CIAL

COCHIN INTERNATIONAL AIRPORT LIMITED

GREEN INITIATIVES OF CIAL

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World's first airport fully powered by solar energy

GREENPORT!

International Conventions and India's Commitments

- The Kyoto Protocol, adopted in 1997 and effective from 2005, was an international treaty aimed at reducing greenhouse gas emissions.
- India's Commitments
  - Promotion of renewable Energy - various initiatives to increase the share of renewables in the energy mix, including solar, wind, hydro, and biomass energy projects.
  - National Action Plan on Climate Change (NAPCC)- Launched in 2008, includes eight national missions, two of which focus on renewable energy: the National Solar Mission and the National Mission for Enhanced Energy Efficiency.
- While not legally bound to reduce emissions under the Protocol, India has voluntarily undertaken significant measures to promote renewable energy and improve energy efficiency.

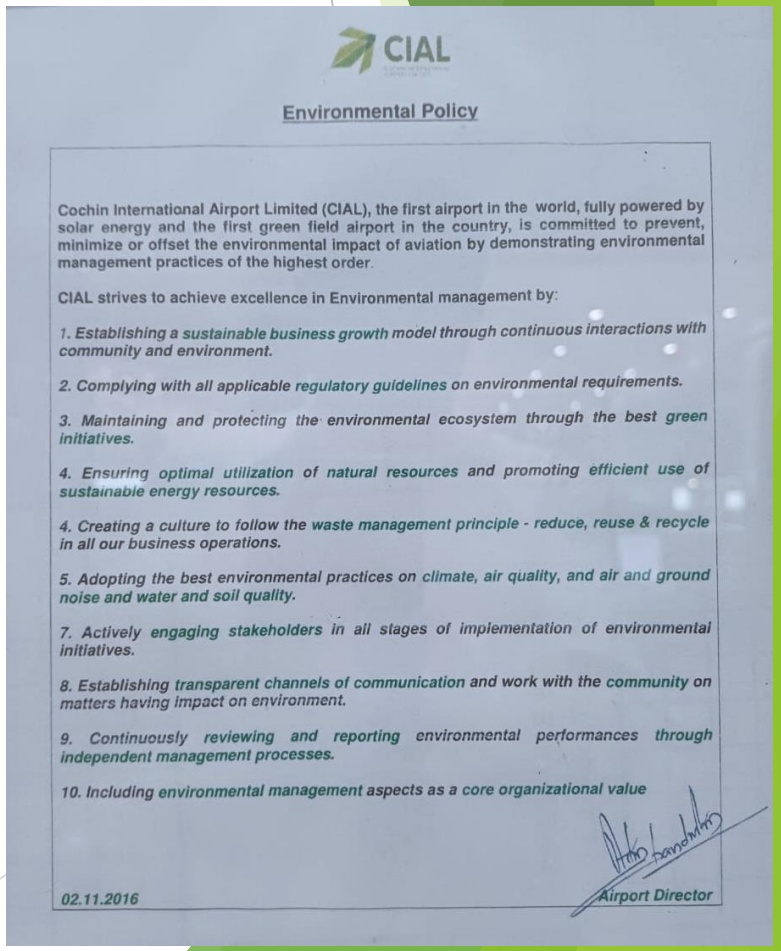
India’s Green Energy Initiatives

- **National Solar Mission** - mission's goal is to achieve 100 GW of solar power capacity by 2022, which has been further extended to 280 GW by 2030.
- **Wind Energy Development**
- **Green Energy Corridor** - project aims to improve the infrastructure for renewable energy generation and transmission.
- **Promotion of Electric Vehicles (EVs)** - initiative aims to reduce dependence on fossil fuels and decrease vehicular emissions.

Cochin International Airport Limited (CIAL) Environmental Policy

CIAL strives to achieve excellence in Environmental management by:

1. ***Establishing a sustainable business growth model through continuous interactions with community and environment.***
2. ***Complying with all applicable regulatory guidelines on environmental requirements***
3. ***Maintaining and protecting the environmental ecosystem through the best green initiatives.***
4. ***Ensuring optimal utilization of natural resources and promoting efficient use of sustainable energy resources.***



CIAL

Environmental Policy

Cochin International Airport Limited (CIAL), the first airport in the world, fully powered by solar energy and the first green field airport in the country, is committed to prevent, minimize or offset the environmental impact of aviation by demonstrating environmental management practices of the highest order.

CIAL strives to achieve excellence in Environmental management by:

1. Establishing a sustainable business growth model through continuous interactions with community and environment.

2. Complying with all applicable regulatory guidelines on environmental requirements.

3. Maintaining and protecting the environmental ecosystem through the best green initiatives.

4. Ensuring optimal utilization of natural resources and promoting efficient use of sustainable energy resources.

4. Creating a culture to follow the waste management principle - reduce, reuse & recycle in all our business operations.

5. Adopting the best environmental practices on climate, air quality, and air and ground noise and water and soil quality.

7. Actively engaging stakeholders in all stages of implementation of environmental initiatives.

8. Establishing transparent channels of communication and work with the community on matters having impact on environment.

9. Continuously reviewing and reporting environmental performances through independent management processes.

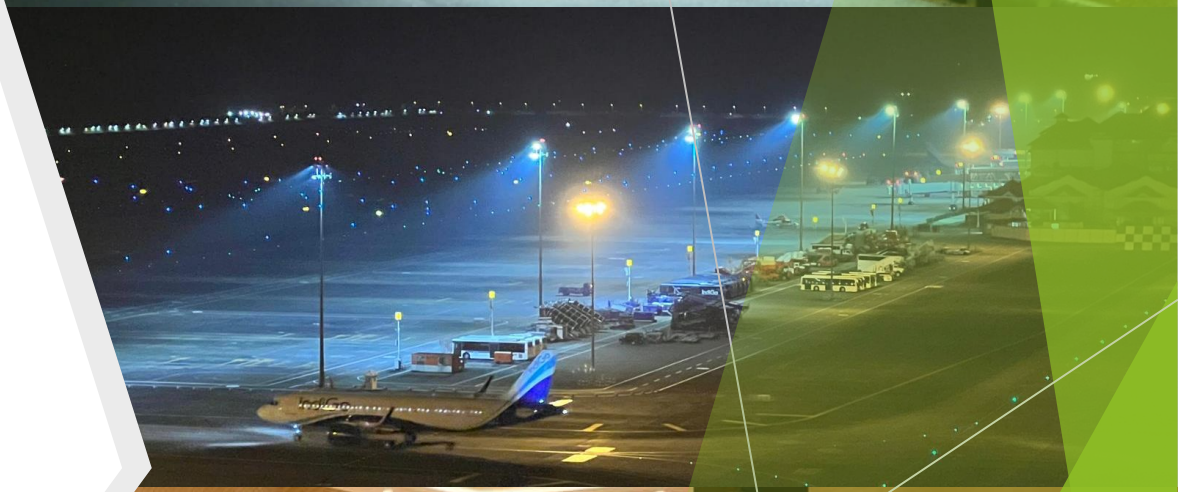
10. Including environmental management aspects as a core organizational value

02.11.2016

Airport Director

Cochin International Airport Green Energy Vision

- Strives to achieve self-sufficiency in power by utilizing renewable energy resources.
- Produces Renewable Energy more than that required for operations.
- Green Energy vision
  - Solar Power Leadership
  - Run-of-river small hydroelectric projects
  - Energy and water conservation
  - Electric vehicles (EVs) and Infrastructure
  - Green hydrogen Plant



Triggering Factor

For CIAL, the switch from conventional energy to solar dependence was triggered by the substantial rise in electricity charges.

In 2012, power tariff for CIAL went up from ₹4 ($0.048) a unit to ₹7 ($0.084). The annual expenses spiralled to ₹120 million ($1.437 million) from the previous level of ₹70 million ($0.838 million).

On an average, the daily electrical energy requirement of Cochin Airport is around 50,000 units.

CIAL Solar Projects Timeline

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MAR 2013 — **100 kWp**

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MAR 2013 — **100 kWp**

NOV 2013 — **1 MWp**

CIAL Solar Projects Timeline

MAR 2013	100 kWp
NOV 2013	1 MWp
AUG 2015	14.4 MWp

CIAL Solar Projects Timeline

MAR 2013	100 kWp
NOV 2013	1 MWp
AUG 2015	14.4 MWp
FEB 2017	3 MWp

CIAL Solar Projects Timeline

MAR 2013	100 kWp
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CIAL Solar Projects Timeline

MAR 2013	100 kWp
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AUG 2015	14.4 MWp
FEB 2017	3 MWp
FEB 2017	2 MWp
JAN 2019	7.5 MWp

CIAL Solar Projects Timeline

MAR 2013	100 kWp
NOV 2013	1 MWp
AUG 2015	14.4 MWp
FEB 2017	3 MWp
FEB 2017	2 MWp
JAN 2019	7.5 MWp
APR 2019	5.1 MWp

CIAL Solar Projects Timeline

MAR 2013	100 kWp
NOV 2013	1 MWp
AUG 2015	14.4 MWp
FEB 2017	3 MWp
FEB 2017	2 MWp
JAN 2019	7.5 MWp
APR 2019	5.1 MWp
JUN 2019	427 kWp

CIAL Solar Projects Timeline

MAR 2013	100 kWp
NOV 2013	1 MWp
AUG 2015	14.4 MWp
FEB 2017	3 MWp
FEB 2017	2 MWp
JAN 2019	7.5 MWp
APR 2019	5.1 MWp
JUN 2020	427 kWp
2021	5.8 MWp

CIAL Solar Projects Timeline

MAR 2013	100 kWp
NOV 2013	1 MWp
AUG 2015	14.4 MWp
FEB 2017	3 MWp
FEB 2017	2 MWp
JAN 2019	7.5 MWp
APR 2019	5.1 MWp
JUN 2020	427 kWp
2021	5.8 MWp
Mar 2022	12 MWp

CIAL Carport

12 MWp Terrain based solar plant

Location : Payyannur, Kerala
Inaugurated in March 2022
DC capacity : 11.67 MWp
No of pv modules installed :34740

- State of the art Terrain-based Installation - a first in South India
- No changes has been made in the natural gradient of the land accommodating 35% extra panels. An area of 2.75 acres/MW was only required as against 3.75 acres/MW in flat land
- Decisive in reducing carbon footprint by cutting CO_2 emission by 11400 MT per year
- A step forward from power Neutrality to Power Positivity
- With this CIAL Installed capacity of Renewable Energy is 50 MWp
- Units generated per day by CIAL is now 2,00,000 KWH and Consumption per day is 1,60,000 KWH, excess energy banked with KSEBL

4.5 MW
SMALL HYDRO ELECTRIC PROJECT

Location: Arippara, Kerala

Inaugurated in November 2021

Runoff the river project

- Being a runoff the river project, CIAL SHP at Arippara works on limited storage of water causes no adverse effect on the environment.
- The Scheme envisages the construction of an overflow type weir across the river, which diverts the water to an intake pool from where the intake structure and connected water conductor system (WCS) starts.
- A Surge tank is constructed to moderate the water flow during load acceptance and load rejection time.
- A penstock commencing from the the surge tank feeds two machines of 2.25MW capacity.
- A surface powerhouse, with a horizontal Francis Turbine, is installed at the right bank of the river with an installed capacity of 4.5MW (2x2.25 MW) anticipating 10 % overload.

Agrivoltaics

Harvesting of both food and energy together

Loss of water due to transpiration is reduced leading to reduced irrigation requirements.

Protection of crops from adverse weather conditions

AGRIVOLTAICS – CIAL EXPERIENCE…!

90 metric tonnes of pesticide-free vegetables produced

AGRIVOLTAICS – CIAL EXPERIENCE…!

Other Green Initiatives

- Solar Boat for use in inland water canal systems.
- Electric charging station with free charging facility
- Transition from diesel-powered to Compressed Natural Gas (CNG) and electric vehicles for airport operations, including ground handling services
- Promotion of Public transport using Electric vehicles in coordination with KMRL
- Converted the airfield ground lighting from halogen lamps to LEDs
- Uses energy-efficient baggage handling facilities
- Airport Buggies, ride on scrubbers, trolley pushers are all converted to electric equipment's.
- Rainwater harvesting.
- Wastewater treatment plant.

Green Hydrogen Plant

Cochin International Airport Ltd (**CIAL**), has entered into a MoU with Bharath Petroleum Corporation Limited (**BPCL**) for setting up a pilot size green hydrogen plant in the premises of Cochin Airport.

The pilot plant will come up on CIAL land and use solar power, making the proposed plant totally green. Plant production capacity 1000 KW.

Specification Category	Details
Electrolysis Technology	
- Type	Alkaline, PEM (Proton Exchange Membrane), Solid Oxide
- Efficiency	60-80%
Energy Source	
- Renewable Energy Integration	CIAL's existing solar infrastructure
- Energy Storage	Battery storage systems for balancing supply and demand
Hydrogen Storage	
- Storage Capacity	High-pressure tanks or cryogenic systems
Distribution and Usage	
- End-Use Applications	Fuel for hydrogen vehicles, power generation, industrial processes
Environmental and Safety	
- Emissions	Zero carbon footprint (using renewable energy sources)
Potential Advantages	
- Sustainability	Carbon neutrality, enhanced energy security

CIAL's green energy generation touches 25 Cr. (250 million) Units !

To produce 1MWp Solar power

Area required: 16,000 m^2

Cost: ₹5 crore ($0.60 million)

Average daily generation of 1.56 lakh (0.156 million) units of electricity

Till date reduced 1.6 lakh (0.16 million) metric ton of carbon footprint.

75 lakh (7.5 million) units generated so far alone from its hydro project

12,04,750 MT of CO_2 is estimated to be saved in 25 years

AWARDS & RECOGNITIONS

- **Energy and Environment Foundation Global Excellence Award (2015)**
- **World Green Building Council (WGBC) Recognition**
- **International Solar Alliance (ISA) Recognition**
- **Golden Peacock Award for Sustainability (2018)**
- **SKOCH Award for Renewable Energy**
- **Asia-Pacific Airports Innovation Award**

UN Champions of the Earth Award (2018)

CIAL was honored with the United Nations' highest environmental accolade for its leadership in renewable energy and entrepreneurial vision. This prestigious award recognizes outstanding environmental leaders from the public and private sectors, as well as from civil society.


THANK YOU