

Onikoube project

O&M Selection fill form

No.	Work item	Juwi ShizenEnergy		SmartEnergy		TAG		Loop		C-Energy		
		Comparison	Cost in a year	O&M cost description	Cost in a year	O&M cost description	Cost in a year	O&M cost description	Cost in a year	O&M cost description	Cost in a year	O&M cost description
1 General Maintenance & Engineering work												
a	Regular Inspection	34,810,000		36,050,000		(average inspection cost.)	12,000,000		16,762,000	Physical inspection periodically by two persons including calibration measurements. They include MC4, connectors and putty	10,000,000	Visual inspections of interconnection substations and intermediate substation facilities will be conducted weekly. Other electrical facilities will be inspected at least once a year.
b	Periodic Inspection (Following Safety Regulation (Huan kitei))	8,429,000			55,243,333		8,000,000		24,149,000	interconnection facilities once a month, intermediate substation and DC facilities twice a year, intermediate substation ground resistance once a year.	13,000,000	Annual inspection will be carried out following the security regulations. The plan is to be 2 days of inspection Day 1: Total power outage Day 2: The remaining intermediate substation For an additional charge Proposal 1: Complete the inspection in one day Proposal 2: Annual inspection at night For all of the above proposals, the solar panels and PCS will be stopped for about 30 minutes. The inspection (insulation resistance measurement) will be conducted over a period of one year.
c	IR (Drone) inspection Or Solar mente inspection 1 time/year	-		Included in "1(a)" Regular Inspection	16,720,000		3,000,000	Drone-Thermal inspection (once/year)	1,600,000		2,000,000	This will be done at an interval of once every two years. The amount shown on the left is the average annual amount, so it will be the same whether you do or do not do IR inspections
d	Drainage system maintenance. (Existing golf course drainage.)	-		included in "1 Maintenance work" This work will be conducted as light maintenance work that does not require heavy machinery.	-	Included in 1-a. However, work that requires equipment, vehicles, and special machinery is not included.	5,000,000	We expect to remove soil from u-shaped ditch (การขุดดิน). However the culvert work (การหาความสะอาดในท่อ) is not included.	1,300,000	> Disposal costs are not included. > Accessible road by shovel is necessary. If the road is not arranged, additional costs will be applied. > The equipment costs are included. > Exact price is to be confirmed depending on site visit.	0	Cleaning of exposed drains and inside drainage basins will be carried out by our technicians and will be within the scope of the estimate. Buried piping, large scale dredging, and other areas that will require outsourcing should be an additional cost
e	Fence maintenance	-		included in "1 Maintenance work" It does not include the repair of the support piles, but assumes the repair of the netting part of the fence.	-	Included in 1-a. However, work that requires equipment, vehicles, and special machinery is not included	0	If can cover by onsite people	600,000	Details listed in quote, agreed upon by subcontractor	0	Small repairs such as fixing fence holes with wire will be carried out by our technicians and will be within the scope of the estimate. Repairs that require fence components or permanent repair of fence inclination (mortar filling) should be charged separately
f	Tree cutting	-		Branch cutting is included in "1 Maintenance work"	-	Included in 1-a. However, work that requires equipment, vehicles, and special machinery is not included	extra charged to be applied	Reference price: 250,000 yen (Two-man operation, rolling of cuttings on site) The price will vary depending on the location.	600,000	Details listed in quote, agreed upon by subcontractor	0	Branch trimming that affects power generation will be within the scope of the estimate, but within reach of high branch trimming scissors (4-6 meters).
g	Manufacturer inspection and parts replacement from maker	-		Not included part replacement from maker	-	Not included part replacement from maker	-	separate quotation on maintenance period.	-	Obtained upon discussion with EPC	-	Obtained upon discussion with EPC
h	Engineer 2person	-		included in "1 Maintenance work" and assignment of a micro radio technician	-	Included in 1-a. 4 people work on the site.	14,000,000	1 person: Chief Electrical Engineer (Class2) 1 person: Skill holder equivalent to a certified electrical engineer	16,300,000	To provide minimum 7 engineers Engineer team: 1 Chief Electrical Engineer (Class 1) and 7 Engineers, in total 8 persons. Work in shift. 2 Engineer per team. In each team, there will be one three-year experience engineer as a leader.	40,000,000	Three engineers will be assigned exclusively to the Onikoube Power Plant.
i	4 supporters to maintain site environment, such as roads trees and fences (working 5 days a week)	13,800,000			-	Included in 1-a. 4 people work on the site.	22,000,000		0	Dependent on subcontract, please see quote details for more information	10,000,000	The above technicians will maintain the environment. Additional supporters will be assigned during winter and other busy periods. The supporters will not be technicians, but miscellaneous personnel such as temporary workers.
Total 1 (Maintenance Work)				57,039,000		71,963,333		64,000,000		61,311,000		75,000,000
2 Weeding work only necessary area												
a	Weeding along road, cart-road (at least once a year)	0		included in "(1.i) Monpower at Site"	6,160,000	This work is an estimate assuming sunny weather all day. * The work range is assumed to be as follows. ① Management passage: width 2m x 10km ② Between arrays: width 2m x 3m x 2,138 units (from management aisle to PCS) ② Inside the interconnection substation: The entire area inside the fence * Weed collection / accumulation / disposal, tree support, fence ivy support, and other work not described above will be charged separately.	0	1-i Conducted by on-site environment maintenance staff.	11,680,000	Weeding Once a year. And tree-trimming every three years. > Disposal costs are not included. > Working schedule of the weeding is arranged and controlled by us. > The costs of equipment for the weeding works are included.	28,000,000	Weeding of the following areas will be carried out by our partner company once a year. Flat areas such as panel installation points and roads and around fences. Roads will be weeded as needed throughout the year. Slopes weeding is not included because of the increased possibility of collapses due to sediment runoff. Forest area: Not implemented because it will not affect power generation.
b	Weeding other areas (to maintain output)	0		included in "(1.i) Monpower at Site"			Estimate each time	As a reference amount, weeding work for the lower part of all modules and PCS will be 37 million/time.	0		0	
Total 2 (Weeding work)		Include in 1-i		0		6,160,000	Include in 1-i	0	Whole area Control by O&M	11,680,000	Whole area 1 time	28,000,000
3 Snow work												
a	Snow removal 2 times / season (lum sum) at necessary areas (Main road to HV-substation)	1,240,000		The current assumption is that snow removal work will be carried out when a heavy snowfall warning is issued or when the snow depth reaches 40cm. We would like to verify and finalize the details this winter after we receive the O&M offer.	18,480,000	cost for one season.	1,800,000	We will move to the extra high voltage substation by snowmobile and only simple snow removal around the entrance of the extra high voltage substation will be carried out by the environment maintenance staff.	8,800,000	> equipments are included. > Snow removal schedule is arranged and controlled by us. > Snow removal on the panels will be additional cost.	0	This will be carried out by our technicians. Snow removal equipment will be placed at the newly opened Onikoube office and at the power plant premises. In addition, we have confirmed with Osaka City and Miyagi Prefecture, which are clearing snow from public roads in the vicinity, that snow removal will be required almost every day from mid-December to the end of February.
b	Addition cost in case we need to do snow removal in specific area near the structure.	extra charged to be applied		Such as for 2ha., the expected costs is 1.0 million yen per round.			extra charged to be applied	35000/1 human-work Since the degree of snowfall at this power plant has not been confirmed, only the human-work unit price will be presented.	In case of order by owner extra charged to be applied	Depending on snowfall, we will have 3 man power at 100,000 Yen per day	extra charge to be applied	The amount of Snow will be applied The cost will be charged as follows: Outsourcing costs x 15% (administrative costs, insurance costs, etc.) However, we will remove snow from around interconnection substations and intermediate substation facilities free of charge if snow removal is required due to inspections, etc (average price 300k yen per day)
Total 3 (Snow work)				1,240,000	Lamsam	18,480,000		1,800,000	Control by O&M	8,800,000	Include in 1-hi	0

4 Panel changing work										
b Panel Changing (lum sum 120 panels/year)	2,855,000	Labor cost only as Corrective maintenance work	0	included in 1-a	2,000,000	extra charge will be applied (120k yen per location)	1,536,000	Already included. MC4x100ea changing cost and other small items such as fuse, etc. is included.	0	Our technicians will replace 120 panels per year, up to a maximum of 15 panels per month. This fee does not include the cost of the solar panels, which must be provided by PurpleSol. If you exceed 120 panels per year or 15 panels per month, please contact us for an additional fee. Also, industrial waste disposal of waste solar panels is not included
Total 4 (Panel changing)		2,855,000	0	Include in 1-a	2,000,000	Depend on position no.	1,536,000	1,536,000	0	Include in 1-hi
5 Control center work										
a Manpower at Control Office (Day - identify no. of persons)	10,000,000		38,000,000		0	We assume the CEE will stay in control office.	2,297,000	At least 1 Person at the control office during the day	2,400,000	During weekdays, four people are stationed in the monitoring centre. On weekends and holidays, there is one person working.
b Manpower at Control Office (Night - identify no. of persons)	0	Included in "3.a" above			20,000,000	4 people will be rotating for 24hr/365 days of monitoring.	6,195,000	At least 2 Persons at the control office at night	0	One person is on duty.
c Operating costs for Control Office at Sendai	3,000,000	Including remort monitoring work			3,000,000		2,040,000	All costs for the control office is included in our quote	0	We will not have an administrative office in Sendai. We will set up an office in Onikoube, closer to the power plant, to serve as a spare parts warehouse.
Total 5 (Control Center)		13,000,000	38,000,000		23,000,000		10,532,000	10,532,000	2,400,000	2,400,000
6 Management										
a Management cost	24,488,000		0	included	20,000,000		1,000,000	Necessary equipments, calibration, cars, tools, etc.	8,200,000	This fee includes the cost of vehicles, transportation, company housing, etc. for the resident engineer.
b Reporting	0	Included in "4-a Management cost"	0	included in 1-a	0		700,000	Performance and Maintenance Report once a month. Emergency	4,000,000	Translation of the manufacturer's report will be charged separately.
d. Spare parts management	0	The initial spare parts will be procured by JESO for the Owner and the cost of the replenishment will be born by us upto the 3% limitation of the corrective maintenance above.	additional costs to be applied		additional costs to be applied	Some subsidy on warehouse costs by TAG is possible. However if the containers are required, the costs may vary. The forest permit is required before the installation of containers. Additional charges to be discussed.	1,600,000	Modules 500 pc. PCS 38 pc. Snow removal and weed removal equipment as well as other inspection equipments	2,400,000	We are opening our office in Onikoube for storage of snow removal equipment and other supplies. We will rent a part of our Onikoube office (20-30m2) for free as storage space for spare parts.
Total 6 (Management Cost)		24,488,000	0		20,000,000		3,300,000	3,300,000	14,600,000	14,600,000
7 Other										
a CEE Class 1person	11,000,000	mainly it would be more effective for us to make use of Mr. Abe's experience and human network at least for the first few years.	11,000,000		10,000,000		12,340,000	CEE specified by Loopo : Candidate 1. Ex. Tokyo electric person Candidate 2. Ex. Smart energy person	8,000,000	If a chief electrician is needed, an additional fee (8 million yen) will be required.
c PR Guarantee following Design value from EPC (Panel degradation 2.5% for first year, 0.576% Each year)	0	included in "6-a Management cost", however, the Guaranteed value will be fixed after 1 year since the O&M starting, and thus we offer the special discount for the 1st year. Please refer to the attached sheet for the formula of PR guarantee.	Not accept		Not accept	not included as this PR guarantee should already be covered by EPC contractor	301,000	Not mention	10,000,000	This is an estimate based on our standard coverage provided separately. Therefore, the amount may increase depending on the contents of the compensation. The details of the compensation will be decided after separate discussion.
c Equipment calibration	588,000		-	Not included	-	Not included	-	Not included	-	Not included
e Additional costs from Control office	1,848,000	fiber optic fee per month 154,000 Yen	1,848,000	fiber optic fee per month 154,000 Yen	1,848,000	fiber optic fee per month 154,000 Yen	1,848,000	fiber optic fee per month 154,000 Yen	0	No need to install
Total 7 (Others in Scope)		13,436,000	12,848,000		11,848,000		14,489,000	14,489,000	18,000,000	18,000,000
Total 1-7		112,058,000	147,451,333		122,648,000		111,648,000	111,648,000	138,000,000	138,000,000
Total	112,058,000	1st year only reduction (30% of the total annual O&M fee)	147,451,333		122,648,000		111,648,000	111,648,000	138,000,000	138,000,000
AVG cost/year	110,424,167		147,451,333		122,648,000		111,648,000	111,648,000	138,000,000	138,000,000
Annual price / watt 18 yrs cost (est.),	0.75	1,987,635,000	1.00	2,654,123,994	0.83	2,207,664,000	0.76	2,009,664,000	0.94	2,484,000,000