

THE PROBLEM: WE HAVE NOT COMMITTED YET THE NECESSARY 100 BILLION US\$ / YEAR TO SOLVE THE CLIMATE CHANGE CRISIS

EXECUTIVE SUMMARY OF THE INNOVATION MODEL

We have a problem named antropogenic climate change and we need to solve it, fast. The underlying economic problem is who has to pay for the required investment necessary in GHG emissions reductions projects in order to avoid catastrophic temperature increases over 2°C. Such investment has been targeted in **100 billion US\$, per year in contributions to the Green Climate Fund (GCF)** - see Table 1-. This Excel attempts to increase open-mindedness in the negotiating process between countries.

The **investment effort contribution to GCF has been distributed among countries** considering **historical CO₂ emissions** to the atmosphere - Table 5 -, but also **current levels of economic development** (a US\$/capita threshold of GDP-PPP is established - Table 4-, equivalent to world median average). Average results by type of country are shown on Table 2.

The innovation model is based on the concept that countries' effort contribution to the GCF could be transformed into an export opportunity. In this sense **amounts contributed by the donor country could be returned to such country through contracts for its companies**, in a growing percentage (i.e: if a country has a 1 billion US\$ contribution target, reaching 90% of such target would result in 900 million US\$ in contracts for the companies in such country who would export projects abroad).

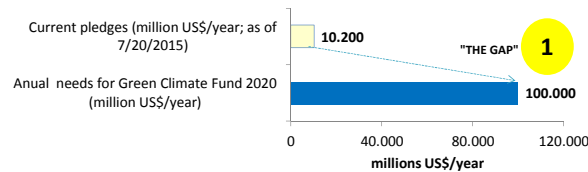
the problem	the underlying truths & perceptions	the analysis	the data	the innovation	the innovation jumps: <i>what is this ?</i>	imagine the outcome	the pitch
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We need to invest globally 100 billion US\$ / year as soon as possible to obtain significant worldwide greenhouse gas emission reductions and avoid severe climate change impacts. Such investment would be managed through the named "Green Climate Fund".

TABLE 1

Annual needs for Green Climate Fund 2020 (million US\$/year)	100.000	United Nations Cancun Climate Change Conference, 2010.
Current pledges (million US\$/year; as of 7/20/2015)	10.200	Pledges are included as capital, grants, loans and other instruments. This model does not differentiate between such instrum



the underlying truths & perceptions

- 1) No country wants to put lots of money upfront and "damage" its economy
- 2) No country wants to make a move unless their direct competitors do so (only a few leading countries have moved so far)
- 3) Citizens want to solve the climate change problem, preferably without altering or diminishing their quality of life
- 4) Citizens are worried about climate change, but they are not fearful (yet)
- 5) The fossil fuel lobbies have a 1.9 trillion dollar revenue business
- 6) The clean energy sector is already strong, with world annual investments of 0.3 trillion dollars (IEA; Energy Investment Outlook 2014)
- 7) External energy independence has proven to be a great way to avoid armed conflict and increase economical strength

"I feel **frustrated** when I think there's **nothing we can do about this** (do you feel like this?)



the analysis

"I feel great to understand these four types of countries" (do you feel like this?)

TABLE 2

	Population (million)	Population (%)	"Long term Emissions" 1850-2012 (Mt-CO2) (excluding Land Use Change and Forestry - LUCF)	% / total	"Short term Emissions" 1990-2012 (Mt-CO2e) (Including LUCF)	% / total	CONTRIBUTION SPLIT ACCORDING TO LONG TERM CO2 EMISSIONS (1850-2012)		CONTRIBUTION SPLIT ACCORDING TO DIRECT + LAND USE CHANGE AND FORESTRY - LUCF - CO2 EMISSIONS (1990-2012)		REFERENCE VALUE FOR FINANCIAL EFFORT			
							Annual input to GCF (M\$/year)	% of GCF goal	Annual input to GCF (M\$/year)	% of GCF goal	Average expense on tobacco cigarettes (\$/capita-year)	Estimation of average healthcare & productivity costs on tobacco (\$/capita-year)		
emissions + over economic development threshold	3.094	44%	1.109.685	84%	587.834	69%	91.572	92%	29,6	88.558	89%	28,6	235	687
"Volcanoes": Countries with high emissions + under economic development threshold	1.559	22%	80.969	6%	90.352	11%	0	0%	0,0	0	0%	0,0	25	n/e
"Firecrackers": Countries with low emissions + over development threshold	579	8%	102.138	8%	75.950	9%	8.428	8%	14,6	11.442	11%	19,8	152	445
"Bonfires": Countries with low emissions + under development threshold	1.746	25%	33.782	3%	98.173	12%	0	0%	0,0	0	0%	0,0	21	n/e
Total	6.978	100%	1.326.575	100%	852.308	100%	100.000	100%	14,3	100.000	100%	14,3	127	649

emissions + over economic development threshold Key countries are those which in sum have contributed to 90% of accrued direct CO2 emissions and 75% of total emissions (with LUCF)

"Volcanoes": Countries high emissions + under economic development threshold Countries with high CO2 emissions (>90%; > 75%) but economically under economic threshold

"Firecrackers": Countries low emissions + over development threshold Countries with low historical CO2 emissions and over economic threshold

"Bonfires": Countries low emissions + under development threshold Countries with low historical CO2 emissions and also under developed economically (in many cases also LDC)

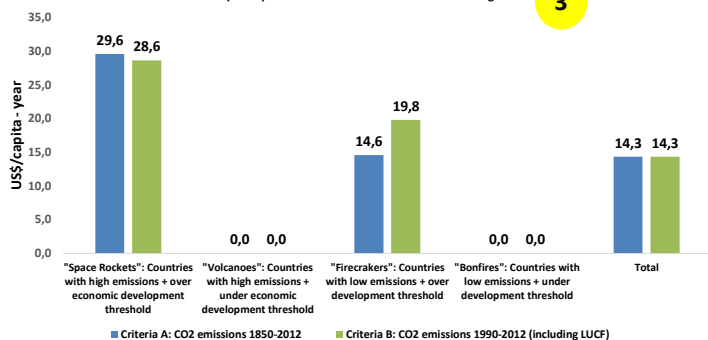
TABLE 4

	10%	50%	90%
n/e: not estimated threshold in GDP-PPP (US\$ / capita-	1.601	10.273	41.219

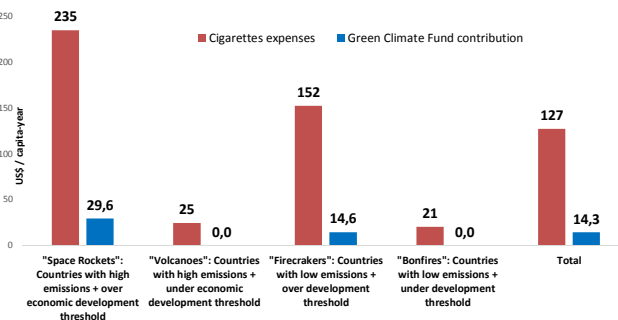
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Annual per-capita investment to solve the Climate Change crisis

3



Annual expenses on cigarettes relative to climate change fund investment effort



the innovation model

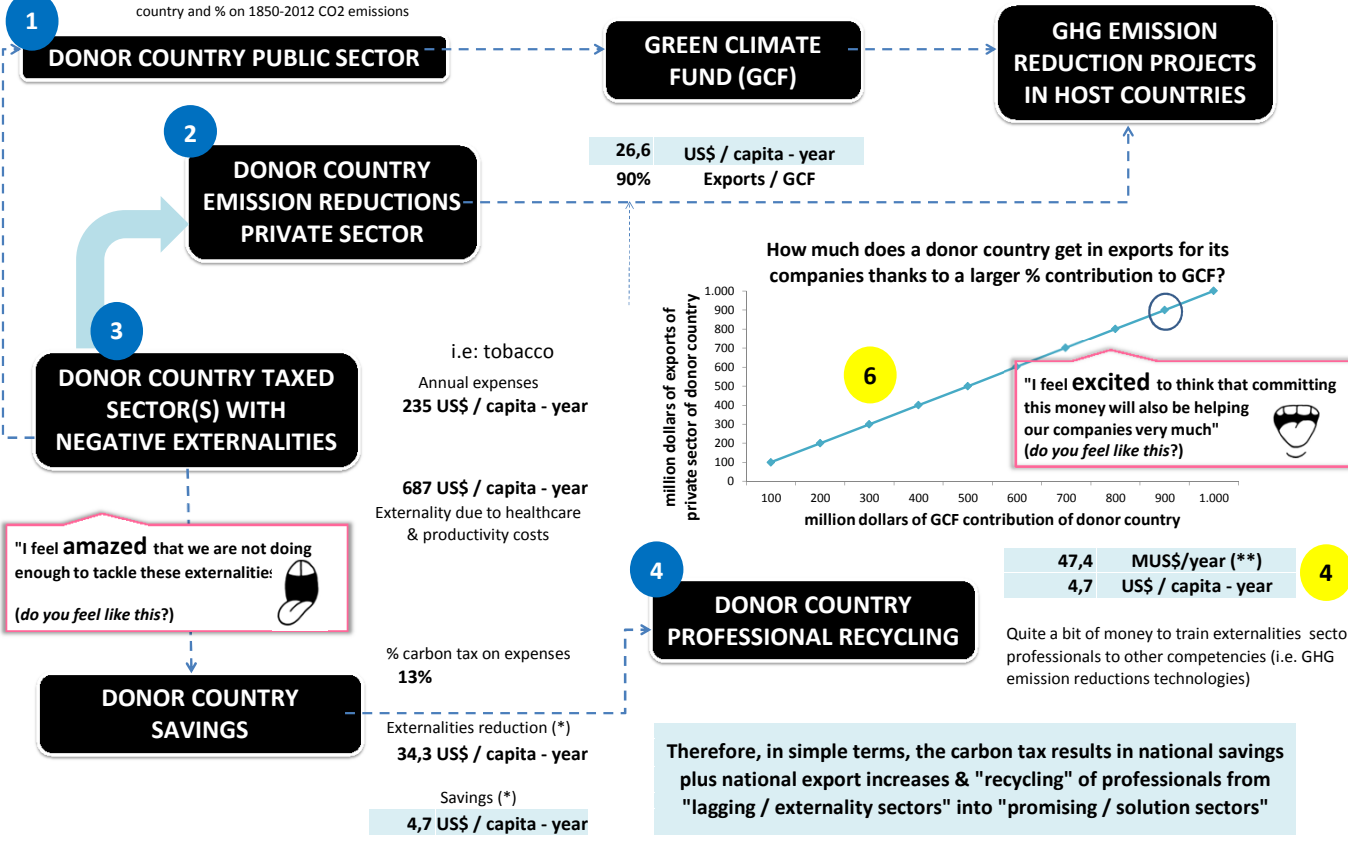
- 1 Agree on a carbon tax to all donor countries over an economic development threshold
- 2 Allow for donor country private exports for emission reduction projects as a % of contribution to Green Climate Fund
- 3 Certain sector(s) in donor country are taxed, mostly those that have strong negative externalities (i.e. fossil fuels, tobacco)
- 4 Donor country net savings used to develop recycle "externalities sectors professionals" to "low carbon sector"

10.273 US\$ GDP-PPP

Economic threshold under which a country does not contribute to GCF (until it surpasses it). Value fixed equivalent to world median average.

29,6 US\$ / capita - year

Carbon tax average value depending on the country and % on 1850-2012 CO2 emissions



i.e: tobacco
Annual expenses
235 US\$ / capita - year

687 US\$ / capita - year
Externality due to healthcare & productivity costs

"I feel **amazed** that we are not doing enough to tackle these externalities: (do you feel like this?)

% carbon tax on expenses
13%
Externalities reduction (*)
34,3 US\$ / capita - year
Savings (*)
4,7 US\$ / capita - year

"I feel **excited** to think that committing this money will also be helping our companies very much" (do you feel like this?)

(*) According to US Center for Disease Control, a 10% increase in tobacco price can decrease demand by 5%. Therefore, with 13% tax increase, demand and corresponding externalities would be reduced by 5%. An externality reduction of 5% would result in 4,7 US\$/capita-year savings. (**) Assuming a 10 million population

the innovation jumps: what is this?

Basically and in simple terms, when we think, we move our mind from concept a) to concept b), and so construct ideas. To move from one concept to another we use (consciously or unconsciously) what we call **creativity principles**.

You will find that such principles are extremely easy to understand, but take into account that "having them in mind when you are thinking" is the key for real creative empowerment.

	Starting concept	End concept	Creativity principle applied	Explanation of creativity principle
1	There is no money to invest in climate change solutions	We have to obtain money from other sources	actions ±	Increase or reduce the action you are doing for a different result. In this case, increase the number of funding sources.
2	We can use the tax opportunity to redirect money to a good strategic purpose	We can enable national exports of products & services related to clean energy	blessing in disguise	Use a problem (i.e. sun with excessive heat) for generating an opportunity (i.e. solar power).
3	Investment effort must take into account historical GHG emissions	The carbon tax has to be adjusted for each country's particular contribution to the problem	dynamics	Adapting something from the draft solution.
4	It is key not to generate unemployment due to externality sectors	Workers in such sectors should be professionally recycled to other sectors	use and reuse	Use the ice-cream cone to contain the icecream, but also to eat it.
5	Under-developed countries do not have the financial resources to tackle this problem	An economical GDP cut-off limit must be established in order to avoid this difficulty	parameter change	Change a parameter so that such change implies a different result.
6	Even though with export incentives, countries might still want to pledge for small amounts	An increasing factor exports / investment contribution is established to avoid countries being disengaged with investing in the Green Climate Fund in large amounts	preliminary anti-action	Do something in advance, before the action you foresee takes place.

imagine the outcome

Friday morning. United Nations debriefing session.
February 24th, 2020. Bonn (Germany)

"I feel good
to think that
we did what we
had to do"



(do you feel like
this?)

170 countries (92%) have committed to 170 billion US\$ / year in climate change.
This is therefore 70% over the initial target of 100 billion.

Exports on clean energy technology are soaring.
Renewable energy, energy storage and electric vehicles are the leading ones.
The world is more global than ever.

15 lagging countries have not yet committed and are facing severe political expenses.
The exports from their companies cleantech sectors are also in serious decline.

Global emission reductions are on track to massive cuts.
A new 2030 investment goal is being discussed: 500 billion US\$ / year investment.



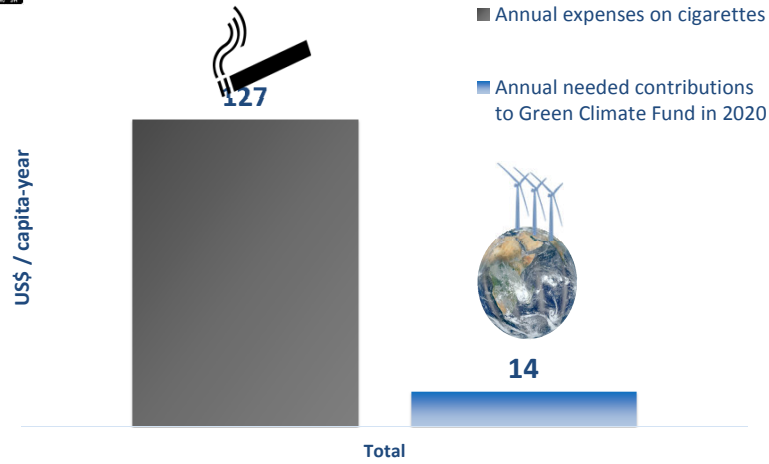
Image: NASA & United Nations

the pitch

If you want to explain or sell this innovation model, you have to use a simple pitch to do so. Once you make the key point, then go into details.



Do you think we have the money for solving climate change?



Images: Gerald Clier/freerectimages

(Full free spreadsheet with results on www.rootgood.com)

COMMENTS

Furthermore, it contains hypothesis that can be altered according to multiple considerations. It has only been elaborated for illustrative purposes on simple mechanisms to reach the 100 billion contribution goal in 2020. Thus, this is a "starting point" document, and not a conclusive one. Even more, certain countries appear with no financial contributions and could eventually have such. Furthermore, commitments can be variable over time depending on GDP / capita evolution.

Several additional calculations have not been taken into account, for simplicity purposes (i.e. macroeconomic effects -direct, indirect & induced - impacts).

No technical, economical or legal feasibility has been carried out.

This document cannot be considered as technical, economical or legal assessment.

DATA
TABLE 5

CRITERIA	A				B				C				A+C		B+C		A+C		B+C		REFERENCE DATA				
	Country	"Long term Emissions" 1850-2012 (Mt-CO ₂) (excluding Land Use Change and Forestry -LUCF)	% / total	% accrued	"Short term Emissions" 1990-2012 (Mt-CO ₂ e) (including LUCF)	% / total	% accrued	Population (2012) (million)	GDP-PPP (billions 2011 Int\$)	GDP-PPP (\$/capita)	Under GDP-PPP threshold (\$/capita)	Least Developed Country	Human Development Index (HDI)	"Contribution index with direct historical Emissions and GDP-PPP threshold"	"Contribution index with total Emissions (including LUCF) and GDP-PPP threshold"	Annual input to GCF (M\$/year)	Annual input to GCF (\$/capita-year)	Annual input to GCF (M\$/year)	Annual input to GCF (\$/capita-year)	Exports for donor country companies with 90% contribution reached (M\$/year)	Exports for donor country companies with 90% contribution reached (M\$/year)	Cigarette per capita consumption (cigarettes / capita - year)	Cigarette pack price (US\$/cigarette)	Cigarette consumption (US\$/capita - year)	Cigarette expense (MU\$/year)
United States of America	366.421	27.6%	27.6%	141.274	16.6%	16.6%	313.9	15,877.508	50,586	NO	NO	Very High	27,622%	16,575%	30,237	96.3	21,283	67.8	30,237	21,283	1,028	6.36	327	102.607	300.000
China	150.109	11.3%	38.9%	133.621	15.7%	32.3%	1,350.7	14,528.694	10,756	NO	NO	High	11,315%	15,678%	12,387	9.2	20,130	14.9	12,387	20,130	1,711	2.25	192	259.992	760.162
Russian Federation	102.709	7.7%	46.7%	47.296	5.5%	37.8%	143.2	3,337.450	23,310	NO	NO	High	7,742%	5,549%	8,476	59.2	7,125	49.8	8,476	7,125	2,786	1.74	242	34.704	101.467
Germany	84.864	6.4%	53.1%	21.375	2.5%	40.3%	80.4	3,454.995	42,959	NO	NO	Very High	6,397%	2,508%	7,003	87.1	3,220	40.0	7,003	3,220	1,045	6.86	358	28.827	84.285
United Kingdom	70.473	5.3%	58.4%	14.905	1.7%	42.1%	63.7	2,327.314	36,535	NO	NO	Very High	5,312%	1,749%	5,815	91.3	2,246	35.3	5,815	2,246	750	10.99	412	26.252	76.577
Japan	51.005	3.8%	62.2%	27.235	3.2%	45.3%	127.6	4,463.071	34,988	NO	NO	Very High	3,845%	3,195%	4,209	33.0	4,103	32.2	4,209	4,103	1,841	5.34	492	62.702	183.929
India	37.976	2.9%	65.1%	42.144	4.9%	50.2%	1,236.7	6,142.389	4,967	YES	NO	Medium	0.000%	0.000%	0	0	0	0	0	0	96	2.03	10	12.050	
France	34.457	2.6%	67.7%	10.739	1.3%	51.5%	65.6	2,447.094	37,275	NO	NO	Very High	2,597%	1,260%	2,843	43.3	1,618	24.6	2,843	1,618	854	8.31	355	23.295	68.109
Canada	28.317	2.1%	69.8%	18.133	2.1%	53.6%	34.8	1,443.732	41,544	NO	NO	Very High	2,135%	2,127%	2,337	78.6	2,732	78.6	2,337	2,732	809	10.51	425	14.774	43.197
Ukraine	26.879	2.0%	71.9%	8.835	1.0%	54.6%	45.6	379.898	8,332	YES	NO	High	0.000%	0.000%	0	0	0	0	0	0	2,401	1.26	151	6.897	
Poland	24.317	1.8%	73.7%	8.030	0.9%	55.6%	38.5	865.056	22,448	NO	NO	Very High	1,833%	0.942%	2,007	52.1	1,210	31.4	2,007	1,210	1,586	3.93	312	12.010	35.114
Italy	21.453	1.6%	75.3%	11.155	1.3%	56.9%	59.5	2,083.456	34,993	NO	NO	Very High	1,617%	1,309%	1,770	29.7	1,681	28.2	1,770	1,681	1,475	6.48	478	28.454	83.194
Mexico	14.983	1.1%	76.4%	14.185	1.7%	58.5%	120.8	1,971.788	16,316	NO	NO	High	1,129%	1,664%	1,236	10.2	2,137	17.7	1,236	2,137	371	2.5	46	5.604	16.386
Australia	14.880	1.1%	77.6%	13.352	1.6%	60.1%	22.7	966.444	42,522	NO	NO	Very High	1,122%	1,567%	1,228	54.0	2,011	28.5	1,228	2,011	1,034	12.14	628	14.265	41.708
South Africa	14.865	1.1%	78.7%	8.859	1.0%	61.1%	52.3	647.704	12,575	NO	NO	Medium	1,121%	1,039%	1,227	23.4	1,335	25.5	1,227	1,335	459	4.14	95	4.973	14.540
Korea, Rep. (South)	13.226	1.0%	79.7%	10.933	1.3%	62.4%	50.0	1,595.195	31,901	NO	NO	Very High	0.997%	1,283%	1,091	21.8	1,647	32.9	1,091	1,647	1,958	2.24	219	10.966	32.062
Spain	12.463	0.9%	80.6%	7.562	0.9%	63.3%	46.8	1,495.368	31,971	NO	NO	Very High	0.939%	0,887%	1,028	22.0	1,139	24.9	1,028	1,139	1,757	5.99	526	24.613	71.963
Iran	12.383	0.9%	81.5%	11.312	1.3%	64.6%	76.4	1,240.638	16,234	NO	NO	High	0.933%	1,327%	1,022	13.4	1,704	22.3	1,022	1,704	657	2.03	67	5.096	14.901
Brazil	11.775	0.9%	82.4%	40.610	4.8%	69.4%	198.7	2,845.377	14,233	NO	NO	High	0.888%	4,765%	9,722	4.9	6,118	20.8	972	6,118	504	2.73	69	13.667	39.959
Kazakhstan	11.681	0.9%	83.3%	4.393	0.5%	78.7%	29.8	361.111	21,506	YES	NO	Medium	0.000%	0.000%	0	0	0	0	0	0	449	1.2	27	8.02	
Venezuela	11.502	0.9%	84.2%	7.808	0.9%	79.6%	310.0	528.476	17,642	NO	NO	High	0.448%	0.403%	483	16.1	1,176	39.3	483	1,176	496	4.66	116	3,462	10.122
Belgium	5.347	0.4%	89.8%	6.352	0.7%	80.2%	66.6	917.374	13,736	NO	NO	High	0.388%	0.745%	425	6.4	957	14.2	425	957	560	2.56	72	4.787	13.997
Czech Republic	4.923	0.4%	90.5%	1.634	0.2%	80.5%	9.5	160.007	16,907	NO	NO	High	0.371%	0.192%	406	42.9	246	26.0	406	246	2,266	1.49	169	1.598	4.671
Netherlands	4.891	0.4%	90.9%	1.657	0.2%	80.7%	8.4	372.739	44,216	NO	NO	Very High	0.369%	0.194%	404	24.9	250	29.6	404	250	1,650	6.12	512	4.312	12.607
Sweden	4.584	0.3%	91.2%	1.311	0.2%	80.9%	9.5	411.835	43,263	NO	NO	Very High	0.346%	0.154%	378	39.7	197	20.7	378	197	715	7.74	277	2.634	7.701
Egypt	4.576	0.3%	91.6%	4.465	0.5%	81.4%	80.7	862.628	10,686	NO	NO	Medium	0.345%	0.524%	378	4.7	673	8.3	378	673	1,104	1.69	93	7.530	22.017
Hungary	4.512	0.3%	91.9%	1.774	0.2%	81.6%	9.9	221.822	22,306	NO	NO	Very High	0.340%	0.208%	372	37.5	267	26.9	372	267	1,518	3.56	270	2.681	7.837
Korea, Dem. Rep. (North)	4.354	0.3%	92.3%	2.626	0.3%	81.9%	24.8		1,800	YES	NO	NO	0.000%	0.000%	0	0	0	0	0	0	0	0	0		
Malaysia	3.805	0.3%	92.5%	3.980	0.5%	82.4%	29.2	640.946	21,920	NO	NO	High	0.287%	0.467%	314	10.7	600	20.5	314	600	539	3.3	89	2.600	7.603
Denmark	3.777	0.3%	92.8%	1.563	0.2%	82.5%	5.6	230.703	42,869	NO	NO	Very High	0.285%	0.183%	312	23.5	235	42.1	312	235	1,413	6.94	490	2.742	8.016
Pakistan	3.431	0.3%	93.1%	5.982	0.7%	82.2%	179.2	777.020	4,337	YES	NO	NO	0.000%	0.000%	0	0	0	0	0	0	468	1.23	29	5.157	
Bulgaria	3.396	0.3%	93.3%	1.240	0.1%	83.4%	7.3	112.824	15,443	NO	NO	High	0.256%	0.145%	280	38.4	187	25.6	280	187	2,822	3.29	464	3.392	9.916
Greece	3.345	0.3%	93.6%	2.509	0.3%	83.7%	11.1	277.216	24,991	NO	NO	Very High	0.252%	0.294%	276	24.9	378	34.1	276	378	2,795	5.21	728	8.077	23.614
Slovakia	3.298	0.2%	93.8%	7.83	0.1%	83.8%	5.4	137.484	25,424	NO	NO	Very High	0.249%	0.092%	272	50.3	118	21.8	272	118	1,403	3.66	257	1.388	4.059
Iraq	3.009	0.2%	94.1%	4.001	0.5%	84.2%	32.6	464.055	14,244	NO	NO	Medium	0.227%	0.469%	248	7.6	603	18.5	248	603	864	0.64	28	901	2.634
United Arab Emirates	2.931	0.2%	94.3%	3.019	0.4%	84.6%	9.2	525.132	57,045	NO	NO	Very High	0.221%	0.354%	242	26.3	455	49.9	242	455	583	1.91	56	5.133	1.499
Algeria	2.886	0.2%	94.5%	2.943	0.3%	84.9%	38.5	491.740	12,779	NO	NO	High	0.218%	0.345%	238	6.2	443	11.5	238	443	775	4.15	161	6.188	18.093
Nigeria	2.809	0.2%	94.7%	9.937	1.2%	86.1%	168.8	893.276	5,291	YES	NO	Low	0.000%	0.000%	0	0	0	0	0	0	0	0	0		
Finland	2.805	0.2%	94.9%	3.441	0.2%	86.3%	5.4	213.722	39,676	NO	NO	Very High	0.211%	0.169%	217	21.7	217	40.1	217	217	671	7.61	355	1.842	4.041
Switzerland	2.744	0.2%	95.1%	1.142	0.1%	86.4%	8.0	436.414	94,573	NO	NO	Very High	0.207%	0.134%	226	28.3	172	21.5	226	172	1,722	8.28	713	5.701	16.669
Colombia	2.595	0.2%	95.3%	4.243	0.5%	86.9%	47.7	555.115	11,637	NO	NO	High	0.196%	0.498%	214	4.5	639	13.4	214	639	412	1.75	36	1.720	5.028
Azerbaijan	2.558	0.2%	95.5%	1.250	0.1%	87.1%	9.3	147.693	15,888	NO	NO	High	0.193%	0.147%	211	22.7	188	20.3	211	188	1,877	1.88	176	1.640	4.795
Serbia	2.520	0.2%	95.7%	8	0.0%	87.1%	7.2	90.023	12,505	NO	NO	High	0.190%	0.001%	208	28.9	1	0.2	208	1	2,861	2.03	290	2.091	6.112
Philippines	2.430	0.2%	95.9%	2.905	0.3%	87.4%	96.7	580.754	6,005	YES	NO	Medium	0.000%	0.000%	0	0	0	0	0	0	838	0.74	31	2.998	
Vietnam	2.379	0.2%	96.1%	2.861	0.3%	87.7%	88.8	436.081	4,912	YES	NO	Medium	0.000%	0.000%	0	0	0	0	0	0	1,001	1.66	83	7.336	
Portugal	2.172	0.2%	96.2%	1.668	0.2%	87.9%	10.5	274.913	26,145	NO	NO	Very High	0.164%	0.196%	179	17.0	251	23.9	179	251	1,114	5.35	298	3.173	9.161
Chile	2.135	0.2%	96.4%	1.474	0.2%	88.1%	17.5	367.616	21,049	NO	NO	Very High	0.161%	0.173%	170	10.1	222	12.7	170	222	860	3.8	163	2.854	8.844
Turkmenistan	2.089	0.2%	96.5%	2.980	0.2%	88.3%	5.2	64.455	12,460	NO	NO	Medium	0.158%	0.385%	173	33.5	238	46.0	173	238	135	1.74	81	496	1.97
Norway	2.083	0.2%	96.7%	700	0.1%	88.4%	5.0	315.023	62,771	NO	NO	Very High	0.157%	0.082%	172	34.3	105	21.0	172	105	534	15.11	403	2.025	5.920
Kuwait	1.997	0.2%	96.9%	3.366	0.4%	88.8%	3.3	267.704	82,358	NO	NO	Very High	0.151%	0											

