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# Effect of the diurnal heating on urban street canyons: a CFD study

Document:

Budget

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## 1 Budget

In this section, the total cost of the study will be calculated. First, the salary of the engineer has been established on 25 €/hour and the cost of the energy has been obtained as the average price established by the market along year 2021 (0.182 €/kWh).

Table 1 shows the hours spend on each necessary work package to finish this study.

*Table 1-1. Human resources needed to finish each task*

<b>Task</b>	<b>Time</b>	<b>Unit</b>	<b>%</b>
Literature review	30	h	7.50%
Gmsh formation	20	h	5.00%
OpenFoam formation	45	h	11.25%
Paraview formation	10	h	2.50%
MATLAB formation	15	h	3.75%
Modelling and meshing	30	h	7.50%
Setting up and running CFD simulations	125	h	31.25%
Postprocessing of results	50	h	12.50%
Writing	75	h	18.75%

Matlab is the only program that requires license since the rest of the programs are free. Nevertheless, the author of this thesis has used a student license for this software because the university has an agreement with MathWorks, thus the annual license price of 800€ will not be computed as a cost of the project.

Concerning the energy consumption, the laptop used to carry out this study has an energetic cost of 85 Wh. In addition, the energetic cost of the light used to carry out this project has been approached to 30Wh. It is important to note, that most of the time used to develop this thesis has been in the afternoon and at night, thus the total amount of hours used to finish this project can be associated with use of light.

Table 2 shows the total amount of hours as well as the total cost of this study.

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*Table 1-2. Total cost of the study*

Reason	Task	Time [h]	Unitary cost		Total amount [€]
			[€/h]	[€]	
Training	Literature	30	0		0
	Gmsh formation	20	0		0
	OpenFoam formation	45	0		0
	Paraview formation	10	0		0
	MATLAB formation	15	0		0
Engineer work	Modelling and meshing	30	25		750
	Setting up and running CFD simulations	125	25		3125
	Postprocessing of results	50	25		1250
	Writing	75	25		1875
Energy	Use of computer	400	0.015		6.188
	Use of light	400	0.005		2.184
Licenses	Microsoft Office	-		0	0
	Gmsh	-		0	0
	OpenFoam	-		0	0
	Paraview	-		0	0
	MATLAB	-		0	0
<b>TOTAL</b>		<b>400</b>			<b>7008,37</b>

The total cost of this study is 7008,37 €