How are Airports Being Designed With the Environment in Mind: Bonaire Case Study

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Introduction

- **Giordano Molina**, as COO of Flamingo International Airport in Bonaire, leads **operational strategy** at Bonaire's airport, driving initiatives that balance **growth**, **sustainability**, and the island's unique **identity**. Giordano holds a Bachelor in Aerospace Technology and a Master's in Industrial Design and built a career with roles at both **airlines** and **airports**, resulting in a deep expertise in airport operations and development.

- **Aasif Bapoo** is the **Airside Systems Lead** at NACO, with over 19 years' experience in airport consulting. As a global specialist in airfield ground lighting, apron systems, and power and control systems, he has delivered solutions across diverse international projects. Aasif is deeply committed to **sustainability**, embedding energy-efficient and **environmentally responsible practices** into airside infrastructure. His work reflects a blend of technical excellence and **forward-thinking design**, aligned with global **aviation standards** and sustainable development goals.

Flamingo International Airport, Bonaire

- Flamingo International Airport, Operated by Bonaire International Airport (BIA), caters to several flights to The Netherlands, USA, Canada and neighbouring Caribbean destinations on a daily basis.
- With 470,000 annual passengers in 2024, Flamingo Airport is the 4th largest airport in The Netherlands
- Bonaire Airport has a focus on sustainable development to mitigate its impact on the environment, implementing several measures, such as the approved the construction of a 3,000 m² solar park with a capacity of 1 megawatt, which equals 50% of the airport's annual demand, resulting in a reduction of 800 tons of CO_2.

Improved and Sustainable Performance

- For the airport's Airfield Ground Lighting which needed replacement to remain compliant with ICAO, the airport saw an opportunity to further enhance its sustainability by transitioning to a modernized AGL solution.
- NACO was appointed for the design and supervision of the AGL upgrade project.

AGL Challenges

- The system we had was more than 20 years old, outdated, and caused operational and reliability challenges.
- It consumed excessive energy, added pressure on the electrical grid, increased costs, and worsened BIA's carbon footprint.
- Over the past years, BIA has focused on enhancing airside safety, and this project was an important step forward.

The AGL Project

- This project was carried out in cooperation with Rijkswaterstaat and with financial support from the Ministry of IenW.
- A completely new, state-of-the-art AGL system gives BIA a 20-year leap forward.
- With this project, we have significantly improved airside safety and reliability, while also making BIA more sustainable.

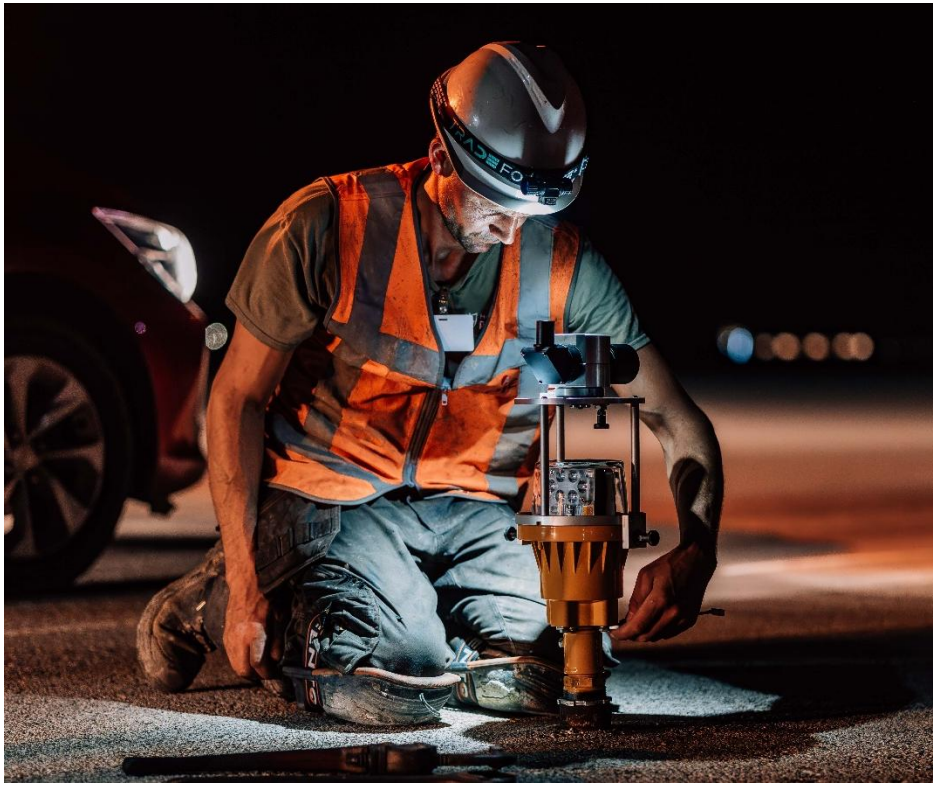
All Airfield Ground Lighting replaced with LED

Key Metrics

- Compliance with regulatory standards
- Achieve maximum energy reduction
- System designed for easy local maintenance
- Maintain full runway availability during operations

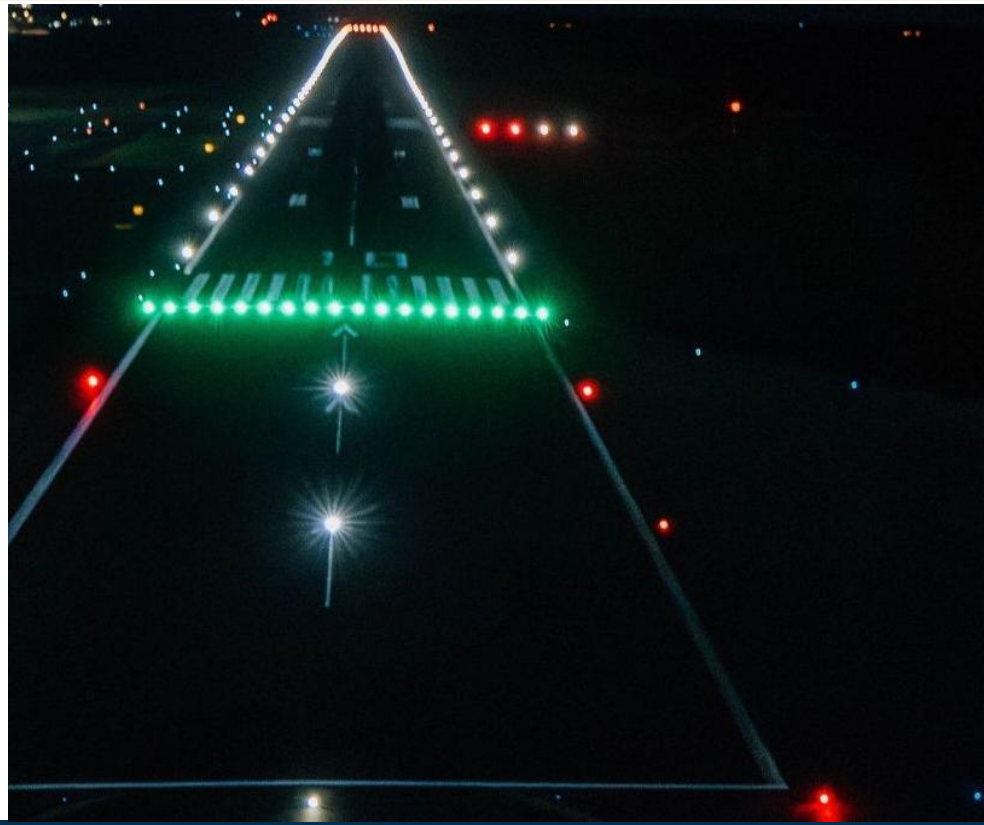
Solution

- Adopted 6.6A LED-based AGL system
- First in Dutch Caribbean with Full LED Runway Lighting



All Airfield Ground Lighting replaced with LED

- The AGL works consisted of new AGL Substation, runway lighting, guidance signs, power supply systems, control systems and hundreds of sustainable LED AGL light fixtures with more than 100 kilometers of cabling.
- The construction phasing was planned to predominantly happen at night, so that the airport could remain open during the day-time. The new system was installed in parallel to maintaining the existing system to ensure uninterrupted operations.



Energy efficiency and increased Sustainability

Energy savings on newly installed Runway Edge Lights (No. 118)

- Halogen to LED Savings
- Assuming 8 hours per day annually

GREEN SAVINGS
6911.4KWH: Total LED Energy Consumption per Year
29726.3KWH: Total Incandescent Energy Consumption per Year
22814.9KWH: Total Energy Consumption Reduction per Year

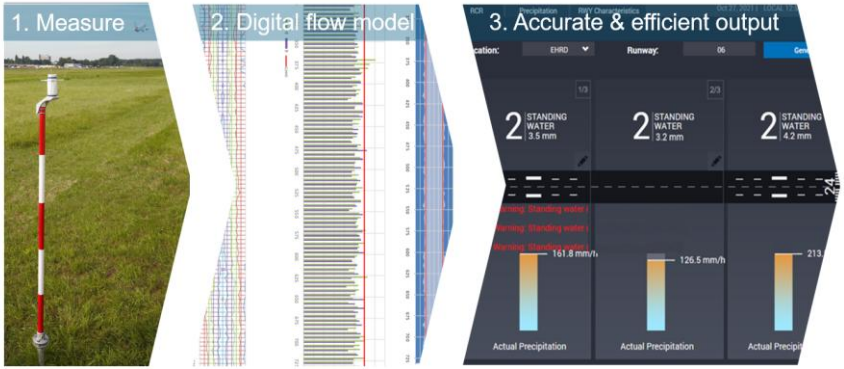
Greenhouse Gas Equivalencies Calculator | US EPA

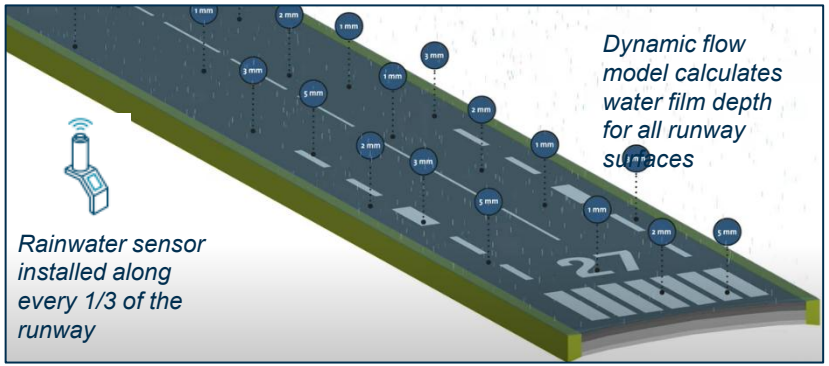
Operational efficiency results in reduced impact on Climate

- In response to ICAO's Global Reporting Format on Runway Condition Reporting (GRF), which intends to:
  - *reduce runway excursions, one of the top aircraft accident risk categories;*
  - *standardize the assessment and reporting of the presence and amount of weather-related contaminants on the runway surface, per runway third;*
  - *provide pilots with standardized, uniform information on the condition of the runway.*
- Bonaire Airport has proactively adopted RCR-Tool© a sustainable, fully automated, and near-real-time runway condition assessment and reporting system with "zero" impact on runway operations.

NACO RCR-Tool© at BON airport

- Provides real-time, precise runway condition insights, allowing pilots to make safe landing decisions without the need for physical runway inspections. This reduces unnecessary runway closures, improving operational efficiency and sustainability.
- Using real-time weather data water depth is accurately modelled even during heavy rainfall, addressing key aviation challenges - including how to better deal with climate change-related weather events and constriction of operational / maintenance resources.
- First airport in the Kingdom of The Netherlands to become compliant with the ICAO GRF in December 2020.





THANK YOU

If you have any further questions that we did not have time for, feel free to reach out to:

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