

# Inception Report

Research Grant 2021



## ASSESSMENT OF GHG EMISSION REDUCTION POTENTIAL IN THAI AVIATION SECTOR

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## List of Abbreviations and Acronyms

ATM	Air Traffic Management
AGERWG	Aviation GHG Emission Reduction Working Group
BAU	Business-As-Usual
CORSIA	Carbon Offsetting and Reduction Scheme for International Aviation
CAAT	Civil Aviation Authority of Thailand
COP	Conference of the Parties
GHG	Greenhouse gas
ICAO	International Civil Aviation Organization
NDC	Nationally Determined Contributions
UNFCCC	United Nations Framework Convention on Climate Change

# CHAPTER I INTRODUCTION

## 1.1 Rationale

During 2015 United Nations Climate Change Conference held in Paris in December 2015, where 21<sup>st</sup> yearly session of the Conference of the Parties (COP) to the 1992 United Nations Framework Convention on Climate Change (UNFCCC) or in short known as “COP 21” was held, a global agreement toward limiting global warming to “well below 2 °C (compared to pre-industrial level) by representatives of 195 attending parties [1]. Subsequently on 22 April 2016 (Earth Day), 175 countries, including Thailand, signed Paris Agreement in New York followed by a committed statement at 71<sup>st</sup> United Nations General Assembly on 21 September 2016 from 184 countries accounting for 55% of world greenhouse gas (GHG) emission [2]. As part of committed country, Thailand has formulated Nationally Determined Contributions (NDCs) to itemize committed goal of 20-25% GHG reduction by 2030

As shown in Fig. 1, about three-quarters Thailand GHG emission in 2013 comes from energy related, in which electricity and transport are main contributors. Hence, Thailand NDC has focused on energy and transport sectors toward more environmentally friendly infrastructure. Business-As-Usual (BAU) level of GHG emission is identified at 2005, where none of climate change countermeasure has started, with continuous monitoring and forecasting shown in Fig. 2. With 20% committed target of GHG emission reduction in 2030, or equivalently 111 Mton CO<sub>2,eq</sub>, Thailand has established a NDC Roadmap with 41 Mton CO<sub>2,eq</sub> target in transportation sectors from Mode Shift (23 Mton CO<sub>2,eq</sub>), Biofuel (10 Mton CO<sub>2,eq</sub>) and Energy Efficiency (8 Mton CO<sub>2,eq</sub>), as shown in Fig. 3 [3].

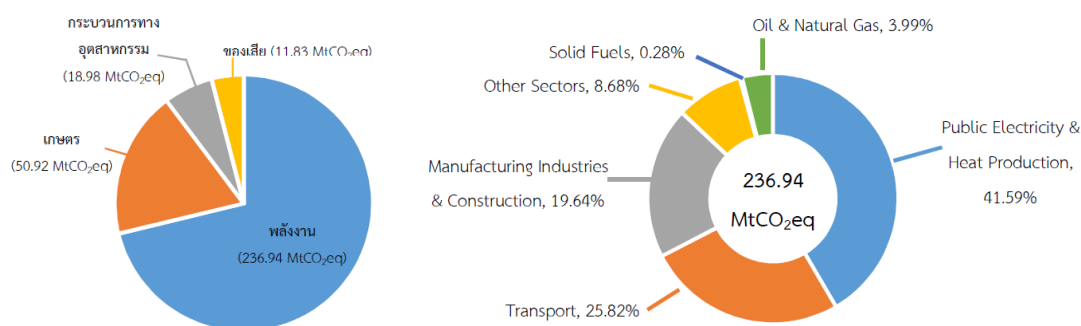


Fig. 1 2013 Thailand GHG emission (left) with breakdown of energy sector (right)



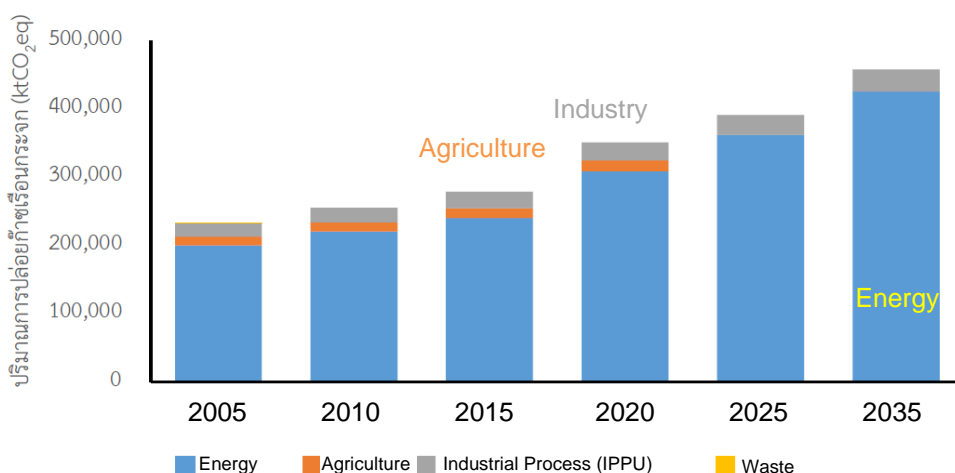


Fig. 2 GHG emission accounting from BAU (2013) with forecasting to 2030

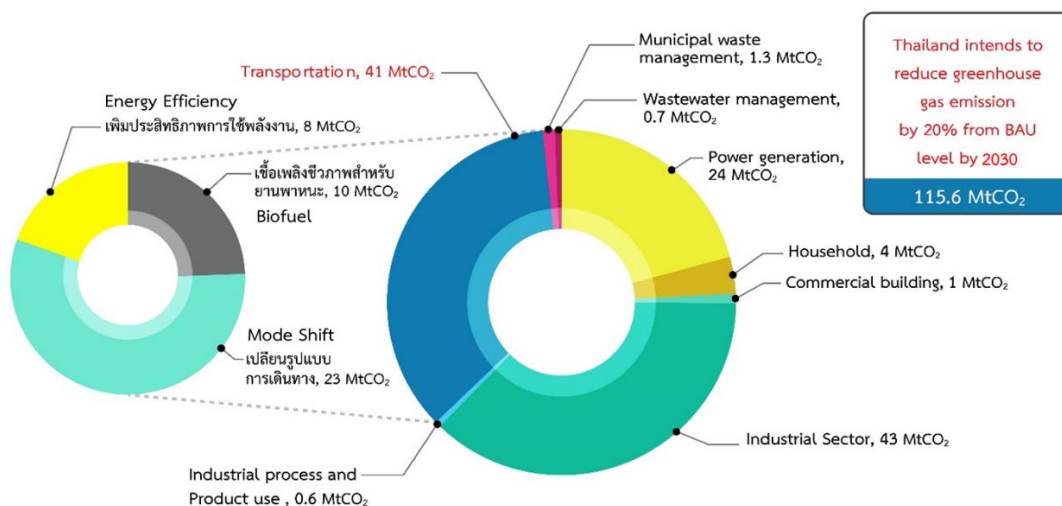


Fig. 3 Thailand NDC roadmap with breakdown of transportation sector

Although all three measures (Mode Shift, Biofuel & Energy Efficiency) of 41 Mton CO<sub>2,eq</sub> target focus on road, rail and water transport, aviation sector has been growing especially with emerging low-cost airlines accounting for 75% and 32% of domestic and international markets in 2015 [4]. On the global scale, 3.6 billion people has travelled by plane resulting one-thirds of passenger-kilometers travelled by car in 2017. Even though CO<sub>2</sub> in aviation is currently about 2-3% of global energy-related CO<sub>2</sub> emission, historical records show 3-5% growth in aviation energy demand. Fig. 4 shows historical fast growing number of international passengers in Thailand with forecast of BAU CO<sub>2</sub> emission till 2030.

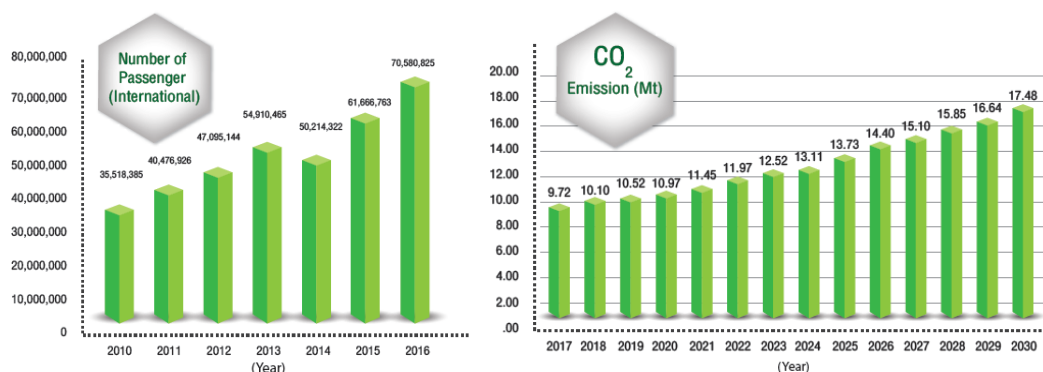


Fig. 4 Historical data of international passengers in Thailand (left) with forecast of CO<sub>2</sub> emission (right)

As part of International Civil Aviation Organization (ICAO), Civil Aviation Authority of Thailand (CAAT) has initiated Thailand’s Action Plan to Reduce Aviation Emission in 2013 with recent update in 2018 [4] to join global effort of improving fuel efficiency and stabilizing CO<sub>2</sub> emission at 2020 levels (shown in Fig. 5 [5]) through the following short/medium/long term mitigation measures through Aviation GHG Emission Reduction Working Group (AGERWG) established in 2011 with structure shown in Fig. 6 [4].

1. Aircraft-related Technology Development such as aircraft minimum fuel efficiency standards
2. Alternative Fuels such as bio jet fuel
3. Improved Air Traffic Management (ATM) and Infrastructure Use such as efficient ATM planning
4. More Efficient Operations such as optimized aircraft maintenance
5. Economic / Market-Based Measures such as Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) and
6. Regulatory Measures/Other such as transparent carbon reporting

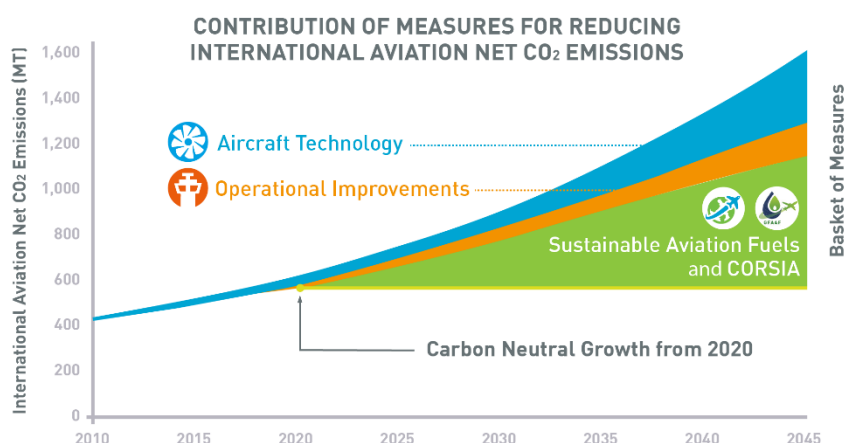


Fig. 5 ICAO's aspirational goals of carbon neutral growth from 2020

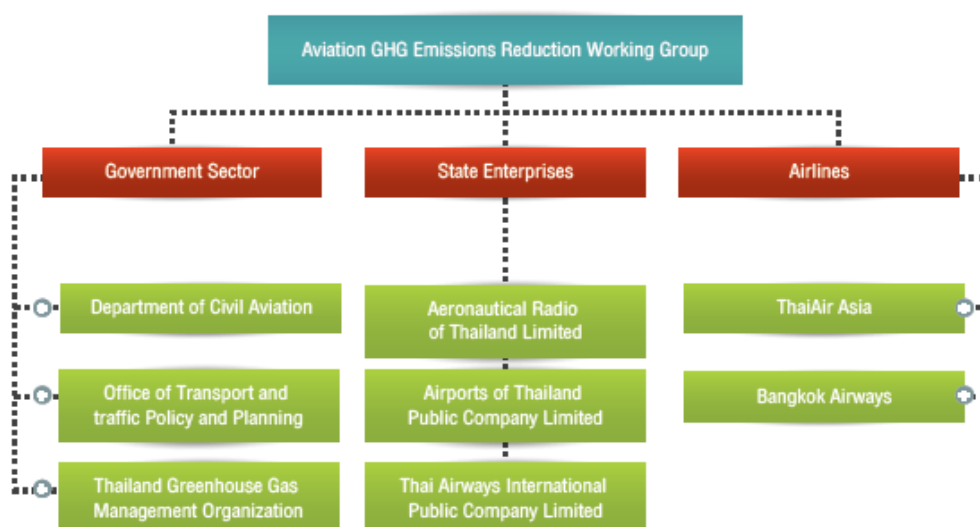


Fig. 6 Aviation GHG Emission Reduction Working Group (AGERWG)

## 1.2 Objectives

The present study aims to assess potential of GHG emission reduction in Thai aviation sector through selected abovementioned measures with COVID-19 impact, where aviation fuel (Jet A1) consumption in 2020 has decreased 62.3% [6].

## 1.3 Methodology

In order to systematically assess potential of GHG reduction in Thai aviation sector, the following methodology is proposed.

1. Update global status and trend on aviation GHG emission reduction with COVID-19 impact.
2. Analyze selected measures critical and suitable to Thailand for GHG emission reduction potential.
3. Conduct roundtable discussion with stakeholders to get feedback for final recommendation.

## CHAPTER 2 RESEARCH PLAN

### 2.1 Project Schedule

Table 1 shows the project planning schedule with project expenditure shown in Table 2. All project members are scheduled to meet regularly to discuss the technical results performed by project research assistant, and directions of the project. Occasionally, the progress report will be presented to the advisors to further seek guidelines and comments of the results and future direction.

Table 1: Project planning schedule

Activity	2020									2021		
	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Update global status and trend on aviation GHG emission reduction												
Analyze selected measures for GHG emission reduction potential												
Conduct roundtable discussion with stakeholders												
Draft final report with recommendation												
Inception report submission	30-Apr											
Interim report presentation					20-Aug							
Interim report submission						30-Sep						
Final report presentation at board meeting									3-Dec			
Final report presentation to IATSS									14/15 Dec			
Final report submission												31-Mar

### 2.2 Project Expenditure

Table 2 shows the breakdown of the project expenditure.

Table 2: Project expenditure

No	Item	Unit cost	# of units	Sub total
1	Project leader	3,000	12	36,000
2	2 Researchers (200 THB/hr x 5 hrs/day x 10 days/month) for 12 months)	10,000	24	240,000
3	Expenses for project meeting	3,000	6	18,000
4	Travel expenses to collect data and interview	2,000	6	12,000
5	Office & computer supply	3,000	6	18,000

No	Item	Unit cost	# of units	Sub total
6	Secretariat's participation portion	10,000	1	10,000
7	Publishing proportion of the report book	50,000	1	50,000
			Total	<b>384,000</b>

## References

1. <https://www.cop21paris.org/>
2. <http://www.oic.go.th/FILEWEB/CABINFOCENTER38/DRAWER027/GENERAL/DATA0000/00000853.PDF>
3. <https://www.otp.go.th/index.php/edureport/view?id=149&id=149>
4. <https://www.caat.or.th/wp-content/uploads/2018/01/Thailand-Action-Plan-2018.pdf>
5. <https://www.icao.int/environmental-protection/pages/climate-change.aspx>
6. <http://www.energy24hours.com/b/board/3503/สถานการณ์การใช้น้ำมันเชื้อเพลิงของปี%202563.html>

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1 <https://www.cop21paris.org/>

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3 <https://www.otp.go.th/index.php/edureport/view?id=149&id=149>

4 <https://www.caat.or.th/wp-content/uploads/2018/01/Thailand-Action-Plan-2018.pdf>

5 <https://www.icao.int/environmental-protection/pages/climate-change.aspx>

6 <http://www.energy24hours.com/b/board/3503/สถานการณ์การใช้น้ำมันเชื้อเพลิงของปี%202563.html>