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Strategic environmental management – tool for the implementation SDGs at airport operation

The implementation of SEM system benefits an organization by increasing environmental awareness and complying with relevant regulations. Properly designed environmental management system enhances company to effectively find opportunities to reduce costs through the implementation of innovative management and technological solutions.

Civil aviation is high-growth market, that leads to an increase of the impact on the environment at local and global scales. In 2016, aviation was accountable for 3.6% of the total EU28 greenhouse gas emissions and for 13.4% of the emissions from transport, making aviation the second most important source of transport GHG emissions after road traffic [1].

Strategic environmental management (SEM) is a set of the management principles of an organization's activity to ensure the achievement of the optimal ratio between economic and environmental benefits on the basis of environmental safety and sustainable development. SEM provides a systematic approach to identify, assess, monitor and reduce the negative environmental impact. The environmental management system is based on the repeating Schuhart-Deming cycle (Fig. 1), as the basis for most management systems at organization [2].

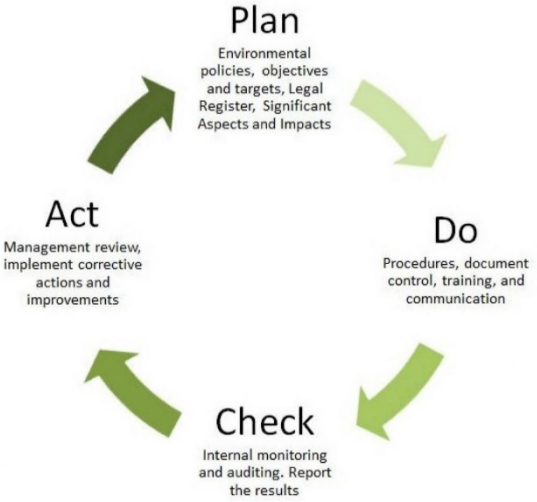

Fig.1. Schuhart-Deming cycle of SEM

At the **PLAN** stage → establishment of environmental goals and tasks in accordance with the organization's environmental policy; development the processes, practices and the choice of methods to achieve the defined goals.
At the stage DO/ **PERFORM** → achievement of goals through the implementation of certain tasks and processes according to defined Plan.
At the stage **CHECK** → assessing and monitoring of actual indicators in comparison with the planned indicators; detection and analysis of observed deviations. Results of this evaluation must be reported.
At the **ACTION** stage → taking measures for continuous improvement.

Kinds of strategic environmental management

Environmental management is based on a number of the different standards for the creation of an effective system of environmental impact regulation at the organization, the most common are:

- **ISO 14001:2015** is part of the ISO 14000 "family of standards" that focuses on management of an organization's environmental responsibilities, regardless of its type of activity. Specifically, ISO 14001:2015 is aimed to achieve the environmental goals by involving top management to efficiently achieve long term success and at the same time contribute to sustainable development;
- **The European EMAS regulation** (Eco-Management and Audit Scheme) is aimed to to evaluate, report, and improve an organization's environmental performance. EMAS is the most credible and robust environmental management tool, adding several elements in addition to the requirements of the international standard EN ISO 14001 [3].

In order to increase the efficiency of the airport, the environmental management system is often integrated with other management systems, as occupational safety management (OHSAS 45001: 2018), energy management (Energy ISO 50001), product quality (Quality ISO 9001), etc.

Benefits of SEM implementation at airports

A recent evaluation of Directive 2009/12/EC on Airport Charges [] together with an analysis of publicly available information, revealed that approximately 60% of the busies EU28+EFTA airports have implemented environmental charges. And 82% of surveyed airports, representing 53% of total EU28+EFTA passengers, were already certified against international standard to effectively monitor and manage their environmental performance (e.g. EU EMAS, ISO 14001) or energy management (Energy ISO 50001) [1].

Airports are often the cause of social and political debates. One of the crucial task of SEM is to provide conditions for exchanging information with all stakeholders contributes to mutual understanding and developing solution regarding the environmental strategy of airport and achievement of sustainable goals. Particularly in the case of Frankfurt Airport, it addresses all of the company's key stakeholders in

targeted manner: passengers, business partners, analysts, property owners, as well as civil society, political and governmental representatives [4].

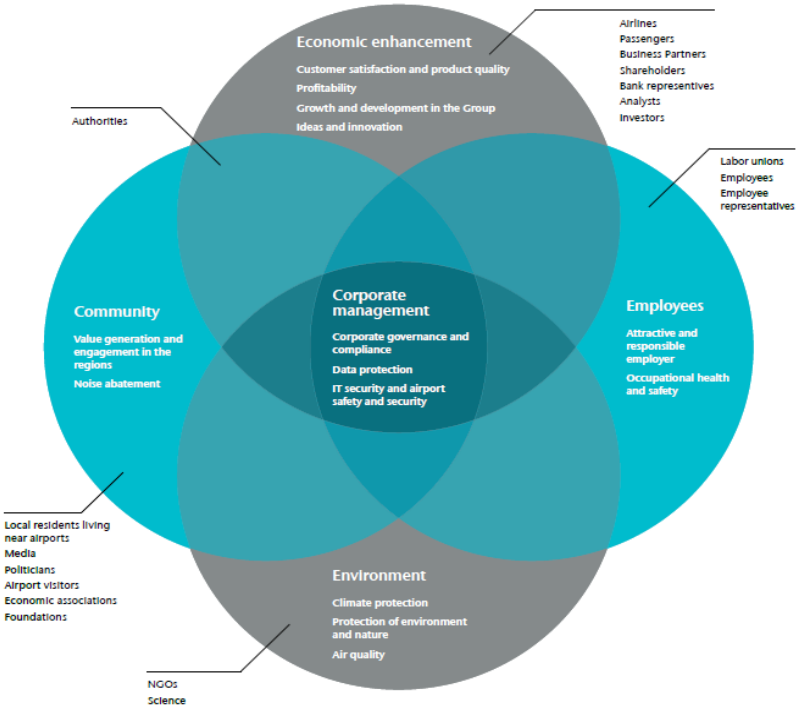

Fig.2. Stakeholder communication of Fraport AG in 2019

Special attention is given to airport employees and neighboors affected by aircraft noise and local air quality at Frankfurt site.

Aviation contribution is nearly 2.8% of global CO_2 emissions [4] and airport is even lower. However, airlines, aircraft manufactures, air traffic control companies and airport operators are involved by climate protection strategy, that contains 3 key points:

1. Increase efficiency or reduce CO_2 growth through technical innovation;
2. Enable CO2 neutral flying by 2050 with new aircraft concepts as well as alternative fuels and propulsion systems.
3. Global climate protection projects that compensate for the increase in CO_2 emissions.

The most part of emission reduction relates with energy saving. Thus, Fraport AG was able to save approximately 16% compared to 2013 and 40% compared to 2000 despite increased traffic numbers.

Conserving energy and GHG emission reduction are focused on following measures:

1. Optimized application of energy and refurbishment of building (installation of control panels at Fraport AG conserved energy by 10 to 30% per one panel);
2. Gradual conversion of fleets to alternative vehicle (application electrically powered devices and machine for ground handling and passenger buses);
3. Conversion of lighting on runway and aprons, terminals and parking garages (Fraport AG was saving approximately 4.8 million KWh per year by replacing almost all conventional lighting with energy-saving and LED technology).

Besides of energy efficiency measures to reduce CO_2 emissions, the SEM also includes generating electricity from renewable energies. Particularly, Fraport AG already adapted energy mix (solar power, wind turbines) with renewable contribution of 55% that has a positive impact on the emission factors and the carbon footprint of Fraport AG [4].

Thus, SEM is one of the tools available for managing environmental matters at an airport along with sustainability plans, certification and other process,

References

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2. ICAO Doc 9968. Report on Environmental Management System (EMS) practices in the Aviation Sector
3. ICAO Doc 9184. Airport Planning Manual. Part 2 – Land Use and Environmental Control. (Керівництво з планування аеропортів. Частина 2 – Використання земельних ділянок та управління довкіллям).
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