

ICAO-European Union Joint Assistance Project

**Feasibility Study on Renewable Energy
Piarco International Airport
Trinidad & Tobago**

Areefa Khan-Labban
Health Safety Security & Environment Specialist
Trinidad & Tobago Civil Aviation Authority

ICAO'S ROLE

Primary Objective

Reduce emissions from international aviation activities.

Co-benefit

Emissions reductions from domestic aviation activities

Additionally:

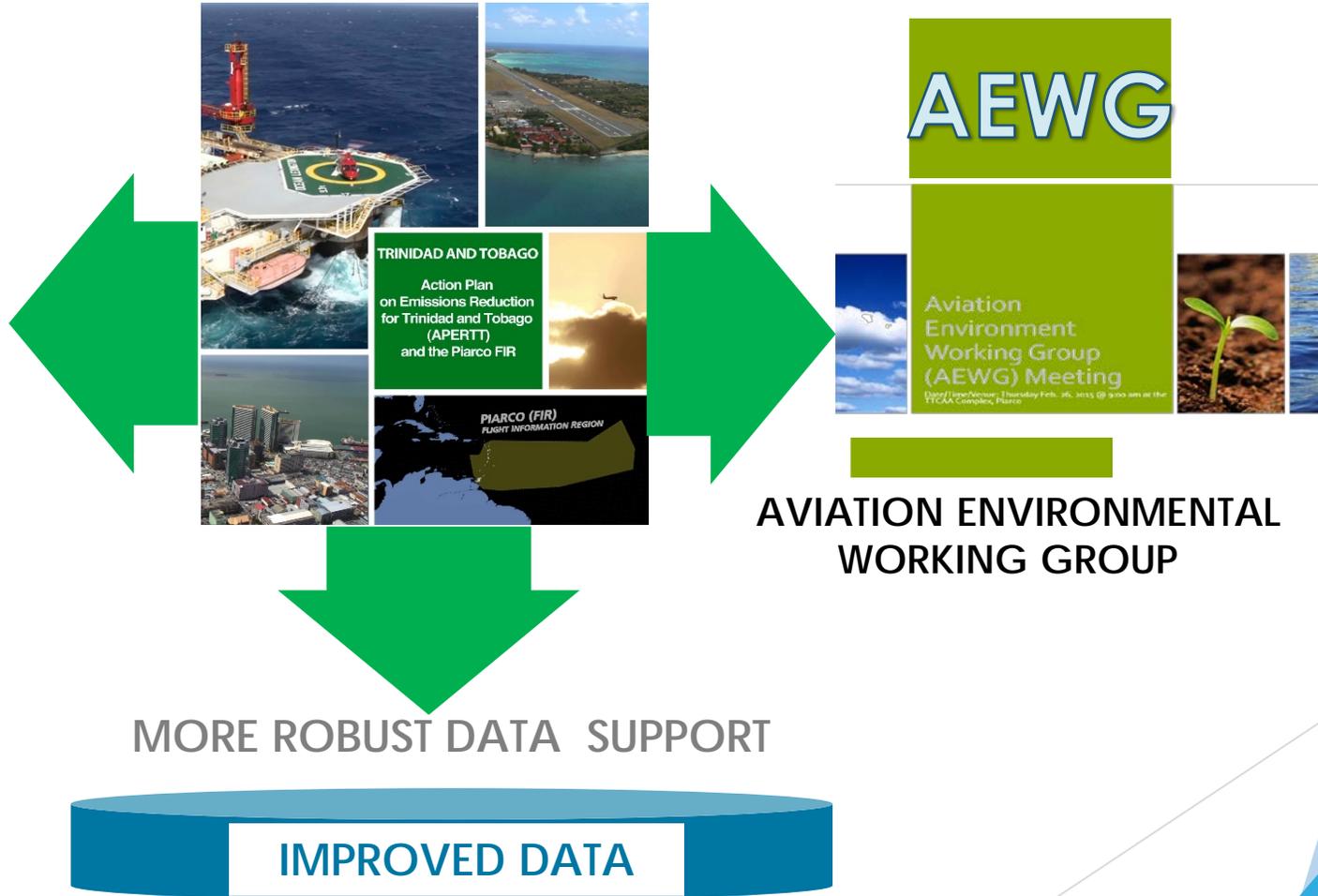
1. Supporting member states in developing action plans to measure and reduce emissions.
2. Developing guidance and implementing studies and demonstration projects

APERTT -Key Elements

Action Plan for Emissions Reduction in Trinidad & Tobago



Carbon Low Emissions Program



AVIATION ENVIRONMENTAL WORKING GROUP

IMPROVED DATA

APERTT -Expectations

At least **26,000 CO₂** – tons per year less from 2017 within the aviation sector

(All international and Domestic flights + Airports Emission)



16,700 CO₂-tons less from International Flights operated by the NATIONAL AIRLINE

+

4,228 CO₂-tons less International Flights by FOREIGN AIRLINES

+

2,500 CO₂-tons less from DOMESTIC FLIGHTS

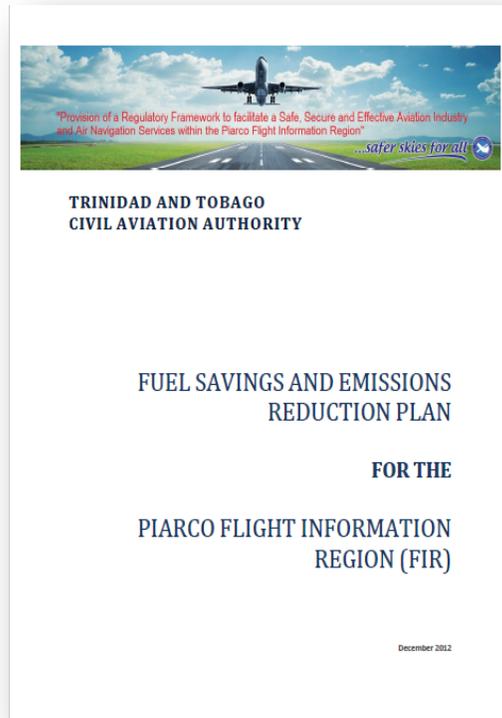
+

1,700 CO₂-tons less at AIRPORTS

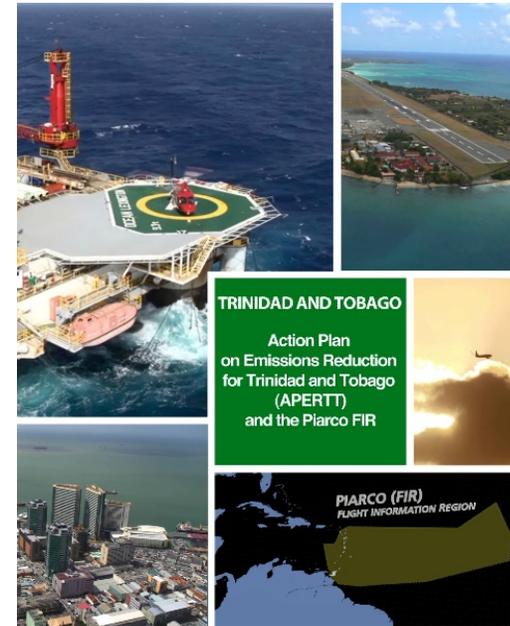
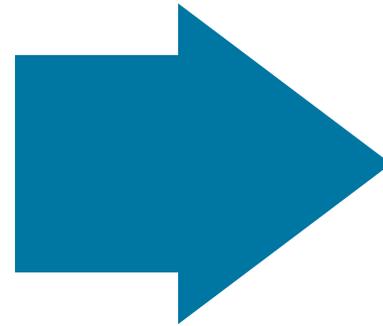
25,128 CO₂ – tons per year less from 2016

at least **70,000 CO₂** – tons less since the ICAO-EU project started

The ICAO – EU project has been providing continuous support to Trinidad & Tobago towards updating the Action Plan in accordance with the ICAO Standards



2012-2014

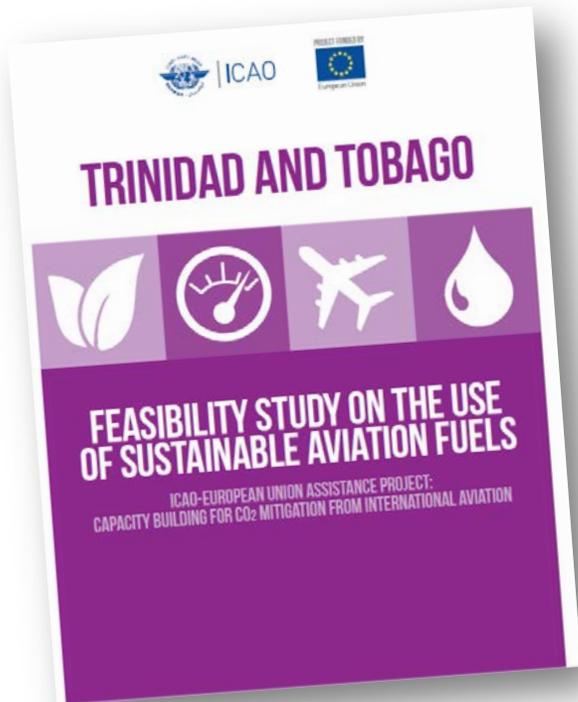


2015-2018

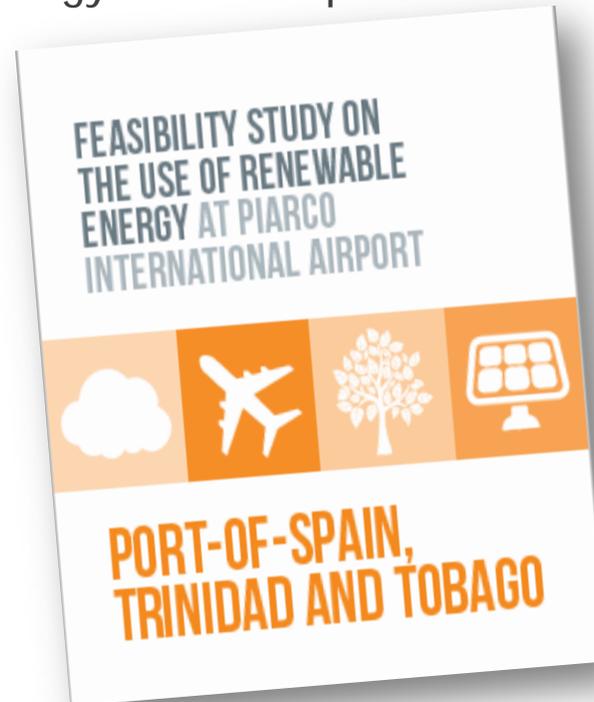
**The new APERTT
will be
available by
June 2018**

ICAO-EU SUPPORTED FEASIBILITY STUDIES

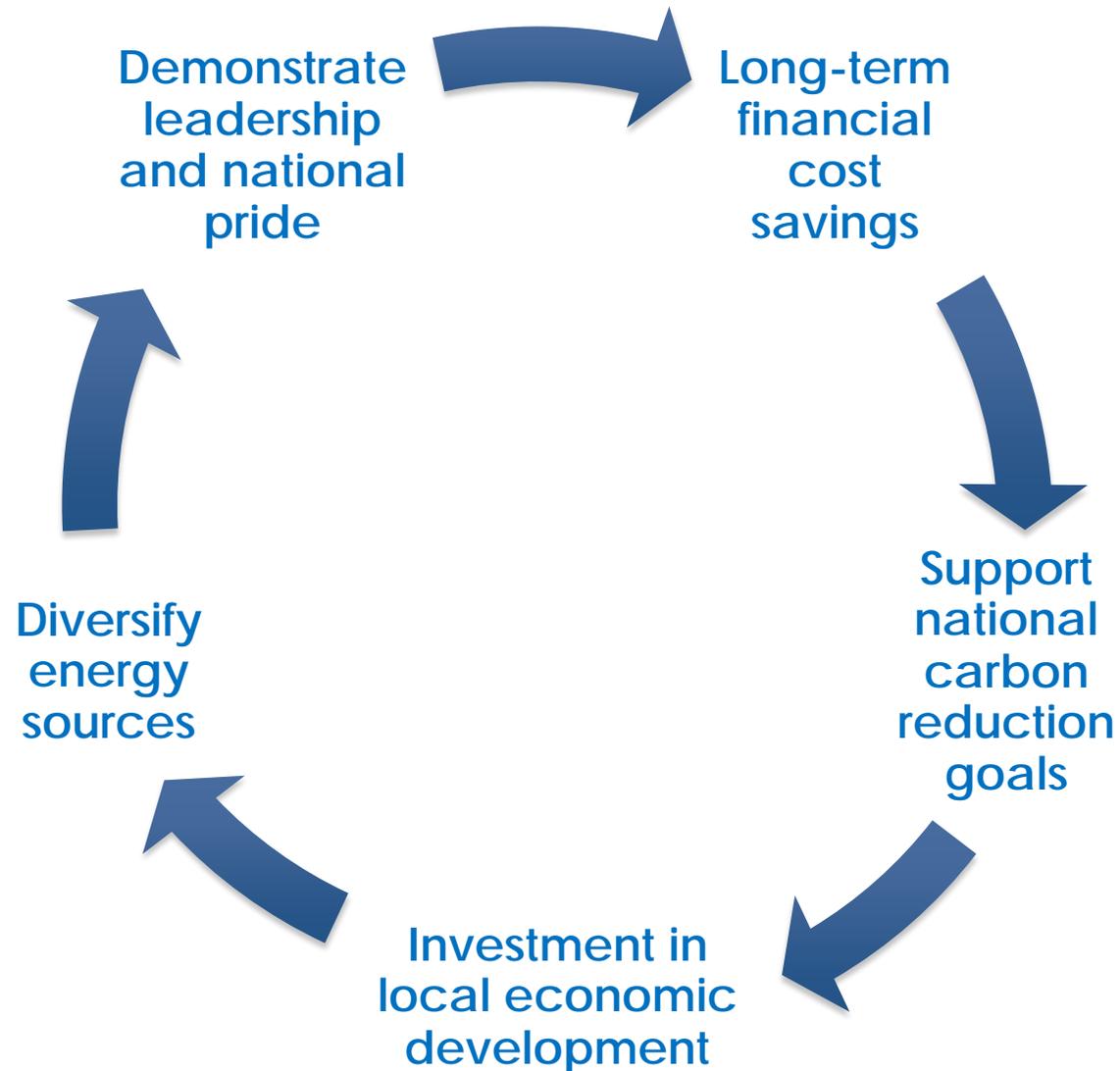
- ▶ Feasibility Study on the use of Sustainable Aviation Fuels(SAFs)



- ▶ Feasibility Study on Renewable Energy at the Airports



Why Renewable Energy?



Piarco International Airport Solar Study

Electricity Usage

Carbon Emissions

Existing and Future
Uses

Environment

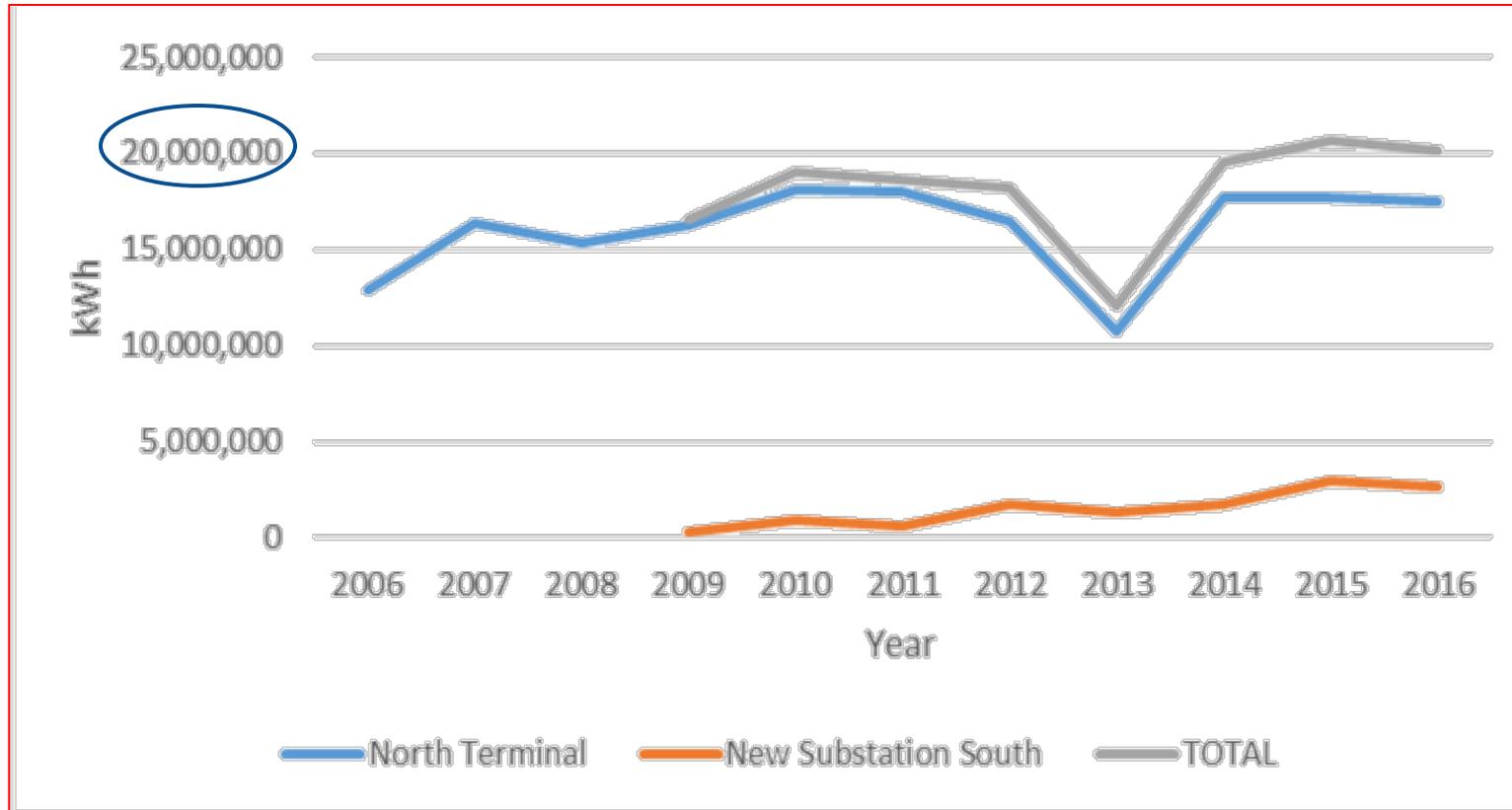
Electrical

Potential Sites

Glare Analysis

Recommended Sites

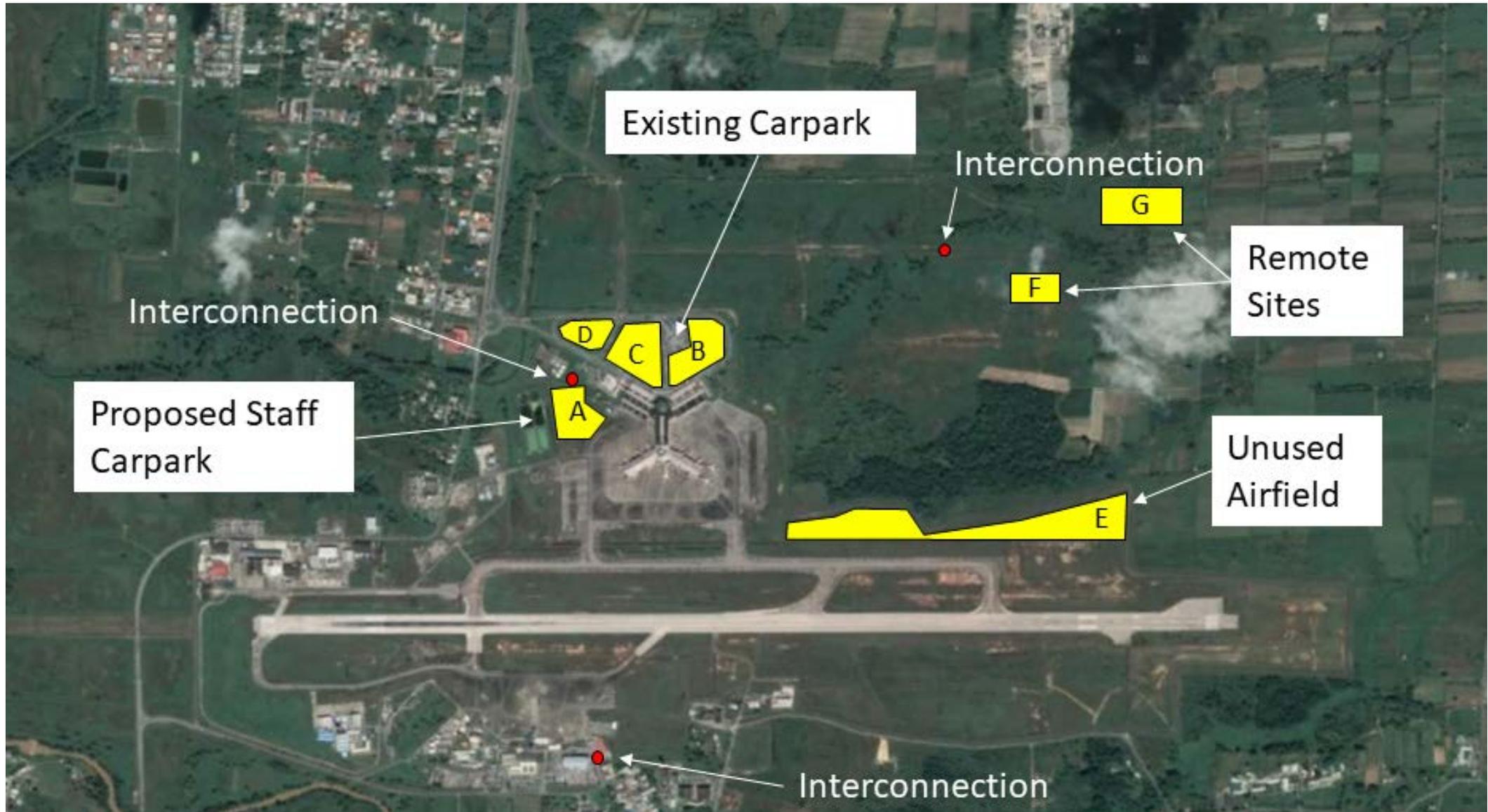
Electricity Usage 2006-2016



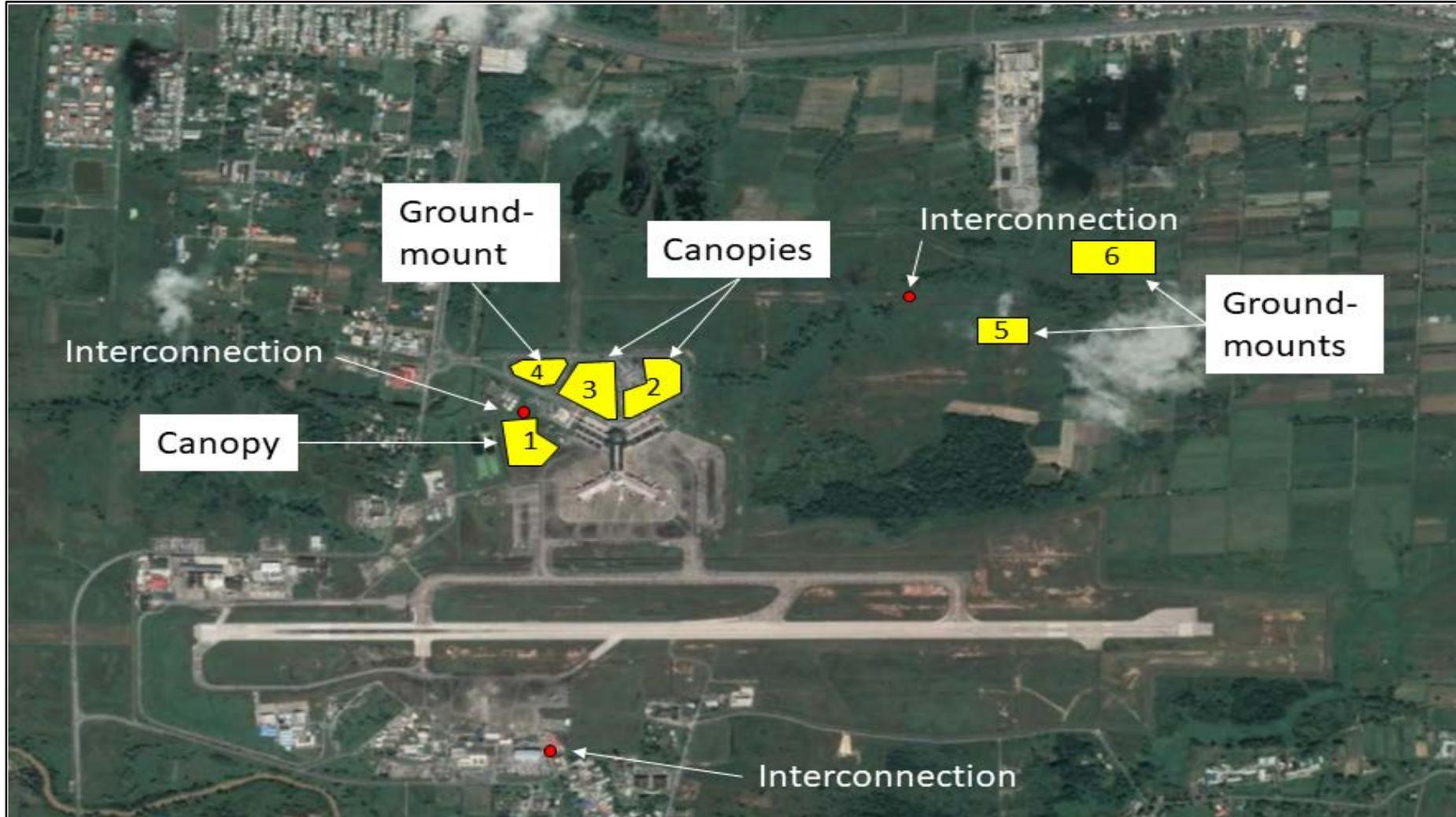
*6% increase in electricity demand annually

**2013 is likely incorrect data

Solar Site Options



Recommended Sites



Characteristics of Sites

#	Site Name	Project Design	Size (hectares)	Nameplate Capacity (kW)	Annual Generation (kWh)	% of Airport Total
1	Proposed Employee Car Park	Canopy	1.88	1,719	2,545,950	12.6
2	Existing Car Park – East	Canopy	2.70	2,469	3,649,927	18.1
3	Existing Car Park – West	Canopy	3.11	2,844	4,208,904	20.9
4	Existing Car Park – Open	Ground-mount	1.54	972	1,443,830	7.2
5	Remote Site – South	Ground-mount	3.37	2,127	3,159,491	15.7
6	Remote Site – North	Ground-mount	9.57	6,041	8,973,430	44.5

Environmental Benefits

#	Site Name	Annual Generation (kWh)	CO ₂ Avoided (kg)
1	Proposed Employee Car Park	2,545,950	1,781,401
2	Existing Car Park – East	3,649,927	2,553,854
3	Existing Car Park – West	4,208,904	2,944,970
4	Existing Car Park – Open	1,443,830	1,010,248
5	Remote Site – South	3,159,491	2,210,696
6	Remote Site – North	8,973,430	6,278,709

Financial Analysis

#	Site Name	Nameplate (kW)	Cost Factor (USD/W)	Installed Cost (USD)	Annual Generation (kWh)	Electricity Cost (USD/kWh)	Simple Payback (Years)
1	Proposed Employee Car Park	1,719	\$2.17 (\$1.75 + \$0.42)	\$3,730,230	2,545,950	\$0.05	29
2	Existing Car Park – East	2,469	\$2.17 (\$1.75 + \$0.42)	\$5,355,560	3,649,927	\$0.05	29
3	Existing Car Park – West	2,844	\$1.92 (\$1.50 + \$0.42)	\$5,458,560	4,208,904	\$0.05	26
4	Existing Car Park – Open	972	\$1.75	\$1,701,000	1,443,830	\$0.05	24
5	Remote Site – South	2,127	\$1.75	\$3,722,250	3,159,491	\$0.05	24
6	Remote Site – North	6,041	\$1.50	\$9,060,000	8,973,430	\$0.05	20

Ownership & Financing

Government owned

- Self Finance
- Contract with an Engineering, Procurement, Construction (EPC) company
- Self ownership, operations and maintenance

Privately owned

- Privately financed
- CAA/Airport serve as host
- CAA/Airport may receive lease payments or purchase the power generated

Barriers to Project Implementation

- ❑ Securing investment commitment to pay for the cost of the electricity produced
- ❑ Ensuring policy commitment to support project implementation

Summary

- ▶ ICAO's focus is on reducing emissions from international aviation activities
- ▶ Solar at-Gate Projects can achieve the objective
- ▶ Six potential solar sites identified at Piarco International Airport
- ▶ Ownership and Financing Dependent on Actors Involved

Roadmap to Implementation-Next Steps

- ✓ **Present findings** with stakeholders –Seminar conducted on 12th April,2018.
- ✓ **Gage participation** of potential partners –Participation and interest at Seminar.
- ❑ **Select project** site to pursue
- ❑ Prepare **RFP to procure** a developer or contractor
- ❑ Secure financial commitments
- ❑ Select development contractor
- ❑ **Oversee construction and commissioning**