Memorandum of Understanding (MOU)
Between
Department of Energy and Mineral Resources
West Java Province, Indonesia
and
Joint Study Team Comprising Japan Capacitor Industrial Co., Ltd., Ogawa Seiki Co., Ltd. and O.P.C. Corporation

A. PURPOSE

The purpose of this Memorandum of Understanding (hereinafter "MOU") is to establish a collaborative relationship between Department of Energy and Mineral Resources West Java Province, Indonesia (hereinafter "DEMR West Java") and Joint Study Team comprising Japan Capacitor Industrial Co., Ltd., Ogawa Seiki Co., Ltd. and O.P.C. Corporation (Hereinafter "Study Team"), and hereinafter collectively referred to as the "Parties".

B. OBJECTIVES

It is envisioned that the Parties will work together to implement the project proposed by Study Team that will promote and demonstrate the–Mini-scale Discharged Thermal Energy Conversion (hereinafter "Mini-DTEC") which will make possible "Local Power Generation for Local Consumption" by utilizing unused geothermal waste heat source at Cisolok village or Sukarame village in Sukabumi Kabupaten, West Java.

C. INTELLECTUAL PROPERTY

No rights of any kind whatsoever in any invention, copyright, trade secret, or any other form of intellectual property (collectively defined as "IP") are granted or transferred under this MOU. Any IP exchanged pursuant to this MOU shall be governed by the terms of a separate written sales or licensing agreement.

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This MOU shall not be used to obligate or commit funds. As the need may arise, specific work statements and details of support to be furnished by each of the Parties to this MOU will be developed separately from this MOU in specific agreements or contracts, subject to the availability of funds. No proposal or contract purporting to

commit either Party to perform any work shall be binding upon that Party without the express in written approval of Parties who are duly authorized to issue such agreements and contracts.

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The Parties agree to disclose data, drawings and other information (hereinafter referred to as 'INFORMATION') each other. The Parties shall not use INFORMATION without the prior written consent of other party, except for the purpose of its business relationship with the Parties for the certain project, if any.

The Parties undertake that INFORMATION so made available shall not, at any time, be divulged totally or partially to any third parties, except when, after and to the extent such INFORMATION:

1) is or hereafter becomes generally available to the public,
2) was known to the other party of this agreement prior to date of such disclosure from DEMR West Java or Study Team, as evidenced by prior written record of the recipient of the INFORMATION under this MOU, or
3) is subsequently disclosed to the other party on a non-confidential basis by a third party not having a confidential relationship neither to DEMR West Java or Study Team as applicable.

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This MOU constitutes the entire understanding of the Parties pertaining to matters contemplated hereunder at this time. The Parties signing this MOU intend that any implementing contract, license, or other agreement entered between the Parties subsequent hereto shall supersede and preempt any conflicting provision in this MOU.

By _____ By _____

Department of Energy and Mineral Resources West Java Province

Joint Study Team

Title _____ Title _____

Date _____ Date _____

Rural Electrification Project with Small Scale Power Supply by using Unused Geothermal Heat Source (Renewable Energy) in INDONESIA "Demonstration of Mini-DTEC"

Progress Report (Project Plan)

（2nd Site study: 2013/12/15～12/28）

December,2013

Japan Capacitor Industrial Co., Ltd.
Ogawa Seiki Co., Ltd
O.P.C. Corporation
Joint Study Team

Contents

①　PROJECT DESIGN MATRIX (PDM)

PROJECT DESIGN MATRIX (PDM)

Project Name: Rural Electrification Project with Small Scale Power Supply by using Unused Geothermal Heat Source (Renewable Energy) "Demonstration of Mini-DTEC"
Project Period: October 2014 to March 2017 (2.5 years)
Project Area: Sukarame, Kabupaten Sukabumi, Jawa Barat
Target Group: 728 families (2,700 people) at Sukarame Village

Date: December 12, 2013

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
Overall Goal Village life is improved by development of power supply system with "local production for local consumption". Based on the demonstrational Mini-DTEC operation at the project area, Indonesia government draw up the power development plan using unused geothermal heat source at remote village and/or solitary island	Until after 3 years from completion of the project, 1) Village industry activity will be galvanized with effective utilization of electricity generated by Mini-DTEC 2) Blackout frequency will be largely improved. 3) Plan of Power Generation Project using Geothermal Hot Spring as Heat Source will be prepared.	1) Village Income 2) Blackout Frequency 3) Plan of Power Generation Project using Geothermal Hot Spring as Heat Source	Any development program will not encumber the project at target area
Project Purpose To establish the availability of power generated by Mini-DTEC at Target Area.	Until complete the project, 1) Verified the possibility of continual power generation using unused geothermal heat source	1) Output Data of Power Generation	Indonesian Government will support this power generation system using unused geothermal heat source.
Output 1) Continuous Mini-DTEC power generation by using Geothermal Hot Spring will be executed. 2) Operation method with existing PLN power grid will be established. (Mini-DTEC will be operated with off-grid system during the project, and the countermeasure for on-grid will be discussed with PLN) 3) Village Power Demand Plan will be prepared by village community. 4) Mechanism of O&M will be established.	1) Mini-DTEC will operate and generate power with good condition. 2) Obtain consensus with PLN for Mini-DTEC operation method 3) Village Power Demand Plan will be prepared. 4) O&M guideline will be prepared.	1) Output Data of Power Generation 2) Consensus document with PLN 3) Village Power Demand Plan 4) O&M guideline	Project site will be secured by land acquisition by C/P. Project site is not specified as protection area
Activities 1) Mini-DTEC Operation 1-1 Fix of Mini-DTEC installation site 1-2 Permit Approval 1-3 Mini-DTEC Construction 1-4 Mini-DTEC Transportation	Input Japan Side <Manpower> ・Short-term Experts Detail Design Supervisor	Indonesia Side <Manpower> ・Assigning C/P personnel <Facilities>	C/P personnel, O&M personnel at target village will continuously participate in the project. Approval and license as listed below will be completed without delay.

1-5 Mini-DTEC Installation 1-6 Demonstrational Operation of Mini-DTEC 2) Power Connection with PLN Grid 2-1 Discuss countermeasure with PLN for emergency stop, blackout and etc 2-2 Establish the concrete method of power system connection 2-3 Define the Scope of work for project side 3) Village Power Supply 3-1 Discuss and consider the effective power utilization for regional and village life improvement 4) Operation and Maintenance 4-1 Organize O&M Team 4-2 Execute O&M Training 4-3 Prepare O&M guideline	Coordinator Test Operation O&M <Equipment and Materials> ・Mini-DTEC (Power Generation Unit) ・Cooling Tower ・Intake Facility ・Pipework ・Power System Connection ・Transformer ・Power Conditioner <Expenses> ・Cost for Project Activities ・Operational Cost for the site office ・Rental car / Driver ・Assistant /Interpreter	・Securement of Project Site (land acquisition for the site and access road) ・Land preparation for the Project Site (Land Surveying, Land Bearing Test) ・Maintenance of Access Road ・Office space for the Project <Expenses> ・Cost for Project Activities ・Cost for land acquisition / Preparation ・Cost for assigning C/P personnel to the site (allowance etc) <u>Pre-condition</u> Government official and local resident will not oppose the project at target area.	・Land Acquisition ・Deforestation ・Utilization of Hot Spring ・Utilization of River water ・Drainage Regulation ・Building Regulation ・Power System Connection ・Environmental Regulation (EIA / AMDAL) ・etc.

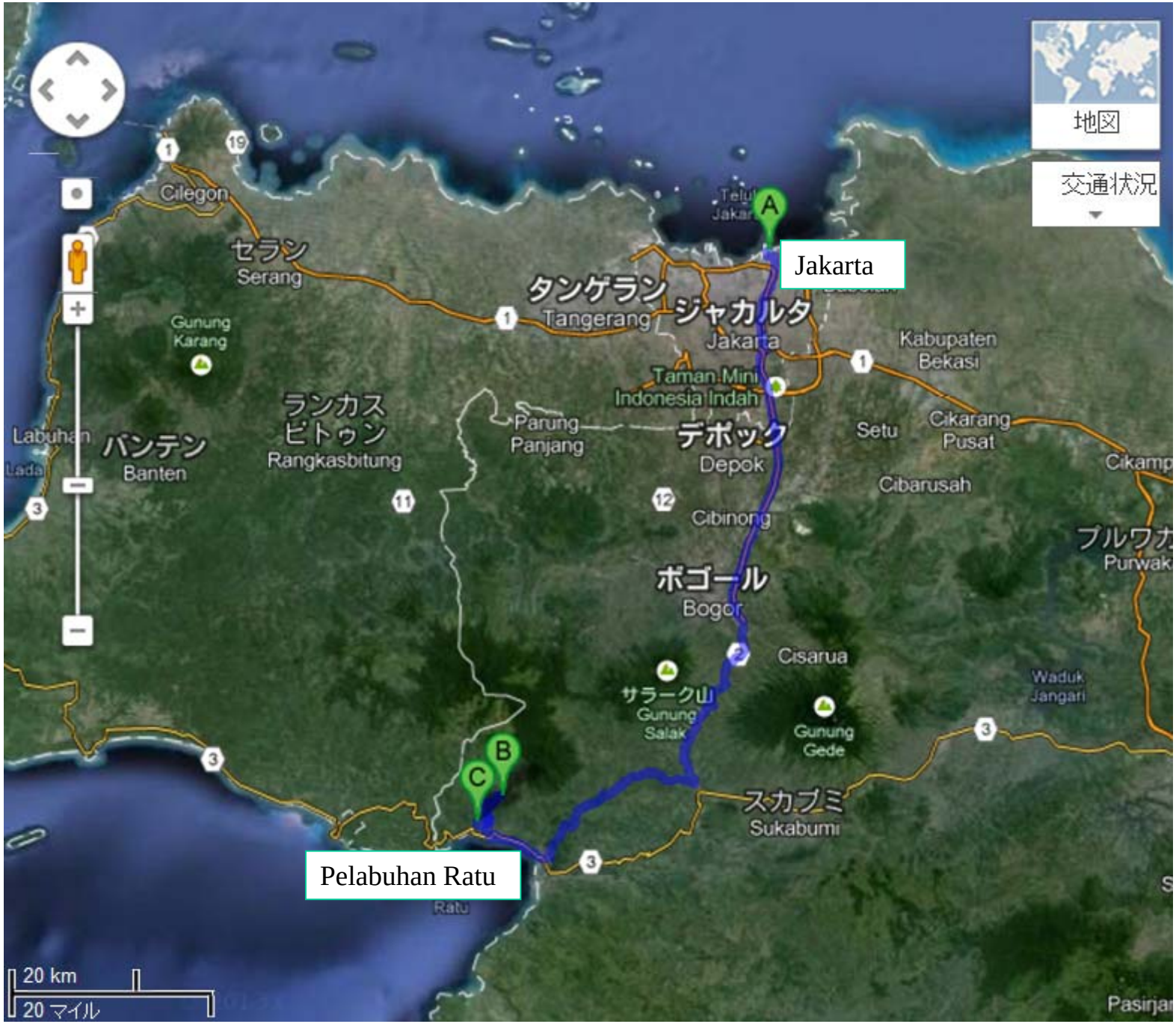
②　Plan of Operation (PO)

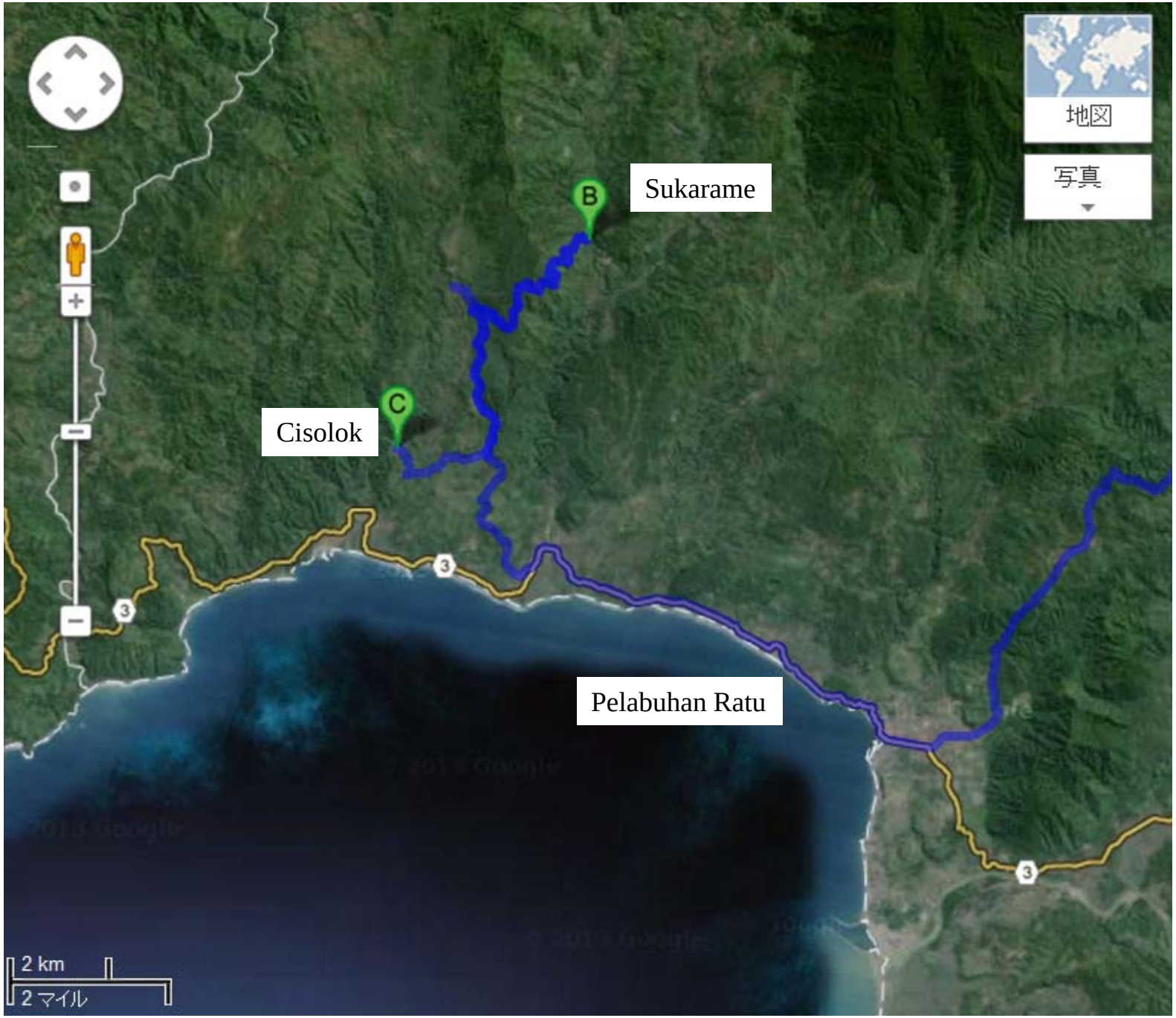
Project Schedule for Rural Electrification Project with Small Scale Power Supply by using Unused Geothermal Heat Source (Renewable Energy)
"Demonstration of Mini-DTEC"

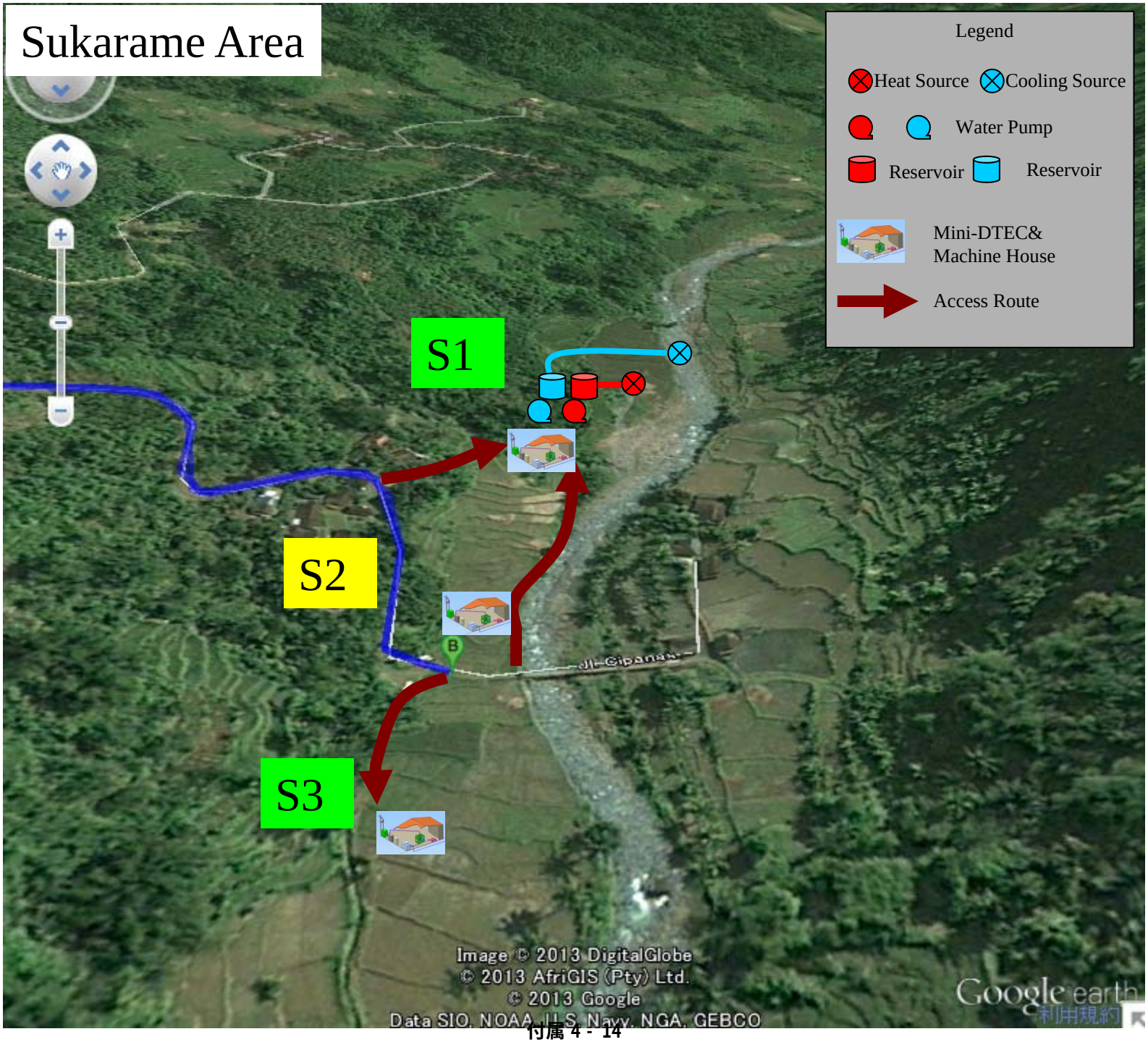
(2013/12/9)

Item				Year	2013		2014												2015												2016												2017	
				Month	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2
Pre-FS/Evaluation																																										
Proposal for Demonstaration Project/ Adoption																																										
Discussion with C/P																																										
Discussion with PNL																																										
Procedure of Site Acquisition																																										
Procedure of AMDAL (if required)																																										
Construction of infrastructure (Access Road etc)																																										
Mini-DTEC Fabrication/Transportation/Installation/Test Operation																																										
Mini-DTEC Demonstration																																										
	Japan	Indonesia	● in-charge ○ Assist in-charge													Total Project Period																											
Study	●		Pre-FS/Evaluation																																								
	●		Pre Kick-off of Demo Project																																								
	●		Preparation of Proposal																																								
	●		Project Flamework																																								
Preparation	●	●	Discussion with PNL																																								
	●	●	Discuss Project Scheme with C/P								acceptation						contract																											
	●	●	Discuss Project Badget with C/P																																								
	●	●	Risk Management																																								
	●	●	・Site Risk(Land、Development)																																								
	●	●	・Network Risk (Access)																																								
	●	●	・Poritical Risk																																								
Design	●		Basic Design				vision		basic design																																		
	●		Datail Design										detail design																														
Approval and License	○	●	Negotiation for Site Acquisition																																								
	○	●	Approval for Site Acquisition																																								
	○	●	Apprication for UKL-UPL(if required)																																								
	○	●	Apprication for AMDAL (if required)																																								
	○	●	Approval from Regional Office																																								
Construction	●		Quotation																																								
	●	●	Road Construction /civil work																																								
	●	●	Intake construction																																								
Mini-DTEC Fabrication	●		MD design/order/fabrication										quotation		inspection			order																									
	●		MD inspection before shipment																																								
	●		MD export formality / shipment																																								
Transportation	●	○	Customs																																								
	●	○	Transportation																																								
Installation	●	●	Incidental work																																								
	●	●	Transformation(cubicle / pole)																																								
	●		MD site fablication / adjustment																																								
Local Workforce	●	●	Local workforce / Training																										facilitytraining		assembly			Operation Training				Normal Operation					
Operation	●	●	Commissioning																																								
	●	●	Demonstrational Operation																																								
Expert	●		Japanese Exparts						Design (Domestic) x3										Desing (Site) x1												Design x1, Supervise x 1													
Tradition	●	○	Mannual / Tradition																																								

③ Mini-DTEC Installation Candidate Site / Site Selection

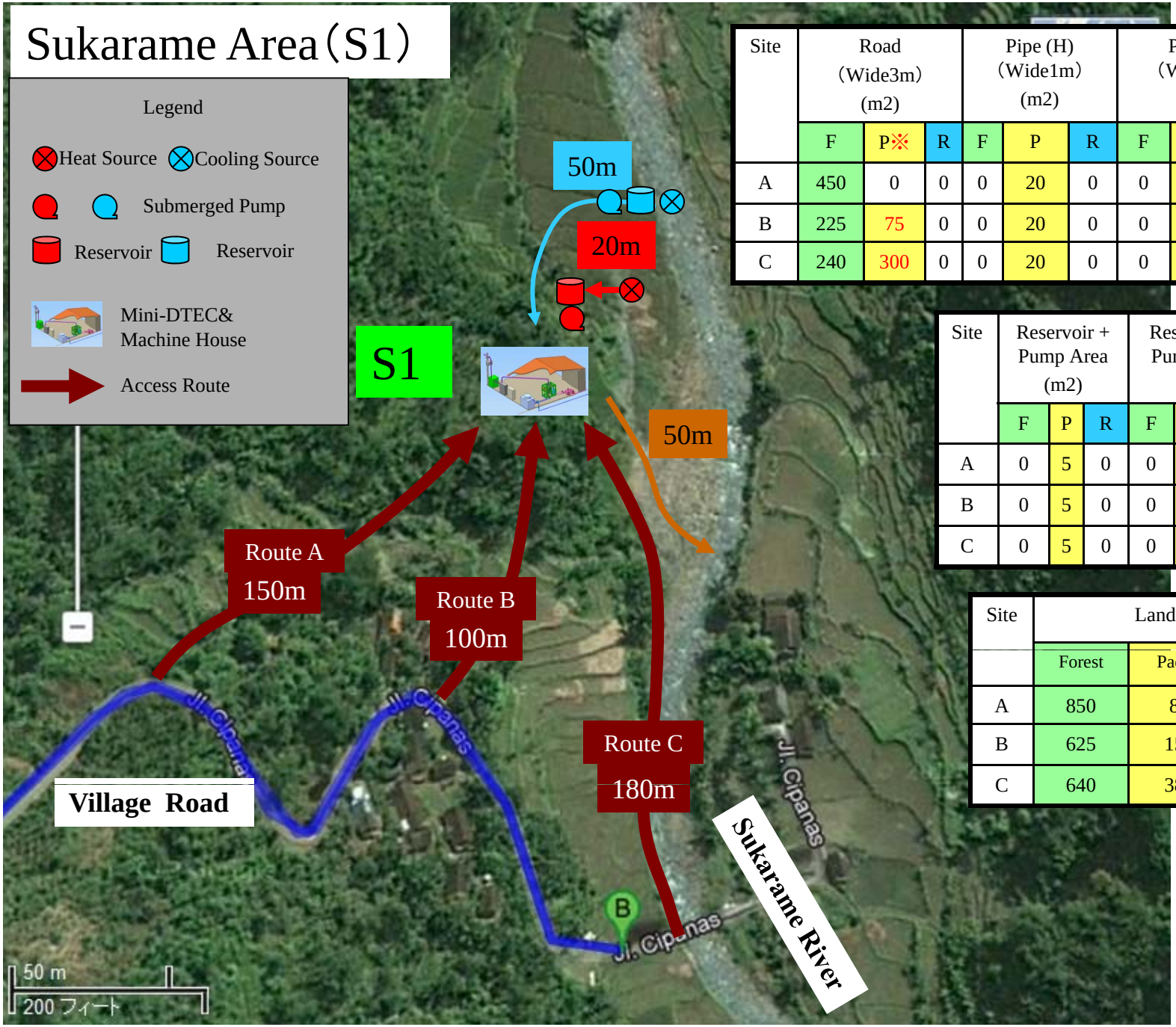

地図
交通状況
Jakarta
Pelabuhan Ratu
A
B
C
Cilegon
セラン
Serang
タンゲラン
Tangerang
ジャカルタ
Jakarta
Kabupaten
Bekasi
Gunung
Karang
Taman Mini
Indonesia Indah
ランカス
ビトゥン
Rangkasbitung
バンテン
Banten
Parung
Panjang
デポック
Depok
Setu
Cikarang
Pusat
Cibarusah
Cibinong
ボゴール
Bogor
Cisarua
サラーク山
Gunung
Salak
Gunung
Gede
Waduk
Jangari
スカブミ
Sukabumi
Ratu
20 km
20 マイル


Sukarame
Cisolok
Pelabuhan Ratu
地図
写真
2 km
2 マイル


Sukarame Area
Legend
Heat Source
Cooling Source
Water Pump
Reservoir
Reservoir
Mini-DTEC&
Machine House
Access Route
S1
S2
S3
Image © 2013 DigitalGlobe
© 2013 AfriGIS (Pty) Ltd.
© 2013 Google
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Google earth
利用規約

※Land of Canadian Owner

Sukarame Area（S1）

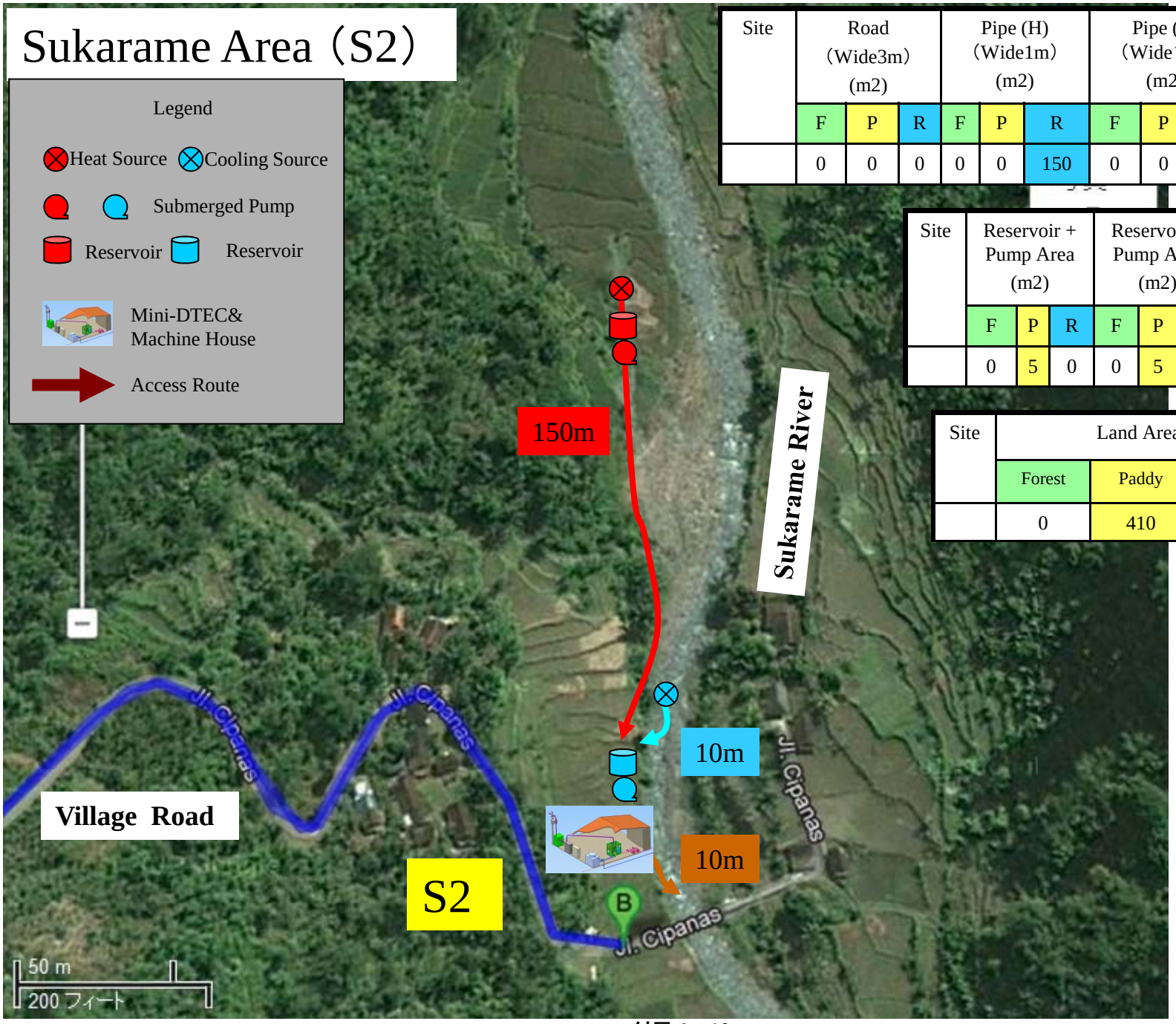


Site	Road（Wide3m）(m2)			Pipe (H)（Wide1m）(m2)			Pipe (C)（Wide1m）(m2)			Drain Pipe（Wide1m）(m2)		
	F	P※	R	F	P	R	F	P	R	F	P	R
A	450	0	0	0	20	0	0	50	0	0	0	50
B	225	75	0	0	20	0	0	50	0	0	0	50
C	240	300	0	0	20	0	0	50	0	0	0	50

Site	Reservoir + Pump Area (m2)			Reservoir + Pump Area (m2)			Mini-DTEC Install Area (m2)		
	F	P	R	F	P	R	F	P	R
A	0	5	0	0	5	0	400	0	0
B	0	5	0	0	5	0	400	0	0
C	0	5	0	0	5	0	400	0	0

Site	Land Area			Total Area (m2)
	Forest	Paddy	Riverbed	
A	850	80	50	980
B	625	155	50	790
C	640	380	50	1070

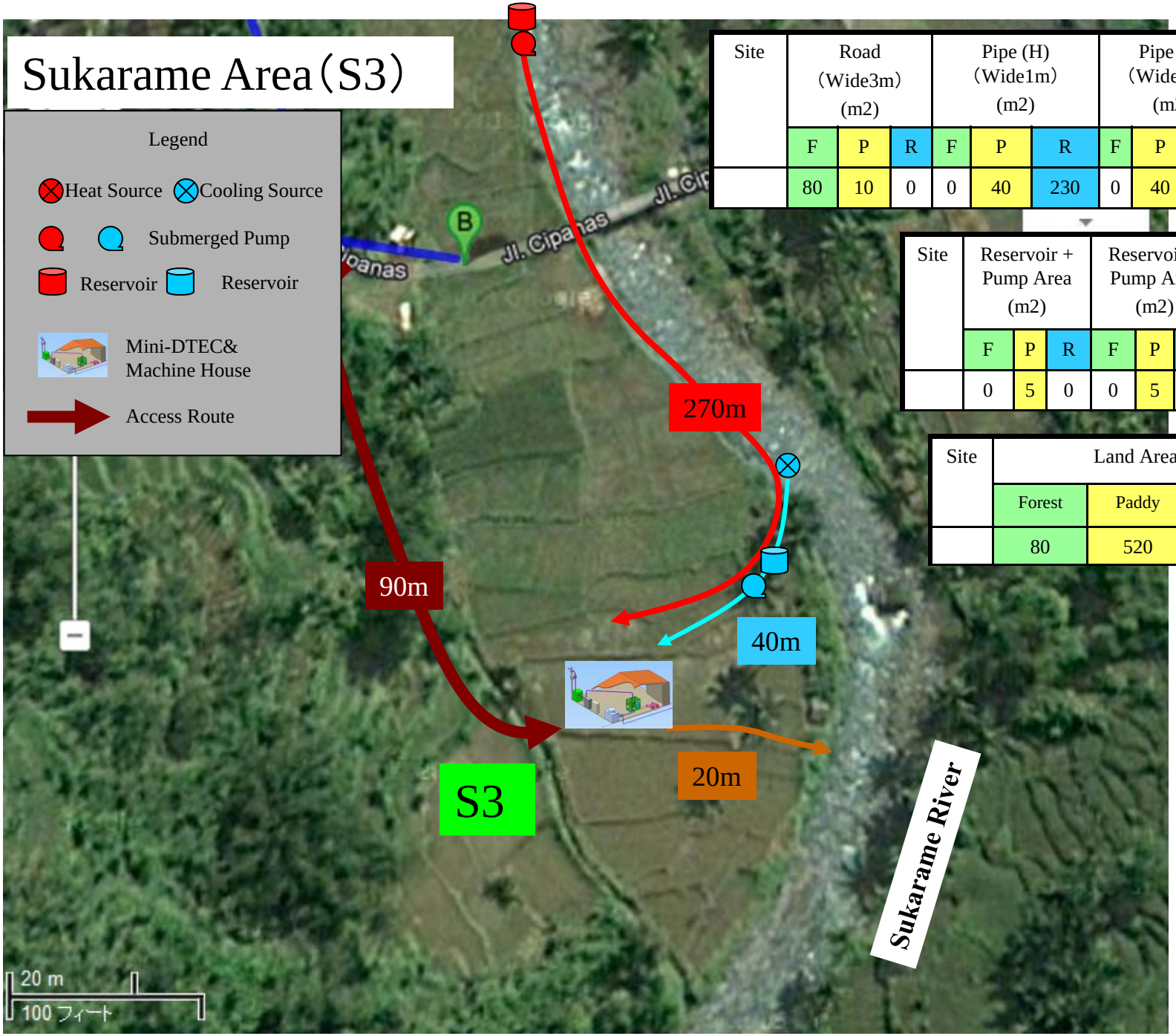
Sukarame Area（S2）



Site	Road（Wide3m）(m2)			Pipe (H)（Wide1m）(m2)			Pipe (C)（Wide1m）(m2)			Drain Pipe（Wide1m）(m2)		
	F	P	R	F	P	R	F	P	R	F	P	R
	0	0	0	0	0	150	0	0	10	0	0	10

Site	Reservoir + Pump Area (m2)			Reservoir + Pump Area (m2)			Mini-DTEC Install Area (m2)		
	F	P	R	F	P	R	F	P	R
	0	5	0	0	5	0	0	400	0

Site	Land Area			Total Area (m2)
	Forest	Paddy	Riverbed	
	0	410	170	580



Site	Road（Wide3m）(m2)			Pipe (H)（Wide1m）(m2)			Pipe (C)（Wide1m）(m2)			Drain Pipe（Wide1m）(m2)		
	F	P	R	F	P	R	F	P	R	F	P	R
	80	10	0	0	40	230	0	40	0	0	20	0

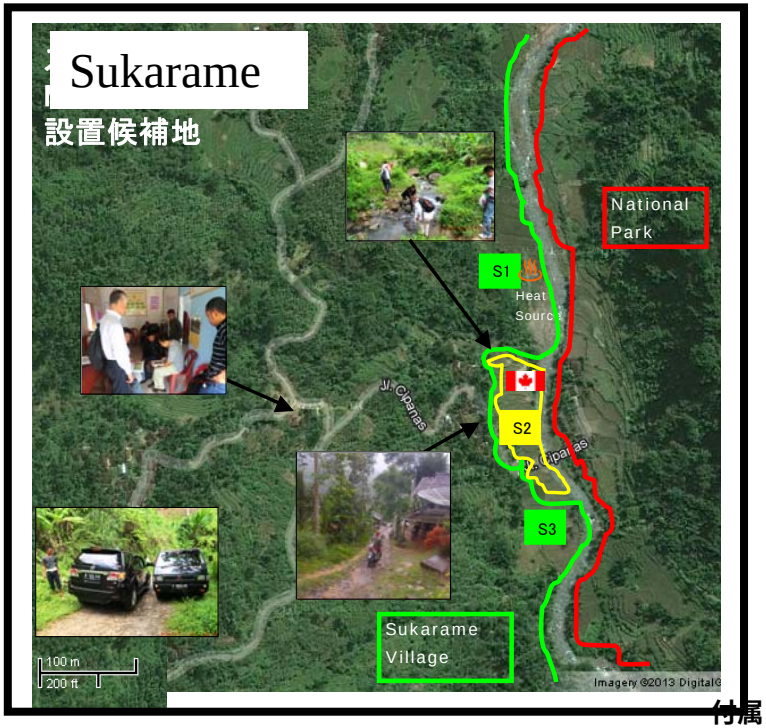
Site	Reservoir + Pump Area (m2)			Reservoir + Pump Area (m2)			Mini-DTEC Install Area (m2)		
	F	P	R	F	P	R	F	P	R
	0	5	0	0	5	0	0	400	0

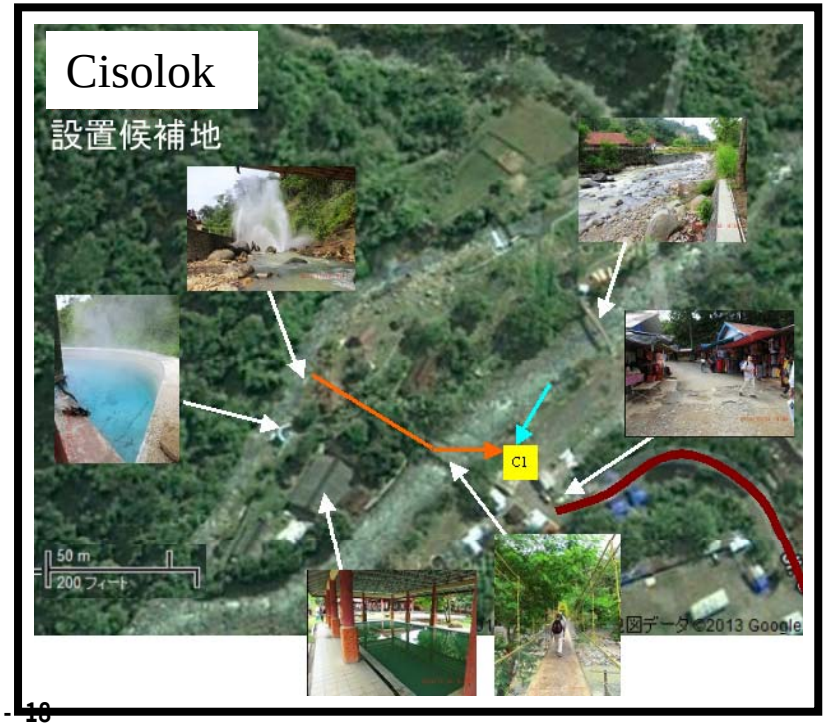
Site	Land Area			Total Area (m2)
	Forest	Paddy	Riverbed	
	80	520	230	830

Site Selection

Level of difficulty　Easy（〇:+1）　Normal（△:0）　Difficult（×:-1）

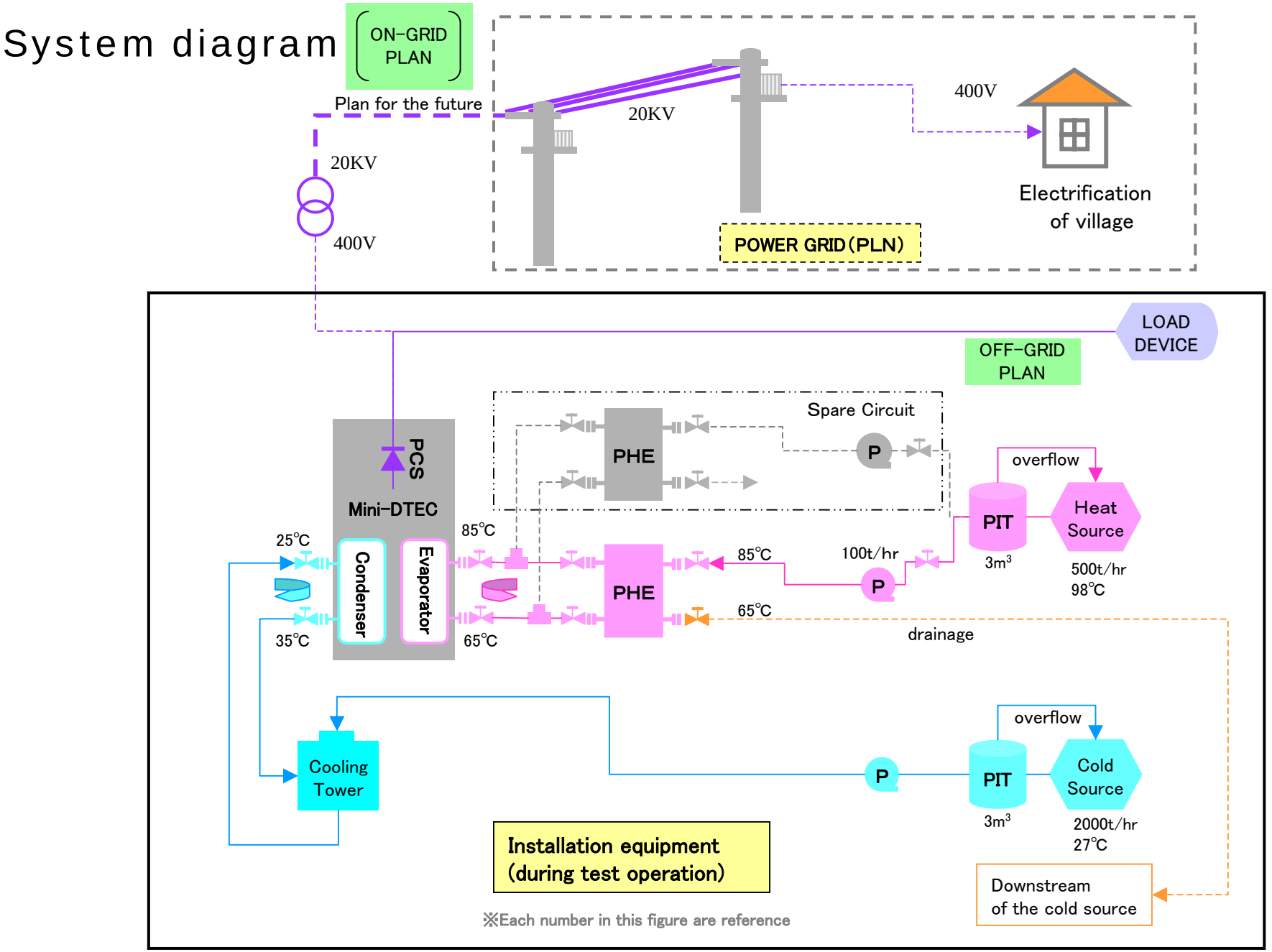
Target Site	Site No	Heat Source Temp.	Heat Source Discharge	Cooling Source Temp.	Cooling Source Discharge	Site Access	Land Right	Pipe Length	O&M	Grade	Note
Sukarame	S1	〇1	〇1	〇1	〇1	×-1	△0	〇1	△0	4	First Priority
	S2	〇1	〇1	〇1	〇1	△0	×-1	△0	△0	3	Negotiation for Land
	S3	〇1	〇1	〇1	〇1	△0	△0	×-1	△0	3	Second Priority
Cisolok	C1	〇1	×-1	〇1	〇1	〇1	△0	〇1	〇1	5	Shortage of Heat source



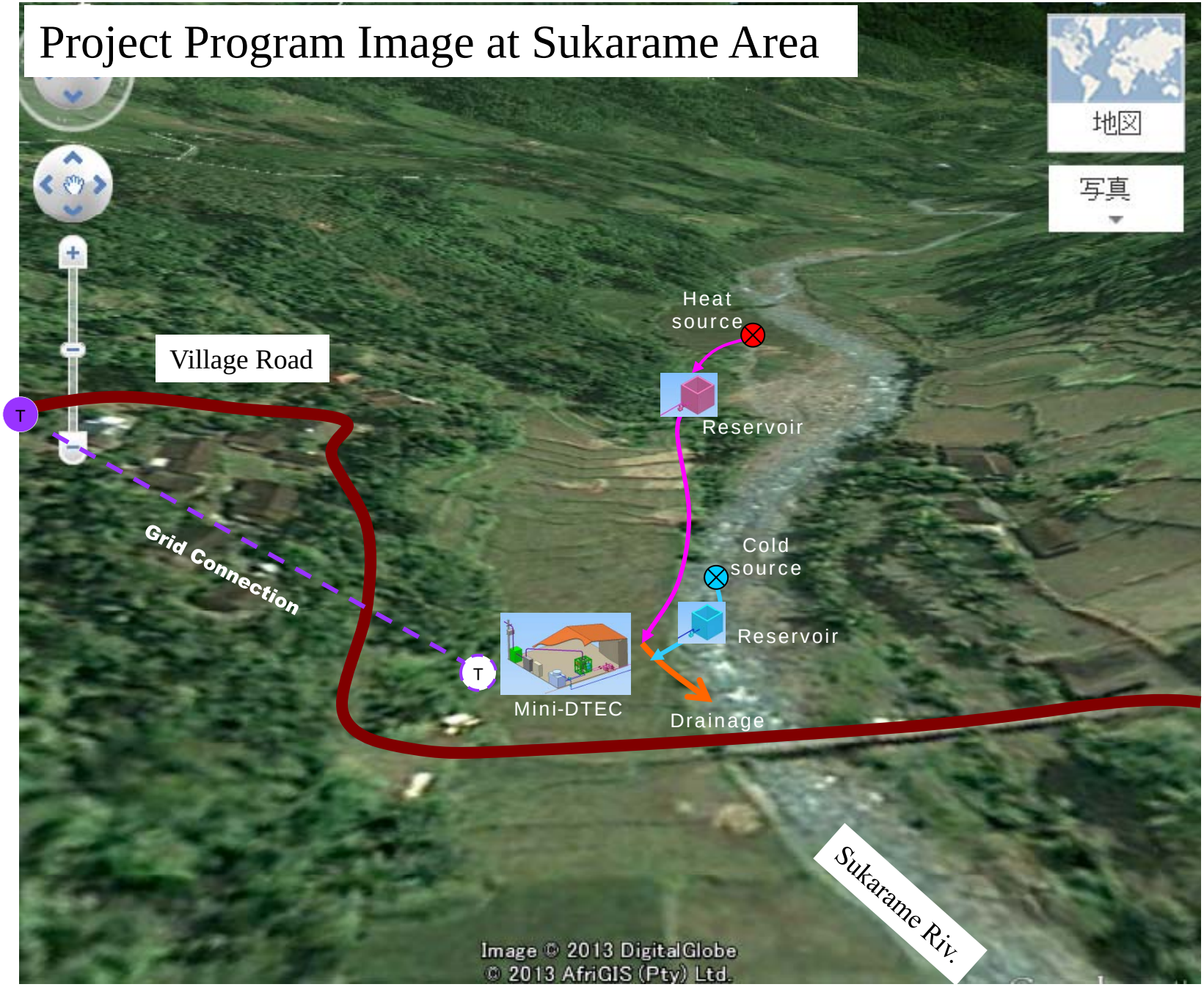


④ Mini-DTEC System Outline

System diagram



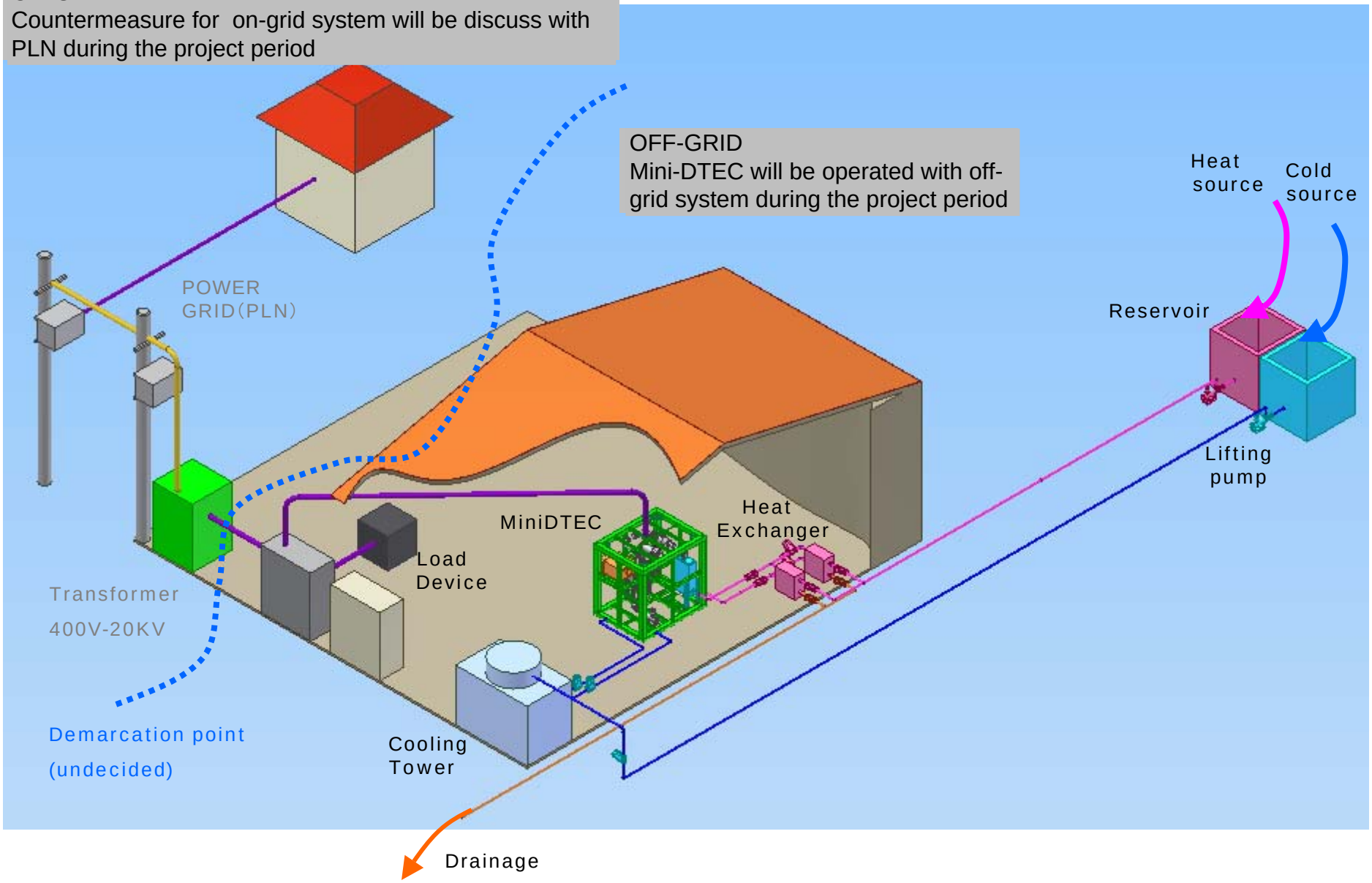
⑤ Mini-DTEC Installation Concept / Outlook


Project Program Image at Sukarame Area
地図
写真
Heat source
Village Road
Reservoir
Grid Connection
Cold source
Reservoir
Mini-DTEC
Drainage
Sukarame Riv.
Image © 2013 DigitalGlobe
© 2013 AfriGIS (Pty) Ltd.

Equipment layout

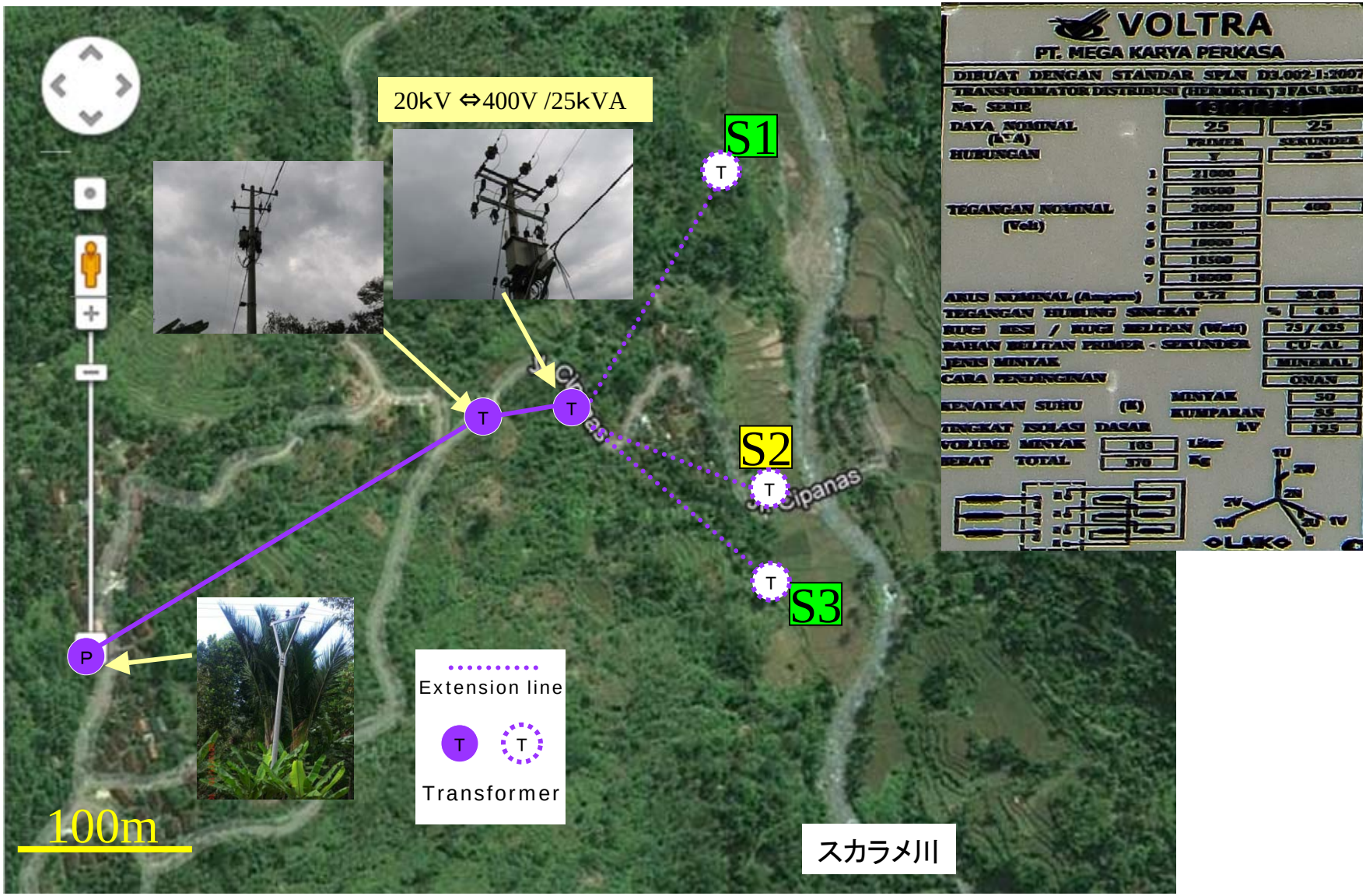
ON-GRID
Countermeasure for on-grid system will be discuss with PLN during the project period

OFF-GRID
Mini-DTEC will be operated with off-grid system during the project period



⑥ Connection of Grid System

POWER GRID


20kV ⇔400V /25kVA
S1
S2
S3
T
P
Extension line
Transformer
100m
スカラメ川
VOLTRA
PT. MEGA KARYA PERKASA

⑦ Transportation

Transportation Route (Jakarta ～ Sukarame)

- Jakarta～Pelabuhan Ratu　: 6～7hours by car（day time）
- Pelabuhan Ratu ～ Sukarame : Distance around 7km, Dirt trail with 3m of width ,
- Max10km/h, Limitation of car size < 2 on autotrack

⑧ Outstanding

[Matters of Concern]

December, 2013

1. Land Acquisition (Project Site / Access Road)
2. Tree-clearing / Deforestation (Project Site / Access Road)
3. Permission of the use of Heat Source (Hot Spring) and River water / Permission of development of River side
4. Power Grid System Connection / Scope of Work between Project and PLN
5. Access Route Construction (from Village to Site)
6. Land Survey / Soil Bearing Capacity Test / Flood Condition (Elevation)
7. Seasonal Fluctuation of Hot Spring and River water / Risk of drawdown of Hot Spring
8. Drainage Regulation (Hot Spring / River water)
9. Environmental Regulation (UKL-UPL/EIA/AMDAL)
10. Electric power consumption at target village (utilization plan)
11. Operation and Maintenance / Village capability
12. Safety Control

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(Draft)

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By Indonesian Team

Title _____

Date _____

By Joint Study Team

Title _____

Date _____

December 23, 2013
Draft of Field Study Report

"Project Formulation Survey" under the Governmental Commission on the Projects for ODA Overseas Economic Cooperation in FY2013

Rural Electrification Project with Small Scale Power Supply by using Unused Geothermal Heat Source (Renewable Energy) in INDONESIA with Demonstration of Mini-DTEC

March, 2014

Joint Study Team of
Japan Capacitor Industrial Co., Ltd., Ogawa Seiki Co., Ltd., and O.P.C. Corporation
with support from Zenesys Inc.

The followings are the contents in this draft of report:

・Selected photo gallery of sites and organization relevant to the project with captions

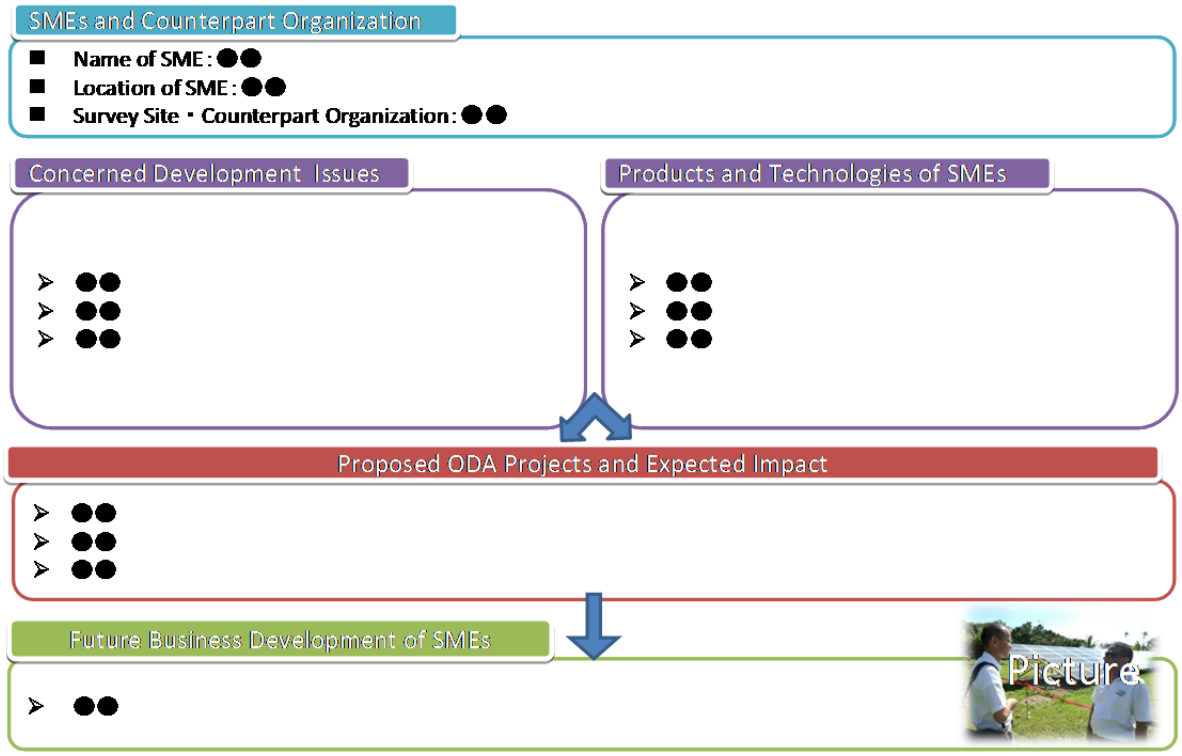
・Abbreviation of technical terms

・Period of the present field study to launch the ODA project and schedule of despatch

・Abstract

・A Glance of the Project to be launched

Type（Needs Survey/Project Formulation Survey）
Country(ies), Title



・Two pages of summary in English

Contents (**Gothic-type written portion** comes from format for Draft Final Report by JICA). These will be deleted for finalizing the draft report.

I. Description of the current situation and development needs of the concerned development issues in the surveyed country

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1.1 Overview of political and economic status in Indonesia

1.2 Development challenges in the subject field

1.3 Relevant plan of the target country, and the legal system (including foreign policy)

1.4 Analysis of other donors and case analysis of ODA projects in the relevant field of Indonesia studied

II. Possible applicability of the SME's products and technologies, and prospects for future business development

Chapter 2 Prospects of business development and future possible use of binary generation system with surface hot water

2.1 Strength of products and technologies proposed in the project

2.1.1 Specification and strengths of the proposed products and technologies

2.1.2 Industry analysis and status of activity by the SME group in the relevant field

2.1.3 Competitors at home and abroad, overview of technology and similar products

2.2 Positioning of overseas business development

2.2.1 Policy of overseas business development by the SME group

2.2.2 Preparatory activities for business development by the SME group

2.3 Contribution to the local economy in Japan by overseas development of the proposed company

2.3.1 Contribution to domestic employment

2.3.2 Relevance to local policy for industrial development in area where the SME resides

2.3.3 Possibility of cooperation with local governments, universities and/or institutions

2.4 Framework of business to be planned in the Project

2.4.1 Planning of supply of the generation system by Mini-DETEC and electricity routes and procedures for supply, and creation of supply chain

2.4.2 Construction of sales methods and sales network

2.4.3 Sales scale and market volume

2.4.4 Prospects of the demand to be assumed in the market and other conditions of market competition

2.5 Schedule for the project implementation

2.5.1 Envisaged organization for implementation of the project

Organization chart including counterpart (C/P) or responsible organization, implementing organization, cooperating organization, MOU, R/D, IP

2.5.2 Schedule such as specific about the production, distribution and sales

Schedule or plan of operation with a barred chart, and Project Design Matrix (PDM)

2.6 Coping with business risks

2.6.1 Meeting expected risks

access road, transportation route,

2.6.2 Risks emerged or made clear in the field study

FIT system, government policy, local government capacity, O&M, taking over process

III. Verification of adaptability of the SME's products and technologies to the surveyed country(ies) (Demonstration and pilot survey)

Chapter 3 Presentation of products and binary generation system of the SMEs

3.1 Specification of products and the generation system and demonstration in Hokkaido and Kyushu islands

Figures of equipment and facility, Tables of characteristics of the generation system, and others

3.2 Meeting local requirement for the binary generation system and its O&M

field study on profitability, local compliance, results of workshop at Sukarame, land acquisition, and operational procedures

3.3 Cost estimation and profitability

Initial cost, O&M, life of the equipment/system

IV. Expected development impact and effect on business development of the proposing SME(s) in the surveyed country(ies) through proposed ODA projects

Chapter 4 Expected development impact and effect on business development by SMEs in Indonesia through implementation of ODA project

4.1 Relevance of the specification of the power generation system with the developmental issues in Indonesia

4.2 Effect on development due to the application, utilization, and dissemination of products and technologies of the SMEs through formulation of ODA project

4.3 Effect on the business development of the SMEs through the implementation of ODA Project

V. Proposals for formulating ODA projects

Chapter 5 Concrete proposals for ODA project

(This section may be overlapped to other section, and hence needs to be edited.)

5.1 Proposed outline of ODA project

(Grant aid, technical cooperation, etc.), specific ODA scheme,

5.2 Specified contents of cooperation and effectiveness of development

5.2.1 Goal of projects and inputs of Japan and Indonesian sides

5.2.2 Counterpart organization

5.2.3 Implementing organization and schedule of the Project

5.2.4 Approximate amount of budget for the Project on an integrated basis

5.2.5 Development specific effects

5.3 Cooperation possibilities with other ODA projects

5.4 Other relevant information

5.4.1 Current status of discussion with the counter parts for the ODA project

5.4.2 Cooperation with ODA projects implemented hitherto in Indonesia

5.4.3 Consultation situation of countries agencies subject to the (counterpart organizations)

Attachment: Outline of the survey

Memos of meeting with central and local governments, and relevant organization/institutions

Photos of field study

Documents provided by the counter parts

スカラメ村落アンケート結果の取り纏め

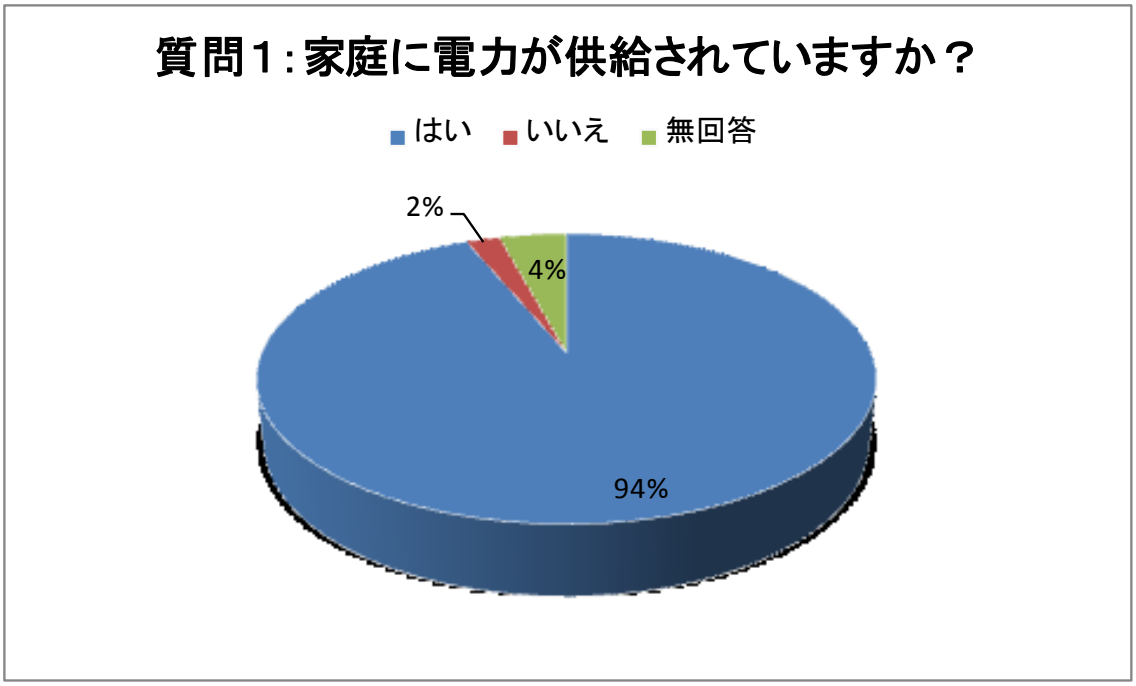
Site Information Checking List					
					at Sukarame Village
No	Field	Contents	item	Unit	
1	Heat Source	Hot water	Temp	℃	98 degree C
			Discharge	L/min	250ℓ/s= 15t/m=900t/h
		Vapor	Temp	℃	–
			Discharge		–
		Water Quality			scale problem?
		Present Situation			no use
		Water Flow Fluctuation			no change
2	Cooling Source	River Water	Yes/No		Yes
		Sea Water	Yes/No		–
		Groundwater	Yes/No		–
			Temp	℃	20-25 degree C?
			Discharge	L/min	over 1000t/h
		Water Flow Fluctuation			Flood 1-2times/year
3	Village Information	Village	Yes/No	No of Village	
		Households			728
		Population			2,666 (1,355/1,311)
		Distance from Heat Source		m	300
		Electrification Condition	Yes/No		yes
		Power Source	Type		PLN
4	Geo Well Info	Circumstances			
		Usage Condition			Under Development Plan
5	Life Info	Power Charge			495 RP/kWh (50,000 RP/month)
		Water Charge		Spring/mountain water→ to house by pipe	
		Power Supply Condition			nomal
		Electrification Needs			450w-900w/household
		use for			lamp/TV/refrigerator
		no power supply			28 families
		blackout frequency			every night
		Fuel Use			wood 70%, LPG gas 30%
		Average Income	lower than 1,000,000 RP/month (400,000-600,000 Ave)		
		Village community	Yes/No		Yes
		Organization of community			?
		Main industry			Agriculture
		Cultivated variety		Banana/Durian/clove/rice/coffee	
		Community facility	Yes/No	village office/school (government x3, private x 6) /clinic x1, mosquex10	
		Land Use			962ha (362ha rubber, 32ha rice)
		handphone adoption rate			40%
		payment of electricity		pay to collector / pay by prepaid card	
					(prepaid= Pulsa card)
6	Meteorologic info	Temperature			
		Humidity			
		Rainfall			
		Rainy/Dry Season			Rain:Sep-Apr / Dry: May-Aug
7	Infrastructure	Fixed-wire networks			
		Water syatem			spring →piping system
		Sewage system			Underground seepage
		Main Road			7km from Cipanengah
		Village Road			
		Access to Geo well			2km to proposed site
8	power-generating	Dibs on Geo well			Developer
		Dibs on river water			–
		Dibs on hot spring			Developer
		Land acquisition			Private owner
		Development permission			
		Environment load			
		Drainage regulation			–
9	Others	Village income/expenditure		Farming / smelting gold / small house business	
		Village development needs			
		Problem			Road condition
		O&M system		village has technician for small repair	

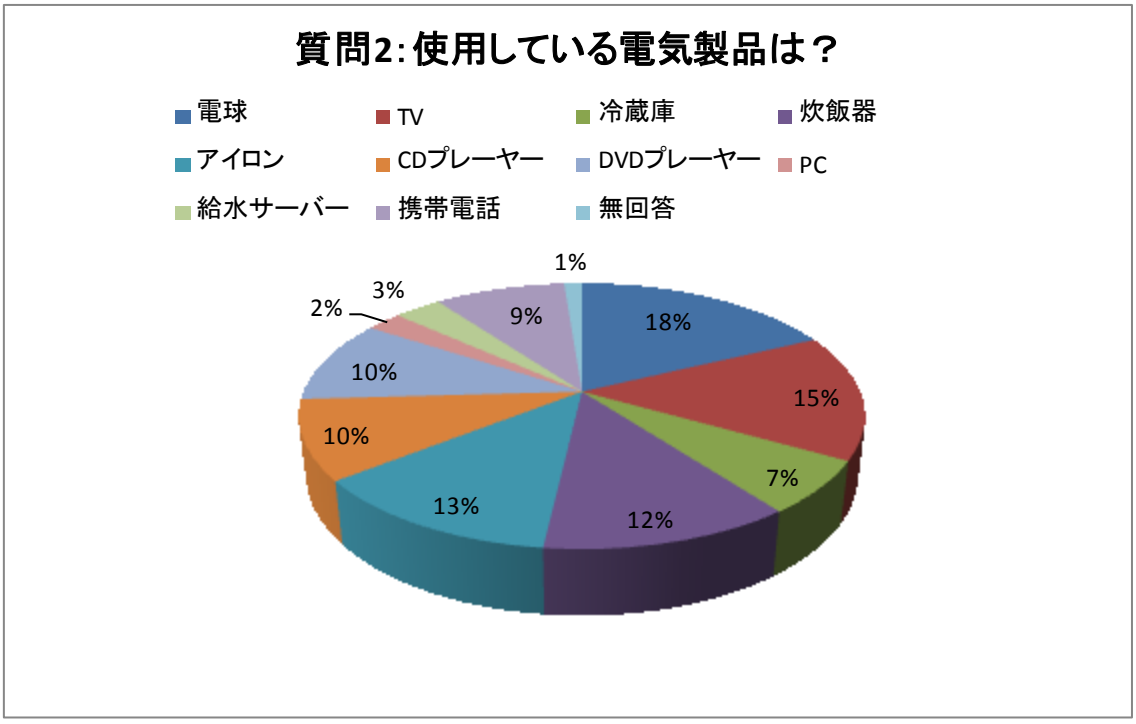
スカラメ村落住民への質問表

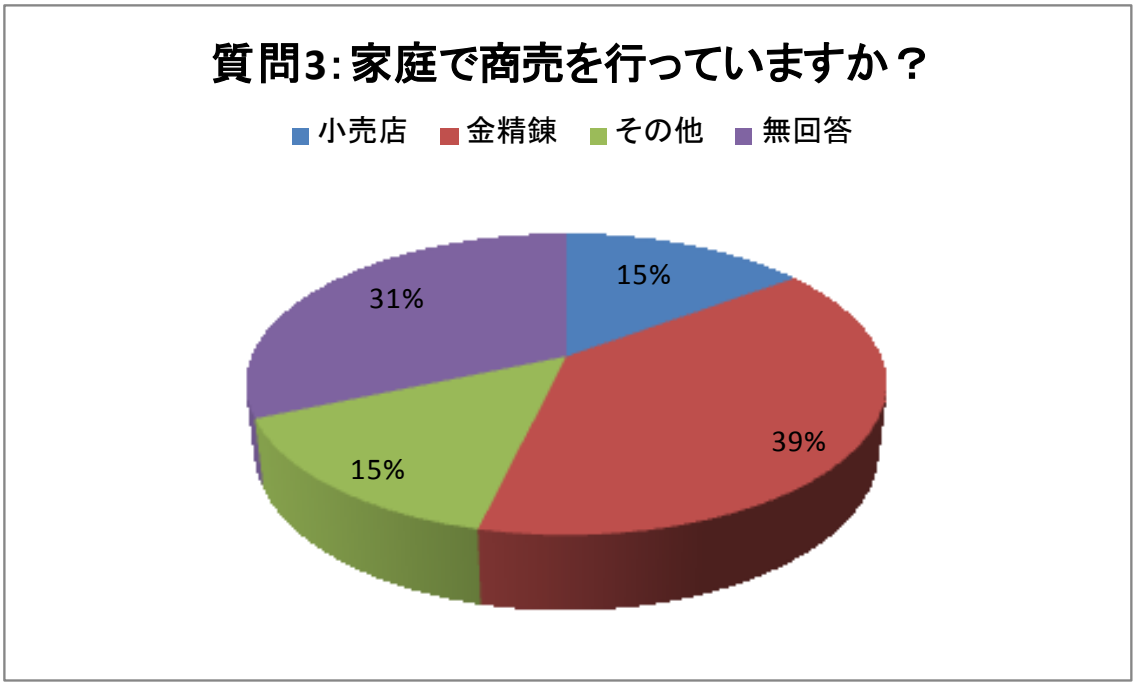
Name：　　Dusun：

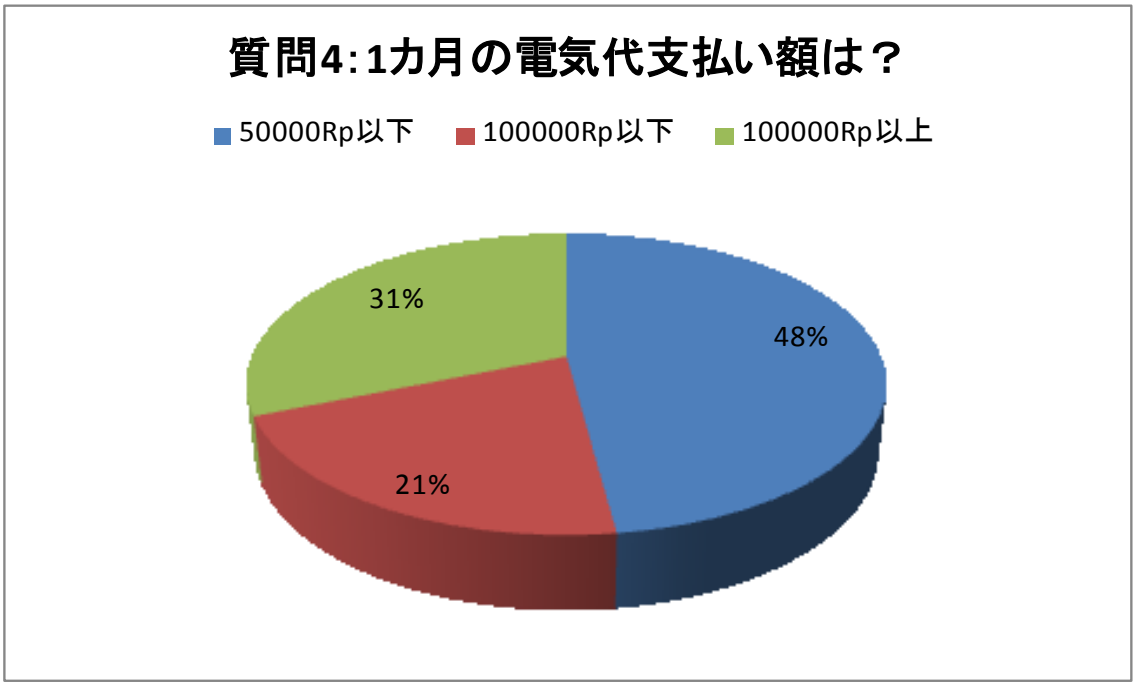
Questionnaire	
1. Power Supply in your house	
Q 1	Do you have electricity in your house? (1) Yes (450w / 900w) (2) No
Q 2	What kind of electronic products do you use in your house? (1) Lamp (5W /10W /20W /30W /over 30W) (2) TV (3) Refrigerator (4) Rice Cooker (5) iron (6) Music Player (7) DVD Player (8) Computer (9) Water Server (10) Mobile-phone (11) Others ( )
Q 3	If you have business in your house, what kind of business do you have? (1) small store (2) smelting gold (3) others ( )
Q 4	How much do you pay for electricity charge in a month? ( ) RP/month
Q 5	How do you pay the electricity charge? (1) pay to charge collector (2) pay by Plusa (3) pay directly to PLN
Q 6	How is the blackout frequency in your house? (1) 1-2 times/week (2) 3-4 times/week (3) almost every day
Q 7	Are you satisfied with the current power supply condition / electricity charge? (1) Yes (2) No (service is not enough / charge is expensive)
Q 8	What kind of demand do you have for power supply? (1) Low cost (2) Stability (3) High capacity (4) Others ( )
2. Power Supply in your community facility	
Q 9	How do you think about power supply condition for school? Does it need more power? (1) Yes if possible (2) No need
Q 10	How do you think about power supply condition for clinic? Does it needs more power? (1) Yes if possible (2) No need
Q 11	How do you think about power supply condition for mosque? Does it need more power? (1) Yes if possible (2) No need
Q 12	How do you think about street lamp in your village? Is it required or not? (1) Yes if possible (2) No need
3. Local Power Generation for local consumption	
Q 13	How do you think, if your village has own power generation for local consumption? (1) good if possible (2) No need
Q 14	If using hot spring in your village can generate power without any fuel, do you want to utilize such new technology and supply additional stable power to your village? (1) Yes (2) No
Q 15	If there is additional power supply using hot spring to your village, what kind of utilization of electricity do you want? (1) for private house use (2) for community facilities (3) for village development (regional improvement by any industry) (4) others ( )

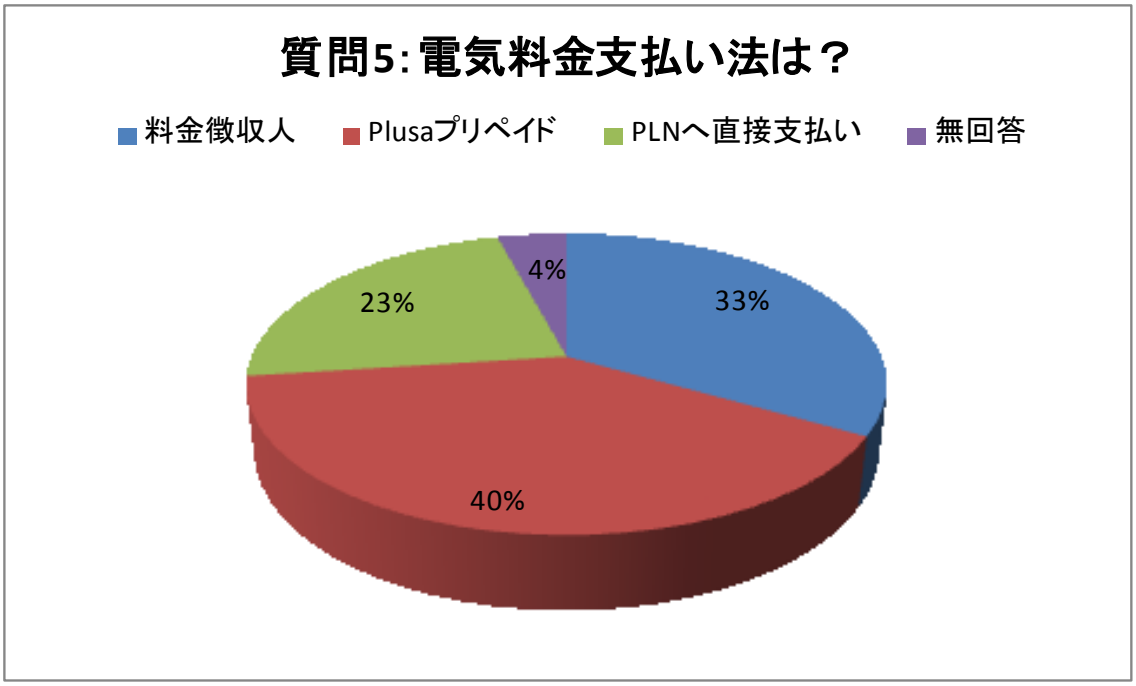
スカラメ村落住民への電力使用に関するアンケート結果

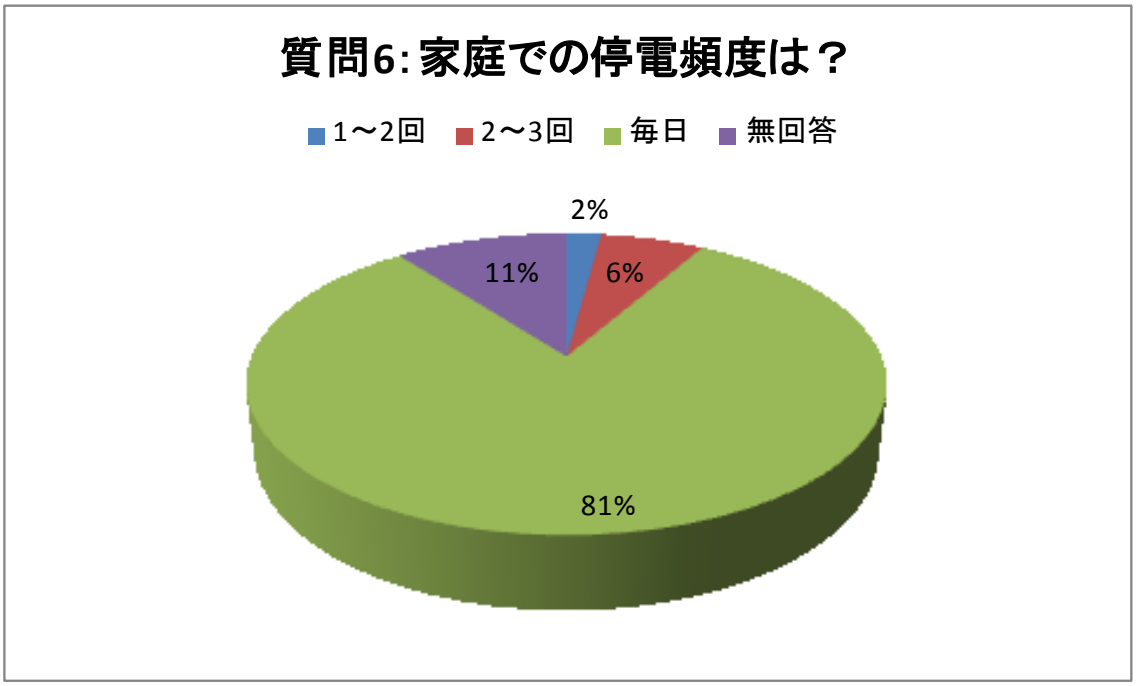


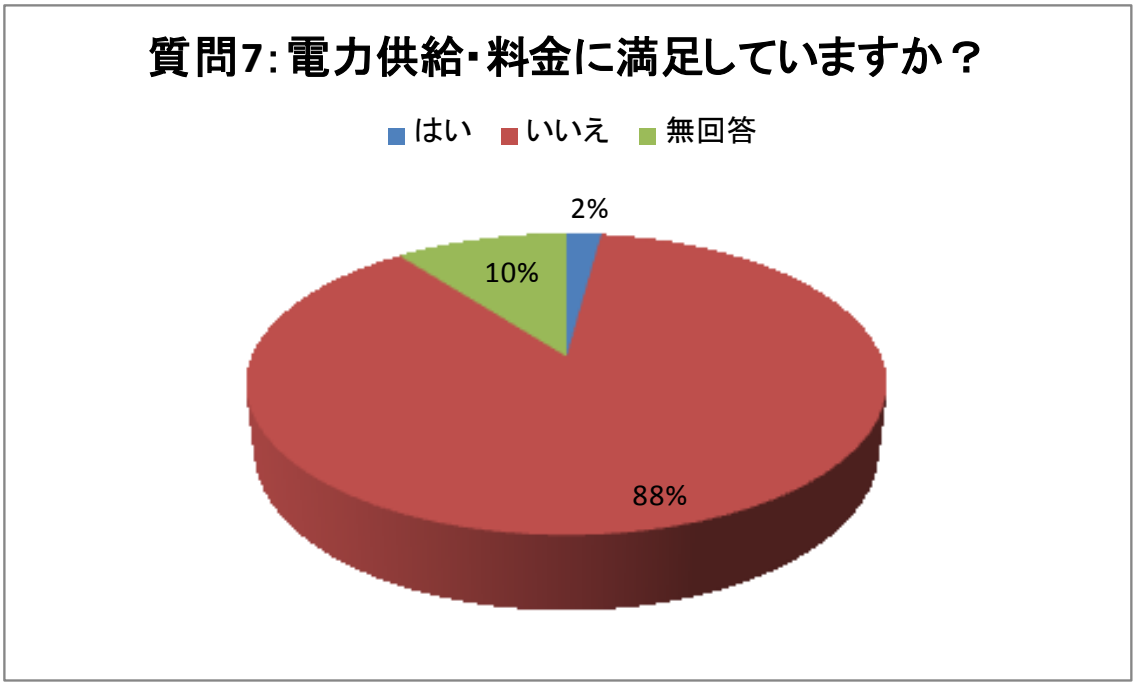


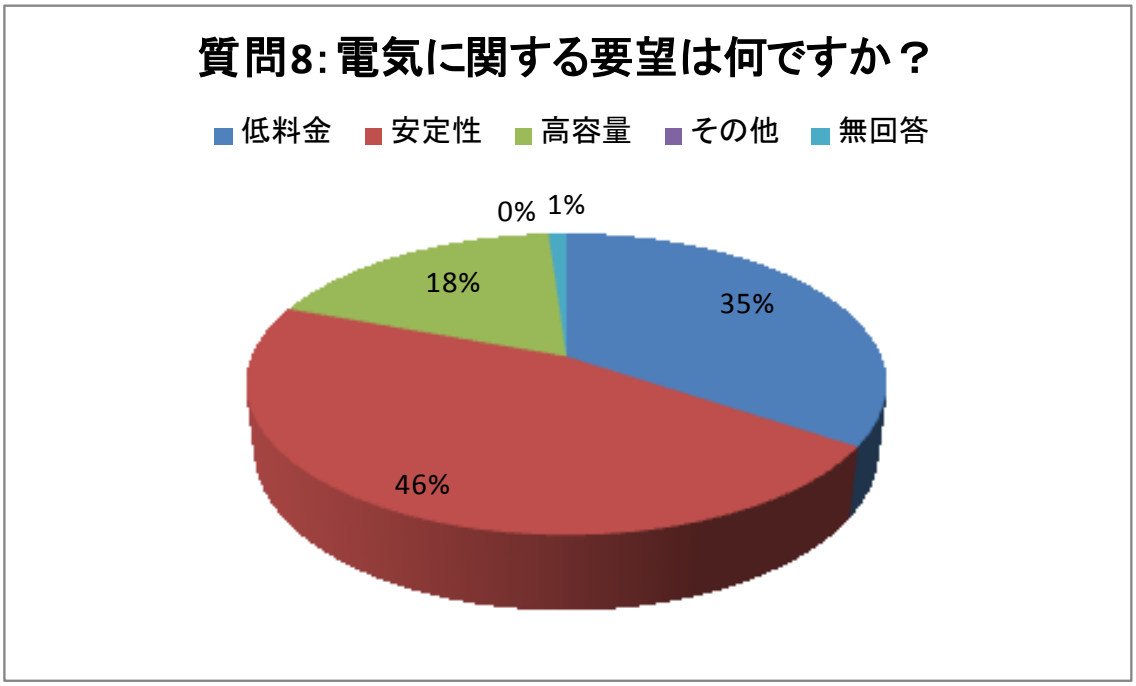

質問3:家庭で商売を行っていますか？
小売店
金精錬
その他
無回答
15%
39%
15%
31%

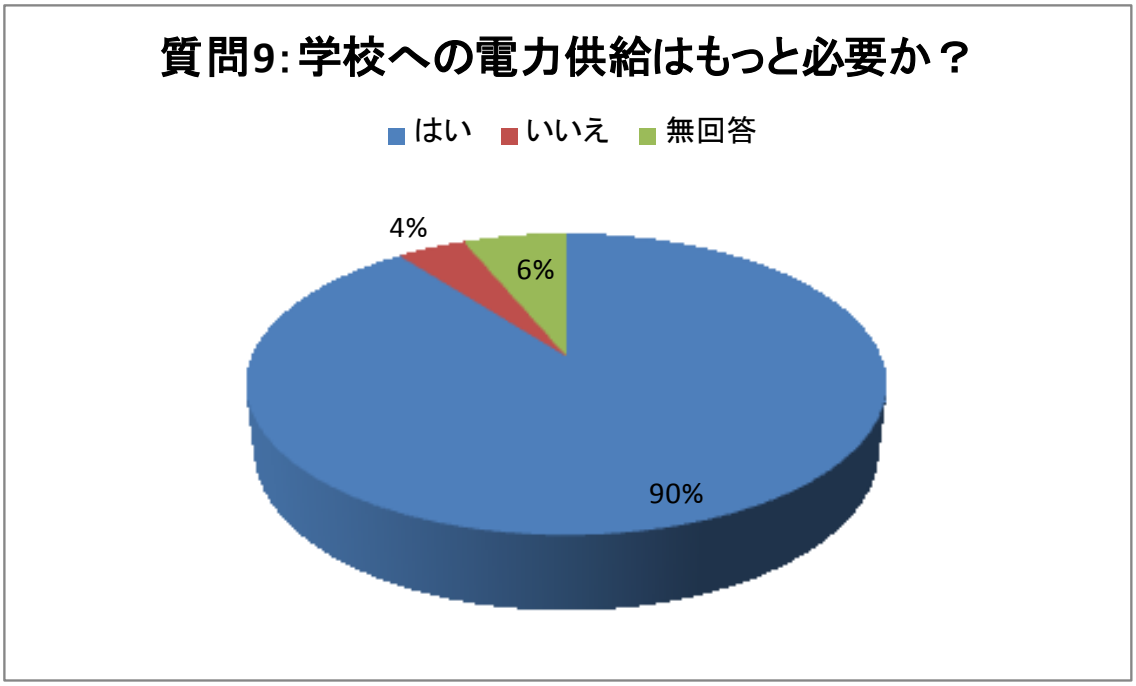

質問4:1カ月の電気代支払い額は？
50000Rp以下
100000Rp以下
100000Rp以上
48%
21%
31%

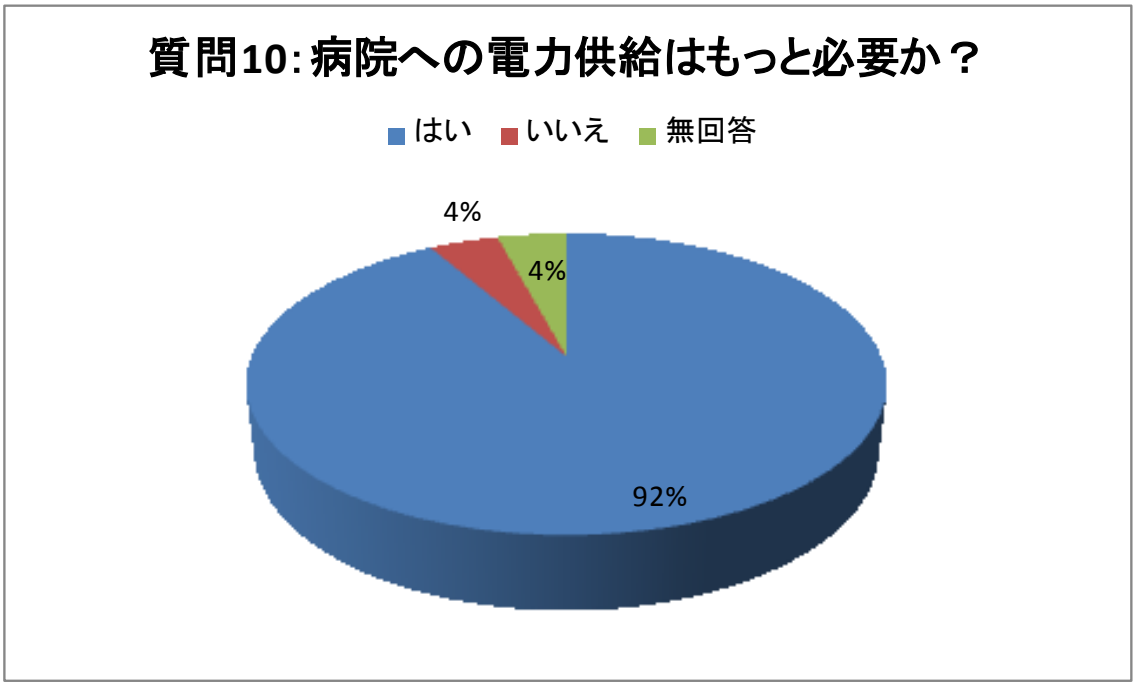

質問5: 電気料金支払い法は？
料金徴収人
Plusaプリペイド
PLNへ直接支払い
無回答
4%
33%
23%
40%

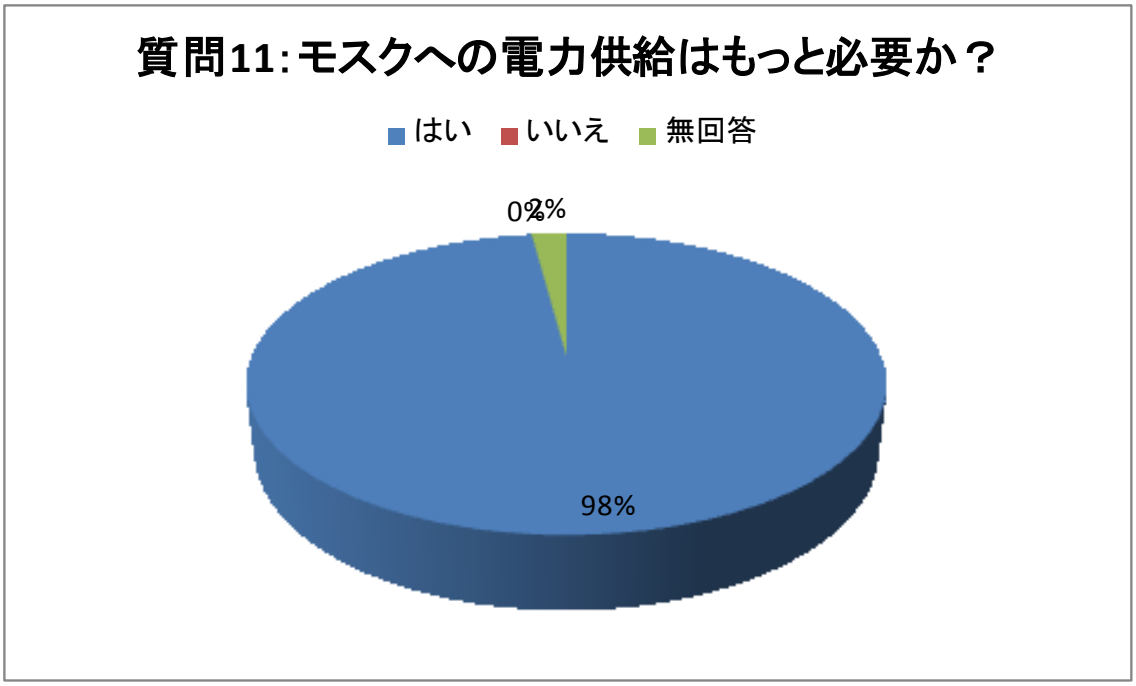

質問6: 家庭での停電頻度は？
1～2回
2～3回
毎日
無回答
2%
11%
6%
81%

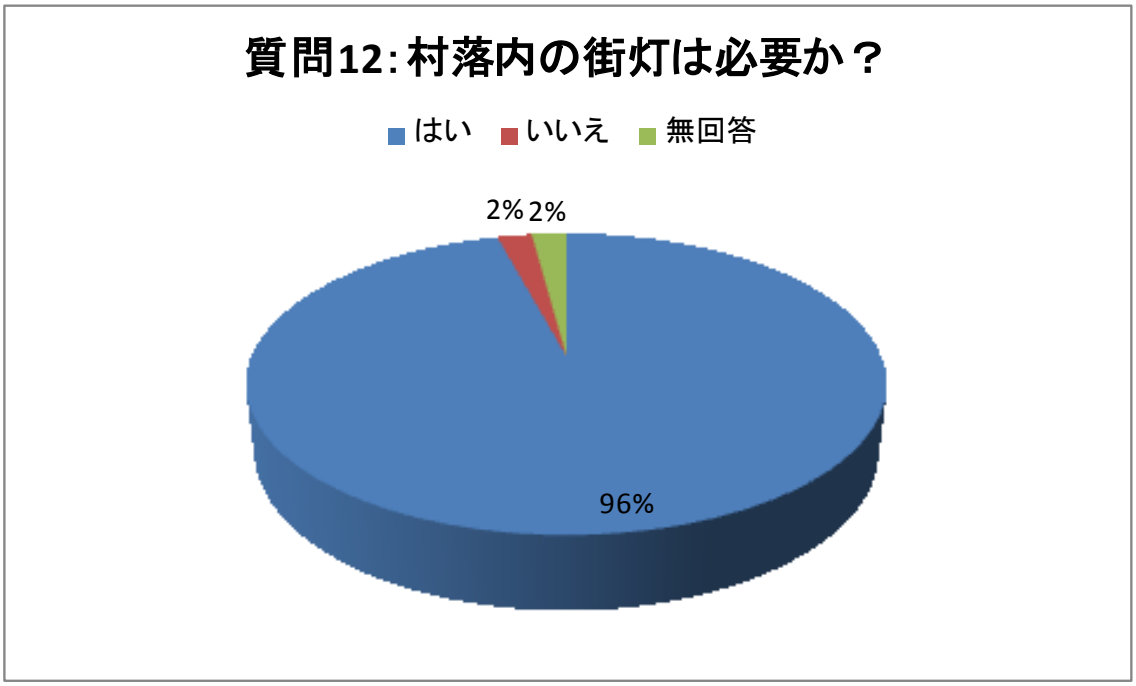

質問7: 電力供給・料金に満足していますか？
はい
いいえ
無回答
2%
10%
88%

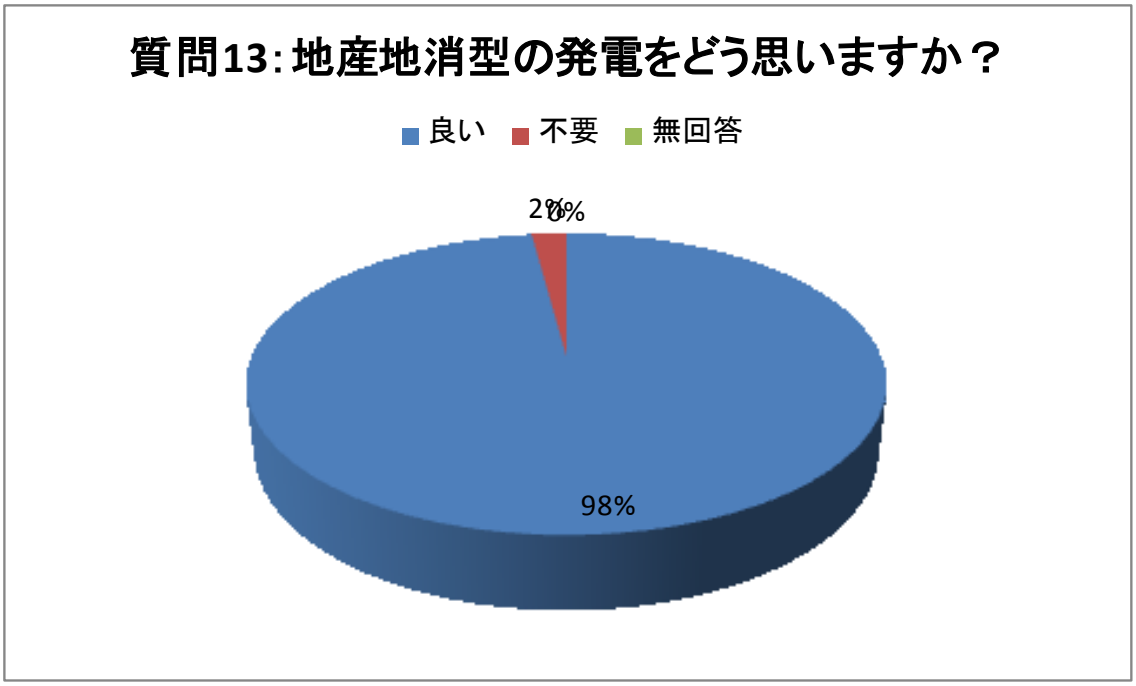

質問8: 電気に関する要望は何ですか？
低料金
安定性
高容量
その他
無回答
0%
1%
18%
35%
46%

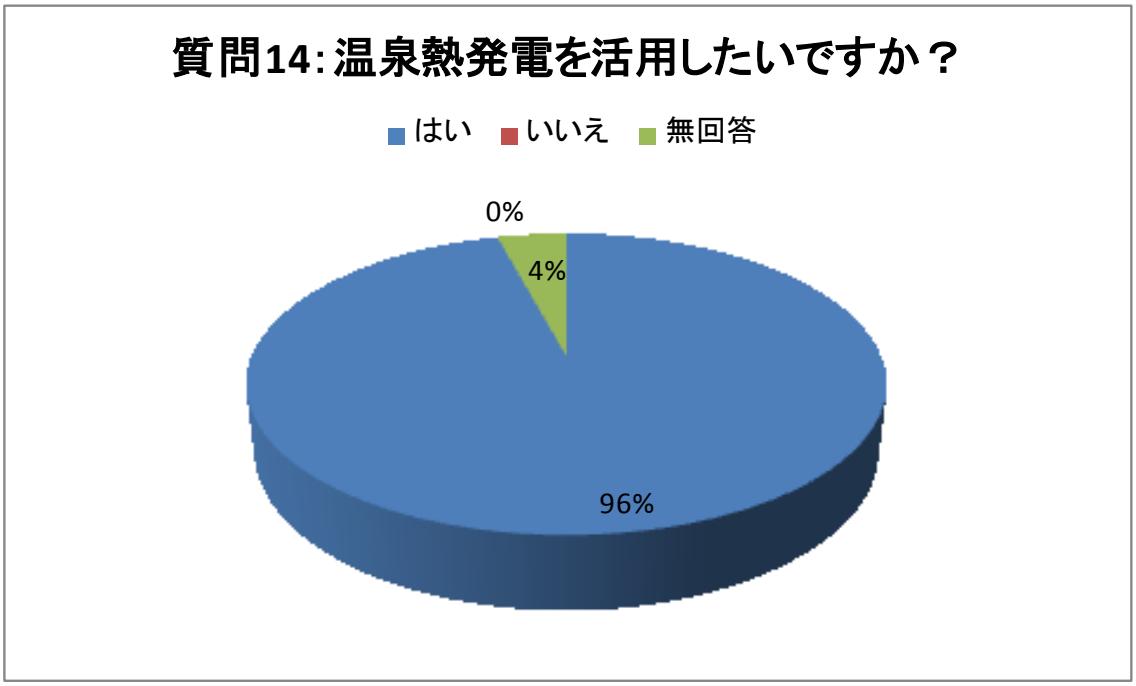

質問9:学校への電力供給はもっと必要か？
はい
いいえ
無回答
4%
6%
90%

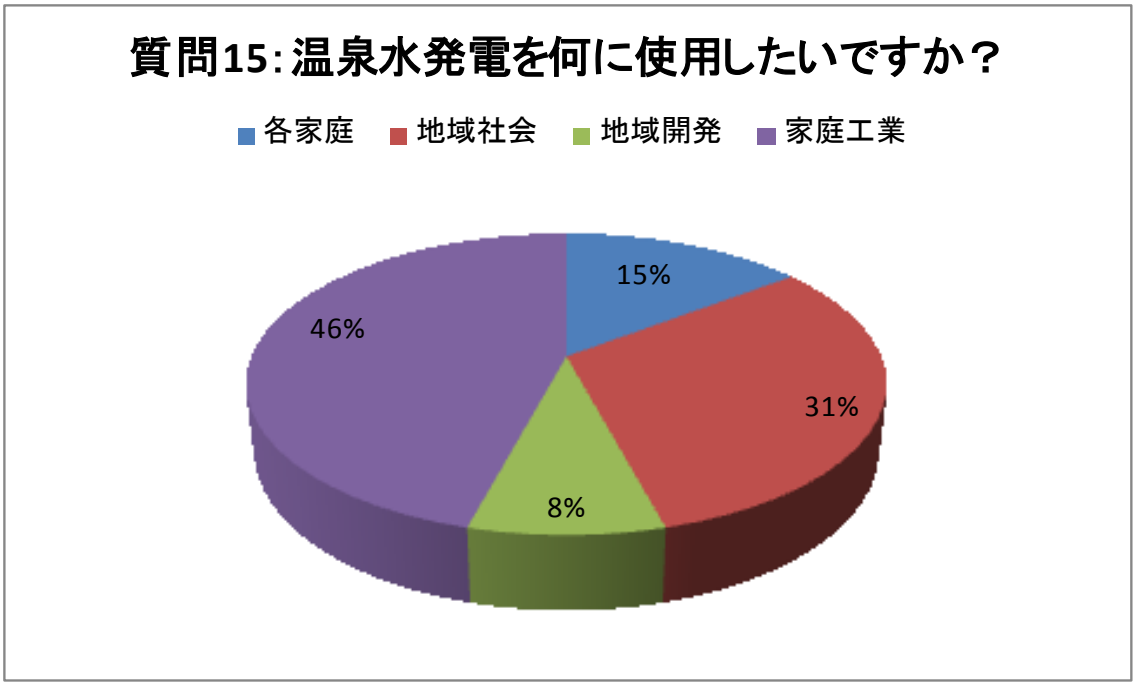

質問10:病院への電力供給はもっと必要か？
はい
いいえ
無回答
4%
4%
92%


質問11:モスクへの電力供給はもっと必要か？
はい
いいえ
無回答
0%
2%
98%


質問12:村落内の街灯は必要か？
はい
いいえ
無回答
2%
2%
96%


質問13:地産地消型の発電をどう思いますか？
良い
不要
無回答
2%
98%


質問14:温泉熱発電を活用したいですか？
はい
いいえ
無回答
0%
4%
96%


質問15:温泉水発電を何に使用したいですか？
各家庭
地域社会
地域開発
家庭工業
15%
31%
8%
46%

ワングサリ村落アンケート結果の取り纏め

Site Information Checking List					
					at Cisorok Village
No	Field	Contents	item	Unit	
1	Heat Source	Hot water	Temp	℃	98 degree C
			Discharge	L/min	50～70ℓ/s （？）
		Vapor	Temp	℃	no record
			Discharge		no record
		Water Quality			
		Present Situation			use for spa / swimming pool
		Water Flow Fluctuation			
2	Cooling Source	River Water	Yes/No		Yes
		Sea Water	Yes/No		No
		Groundwater	Yes/No		
			Temp	℃	25-30℃
			Discharge	L/min	
		Water Flow Fluctuation			Flood 1－2times/year
3	Village Information	Village	Yes/No	No of Village	Yes
		Households			1,300
		Population			4,020
		Distance from Heat Source		m	1,500
		Electrification Condition	Yes/No		Yes
		Power Source	Type		PLN
4	Geo Well Info	Circumstances			
		Usage Condition			
5	Life Info	Power Charge			495 RP/kWh
		Water Charge			5200 RP/m3
		Power Supply Condition			Nomal
		Electrification Needs			450W (80%)
		use for			lamp/TV/refrigerator
		no power supply			Zero
		blackout frequency			often
		Fuel Use			Gas 70% Wood 30%
		Average Income			600,000-700,000 RP/Month
		Village community	Yes/No		Agri business
		Organization of community			
		Main industry			Agriculture / Fisher
		Cultivated variety			rice/banana
		Community facility	Yes/No		Mosque
		Land Use			
		handphone adoption rate			80-100%
		payment of electricity			directly pay / Pulsa
6	Meteorologic info	Temperature			
		Humidity			
		Rainfall			
		Rainy/Dry Season			Rain:Sep-Apr / Dry: May-Aug
7	Infrastructure	Fixed-wire networks			
		Water system			yes
		Sewage system			yes
		Main Road			paved
		Village Road			paved
		Access to Geo well			1500m
8	power-generating	Dibs on Geo well			Developer
		Dibs on river water			
		Dibs on hot spring			Developer
		Land acquisition			Village
		Development permission			Developer
		Environment load			
		Drainage regulation			
9	Others	Village income/expenditure	17,000,000 RP/year from Cisolok Hot Spring		
		Village development needs			
		Problem			
		O&M system			

"Project Formulation Survey" under the
Governmental Commission on the Projects for
ODA Overseas Economic Cooperation
In FY2013

Summary Report

Republic of Indonesia

Feasibility Survey for Village Electrification through Unused Geothermal Waste Heat Source (Renewable Energy) – Introduction of Mini-Discharged Thermal Energy Conversion System (Mini-DTEC)

March, 2014

A joint study team consisting of
JAPAN CAPACITOR INDUSTRIAL CO.,LTD.,
OGAWA SEIKI CO., LTD., and O.P.C.CORPORATION

The content of this report is a summary of the project formulation survey, which was commissioned by the Ministry of Foreign Affairs of Japan in the FY 2013 and is carried out by the consortium A joint study team consisting of JAPAN CAPACITOR INDUSTRIAL CO.,LTD., OGAWA SEIKI CO., LTD., and O.P.C.CORPORATION. It does not represent the official view of the Ministry of Foreign Affairs.

I. Description of the current situation and development needs of the concerned development issues in the surveyed country

Since 2000, the domestic demand-oriented economic policy of the Republic of Indonesia (hereafter, the Country) has resulted in the average annual economic growth rate of 4-6%. The level of CO_2 emissions from use of fossil fuels remains at the 12th in the world ranking, but the loss of the peat lands and forests is enormous. The forecast of economic activities predicts substantial increase in the transport and power sectors by their strong economic development. The Country intends to keep stimulating industrial activities and, at the same time, it has set a policy target for 26% reduction in CO_2 emissions in comparison with no policy case. Among the technical countermeasures, the policy aims to boldly promote a shift from fossil fuels to renewable energies. By converting abundant geothermal energy in the Country to electric power, the government aims to achieve mitigation of CO_2 emissions along with further progress of industrial activities. At the same time, it aims at resolution of regional disparities in the infrastructure by improving the electrification rate in the remote areas and local villages. Specific technologies for the government policy are the development of power generation technology using geothermal energy as the renewable energy of their own property. The binary power generation system could be expected to meet these policy objectives, technical requirements and needs in the local community, and hence was investigated for installation possibility in this study for both aspects of natural and social conditions.

II. Possible applicability of the SME's products and technologies, and prospects for future business development

Capacity of 50 to 100 kW class Binary Power Generation System has been developed by several makers in Japan, and the system is now in the validation and prevailing phase in recent years. Some of the projects are in operation and conducting the electric power selling to the power company through a feed-in-tariff of renewable energy, while further technical improvement is pursued. Also Mini-DTEC, which is the target binary machine in this study, has been applied in the power generation project (sell power business) with a use of hot springs in Hokkaido and started its test operation at the end of 2013. This Hokkaido project using Mini-DTEC attracts attention as the trailblazing consultation on the dissemination of small-scale binary power generation system in Japan. Not only the manufacturing of hardware “Mini-DTEC” with modified design specifications to meet requirements in Indonesia, but also operation and management support (O&M) will be provided in this project. Then, this project will develop a system that can provide a small-scale binary power generation system to satisfy natural and social conditions in Indonesia. The dissemination of the Mini-DTEC will be able to contribute to local economic development of Indonesia, where the equipment is manufactured, through increased profit and employment. The planned installation site of the binary power generation system is hot and humid throughout the year. The equipment components will be transported using a steep access road to the village and to geothermal source. To meet these natural and social conditions, the design for transportation will be changed to the Country specifications.

III. Verification of adaptability of the SME's products and technologies to the surveyed country

By the preliminary survey, two sites of Sukarame and Cisolok areas in West Java Province were selected as candidate sites for setting the small-scale binary power generate system. The site survey was carried out to determine whether or not it meets the equipment performance and needs for power source for security with the guide of the government of West Java Province, Sukabumi District, Village head and Geothermal Developer. The surveyed conditions include natural environment, land conditions for access to these sites, heat source (discharge and temperature), and interest on the new generation system. On a basis of such information, it was concluded that the site condition of Sukarame area will meet the requirements for O&M of the power generation system. Procedures to obtain permits from public administrations have been confirmed for the process from land acquisition for setting the equipment to operation of the generation system.

IV. Expected development impact and effect on business development of the proposing SMEs in the surveyed country through proposed ODA projects

The proposed binary generation system possesses excellence in transportation and assemblability , and hence suggests the feasibility of electrification from renewable geothermal energy in remote areas of the island regions that rely on diesel power generation. There is a strong possibility that the dual policy goal of global warming gas reduction and diesel fuel cost saving will be attained. Additional 15 heat source locations suitable for setup of the generation system are expected to develop according to the geothermal potential map issued by Ministry of Energy and Mineral Resources. Based on this information, a big volume of business market could be developed through demonstration and establishment in the Country through the proposed ODA project. At the same time, the ODA project will promote the dissemination of related technology, engineering education, and development of the maintenance business.

V. Proposals for formulating ODA projects

Considering that the activity of Mini-DTEC in the demonstration stage is most appropriate to be conducted under the scheme of Pilot survey for disseminating SME's technologies in the area of Sukarame, Sukabumi province, West Jawa, we proposed the Project Design Matrix (PDM) and Plan of Operation (PO) based on current information. In this phase, we verify the feasibility of binary power generation system on the condition that the system is not connected to the electric grid under the control of PLN. In this verification activity, we extract issues of the system related to electric grid connections, discuss and study its solutions with C/P and stakeholders.

Republic of Indonesia
Feasibility Survey for Village Electrification through Unused Geothermal Waste Heat Source (Renewable Energy) – Introduction of Mini- Discharged Thermal Energy Conversion System (Mini-DTEC)

SMEs and Counterpart Organization

- Name of SME : JAPAN CAPACITOR INDUSTRIAL CO.,LTD.
- Location of SME : TOKYO, JAPAN
- Survey Site・Counterpart Organization : BADAN PENGKAJIAN DAN PENERAPAN TEKNOLOGI

Concerned Development Issues

- Problem facing Indonesia includes delay of infrastructure construction (especially electric power), regional development gap, susceptibility to risk such as disaster.
- Rate of electrification in Indonesia in 2012 is 75.3, (no electricity for 60 million) , national goal is set at 80% in 2014, 99% in 2020.
- Rate of electrification in West Java (our target site) in 2012 is 75.98%.
- Breakdown of power supply in 2012 is 51% by coal, 22% by gas, 16% by petroleum, 6% by hydraulic power, and 5% by geo thermal. However, utilization rate of geothermal is only 4% (1341MW) of all potential in Indonesia (28000MW).
- Roadmap of development toward 2015(2016-2015) includes that renewable energy shall be account for 12% (3516MW) of all generation potential.

Products and Technologies of SMEs

- Mini-DTEC is a small scale power –supply equipment utilize heat source such as thermal water which is not used geothermal power.
- Mini DTEC is able to supply clean electrical power (no emission of CO_2)
- Mini-DTEC is able to stand-alone power generating, available to running at 90% of capacity of the system by constant use of heat source.
- Proprietary developed heat exchanger, turbine generator, power conditioner are unitized to realize miniaturization of the system. Facilitate customize according to each condition of the site.
- Heat exchanger, turbine generator are designed not to leak CFC so that has little environmental impact.
- Easily transported / installed because of small size

Proposed ODA Projects and Expected Impact

- Feasibility demonstration (approx. 100kw) of Mini-DTEC will be conducted under the scheme of Pilot survey for disseminating SME's technologies . The results achieved by the verification of the feasibility test will help to improve of equipment performance, promote of cost reduction, strengthen relationship with governments concerned, construct of operation and maintenance system.
- During the period of the pilot survey, select other possible sites and make a plan to formulate future ODA projects trough discussions with the governments concerned, in the medium run, expect wide range of development effects by promoting hot spring thermal used rural electrification.

Future Business Development of SMEs

- Modularized system developed for domestic market will be redesigned to address the easy-transportation for Indonesia as well as neighboring countries where has many geothermal potential to be developed.
- Aim to expand sales in Indonesia through the utilization of "FIT" (Feed in –Tarff in INDONESIA) in the long run.