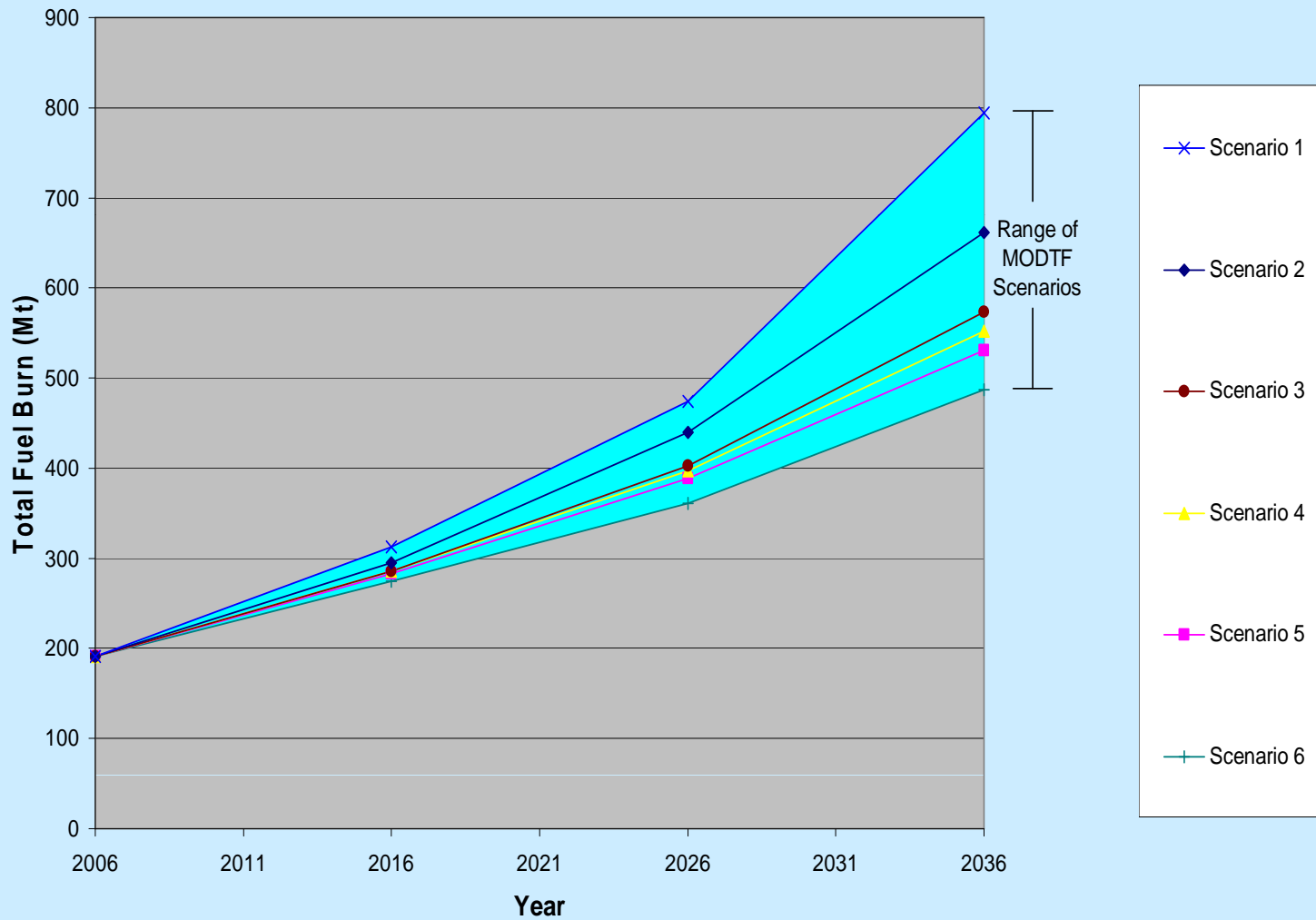


CAEP-FESG Fleet forecast

Seat Category	2006	2016	2026	2036
20-50	4053	2975	3042	3643
51-100	1813	4152	5697	7650
101-150	5896	7542	9309	11445
151-210	3984	6294	8593	11375
211-300	2003	3040	4446	6499
301-400	824	1314	2048	3261
401-500	159	405	950	1723
501-600	41	120	307	938
601-650		65	394	969
Total	18773	25907	34786	47503

Global en route fuel use

by CAEP/MODTF



Conclusions

- Technological nor operational improvements are going to solve the climate issue for aviation !

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¹⁾ Future high fuel efficient engine might induce more noise

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 - Biofuels???
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- Yes maybe, but....

Biofuels

- Start of the development;
- Reduction CO₂ limited (now 40%);
- Price is high; in the order of 2-4 \$ per gallon;
- Large area arable land necessary;
*e.g. for carbon neutral growth from 2020 onwards for the present types of biofuels in 2036 an area of 1000*1000 km² would be needed*
- Algae may be a way out, but algae contain 97-99% water; Jatropha yet low production levels;
- In any case fuel cost will rise.

Emission Trading

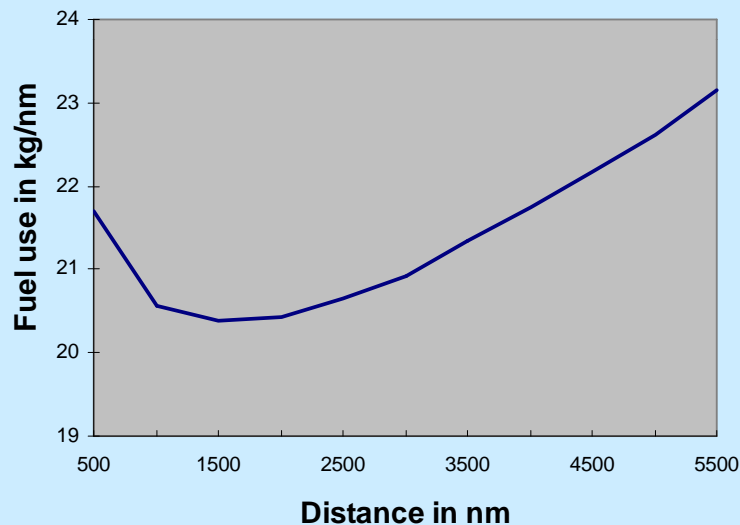
- EU ETS will not survive the international debate;
- Solution start with intra-EU traffic, extend later with possibly domestic traffic Canada, Australia, New Zealand, Japan and the US;
- Start linking these systems;
- Final target a Global ETS (with exceptions for the Least Developed Countries);
- Consequence fuel related cost will rise.

Result

- When world economy will pick up fuel prices will rise anyway;
- ET and Biofuels will add to these cost;
- Overall there will be a smaller growth in traffic than now foreseen.

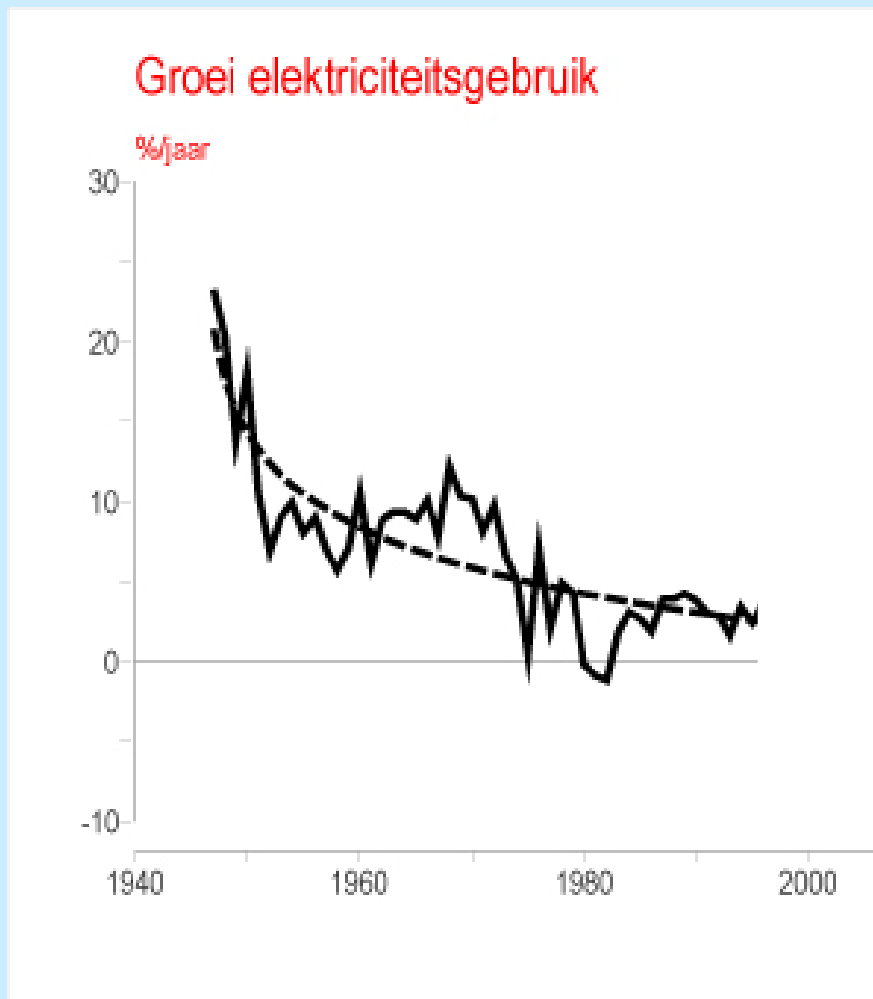
Remark Presentation

Peter Morrell



- Larger aircraft for short haul;
- But what about: for long haul there might be more stop-overs;
- A stop-over in Dehli for a trip A'dam-Singapore gives savings in:
 - fuel cost €20.000 (\$4/gallon) and
 - €8.000 in ETS cost (50% auctioning; €30/ton CO₂)

Compare with developments in other sectors



Growth figures
Electricity use