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PU	Public	
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	X

Introduction

This report provides the foundations of the software implementation of the life cycle cost analysis (LCCA) tool. The tool forms the basis for the Vestas industrial Cooling innovative cooling tower design Fig 1.

The life cycle cost analysis is based on a figure with five parameters, water in- and outlet temperature [°C], motor effect [kW], Hour [h] and Cooling capacity/heat [kW]. The data for hour is based upon annual weather data on a specific location. An example of the figure can be seen in figure 1. Wet bulb temperature is plotted on the x-axis, and water temperatures and motor effect are shown on the left y-axis. Cooling capacity/heat and hour are plotted on the right y-axis.

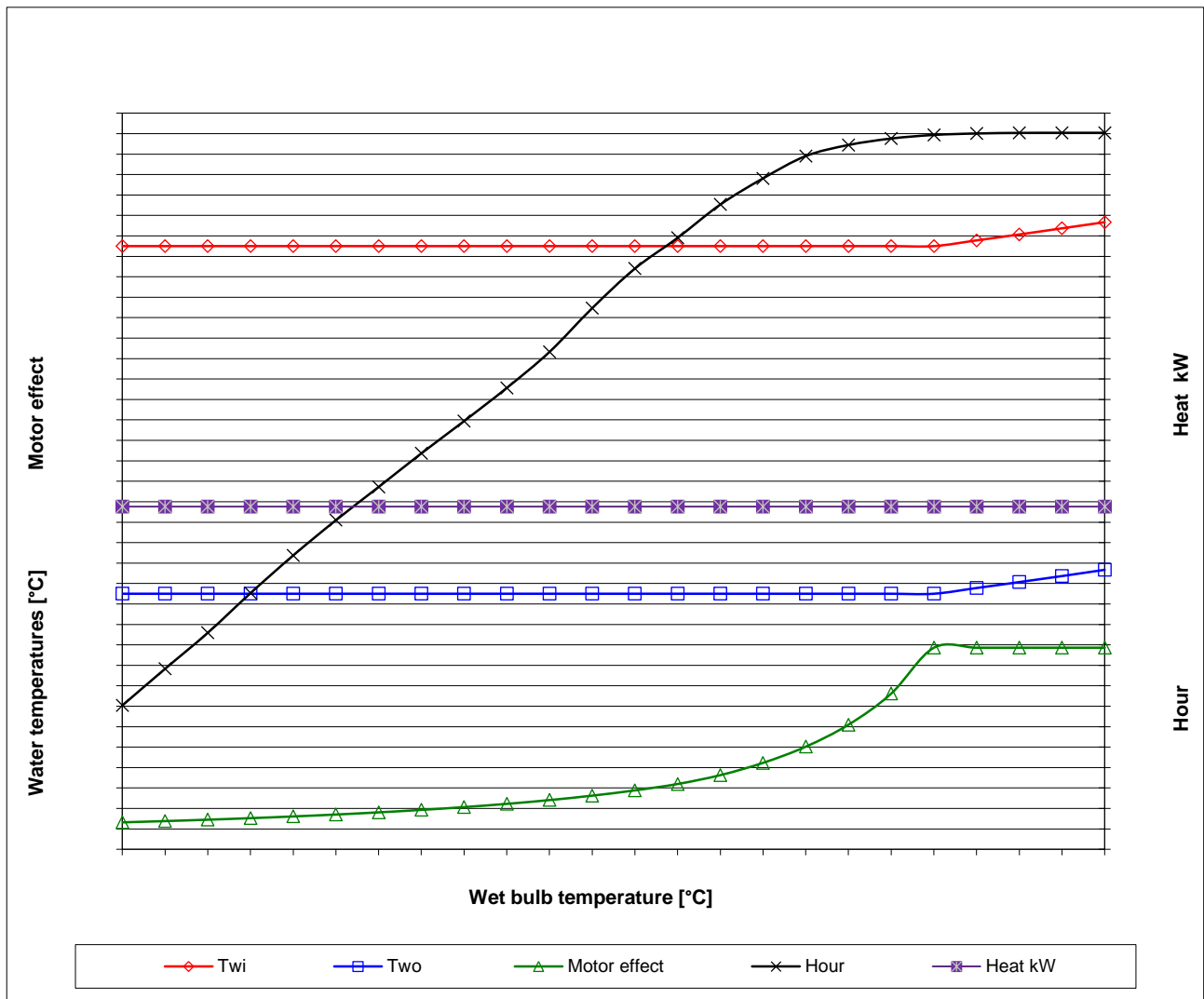
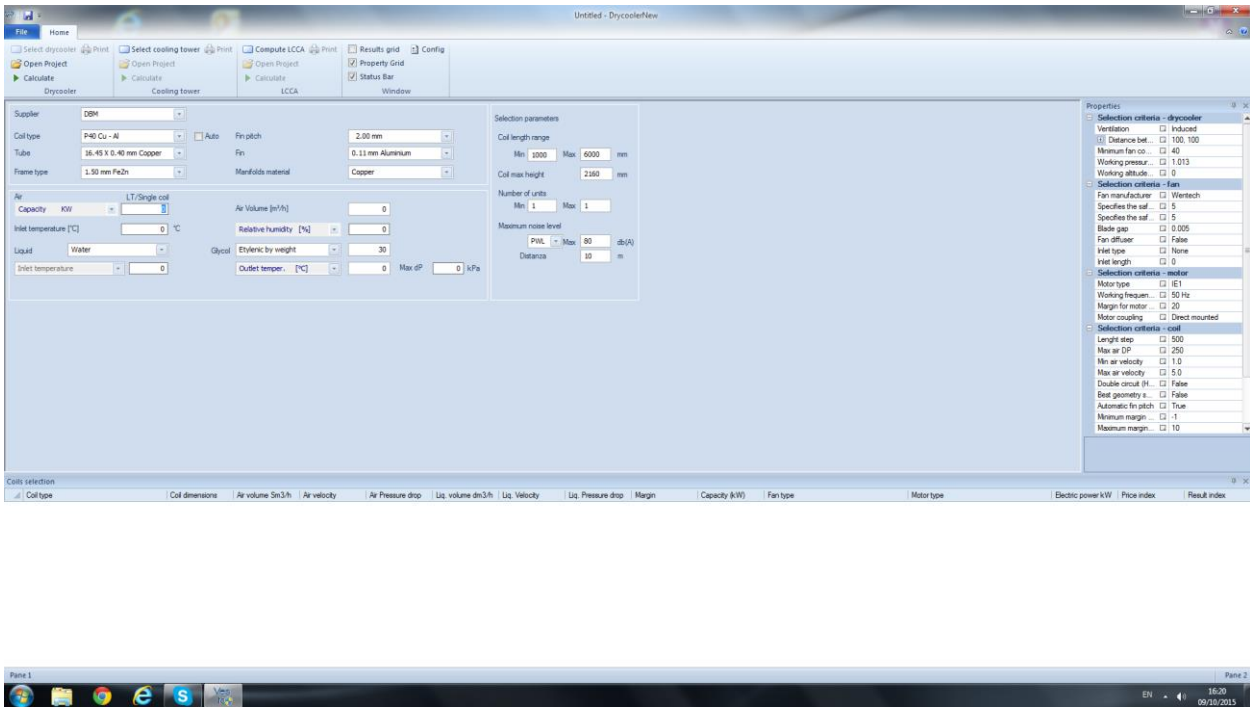


Figure 1: Cooling tower parameters (numbers removed for confidentiality reasons)

The software tool developed enables to analyse scenarios and the design of cooling towers.



Simplified results of one of case study's scenarios would look like this:

LCCA Simplified (Life Cycle Cost Analysis)		Vestas industrial cooling					
Project							
Date							
Cooling capacity kW	4200	Temp in °C	59	Temp out °C	25	Temp Wb °C	19
Assumptions							
Running period Year	5 Years						
Energy price €/kWh	0,0833						
Operation hours	8000 h / year						
	Alternative Fab Solution	1	2	3	4	5	6
		Vestas OCT09	Vestas 2*OCT06				
Investment	€	23.640	40.650				
Operation cost:							
Power consumption	kW	20	9				
Energy consumption	kWh / year	160.000	68.000	-	-	-	-
Energy cost/year	€/year	13.328	5.664	-	-	-	-
LCCA	€	90.280	68.972	-	-	-	-
Benchmark	€	90.280					
Difference	€	-	21.308	90.280	90.280	90.280	90.280
ROI	Month	26,6					
Assumption							
Energy cost investment no. 1	€/year	13.328					
Energy cost investment no. 2	€/year	5.664					
Installation no. 1	€	23.640					
Installation no. 2	€	40.650					

Figure 2: Return of investment

Based on the results of analysis of a number of scenarios for an industrial cooling tower system the report provides energy saving options along with their economic benefits