

Introduce our unique GPU (Ground Power Unit) To reduce CO2 emissions



FEEL THE SKY, MASTER THE TECHNIQUE, AND CREATE THE ENVIRONMENT FRIENDLY SOCIETY

2022.3.4

Self-introduction



HIROYUKI HIOKA

- April 1981** **Japan Airlines Co.,Ltd.**
- June 2006** **JAL General Manager of Business Appraisal Department**
- February 2010** **JAL Senior Vice President of Americans and Regional Manager of New York**
- April 2013** **JAL Executive Officer of General Affairs (General Administration/Legal Affairs/Public Relations/Government Affairs)**
- June 2018** **AGP CORPORATION President and CEO**
- July 2021** **AGP Chairman**

Agenda



1. About AGP

- (1) Company Profile**
- (2) Domestic Network**
- (3) Background of AGP's establishment**
- (4) Business Overview**

2. Our CO2 reduction efforts

- (1) Outline of the power supply business
- (2) In-house product introduction of power-related equipment
- (3) Use of APU (Auxiliary Power Unit)
- (4) Comparison between GPU usage and APU usage
- (5) Our contribution to the environment and society

3. Future Environmental Business

- (1) Expansion and commercialization of environmental contributions
- (2) Emission credit

4. APPENDIX

List of Airports in Japan

1. About AGP

(1) Company Profile



March 31, 2021

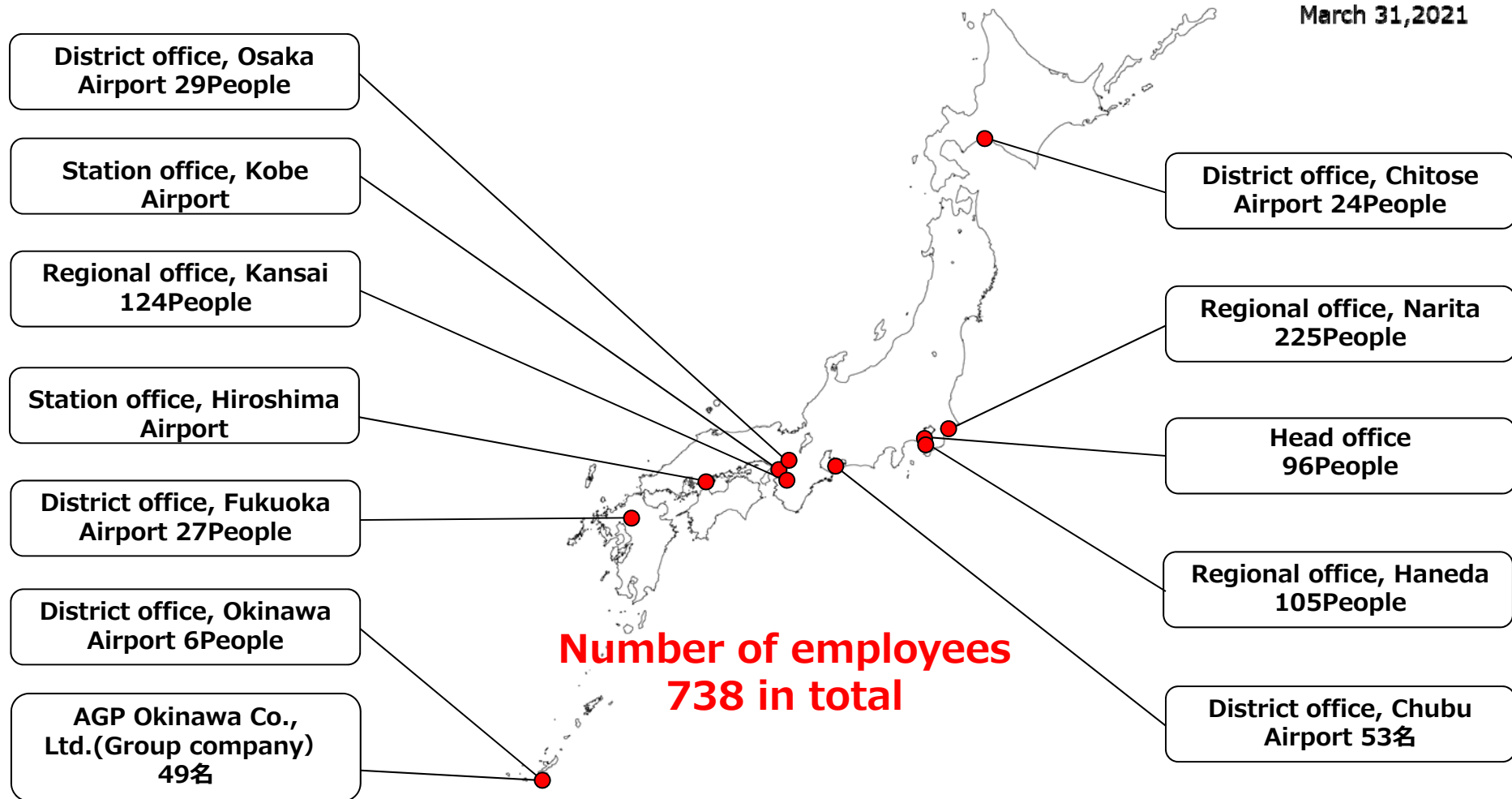
◆ NAME	AGP CORPORATION (AGP : Airport Ground Power)
◆ ESTABLISH	December , 1965
◆ HEAD OFFICE	1-7-1 Haneda Airport, Ota-ku, Tokyo
◆ CAPITAL	2,038,750,000yen
◆ MAJOR STOCKHOLDER	Japan Airlines Co.,Ltd(33.3%) Japan Airport Terminal Co.,Ltd.(26.8%) ANA HOLDINGS INC.(20.0%)
◆ NUMBER OF EMPLOYEES	Total: 738 (as March 31, 2021)
◆ DOMESTIC OFFICES	3 Regional office(Tokyo International Airport, Narita International Airport, Kansai International Airport) 5 District office (New Chitose Airport, Chubu International Airport, Osaka International Airport, Fukuoka Airport, Naha Airport) 2 Station office (Kobe Airport, Hiroshima Airport)
◆ GROUP COMPANIES	AGP Okinawa, AGP Thailand (overseas)
◆ FY2019 RESULTS	Sales: 14,742 million yen, operating income: 1,422 million yen, ordinary income: 1,446million yen
◆ FY2020 RESULTS	Sales: 10,404 million yen, operating income: ▲ 131 million yen, ordinary income: ▲ 58 million yen

1. About AGP

(2) Domestic network



March 31, 2021



Based on 8 major airports, we support airports nationwide 24 hours a day, 365 days a year

1. About AGP

(3) Background of AGP's establishment



Jet passenger planes spread rapidly in Japan in the 1960s

- At that time, aircrafts were not equipped with APU (Auxiliary Power Unit)
- Electricity, air-conditioning, and compressed air for starters were supplied to parked aircraft by ground vehicles



As the ground vehicles of each airline worked concurrently, Concerns about safety due to inefficient operation and congestion around the ramp have increased.



Therefore, under the guidance of the Civil Aviation Bureau, Japanese airlines invested to establish AGP in 1965, and the power supply of underground GPU (fixed GPU) was started.



Result (effect) of Introducing underground embedded GPU

- Relieving ramp congestion, reducing GSE vehicles, curbing duplicate investment
- Streamline work, improve efficiency, and ensure safety
- Realization of eco-airport (noise / exhaust gas)

Power supply In the 1960s



Power supply for underground embedded GPU



Deployment to the airport

'67
ITM

'68
FUK

'71
CTS

'78
NRT

'83
HND

'92
CTS

'92
NRT
T2

'93
HND
西地区

'94
KIX

'99
OKA

'02
HIJ

'04
NGO

'05
UKB

'10
HND
国際

'15
NRT
T3

1. About AGP

(4) Business overview

Introduction of core business



- AGP provides services across three business segments at major airports in Japan. There are power and air conditioning supply to the parked aircraft, maintenance of airport special equipment and maintenance of buildings and facilities in the airport, as well as related businesses.



Power Supply Business

Contribute to CO2 reduction at airports !!

- Installation and maintenance of security equipment
- Cleaning service for parked aircraft and aircraft body by dedicated hanger
- Import and sale of GSE from overseas
- Sale of GSE for overseas ODA projects
- Introduction of eco-friendly electrified GSE
- Sales of in-house developed products (passenger boarding roof) and brake cleaning carts
- Other auxiliary businesses include retail electricity business (sales of high-voltage and low-voltage electricity) and manufacturing and sales of food carts.



- Maintenance of special equipment
- Maintenance and management of special equipment such as hangars



Systems & Maintenance business



Auxiliary Business and Others

Agenda



1. About AGP

- (1) Company Profile
- (2) Domestic Network
- (3) Background of AGP's establishment
- (4) Business Overview

2. Our CO2 reduction efforts

- (1) Outline of the power supply business**
- (2) In-house product introduction of power- related equipment**
- (3) Use of APU (Auxiliary Power Unit)**
- (4) Comparison between GPU usage and APU usage**
- (5) Our contribution to the environment and society**

3. Future Environmental Business

- (1) Expansion and commercialization of environmental contributions
- (2) Emission credit

4. APPENDIX

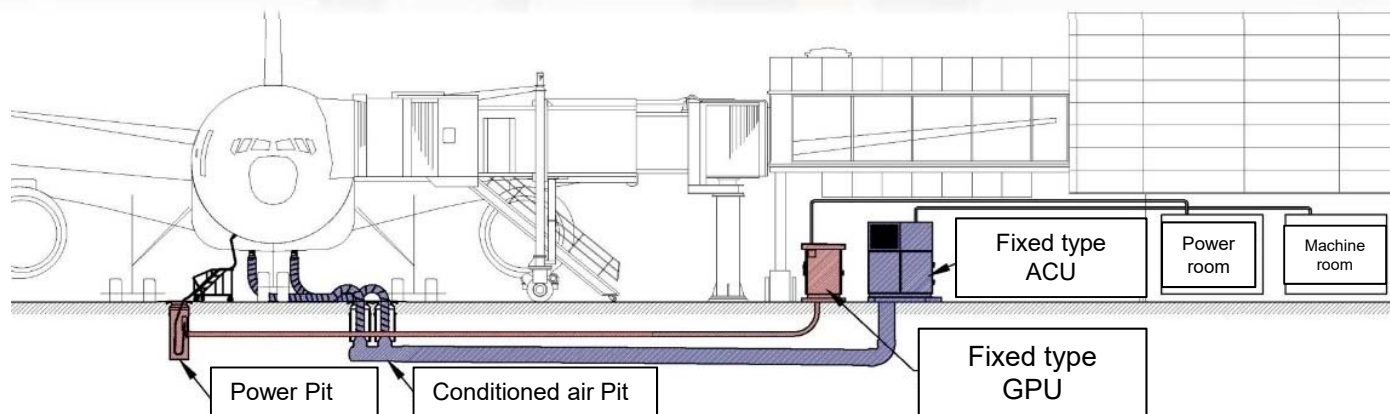
List of Airports in Japan

2. Our CO2 reduction efforts

(1) Outline of power supply business



Supply of electricity, air-conditioned air, compressed air required by aircrafts, as well as design, construction, operation and management of the power supply facilities.



By using a ground power facility, CO2 emissions are reduced to less than 1/10 of that when using APU.

2. Our CO2 reduction efforts

(2) In-house product introduction of power-related equipment



Power-related equipment (in-house product)



Fixed GPU (electricity /
air conditioning)



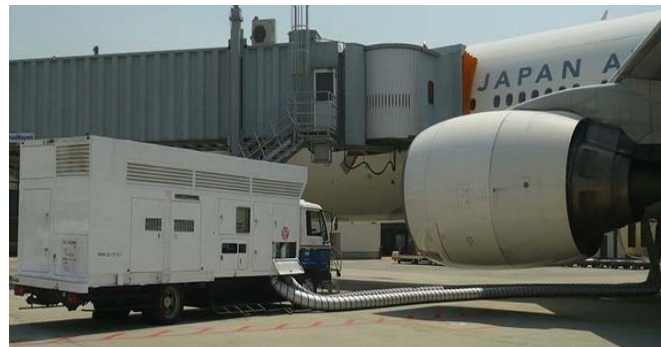
Mobile power supply vehicle (self-
propelled)



Mobile power supply
vehicle (Towing type)



Ground-based GPU
(electricity)



Mobile air-conditioned vehicle
(self-propelled)



Air starter vehicle (self-
propelled)

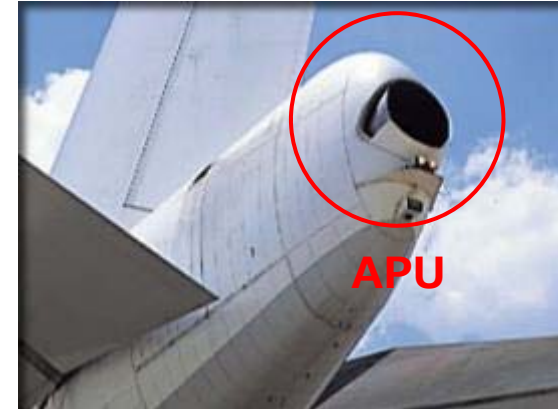
2. Our CO2 reduction efforts

(3) Use of APU (Auxiliary Power Unit)

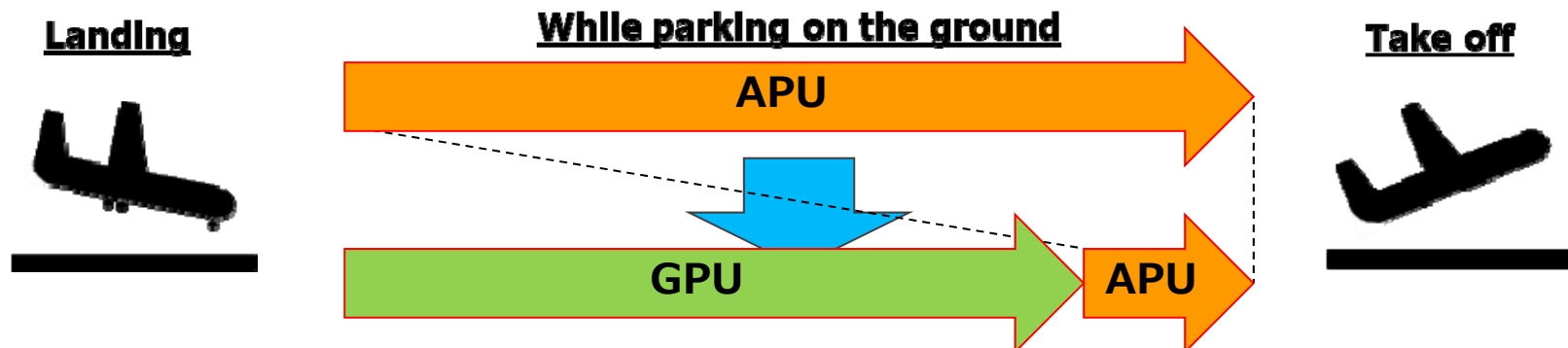


Currently, APU is a standard equipment installed at the rear of the aircraft. However, as APU is a jet engine, there are problems such as

- Large amount of CO2 emissions
- Aircraft fuel consumption
- Noise generation



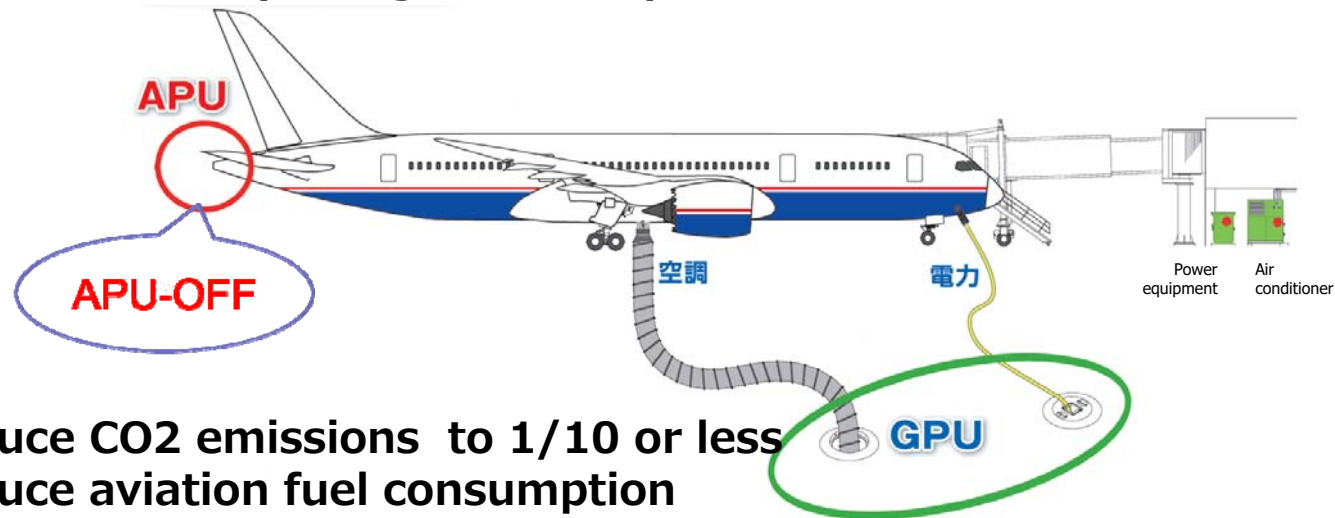
To reduce CO2, each airline is expected to make proactive efforts in using GPU while reducing the use of APU.



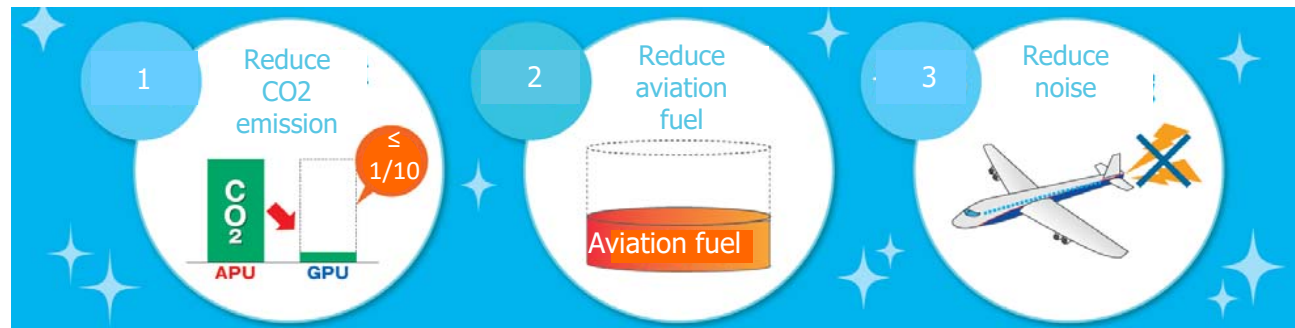
2. Our CO2 reduction efforts

(4) Comparison between GPU usage and APU usage

Benefits of actively using GPUs for parked aircraft



- Reduce CO2 emissions to 1/10 or less
- Reduce aviation fuel consumption
- Reduce noise



- Due to the efforts taken by each airline in actively using the GPU, **about 335,878 tons of CO2** was reduced in 2019. This is equivalent to CO2 amount absorbed by **about 24.0 million** cedar trees annually.
- There are restrictions on the use of APU while parked at CTS, NRT, HND, NGO, ITM, KIX, FUK, and UKB.

2. Our CO2 reduction efforts

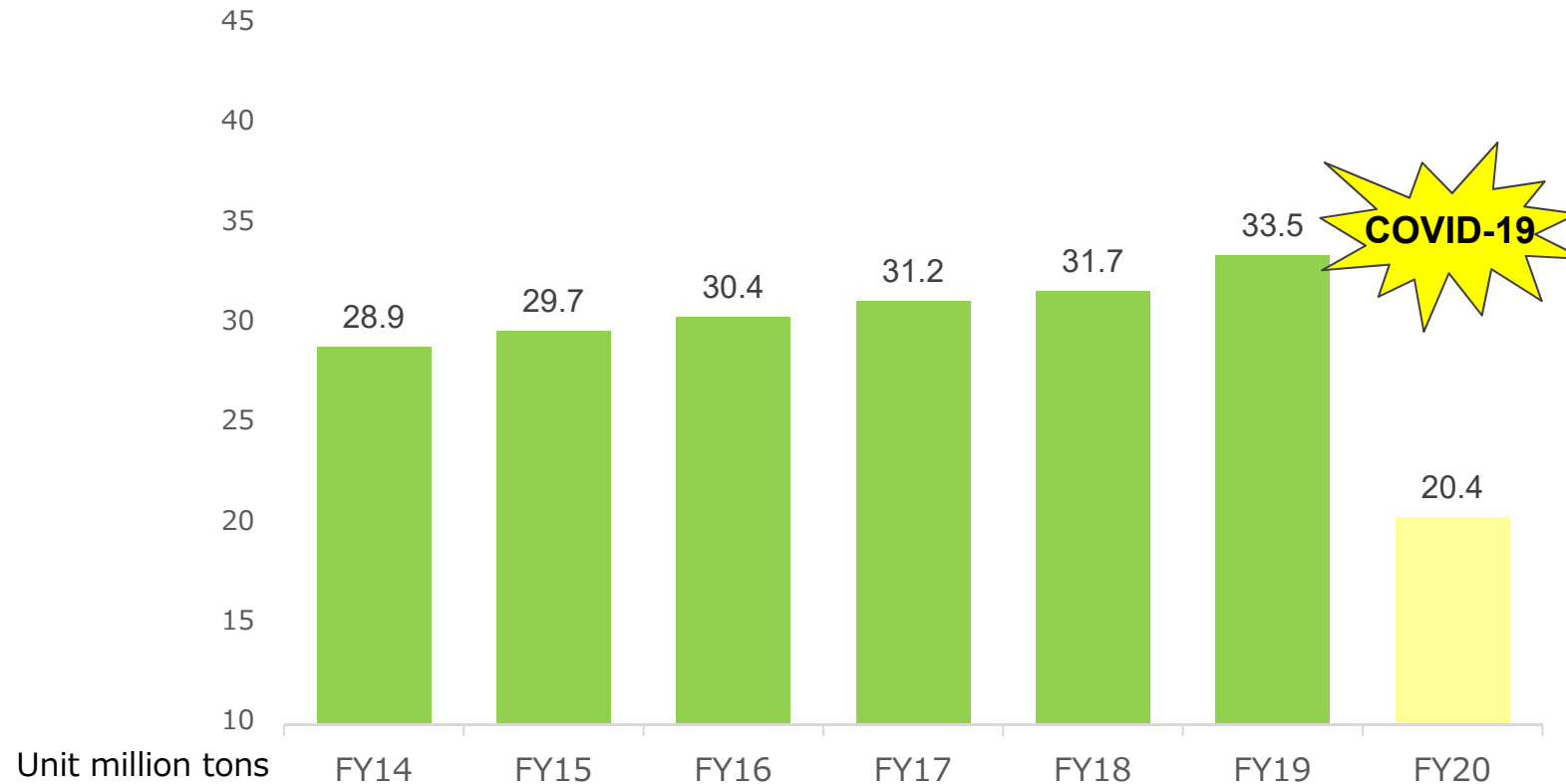


(5) Our contribution to the environment and society

The following table shows the results of CO2 emission reductions at our major airports due to promotion of GPU usage, etc.

In FY20, due to the impact of Covid-19, the CO2 emission reduction effect is also decreasing due to the decrease in GPU usage caused by the decrease in the number of airline flights.

■ Results of CO2 emission reduction through the use of GPUs



Agenda



1. About AGP

- (1) Company Profile
- (2) Domestic Network
- (3) Background of AGP's establishment
- (4) Business Overview

2. Our CO2 reduction efforts

- (1) Outline of the power supply business
- (2) In-house product introduction of power-related equipment
- (3) Use of APU (Auxiliary Power Unit)
- (4) Comparison between GPU usage and APU usage
- (5) Our contribution to the environment and society

3. Future Environmental Business

- (1) Expansion and commercialization of environmental contributions**
- (2) Emission credit**

4. APPENDIX

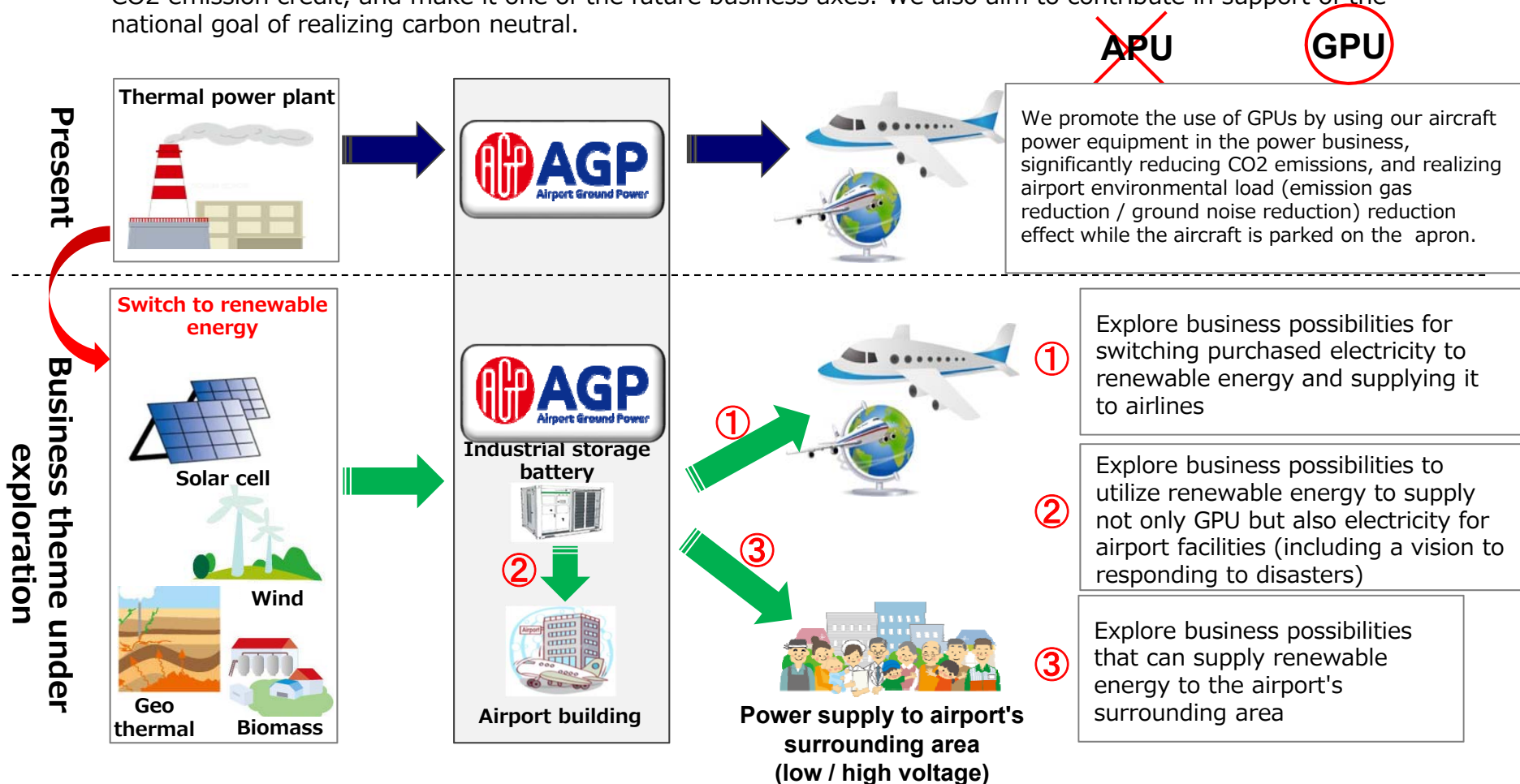
List of Airports in Japan

3. Future environmental business

(1) Expansion and commercialization of environmental contributions



- To date, we have promoted the use of GPUs by using aircraft power equipment in the power business, and have contributed to the improvement of the airport environment such as CO2 emission reduction and noise reduction. Taking it a step further, we are exploring initiatives for "carbon neutralization by airports" and aiming to further expand our environmental contribution.
- We aim to commercialize a sustainable "environmental business" with themes such as renewable energy and CO2 emission credit, and make it one of the future business axes. We also aim to contribute in support of the national goal of realizing carbon neutral.

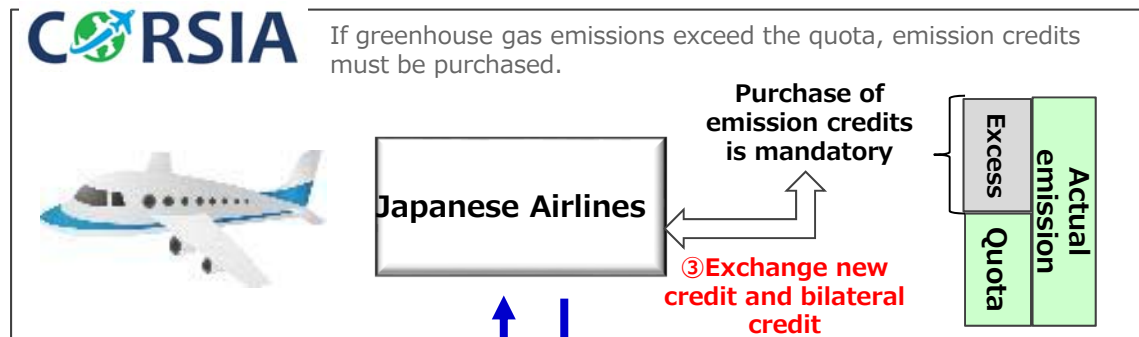


3. Future environmental business

(2) Emission credit



- If there is a system (mechanism) that connects on-the-ground greenhouse gas reduction efforts to the acquisition of some form of credit that can be used in CORSIA, we can help to reduce the load on Japanese airlines' duty to purchase/offset the required amount of emission allowance.



AGP Activities

- Switch purchased electricity to renewable energy and supply it to aircrafts to **acquire new credits.**

Airline benefits

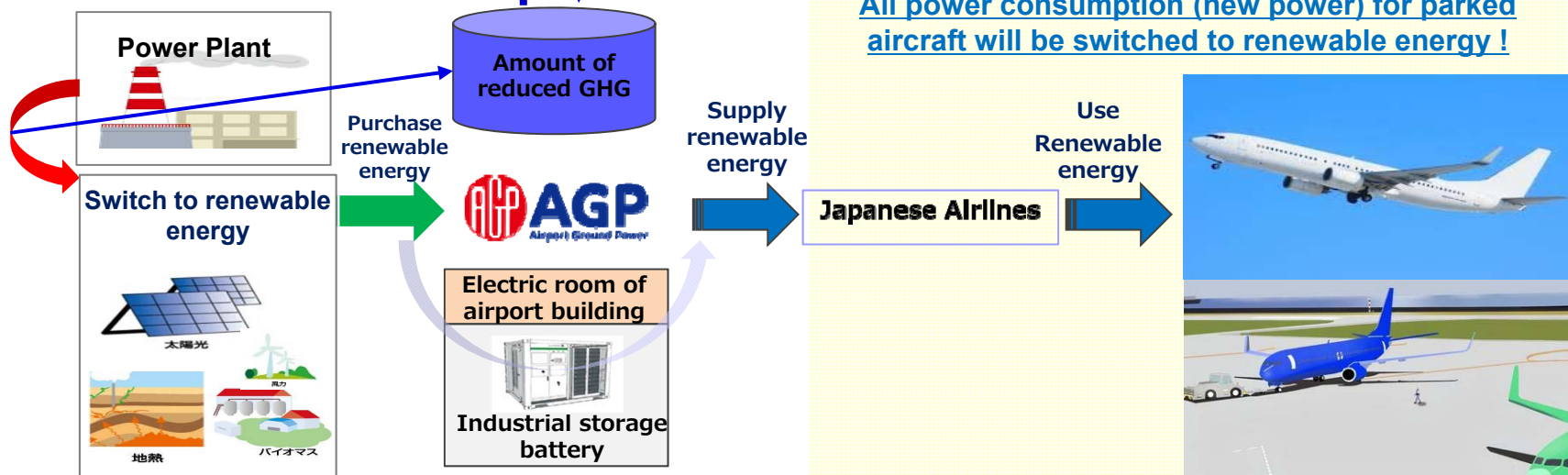
- Airlines buy new credits from AGP at a low cost via bilateral credit.
- Airlines can redeem a portion of CORSIA's quota for new credit.

Airline activities

- Bilateral credit
- Purchase new credit

On-ground activities

- Acquire new credit



Partnership with airport building management companies such as NAA, JAT, and regional airports

Agenda



1. About AGP

- (1) Company Profile
- (2) Domestic Network
- (3) Background of AGP's establishment
- (4) Business Overview

2. Our CO2 reduction efforts

- (1) Outline of the power supply business
- (2) In-house product introduction of power-related equipment
- (3) Use of APU (Auxiliary Power Unit)
- (4) Comparison between GPU usage and APU usage
- (5) Our contribution to the environment and society

3. Future Environmental Business

- (1) Expansion and commercialization of environmental contributions
- (2) Emission credit

4. APPENDIX

List of Airports in Japan

4. Appendix



(1) List of Airports in Japan

List of airports in Japan: 96 airports *Airports served by jet aircraft :62 airports

Company-controlled Airport] (4)	State-controlled Airport] (19)	[Specified local-controlled Airports] (5)	[Local – controlled Airport] (54)						Other airports (7)			
									<input type="checkbox"/> [Chofu Airport]			
<input type="radio"/> New Tokyo International Airport	<input type="radio"/> Tokyo International Airport	<input checked="" type="bullet"/> Asahikawa Airport		[Hokkaido]		[Chubu region]		[Kyushu region]	[Okinawa Prefecture]	<input type="radio"/> Nagoya Airport		
<input type="radio"/> Central Japan International Airport	<input type="radio"/> New Chitose Airport	<input checked="" type="bullet"/> Obihiro Airport	<input type="checkbox"/>	[Rishiri Airport]	<input type="checkbox"/>	[Sado Airport]	<input type="radio"/>	Saga Airport	<input type="checkbox"/>	[Aguni Airport]	<input type="checkbox"/>	[Tajima Airport]
<input type="radio"/> Kansai International Airport	<input checked="" type="bullet"/> Wakkanai Airport	<input checked="" type="bullet"/> Akita Airport	<input type="checkbox"/>	[Rebun Airport]	<input type="radio"/>	Matsumoto Airport	<input type="radio"/>	Tsushima Airport	<input type="radio"/>	Kumejima Airport	<input type="checkbox"/>	[Okaminami Airport]
<input type="radio"/> Osaka International Airport	<input checked="" type="bullet"/> Kushiro Airport	<input checked="" type="bullet"/> Yamagata Airport	<input type="checkbox"/>	[Okushiri Airport]	<input type="radio"/>	Shizuoka Airport	<input type="checkbox"/>	[Ojika Airport]	<input type="checkbox"/>	[Kerama Airport]	<input type="checkbox"/>	[Amakusa Airport]
	<input checked="" type="bullet"/> Hakodate Airport	<input checked="" type="bullet"/> Yamaguchi Ube Airport	<input type="radio"/>	Nakashibetsu Airport	<input type="radio"/>	Toyama Airport	<input type="checkbox"/>	[Fukue Airport]	<input type="checkbox"/>	[South Daito Airport]	<input type="checkbox"/>	[Oita Prefecture Nao Airport]
	<input checked="" type="bullet"/> Sendai Airport		<input type="radio"/>	Monbetsu Airport	<input type="radio"/>	Noto Airport	<input type="checkbox"/>	[Kami-Goto Airport]	<input type="checkbox"/>	[North Daito Airport]	<input type="checkbox"/>	[Yao Airport]
	<input checked="" type="bullet"/> Niigata Airport		<input type="radio"/>	Memambetsu Airport	<input type="checkbox"/>	[Fukui Airport]	<input type="checkbox"/>	[Iki Airport]	<input type="checkbox"/>	[Iejima Airport]		
	<input checked="" type="bullet"/> Hiroshima Airport							[Tanegashima Airport]	<input type="radio"/>	Miyako Airport		
	<input checked="" type="bullet"/> Takamatsu Airport	[Joint military/civilian use airport] (7)		[Tohoku region]		[Kinki region]	<input type="checkbox"/>	[Yakushima Airport]	<input type="checkbox"/>	[Shimajima Airport]		
	<input checked="" type="bullet"/> Matsuyama Airport	<input checked="" type="bullet"/> Zhu Airport	<input type="radio"/>	Aomori Airport	<input type="radio"/>	Kobe Airport	<input type="radio"/>	Amami Airport	<input type="checkbox"/>	[Tarama Airport]		
	<input checked="" type="bullet"/> Kochi Airport	<input checked="" type="bullet"/> Misawa Airport	<input type="radio"/>	Hanamaki Airport	<input type="radio"/>	Nanki Shirahama Airport	<input type="checkbox"/>	[Kikaishima Airport]	<input type="radio"/>	New Ishigaki Airport		
	<input type="radio"/> Fukuoka Airport	<input checked="" type="bullet"/> Ibaraki Airport	<input type="radio"/>	Odate Noshiro Airport			<input type="radio"/>	Tokunoshima Airport	<input type="checkbox"/>	[Hateruma Airport]		
	<input checked="" type="bullet"/> Kitakyushu Airport	<input checked="" type="bullet"/> Komatsu Airport	<input type="radio"/>	Shonai Airport		[Chugoku region]	<input type="checkbox"/>	[Okinagarabe Airport]	<input type="checkbox"/>	[Yonaguni Airport]		
	<input checked="" type="bullet"/> Nagasaki Airport	<input checked="" type="bullet"/> Miho Airport	<input type="radio"/>	Fukushima Airport	<input type="radio"/>	Tottori Airport	<input type="checkbox"/>	[Yoron Airport]				
	<input checked="" type="bullet"/> Kumamoto Airport	<input checked="" type="bullet"/> Iwakuni Airport					<input type="checkbox"/>	[Oki Airport]				
	<input checked="" type="bullet"/> Oita Airport	<input checked="" type="bullet"/> Tokushima Airport		[Kanto region]	<input type="radio"/>	Izumo Airport						
	<input checked="" type="bullet"/> Miyazaki Airport		<input type="checkbox"/>	[Oshima Airport]	<input type="radio"/>	Iwami Airport						
	<input checked="" type="bullet"/> Kagoshima Airport		<input type="checkbox"/>	[Nijima Airport]	<input type="radio"/>	Okayama Airport						
	<input type="radio"/> Naha Airport		<input type="checkbox"/>	[Kozushima Airport]								
			<input type="checkbox"/>	[Miyakejima Airport]								
			<input type="radio"/>	Hachijojima Airport								
<input checked="" type="radio"/> 4 airports	<input type="radio"/> 4 airports <input checked="" type="bullet"/> 15 Airport	<input checked="" type="bullet"/> 12 Airport	<input checked="" type="radio"/> 1 Airport	<input type="radio"/> 26 Airport	<input checked="" type="radio"/> 34 airports							

62 airports served by jet aircraft, with fixed GPUs at PBB spots at airports where AGP has power operations: 9 airports

⊙ (Company-controlled airports: 4, State-controlled airports: 4, Local-controlled airports: 1)

62 airports served by jet aircraft that will require new GPU deployment: 53 airports

● (State-controlled airports: 15 airports, specified local-controlled airports: 5 airports, Joint military/civilian use airport: 7 airports)

○ (Local-controlled airports served by jet aircraft: 26 airports)

34 airports not served by jets :

□ (Local-controlled airports: 34 airports)



空を想い、技術を極め、環境社会を創る。

FEEL THE SKY, MASTER THE TECHNIQUE, AND CREATE THE ENVIRONMENT FRIENDLY SOCIETY