



**UNIVERSITAT POLITÈCNICA
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Exploration and Utilisation of Lunar Resources affected by Space Weathering

Master's Thesis - Budget Breakdown

submitted in partial fulfilment
of the requirements for the degree of

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Submitted to:

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Budget Breakdown

Testing

This area of the budget corresponds to the running cost of utilising the corresponding equipment to gain either the processed sample or raw data. It must be stated that the cost of the actual SEM equipment is not included, just the cost to use this equipment is present. This is also the case within the UV-VIS spectroscopy and Mössbauer analysis budget breakdown. The cost of the hydrogen reduction testing was gained by viewing the electric cost per unit of kWh and calculating the total kWh used for an individual test.

Human Resources

This area of the budget represents the time that is dedicated to each phase of this study. The Thesis is a 400 hour project, and as such the sum of the hours the student has dedicated to this project accumulates to 400 hours. Evidently, this sum excludes the time in which the project supervisor and the technicians – who aided in accomplishing the experimental phase of this project, have dedicated to this project.

Equipment

This area includes the equipment cost which was utilised through this experiment. Evident from the tables below, only the equipment cost for research and analysis, and the hydrogen reduction phase is taken into account.

Other Costs

This area includes transportation related costs. Transportation represents the commutes conducted by the student to travel from their place of residence to the university campus.

Table 1: Hydrogen Reduction Budget

Testing				
Sample ID	Quantity	Unitary Cost	Unit	Total cost(€)
JSC-1/600/120	0.753930	0.93	€ per kWh	0.70
FJS-3/600/120	0.640019	0.93	€ per kWh	0.60
JSC-1/800/120	1.140153	0.93	€ per kWh	1.06
FJS-3/800/120	1.301089	0.93	€ per kWh	1.21
JSC-1/1000/120	2.109704	0.93	€ per kWh	1.96
FJS-3/1000/120	2.042523	0.93	€ per kWh	1.90
JSC-1/600/240	1.168220	0.93	€ per kWh	1.09
FJS-3/600/240	1.176635	0.93	€ per kWh	1.09
JSC-1/800/240	2.120189	0.93	€ per kWh	1.97
FJS-3/800/240	2.465181	0.93	€ per kWh	2.29
JSC-1/1000/240	3.538426	0.93	€ per kWh	3.29
FJS-3/1000/240	3.624895	0.93	€ per kWh	3.37
Total	-	-	-	21.84
Human Resources				
Member	Quantity	Unitary Cost	Unit	Total cost (€)
Student	56.5	35	€ per hour	1,977.50
Technician	4	60	€ per hour	240
Supervisor	5	60	€ per hour	300
Total	-	-	-	2,517.50
Equipment				
Equipment	Quantity	Unitary Cost	Unit	Total Cost (€)
Carbolite Furnace (MTF 12/38/400)	1	4,000	€	4,000
Stainless steel Reactor Tube	1	10	€	10
Quartz wool	1	25	€ per 10 grams	25
Quartz Fabric	2	1	€ per quantity	2
Bronkhurst E-Flow meter	1	1300	€	1300
Total	-	-	-	5,337
Other Costs				
Activity	Quantity	Unitary Cost	Unit	Total Cost (€)
Transport	28	1.10	€ per quantity	30.80
Total	-	-	-	30.80

Table 2: SEM Characterisation Budget

Testing				
Batch	Quantity	Unitary cost	Unit	Total Cost (€)
1 st	2	106.74	€ per hour	213.48
2 nd	2	106.74	€ per hour	213.48
Total	-	-	-	426.96
Human Resources				
Member	Quantity	Unitary cost	Unit	Total Cost (€)
Student	4	35	€ per hour	140
Technician	4	60	€ per hour	240
Supervisor	4	60	€ per hour	240
Total	-	-	-	620
Other Costs				
Activity	Quantity	Unitary cost	Unit	Total Cost (€)
Transport	4	1.10	€ per quantity	4.40
Total	-	-	-	4.40

Table 3: UV - VIS Spectroscopy Budget

Testing				
Batch	Quantity	Unitary cost	Unit	Total Cost (€)
1 st	5	4.85	€ per hour	24.25
2 nd	5	4.85	€ per hour	24.25
3 rd	1	4.85	€ per hour	4.85
Total	-	-	-	53.35
Human Resources				
Member	Quantity	Unitary cost	Unit	Total Cost (€)
Student	11	35	€ per hour	385
Technician	2	60	€ per hour	120
Total	-	-	-	505
Activity	Quantity	Unitary cost	Unit	Total Cost (€)
Transport	6	1.10	€ per quantity	6.60
Total	-	-	-	6.60

Table 4: Mössbauer Analysis Budget

Testing				
Sample ID	Quantity	Unitary cost	Unit	Total Cost (€)
Unprocessed JSC-1	1	100	€ per test	100
JSC-1/1000/240	1	100	€ per test	100
Total	-	-	-	200
Human Resources				
Member	Quantity	Unitary cost	Unit	Total Cost (€)
Student	2	35	€ per hour	70
Technician	2	100	€ per sample	200
Supervisor	1	60	€ per hour	60
Total	-	-	-	330
Other costs				

Table 5: Research and Analysis Budget

Human Resources				
Member	Quantity	Unitary cost	Unit	Total Cost (€)
Student	326.5	35	€ per hour	11,427.50
Supervisor	90	60	€ per hour	5400
Total	-	-	-	16,827.50
Equipment Cost				
Equipment	Quantity	Unitary cost	Unit	Total Cost (€)
Matlab Student Licence	1	2000	€	2000
Macbook Pro	1	1000	€	1000
Total	-	-	-	3000

Table 6: Summary of Project's Budget

Phase of Study	Costs	
Hydrogen Reduction	Testing	€21.84
	Human Resources	€2,517.50
	Equipment	€5,337
	Other	€30.80
	Total	€7,907.14
SEM Characterisation	Testing	€426.96
	Human Resources	€620
	Equipment	-
	Other	€4.40
	Total	€1,051.36
UV-VIS Spectroscopy	Testing	€53.35
	Human Resources	€505
	Equipment	-
	Other	€6.60
	Total	€564.95
Mössbauer Analysis	Testing	€200
	Human Resources	€330
	Equipment	-
	Other	-
	Total	€530
Research and Analysis	Testing	-
	Human Resources	€16,827.50
	Equipment	€3000
	Other	-
	Total	€19,827.50
Total Cost for Project		€29,880.95