

The Association for Overseas Technical Cooperation and Sustainable Partnerships (AOTS)

[Annual Evaluation Report] (Overview)

FY2022 Support Program for Human Resources Development to Export Carbon Reduction Technology

[Chapter 1 Program Outline] (Outline of the objectives and evaluation of the program)

Objectives	To achieve carbon neutrality together with emerging Asian countries through 1) promoting efficient energy uses and reductions of CO2 emissions by transferring Japan's energy-saving technologies to the industrial sector of each target country of this program and 2) reinforcing the environment for local human resource development and bilateral cooperation towards practical applications of advanced technologies that are required for the achievement of carbon neutrality by holding events to spread these technologies.			
Target Countries/ Regions	Countries and regions in Asia and the Middle East			
By Program Type	I. Development of human resources for low carbon technology export	Domestic human resources development	(i) Technical Training: Engineers in developing countries, etc. are accepted by parent companies in Japan and provided with training.	Target Companies: SMEs, Second-tier Companies
	(A) Human resource development program for saving energy consumed by production processes	Overseas human resources development	(ii) Overseas Training: Training is provided by instructors dispatched from Japan, etc. or instructors in the country where training is provided.	
			(iii) Expert Dispatch: Technical guidance is provided by experts dispatched from Japanese companies with investment or transaction relationships.	
	(B) Human resource development program for introducing and maintaining energy-saving equipment	Domestic human resources development	(i) Technical Training: Engineers in developing countries, etc. are accepted by parent companies in Japan and provided with training.	
Overseas human resources development		(ii) Overseas Training: Training is provided by instructors dispatched from Japan, etc. or instructors in the country where training is provided.		
	II. Development of human resources for advanced Technology diffusion (the Green Growth Strategy)	(i) Invitation of industrial engineers: Engineers who play a pivotal role in introducing new technologies are accepted in Japan and provided with technical training. (ii) Invitation of key persons: Key persons, e.g. managerial and technical executives, are invited to Japan to receive explanations about new technologies and to visit demonstration sites. (iii) Overseas seminars: Seminars are held locally to foster, disseminate, and develop the understanding of Japanese companies' zero-carbon technologies. (iv) Industry-Academia collaborative programs: Industry-Academia collaborative programs about zero-carbon technologies researched and demonstrated by Japanese companies, organizations, universities, etc. are offered at local higher education institutions.  * Targets are Technologies concerning the carbon neutrality of sectors described in the Green Growth Strategy and AETI.		Targets: Higher Educational Institutions, Public service corporations, SMEs, Second-tier Companies, Large Companies

Method of Program Evaluation	Prior Evaluation	<ul style="list-style-type: none"> <li>○ Evaluation of adequacy of each case by the Screening Committee <ul style="list-style-type: none"> <li>- Clarity of objectives and goals of projects</li> <li>- Adequacy of objectives, methods, and duration</li> <li>- Qualifications and suitability of eligible invitees</li> <li>- Expertise of instructors and experts</li> <li>- Effects of low carbonization (effects of CO2 reduction)/adequacy of target technologies, effects of decarbonization</li> </ul> </li> </ul>
	Interim Evaluation/ Evaluation Immediately after Completion	<ul style="list-style-type: none"> <li>○ Self-evaluation of goal achievement level by participants, dispatched experts, and using companies (Japanese and local companies)</li> </ul>
	Ex-post Evaluation	<ul style="list-style-type: none"> <li>○ Questionnaires for companies that used the program and trainees in the fiscal year</li> </ul>
	Aging Evaluation	<ul style="list-style-type: none"> <li>○ Questionnaires for companies that used the program before and returnee participants</li> <li>○ Overseas on-site survey</li> </ul>

## Chapter 2 Prior Evaluation] (Outlines of Review Implementation and Cases)

### 1. Outline of Review Implementation ( ): the number of participants

- Screening Committee – Hold 10 reviews (conducted in document review or online)
- Number of review approvals
- I. Development of human resources for low carbon technology export
  - (A) Human resource development program for saving energy consumed by production processes
    - Technical Training 17 cases (27), Overseas Training 1 case(10), Expert Dispatch 3 cases(65)
- II. Development of human resources for advanced technology diffusion (the Green Growth Strategy)
  - Technical Training (Invitation of industrial engineers) 2 cases (4)

### 2. Outline of Cases in FY2022

- (1) I. Development of human resources for low carbon technology export
- (A) Human resource development program for saving energy consumed by production processes
- [1] Technical Training: number of accepting companies and participants
- 14 accepting companies in FY2021, 27 participants including 1 company (2) that canceled after the review approval.
- [2] Overseas Training (Outline of the course and the number of participants):
- Invitation Type: (overseas training under invitation by AOTS, implemented by companies, groups, etc.)
  - Held one course in China (Dalian); participants: 10 persons.
- [3] Number of companies using the expert dispatch program (number of dispatching companies), number of dispatched experts, and number of participants receiving guidance
- Companies that used the program in FY2022: 3 companies, 3 dispatched experts, 65 participants receiving guidance.
  - \* The number of participants receiving guidance was submitted by the dispatching companies at the time of application, and the number in the plan of the human resource training goal approved by the Screening Committee was aggravated.
  - Dispatch by country: 1 in Thailand and 2 in Indonesia, a total of 3 cases.
- (2) II. Development of human resources for advanced technology diffusion (the Green Growth Strategy)
- [1] Technical Training: number of accepting companies and participants
- 1 accepting company in FY2022, 4 participants.
  - \* No consultation was made with regard to the invitation of key persons, overseas seminars and Industry-Academia collaborative programs in I. B. Human resource development program for introducing and maintaining energy-saving

equipment and II. Development of human resources for advanced technology diffusion (the Green Growth Strategy).

### **Chapter 3 Interim Evaluation/ Evaluation Immediately after Completion** (Evaluation by the companies, participants, and AOTS during and immediately after the training)

#### **1. I. Development of human resources for low carbon technology export**

##### **(A) Human resource development program for saving energy consumed by production processes**

###### **(1) Technical Training**

- Technical training consists of general training conducted by AOTS and on-site training conducted by the accepting companies. Interim evaluation and evaluation immediately after completion were conducted for general training for thirteen weeks, six weeks and nine days course. For on-site training, interim evaluation and evaluation immediately after completion were conducted for multi-year projects starting in FY2021 and ending by the end of March 2023.

[1] General Orientation Course (Objectives: “adaptability for on-site training”, “spreading ability of technical transfer”, and “increasing familiarity with Japan”)

(i) Evaluation of goal achievement level in the general training < Self-evaluation of the participants about 17 items with 7 grades >

- The target score of five points was exceeded for all items. (5.4–6.2 with the full score of 7.0), which increased by 0.5–2.4 compared with the initial scores prior to training. The score for the basic ability to use the Japanese language at the start of the course was 2.8, which was the lowest score in all items, but it improved to 5.5 at the end of the course, achieving the highest increase of 2.7 among all items. This suggests that by learning the Japanese language, the trainees became more confident.

(ii) Evaluation of goal achievement level in Japanese proficiency < Evaluation by AOTS>

- The initial scores on kana characters at the start of the training were 2.00 for T13W and 2.36 for T6W due perhaps to the encouragement given to the trainees to learn kana characters before coming to Japan. The initial scores on kana characters that trainees achieved before starting to learn the Japanese language before arrival had never exceeded 2.00, with 1.47 in FY2019, 1.44 in FY2018, and 1.58 in FY2017. This shows that the encouragement to learn the Japanese language before arrival was working. (Previously, trainees were only encouraged to learn kana characters and required to take hiragana and katakana exams in order to learn the Japanese language before arrival. It is now possible to manage their learning progress by using an e-learning system in the pre-arrival online Japanese language training course.)

###### **[2] On-site Training**

(i) Evaluation of effect of general training in on-site training <Evaluation by accepting companies and participants>

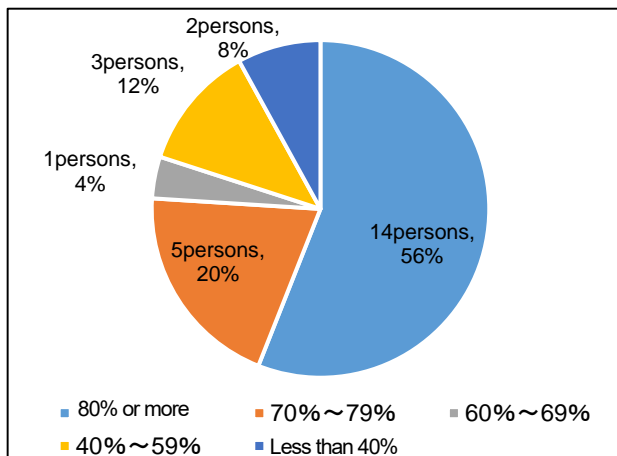
- Accepting Companies: The general satisfaction level averaged 3.9 (out of a full score of 5.0), failing to reach the evaluation goal of 4.0. The items exceeding the evaluation goal of 4.0 were “Life skills” (4.4), followed by “Self management skills” (4.2) and “Communication skills” (4.2). Some evaluation items received relatively low scores, such as “Understanding of practical training and cultural adaptability” (3.9), “Understanding of culture and social customs” (3.8) and “Understanding of Japanese companies” (3.7). It is believed that the satisfaction levels were due to the fact that during the COVID-19 pandemic, company or facility visits which would otherwise have been conducted were limited, and that, in particular, it became even more difficult to help the participants to gain a better understanding of Japanese companies than it had been before the pandemic.
- Participants: Training was highly evaluated (4.4 average) in general, and the participants generally achieved their goal both in the general training and in the use of the on-site training.

(ii) Evaluation of goal achievement level in on-site training <Evaluation by accepting companies and participants>

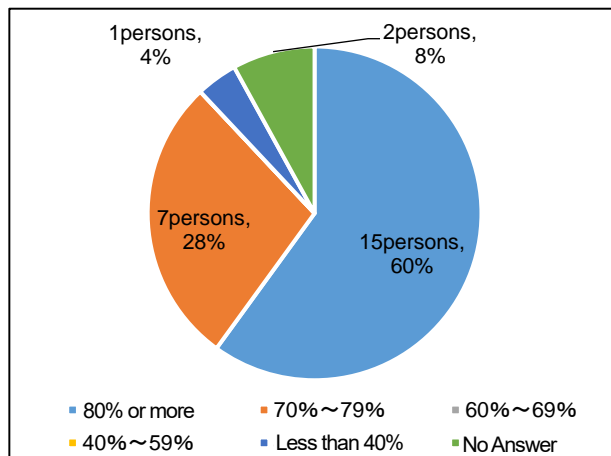
- Just under 80% of host companies answered that they achieved 80% or more or 70% to 79% or more, and just under

90% of trainees answered that they achieved 80% or more or 70% to 79% or more. The goals of the initial plan were thought to be mostly achieved.

**[[Evaluation of Goal Achievement Level]]**  
 (evaluator: accepting companies) (n=25)



**[[Evaluation of Goal Achievement Level]]**  
 (evaluator: participants) (n=25)



(2) Overseas Training (Invitation Type):

- One training program was conducted.

(i) Evaluation by participants (excerpted)

- Have gained a deeper understanding of low-speed technology. I'd like to gradually explore methods that are suitable for the Dalian factory.
- During the training, I didn't feel I was sufficiently competent at CAM-Tool.
- For the next training, an instructor should be informed of the Dalian factory's technical issues before the training. I'd like to learn both theoretical and practical aspects.

(ii) Evaluation by applicant companies

- The participants understood the lectures very well despite the fact they were conducted in Japanese.
- A participant who had a sufficient specialist knowledge about direct carving helped to communicate with other participants.
- The participants were so highly focused on the CAM programming exercise that they made it easier for us to teach as many specialist skills as possible.

(iii) CO2 reduction effects

- Acquiring direct carving and efficient CAM tool programming skills has made production processes more efficient and reduced power consumption. 45.8t-CO2 (▲54.2%)

(3) Expert Dispatch Program

(i) Evaluation by experts (evaluation by two experts who had returned to Japan by March 2023)

- Two experts said companies receiving guidance would be more likely to improve training and make further progress.
- Goal of technical improvement: One expert said 100% was achieved while the other said 70% was achieved.
- Goal of human resource training: One expert said 60% was achieved while the other said 40% was achieved.

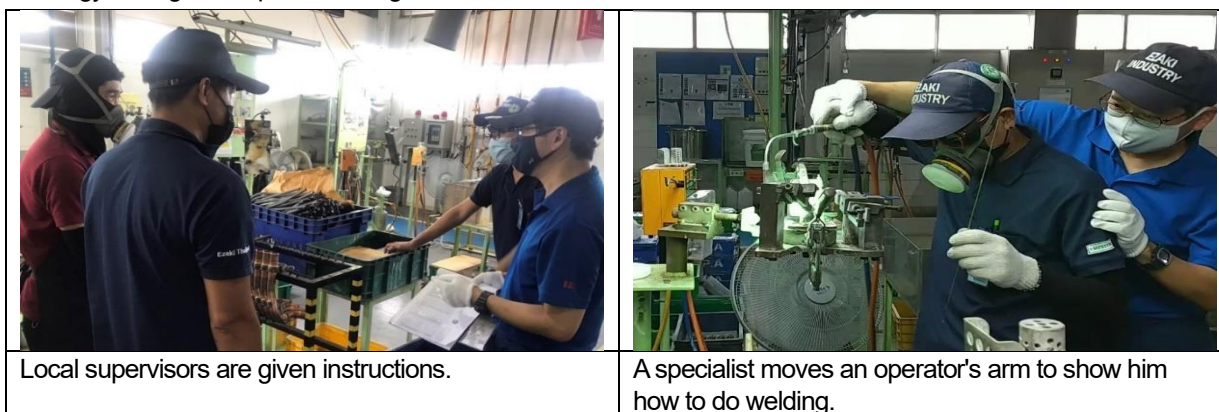
(ii) Management effects for companies receiving guidance and dispatching companies, changes in employees of companies receiving guidance

- Two companies said dispatch guidance is "expected to have considerable management effects." It is clear that

guidance by experts has generated a degree of results in areas such as solutions to issues faced by companies receiving guidance and dispatching companies and reducing their energy consumption. In particular, companies receiving guidance regarded highly its effects on "improving productivity," "improving quality," "cutting costs," and "improving technologies."

(iii) Effects of reduction in environmental load (Evaluated by experts)

- Evaluating the effects of reduction in environmental load by technical guidance on "reduction in CO2 emissions", "energy saving", and "power saving", etc.



## 2. I. Development of human resources for low carbon technology export

### (B) Human resource development program for introducing and maintaining energy-saving equipment

#### (1) Technical Training

- In this training, technical training (invitation of industrial engineers) was conducted for four participants at one company (two training programs) in this fiscal year.

[1] General Orientation Course (Objectives: "adaptability for on-site training", "spreading ability of technical transfer", and "increasing familiarity with Japan")

(i) Evaluation of goal achievement level in the general training < Self-evaluation of the participants about 17 items with 7 grades >

- The target score of five points was exceeded for all items. (6.5–7.0 with the full score of 7.0).
- No evaluation of goal achievement levels in Japanese language proficiency was carried out due to the participation in the 9D course.

[2] On-site Training

(i) Evaluation of effect of general training in on-site training <Evaluation by accepting companies and participants>

- Accepting Company: The general satisfaction level averaged 4.5 (out of a full score of 5.0), achieving the evaluation goal of 4.0 in all items.
- Participants: Training was highly evaluated (4.5 average) in general, and the participants generally achieved their goal both in the general training and the on-site training.

(ii) Evaluation of goal achievement level in on-site training <Evaluation by accepting companies and participants>

- Accepting companies said all four participants achieved 100% while three participants said 80% or more and one participant said 60% to 69%.

## [Chapter 4 Ex-Post Evaluation]

### 1. Training Program / Expert Dispatch Program (Appearance of results of the programs, ripple effect)

- Six companies in Japan that had completed training and dispatch by the end of December 2022 were surveyed.

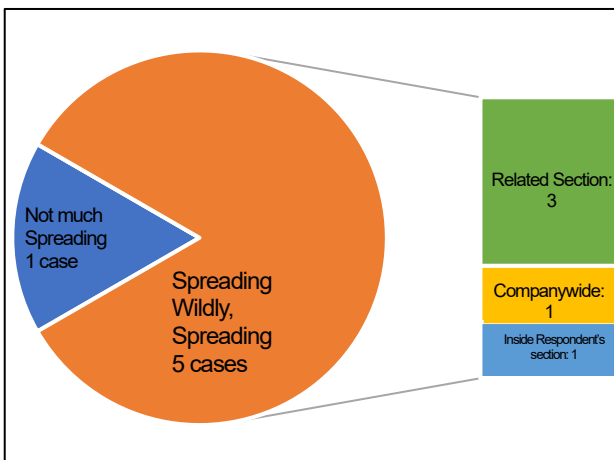
- (I. (A) Human resource development program for saving energy consumed by production processes: 5 companies,
- II. Development of human resources for advanced technology diffusion (the Green Growth Strategy): 1 company)

(1) Training and guidance results (settlement of participants, spread of techniques and knowledge, etc.), contribution to local and Japanese companies

- Technical trainees continued to be employed by the local companies. 82% of respondents answered that technologies and knowledge were "spreading" in their local companies since they returned to their home countries (see illustration below). All respondents answered that the program had "contributed" to management of the local companies.
- Japanese companies answered the contribution of the AOTS program to "strengthening cooperation with the local companies" and "strengthening international consciousness of employees in Japan", etc.

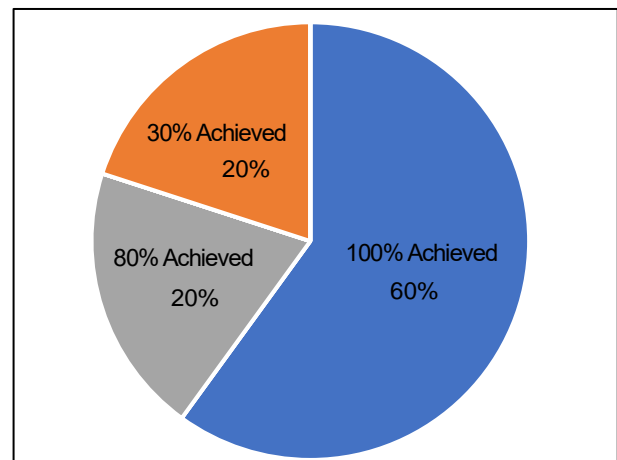
**Spread of technologies and knowledge**

(evaluated by: Japanese companies) (n=3)



**Levels of achievement of initial goals by departments**

(evaluated by: Japanese companies) (n=6)



**[Chapter 5 CO2 Reduction Effects]**

- The effects of energy conservation and CO2 reduction targets in I. A. the Human resource development program for saving energy consumed by production processes were calculated.
- When all programs were compiled, CO2 reduction was 235t-CO2 and the amount of effects was 6 million yen.

	Technical Training	Expert Dispatch	Overseas Training	Total
Volume of CO2 reduction	190.03 t-CO2		45.8t-CO2	235.83t-CO2
Amount of effects	4.84 million yen		1.17 million yen	6.01 million yen

\*Conversion: Crude oil CO2 emission coefficient=2.62t-CO2/kL-Crude oil, Unit price of crude oil=66,727 yen/kL

**[Chapter 6 Aging Evaluation]**

(The results of the survey of the companies at a set period [3 years] after use of the program)

**1. Training Program (Technical Training) / Expert Dispatch Program (Results of the questionnaire and on-site survey)**

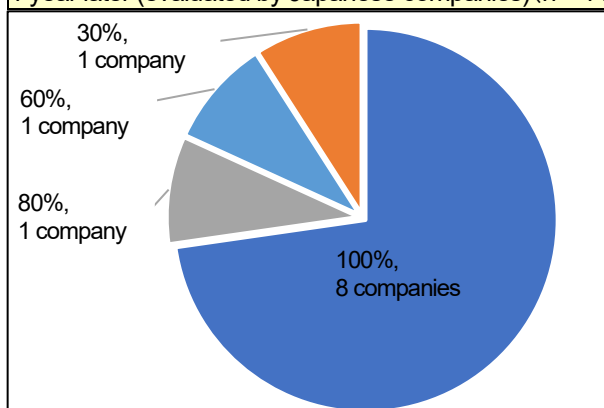
(1) Results of training and guidance, and contribution to the local and Japanese companies (Changes between FY2018 and FY2020)

- Companies that used I. A. the Human resource development program for saving energy consumed by production processes in FY2020 or FY2018 were surveyed on the results of training and guidance, management effects and the contributions of the AOTS program.

- When asked about contributions to the local companies, over 90% answered "contributed" or "expected to contribute in the future" both for those companies that used the program one year ago and those that used it three years ago. Thus, the effects of training and guidance can be said to be continuing. The most common answers directly connected to management effects were "energy conservation/CO2 reductions," "improvements in profitability" and "sales increase." From these results, promoting energy conservation and CO2 reductions can be considered to have a positive impact on management of local companies.
- More than 70% of the companies generally achieved the energy conservation/CO2 reduction goals they set when they used the program, with their departments achieving 80% or more of the goals.

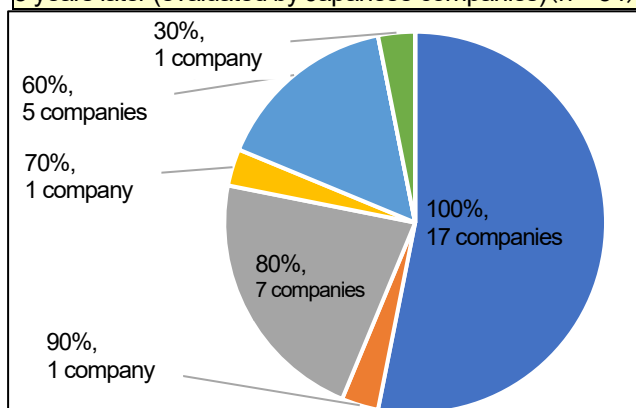
Levels of achievement of initial goals by departments

1 year later (evaluated by Japanese companies)(n=14)



Levels of achievement of initial goals by departments

3 years later (evaluated by Japanese companies)(n=34)



- Results on contributions to Japanese firms suggested demonstration of meaningful effects on business such as "energy conservation/CO2 reductions" and "supply chain development and expansion" as well as effects on human resource development through "strengthening cooperation with local companies."

## (2) Overseas on-site survey

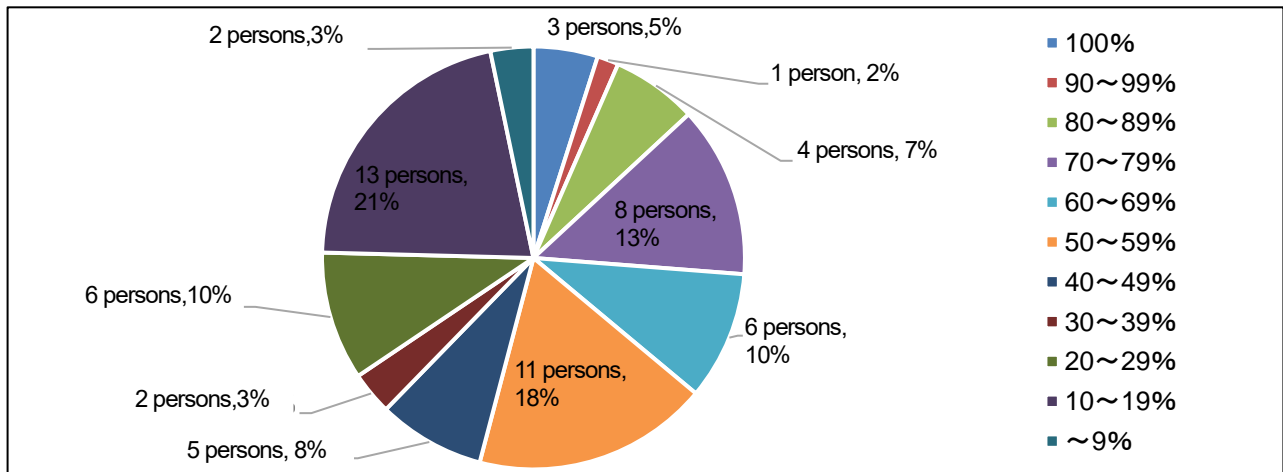
- Results of on-site surveying by outside researchers of four local companies that used the program in FY2020 or FY2018 (four companies in Indonesia) show that training and experts dispatch through this program contributed greatly to energy conservation through quality and productivity improvements and to management structural enhancements at the companies that used it, substantially strengthening the competitive advantages of Japanese companies in highly competitive Southeast Asian markets, and as a result it is regarded highly by companies that have used it. It also can be considered to contribute to improving retention rates at dispatching companies and encouraging friendly ties to Japan, by improving the work knowledge and skills of employees of dispatching companies through this training and by fostering a sense of attachment to and strong trust in Japan among them.
- Requests for AOTS include the development of a framework for enhancing a pre-arrival Japanese language course for trainees.
- It would be desirable for the operation of this program to contribute more to the progress of local Japanese companies through development of structures better suited to the needs of dispatching companies, referring to the requests expressed in these interviews.

## 2. Training Program (Management Training) (Describing the results of the questionnaire regarding the change in the situation after 3 years)

### (1) Questionnaire results

- Trainees who returned to their home countries after participating in management training in FY2018 were surveyed about the change in the situation after three years (2021). About half of 61 respondents said at least 50% of the CO2 reduction goal had been achieved. Some answered 100%. This shows CO2 reductions have been achieved to some level, even while the conditions differed between FY2018 and FY2021 in areas, such as product production and the impact of the COVID-19 pandemic.

**Goal achievement level of reducing CO2 (n=61)**



## (2) Overseas on-site survey

- The survey was conducted by outside researchers and an AOTS staff, featuring interviews with five former participants who participated in The Productivity Improvement Training Program for Vietnam (“VNPI”) conducted in FY2018. The interviews showed that the trainees had promoted energy-saving and improvement initiatives and delivered both visible and invisible results despite the fact that many restrictions had been placed on them. The trainees recognized that improvement initiatives are a major strategic initiative in business management, and that they actually realized after participating in the training how hard it is to continue to carry out such initiatives.
- In addition, outside researchers pointed out that improvement initiatives for energy conservation should not be a one-off initiative, and that it is essential that it should be carried out company-wide on a continuous basis. They also recommended that the very strong ties that AOTS had built with other countries on a national level through the implementation of these training programs should be maintained. As companies are expected to maintain both activity and business continuity, the outside researchers also expressed their expectations for training programs to be planned and implemented that disseminate and improve various knowledge and technologies, including energy-saving and improvement training for achieving carbon neutrality.

## **Chapter 7 Summary**

- Results of surveys over the years show that effects are being generated steadily over time on the goal of CO2 reduction.
- It is confirmed that human resource development in this program promotes CO2 reductions and improves the performance of companies in Japan and local companies simultaneously. Demand for energy is projected to continue to increase, along with rising interest in carbon neutrality in emerging markets centered on Asia in the future as well, and efforts to reduce CO2 are likely to grow increasingly important. Through human resources development, AOTS globally promotes Japanese companies' manufacturing technology, production technology, and associated management technology that have less environmental impact and identifies new needs for human resources development. AOTS remains committed to supporting human resources development for Green Growth Strategy areas and technologies in an effort to achieve low carbonization and ultimately carbon neutrality by 2050.