

Solar Travels Ltd.

Víctor Hernández

Solar Travels Ltd.



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Solar Travels Ltd.

Company Overview

- Location: Salford, United Kingdom
 - Strong legal protections for investors
 - Employer-friendly labor regulations
 - Fast business start-up
- Service
 - Space disposal of radioactive waste
- Target
 - Power companies with nuclear power plants
 - Governments



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Business Concept



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Business Concept

- Sell weight Carriage capacity in a space vehicle
 - Mainly for highly radioactive waste
- Launch the payload into the sun
 - From Geostationary Transfer Orbit
- Promote an earth free of nuclear waste
 - Strong marketing and information

Space nuclear waste disposal!



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Background

- In the 70's NASA expected to use the "Space Shuttle" for space disposal
- In the 90's NASA explored the program "Alt Access" for ISS services by entrepreneurs.
- In 1998 "Space Adventures" is founded, to send private space explorers.
- In 2006 NASA starts the "Commercial Orbital Transportation Services".
- In 2006 Reaction Engines Limited announces "Skylon".



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Technical Overview

- Reusable launch vehicle
 - No orbit insertion
 - No docking with another spacecraft
 - No space rendezvous
- Shoot the payload from GTO
 - Less energy to impulse the payload
- Shoot the load into the sun
 - Short distance
 - Great size of the objective
 - High gravity force



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Technical Overview

Sun Data

- Orbital Characteristic
 - Mean distance: 150×10^6 km
- Physical characteristics
 - Surface area: 11,990 x Earth area
 - Volume: 1,300,000 x Earth volume
 - Surface temperature: 5,778 K
 - Corona temperature: 5×10^6 K



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Market Analysis

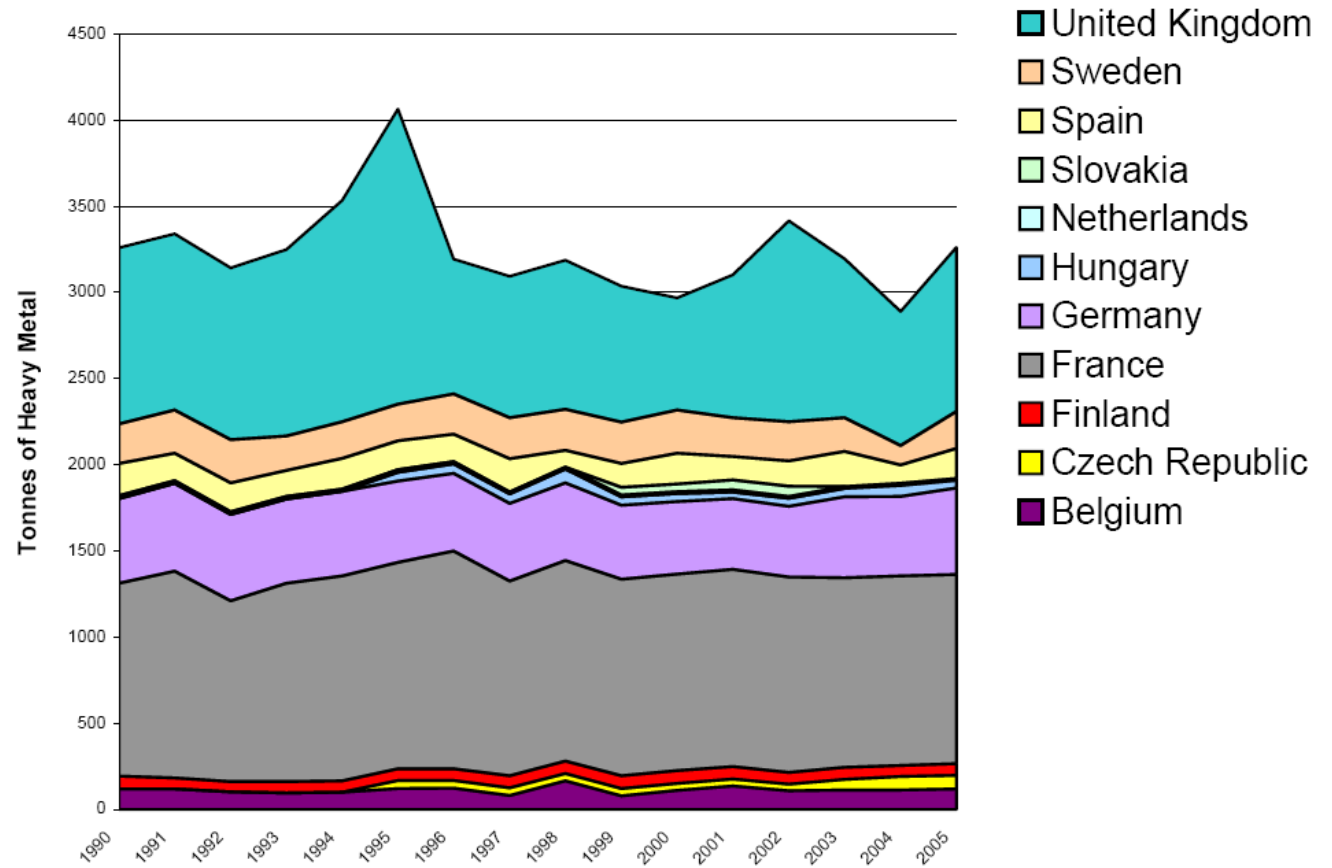


Launch Vehicle	Skylon	Falcon 9	Kistler K-1	Avatar
Company	Reaction Engines Limited	SpaceX	Rocketplane Kistler	DRDO/ISRO
Length (m)	82	54	18.4	-
Diameter (m)	25 (wingspan)	3.6	6.7	-
Max. Payload (m)	12,000	12,000	2,000	-
Cost per launch (€)	28,000,000	61,000,000	13,200,000	-
Payload Cost (€/kg)	2,333	5,083	6,600	52 (LEO)

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Market Analysis

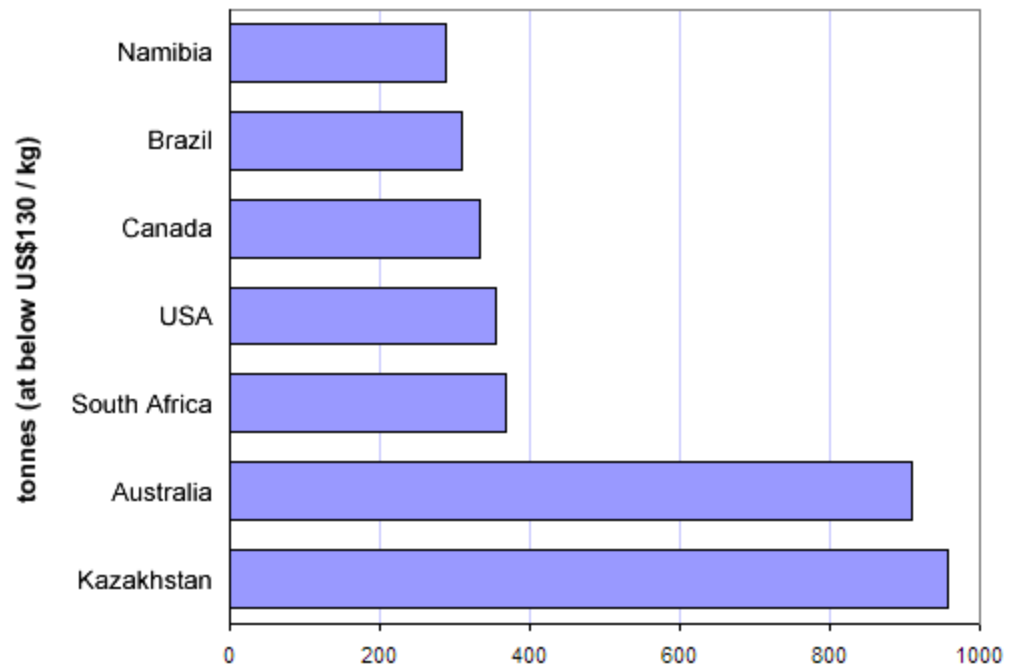
Spent fuel produced in the EU



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Market Analysis

Uranium reserves



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Market Analysis

- 440 nuclear power plants worldwide in operation
- 270,000 tones of spent fuel generated in the last half century
- 10,000 tones of spent fuel generated annually
- 3% of annual spent fuel is classified as High-level radioactive waste.
- High-level radioactive (HLW) waste represents 95% of total radioactivity
- From thousands to millions of years (for HLW) to decay



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Market Analysis

Costs of Alternative Approaches for the Long-Term Management of Canada's Nuclear Fuel Waste

Fuel Bundles (millions) / Station Life (Years)	Interim Storage and Retrieval (M€)	Road Transportation (M€)	Disposal (M€)	Total (M€)
3.7/40	2,380	954	12,882	16,216

Source: Canada's Nuclear Waste Management Organization

Bundle weight: 23 kg.

$23 \text{ kg/bundle} \times 3.7\text{M bundle} = 85,100 \text{ t}$

$16,216 \text{ M€} / 85,100 \text{ t} = 190,552\text{€} / \text{t}$

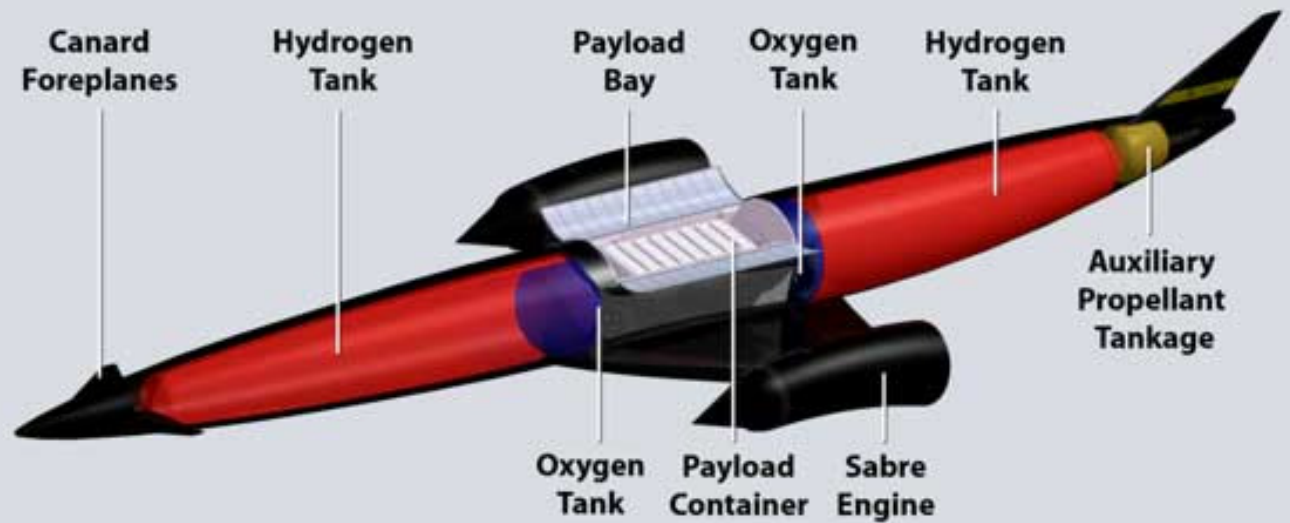
$28\text{M€} / 10 \text{ t} = 2.8\text{M€} / \text{t}$

$3.9\text{M€} / 10 \text{ t} = 390,000\text{€} / \text{t}$



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Skylon Space Vehicle



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Skylon Space Vehicle



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Skylon specifications

- Length: 82 m
- Fuselage diameter: 6.25 m
- Wingspan: 25 m
- Unladen mass: 41,000 kg
- Fuel mass: 220,000 kg
- Maximum payload mass (to GTO): 12,000 kg
- Specific impulse: 2000 to 2800 s (20 to 27 kN·s/kg) atmospheric, 450 s (4.4 kN·s/kg) exoatmospheric
- SABRE engine thrust/weight ratio: greater than 10
- Lifetime: 200
- Cost per launch: 28,000,000.00 €
- Lifetime: 200 launches

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Problems / Controversy

- Rocket launch failure
- In-Orbit failure
- Cargo deviation
- Sun contamination
- Untraceable
- High-Costs



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Regulation

- Responsibility for damages
 - Indemnification
 - Safety
- Nuclear waste handling certification
 - For transporting
 - For cargo loading
- Rocket launch approval
 - Space Vehicle approval
 - Launcher approval



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Investment Costs

Description	Unit cost	Quantity	Amount of investment (€)	Depreciation rate (years)	Annual depreciation (€)
Building					
Headquarters office 200m ²	400,000.00	1	400,000.00	20	20,000.00
Sum of Building			400,000.00		20,000.00
Office technical equipment					
Computer	1,000.00	16	16,000.00	4	4,000.00
Printer	200.00	4	800.00	4	200.00
Photocopier	2,000.00	4	8,000.00	4	2,000.00
Phone	50.00	15	750.00	10	75.00
Fax	100.00	2	200.00	10	20.00
Video beam	1,000.00	1	1,000.00	4	250.00
General PC software	5,000.00	1	5,000.00	3	1,666.67
Astronomy PC software	1,000.00	1	1,000.00	3	333.33
Sum of Office Technical equipment			32,750.00		8,545.00

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Investment Costs

Description	Unit cost	Quantity	Amount of investment (€)	Depreciation rate (years)	Annual depreciation (€)
Office furniture					
Office set	1,300.00	12	15,600.00	10	1,560.00
Office luxury set	2,500.00	3	7,500.00	10	750.00
Meeting set	1,500.00	1	1,500.00	10	150.00
Sum of Office furniture			24,600.00		2,460.00
First service procurement					
Handling and transport of nuclear waste (2,5 t)	770,000.00	4	3,080,000.00	0	0.00
Storage of nuclear waste	100,000.00	3	300,000.00	0	0.00
GEO Launch	28,000,000.00	1	28,000,000.00	0	0.00
Sum of First rocket launch			31,380,000.00	0	0.00

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Total Investment

Description	Amount of investment (€)	Annual depreciation (€)
Building	400,000.00	20,000.00
Office technical equipment	32,750.00	8,545.00
Office furniture	24,600.00	2,460.00
First rocket launch	31,380,000.00	-
Marketing	6,000,000.00	-
Unexpected	2,000,000.00	-
Circulating Capital	1,000,000.00	-
Total	40,837,350.00	31,005.00



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Financing



Total Investment		40,837,350.00
Shareholders equity	40	16,334,940.00
Bank Loan	60	24,502,410.00

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Shared Capital

Víctor Hernández (33,33%) = 5,444,980.00€

Partner 1 (33,33%) = 5,444,980.00 €

Partner 2 (33,33%) = 5,444,980.00 €



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Interest paid on debt

Year	Balance of debt	Interest rate	Interest Costs Paid p.a.	Repayment
1	24,502,410.00	4.5	1,102,608.45	1,633,494.00
2	22,868,916.00	4.5	1,029,101.22	1,633,494.00
3	21,235,422.00	4.5	955,593.99	1,633,494.00
4	19,601,928.00	4.5	882,086.76	1,633,494.00
5	17,968,434.00	4.5	808,579.53	1,633,494.00
6	16,334,940.00	4.5	735,072.30	1,633,494.00
7	14,701,446.00	4.5	661,565.07	1,633,494.00
8	13,067,952.00	4.5	588,057.84	1,633,494.00
9	11,434,458.00	4.5	514,550.61	1,633,494.00
10	9,800,964.00	4.5	441,043.38	1,633,494.00
11	8,167,470.00	4.5	367,536.15	1,633,494.00
12	6,533,976.00	4.5	294,028.92	1,633,494.00
13	4,900,482.00	4.5	220,521.69	1,633,494.00
14	3,266,988.00	4.5	147,014.46	1,633,494.00
15	1,633,494.00	4.5	73,507.23	1,633,494.00
Total Interest Paid			8,820,867.60	
	Total Repayment			24,502,410.00



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Personnel Costs

Description	Quantity	Annual Salary (€)	Total (€)
CEO	1	120,000.00	120,000.00
Advisory board	3	110,000.00	330,000.00
Technical Staff	3	80,000.00	240,000.00
Marketing staff	3	70,000.00	210,000.00
Logistic staff	3	70,000.00	210,000.00
Secretary	2	50,000.00	100,000.00
Total Personnel cost			1,210,000.00



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Marketing Investment

Year	Marketing Investment (€)
1	5,000,000.00
2	3,351,600.23
3	2,246,644.82
4	1,505,971.06
5	1,009,482.59
6	1,009,482.59
7	1,009,482.59
8	1,009,482.59
9	1,009,482.59
10	1,009,482.59
11	1,009,482.59
12	1,009,482.59
13	1,009,482.59
14	1,009,482.59
15	1,009,482.59

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Cost of space vehicle launch



Year	Cost per launch	Number of launches	Total launches cost
1	0.00	0	0.00
2	28,000,000.00	5	140,000,000.00
3	23,180,597.67	7	162,264,183.66
4	19,190,718.15	9	172,716,463.34
5	15,887,582.73	12	190,650,992.72
6	13,152,987.97	17	223,600,795.43
7	10,889,075.79	22	239,559,667.42
8	9,014,831.60	30	270,444,948.09
9	7,463,185.16	41	305,990,591.47
10	6,178,610.44	55	339,823,574.46
11	5,115,138.67	74	378,520,261.84
12	5,115,138.67	74	378,520,261.84
13	5,115,138.67	74	378,520,261.84
14	5,115,138.67	74	378,520,261.84
15	5,115,138.67	74	378,520,261.84

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Self costs

Year	1	2	3	4	5	6	7	8
Launches per year	0	5	7	9	12	17	22	30
Depreciation costs	31,005.00	31,005.00	31,005.00	31,005.00	31,005.00	31,005.00	31,005.00	31,005.00
Financing costs	1,102,608.45	1,029,101.22	955,593.99	882,086.76	808,579.53	735,072.30	661,565.07	588,057.84
Personnel costs	1,210,000.00	1,210,000.00	1,210,000.00	1,210,000.00	1,210,000.00	1,210,000.00	1,210,000.00	1,210,000.00
Launch cost	0.00	140,000,000.00	162,264,183.66	172,716,463.34	190,650,992.72	223,600,795.43	239,559,667.42	270,444,948.09
Marketing cost	5,000,000.00	3,351,600.23	2,246,644.82	1,505,971.06	1,009,482.59	1,009,482.59	1,009,482.59	1,009,482.59
Sum of costs	7,343,613.45	145,621,706.45	166,707,427.47	176,345,526.16	193,710,059.84	226,586,355.32	242,471,720.08	273,283,493.52
Unitary self cost per launch	-	29,124,341.29	23,815,346.78	19,593,947.35	16,142,504.99	13,328,609.14	11,021,441.82	9,109,449.78

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Self costs

Year	9	10	11	12	13	14	15
Launches per year	41	55	74	74	74	74	74
Depreciation costs	31,005.00	31,005.00	31,005.00	31,005.00	31,005.00	31,005.00	31,005.00
Financing costs	514,550.61	441,043.38	367,536.15	294,028.92	220,521.69	147,014.46	73,507.23
Personnel costs	1,210,000.00	1,210,000.00	1,210,000.00	1,210,000.00	1,210,000.00	1,210,000.00	1,210,000.00
Launch cost	305,990,591.47	339,823,574.46	378,520,261.84	378,520,261.84	378,520,261.84	378,520,261.84	378,520,261.84
Marketing cost	1,009,482.59	1,009,482.59	1,009,482.59	1,009,482.59	1,009,482.59	1,009,482.59	1,009,482.59
Sum of costs	308,755,629.67	342,515,105.43	381,138,285.58	381,064,778.35	380,991,271.12	380,917,763.89	380,844,256.66
Unitary self cost per launch	7,530,625.11	6,227,547.37	5,150,517.37	5,149,524.03	5,148,530.69	5,147,537.35	5,146,544.01

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Calculation of turnover / revenue

Year	Launches	Price per launch	Turnover
1	0	29,000,000.00	0.00
2	5	29,000,000.00	145,000,000.00
3	7	24,000,000.00	168,000,000.00
4	9	20,000,000.00	180,000,000.00
5	12	16,500,000.00	198,000,000.00
6	17	14,000,000.00	238,000,000.00
7	22	11,500,000.00	253,000,000.00
8	30	10,000,000.00	300,000,000.00
9	41	8,500,000.00	348,500,000.00
10	55	7,000,000.00	385,000,000.00
11	74	6,000,000.00	444,000,000.00
12	74	6,000,000.00	444,000,000.00
13	74	6,000,000.00	444,000,000.00
14	74	6,000,000.00	444,000,000.00
15	74	6,000,000.00	444,000,000.00



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Cash Flow Calculation

Year	1	2	3	4	5	6	7	8
Turnover/ Revenue	0.00	145,000,000.00	168,000,000.00	180,000,000.00	198,000,000.00	238,000,000.00	253,000,000.00	300,000,000.00
Depreciation costs	31,005.00	31,005.00	31,005.00	31,005.00	31,005.00	31,005.00	31,005.00	31,005.00
Financing costs	1,102,608.45	1,029,101.22	955,593.99	882,086.76	808,579.53	735,072.30	661,565.07	588,057.84
Personnel costs	1,210,000.00	1,210,000.00	1,210,000.00	1,210,000.00	1,210,000.00	1,210,000.00	1,210,000.00	1,210,000.00
Launch cost	0.00	140,000,000.00	162,264,183.66	172,716,463.34	190,650,992.72	223,600,795.43	239,559,667.42	270,444,948.09
Marketing cost	5,000,000.00	3,351,600.23	2,246,644.82	1,505,971.06	1,009,482.59	1,009,482.59	1,009,482.59	1,009,482.59
Loss carried forward		-7,343,613.45	-7,965,319.90	-6,672,747.38				
Profit before tax	-7,559,613.45	-7,965,319.90	-6,672,747.38	-3,018,273.53	4,289,940.16	11,413,644.68	10,528,279.92	26,716,506.48
Taxes (40%)	0	0	0	0	1,715,976.07	4,565,457.87	4,211,311.97	10,686,602.59
Profit after taxes	-7,343,613.45	-7,965,319.90	-6,672,747.38	-3,018,273.53	4,289,940.16	11,413,644.68	10,528,279.92	26,716,506.48
Cash-flow	-7,312,608.45	-7,934,314.90	-6,641,742.38	-2,987,268.53	2,604,969.10	6,879,191.81	6,347,972.95	16,060,908.89
Repayment loan	1,953,494.00	1,953,494.00	1,953,494.00	1,953,494.00	1,953,494.00	1,953,494.00	1,953,494.00	1,953,494.00
Dividend	-9,266,102.45	-9,887,808.90	-8,595,236.38	-4,940,762.53	651,475.10	4,925,697.81	4,394,478.95	14,107,414.89

Solar Travels Ltd.

Cash Flow Calculation

Year	9	10	11	12	13	14	15
Turnover/ Revenue	348,500,000.00	385,000,000.00	444,000,000.00	444,000,000.00	444,000,000.00	444,000,000.00	444,000,000.00
Depreciation costs	31,005.00	31,005.00	31,005.00	31,005.00	31,005.00	31,005.00	31,005.00
Financing costs	514,550.61	441,043.38	367,536.15	294,028.92	220,521.69	147,014.46	73,507.23
Personnel costs	1,210,000.00	1,210,000.00	1,210,000.00	1,210,000.00	1,210,000.00	1,210,000.00	1,210,000.00
Launch cost	305,990,591.47	339,823,574.46	378,520,261.84	378,520,261.84	378,520,261.84	378,520,261.84	378,520,261.84
Marketing cost	1,009,482.59	1,009,482.59	1,009,482.59	1,009,482.59	1,009,482.59	1,009,482.59	1,009,482.59
Loss carried forward							
Profix before tax	39,744,370.33	42,484,894.57	62,861,714.42	62,935,221.65	63,008,728.88	63,082,236.11	63,155,743.34
Taxes (40%)	15,897,748.13	16,993,957.83	25,144,685.77	25,174,088.66	25,203,491.55	25,232,894.45	25,262,297.34
Profit after taxes	23,846,622.20	25,490,936.74	37,717,028.65	37,761,132.99	37,805,237.33	37,849,341.67	37,893,446.01
Cash-flow	23,877,627.20	25,521,941.74	37,748,033.65	37,792,137.99	37,836,242.33	37,880,346.67	37,924,451.01
Repayment loan	1,953,494.00	1,953,494.00	1,953,494.00	1,953,494.00	1,953,494.00	1,953,494.00	1,953,494.00
Dividend	21,924,133.20	23,568,447.74	35,794,539.65	35,838,643.99	35,882,748.33	35,926,852.67	35,970,957.01

Solar Travels Ltd.

Total dividend

Total dividend cumulated over 15 years:

216,295,479.06 €



Solar Travels Ltd.

Equity Profitability

Equity	Profit after tax	Dividend	Interest made on equity	
16,334,940.00	-7,343,613.45	-9,266,102.45	-56.73	1. year
16,334,940.00	2,573,964.10	651,475.10	3.99	5. year
16,334,940.00	25,490,936.74	23,568,447.74	144.28	10. year
16,334,940.00	37,893,446.01	35,970,957.01	220.21	15. year



Solar Travels Ltd.

Conclusion

The novelty of this Enterprise, its purpose along with a strong campaign will guarantee its success.



Solar Travels Ltd.

Keep the Earth
Clean

Thanks for
your
Attention

Víctor Hernández

