



CLIMATE CHANGE:

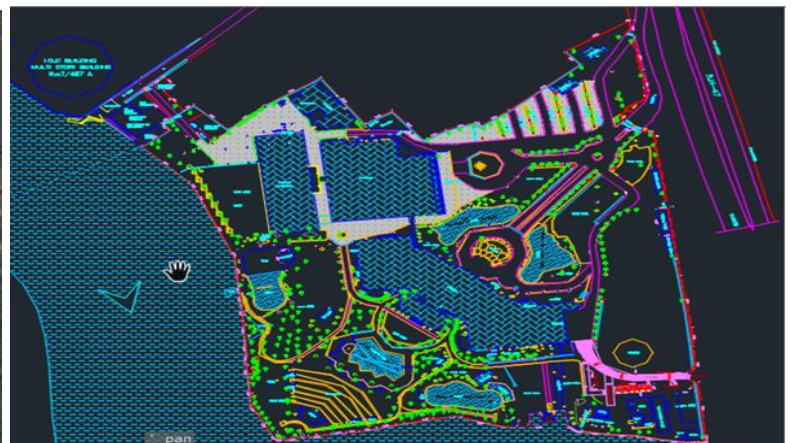
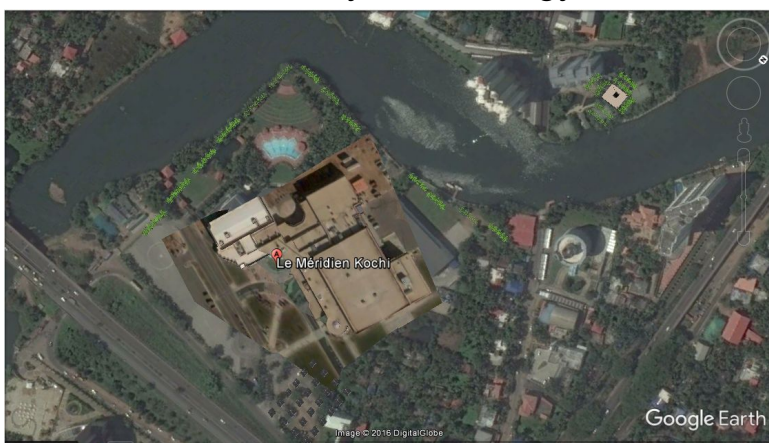
BUILDING SYMBIOTIC RELATIONSHIP



Build Low Carbon Economy For Le-Meridian Hotel

Infrastructure Analysis

- 1) A Building Rough SketchUp Image Was Developed To Understand the Facilities From The AutoCad Display
- 2) Sketchup was used to understand the floriculture in the region and also deploy infrastructure.
- 3) The Autocad Image was imported into e-Quest to complete the analysis of energy used based on hotel economics.

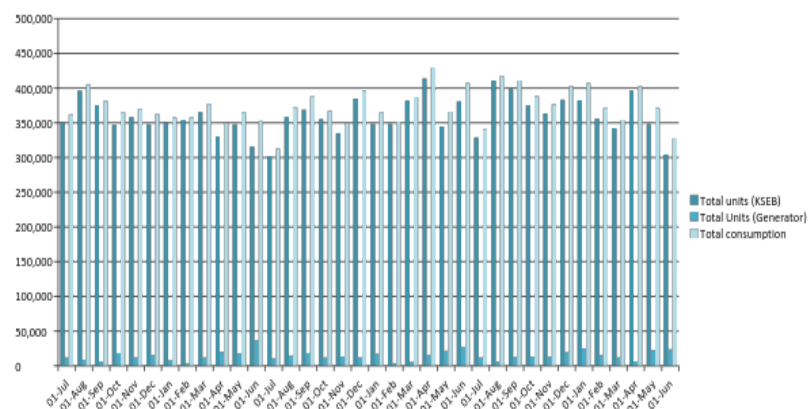


Energy Reading Analysis

- Contracted Load – 1500 KVA
- Energy Consumption Units at 8.5 INR

Observations: There has been a constant increase of 80000 units every year. Possible Reasons:

- 1) Climate Change
- 2) Change in Equipment Efficiency
- 3) Change in Business.



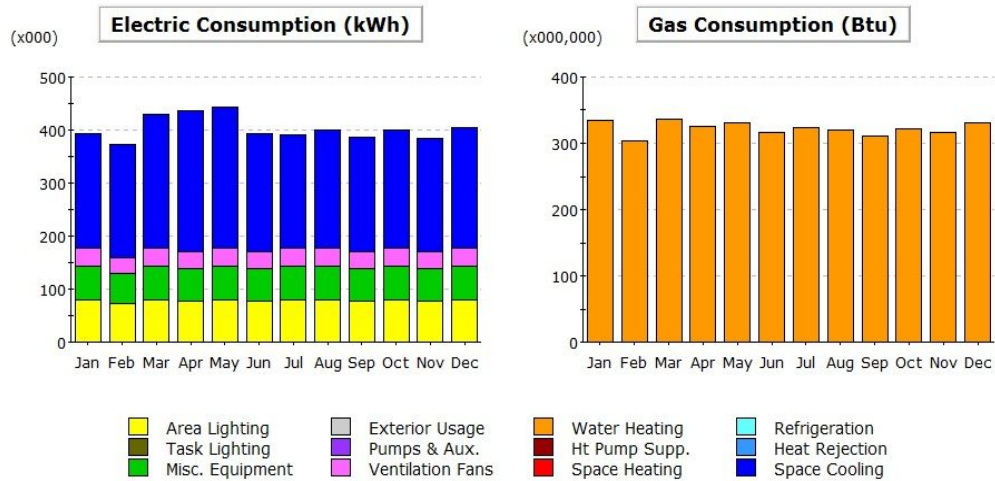
Year	From KSEB	Diesel Generator	Total	DG %
2013-14	42,38,413	1,68,544	44,06,957	3.8 %
2014-15	43,22,680	1,70,663	44,93,343	3.8 %

2015-16	43,90,080	1,81,730	45,71810	4 %
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Energy Simulation Results For The Weather Conditions of Cochin

Project/Run: Project 11 - Baseline Design

Run Date/Time: 10/01/16 @ 20:08



Electric Consumption (kWh x000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	216.4	212.6	253.4	266.0	266.7	221.7	214.7	224.4	214.8	223.1	213.4	229.1	2756.3
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	-	-	-	-	-	-	-	-	-	-	-	-	-
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	32.9	29.7	32.9	31.9	32.9	31.9	32.9	32.9	31.9	32.9	31.9	32.9	387.6
Pumps & Aux.	-	-	-	-	-	-	-	-	-	-	-	-	-
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	64.0	57.8	64.0	62.0	64.0	62.0	64.0	64.0	62.0	64.0	62.0	64.0	753.8
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	79.5	71.8	79.5	77.0	79.5	77.0	79.5	79.5	77.0	79.5	77.0	79.5	936.4
Total	392.9	372.0	429.9	436.8	443.2	392.5	391.2	400.9	385.6	399.6	384.2	405.6	48,34.2

Gas Consumption (Btu x000,000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	-	-	-	-	-	-	-	-	-	-	-	-	-
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	334.4	304.0	337.0	325.1	331.6	316.2	323.0	320.8	310.4	322.4	315.7	330.6	3871.1
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	-	-	-	-	-	-	-	-	-	-	-	-	-
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	-	-	-	-	-	-	-	-	-	-	-	-	-
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	334.4	304.0	337.0	325.1	331.6	316.2	323.0	320.8	310.4	322.4	315.7	330.6	38,71.1

Energy Compensation Using Technology

- Wind Farm Deployment
- Solar Deployment
- CO2 Capture
- Reduced Emissions From Agriculture
- Equipment Finance

Kerala State Economics And Future Projection

Power purchase cost excluding transmission charges as estimated by KSEBL

Summary	MU	%	Rs.Cr	%	Rs./kWh
Total Hydel	6,924	31.91%		0.00%	
CGS	9,752	44.95%	3,072	47.16%	3.15
LFS	456	2.10%	895	13.74%	19.62
Others	197	0.91%	55	0.85%	2.81
Short term/traders	4,366	20.12%	2,491	38.25%	5.71
Total *	21,697		6,514		3.00

*Excluding transmission charges

Proposed Generation & Cost for Power from Wind and Other Small IPPs

Source	Proposed by KSEBL			Approved by the Commission		
	Generation target (MU)	Per unit cost (Rs/ kWh)	Total cost (Rs. Cr)	Generation target (MU)	Per unit cost (Rs/ kWh)	Total cost (Rs. Cr)
Wind IPPs	70	3.14	22.12	70	3.14	22.12
Ullumkal SHP	34	2.00	6.80	34	2.00	6.80
MP steel- Co generation plant	41	2.31	9.42	41	2.31	9.42
Iruttukanam SHP- Stage-1	12	2.70	3.22	12	2.70	3.22
Iruttukanam SHP- Stage-2	4	2.96	1.07	4	2.96	1.07
Karikayam				67	4.16	27.74
PCBL	36	3.50	12.60			
Total	197		55.22	227		70.37

- Out of the total Requirements of energy: 22% is from liquid fuel stations and traders/exchanges, for which the cost is about 52% and the average cost works out to be Rs 7.02 per unit.
- 2995MU of power has been tied up at average rate of Rs 5.80 per unit. The balance requirement of 1371Mu is proposed to be met from energy exchanges and traders at an average rate of Rs 5.50/unit

Energy Elasticity of Kerala

- Kerala has the impression of being surplus state in case of electricity

but paradoxically it has been so because the demand of electricity has not been sufficient to match the supplies. The power demand is between 3,000 mw and 3,300 mw where the total domestic generation is just 1,500 mw with deficit showing up mostly in summer. The gap is now being met with power drawn from the Central grid and bought from outside.

- In Kerala the agriculture supply co-efficients is also more than unity suggesting proportionally higher rise in income which means higher demand of electricity.
- The price elasticity co-efficients in Kerala, though negative, in both short as well as long run, don't give the expected picture of a developing economy. But with the economy moving away from communist era and currency inflow - the indices do not show complete picture.

Expectations For Le-Meridian Hotel

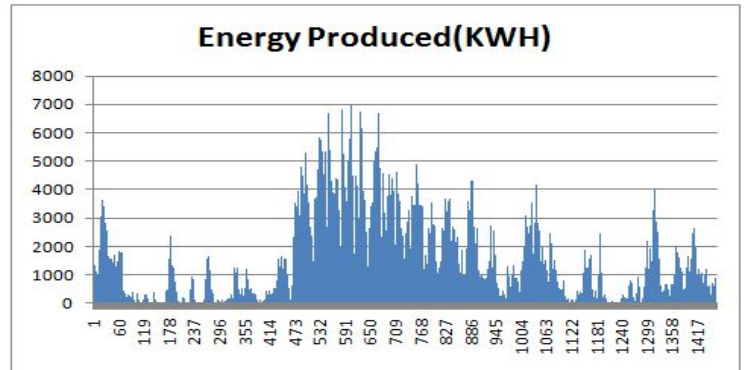
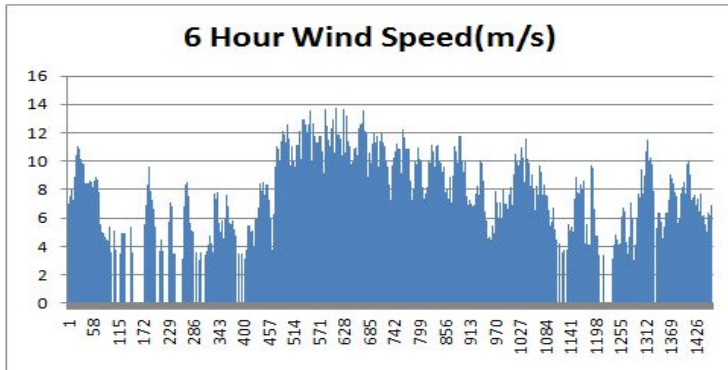
- Pooled Price of electricity in Kerala is low as they take the electricity from renewables like dams. We have to understand the policy framework
- In the future of climate change, there is a possibility that Kerala will not be able to keep the grid energized 24/7. Does this mean more push for in-situ generation.

Wind Deployment In Wind Farm In Idduki District



Maximum possible capacity = Contracted Load 1500 KVA

- Yearly Generation = 30,40,000 Units
- Tariff = 6 INR
- Yearly Monetary savings = 76 Lakhs first year
- Considering yearly increment of 2% for the KSEB tariff. Savings over 10 years 832 Lakhs.



Wind Simulation Results(NREL product)

Annual energy (year 1 75 KW) 1,333,779 kWh

Capacity factor (year 1) 20.3%

Levelized cost of energy 8.80¢/kWh (5.8 Rs/kWh)

Wind Generation Costs

Annexure E (2015-16)
Wind energy generation projects, located in wind zone - 3

Sl. No.	Head	Sub-Head	Detailed head	Unit	Norm
1	Generation of power	Capacity	(i) Installed capacity	MW	1
			(ii) Capacity utilization factor	%	25%
			(iii) Useful life	Years	25
2	Project cost	Capital cost per MW	Power plant cost	Rs. lakh / MW	619.522
			Tariff period	Years	13
3	Source of fund	Debt-equity	(i) Debt	%	70%
			Moratorium period	Years	0
			Repayment period including moratorium	Years	12
			Interest rate	%	13%
			(ii) Equity	%	30
			Return on equity (post tax)		
			For first ten years	% per annum	20%
			Return on equity 11 th year onwards	% per annum	24%
			Weighted average of ROE	%	22.40%
			Discount rate	%	10.81%
4	Financial	Tax	Income tax	%	33.990%
		Depreciation	Rate of depreciation for first 12 years	%	5.83%
			Rate of depreciation from 13 th year onwards	%	1.54%
5	Working capital	Fixed charges	O&M charges	Months	1
			Maintenance spare	% of O&M	15%
			Receivables from debtors	Month	2
			Interest on working capital	%	13.50%
6	Operation and Maintenance	O&M expenses		Rs. Lakhs / MW	10.63
		O&M escalation		%	5.72%

Levelised tariff Rs.5.27 / unit for 25 years.

Solar Deployment In Le-Meridian Hotel Cochin



Requirement to offset energy drawn from KSEB

44 Lakh Units = 2.5 MW

Infrastructure Requirements

Max of 1 MWp capacity allowed at one premise. Land Requirement = 15 acres

Cost = 13.75 Crore INR, Break even in less than 5 years.

State Wise Policy

Kerala policy for Solar Net metering scheme permits installing solar PV plant in one premise and using 9a5% (Accommodating 5 % for line losses)of the excess generation in any other premise of the same owner.

Limitations

- The permitted capacity of the Grid connected Solar PV installation is limited by several factors.
- For 11 kV HT connection it can be a maximum of 80% of the average load on the respective power transformer.
- Also this is the maximum capacity for that feeder, if other solar installations already exists on that feeder our quota further reduces.
- Need to apply for a fresh 11 kV connection for the site, considering the high capacity. Availability of suitable connection in the locality needs to checked.
- Liaising with the KSEB officials.

Wind Vs Solar Installation Comparison

Constraints:

- 1) the wind capacity cannot be extended beyond 1500 KVA as that is the contractual load for the hotel.
- 2) The biggest benefit of going for wind is zero investment and hence no liability. However the benefit is limited to the difference in the tariff i.e. Rs. 2.5 for the first year which might increase at the rate of 2- 3% yearly. Also the degradation in generation over the years might not be there unlike solar.
- 3) There is however a shortfall of around 10 lakh units and for the past three years the consumption has increased by around 80,000 units every year i.e 2%, which is quite high. Even after discounting for probable increase in occupancy there is considerable increment which must be attributed to rising average temperature of the area and aging equipment of the hotel.
- 4) There is scope of adding solar to compensate atleast 10-12 lakh units per year. Which translates to roughly 700 kWp. The policy allows for a maximum of 1 MWp per land. However there are certain limitations which could be explained later.

Proposals:

- 1) Agreement with the Wind developer for the maximum possible installation i.e. 1500 kVA and avail the benefit of reduced tariff for the generated units.
- 2) Still scope of installing Solar PV for the remaining close to 13 Lakh units i.e. 700 kW approx and increase them with increasing demands.
- 3) KSEB officials may be approached to ascertain the maximum possible capacity for the two plots. Accordingly suitable capacity can be planned on each plot.

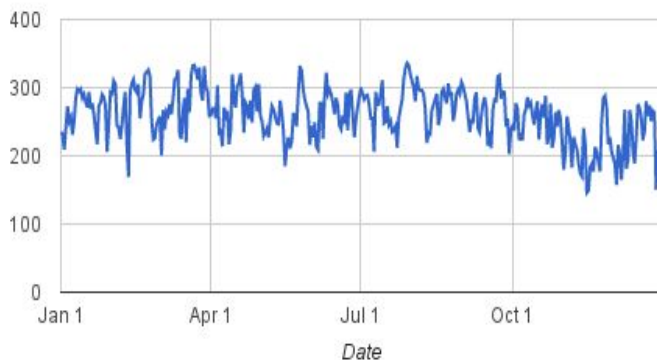
Solar Deployment In Hotel

Site Suitable: 150KW of Solar Power @ 8-9 feet above ground with single axis

- Pro's and Con's: Does not come in direct sight of the building and can be used as shade for vehicles
- Can be used as a statement for climate sensitivity

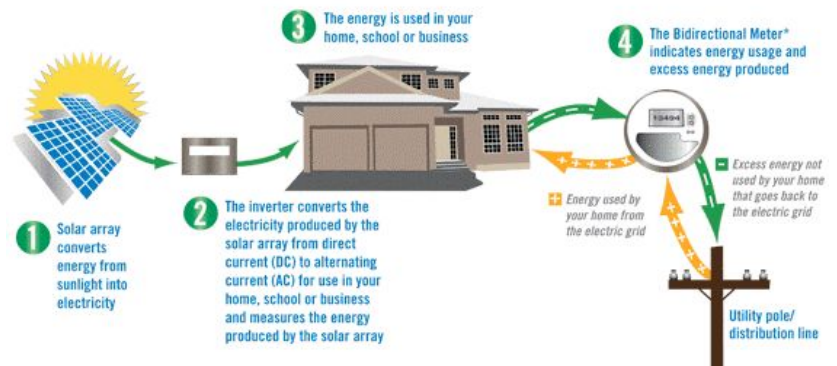


Solar Radiation vs. Date



Understanding NET METERING

Solar Photovoltaic Array Example



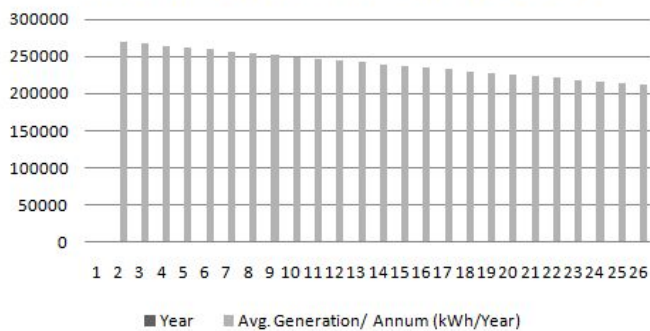
Net Metering Costs

- Industries are eligible for Accelerated Depreciation, Custom Duty Concessions, Excise Duty exemption.
- And after Break-even period of 4 to 4.5 years, company will get the power benefits without any cost.
- The solar energy generated shall be adjusted against consumption in a 15 min time block shall be purchased by DisCom(e.g TORRENT, UGVCL,PGVCL) through NET metering technology

SOLAR COSTING

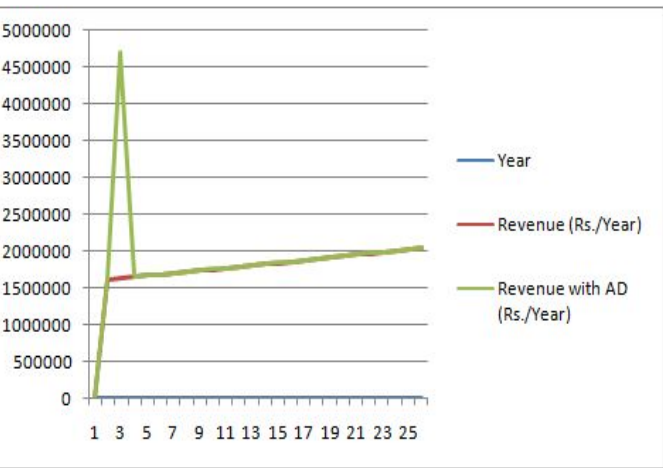
- Increase grid unit price @2% YoY to account for a conservative increase in coal prices and inflation
- Contingency of a possible inverter change during year 13 has been added @3% of total capital cost
- The above table does not include the AD benefit as it varies from case to case.

Average Generation From The Plant



Description	Price
PV System Capacity (kWp)	150.00
Price of 1 kWp PV System (Rs.)	60,000.00
Total Price (Rs.)	9,000,000.00
YEAR 1	
Total Price of Solar PV System (Rs.)	9,000,000.00
Avg. Area required for PV System (Sq. Ft.)	15,000.00
Monthly Solar Units Produced (Units/Month)	22,500.00
Monthly Savings @ Rs. 6/unit	157,500.00
25 YEARS	
Life Cycle Solar Unit Price (Rs./ Solar Unit)	1.50
Break Even Period (Years)	4.93
ROI	21.88%
IRR	18.66%
AD Benefit @ 34% Corporate Tax	3,060,000.00

Revenue With Accelerated Depreciation Benefit for Le-Meridien



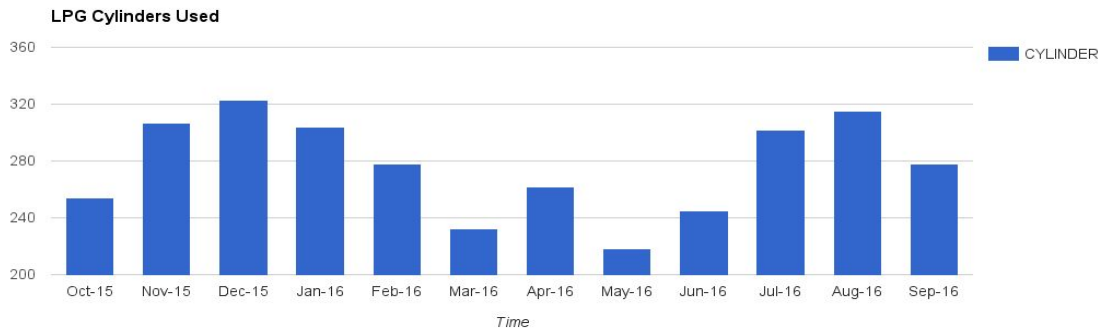
AFTER ACCELERATED DEPRECIATION (AD) BENEFIT	
System Price (Rs.)	5,940,000.00
Life Cycle Solar Unit Price (Rs./ Solar Unit)	0.99
Break Even Period (Years)	3.05
ROI	33.15%
IRR	23.96%
Description	Price (INR)
Design, Engineering and Supply	8,460,000.00
Tax @5% VAT	423,000.00
Installation and Commissioning	540,000.00
Tax @15% Service Tax	81,000.00
TOTAL PROJECT COST	9,000,000.00
TOTAL PROJECT COST WITH TAXES	9,504,000.00

InSitu Solar Generation Vs Diesel Powered Generators



Diesel Genset Used	
Total DG Consumption	181730
Number of hours in an year	8760
Number of hours of DG operation in an year (4% of yearly hrs)	348.21
Considering 70% DG Operations	243.74
150 KW Solar Generation	
Extreme scenario of all these hrs corresponding to peak generation from Solar PV	
Number of units compensated	32906
Realistic equivalanet of 50% hrs	
Number of units compensated	16452.9
CO2 Reduced InSitu (Kgs)	11,563
Percentage Renewable	9.05%

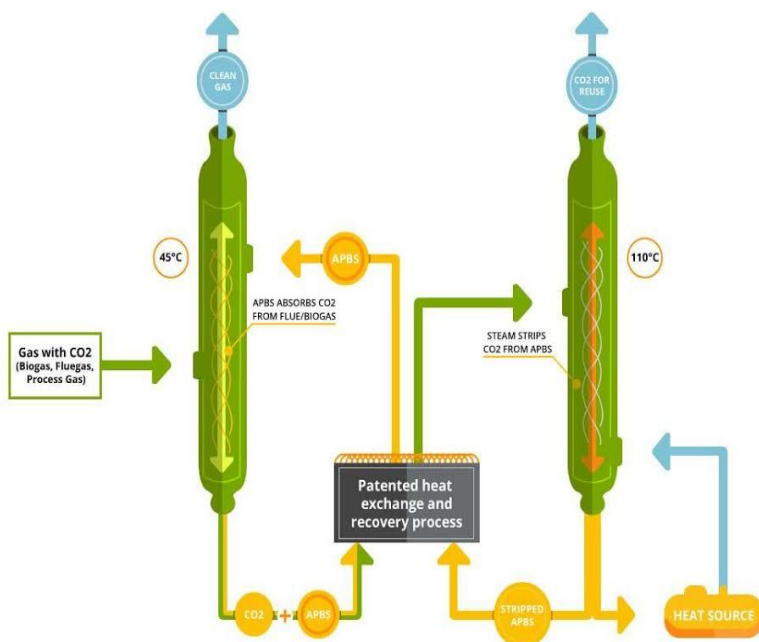
CO2 Emissions of Le-Meridien Hotel



- $\text{LPG: Input Value (In Kg/Yr)} \times 2.983 \text{ (Emission Factor)} = \text{Output value in (Kg of CO}_2\text{)}$
CO₂ Emissions in KGs = 188054.286
- Energy From Diesel Operated Water Heating: 3871 million BTU's
CO₂ Emissions in KG's = $73.16 \times 3871 = 283202$
- Energy From Grid if powered by coal (which might not be the case here):
4832000
CO₂ Emissions in KG's = 3,395,814

Approx Total Emissions for CO₂ from Hotel: 3,867,070 kgs

CO2 Capture Technology (Carbon Clean Solutions)



COSTS

1. Cost for setting up a 1Metric Tons per day CO₂ capture plant will be ~ 75 Lakhs
2. For capturing 90% CO₂ (10-12% concentration in gas):
 - a. Thermal energy consumption : 2.2 GJ/ton of CO₂
 - b. Electrical energy consumption: 90 kWh/ton of CO₂

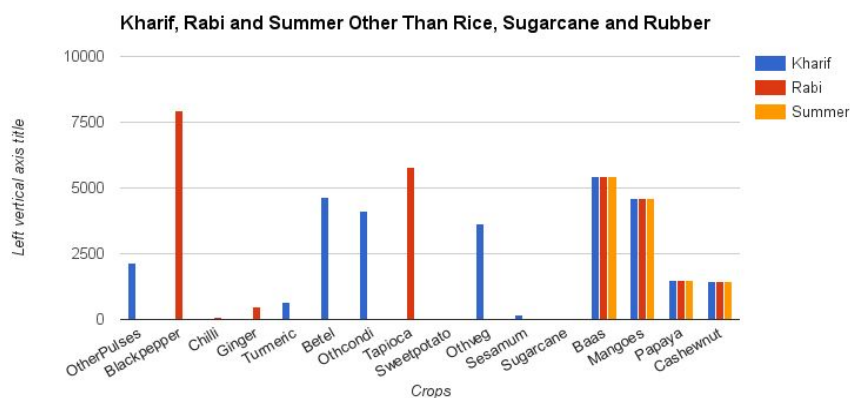
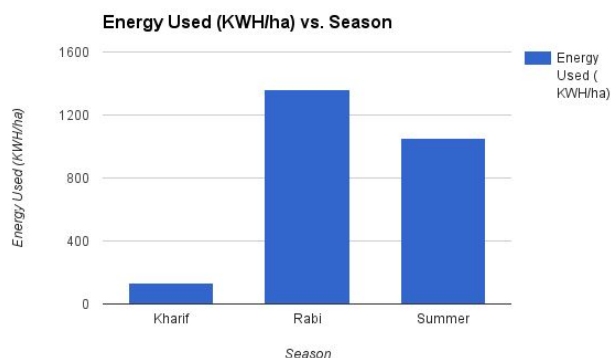
BENEFITS

- CO₂ emitted increases the ambient temperature especially in high moisture region near backwaters.
- One ton of CO₂ captured can be used in the future to drive electric cars with Fuel Cells
- Co-electrolysis of CO₂ can produce fuel for fuel cells also.

Agriculture-Energy Nexus Market Analysis

Options:

- Efficiently Grow The Crops At Lesser Energy Requirement Compared To State Average
- Sell The Output in a farmer's market in the hotel.
- Options for Herbal and Medicinal Plants in the Region



Solar Deployment With VFD Pumps in Thalikulam Land

Yearly Energy Requirement Thalikulam 11.5 ha	29.293	MWh
Solar Capacity Required	14.39	kW
Considering Low generation hrs and Degradation margin 50%	21.58	kW
Considering 5hp Solar Pumpsets		
Solar PV capacity per pump	4.8	kW
No. of Pump sets Required for meeting the water Requirement	4.49	
	5	No.s

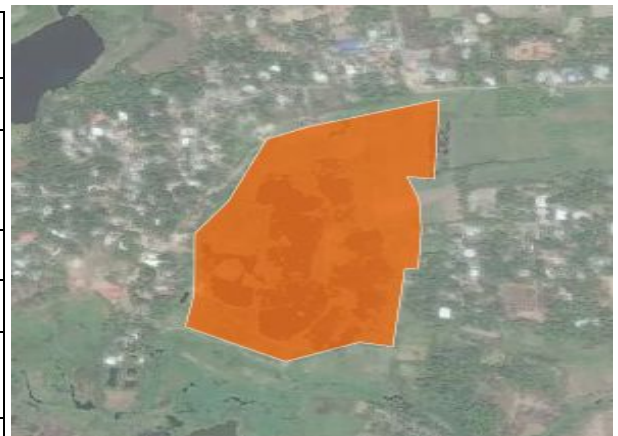


Solar Panel Deployment	Unit Size
Solar Panel With Smart Tracking	200 KW
Costs	1.2 crore
Units Produced Each Year	360000

Proposed Installations		Cost
4 No.s 5hp pumps	19.2 kW	20 Lakh
1 No. 3 hp pump	3 kW	3.2 Lakh
Total Pump with VFD Costs	22.2 kW	23.2 Lakh

Solar Deployment With VFD Pumps in Kapraserry Land

Yearly Energy Requirement Kapraserry 5.5 ha	14 MWh	
Solar Capacity Required	6.87 kW	
Considering Low generation hrs and Degradation margin 50%`	10.31 kW	
Considering 5hp Solar Pumpsets		
Solar PV capacity per pump	4.8 kW	
No. of Pump sets Required for meeting the water Requirement	2.14	
	1 No.s	

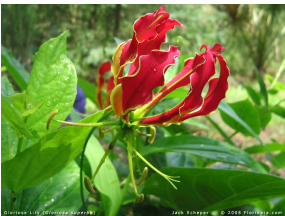
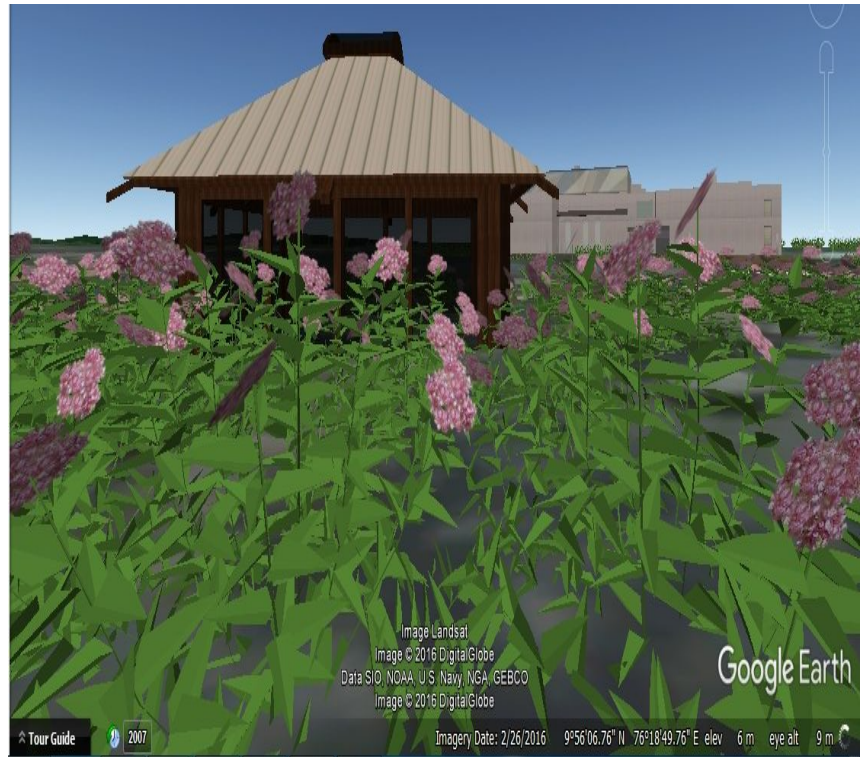


Solar Panel Deployment	Unit Size
Solar Panel With Smart Tracking	350 KW
Costs	2.1 crore
Units Produced Each Year	514285.71

Proposed Installations		Cost
1 No.s 5hp pumps	4.8 kW	5.12 Lakhs
2 No. 3 hp pump	6 kW	6.4 Lakhs
Total Pump with VFD Costs	10.8 kW	11.52 Lakhs

Floriculture Near Spa

- The team expertises in medicinal and medicinal and ayurvedic products
- There is a provision for procurement of medicinal plants from outside India.
- The medicinal plants can also be grown in the other agricultural lands.



Rauvolfia serpentina



Abemoschus moschatus



Ashvagandha



Bacopa Monnieri



Gloriosa superba

Sustainable Agriculture Solution

Project Specifications:

- Experts in soil health and nutrient management. Specialty of managing the soil health without disturbing the micro soil flora through organic inputs.
- In house capability of developing and producing the required bio inputs i.e. bio fertilizers, nutrient stimulants, bio-micronutrients and nano nutrients.

- Bio pesticides, fungicides and bio-nematocides can also be produced at the farm.
- All input formulations tailored as per the requirements and needs.
- Network to source the best seeds and samplings from different parts of India and abroad.
- Experts in breeding and sourcing of breeder seeds and in-house nurseries for precision farming. Ability to procure best quality germplasm and develop own plantation material.
- The team has mastered the intercropping cultivation method and taken it to a whole new level. We have already carried out high density precision farming with several different combination of crops. Here it is proposed to carry out cultivation using Agri-Horti-Forestry-Medicinal & Aromatic Plantation model.

Sustainable Agriculture- THALIKKULAM

Land Development for Agriculture Observations

- The soil has high sand content.
- Present coconut plantation probably has very low yield due to aged trees and improper management.
- Thick Vegetation cover.
- Due to the proximity to sea, the strong wind will be the main abiotic stress on the plants and will be a major consideration in selecting plants.



Land Development for Agriculture: PROPOSAL

- Uprooting and clearing the coconut trees in order to maximize the

cultivable land.

- Clearing the weeds and vegetation and disposing off elsewhere or burning it in the same field which would yield potash and act as fertilizer.
- Filling up the pits created by uprooting of coconut trees with best available soil nearby.
- Levelling the land
- Improving the humus content and nutrient level in the soil.
- Adopting mechanism to alleviate wind stress and considering it while planning the crops and growing patterns.
- Development cost would be close to one Crore INR

For the geography of Thallikulam region and the soil conditions following plants can be planted in different combinations as per requirement and trial success.

Agriculture:

- Chilly,
- Groundnut,
- Curry leaves (Hybrid variety),
- Turmeric
- Ginger and marigold.

Some pulses may also be grown, not- for any potential financial consequence but for soil enrichment.



Horticulture:

These exotic varieties of fruits are suitable and can give very good yield.

- Jumbo Jamun
- Rambutan ,
- Longan
- Durian
- Jumbo custard apple.
- Drum Sticks (for moringa oil)

For the exotic plants best plantation material can be procured from abroad through our channels.

The fruiting is expected in 3rd year and by fifth sustained commercial production can start. The trees shall be planted in high density 6X2 pattern.



Spices

Climate in kerala is generally conducive for spices and here too certain aromatic and medicinal plants can be grown.

- Long pepper,
- Rauwolfia serpentina (Sarpagandha),
- Ashvagandha,
- Black Turmeric,
- Gloriosa Superba,
- Abelmoschus moschatus (kastury bhindi)



- Bacopa Monnieri.

They can be used to extract and market essential oil. Forward integration of extraction unit is not possible for small tract of land.

Agro - Forestry:

- Poplar,
- Pink cedar,
- Milia Dubia
- Neem.
- Eucalyptus

As has been noted heavy wind is a major abiotic factor in this region, the trees will help mitigate it for the shorter plants growing in between. And after maturity have good commercial value.



COST OF PRODUCTION

Crop	Cost Per Acre Rs	% Area	Proportionate Cost
Turmeric	1,52,550	55%	83,903
Ginger	1,52,000	10%	15,200
Mango/Indigenous Fruit	1,46,250	20%	29,250
Exotic Fruit	2,06,500	15%	30,975



Crops			
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AVERAGE COST OF PRODUCTION PER ACRE (for Multiple cropping): Rs 1,59,328

ESTIMATED REVENUE

Item	Costs	Yield MT's	Cost Per MTs	Total Revenue	Net Surplus
Turmeric	83,903	1.87	85,000	1,58,950	75,047
Ginger	15,200	1	45,000	45000	29800
Mango	29,250	1.5	25,000	37,500	8,250
Exotic Fruit Crops	30,975	1	65000	65,000	34,025

AVERAGE ESTIMATED REVENUE PER ACRE (for Multiple cropping): Rs 1,47,122

THALIKKULAM CONCLUSION

- Presently only a rough estimate of basic land development costs has been provided.
- Decision on crops and or combination of crops shall be made in consultation with management.
- The land at Thallikulam requires less intervention to start cultivation and is more suited for normal cultivation practices. Considering the weather and usual agriculture practices in Kerala, Aromatic and Medicinal plants can be perused for cultivation for better yield.
- The land at Kapraserry will require considerable investment for making the land suitable for any form of crop cultivation. Considering the easy water availability and low land level, aquaculture and spirulina provide better alternative.
- In consultation with the management, decision on type of cultivation and selection of crops will be carried out. The main focus shall be on sustainability of the model and adopting organic and ecofriendly cultivation techniques.

Sustainable Agriculture- KAPRASSERY

Observations

- Having been unattended for a long time the plot has become largely unfit for agriculture.
- Heavy waterlogging
- Thick and deep rooted woody vegetation covers majority of the land.
- Soil erosion is continuing due to heavy rains.
- The level of land has and is continuing to drop compared to adjoining land, making it susceptible to further waterlogging in future as well.

Preparing land for normal cultivation

- Clearing the vegetation along with roots and disposing off elsewhere or burning it in the same field which would yield potash and act as fertilizer.
- Leaving the sludge to dry.
- Procuring nutrient rich soil, preferably from dried water bodies or hills.
- Filling the soil in the plot. The level needs to be raised in the range of 2 to 4 feet at different locations.
- Levelling the land.
- Soil nourishment based on the nutrient level of procured soil, using Bio fertilizers and soil health boosters.
- **Cost in the range of 2-3 Crore INR**



Developing land for SOILLESS cultivation

- Clearing the vegetation along with roots and disposing off elsewhere or burning it in the same field.
- Clearing the wet slurry and depositing on the boundaries using proclainer.
- Procuring 80-100 mm gravel aggregate, sand and red gravel to fill the area in layers and compacting the land till desired height.
- Cultivation is possible using hydroponic growing media such as **coco peat** (easily available in Kerala), perlite, vermicompost mixed soil in growbags.
- The Disadvantage being normal cultivation wont be possible in the future.
- **Cost would be above 3 Crore INR**
- Additional cost for required protective structure.



Aquaculture

- Clearing the vegetation along with roots and disposing off elsewhere or burning it in the same field.
- Dividing the main field into plots into desired area for easy maintenance.
- Excavating the land using proclainer, forming banks with the excavated soil to form ponds.
- Levelling the pond bed.
- Compacting pond bed and banks using compacters.
- **Cost would be above 1 Crore INR.**
- Apart from pisciculture Spirulina cultivation is another good cost



effective yet profitable option.

OPTIONS FROM THE TEAM

- The team has good experience of managing algae cultivation.
- The most important skill required for increasing the yield is nutrient management of the water.

Benefits of Spirulina Plantation

- Spirulina is a natural “algae” (cyanobacteria) powder that is incredibly high in protein and a good source of antioxidants, B-vitamins and other nutrients. When harvested correctly from non-contaminated ponds and bodies of water, it is one of the most potent nutrient sources available.
- It is largely made up of protein and essential amino acids, and is typically recommended to vegetarians due to its high natural iron content.
- The team specializes in Spirulina Plantation.



Crop Monitoring & Insurance

Insurance and Loss Estimation Details

- **Sum Insured:** The maximum amount insured by the bank/underwriting agency for crop losses. In other terms it is the amount a farmer shall get on 100% crop loss.
- Ideally this value should be equal to total investment made in the crop.
- Some people keep it at the potential market value of the crop.
- In Indian context it sum insured value is always less than the crop

investment or crop market value.

Insurance Premium: It is the amount of value to be borne by the farmer for availing the insurance services and getting a protection coverage as per the policy document by the insurer.

- Generally this value ranges between 10% to 60% of the sum insured depending upon the crop and historical data of the losses in that region.
- In India we have mostly cereal crops insured, followed by some horticulture crops and very little spices. Medicinal crops insurance have not been tried so far.
- There is a stage government subsidy available through horticulture department under which a part of the insurance premium is born by the state to make the crop insurance affordable and lucrative proposition.

In the efficient delivery of crop insurance services mobile app technology can play a great role in streamlining the operations, loss estimation and pay-out generation.

- A centralized web MIS for farmer onboarding
- Mobile app with GPS technology for farmer field geo-fencing and risk assessment
- Mobile app technology for crop health monitoring and loss data capturing
- Loss intimation through 24*7 call center.
- Web MIS with backend algorithm for loss estimation and pay-out generation

Equipment Finance

Ground Source Heat Pumps

- Outdoor temperatures fluctuate with the changing seasons but

underground temperatures don't change as dramatically, thanks to the insulating properties of the earth.

- A geothermal system, which typically consists of an indoor handling unit and a buried system of pipes, called an earth loop, and/or a pump to reinjection well, capitalizes on these constant temperatures to provide “free” energy.
- Geothermal HVAC systems remove four times more kilowatt-hours of consumption from the electrical grid per dollar spent than photovoltaic and wind power add to the electrical grid.

