

BOARD OF WATER SUPPLY of the COUNTY OF KAUA'I

SPECIAL BOARD MEETING

**Second Floor, Microbiology Lab Bldg
Kaua'i County Department of Water
4398 Pua Loke Street, Lihu'e, Kaua'i, Hawai'i 96766**

TUESDAY, September 17, 2013

2:00 p.m.

Or soon thereafter

A. CALL TO ORDER

B. ROLL CALL

C. ACCEPTANCE OF AGENDA

D. NEW BUSINESS

1. Discussion and possible action on Kahili Well energy saving project EIS

E. ADJOURNMENT

New Business

The text "New Business" is rendered in a bold, blue, sans-serif font. The letters are slightly 3D, with a thin, lighter blue outline. A soft, grey shadow is cast beneath the text, giving it a sense of depth and making it appear to float above the white background. The text is tilted slightly upwards from left to right.

KAUA`I BWS SPECIAL
MEETING SEPT 17, 2013

Kāhili Horizontal Directional
Drilled Well Project (HDD)

BWS Goals

- Provide:
 - SAFE
 - RELIABLE
 - AFFORDABLE
- Water to customers
- Now and the **future**

Existing Water Sources

- Groundwater sources
 - Vertical wells
 - Tunnels
- Surface water source
 - SW Treatment Plant

Map of Existing Sources



Ground Water Sources

- Advantages:
 - Vertical Wells are low in operational cost
 - Wells are interconnected where feasible
- Disadvantages:
 - Deep well pumps require high electrical power
 - Kaua`i's high electrical power rates likely to increase
 - Līhu'e aquifer is reducing due to lack of former irrigation
 - Increased regulation of contaminants by EPA/DOH

Surface Water Sources

- Advantages:
 - Kaua`i has abundant surface waters
 - Low electric costs
- Disadvantages:
 - High O&M costs
 - Increased regulation of potential contaminants by EPA/DOH
 - Currently existing uses are highly contested
 - Potential lengthy legal issues
 - Affects Stream Flow

New High-level, Dike-confined Gravity Water Source

- Advantages:
 - Gravity source therefore no electrical cost
 - Minimum contaminants due to location in watershed areas
 - Lower operational costs
 - Would result in lower water rates or lower escalation of water rates
 - Potential to create hydropower
 - 3 MGD flow rate benefit to cost ratio is 10:1
 - Pays for itself at 3 MGD in 28 years

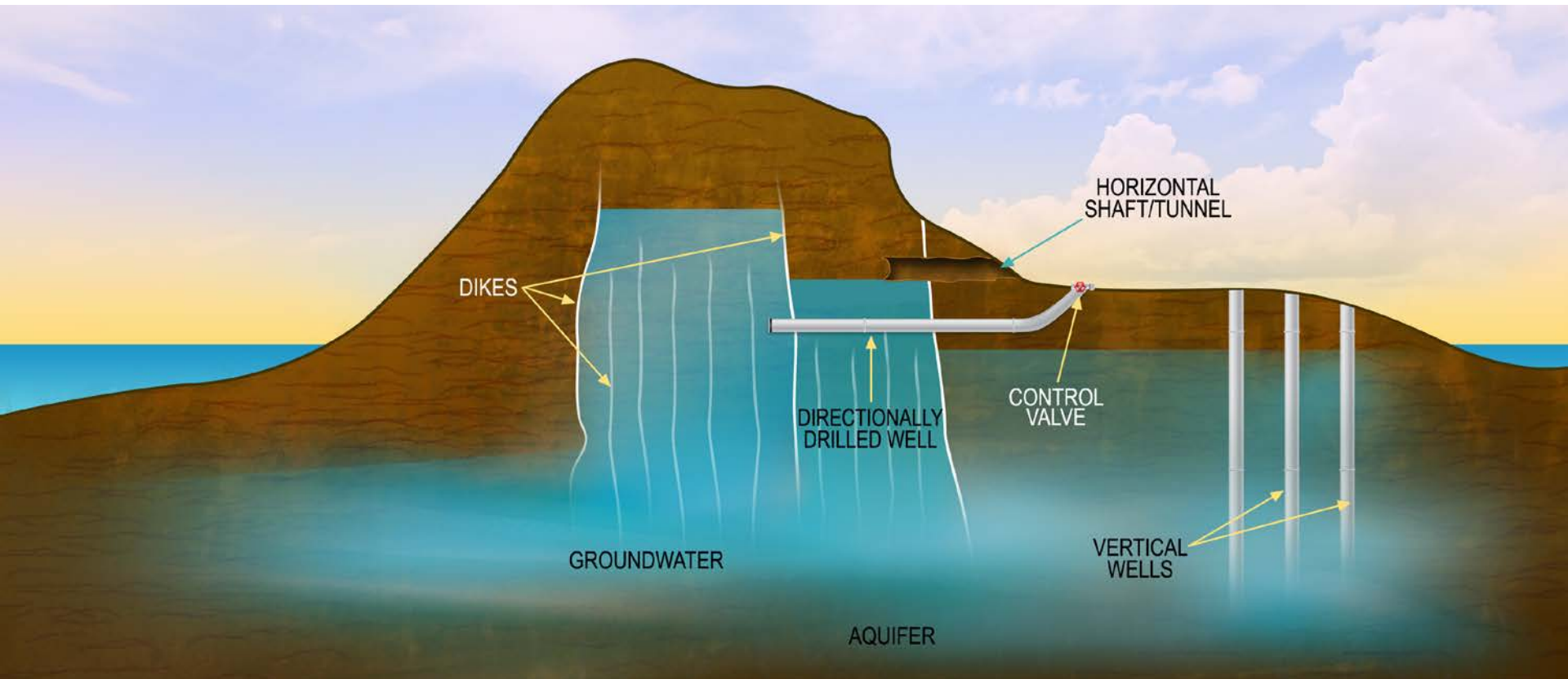
New High-level, Dike-confined Gravity Water Source

- Disadvantages:
 - We have already paid for our wells once
 - Site impacts – drilling fluids, archaeological, storm water, flora & fauna
 - Cultural concerns
 - Impact to stream flows will limit amount of water sustainably developed
 - DOW does not currently own the land the well would be located on

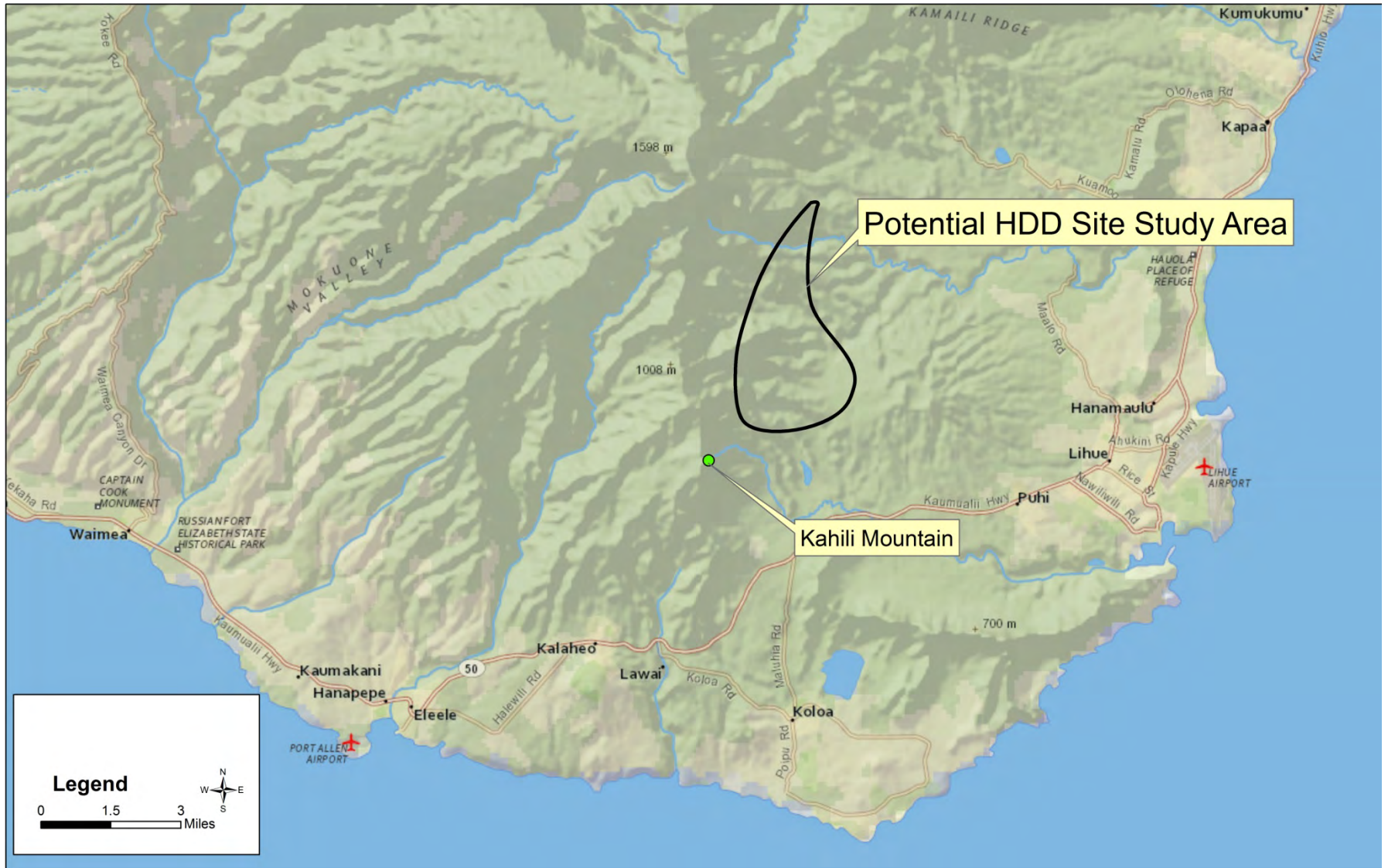
Photovoltaic Power Source

- Advantages:
 - It is available
- Disadvantages:
 - KIUC is at its limit for large arrays that can use net billing
 - Short life span
 - Only available 6 hours out of the day
 - Requires battery operation for the 16 hours additional run time
 - If batteries are not used requires added facility capacity and \$55 million in cost
 - DOW does not own any of the land PV would be located on
 - Use current public right of way has aesthetics issues
 - Very low benefit to cost ratio almost 1:1 for TF

Cross-Section of HDD Well



Potential HDD Sites



The Kāhili HDD Well Project

- Phase IA (Investigation, EIS & Permitting)
- Phase 1B (Engineering Design)
- Phase II (Exploratory Drilling)
 - HDD Well Drilling (new technology in Hawaii)
 - Test source capacity and quality
 - Proceed to Phase III

The Kāhili HDD Well Project

- Phase III (Development of HDD Well)
 - Permit applications/approvals based on Phase II tested source capacity
 - Additional EIS for permanent source, pipeline and hydropower development
 - Design & Construction
 - Deactivate selected existing wells
 - Convert wells to emergency standby sources
 - Put treatment facility on standby status.

Anticipated Permits

- State DLNR: Conservation District Use Permit; Stream Channel Alteration Permit; Well Construction Permit; State Historic Preservation Division approval.
- State DOH: National Pollution Discharge Elimination System (NPDES) Permits; 401 Water Quality Certification.
- Federal: 404 Permit; Endangered Species Act Compliance; NHP Section 106 Consultation.
- County: Grading/Grubbing Permit.

EIS

- The EIS will be compliant with State Law (Chapter 343 HRS) and will cover all the adverse and beneficial impacts of the project. It will include special studies on water, archaeology, cultural impacts, and flora and fauna.
- Approving Entity: Kaua`i BWS

Public Relations Program

- EIS process requires public input
- Program to date
 - Many meetings held with interest groups
 - Government officials informational meetings held
 - Two General Public meeting held (October 2012 and April 2013)

Public Concerns

- Cultural significance of Mt Waialeale
- Impact to stream flows and aquatic ecosystems
- Reliability of HDD technology
- KDOW should seek other alternative for saving power
- More water may encourage more development
- Cost to ratepayers

New Public Information Program

- Focus on identifying and holding special meetings with cultural, environmental and activist groups
- Re-establish contacts w/interest groups
- Develop community-wide educational materials on the project using news media and other outreach programs
- DOW staff to administer the PR program with assistance from contractors to restart the program

Risk Management of Gravity

Source Development

- Identify and define project risks
 - Uncertainty of obtaining project financing
 - Uncertainty of securing permits
 - Community/customers opposition to the project
 - Cultural, environmental and economic impacts
 - High initial capital cost of drilling
 - Application of HDD technology in Hawaii
 - HDD well capacity not meeting expected goals
 - Well capacity exceeding expected goals
- Determination of Reasonableness of risks
 - DOW administration/management
 - Legal standards
 - Procurement requirements
 - Contractor and sub-contractors contract limitations
- Acceptance of risks by the Board

Updated Project Schedule

- Informational meetings October 2013
- Draft EIS July 2014
- Final EIS March 2015
- Design/permitting December 2015
- Mobilization April 2016
- Drilling December 2016
- Well yield testing March 2017
- Restore site May 2017

Progress to Date

- RFP process
- Contractor selection process
- Prime Contractor: Mears Group, Inc. of Houston Texas
- Sub-Contractor: Oceanit of Honolulu & Līhu‘e
- Contract costs and scope:
 - Mears Group, Inc.: \$1,924,300 for investigation, planning, permitting, project management
 - Oceanit: \$1,132,000 for planning and permitting
 - Total Contract expenditures to date: \$450,000 (23%)

Financing the Project

- **Current funding source: \$2.0M**
 - State DOH SRF Grant: \$1.0 M
 - State DOH SRF Loan: \$1.0 M
 - Scope of Work: Site investigation, EIS & permits
- **Future funding sources:**
 - Federal/State Energy, natural disaster, homeland security programs
 - DOW cash/debit funding
 - Scope of Work: Drilling exploratory HDD well and development of transmission pipeline and hydropower plant

Summary

- Addition of Kāhili gravity HDD well would provide BWS increased source reliability
- Insure against future well water contamination
- Reduce operational costs by minimizing electrical power usage and treatment cost

Recommendation to Re-start Project

- Do not prevent a re-start of the project with revised public information program
- No additional funding are required to re-start the project
 - Manager will authorize the Contractors to continue work based on the contract timeline and costs.
- Require periodic progress reports to be submitted to the Board

Questions and Answers



High Level HDD Well

	FLOW in	MGD	500	600	700	800	HEAD
\$ Benefit to \$ Cost Ratio		3	10	10	10	10	
2013 Dollars		4	13	13	14	14	
		6	15	16	16	16	
		8	14	14	15	15	

Using Solar panels to replace power costs at Waiahi Treatment Facility

FLOW in MGD

\$ Benefit to \$ Cost Ratio

2013 Dollars

first 30 **3** **0.9**

no allowance for power cost increase	next 30	0.9
--------------------------------------	---------	------------

25 years to break even and
most likely the batteries will
not last 30 years

next 30
next 30
next 30
next 30
next 30

There may be another scenario where a power provider that can use tax credits would install the solar panels.
The above case would result in reduced up front cost

ADDRESS SERVICE REQUESTED

**SINGLE-PIECE 1 SGL 81572AA15-A-1
 106 1 SP 0.460



COUNTY OF KAUAI
 DEPT OF WATER
 PO BOX 1706
 LIHUE HI 96766-5706



See reverse side for important information.

SPECIAL MESSAGE FROM YOUR CO-OP AND YOUR COMMUNITY

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 "Follow" KIUC on Twitter @KIUC

ACCOUNT INFORMATION

ACCOUNT NUMBER: 489822512-501
 SERVICE ADDRESS: KAPAIA RESERVOIR
 SERVICE PERIOD: 07/15/13 TO: 08/14/13
 SERVICE DAYS: 31
 BILLING DATE: 08/15/13
 RATE SCHEDULE: LARGE POWER SCHED P (5P1)
 CYCLE: 11
 BILLING MULTIPLIER: 201

METER INFORMATION

METER	PREVIOUS	CURRENT	USAGE
MAIN - Z-26-10002	4612	4973	7220
KVAR - Z-26-10002	1941	2095	3080
DEMAND - Z-26-10002		0.739	147.8
BILLED DEMAND:			147.8
POWER FACTOR:			92 %
ADJUSTED KWH:			6967

CURRENT ELECTRIC CHARGES

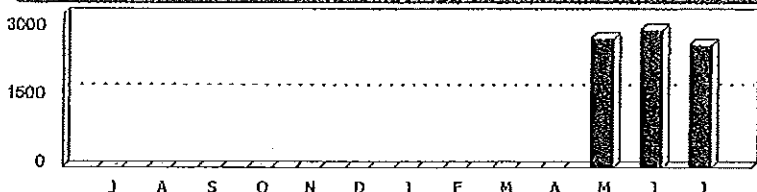
NON-FUEL ENERGY CHARGE	8,271.70
FUEL AND PURCHASED POWER ENERGY	18,511.11
Base Fuel Charge	13,337.50
Energy Rate Adjustment Clause	5,173.61
CUSTOMER CHARGE	369.38
RESOURCE COST CHARGE	208.30
KW DEMAND CHARGE	1,646.48

AMOUNT DUE

CURRENT AMT DUE NO LATER THAN 09/09/13	29,006.98
PRIOR AMOUNT - DUE IMMEDIATELY	32,984.60
TOTAL	61,991.58

THIS IS A FRIENDLY REMINDER THAT YOUR ACCOUNT HAS A PRIOR AMOUNT OWING. IF PAYMENT HAS BEEN MADE, KINDLY DISREGARD THIS NOTICE. MAHALO.

YOUR ENERGY USE (KWh per day usage last 13 months)



LAST PAYMENT AMOUNT: 30,012.54

RECEIVED ON 07/19/13, THANK YOU!

KWH COST COMPARISON	BILL DAYS	KWH USED	KWH PER DAY
THIS PERIOD	30	72200	2406.66
LAST PERIOD	31	84000	2709.68
THIS PER. LAST YR	0	0	0.00

RETAIN TOP PORTION FOR YOUR RECORDS

Please detach and return this portion with your payment
 Bring entire bill if making payment in person
 Make your check payable to KIUC

ACCOUNT INFORMATION

ACCOUNT NUMBER: 489822512-506
 SERVICE ADDRESS: KAPAIA RESERVOIR
 SERVICE PERIOD: 07/15/13 TO: 08/14/13
 BILLING DATE: 08/15/13

AMOUNT DUE

CURRENT AMT DUE NO LATER THAN 09/09/13	29,006.98
PRIOR AMOUNT - DUE IMMEDIATELY	32,984.60
TOTAL	61,991.58

AMOUNT ENCLOSED

\$

COUNTY OF KAUAI
 DEPT OF WATER
 PO BOX 1706
 LIHUE HI 96766-5706

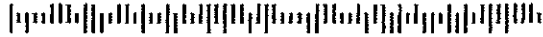
Please check if new address or phone number and indicate change(s) on back.



KAUAI ISLAND UTILITY COOPERATIVE
 PO BOX 29560
 HONOLULU HI 96820-1960

ADDRESS SERVICE REQUESTED

**SINGLE-PIECE 1 SGL 80843AALB-A-1
 178 1 SP 0.480



COUNTY OF KAUAI
 DEPT OF WATER
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ACCOUNT INFORMATION

ACCOUNT NUMBER: 489822512-501
 SERVICE ADDRESS: KAPAIA RESERVOIR
 SERVICE PERIOD: 06/14/13 TO: 07/15/13
 SERVICE DAYS: 3
 BILLING DATE: 07/16/13
 RATE SCHEDULE: LARGE POWER SCHED P (5P1)
 CYCLE: 11
 BILLING MULTIPLIER: 201

METER INFORMATION

METER	PREVIOUS	CURRENT	USAGE
MAIN - Z-26-10002	4192	4612	8400
KVAR - Z-26-10002	1770	1941	3420
DEMAND - Z-26-10002		0.750	150.0
BILLED DEMAND:			150.0
POWER FACTOR:			93 %
ADJUSTED KWH:			8064

CURRENT ELECTRIC CHARGES

NON-FUEL ENERGY CHARGE	9,371.3
FUEL AND PURCHASED POWER ENERGY	21,330.5
Base Fuel Charge	15,436.92
Energy Rate Adjustment Clause	5,893.62
CUSTOMER CHARGE	369.3
RESOURCE COST CHARGE	242.3
KW DEMAND CHARGE	1,671.0

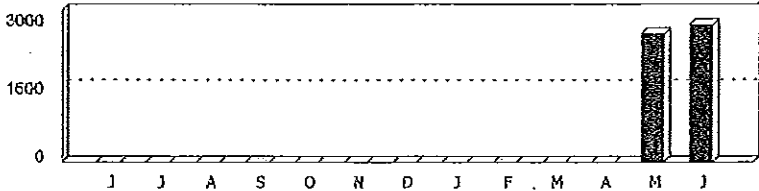
AMOUNT DUE

CURRENT AMT DUE NO LATER THAN 08/10/13	32,984.6
PRIOR AMOUNT - DUE IMMEDIATELY	30,012.5
TOTAL	62,997.1

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34776

YOUR ENERGY USE - KWH per day usage last 13 months



RETAIN TOP PORTION FOR YOUR RECORDS

KWH COST COMPARISON	BILL DAYS	KWH USED	KWH PER DAY
THIS PERIOD	31	84000	2709.67
LAST PERIOD	30	76000	2533.33
THIS PER. LAST YR	0	0	0.00

WAI'IAHI WATER COMPANY, LLC
PO BOX 662069
LIHUE, HI 96766

DEPARTMENT OF WATER
 PO Box 1706
 Lihue, HI 96766

INVOICE#: 2013-006
 DATE: July 8, 2013

Surface water usage for period of: June 1 – June 30, 2013

Usage Charge (<i>computed below</i>)	156,822.75
Subtotal	156,822.75
General excise tax 4.166%	6,533.23
TOTAL BALANCE DUE	163,355.98

Usage Charge equals the greater of minimum gallons per day or actual usage

	Days in period	30
	Minimum gallons per day (per contract)	3,000,000
	Rate per 1,000 gallons	\$1.75
	Minimum guaranteed usage charge	\$ 157,500.00
	Actual usage per KDOW valve meter (in gallons)	89,613,000
	Rate per 1,000 gallons	\$1.75
	Usage Charge based on actual usage	\$ 156,822.75

2,987

47,917

Please remit payment to the address above.

Any billing inquiries should be directed to Shawn Shimabukuro -- (808) 632-2525.

Invoice

Invoice Number:
2013-006

Invoice Date:
Jun 30, 2013

Page:
1

Waiahi Water Company, LLC
P.O. BOX 662069
LIHUE, HI 96766
USA

Voice: 808-245-3678
Fax: 808-246-9470

Sold To:
DEPARTMENT OF WATER
PO BOX 1706
LIHUE, HI 96766

Ship to:
DEPARTMENT OF WATER
PO BOX 1706
LIHUE, HI 96766

Customer ID		Customer PO		Payment Terms	
10780				Net 30 Days	
Sales Rep ID		Shipping Method		Ship Date	Due Date
		Courier			7/30/13
Quantity	Item	Description	Unit Price	Extension	
		USAGE CHARGE, JUNE 1 TO JUNE 30, 2013		156,822.75	
		GENERAL EXCISE TAX		6,533.23	
<i>Supervisor</i>					

Subtotal	163,355.98
Sales Tax	
Total Invoice Amount	163,355.98
Payment/Credit Applied	
TOTAL	163,355.98

Check/Credit Memo No

WAI'IAHI WATER COMPANY, LLC
 PO BOX 662069
 LIHUE, HI 96766

DEPARTMENT OF WATER
 PO Box 1706
 Eihue, HI 96766

INVOICE#: 2013-007
 DATE: August 13, 2013

Surface water usage for period of: July 1 – July 31, 2013

Usage Charge (<i>computed below</i>)	157,295.25
Subtotal	<u>157,295.25</u>
General excise tax 4.166%	<u>6,552.92</u>
TOTAL BALANCE DUE	\$ 163,848.17

Usage Charge equals the greater of minimum gallons per day or actual usage

Days in period	31
Minimum gallons per day (per contract)	3,000,000
Rate per 1,000 gallons	\$1.75
Minimum guaranteed usage charge	<u>\$ 162,750.00</u>
Actual usage per KDOW valve meter (in gallons)	89,883,000 ✓
Rate per 1,000 gallons	\$1.75
Usage Charge based on actual usage	<u>\$ 157,295.25</u>

2,899

Please remit payment to the address above.

Any billing inquiries should be directed to Shawn Shimabukuro – (808) 632-2525.

SH

Waiahi Water Company, LLC
P.O. BOX 662069
LIHUE, HI 96766
USA

Invoice

Invoice Number:
2013-007

Invoice Date:
Jul 31, 2013

Voice: 808-245-3678
Fax: 808-246-9470

Page:
1

Sold To:
DEPARTMENT OF WATER
PO BOX 1706
LIHUE, HI 96766

Ship to:
DEPARTMENT OF WATER
PO BOX 1706
LIHUE, HI 96766

Customer ID	Customer PO	Payment Terms	
10780		Net 30 Days	
Sales Rep ID	Shipping Method	Ship Date	Due Date
	Courier		8/30/13

Quantity	Item	Description	Unit Price	Extension
		USAGE CHARGE - JULY 1 TO JULY 31, 2013		157,295.25
		GENERAL EXCISE TAX		6,552.92
		<i>2L-32034</i>		

Signature

	Subtotal	163,848.17
	Sales Tax	
	Total Invoice Amount	163,848.17
Check/Credit Memo No	Payment/Credit Applied	
	TOTAL	163,848.17



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Answers.com > Wiki Answers > Categories > Science > Energy > Renewable Energy > Solar Power > How much does a 1 MW solar farm cost?

How much does a 1 MW solar farm cost?

In: Solar Power, Biofuel (Edit categories)

Answer:

A 1 MW solar farm would cost in the 4-5 million range.

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Did we answer your question?

- Yes
- No
- Partially

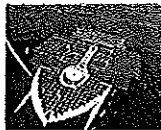
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NASA Engineer Unveils Plan for Orbiting, Solar Power Plant



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Solar Powered Hospital Opens in Haiti



Concentrated Solar Power Plant Adopts the Sunflower's Layout

Related Answers:

How much does a 1 MW solar farm cost?
A 1 MW solar farm would cost in the 4-5 million range.

How much land do you need to build a 1 MW solar Farm?
Depends on the efficiency of your solar panels and location on earth. Some areas get more sun than o

How much energy does 1 MW solar park produce per annum?
It all depends on where the solar park is situated. It is dependent on the insolation value of the a

How much carbon credit can a 1 MW solar energy claim in a year?
It depends on what country it is in. There are different carbon credit schemes around the world.

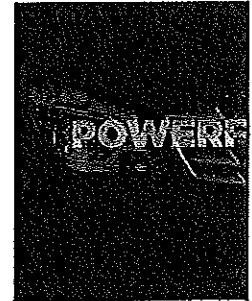
How much does a water turbine of 100 KW 300 KW 1 MW and 15 MW cost?
I think it is £10

What is the cost for solar panels for a solar farm?
You have to know what your needs are. How many hours? How many watts? Room for future expansion? The

Can you answer these?

What does the SO-ND mean in rebus?
In: WikiAnswers Local

How is the native American government like ours?
In: History, Politics & Society



Supervisors



N2146X
Trust: 2r
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Wildrosebeef
• Trust Points: 6075
• Member Since: 12/0



Skullcandy88
• Trust Points: 2502
• Member Since: 11/1



lmo pop
• Trust Points: 1450
• Member Since: 11/0



Varshah
• Trust Points: 72
• Member Since: 2/09



LincMad
• Trust Points: 1500
• Member Since: 12/11

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Worry Less Live



What is the latitude and longitude of Hesperus Colorado?
 In: Colorado

Why is the use of periodic table important?
 In: Periodic Table

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Categories

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Renewable Energy
Science



Answers.com > Wiki Answers > Categories > Science > Energy > Renewable Energy > Solar Power > How much energy does 1 MW solar park produce per annum?

How much energy does 1 MW solar park produce per annum?

In: Solar Power (Edit categories)

Answer:

It all depends on where the solar park is situated. It is dependent on the insolation value of the area. Generally speaking the closer to the equator you are the better your insolation value is. But for arguments sake we can use some rough values to calculate how much energy is produced.

Typically photovoltaics have a 15% efficiency level:

1MW solar park at peak can produce 1MW per hour therefore 1MWh.

Now times that for a 24 hour period = 24MWh/day

For 365 days a year = 8760MWh/year

15% efficient = 1314MWh/year.

Remember this a guesstimating but should give you a ball park number.

Ads

Hawaii PV Solar Panels

Photovoltaic Solar Electric Systems 65% Back on Tax Credits & Financing www.sunetricenergyhawaii.com

Did we answer your question?

Yes

No

Partially

Improve this Answer...

Answer History

Related Answers:

How much energy does 1 MW solar park produce per annum?

It all depends on where the solar park is situated. It is dependent on the insolation value of the a

How much carbon credit can a 1 MW solar energy claim in a year?

It depends on what country it is in. There are different carbon credit schemes around the world.

How much does a 1 MW solar farm cost?

A 1 MW solar farm would cost in the 4-5 million range.

How much Electric power in India generated by solar energy in MW?

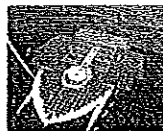
20063777

How much land do you need to build a 1 MW solar Farm?

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NASA Engineer Unveils Plan for Orbiting Solar Power Plant



World's Largest Solar Powered Boat Is Vying for Speed Record



Solar Powered Hospital Opens in Haiti



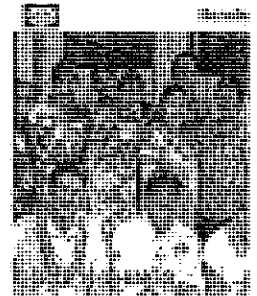
Concentrated Solar Power Plant



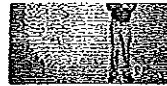
Contributors - Supervisor



Meshat
Trust: 0
Voted
Recommend



Depends on the efficiency of your solar panels and location on earth. Some areas get more sun than o



Adopts the Sunflower's Layout

How much CO2 is produced in 1 MW coal based power plant?

2600 tonnes of CO2 is released in 1mw of power generation

Can you answer these?

How is the native American government like ours?

In: History, Politics & Society

What is the latitude and longitude of Hesperus Colorado?

In: Colorado

Why is the use of periodic table important?

In: Periodic Table

What is salary of MD Dr child psychologist?

In: Salary and Pay Rates

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ENERGY

SCIENCE

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How much land do you need to build a 1 MW solar Farm?

In: Energy Conservation [Edit categories]

Answer:

Depends on the efficiency of your solar panels and location on earth. Some areas get more sun than others. Also, are the panels fixed or directional? Typically 4.5-7 acres depending on the various factors.

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A 1 MW solar farm would cost in the 4-5 million range.

How much land required for 500 MW solar power plant?

one mega watt it is 6 acres then 500 x 6= 3000 acres fy

How much energy does 1 MW solar park produce per annum?

It all depends on where the solar park is situated. It is dependent on the insolation value of the a

How much carbon credit can a 1 MW solar energy claim in a year?

It depends on what country it is in. There are different carbon credit schemes around the world.

How much land is needed for a wind farm?

For production = 20 acres For profit = 200 acres

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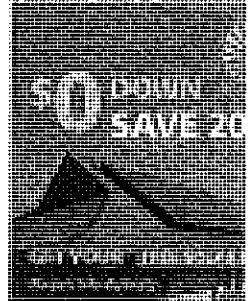
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