EUROPEAN REGIONAL DEVELOPMENT FUND, "INCREASING AND INTEGRATING THE INTERDISCIPLINARY SCIENTIFIC POTENTIAL RELATING TO AVIATION SAFETY INTO THE INTERNATIONAL RESEARCH NETWORK AT THE NATIONAL UNIVERSITY OF PUBLIC SERVICE ". GINOP-2.3.2-15-2016-00007

CRUSADE AGAINST THE CARBON DIOXIDE OR HOW THE CIVIL AVIATION INDUSTRY TRIES TO REIN ITS EVER INCREASING CARBON DIOXIDE EMISSION

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SZÉCHENYI 2020

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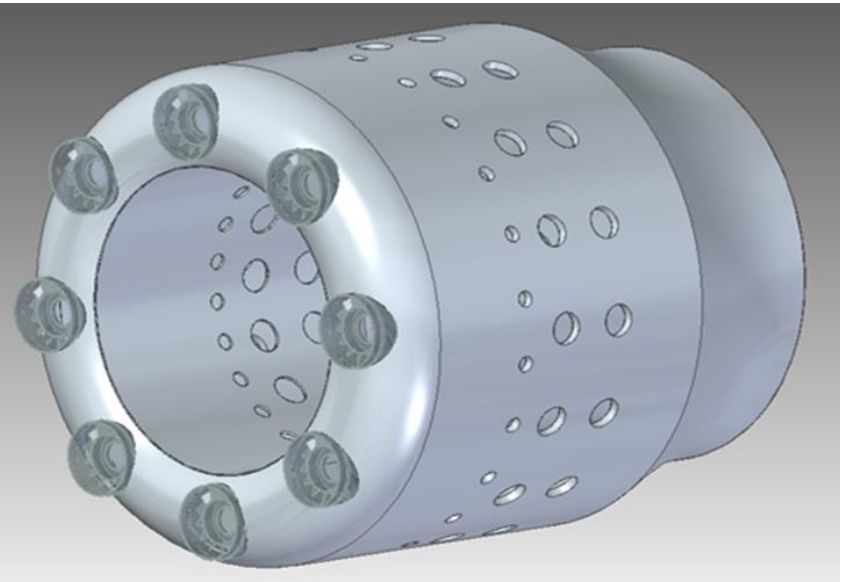
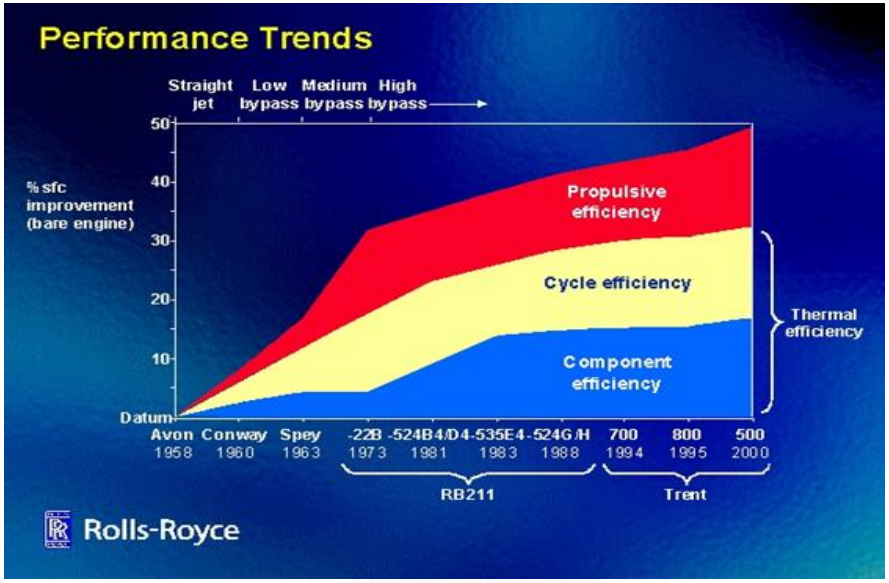
- Test cell, measuring the effect of alternative fuels on engine parameters and emisssion;
- Computer Flow Modeling (Computational Fluid Dynamics);
- Based on the finite volume method;
- Quick modification, analysis and comparison



OUTLINE

- Actuality;
- CORSIA in a nutshell;
- Carbaon Neutral growth;
- CORSIA schedule and participants;
- Determination of carbon dioxide emission baseline and offset calculation;
- Immediate tasks of the aircraft operators and National Aviation Authorities;
- CORSIA and the Paris Agreement;
- CORSIA & the EU
- Conclusions.

ACTUALITY

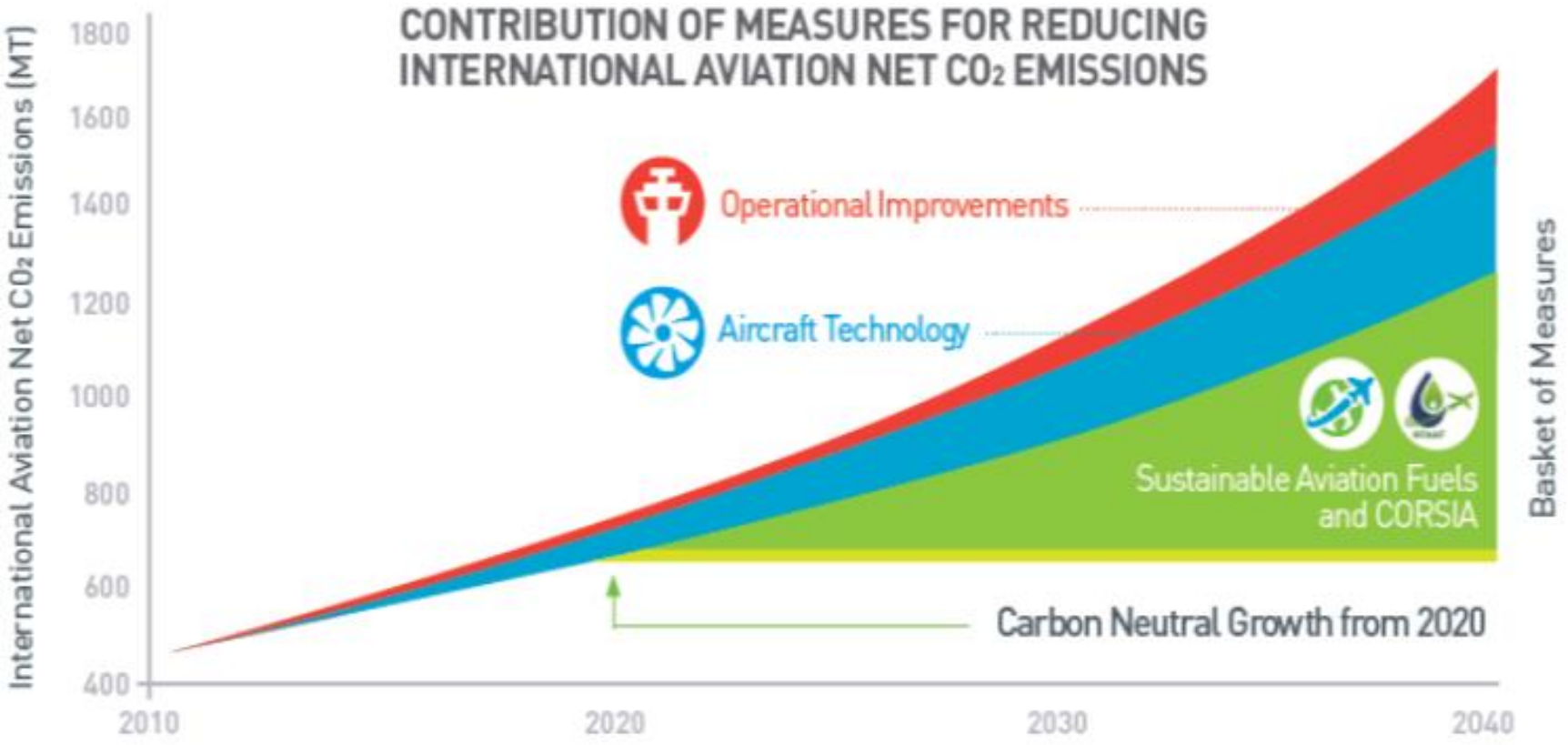


- World's carbon dioxide emission in 2015 is **36,061.71 million tons**;
- Civil aviation is responsible for **2% or 814 million tons**;
- International air traffic produces at about **1.3%**;
- The production of an average aircraft per year is 4.5x3600x12x300=58,320,000 kg, or **58,320 tons**;
- The fuel consumption per passenger-kilometre of today manufactured aircraft **decreased by about 80%** compared to the 1960s
- carbon dioxide would be **triplicated** in the next 30 years without additional measures.

pollutant	CO_2	H_2O	NO_x	SO_x	CO	unburnt fuel	soot
gram/kg fuel	3100	1394	9-15	0.3-0.8	0.2-0.6	0-0.1	0.01-0.05

CARBON NEUTRAL GROWTH OF INTERNATIONAL AVIATION

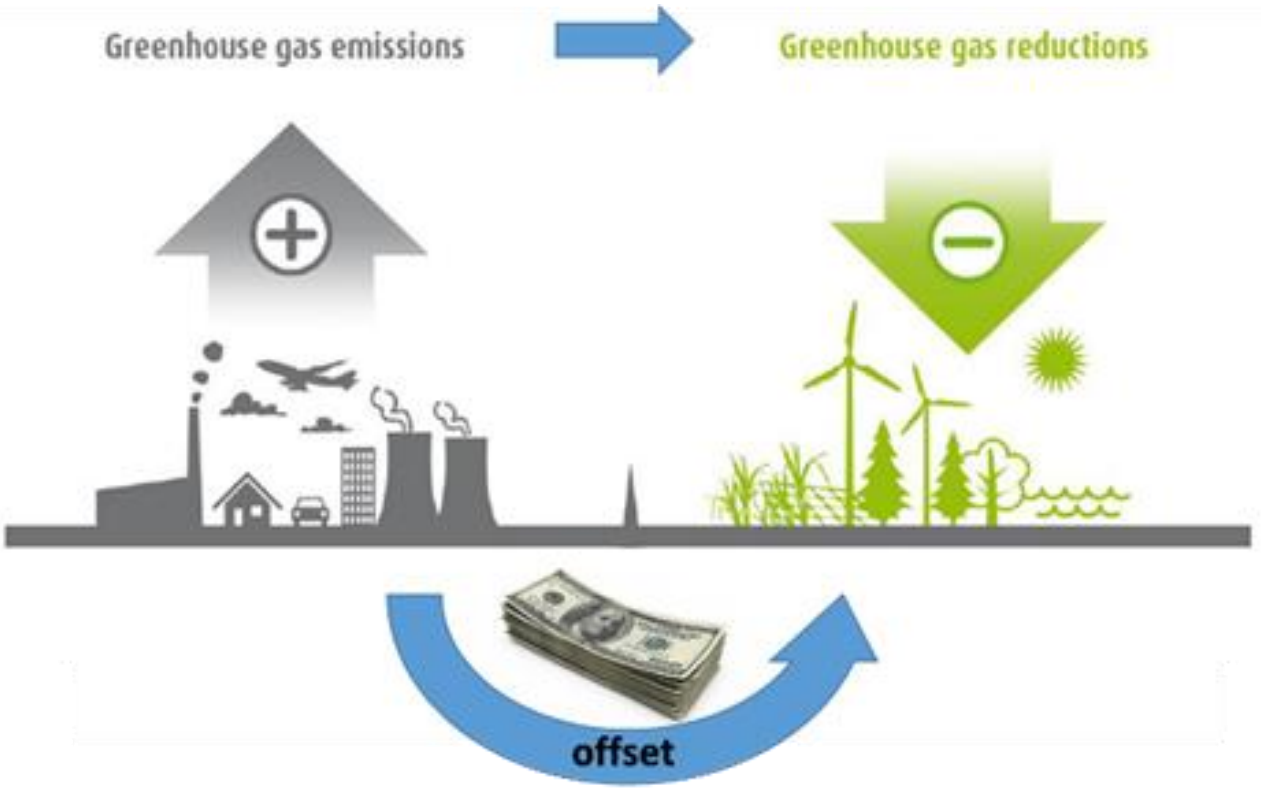
Based on the environmental trend assessment by the ICAO Council's Committee on Aviation Environmental Protection (CAEP), international aviation fuel consumption is estimated to grow somewhere between 2.8 to 3.9 times by 2040 compared to the 2010 levels.



In October 2013, the 38th Session of the ICAO decided of keeping the global net CO2 emissions from international aviation from 2020 at the same level (so-called "**carbon neutral growth from 2020**").

CORSIA IN A NUTSHELL I.

CORSIA = Carbon Offsetting and Reduction Scheme of International Aviation



The global MBM system allows to maintain the net emission level by means of offsetting the remaining gap, through carbon dioxide emission reducing, or even carbon dioxide absorbing projects,

CORSIA SCHEDULE AND PARTICIPANTS

State	Individual share of total RTK	Cumulative share of total RTK
China	11.76%	11.76%
United States	11.70%	23.46%
UAE	8.8%	32.27%
…	…	…
Ethiopia	0.55%	88.73%
South Africa	0.54%	89.26%
Indonesia	0.52%	89.78%
Finland	0.52%	90.30%
Mexico	0.52%	90.82%
Israel	0.50%	91.32%
Austria	0.49%	91.81%
Panama	0.47%	92.28%
Viet Nam	0.44%	92.71%
Colombia	0.43%	93.14%
…	…	…
Iran	0.12%	97.84%
…	…	…

Pilot Phase 2021-2023.
First Phase 2024-2026.
Both phases are voluntary.
So far 72 states have volunteered to implement the program and these countries currently cover 87.7% of the international aviation industry.
Second Phase 2026→ Mandatory but there are exempted countries.

LDC/SIDS/LLDC

Volunteer

Individual RTK > 0.5%

Cumulative RTK < 90%

The **individual share** of a given country and the calculation of **cumulative share** are based on **Revenue Tonne Kilometres (RTK) performed in 2018**.

DETERMINATION OF CARBON DIOXIDE EMISSION BASELINE AND OFFSET CALCULATION

			Baseline	Year Y 100% sectoral 0% individual	Year X 80% sectoral 20% individual	Year Z 30% sectoral 70% individual
Total industry	Total CO_2		10000	10350	10712	11087
	Growth above baseline	*in tCO_2*		350	712	1087
	Sector's "growth factor"			3.38%	6.65%	9.80%
Airline A	Total CO_2		100	107	114	122
	Individual "growth factor"			6.54%	12.28%	18.03%
	Sectoral component	*in tCO_2*		3.62	7.58	11.96
	Individual component	*in tCO_2*		n/a	14	22
	Offsetting requirement	*in tCO_2*		3.62	8.86	18.99
Airline B	Total CO_2		100	103	106	109
	Individual "growth factor"			2.91%	5.66%	8.26%
	Sectoral component	*in tCO_2*		3.48	7.05	10.69
	Individual component	*in tCO_2*		n/a	6	9
	Offsetting requirement	*in tCO_2*		3.48	6.84	9.51

The sectoral Growth Factor is: (103,500-100,000)/103,500 = 3.38%,
Individual Growth Factor of Airline A is: (107-100)/107 = 6.54%.
In this period the individual Growth Factor does not matter so the carbon dioxide emission the Airline A, have to compensate is: 107*0.0338=3.616 t, after rounding 3.62 tonnes.
Year X can be between 2030-32 with 80-20% ratio of sectoral and individual Growth factor.
The carbon dioxide emission, the Airline B have to compensate is: 0.8*106*0.0665+0.2*106*0.0566=6,389 t, after rounding 6.84 tonnes.

IMMEDIATE TASKS OF THE AIRCRAFT OPERATORS AND NATIONAL AVIATION AUTHORITIES

- January-September 2018: National authorities should ensure the necessary information for aircraft operators to develop MRV procedures;
- September 30, 2018: Aircraft Operators submit their MRV procedures for approval;
- 30 November 2018: National Authorities approve these procedures;
- January 1, 2019: Carbon dioxide emission measurement begins;
- December 31, 2019: Measurement of the first year is completed;
- May 31, 2020: aircraft operators submit their 2019 CO2 emissions report to the national authorities after verification;
- August 31, 2020: Countries will submit the total carbon dioxide report to ICAO.

CONCLUSION

ICAO has sought to develop a single global carbon-dioxide compensation system. Why?

- To avoid "Patchwork" solutions, which include carbon dioxide taxes or other remedies in the national or regional system.
- These solutions would not be a uniform standard, so it would be more complicated and costly, in the case of taxes, these funds would not necessarily be reflected in the actual carbon dioxide reduction projects.
- A single measure not only simplifies the system but also reduces the risk of market distortion as it imposes uniform requirements on all airlines.

CORSIA does not in itself lead to a **sustainable future of aviation**. With this global, market-based measure, the industry continues to pursue a **four-pillar strategy on climate change, including technology, operational and infrastructure developments.**

THANK YOU FOR YOUR ATTENTION!

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