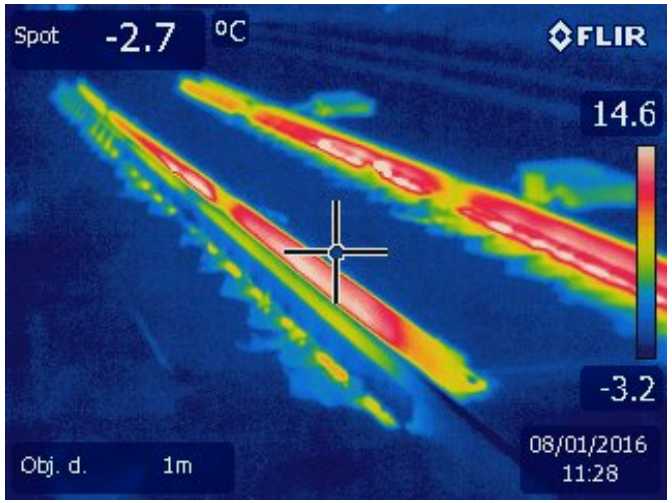
Rail Insulation / Retainer



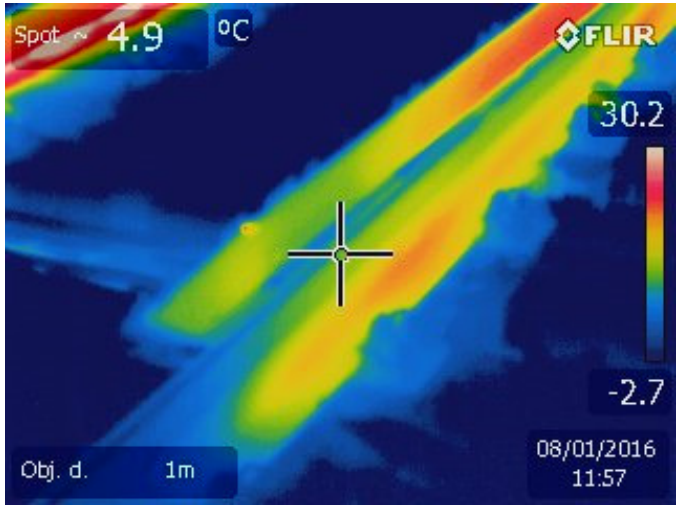
SAN Electro Heat a/s

Point Heating - Insulation

Insulated



Not insulated



Thank you for your time

SAN Electro Heat a/s