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ENVIRONMENT

States' Action Plans Seminar

5. Selection and Prioritization of Mitigation Measures

ICAO Secretariat





- Selection and prioritization
- Cost-benefit and cost-effectiveness
- Marginal Abatement Cost (MAC) Curve





Once the range of possible mitigation measures has been identified:

Selection:

- Top-down: A global emissions reduction target is decided, and measures are chosen so that the target is reached
- Bottom-up: Measures are chosen depending on several criteria discussed by the stakeholders (economical, political, etc.)
- See Figure 4-1 of Guidance 9988

Prioritization: necessary to define a feasible implementation plan and organize the request for assistance;

- Economic feasibility and sustainability represent for most States a crucial criteria for the selection and prioritization of measures;
- Two methods of economic analysis may be useful as decision-making tools in this process:
 - Cost benefit analysis
 - Cost effectiveness analysis

Cost-benefit analysis

- Useful when costs and benefits can easily be translated into monetary units



- According to this analysis, a measure is profitable if benefits are greater than costs
- Challenge:** compare costs and benefits over the lifetime of a measure (Net Present Value)

- When costs and benefits cannot be translated into **monetary** or another **common unit** (e.g. environment, health, education).



- Solution:**
 - Costs are quantified in monetary units
 - Benefits are quantified in a **relevant unit**, so that measures can be compared between each others (e.g. tonnes of CO₂ reduced)

Cost-effectiveness analysis

- Once the quantification has been done, the cost-effectiveness ratio can be calculated

$$r = \frac{\textit{Costs}}{\textit{Benefits}}$$

← Monetary unit (US\$)

← Physical unit (tCO₂)

→ US\$ / tCO₂

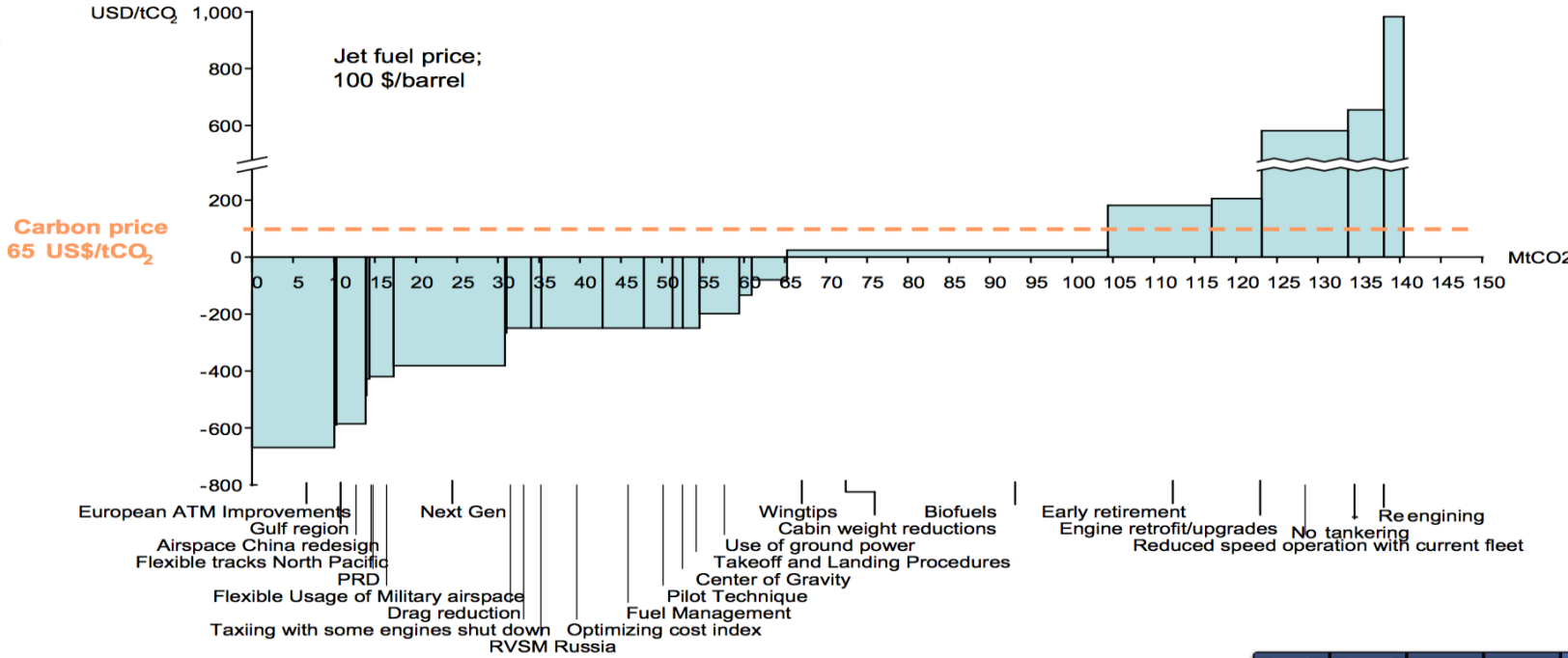
- Strategy to compare low-carbon options that can be implemented to improve a baseline situation:
 - Calculate the extra (= marginal) cost compared to the baseline
 - Calculate the CO₂ reduction potential (= abatement) relative to the baseline
- Draw the Marginal Abatement Cost (MAC) curve for these options

→ US\$

→ tCO₂

- What is a MAC curve?
 - A graphical way to display the costs of reducing pollution by one unit.

Source: IATA

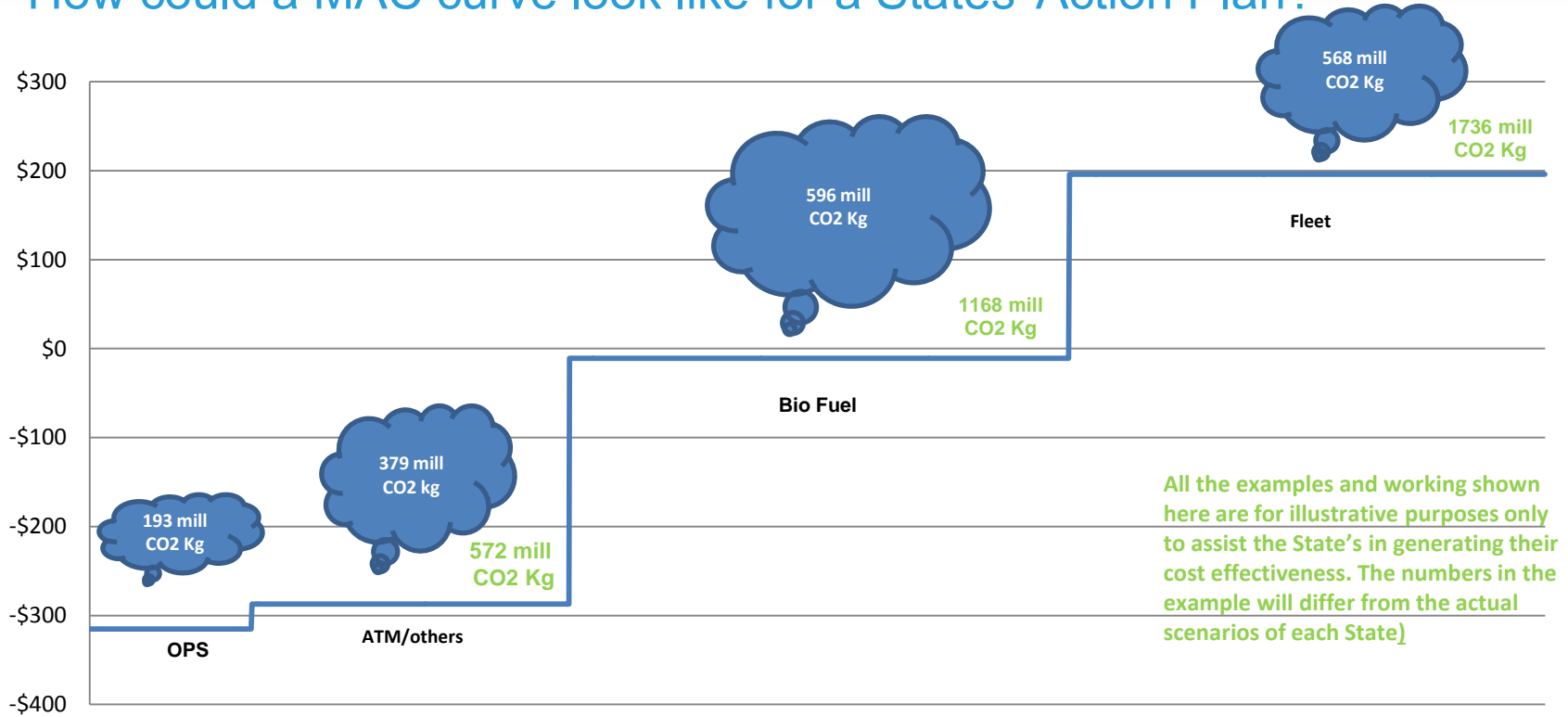




- How to read a MAC Curve?
 - Each bar represents a single low carbon option (mitigation measure);
 - The width of the bar represents the abatement potential relative to business as usual (the baseline scenario);
 - The height of the bar represents the abatement cost per year, relative to business as usual (Costs can be negative);
 - The costs are expressed in USD per tonne CO₂ avoided.
- Why is it useful?
 - Provides a quick overview of available low carbon options, and can therefore be used as a starting point for prioritising such options;
 - BUT planning low carbon development via the Action Plan always involves much more than choosing the options with the least additional costs or largest abatement potential;
 - MAC curves are only a starting point for discussion.



- How could a MAC curve look like for a States' Action Plan?



All the examples and working shown here are for illustrative purposes only to assist the State's in generating their cost effectiveness. The numbers in the example will differ from the actual scenarios of each State]



- Guidance 9988
 - Appendix F: costs and benefits related to the basket of measures
- A MAC curve for the UK aviation sector out to 2050
http://www.icao.int/environmental-protection/Documents/ActionPlan/UK_AbatementModel_en.pdf
- A Global Framework For Addressing Aviation CO₂ Emissions
<https://sustainabledevelopment.un.org/content/documents/PaulSteele.pdf>



Selection and Prioritization of Mitigation Measures: a concrete case study

Sustainable Alternative Fuels in the Dominican Republic



Sustainable Alternative Fuels in the Dominican Republic

Needs

- Mitigating CO₂ emissions
 - Savings of up to 80%
- International agreements: need to reduce GHG emissions
 - cannot be achieved just with technological measures

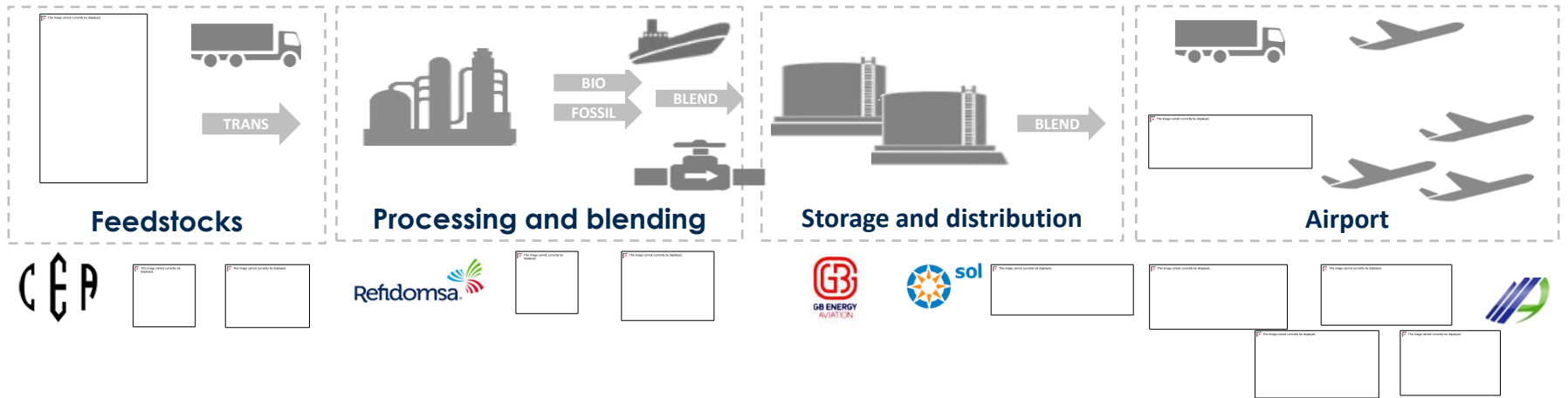
Benefits

- Promoting **new internal industries** and production schemes
- Improving **competitiveness** at long term of the sector:
Green Tourism
- Improving LAQ



- Define the singularities and opportunities of the Dominican Republic relevant for a **potential value chain** of alternative fuels for aviation
- Defining **potential capacity**: Feedstocks and Biojet production
- Defining **demand**, considering cost/benefit and prices
- Evaluate the **environmental impact** (GHG, water, resources) and local development impact
- Look for **implementation keys** (policies, challenges and alternatives)

Value Chain



Source: Adapted from SkyNRG

Feedstock

- **vegetable oils & fats** → low potential
- production of municipal or industrial **wastes** is limited and disperse,
- major **agricultural residues** are being currently used.
- However, the country has a **significant potential** on **sugarcane** which could be renewed to produce SIP or ATJ alternative aviation fuels.





jetBlue

- MDCY Catey
- MDLR La Romana
- MDPC Punta Cana
- MDPP Puerto Plata
- MDSB Las Américas
- MDST El Cibao



MDPC Punta Cana



MDPC Punta Cana



MDSB Las Américas



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MDSB Las Américas



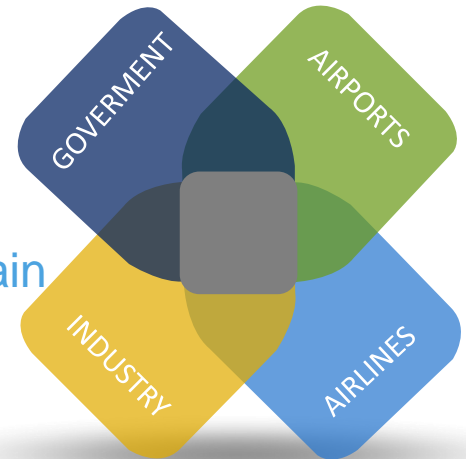
- MDPC Punta Cana
- MDSB Las Américas



MDPC Punta Cana

Roadmap Strategy

- 
- 2017 - 2018:
 - Establish information sharing mechanisms for aviation biofuels
 - 2017 - 2020:
 - Adapt regulations & standards
 - Disseminate about the relevance of the use SAFs
 - Increase R&D on feedstock capacity
 - From 2020:
 - Promote sustainable implementation of a value chain
 - Establish incentive measures for stable demand





DECLARACIÓN DE PUNTA CANA

IMPLEMENTACIÓN DE UNA HOJA DE RUTA PARA EL DESARROLLO Y USO DE COMBUSTIBLES ALTERNATIVOS SOSTENIBLES PARA LA AVIACIÓN EN LA REPÚBLICA DOMINICANA

Los representantes del Estado Dominicano, reunidos en Punta Cana, República Dominicana, el 16 de Diciembre de 2016, conscientes de la importancia y trascendencia de las cuestiones de medio ambiente y cambio climático, y alentados por las iniciativas globales para el desarrollo y uso de combustibles sustentables para la aviación, como una estrategia a largo plazo para el transporte aéreo;

Considerando: Que la aviación es una industria clave a nivel mundial, particularmente relevante en un estado insular como la República Dominicana. El sector turístico e industrial en el país depende enormemente de un transporte aéreo eficiente y sostenible, que apoye el desarrollo y crecimiento económico;

Considerando: Que el cambio climático es uno de los mayores retos a los que se enfrenta la humanidad y, particularmente, la República Dominicana como país en vías de desarrollo altamente vulnerable a los efectos resultantes de este fenómeno global;

Considerando: Que a nivel global, la industria de aviación ha establecido de forma proactiva un conjunto de ambiciosas metas para reducir sus emisiones, mejorando la eficiencia energética de la flota mundial en promedio un 1.5% anual, estabilizando las emisiones de CO₂ antes de la mitad de las emisiones que se alcanzaron en 2000 (crecimiento neutro en carbono) y emitiendo en 2050 la mitad de las emisiones que se alcanzaron en 2000.

Considerando: Que una estrategia de sostenibilidad, seguridad e innovación energética a través de combustibles alternativos puede contribuir a alcanzar la visión de nación para largo plazo reflejada en la Ley 1-12 Estrategia Nacional de Desarrollo – ENVD 2030, la cual, establece en dos de los cuatro ejes estratégicos: i) Una economía articulada, innovadora y sostenible, con una estructura productiva que genere crecimiento alto y sostenido con empleo decente, y que se inserta de forma competitiva en la economía global; y ii) Un manejo sustentable del medio ambiente y una adecuada adaptación al cambio climático;

Considerando: Que para fomentar el crecimiento sostenible de la aviación internacional y lograr las metas mundiales a las que se aspira, es necesario adoptar un enfoque integral que incluya un conjunto de medidas, que incluyen tecnologías y normas, combustibles alternativos, mejores operaciones y medios basados en el mercado para reducir



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Do not expect the others to change your reality. YOU can make a change that would inspire all



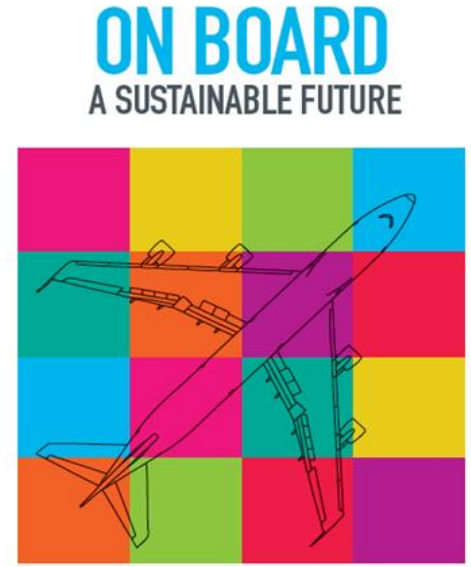
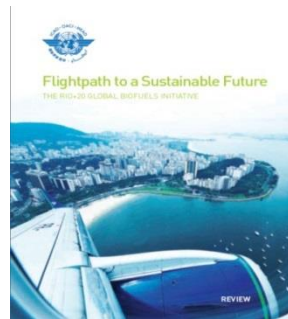
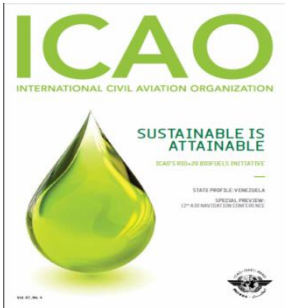
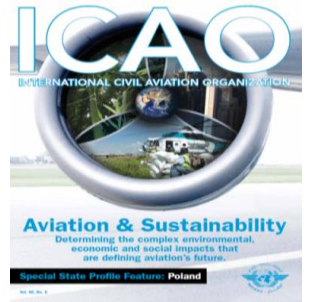
- States' Action Plans are a planning tool leading to the implementation of identified mitigation measures;
- The selection and prioritization of the identified mitigation measures is a critical step;
- The methodologies presented are indicative and States are free to adapt them to their own circumstances and priorities;
- The role of stakeholders is key;
- A fully fletched selection and prioritization methodology can support requests for assistance in the implementation phase.



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Additional information



ICAO 2016 ENVIRONMENTAL REPORT

For more information on our activities, please visit: <http://www.icao.int/env>