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ICAO CAPACITY BUILDING SEMINAR ON LOW EMISSIONS AVIATION MEASURES

# Clean Development Mechanism (CDM) and Aviation

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# INTRODUCTION TO CDM



## Carbon markets

- Compliance markets and voluntary markets
- Emissions units are traded in carbon markets
- Cancel emissions units to offset emissions
- Supply and demand affect prices



ICAO Seminar on Carbon Markets in February 2018 for further information:

<https://www.icao.int/Meetings/carbonmarkets/Pages/default.aspx>



## UNFCCC market mechanisms

- Carbon market mechanisms under the Kyoto Protocol:
  - Emissions trading
  - Joint implementation
  - Clean development mechanism

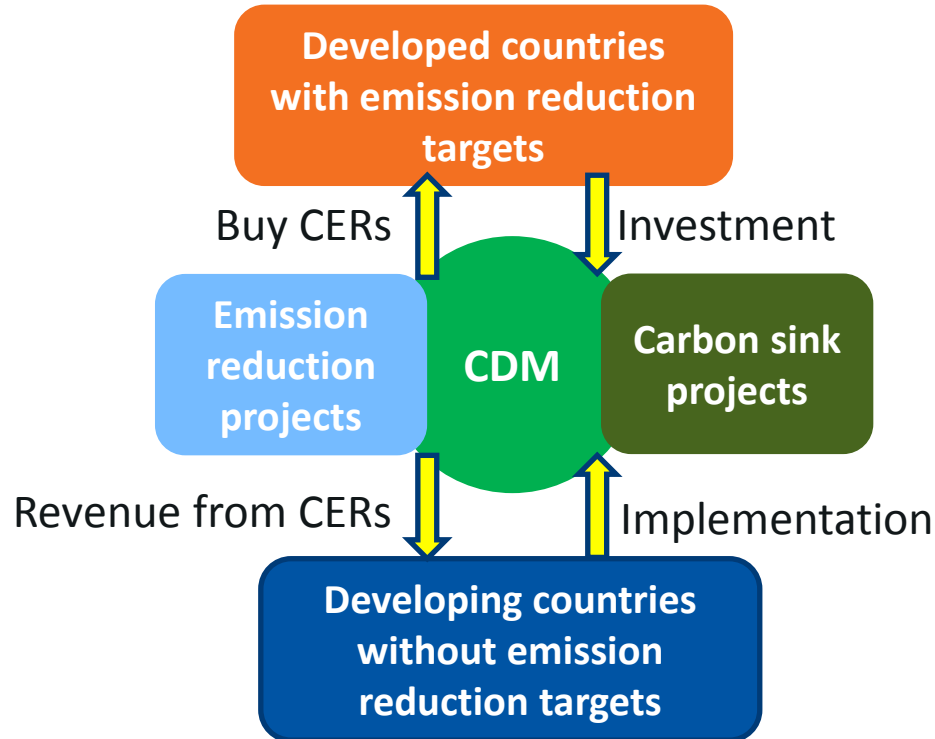


## Clean development mechanism

- Emission reduction (or removal) projects in developing countries
- Certified emissions reductions (CERs)
  - 1 CER = 1 tonne of CO<sub>2</sub>.
- CERs can be traded and used to meet a part of emission reduction targets under the Kyoto Protocol



## Clean development mechanism





## Key design features

- Sustainable development and emission reductions
- Flexibility in how targets are met
- Rigorous and public registration and issuance process
- Real, measurable and verifiable reductions
- Additionality



## CDM projects

About 8,000 projects

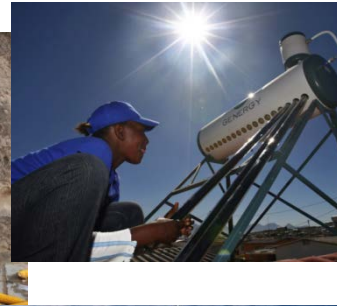
- About 9 billion CERS (potential)

Actual:

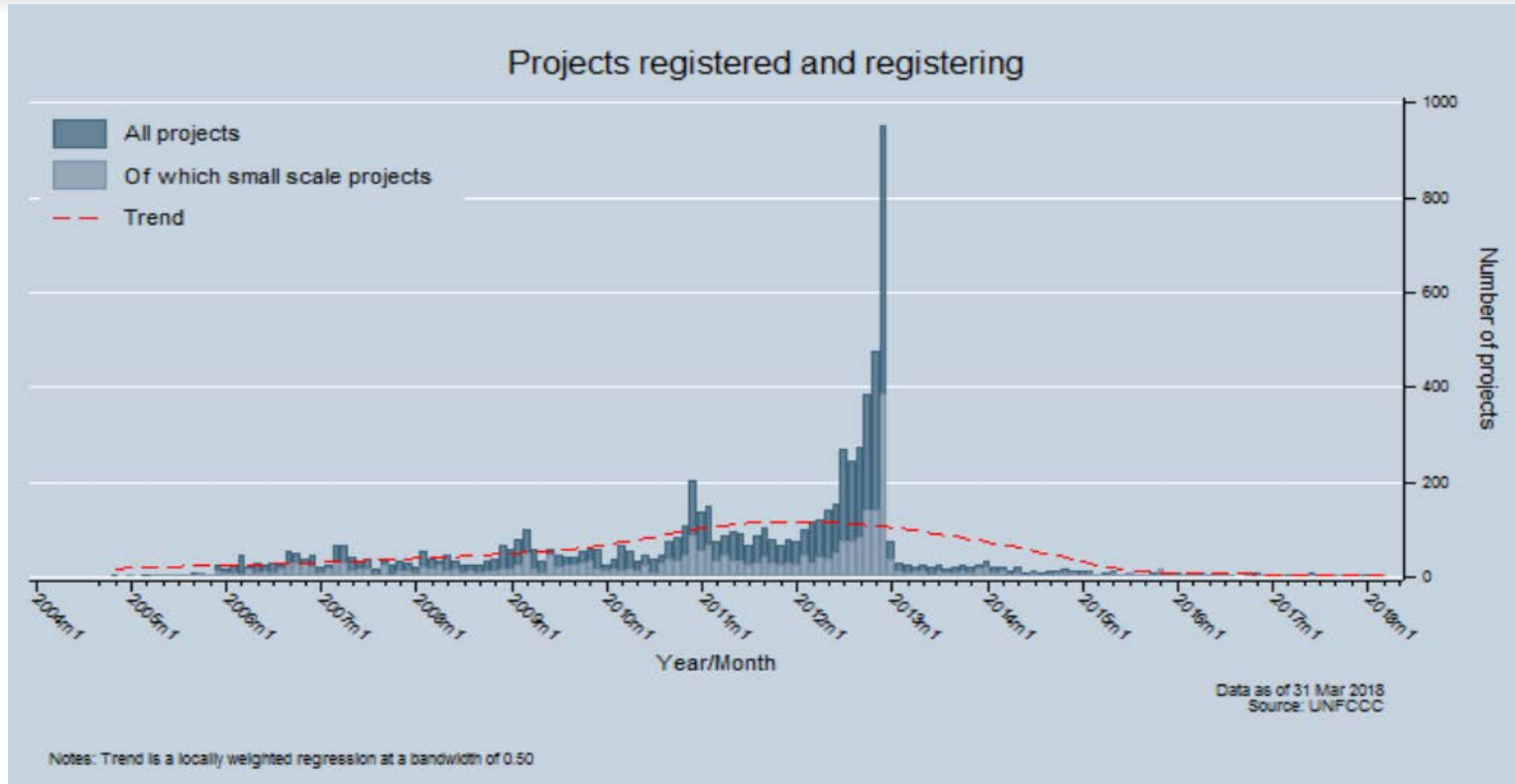
- 3,125 projects issued CERs
- 1.9 billion CERs

15 sectoral scopes:

Energy production and demand;  
Industrial processes;  
Transport; Fugitive emissions;  
Solvents use; Waste handling  
and disposal; Afforestation and  
reforestation; Agriculture







Source: <http://cdm.unfccc.int/>



## CDM projects in Fiji

Project Name	Donor	Period	Est. reductions (t CO <sub>2</sub> eq /year)	Total actual CERs issued
Vaturu and Wainikasou Hydro Projects	United Kingdom	01 Jun 05 – 31 May 12	24,928	35,550 (Oct 07) <i>87,184 (pending)</i>
Kinoya Sewerage Treatment Plant GHG Emission Reduction Project	Sweden and Spain	15 Apr 12 – 14 Apr 22	22,471	18,663 (Apr 17)
Fiji Nadarivatu Hydropower Project		01 Apr 13 – 31 Mar 20	47,361	100,367 (Mar 16)

Source: <http://cdm.unfccc.int/>



## Future CDM?

- CDM is one of the mechanisms under the Kyoto Protocol
  - Ends in 2020
- Ongoing discussions under the Paris Agreement on a new mechanism
  - Modalities, rules and guidelines to be developed



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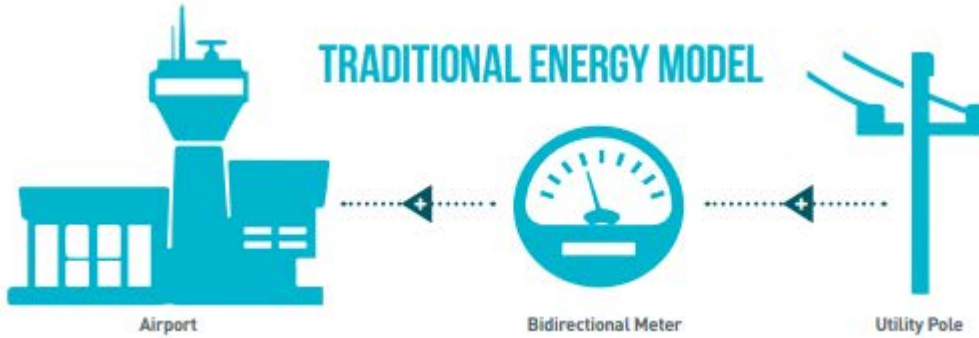


# CDM AND AVIATION



# A new energy paradigm for airports

## TRADITIONAL ENERGY MODEL



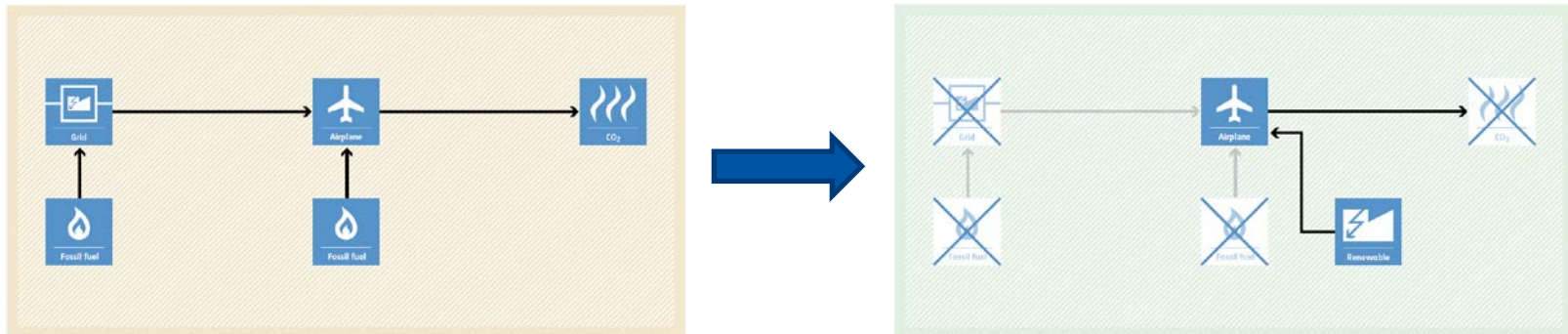
## GREEN AIRPORT MODEL





## Aviation CDM methodology

- ICAO developed a CDM methodology:
  - AMS-I.M.: Solar power for domestic aircraft at-gate operations
- Electricity from solar photovoltaic that supply electrical energy for aircraft at-gate operations in airports.





## Applicability

- Important conditions under which the methodology is applicable:
  - New installation of a solar photovoltaic system at an airport facility where no onsite renewable energy power generation capacities existed prior to the implementation of the project
  - Electricity generated from the solar photovoltaic system is supplied to airports for domestic aircraft at-gate operations
  - Aircrafts that operate on international routes are not included in this methodology



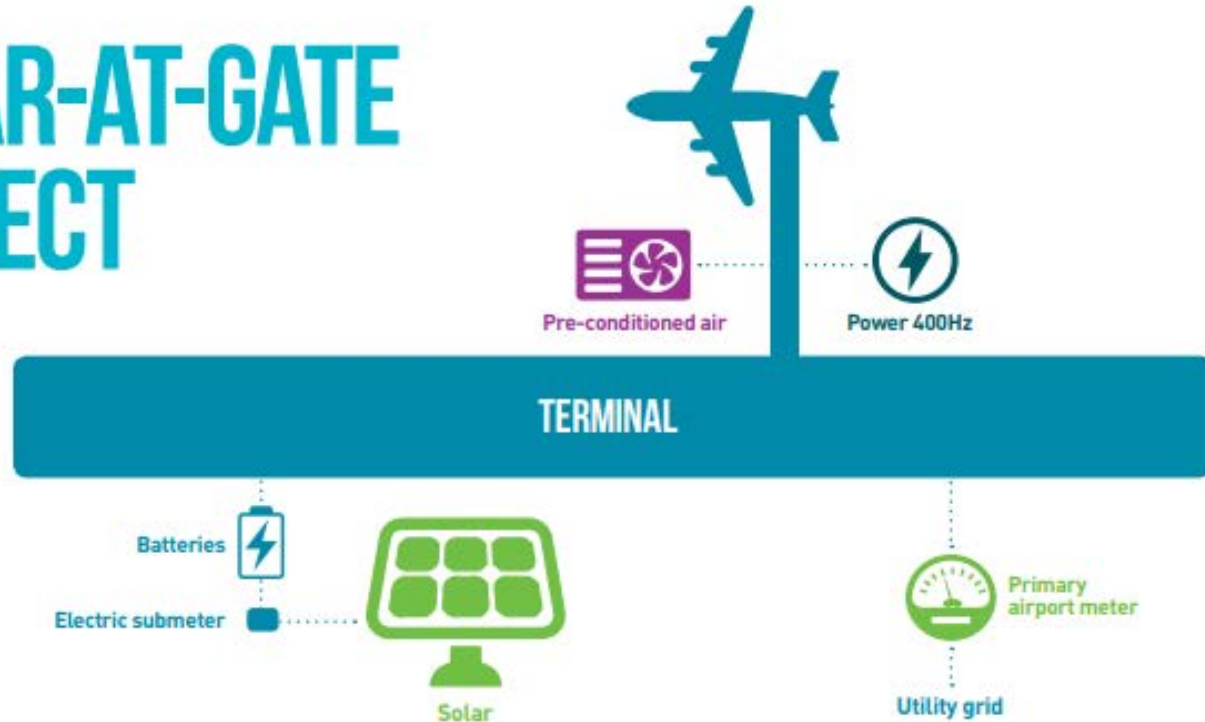
## Monitoring

- Emission factor of the baseline source (e.g. jet fuel, diesel, electric grid) used to provide energy
- Monitored:
  - Quantity of electricity consumed by aircraft electrical components for the domestic aircraft at-gate operation, which is supplied by the solar power
  - Quantity of electricity consumed by an aircraft to obtain pre-conditioned air for a domestic aircraft's at-gate operation which is supplied by the solar power





# SOLAR-AT-GATE PROJECT





## Summary

- CDM has contributed to the establishment of an international carbon market and setting a price for carbon
- Moderately successful but not without problems
- Ongoing work relating to its potential successor under the Paris Agreement
- New CDM methodology for solar-at-gate
- Potential for developing CDM (or successor) projects to produce emissions units



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