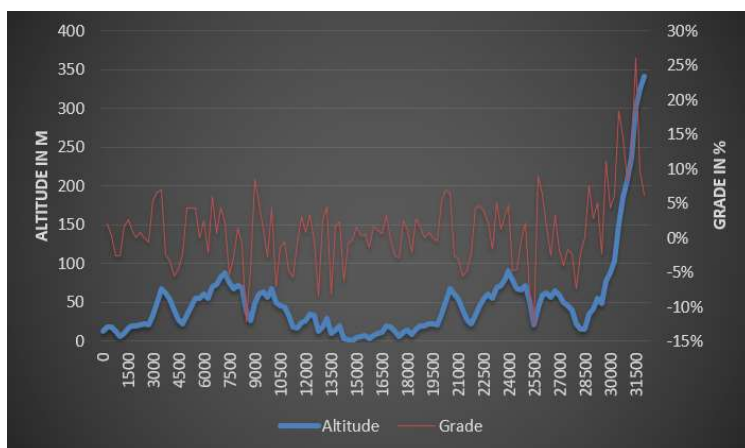# CASE STUDY

UCI TIME TRIAL 2017 – STEFAN KÜNG

THE COURSE

The time trial course of the 2017 world championships in Bergen (NO) is about 31km with a 3.4km uphill section with an average grade of 9% at the end.

MODELLING

In today's newspaper, it was announced that the Swiss rider Stefan Küng (BMC) is going to change from the time trial bike to a normal bike for the climbing section in the end. We have modelled Stefan Küng (1.93m, 83kg) to see whether this bike switch has an advantage. We assume, that Stefan Küng is able to produce 6 Watt/kg. Modelling: set 1 to 4 is assuming a time trial bike (higher weight) with increasing average power and increasing air resistance as in an uphill section the optimal position cannot be hold but higher power can be produced. Set 5 is a standard bike.

	1 (Basis)	2	3	4	5
Drag coefficient CdA	0.26	0.28	0.32	0.36	0.4
Rolling resistance coefficient Cr	0.005	0.005	0.005	0.005	0.005
Drive and slip loss Cm (%)	3%	3%	3%	3%	3%
Weight bike (kg)	8.1	8.1	8.1	8.1	6.5
Weight rider (kg)	83	83	83	83	83
Constant power	460	470	480	490	490
Height above sea level (m)	0	0	0	0	0
Temperature	15	15	15	15	15
Wind (km/h)	0	0	0	0	0
Wind direction (degree)	0	0	0	0	0

RESULTS

If Stefan Küng is able to produce 30 Watt more on his normal bike than on the time trial bike for the climbing section the benefit will be 20 seconds. This must be compared to the time he loses in changing the bike. A very tight situation.