

Airport Carbon Emission Accreditation as a Policy Approach towards Net Zero Carbon 2050

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Abstract—Airport carbon emissions accreditation is a carbon management program for airports that can independently assess and recognize airport efforts to manage and reduce CO₂ emissions. This proposal is an adaptation of the Airport Carbon Accreditation Program launched by the Airport Council International (ACI) SINCE 2009. In this program, concrete steps can be taken starting from identification, planning, prioritization, implementation, monitoring and improvement, determination, justification and demonstration. It is important to immediately begin identifying or censusing potential carbon emitters in all areas of airport resources which are then calculated so that the value of carbon emissions can be known quantitatively and specifically. Then further efforts such as lowering or even offsetting can be done in a more measurable manner. If the airport carbon offset policy, which replaces airport carbon emissions or other greenhouse gases in order to compensate for emissions, is implemented and becomes a global mandatory, it means that Indonesia has a fairly strong footing.

Keywords—Airport Carbon Accreditation, Net Zero Carbon, Green Airports, Greenhouse Gases.

Introduction

The United Nations Climate Change Conference or COP 21 held in Paris 30 November 2015 - 12 December 2015 has the main objective of strengthening the global response to the threat of climate change by keeping global temperature rise this century well below 2 degrees Celsius above pre-industrial levels and to pursue efforts to limit temperature rise. even further to 1.5 degrees Celsius, which requires Zero Carbon conditions by 2050. Each country must nationally determine their contribution to this target (Intended Nationally Determined Contributions, INDCs). Against this effort, the Government of the Republic of Indonesia ratified the agreement through Law of the Republic of Indonesia Number 16 of 2016 concerning Ratification of the Paris Agreement to the United Nations Framework Convention on Climate Change.

Law of the Republic of Indonesia Number 1 of 2009 concerning Aviation Article 10 Guidance, states that aviation guidance is carried out by paying attention to all aspects of community life and is directed at fulfilling environmental protection by efforts to prevent and overcome pollution resulting from air transport and airport activities, and

preventing climate change. , as well as aviation safety and security.

The consensus formed at the High Level Meeting-ICAO Long Term Aspirational Goal (LTAG) in 2022 was that civil aviation contributed 2.5% of global carbon emissions and agreed to a Net Zero Carbon (NZC) consensus by 2050. At this meeting the Commission on Aviation Environment Protection (CAEP) said that towards NZC 2050, efforts related to Sustainable Aviation Fuel (SAF) management contributed 71%, aircraft technology management contributed 12%, airport operations and flight traffic contributed 9%, and the Carbon Offsetting Reduction Scheme for International Aviation (CORSA) by 8%.



Fig. 1. How do Carbon Emissions occur at Airports?

Airport stakeholders are required to implement best practices in carbon management and achieve the intended emission reductions. Airports must be able to map their carbon footprint through identifying emission sources or 'carbon hotspots' and understanding and implementing management of airport carbon emissions and their operations in a fit for purpose manner so as to contribute positively to the achievement of NZC 2050.

The fundamental question as a problem question is what proposals can be submitted as a systemic and integrated framework in the airport entity's efforts to manage carbon emissions towards Net Zero Carbon 2050?

Problem Analysis

As a systemic and integrated framework in the airport entity's efforts to manage carbon emissions towards Net Zero Carbon 2050, it can be explained through the narrative of



airport carbon emissions accreditation as a policy approach towards NZC 2050.

Adapting the Airport Carbon Accreditation Program (ACAP), as a flagship program of the Airport Council International (ACI), airport carbon emissions accreditation aims to encourage and enable airports to implement best practices in carbon management and achieve emission reductions. This program assesses and recognizes airports' efforts to manage and reduce carbon emissions.

Airports can participate in the program at one of 6 levels of accreditation which become increasingly stringent at each level, namely: 1. Mapping; 2. Reduction; 3. Optimization; and 4. Transformation. Additionally, Airports at Levels 3 and 4 can choose to offset their residual emissions, thereby achieving Level 3+ (Neutrality) and Level 4+ (Transition), respectively.

The Airport Carbon Emission Accreditation process involves cooperation and coordination between the Airport and the Airport Authority Office as Inspector and Administrator. In the process, the airport's carbon footprint for 12 months must be independently verified in accordance with ISO 14064-1 (Greenhouse Gas Accounting). This evidence must be provided to the Administrator along with all claims regarding the carbon management process. The Airport Authority Office verifies and reviews the application and approves and awards the accreditation certificate.

The program includes a number of key elements that airports must consider to achieve appropriate accreditation. These elements include:

- 1) Policy: Airports must have clear policies and commitments to reduce carbon emissions.
- 2) Carbon Footprint: Airports must regularly measure and report their carbon footprint using standard methods such as the GHG Protocol and ISO 14064-1.
- 3) Targets and Implementation: Airports must formulate emission reduction targets and implement them according to plan.
- 4) Compliance Targets: Airports must comply with the targets set by the Airport Authority Office.
- 5) Carbon Management: Airports must develop a Carbon Management Plan that includes responsibilities, resource allocation, initiatives, implementation plans, communications, and self-assessment.
- 6) Stakeholder Management: Airports must engage with a variety of stakeholders, including airlines, ground service providers, cargo handlers, and many others.
- 7) Neutrality: To achieve the Neutrality level, the Airport must compensate for residual emissions and business travel of its staff that cannot be reduced by other means.
- 8) Renewal Cycle: This program also includes a continuous renewal cycle to ensure business continuity in reducing emissions.
- 9) Examiner: The Airport Authority Office is responsible for verifying and reviewing airport applications and providing accreditation certificates.

Each level of accreditation has a series of requirements for various key elements as presented in Table 1 below:

TABLE 1. Summary of Participation Requirements at Each Level of Accreditation

Key Elements	Level 1 (Mapping)	Level 2 (Subtraction)	Level 3 (Optimization)	Level 3+ (Neutrality)	Level 4 (Transformation)	Level 4+ (Transition)
Policy Statement	Policy commitment to emission reduction.				Absolute emission reduction policy commitment.	
Carbon Footprint	Emissions under Airport control.		Emissions under Airport control + Selected emissions from other sources related to airport activities.		Emissions under Airport control + Significant Emissions from other sources related to airport activities.	
Targets and Implementation	--	Formulation of carbon emission reduction targets (absolute or relative) for emissions under airport control.			Formulation of long-term absolute reduction targets for emissions under Airport control and emissions from other sources in line with the IPCC 1.5°C or 2°C pathway.	
Compliance Targets	--	Annual increase to the current 3-year average.			Compliance is assessed every 6 years through carbon footprints as well as interim and annual milestones.	
Carbon Management	--	Creation of a Carbon Management Plan to achieve targets, with requirements depending on the level of accreditation.				
Stakeholder Management	--	--	Making a Stakeholder Partnership Plan.		Creation of a Stakeholder Engagement Plan.	
Neutrality	--			Offset of residual emissions	--	Offset of residual emissions
Update Cycle	Every year; Verified every 2 years.		Every year; 3-year cycles are permitted under certain conditions.		Every 3 years; Traces were not verified in the interim years.	
Examiner	Approved examiners for Levels 1 – 3/3+				Approved examiner for Level 4/4+	

The Airport Authority Office is collaborating with Airports in the initial phase of implementing the Airport Carbon Emissions Accreditation Program, which includes the implementation of Level 1 (mapping) and Level 2 (reduction). In this collaboration, Airports have access to a series of concrete measures to reduce their carbon emissions:

- 1) Identification: Airports must identify and map their carbon footprint annually to understand key emission sources. This involves analyzing and identifying the largest sources of emissions with carbon tracking tools or monitoring software.
- 2) Planning: Airports need to plan how to reduce their carbon footprint and limit future emissions. Emission reduction targets should be updated annually to ensure their effectiveness.
- 3) Prioritization: Prioritize carbon reduction actions based on factors such as carbon hotspots, carbon reductions, costs, return on investment, and cost benefits.
- 4) Implementation: Once actions have been prioritized, implementation begins with an implementation schedule and periodic reviews.
- 5) Monitoring and Improvement: Airports regularly monitor performance and implement corrective actions if targets are not achieved.
- 6) Determination: The airport determines that it has implemented all available mitigation options.

- 7) Justification: The airport explains the reasons behind carbon reduction measures not being implemented.
- 8) Demonstration: After following all steps, the airport can demonstrate that they have implemented all reasonable measures and purchased an indemnity.
- 9) This process can be repeated annually to ensure continuous improvement and reduced emissions. The carbon management plan must also be updated regularly.

Closing

Strategically, in building a policy framework and implementing accreditation of airport carbon emissions towards NZC 2050 in the Indonesian air transportation system, this can be done by implementing the following implementation strategy:

- 1) Preparing policies and programs through paying attention to issues of legislation, regulations, policies, interventions and instruments, outreach & awareness, supervision and control;
- 2) Service innovation through attention to regulatory authorization issues, internal services, creative investment financing and consulting services, etc.;
- 3) Transparency and public trust through attention to issues of engagement, relationship building, data & information sharing and accountability;
- 4) Data-based decision making, which can be achieved through strong attention to big data issues, advanced analysis, environment and infrastructure, and governance, and;
- 5) Modern and inclusive employment management through attention to HR issues, work equipment, culture and workplace. This requires agility and innovation in meeting the demands of future aviation.

Responding to the actual issues above, a proposal for an implementation strategy approach that can be elaborated by capitalizing on the organization's existing resources and optimizing the interface of science and technology and the related strategic environment in a directed, orderly and integrated manner through the 4 (four) "C" policy implementation method, namely Cooperation, Consensus, Compliance and Commitment.

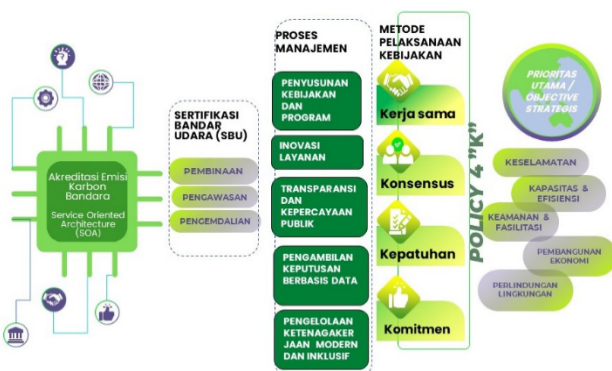


Fig. 2. Strategy Proposal

With the belief that through the right and wise approach, the challenges of managing carbon emissions towards Net Zero Carbon 2050 as well as the dynamics of challenges in building sustainable Indonesian air transportation can be controlled to realize Indonesian civil aviation SELAMANYA (Safe, Safe and Comfortable).

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REFERENCES

- [1] Adi Kusumaningrum, 2017, "Pengaturan Safeguards Sektor Angkutan Udara Asean di Era Liberalisasi Jasa, Jurnal Bina Mulia Hukum, No. 2, Vol 1;
- [2] Alan Boyle, 2012. "Human Rights and the Environment: Where Next?", The European Journal of International Law, No. 3, Vol. 23;
- [3] <https://www.airportcarbonaccreditation.org/>
- [4] <https://www.icao.int/environmental-protection/CORSIA/Pages/ETM-V-IV.aspx>
- [5] <https://www.icao.int/environmental-protection/Documents/Publications/Doc%209968%201st%20Edition%20alltext%20en%20FINAL.pdf>
- [6] <https://www.icao.int/environmental-protection/Pages/Ecoairports.aspx>
- [7] [icao.int/environmental-protection/Documents/COMMUNITY_ENGAGEMENT_FOR_AVIATION_ENVIRONMENTAL_MANAGEMENT.EN.pdf](https://www.icao.int/environmental-protection/Documents/COMMUNITY_ENGAGEMENT_FOR_AVIATION_ENVIRONMENTAL_MANAGEMENT.EN.pdf)
- [8] M.N Postrino, 2011, Environmental Effects of Airport Nodes: A Methodological Approach dalam M.N. Postrino (Ed.), Regional Airports, Boston: WIT Press;
- [9] Nadia Astriani, Siti Sarah Afifah dan Maret Priyanta (Ed.), 2018, Sistem Hukum Lingkungan dan Pengelolaan Sumber Daya Alam yang Berkelanjutan-50 Tahun Prof. Dr. M. Daud SIlalahi, S.H. untuk Universitas Padjadjaran, Bandung: LoGoZ Publishing;
- [10] Peraturan Pemerintah Republik Indonesia Nomor 27 Tahun 1999 tentang Analisis Mengenai Dampak Lingkungan Hidup;
- [11] Puneet Pathak, 2014, "Human Rights Approach to Environmental Protection", OIDA International Journal of Sustainable Development, No. 1, Vol. 7
- [12] Syazwani Sahrir et. al., 2014, "Environmental and Health Impacts of Airport Infrastructure Upgrading: Kuala Lumpur International Airport 2", Procedia-Social and Behavioral Sciences, No.16, Vo. 153;
- [13] Undang Undang Republik Indonesia Nomor 16 Tahun 2016 tentang Pengesahan Paris Agreement to the United Nations Framework Convention on Climate Change (Persetujuan Paris Atas Konvensi Kerangka Kerja Perserikatan Bangsa-bangsa Mengenai Perubahan Iklim)
- [14] Undang-Undang Nomor 1 Tahun 2009 tentang Penerbangan;
- [15] Undang-Undang Nomor 32 Tahun 2009 tentang Perlindungan dan Pengelolaan Lingkungan Hidup