Jekta FACTOR

Payerne, Switzerland

2023

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The Jekta Factor: A preliminary assessment of the regional electric aircraft market

Many factors influence the way markets are established and evolve. Some are suitable for quantitative assessment, others are difficult or impossible to express. It is therefore also impossible to derive a definitive, universal formula that would allow us to define a market and its prospects for change.
However, some criteria are useful indicators for judging the state of the market with a reliable degree of probability and these are sometimes used in established markets for well-known products. As a rule, the process applies to commodity markets, that is markets for products with a limited number of properties. Finding similar criteria for more complex goods is difficult, although it is logical to assume that some of these criteria likely connect certain physical properties with economic indicators, allowing quantitative assessment of a new product compared to a known one.
These challenges apply to any assessment of the prospects in the emerging market for electric aircraft, where they are expected to replace fossil-fueled airplanes and helicopters. Direct operating cost per flight hour is commonly used as a market indicator in civil aviation, but difficult to determine accurately in the early stages of an airplane design. Instead, it is sensible to estimate the energy costs per hour for operating the aircraft compared. Energy costs rather than fuel costs, of course, because electric aircraft are charged with electricity rather than filled with fossil fuel.
The $Jekta$ Factor enables a preliminary assessment of the future regional market. It is a dimensionless ratio of the cost per flight hour for two aircraft of the same capacity, comparing cost for fossil fuel with cost for the energy used by an electric aircraft:

$$Jekta = \frac{C_f}{C_e} \cdot \frac{P_f}{P_e}, \qquad (1)$$

where

C_f – specific hourly consumption of fossil fuel, *kg;*

C_e – specific hourly electricity consumption, *kW · h*;

P_f – price of fossil fuels on the regional market, *USD/kg;*

P_e – price of electricity on the regional market, *USD/kW· h.*

The first two indicators do not depend on the region and are determined only by the physical properties of the powerplants of the compared aircraft. Their ratio C_f/C_e can be considered a constant for the two products being compared.
The second two indicators do not depend on powerplant type and are determined only by regional prices for fuel and electricity.
Let's consider an example using the $Jekta$ Factor to assess the prospects for replacing the DHC-6 Twin Otter turboprop aircraft with the PHA-ZE 100 electric aircraft in Germany and the United Arab Emirates (Table 1).
Ratio $C_f/C_e = 260/600 = 0.4333$.

Table 1 – Preliminary assessment of the prospects of the PHA-ZE 100 compared to the DHC-6 Twin Otter in Germany and the UAE

Market	C_f	C_e	P_f	P_e	$Jekta$
	kg	kWh	USD/kg	USD/kWh	
Germany	260	600	0.6755	**0.5201**	0.6
UAE	260	600	0.6755	0.0811	3.6

The price of electricity in Germany is currently very high, so the cost of Jet A-1 [Footnote 1] for the Twin Otter is 40% less than the cost of the electricity required for a 60-minute PHA-ZE 100 flight. In contrast, electricity is cheap in the UAE, and the electric PHA-ZE 100 is 3.6 times more cost efficient than the Twin Otter. It should be noted that the numerator of equation (1) as applied here calculates the hourly fuel costs of the DHC-6, while the denominator calculates the energy costs of the PHA-ZE 100. In Germany, the ratio is USD175.63:312.06 = 0.6. In the UAE, the ratio is USD175.63:48.66 = 3.6

Table 2 – Preliminary assessment of the prospects of the PHA-ZE 100 compared to the DHC-6 Twin Otter in Europe ($C_f/C_e = 0.4333$).

##	Country	P_e [2]	P_f [1]	$\frac{P_f}{P_e}$	*Jekta*	PHA-ZE	DHC-6	***Jekta***
		USD/kWh	USD/kg			USD	USD	
1	Norway	0.1331	0.6755	5.08	2.2	79.86	175.63	**2.2**
2	Sweden	0.2871	0.6755	2.35	1.0	172.26	175.63	**1.0**
3	Finland	0.2351	0.6755	2.87	1.2	141.06	175.63	**1.2**
4	Iceland	0.1371	0.6755	4.93	2.1	82.26	175.63	**2.1**
5	Ireland	0.3301	0.6755	2.05	0.9	198.06	175.63	**0.9**
6	United Kingdom	0.4711	0.6755	1.43	0.6	282.66	175.63	**0.6**
7	Denmark	0.5291	0.6755	1.28	0.6	317.46	175.63	**0.6**
8	Netherlands	0.3411	0.6755	1.98	0.9	204.66	175.63	**0.9**
9	Estonia	0.3191	0.6755	2.12	0.9	191.46	175.63	**0.9**
10	Latvia	0.2951	0.6755	2.29	1.0	177.06	175.63	**1.0**
11	Lithuania	0.3601	0.6755	1.88	0.8	216.06	175.63	**0.8**
12	Belarus	0.0921	0.6755	7.33	3.2	55.26	175.63	**3.2**
13	Germany	0.5201	0.6755	1.30	0.6	312.06	175.63	**0.6**
14	Poland	0.1781	0.6755	3.79	1.6	106.86	175.63	**1.6**
15	Czech Republic	0.3651	0.6755	1.85	0.8	219.06	175.63	**0.8**
16	Austria	0.4621	0.6755	1.46	0.6	277.26	175.63	**0.6**
17	Slovakia	0.1991	0.6755	3.39	1.5	119.46	175.63	**1.5**
18	Hungary	0.1051	0.6755	6.43	2.8	63.06	175.63	**2.8**
19	Romania	0.1721	0.6755	3.93	1.7	103.26	175.63	**1.7**
20	Switzerland	0.2291	0.6755	2.95	1.3	137.46	175.63	**1.3**
21	Liechtenstein	0.2731	0.6755	2.47	1.1	163.86	175.63	**1.1**
22	Luxembourg	0.2391	0.6755	2.83	1.2	143.46	175.63	**1.2**
23	Belgium	0.4441	0.6755	1.52	0.7	266.46	175.63	**0.7**
24	France	0.2141	0.6755	3.16	1.4	128.46	175.63	**1.4**
25	Portugal	0.2661	0.6755	2.54	1.1	159.66	175.63	**1.1**
26	Spain	0.3661	0.6755	1.85	0.8	219.66	175.63	**0.8**
27	Malta	0.1421	0.6755	4.75	2.1	85.26	175.63	**2.1**
28	Italy	0.4611	0.6755	1.46	0.6	276.66	175.63	**0.6**
29	Serbia	0.0921	0.6775	7.36	3.2	55.26	176.15	**3.2**
30	Macedonia	0.1011	0.6775	6.70	2.9	60.66	176.15	**2.9**
31	Slovenia	0.2681	0.6755	2.52	1.1	160.86	175.63	**1.1**
32	Bosnia And Herzegovina	0.0961	0.6775	7.05	3.1	57.66	176.15	**3.1**
33	Albania	0.1051	0.6775	6.45	2.8	63.06	176.15	**2.8**
34	Bulgaria	0.1301	0.6755	5.19	2.2	78.06	175.63	**2.2**
35	Greece	0.1981	0.6755	3.41	1.5	118.86	175.63	**1.5**
36	Cyprus	0.2701	0.6826	2.53	1.1	162.06	177.476	**1.1**
37	Ukraine	0.0391	0.6755	17.28	7.5	23.46	175.63	**7.5**
38	Moldova	0.1151	0.6755	5.87	2.5	69.06	175.63	**2.5**
39	Georgia	0.0761	0.6826	8.97	3.9	45.66	177.476	**3.9**
40	Armenia	0.1031	0.6826	6.62	2.9	61.86	177.476	**2.9**
41	Azerbaijan	0.0471	0.6826	14.49	6.3	28.26	177.476	**6.3**

The shaded rows in Table 2 indicates that 14 out of 41 European countries still have mixed prospects for electric aircraft.

Preliminary assessment of the prospects of the PHA-ZE 100 compared to the DHC-6 Twin Otter in Asia ($C_f/C_e = 0.4333$).

##	Country	P_e [2]	P_f [1]	$\frac{P_f}{P_e}$	*Jekta*	PHA-ZE	DHC-6	***Jekta***
		USD/kWh	USD/kg			USD	USD	
1	Russia	0.0641	0.6755	10.54	4.6	38.46	175.630	**4.6**
2	Turkey	0.0771	0.6826	8.85	3.8	46.26	177.476	**3.8**
3	Lebanon	0.0021	0.6826	325.05	140.9	1.26	177.476	**140.9**
4	Israel	0.1591	0.6826	4.29	1.9	95.46	177.476	**1.9**
5	Syria	0.0141	0.6826	48.41	21.0	8.46	177.476	**21.0**
6	Iraq	0.0131	0.6826	52.11	22.6	7.86	177.476	**22.6**
7	Iran	0.0051	0.6826	133.84	58.0	3.06	177.476	**58.0**
8	Saudi Arabia	0.0481	0.6826	14.19	6.1	28.86	177.476	**6.1**
9	United Arab Emirates	0.0811	0.6755	8.33	3.6	48.66	175.630	**3.6**
10	Jordan	0.1001	0.6826	6.82	3.0	60.06	177.476	**3.0**
11	Qatar	0.0321	0.6826	21.26	9.2	19.26	177.476	**9.2**
12	Oman	0.0261	0.6826	26.15	11.3	15.66	177.476	**11.3**
13	Kuwait	0.0291	0.6826	23.46	10.2	17.46	177.476	**10.2**
14	Bahrain	0.0481	0.6826	14.19	6.1	28.86	177.476	**6.1**
15	Kazakhstan	0.0451	0.6826	15.14	6.6	27.06	177.476	**6.6**
16	Uzbekistan	0.0261	0.6826	26.15	11.3	15.66	177.476	**11.3**
17	Kyrgyzstan	0.0101	0.6826	67.58	29.3	6.06	177.476	**29.3**
18	Afghanistan	0.0421	0.6826	16.21	7.0	25.26	177.476	**7.0**
19	Pakistan	0.0371	0.6826	18.40	8.0	22.26	177.476	**8.0**
20	India	0.0731	0.6826	9.34	4.0	43.86	177.476	**4.0**
21	Bangladesh	0.0541	0.6826	12.62	5.5	32.46	177.476	**5.5**
22	Sri Lanka	0.0411	0.6826	16.61	7.2	24.66	177.48	**7.2**
23	Maldives	0.1431	0.6826	4.77	2.1	85.86	177.48	**2.1**
24	China	0.0791	0.6826	8.63	3.7	47.46	177.48	**3.7**
25	Taiwan	0.0921	0.6826	7.41	3.2	55.26	177.48	**3.2**
26	Hong Kong	0.1631	0.6826	4.19	1.8	97.86	177.48	**1.8**
27	Macao	0.1511	0.6826	4.52	2.0	90.66	177.48	**2.0**
28	Nepal	0.0441	0.6826	15.48	6.7	26.46	177.48	**6.7**
29	Bhutan	0.0151	0.6826	45.21	19.6	9.06	121.15	**13.4**
30	Myanmar	0.0291	0.6826	23.46	10.2	17.46	177.48	**10.2**
31	Laos	0.0351	0.6826	19.45	8.4	21.06	177.48	**8.4**
32	Thailand	0.1121	0.6826	6.09	2.6	67.26	177.48	**2.6**
33	Vietnam	0.0791	0.6826	8.63	3.7	47.46	177.48	**3.7**
34	Cambodia	0.1501	0.6826	4.55	2.0	90.06	177.48	**2.0**
35	Malaysia	0.0491	0.6826	13.90	6.0	29.46	177.48	**6.0**
36	Singapore	0.2221	0.6826	3.07	1.3	133.26	177.48	**1.3**
37	Indonesia	0.0951	0.6826	7.18	3.1	57.06	177.48	**3.1**
38	Philippines	0.1841	0.6826	3.71	1.6	110.46	177.48	**1.6**
39	South Korea	0.0931	0.6826	7.33	3.2	55.86	177.48	**3.2**
40	Japan	0.2461	0.6826	2.77	1.2	147.66	177.48	**1.2**

Of course, the $Jekta$ Factor is not the only indicator of market prospects. For example, $Jekta$ = 21 in Syria, but continuing conflict in the country precludes aircraft deliveries.

Table 4 – Assessment of the prospects of the PHA-ZE 100 compared to the DHC-6 Twin Otter in Africa ($C_f/C_e = 0.4333$).

##	Country	P_e [2]	P_f [1]	$\frac{P_f}{P_e}$	$Jekta$	PHA-ZE	DHC-6	$Jekta$
		USD/kWh	USD/kg			USD	USD	
1	Egypt	0.0271	0.6612	24.40	10.6	16.26	171.91	**10.6**
2	Libya	0.0041	0.6612	161.27	69.9	2.46	171.91	**69.9**
3	Tunisia	0.0671	0.6612	9.85	4.3	40.26	171.91	**4.3**
4	Algeria	0.0391	0.6612	16.91	7.3	23.46	171.91	**7.3**
5	Morocco	0.1131	0.6612	5.85	2.5	67.86	171.91	**2.5**
6	Mauritius	0.1311	0.6612	5.04	2.2	78.66	171.91	**2.2**
7	Cape Verde	0.3041	0.6612	2.17	0.9	182.46	171.91	**0.9**
8	Mali	0.2121	0.6612	3.12	1.4	127.26	171.91	**1.4**
9	Senegal	0.1671	0.6612	3.96	1.7	100.26	171.91	**1.7**
10	Sierra Leone	0.0821	0.6612	8.05	3.5	49.26	171.91	**3.5**
11	Ivory Coast	0.1171	0.6612	5.65	2.4	70.26	171.91	**2.4**
12	Burkina Faso	0.2001	0.6612	3.30	1.4	120.06	171.91	**1.4**
13	Ghana	0.0291	0.6612	22.72	9.8	17.46	171.91	**9.8**
14	Togo	0.1871	0.6612	3.53	1.5	112.26	171.91	**1.5**
15	Nigeria	0.0491	0.6612	13.47	5.8	29.46	171.91	**5.8**
16	Cameroon	0.0811	0.6612	8.15	3.5	48.66	171.91	**3.5**
17	Gabon	0.1991	0.6612	3.32	1.4	119.46	171.91	**1.4**
18	Sudan	0.0091	0.6612	72.66	31.5	5.46	171.91	**31.5**
19	Ethiopia	0.0061	0.6612	108.39	47.0	3.66	171.91	**47.0**
20	Uganda	0.1631	0.6612	4.05	1.8	97.86	171.91	**1.8**
21	Rwanda	0.2361	0.6612	2.80	1.2	141.66	171.91	**1.2**
22	Democratic Republic of the Congo	0.0811	0.6612	8.15	3.5	48.66	171.91	**3.5**
23	Kenya	0.1721	0.6612	3.84	1.7	103.26	171.91	**1.7**
24	Tanzania	0.0981	0.6612	6.74	2.9	58.86	171.91	**2.9**
25	Malawi	0.1091	0.6612	6.06	2.6	65.46	171.91	**2.6**
26	Zambia	0.0281	0.6612	23.53	10.2	16.86	171.91	**10.2**
27	Angola	0.0231	0.6612	28.62	12.4	13.86	171.91	**12.4**
28	Zimbabwe	0.0051	0.6612	129.65	56.2	3.06	171.91	**56.2**
29	Mozambique	0.1271	0.6612	5.20	2.3	76.26	171.91	**2.3**
30	Namibia	0.1351	0.6612	4.89	2.1	81.06	171.91	**2.1**
31	Botswana	0.0951	0.6612	6.95	3.0	57.06	171.91	**3.0**
32	Swaziland	0.0951	0.6612	6.95	3.0	57.06	171.91	**3.0**
33	Lesotho	0.0921	0.6612	7.18	3.1	55.26	171.91	**3.1**
34	South Africa	0.1511	0.6612	4.38	1.9	90.66	171.91	**1.9**
35	Madagascar	0.1361	0.6612	4.86	2.1	81.66	171.91	**2.1**

It should be noted that although Jet A-1 prices vary from continent to continent, they are more stable than electricity prices, so the $Jekta$ Factor is more dependent on the cost of electricity, the variability of which manifests itself at the country level. Jet A-1 is frequently expensive in countries with relatively undeveloped economies, where the introduction of new, more efficient, sustainable technology may be stopped by lack of investment for the purchase of new aircraft, and high leasing or insurance premiums. It should also be noted that some countries with a high $Jekta$ Factor are less suitable for seaplanes, being mountainous or largely desert.

Table 5 – Assessment of the prospects of the PHA-ZE 100 compared to the DHC-6 in the Americas, Caribbean, Australia and Oceania ($C_f/C_e = 0.4333$).

##	Country	P_e [2]	P_f [1]	$\frac{P_f}{P_e}$	*Jekta*	PHA-ZE	DHC-6	***Jekta***
		USD/kWh	USD/kg			USD	USD	
1	Canada	0.1121	0.6976	6.22	2.7	67.26	181.38	**2.7**
2	USA	0.1751	0.6976	3.98	1.7	105.06	181.38	**1.7**
1	Mexico	0.0971	0.7015	7.22	3.1	58.26	182.39	**3.1**
2	Bahamas	0.2621	0.7015	2.68	1.2	157.26	182.39	**1.2**
3	Cuba	0.0301	0.7015	23.31	10.1	18.06	182.39	**10.1**
4	Dominican Republic	0.1231	0.7015	5.70	2.5	73.86	182.39	**2.5**
5	Jamaica	0.3301	0.7015	2.13	0.9	198.06	182.39	**0.9**
6	Guatemala	0.2711	0.7015	2.59	1.1	162.66	182.39	**1.1**
7	Belize	0.2171	0.7015	3.23	1.4	130.26	182.39	**1.4**
8	El Salvador	0.2441	0.7015	2.87	1.2	146.46	182.39	**1.2**
9	Honduras	0.2311	0.7015	3.04	1.3	138.66	182.39	**1.3**
10	Nicaragua	0.1731	0.7015	4.05	1.8	103.86	182.39	**1.8**
11	Costa Rica	0.1551	0.7015	4.52	2.0	93.06	182.39	**2.0**
12	Panama	0.1761	0.7015	3.98	1.7	105.66	182.39	**1.7**
13	Aruba	0.1851	0.7015	3.79	1.6	111.06	182.39	**1.6**
14	Barbados	0.3301	0.7015	2.13	0.9	26.36	123.20	**4.7**
15	Bermuda	0.3951	0.7015	1.78	0.8	68.06	123.20	**1.8**
16	Trinidad And Tobago	0.0521	0.7015	13.46	5.8	7.35	123.20	**16.8**
17	Cayman Islands	0.3661	0.7015	1.92	0.8	30.12	123.20	**4.1**
18	Venezuela	0.1731	0.7015	4.05	1.8	103.86	182.39	**1.8**
19	Colombia	0.1371	0.7015	5.12	2.2	82.26	182.39	**2.2**
20	Ecuador	0.0961	0.7015	7.30	3.2	57.66	182.39	**3.2**
21	Suriname	0.0101	0.7015	69.46	30.1	6.06	182.39	**30.1**
22	Brazil	0.1971	0.7015	3.56	1.5	118.26	182.39	**1.5**
23	Peru	0.2251	0.7015	3.12	1.4	135.06	182.39	**1.4**
24	Chile	0.1731	0.7015	4.05	1.8	103.86	182.39	**1.8**
25	Paraguay	0.0551	0.7015	12.73	5.5	33.06	182.39	**5.5**
26	Uruguay	0.2431	0.7015	2.89	1.3	145.86	182.39	**1.3**
27	Argentina	0.0331	0.7015	21.19	9.2	19.86	182.39	**9.2**
1	Australia	0.2151	0.6826	3.17	1.4	129.06	177.48	**1.4**
2	New Zealand	0.1881	0.6826	3.63	1.6	112.86	177.48	**1.6**

It is clear that in Canada ($Jekta$ = 2.7), Norway ($Jekta$ = 2.2) and the USA ($Jekta$ = 1.7) there are potentially greater prospects for promoting the PHA-ZE 100 amphibious aircraft as an alternative to the DHC-6 than in the UK and Italy (for both countries $Jekta$ = 0.6), despite their governments' efforts to reduce emissions and their ambitions for zero-emissions transport.

Questions might arise over the correctness of equation (1) since it uses prices for different energy sources. However, the *Jekta* Factor does not change even when these indicators are expressed as in units of energy.

The specific energy of Jet A-1 is 42.8 MJ/kg, while 1 kWh of electricity is equal to 3.6 MJ/kWh. Accordingly, equation (1) takes the form:

$$Jekta = \frac{C_{fh}}{C_{eh}} \cdot \frac{P_{fh}}{P_{eh}}, \qquad (2)$$

where

$P_{fh} = 42.8 \cdot P_f$ accordingly, for the DHC-6 we get P_{eh} = 42.8 MJ/kg*260 kg = 11128 MJ; $P_{eh} = 3.6 \cdot P_e$, therefore for the PHA-ZE 100 P_{eh} = 3.6 MJ/kWh*600 kWh = 2160 MJ.

$C_{fh} = C_f/42{,}8$, accordingly, in Germany C_{fh} = 0.6755/42.8 = 0.0158 USD/MJ; $C_{eh} = C_e/3.6$ = 0.5201/3.6 = 0.1445 USD/MJ.

$$Jekta = \frac{0.0158 \text{ USD/MJ}}{0.1445 \text{ USD/MJ}} \cdot \frac{11128 \text{ MJ}}{2160 \text{ MJ}} = \frac{175.63\ USD}{312.06\ USD} = 0.1092 \cdot 5.16 = 0.6$$

The same as in equation (1), the relation P_{fh}/P_{eh} = Const for the compared aircraft. In this case it will be equal to 5.16. The ratio C_{fh}/C_{eh} will vary from country to country. In the example discussed above, for Germany it is equal to 0.1092, and for Norway, for example, 0.4269.

Equations (1) and (2) give the same value for the $Jekta$ Factor, but equation (1) is more convenient since no additional calculations are required.

It makes sense to compare the market potential of aircraft of the same capacity using equations (1) and (2), but in some cases an electric aircraft might be challenging a fossil-fueled aircraft of greater passenger capacity. Comparing the market prospects of the PHA-ZE 100 and Cessna 208B in Thailand provides a good example. Specific hourly Jet A-1 consumption of the Cessna 208B C_f = 174 kg; specific hourly electricity consumption of the PHA-ZE 100 C_e = 600 $kW \bullet h$; price P_f Jet A-1 in Thailand 0.6826 USD/kg; electricity price P in Thailand 0.1121 $USD/kW \bullet h$. Substituting these values into equation (1), we obtain $Jekta_{C208}$ = 1.8. This value is less than the value for comparison with the DHC-6 $Jekta_{DHC-6}$ = 2.6 (Table 3)). It can therefore be assumed that replacing a Cessna 208B with a PHA-ZE 100 is less profitable than replacing a DHC-6. However, in this case we are comparing aircraft of different capacities, so it is more correct to compare them according to the Jekta factor per passenger. To do this, divide the cost per hour of flight of the fossil-fuel aircraft (numerator) by the number of passengers, taking load factor into account – 8 passengers for a Cessna 208B. Then divide the energy costs per hour of flight for an electric aircraft (denominator) by the number of passengers (for the PHA-ZE 100 this is 14 passengers):

$$Jekta_p = \frac{C_f}{C_e}\frac{P_f}{P_e} = \frac{(C_f \cdot P_f)/n_{pasf}}{(C_e \cdot P_e)/n_{pase}} = Jekta\,\frac{n_{pase}}{n_{pasf}}, \qquad (3)$$

Where n_{pasf} = 8 is the number of passengers on a fossil fuel aircraft flight, for Cessna 208B = 8;

n_{pase} = 14 – number of passengers on an electric aircraft flight, for PHA-ZE 100 = 14.

Thus, $Jekta_p$ = 3.1 (Table 6). That is, per PHA-ZE 100 passenger, energy costs will be 3.1 times lower than fuel costs per Cessna 208B passenger. As a result it would be possible to reduce ticket prices on the electric aircraft, increasing the number of passengers able to afford flights, or make more profit with unchanged fares.

The calculations reveal several countries where $Jekta$ and $Jekta_p$ are unusually large: Lebanon (94.3 and 165, respectively), Syria (14 and 24.6), Iraq (15.1 and 26.4), Iran (38.8 and 67.9), Kyrgyzstan (19.6 and 34.3), Bhutan (8.9 and 15.7), Myanmar (6.8 and 11.9), Libya (46.8 and 81.8), Ghana (6.6 and 11.5), Sudan (21.1 and 36.9), Ethiopia (31.4 and 55), Zambia (6.8 and 11.9), Angola (8.3 and 14.4), Zimbabwe (37.6 and 65.8), Cuba (6.8 and 11.8), and Suriname (20.1 and 35.2).

Most of these countries are either politically unstable or far from a market economy and represent unpromising markets for electric aircraft. Excluding them from consideration, we obtain the following ranges: $Jekta$ min = 0.4; mid = 2.1, max = 11.2; $Jekta_p$ min = 0.6; mid = 3.5; max = 13.3.

Table 6 – Assessment of the prospects of the PHA-ZE 100 compared to the Cessna 208B in countries around the world ($C_f / C_e = 0.29$).

Continent	##	Country	Price of electricity	Price of Jet A-1			USD	USD	$Jekta$	USD/pas		$Jekta_p$
			USD/kWh	USD/kg	Pf/Pe	Cf/Ce	PHA-ZE 100 (1 h = 600 kW)	Cessna 208B (1 h = 174 kg)		PHA-ZE 100	Cessna 208B	
			1	1		0.290	600	174		n_{pase} =14	n_{pasf} = 8	
Europe	1	Norway	0.1331	0.6755	5.08	**1.5**	79.86	117.537	**1.5**	**5.7**	**14.7**	**2.6**
	2	Sweden	0.2871	0.6755	2.35	**0.7**	172.26	117.537	**0.7**	**12.3**	**14.7**	**1.2**
	3	Finland	0.2351	0.6755	2.87	**0.8**	141.06	117.537	**0.8**	**10.1**	**14.7**	**1.5**
	4	Iceland	0.1371	0.6755	4.93	**1.4**	82.26	117.537	**1.4**	**5.9**	**14.7**	**2.5**
	5	Ireland	0.3301	0.6755	2.05	**0.6**	198.06	117.537	**0.6**	**14.1**	**14.7**	**1.0**
	6	United Kingdom	0.4711	0.6755	1.43	**0.4**	282.66	117.537	**0.4**	**20.2**	**14.7**	**0.7**
	7	Denmark	0.5291	0.6755	1.28	**0.4**	317.46	117.537	**0.4**	**22.7**	**14.7**	**0.6**
	8	Netherlands	0.3411	0.6755	1.98	**0.6**	204.66	117.537	**0.6**	**14.6**	**14.7**	**1.0**
	9	Estonia	0.3191	0.6755	2.12	**0.6**	191.46	117.537	**0.6**	**13.7**	**14.7**	**1.1**
	10	Latvia	0.2951	0.6755	2.29	**0.7**	177.06	117.537	**0.7**	**12.6**	**14.7**	**1.2**
	11	Lithuania	0.3601	0.6755	1.88	**0.5**	216.06	117.537	**0.5**	**15.4**	**14.7**	**1.0**
	12	Belarus	0.0921	0.6755	7.33	**2.1**	55.26	117.537	**2.1**	**3.9**	**14.7**	**3.7**
	13	Germany	0.5201	0.6755	1.30	**0.4**	312.06	117.537	**0.4**	**22.3**	**14.7**	**0.7**
	14	Poland	0.1781	0.6755	3.79	**1.1**	106.86	117.537	**1.1**	**7.6**	**14.7**	**1.9**
	15	Czech Republic	0.3651	0.6755	1.85	**0.5**	219.06	117.537	**0.5**	**15.6**	**14.7**	**0.9**
	16	Austria	0.4621	0.6755	1.46	**0.4**	277.26	117.537	**0.4**	**19.8**	**14.7**	**0.7**
	17	Slovakia	0.1991	0.6755	3.39	**1.0**	119.46	117.537	**1.0**	**8.5**	**14.7**	**1.7**
	18	Hungary	0.1051	0.6755	6.43	**1.9**	63.06	117.537	**1.9**	**4.5**	**14.7**	**3.3**
	19	Romania	0.1721	0.6755	3.93	**1.1**	103.26	117.537	**1.1**	**7.4**	**14.7**	**2.0**
	20	Switzerland	0.2291	0.6755	2.95	**0.9**	137.46	117.537	**0.9**	**9.8**	**14.7**	**1.5**
	21	Liechtenstein	0.2731	0.6755	2.47	**0.7**	163.86	117.537	**0.7**	**11.7**	**14.7**	**1.3**
	22	Luxembourg	0.2391	0.6755	2.83	**0.8**	143.46	117.537	**0.8**	**10.2**	**14.7**	**1.4**
	23	Belgium	0.4441	0.6755	1.52	**0.4**	266.46	117.537	**0.4**	**19.0**	**14.7**	**0.8**
	24	France	0.2141	0.6755	3.16	**0.9**	128.46	117.537	**0.9**	**9.2**	**14.7**	**1.6**
	25	Portugal	0.2661	0.6755	2.54	**0.7**	159.66	117.537	**0.7**	**11.4**	**14.7**	**1.3**
	26	Spain	0.3661	0.6755	1.85	**0.5**	219.66	117.537	**0.5**	**15.7**	**14.7**	**0.9**

Continent	##	Country	Price of electricity	Price of Jet A-1			USD	USD	$Jekta$	USD/pas		$Jekta_p$
			USD/kWh	USD/kg	Pf/Pe	Cf/Ce	PHA-ZE 100 (1 h = 600 kW)	Cessna 208B (1 h = 174 kg)		PHA-ZE 100	Cessna 208B	
			1	1		0.290	600	174		n_{pase} =14	n_{pasf} = 8	
	27	Malta	0.1421	0.6755	4.75	**1.4**	85.26	117.537	**1.4**	**6.1**	**14.7**	**2.4**
	28	Italy	0.4611	0.6755	1.46	**0.4**	276.66	117.537	**0.4**	**19.8**	**14.7**	**0.7**
	29	Serbia	0.0921	0.6775	7.36	**2.1**	55.26	117.885	**2.1**	**3.9**	**14.7**	**3.7**
	30	Macedonia	0.1011	0.6775	6.70	**1.9**	60.66	117.885	**1.9**	**4.3**	**14.7**	**3.4**
	31	Slovenia	0.2681	0.6755	2.52	**0.7**	160.86	117.537	**0.7**	**11.5**	**14.7**	**1.3**
	32	Bosnia And Herzegovina	0.0961	0.6775	7.05	**2.0**	57.66	117.885	**2.0**	**4.1**	**14.7**	**3.6**
	33	Albania	0.1051	0.6775	6.45	**1.9**	63.06	117.885	**1.9**	**4.5**	**14.7**	**3.3**
	34	Bulgaria	0.1301	0.6755	5.19	**1.5**	78.06	117.537	**1.5**	**5.6**	**14.7**	**2.6**
	35	Greece	0.1981	0.6755	3.41	**1.0**	118.86	117.537	**1.0**	**8.5**	**14.7**	**1.7**
	36	Cyprus	0.2701	0.6826	2.53	**0.7**	162.06	118.7724	**0.7**	**11.6**	**14.8**	**1.3**
	37	Ukraine	0.0391	0.6755	17.28	**5.0**	23.46	117.537	**5.0**	**1.7**	**14.7**	**8.8**
	38	Moldova	0.1151	0.6755	5.87	**1.7**	69.06	117.537	**1.7**	**4.9**	**14.7**	**3.0**
	39	Georgia	0.0761	0.6826	8.97	**2.6**	45.66	118.7724	**2.6**	**3.3**	**14.8**	**4.6**
	40	Armenia	0.1031	0.6826	6.62	**1.9**	61.86	118.7724	**1.9**	**4.4**	**14.8**	**3.4**
	41	Azerbaijan	0.0471	0.6826	14.49	**4.2**	28.26	118.7724	**4.2**	**2.0**	**14.8**	**7.4**
Asia	1	Russia	0.0641	0.6755	10.54	**3.1**	38.46	117.537	**3.1**	**2.7**	**14.7**	**5.3**
	2	Turkey	0.0771	0.6826	8.85	**2.6**	46.26	118.7724	**2.6**	**3.3**	**14.8**	**4.5**
	3	Lebanon	0.0021	0.6826	325.1	**94.3**	1.26	118.7724	**94.3**	**0.1**	**14.8**	**165.0**
	4	Israel	0.1591	0.6826	4.29	**1.2**	95.46	118.7724	**1.2**	**6.8**	**14.8**	**2.2**
	5	Syria	0.0141	0.6826	48.41	**14.0**	8.46	118.7724	**14.0**	**0.6**	**14.8**	**24.6**
	6	Iraq	0.0131	0.6826	52.11	**15.1**	7.86	118.7724	**15.1**	**0.6**	**14.8**	**26.4**
	7	Iran	0.0051	0.6826	133.9	**38.8**	3.06	118.7724	**38.8**	**0.2**	**14.8**	**67.9**
	8	Saudi Arabia	0.0481	0.6826	14.19	**4.1**	28.86	118.7724	**4.1**	**2.1**	**14.8**	**7.2**
	9	United Arab Emirates	0.0811	0.6755	8.33	**2.4**	48.66	117.537	**2.4**	**3.5**	**14.7**	**4.2**
	10	Jordan	0.1001	0.6826	6.82	**2.0**	60.06	118.7724	**2.0**	**4.3**	**14.8**	**3.5**
	11	Qatar	0.0321	0.6826	21.26	**6.2**	19.26	118.7724	**6.2**	**1.4**	**14.8**	**10.8**
	12	Oman	0.0261	0.6826	26.15	**7.6**	15.66	118.7724	**7.6**	**1.1**	**14.8**	**13.3**

Continent	##	Country	Price of electricity	Price of Jet A-1			USD	USD	$Jekta$	USD/pas		$Jekta_p$
			USD/kWh	USD/kg	Pf/Pe	Cf/Ce	PHA-ZE 100 (1 h = 600 kW)	Cessna 208B (1 h = 174 kg)		PHA-ZE 100	Cessna 208B	
			1	1		0.290	600	174		n_{pase} =14	n_{pasf} = 8	
	13	Kuwait	0.0291	0.6826	23.46	**6.8**	17.46	118.7724	**6.8**	**1.2**	**14.8**	**11.9**
	14	Bahrain	0.0481	0.6826	14.19	**4.1**	28.86	118.7724	**4.1**	**2.1**	**14.8**	**7.2**
	15	Kazakhstan	0.0451	0.6826	15.14	**4.4**	27.06	118.7724	**4.4**	**1.9**	**14.8**	**7.7**
	16	Uzbekistan	0.0261	0.6826	26.15	**7.6**	15.66	118.7724	**7.6**	**1.1**	**14.8**	**13.3**
	17	Kyrgyzstan	0.0101	0.6826	67.58	**19.6**	6.06	118.7724	**19.6**	**0.4**	**14.8**	**34.3**
	18	Afghanistan	0.0421	0.6826	16.21	**4.7**	25.26	118.7724	**4.7**	**1.8**	**14.8**	**8.2**
	19	Pakistan	0.0371	0.6826	18.40	**5.3**	22.26	118.7724	**5.3**	**1.6**	**14.8**	**9.3**
	20	India	0.0731	0.6826	9.34	**2.7**	43.86	118.7724	**2.7**	**3.1**	**14.8**	**4.7**
	21	Bangladesh	0.0541	0.6826	12.62	**3.7**	32.46	118.7724	**3.7**	**2.3**	**14.8**	**6.4**
	22	Sri Lanka	0.0411	0.6826	16.61	**4.8**	24.66	118.77	**4.8**	**1.8**	**14.8**	**8.4**
	23	Maldives	0.1431	0.6826	4.77	**1.4**	85.86	118.77	**1.4**	**6.1**	**14.8**	**2.4**
	24	China	0.0791	0.6826	8.63	**2.5**	47.46	118.77	**2.5**	**3.4**	**14.8**	**4.4**
	25	Taiwan	0.0921	0.6826	7.41	**2.1**	55.26	118.77	**2.1**	**3.9**	**14.8**	**3.8**
	26	Hong Kong	0.1631	0.6826	4.19	**1.2**	97.86	118.77	**1.2**	**7.0**	**14.8**	**2.1**
	27	Macao	0.1511	0.6826	4.52	**1.3**	90.66	118.77	**1.3**	**6.5**	**14.8**	**2.3**
	28	Nepal	0.0441	0.6826	15.48	**4.5**	26.46	118.77	**4.5**	**1.9**	**14.8**	**7.9**
	29	Bhutan	0.0151	0.6826	45.21	**13.1**	9.06	81.07	**8.9**	**0.6**	**10.1**	**15.7**
	30	Myanmar	0.0291	0.6826	23.46	**6.8**	17.46	118.77	**6.8**	**1.2**	**14.8**	**11.9**
	31	Laos	0.0351	0.6826	19.45	**5.6**	21.06	118.77	**5.6**	**1.5**	**14.8**	**9.9**
	32	Thailand	0.1121	0.6826	6.09	**1.8**	67.26	118.77	**1.8**	**4.8**	**14.8**	**3.09**
	33	Vietnam	0.0791	0.6826	8.63	**2.5**	47.46	118.77	**2.5**	**3.4**	**14.8**	**4.4**
	34	Cambodia	0.1501	0.6826	4.55	**1.3**	90.06	118.77	**1.3**	**6.4**	**14.8**	**2.3**
	35	Malaysia	0.0491	0.6826	13.90	**4.0**	29.46	118.77	**4.0**	**2.1**	**14.8**	**7.1**
	36	Singapore	0.2221	0.6826	3.07	**0.9**	133.26	118.77	**0.9**	**9.5**	**14.8**	**1.6**
	37	Indonesia	0.0951	0.6826	7.18	**2.1**	57.06	118.77	**2.1**	**4.1**	**14.8**	**3.6**
	38	Philippines	0.1841	0.6826	3.71	**1.1**	110.46	118.77	**1.1**	**7.9**	**14.8**	**1.9**
	39	South Korea	0.0931	0.6826	7.33	**2.1**	55.86	118.77	**2.1**	**4.0**	**14.8**	**3.7**

Continent	##	Country	Price of electricity	Price of Jet A-1			USD	USD	$Jekta$	USD/pas		$Jekta_p$
			USD/kWh	USD/kg	Pf/Pe	Cf/Ce	PHA-ZE 100 (1 h = 600 kW)	Cessna 208B (1 h = 174 kg)		PHA-ZE 100	Cessna 208B	
			1	1		0.290	600	174		n_{pase} =14	n_{pasf} = 8	
	40	Japan	0.2461	0.6826	2.77	**0.8**	147.66	118.77	**0.8**	**10.5**	**14.8**	**1.4**
Africa	1	Egypt	0.0271	0.6612	24.40	**7.1**	16.26	115.05	**7.1**	**1.2**	**14.4**	**12.4**
	2	Libya	0.0041	0.6612	161.3	**46.8**	2.46	115.05	**46.8**	**0.2**	**14.4**	**81.8**
	3	Tunisia	0.0671	0.6612	9.85	**2.9**	40.26	115.05	**2.9**	**2.9**	**14.4**	**5.0**
	4	Algeria	0.0391	0.6612	16.91	**4.9**	23.46	115.05	**4.9**	**1.7**	**14.4**	**8.6**
	5	Morocco	0.1131	0.6612	5.85	**1.7**	67.86	115.05	**1.7**	**4.8**	**14.4**	**3.0**
	6	Mauritius	0.1311	0.6612	5.04	**1.5**	78.66	115.05	**1.5**	**5.6**	**14.4**	**2.6**
	7	Cape Verde	0.3041	0.6612	2.17	**0.6**	182.46	115.05	**0.6**	**13.0**	**14.4**	**1.1**
	8	Mali	0.2121	0.6612	3.12	**0.9**	127.26	115.05	**0.9**	**9.1**	**14.4**	**1.6**
	9	Senegal	0.1671	0.6612	3.96	**1.1**	100.26	115.05	**1.1**	**7.2**	**14.4**	**2.0**
	10	Sierra Leone	0.0821	0.6612	8.05	**2.3**	49.26	115.05	**2.3**	**3.5**	**14.4**	**4.1**
	11	Ivory Coast	0.1171	0.6612	5.65	**1.6**	70.26	115.05	**1.6**	**5.0**	**14.4**	**2.9**
	12	Burkina Faso	0.2001	0.6612	3.30	**1.0**	120.06	115.05	**1.0**	**8.6**	**14.4**	**1.7**
	13	Ghana	0.0291	0.6612	22.72	**6.6**	17.46	115.05	**6.6**	**1.2**	**14.4**	**11.5**
	14	Togo	0.1871	0.6612	3.53	**1.0**	112.26	115.05	**1.0**	**8.0**	**14.4**	**1.8**
	15	Nigeria	0.0491	0.6612	13.47	**3.9**	29.46	115.05	**3.9**	**2.1**	**14.4**	**6.8**
	16	Cameroon	0.0811	0.6612	8.15	**2.4**	48.66	115.05	**2.4**	**3.5**	**14.4**	**4.1**
	17	Gabon	0.1991	0.6612	3.32	**1.0**	119.46	115.05	**1.0**	**8.5**	**14.4**	**1.7**
	18	Sudan	0.0091	0.6612	72.66	**21.1**	5.46	115.05	**21.1**	**0.4**	**14.4**	**36.9**
	19	Ethiopia	0.0061	0.6612	108.4	**31.4**	3.66	115.05	**31.4**	**0.3**	**14.4**	**55.0**
	20	Uganda	0.1631	0.6612	4.05	**1.2**	97.86	115.05	**1.2**	**7.0**	**14.4**	**2.1**
	21	Rwanda	0.2361	0.6612	2.80	**0.8**	141.66	115.05	**0.8**	**10.1**	**14.4**	**1.4**
	22	Democratic Republic Of The Congo	0.0811	0.6612	8.15	**2.4**	48.66	115.05	**2.4**	**3.5**	**14.4**	**4.1**
	23	Kenya	0.1721	0.6612	3.84	**1.1**	103.26	115.05	**1.1**	**7.4**	**14.4**	**1.9**
	24	Tanzania	0.0981	0.6612	6.74	**2.0**	58.86	115.05	**2.0**	**4.2**	**14.4**	**3.4**
	25	Malawi	0.1091	0.6612	6.06	**1.8**	65.46	115.05	**1.8**	**4.7**	**14.4**	**3.1**
	26	Zambia	0.0281	0.6612	23.53	**6.8**	16.86	115.05	**6.8**	**1.2**	**14.4**	**11.9**

Continent	##	Country	Price of electricity	Price of Jet A-1			USD	USD	$Jekta$	USD/pas		$Jekta_p$
			USD/kWh	USD/kg	Pf/Pe	Cf/Ce	PHA-ZE 100 (1 h = 600 kW)	Cessna 208B (1 h = 174 kg)		PHA-ZE 100	Cessna 208B	
			1	1		0.290	600	174		n_{pase} =14	n_{pasf} = 8	
	27	Angola	0.0231	0.6612	28.62	**8.3**	13.86	115.05	**8.3**	**1.0**	**14.4**	**14.5**
	28	Zimbabwe	0.0051	0.6612	129.7	**37.6**	3.06	115.05	**37.6**	**0.2**	**14.4**	**65.8**
	29	Mozambique	0.1271	0.6612	5.20	**1.5**	76.26	115.05	**1.5**	**5.4**	**14.4**	**2.6**
	30	Namibia	0.1351	0.6612	4.89	**1.4**	81.06	115.05	**1.4**	**5.8**	**14.4**	**2.5**
	31	Botswana	0.0951	0.6612	6.95	**2.0**	57.06	115.05	**2.0**	**4.1**	**14.4**	**3.5**
	32	Swaziland	0.0951	0.6612	6.95	**2.0**	57.06	115.05	**2.0**	**4.1**	**14.4**	**3.5**
	33	Lesotho	0.0921	0.6612	7.18	**2.1**	55.26	115.05	**2.1**	**3.9**	**14.4**	**3.6**
	34	South Africa	0.1511	0.6612	4.38	**1.3**	90.66	115.05	**1.3**	**6.5**	**14.4**	**2.2**
	35	Madagascar	0.1361	0.6612	4.86	**1.4**	81.66	115.05	**1.4**	**5.8**	**14.4**	**2.5**
North America	1	Canada	0.1121	0.6976	6.22	**1.8**	67.26	121.38	**1.8**	**4.8**	**15.2**	**3.2**
	2	USA	0.1751	0.6976	3.98	**1.2**	105.06	121.38	**1.2**	**7.5**	**15.2**	**2.0**
South America	1	Mexico	0.0971	0.7015	7.22	**2.1**	58.26	122.06	**2.1**	**4.2**	**15.3**	**3.7**
	2	Bahamas	0.2621	0.7015	2.68	**0.8**	157.26	122.06	**0.8**	**11.2**	**15.3**	**1.4**
	3	Cuba	0.0301	0.7015	23.31	**6.8**	18.06	122.06	**6.8**	**1.3**	**15.3**	**11.8**
	4	Dominican Republic	0.1231	0.7015	5.70	**1.7**	73.86	122.06	**1.7**	**5.3**	**15.3**	**2.9**
	5	Jamaica	0.3301	0.7015	2.13	**0.6**	198.06	122.06	**0.6**	**14.1**	**15.3**	**1.1**
	6	Guatemala	0.2711	0.7015	2.59	**0.8**	162.66	122.06	**0.8**	**11.6**	**15.3**	**1.3**
	7	Belize	0.2171	0.7015	3.23	**0.9**	130.26	122.06	**0.9**	**9.3**	**15.3**	**1.6**
	8	El Salvador	0.2441	0.7015	2.87	**0.8**	146.46	122.06	**0.8**	**10.5**	**15.3**	**1.5**
	9	Honduras	0.2311	0.7015	3.04	**0.9**	138.66	122.06	**0.9**	**9.9**	**15.3**	**1.5**
	10	Nicaragua	0.1731	0.7015	4.05	**1.2**	103.86	122.06	**1.2**	**7.4**	**15.3**	**2.1**
	11	Costa Rica	0.1551	0.7015	4.52	**1.3**	93.06	122.06	**1.3**	**6.6**	**15.3**	**2.3**
	12	Panama	0.1761	0.7015	3.98	**1.2**	105.66	122.06	**1.2**	**7.5**	**15.3**	**2.0**
	13	Aruba	0.1851	0.7015	3.79	**1.1**	111.06	122.06	**1.1**	**7.9**	**15.3**	**1.9**
	14	Barbados	0.3301	0.7015	2.13	**0.6**	26.36	82.45	**3.1**	**1.9**	**10.3**	**5.5**
	15	Bermuda	0.3951	0.7015	1.78	**0.5**	68.06	82.45	**1.2**	**4.9**	**10.3**	**2.1**
	16	Trinidad And Tobago	0.0521	0.7015	13.46	**3.9**	7.35	82.45	**11.2**	**0.5**	**10.3**	**19.6**

Continent	##	Country	Price of electricity	Price of Jet A-1			USD	USD	$Jekta$	USD/pas		$Jekta_p$
			USD/kWh	USD/kg	Pf/Pe	Cf/Ce	PHA-ZE 100 (1 h = 600 kW)	Cessna 208B (1 h = 174 kg)		PHA-ZE 100	Cessna 208B	
			1	1		0.290	600	174		n_{pase} =14	n_{pasf} = 8	
	17	Cayman Islands	0.3661	0.7015	1.92	**0.6**	30.12	82.45	**2.7**	**2.2**	**10.3**	**4.8**
	18	Venezuela	0.1731	0.7015	4.05	**1.2**	103.86	122.06	**1.2**	**7.4**	**15.3**	**2.1**
	19	Colombia	0.1371	0.7015	5.12	**1.5**	82.26	122.06	**1.5**	**5.9**	**15.3**	**2.6**
	20	Ecuador	0.0961	0.7015	7.30	**2.1**	57.66	122.06	**2.1**	**4.1**	**15.3**	**3.7**
	21	Suriname	0.0101	0.7015	69.46	**20.1**	6.06	122.06	**20.1**	**0.4**	**15.3**	**35.2**
	22	Brazil	0.1971	0.7015	3.56	**1.0**	118.26	122.06	**1.0**	**8.4**	**15.3**	**1.8**
	23	Peru	0.2251	0.7015	3.12	**0.9**	135.06	122.06	**0.9**	**9.6**	**15.3**	**1.6**
	24	Chile	0.1731	0.7015	4.05	**1.2**	103.86	122.06	**1.2**	**7.4**	**15.3**	**2.1**
	25	Paraguay	0.0551	0.7015	12.73	**3.7**	33.06	122.06	**3.7**	**2.4**	**15.3**	**6.5**
	26	Uruguay	0.2431	0.7015	2.89	**0.8**	145.86	122.06	**0.8**	**10.4**	**15.3**	**1.5**
	27	Argentina	0.0331	0.7015	21.19	**6.1**	19.86	122.06	**6.1**	**1.4**	**15.3**	**10.8**
Australia and Oceania	1	Australia	0.2151	0.6826	3.17	**0.9**	129.06	118.77	**0.9**	**9.2**	**14.8**	**1.6**
	2	New Zealand	0.1881	0.6826	3.63	**1.1**	112.86	118.77	**1.1**	**8.1**	**14.8**	**1.8**

Two groups of countries are highlighted in Table 6. The orange shading denotes countries with low $Jekta$ Factors, where electric aircraft have limited commercial feasibility ($Jekta_p$); blue shading indicates countries where, despite high $Jekta$ Factors, the development of an electric aircraft market is unlikely because of instability or poor market conditions.

In conclusion, it is informative to calculate the *Jekta* Factor for a 30-minute flight of a hypothetical electric multicopter in comparison with a similar flight of a Robinson R66 turboshaft helicopter, in Norway and the UAE (Table 7).

The R66's hourly Jet A-1 consumption is 87 litres [3], corresponding to 35kg per half hour. The helicopter is designed to carry four passengers. Assuming a two-seat multicopter consumes 250 kWh of electricity during a 30-minute flight, we arrive at $Jekta$ values of 0.7 and 1.16, respectively. Considering Jet A-1 and electricity prices in Norway and the UAE, the $Jekta_p$ Factor is equal to 0.36 and 0.58, respectively. In this case, the larger capacity of the helicopter reduces the chances of the multicopter's success in competition with the helicopter.

Recognizing the positive attitudes of the governments of Norway and the UAE towards electric aircraft, the multicopter nonetheless has prospects in both countries, but is likely to gain greater traction in the UAE.

Table 7 – Preliminary assessment of the prospects of a multicopter in Norway and the UAE in comparison with the R66

Market	C_f [3]	C_e [4]	P_f	P_e	$Jekta$	$Jekta_p$
	kg	kWh	USD/kg [	USD/kWh		
Norway	35	250	0.6755	0.1331	0.7	0.36
UAE	35	250	0.6755	0.0811	1.16	0.58

The prices for electricity given in [2] represent the average values of the cost of electricity generated by different means, including thermal, nuclear, hydroelectric, solar, diesel generator and wind. The $Jekta$ Factor may therefore be refined by examining individual use cases, including the use of autonomous solar stations for battery charging. An Austrian supplier of floating offshore solar powerplants for example, claims that the cost of electricity thus generated is half the average cost of electricity in the Republic of the Maldives. Using such stations would increase the $Jekta$ Factor in the Maldives from 2.1 to 4.2. Conversely, in countries at high latitudes the cost of solar electricity may be higher than the national average. In this case, the $Jekta$ Factor is adjusted downward. In all cases, the values given in Tables 2 to 5 allow a focus on potentially promising countries without resorting to expensive marketing research or the development of detailed business plans.

Note: The $Jekta$ and $Jekta_p$ Factors are intended to provide a preliminary assessment of electric aircraft market prospects. No categorical conclusions should be made based on the results of using these formulae.

Sources

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All PHA-ZE 100 data is preliminary and subject to change