

“Finding the investment proposal for NVVN

- **In Water Bottling Plant
in A&N”**

**By
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Project - 2

Market Study and Commercial Viability of Water Bottling Plant

**LOCATION- HOPE TOWN AT FERRARGUNJ TEHSIL
DIST. SOUTH ANDAMAN
(ANDAMAN & NICOBAR ISLANDS)**

1. **Executive Summary**

- This business case deals with understanding the commercial viability of water bottling business from installed desalination plant capacity of 50 MW LNG plant in Andaman and Nicobar Islands.
- The business case also discusses project goals, assumptions, constraints along with the detailed financial analysis which includes the expected Profit-Loss statement and Cash Flow statement.
- The commercial viability of the project has been derived by market study of the current demand and forecasting of growing demand in the coming years.

○ **Available freshwater sources**

- The average annual precipitation is 3,100 mm and rainwater is the primary source of freshwater for the A&N Islands. Reservoirs are used to store the water all through the year.
- Underground water is another source. In islands such as Neil, Car Nicobar, Long Island, and others, shallow wells have been dug to supply the water. In most of the other islands, perennial spring water sources, after being treated, are also tapped to supply water to the local populace.
- In Chowra Island, a seawater desalination plant has been installed on an experimental basis. In Port Blair, Havelock, Diglipur, Mayabandar, Rangat, Bakultala, Bamboo Flat, Kamorta, Campbell Bay, and elsewhere, regular water treatment plants were functional.
- The Andaman Public Water Department (APWD) provides bulk water supply to the Port Blair Municipal Council (PBMC) which in turn distributes water to the areas under its jurisdiction. For the remaining areas, treatment and the distribution of water is handled by APWD, which taps from a large number of individual small schemes and sources.

○ **Urban Water Supply**

- The main water sources for Port Blair are the Dhanikhari and Jawahar Sarovar reservoirs. In the urban water supply subsector, APWD supplies water to PBMC after treatment at the Lambaline and Dairy Farm treatment plants.
- The Lambaline treatment plant is a rapid sand filtration plant commissioned in 1973 with a capacity of 16,031 metric tons MT/per day.
- The other treatment plant with slow sand filter beds is at Dairy Farm, which was commissioned in 1954 and has a treatment capacity of 2,992 MT per day. This plant treats water mainly from the Jawahar Sarovar reservoir.
- Another slow sand filter plant with an installed capacity of 1,816 MT per day was functioning at the Garacharama suburban area.
- From 2003 to 2004, the Diltaman Tank, as well as the Nayagaon and Chakkargaon Diggies, have also been revived. A slow sand treatment plant has also been constructed to treat water from the Nayagaon and Chakkargaon Diggies. These two schemes contribute about 6,000,000 L per day.

○ **Rural Water Supply**

- Efforts are being made to augment the rural water supply of a total of 502 villages, 344 have been provided with piped water supply. It is proposed that the remaining villages will be covered during the tenth five-year plan. Improvement of the water supply in Rangat, Nimbutala, Dasarathpur, and other adjoining areas has been undertaken by tapping water from the Panchavati River source.
- Phase 1 of this scheme has already been completed during 2003–04. Work on the Kamsarat Nallah water supply scheme has been undertaken in the South Andaman Island area. Under schemes recommended by the Central Ground Water Board, augmentation of the water supply has already yielded water—much to the comfort of the people of the Badamash Pahar, Dollygunj, and Austinabad areas.

○ **Issue**

- The Andaman Nicobar Islands receives an average annual rainfall of little more than 3000 mm. The rainfall, received from both the southwest and northeast monsoons, is spread over a period of 6 to 7 months. During the next four months (summer season) the rainfall is scanty and there is an acute shortage of water supply even for drinking purpose. At present, there is one water storage tank in A&N islands called Dhanikhari Tank. There are two main focus areas which need to be addressed for understanding the demand for packaged drinking water in the islands.

A. Increase in population in coming years

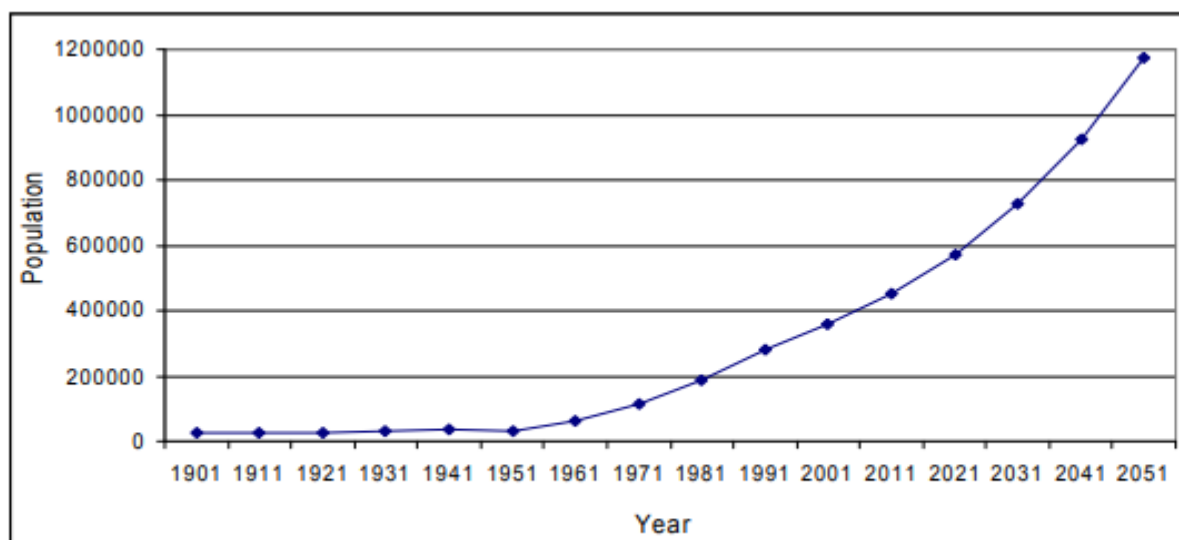
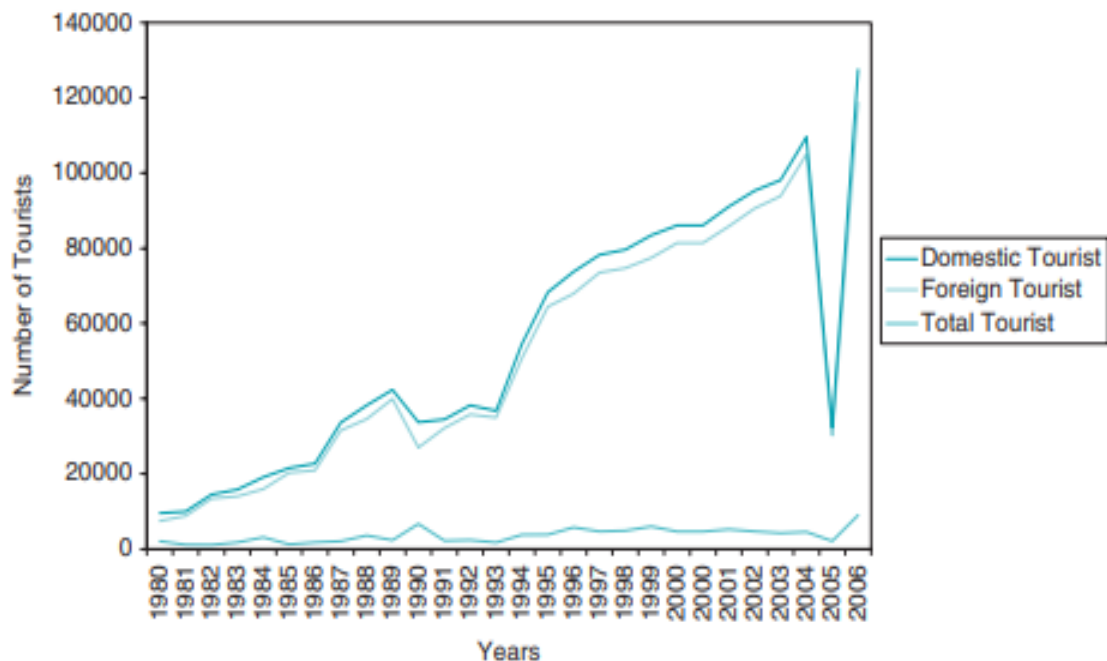


Fig.2. Trend of population growth and projected population in A&N Islands

The figure above shows the growth in population over the years, we will be interpreting the growth in demand for fresh drinking water subsequently.

B. With the influx of tourists on the island demand of drinking water shows an increasing trend



The above figure shows tourist arrivals to Andaman and Nicobar Islands in different years.

○ **Anticipated Outcomes**

- Implementation of the project will increase the availability of fresh drinking water sources on the island. This project can serve as a pilot project for other desalination plants in future. A distributed network of desalination plants in the island will address the need for the increasing demand for fresh drinking water in the coming years. Four lakh tourists visit Andamans every year which includes around 15,000 foreigners which will provide a great opportunity for fulfilling the demand for mineral water on the island.
- This business provides NVVN with an opportunity to diversify from its core business of power trading. Since NVVN is thinking of growth and expansion of its business portfolios, this project is in line with the current interests of the organization.

2. Problem Definition

○ Problem Statement

Availability of fresh drinking water in Andaman & Nicobar Islands is highly dependent on collected rainwater. The figures and graphs mentioned above tell us that with a growing population and increasing need for water, the stored water and groundwater levels are not sufficient to sustain the growing demand.

○ Ground water Survey data of Andaman and Nicobar Islands

- Central Ground Water Board carried out ground water exploration in Andaman and Nicobar Islands from 1985 to 1994 during which 47 exploratory wells had been drilled. Of these, 9 were constructed in Great Nicobar, 3 in Nan cowry and 4 were in Katchal.
- It is concluded from the exploration data that, there is no potential water-bearing formation occurs in the subsurface of Great Nicobar, Katchal and Nan cowry. All the explorations were unproductive. The quality of water in deeper aquifer deteriorates, probably due to contamination with the saline water. In Kamorta island the discharge varies from 0.5 to 1.0 m³ /hr.

○ Ground Water Quality-

GROUND WATER EXPLORATION BY CGWB(as on 31.3.2013)	
No. of wells drilled	9
Depth range	27.36 m-101 m
Discharge	Negligible- 0.5 m ³ /hr
Storativity(S)	-
Transmissivity(T)	-
GROUNDWATER QUALITY	
Presence of Chemical constituents more than the permissible limit	Iron in pockets and brackishness in dugwells close to the coastal tracts
Type of water	Ca-Mg-HCO ₃ -Na- HCO ₃

HYDROGEOLOGY	
Major water bearing formation	Ground water in Marine sedimentary formation occurs under unconfined condition in weathered residuum. Preponderance of clayey mineral renders groundwater development possibility very low. Yield of dugwell (5-6m dia,6m depth) in Marine sedimentary group varies from 4000-5000 litres/day. Ground water in Ophiolites occurs under unconfined to semi-confined condition in weathered residuum while in fractured hard rock in deeper horizon in confined condition. Yield of dugwell (5-6m dia,6m depth) in Marine sedimentary group varies from 40,000-50000 litres/day. The formation is yet to be explored for development in the district. In Coralline limestone in Nicobar group yield of dugwell (5-6m dia,6m depth) varies from 1,00,000-1,50,000 litres/day or even high. Springs are profuse in all the geological formations. However, springs are sustainable in ophiolite formation and in the limestones of Nicobar group.
Premonsoon depth to water level during 2012	Not available as hydrograph stations are absent.
Premonsoon depth to water level during 2012	Not available as hydrograph stations are absent.
Long term water level trend in 10 years(2002-2012) in m/yr	Not available as hydrograph stations are absent.

The above data substantiates that the availability of groundwater resources is low and with growing population and tourist influx water demand will increase over the years.

○ **Organizational Impact**

- The global desalination market has tremendous potential and is going to surpass US\$ 27 Bn by 2025 with a CAGR of 7.8%. NVVN can develop **Integrated water and power plant project**. The current project can serve as a pilot project for other projects to come up.
- NVVN will have an opportunity to develop itself as an asset-based company which in turn will set a platform for its growth.
- It will help NVVN diversify from its core business of power trading and help reduce stress on the existing business portfolio.

3. Project Overview

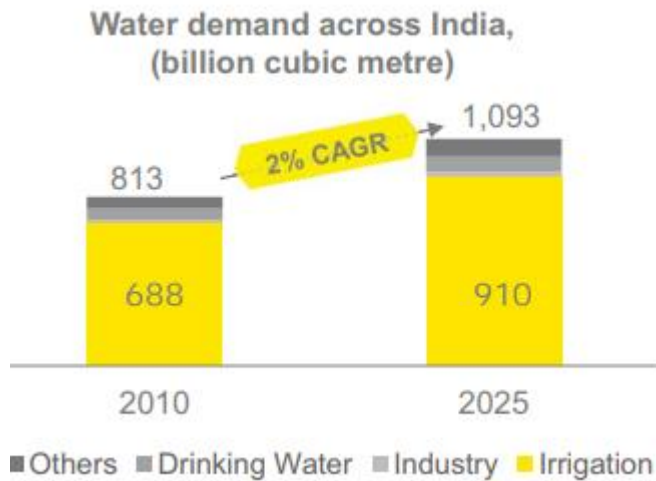
○ Project Description

Name of Project:	Andaman & Nicobar Gas Power Project (50 MW) at Hope Town in Ferrargunj Tehsil of South Andaman District.
Name of Project Proponent:	NVVN
Location of the Project:	<p>The project site is located in Hope Town at Ferrargunj Tehsil in South Andaman District of Andaman & Nicobar Islands. Nearest National Highway NH-223 is at a distance of 8 km in North direction. Nearest major city is Port Blair located at a distance of 7.9 km South to the project site.</p> <p>The vicinity map of the project is shown in Exhibit-I.</p>
Capacity & Unit Configurations:	50 MW Greenfield project (Dual Fuel Power Project)
Land Requirement, Current Land Use and Availability:	<p>At Hope Town Site, about 2 acres of undulated barren land having irregular topography with elevation of 2 M above MSL exists along the Sea Shore.</p> <p>The power project is proposed to be accommodated within the available land (2 Acres) located in Hope Town. The land is Government land and is under physical possession of A&N Administration. No forest land is involved. Topography of the site is rocky and undulated terrain. The land is away from the navigational channel & other marine traffic.</p>
Water Requirement and Availability:	<p>Sea Water will be the Source of Water. About 8 KL/day of fresh water is required to meet the requirement of Cooling Water System & Service Water System of the plant. In order to meet the water requirement of the project through desalination plant, it is proposed to draw 25 KL/day of water from Sea.</p> <p>Plant Water requirement i.e... Engine Jacket Cooling, Lub Oil Cooling and Portable Water is proposed to be met by treating the sea water in Water Treatment Plant/ Desalination Plant.</p>

The excess capacity of the desalination plant is to be used for packaging water and selling it in the islands.

The commercial viability of water packaging business has been shown below. The figures below describe why the project would be a viable option in the Andaman & Nicobar Islands.

- **Water demand on the rise in India**



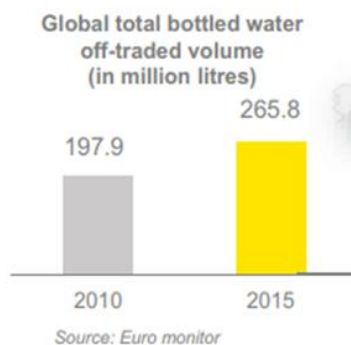
- **Global and Indian Scenario**

Key metrics...

230 cubic km of groundwater is drawn by India per year

40% water losses out of total distributed water, highest in world

33% expected rise in Indian population, from 1.2 billion in 2015 to 1.6 billion by 2030



The total global off traded volume is a combined volume of **still bottled water, Functional, Flavored and Carbonated bottled water** with still bottled water having the maximum share.

INR60.8 billion

Indian off-traded bottled water market value in 2016

26%

Y-o-y increase in bottled water value for off-traded value in 2016

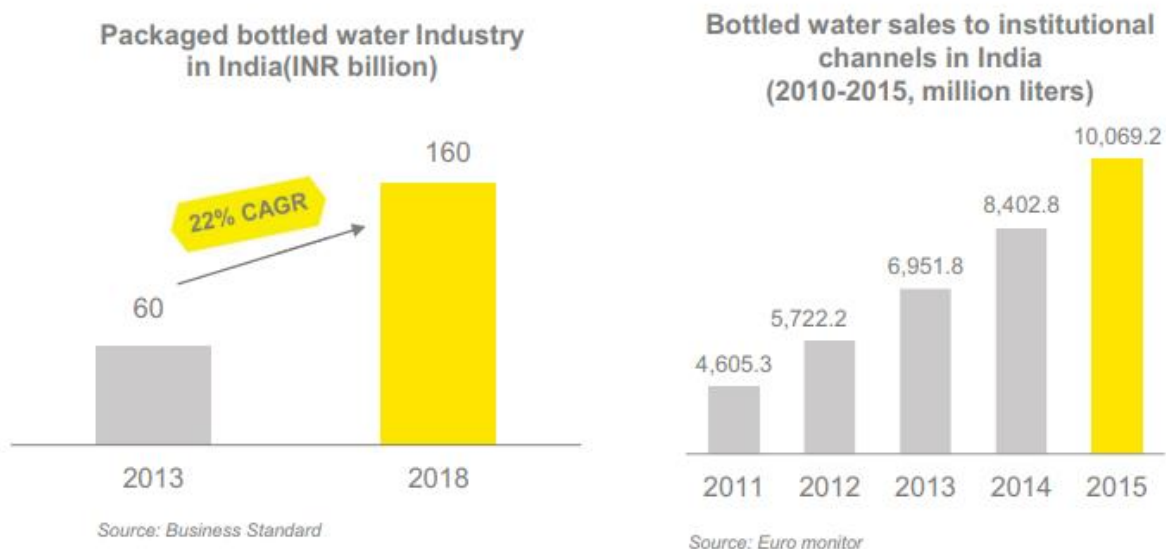
20.2% CAGR

Volume growth is forecasted in off traded bottled water business between 2015 to 2020.

○ **Project Goals & Objectives**

- The primary objective is to diversify the existing business of the organization. The project will also help NVVN set up a pilot project in Andaman & Nicobar Islands of seawater desalination and packaged bottling plant. Taking up the project on a commercially large scale will give the organization a first-mover advantage in the business.
- The project will not only be of commercial importance with the growing water demand but will also have a social impact as the sole organization taking up water processing business in Andaman making its freshwater sources reliable and reducing the dependency on the mainland.

Bottled water sales by value and volume are on the rise in India and are expected to further grow in future



○ **Project Viability**

To understand the viability of the project we will look at two main components

1. **Financial Viability**
2. **Demand Forecasting**

○ **Demand Forecasting**

- For demand forecasting, we have mentioned two main components, population growth and the influx of tourists. We can take into account the rise of the level of income as another parameter to understand the potential consumers. This has been compared with the availability of fresh drinking water levels in Andaman & Nicobar Islands.
- We look at the various figures of the above-mentioned components. Secondary data has been used to interpret the results.

1) Growth of population:

- Growth in population has a direct relation with the increasing demand for drinking water. It is evident that with the increasing population and constant supply of water resources commercial organizations, institutions, populated areas like airports and bus stations will have an increasing demand for packaged drinking water. We have taken the population data from the Indian Census data and have assumed a straight-line growth for the past decade.
- **Forecast:** We have assumed that the population of Andaman & Nicobar Islands will grow at the same rate as last decade (2001-2011) and hence have taken a last ten year's growth rate of 6.86%.

2) Urbanization

- There is an inherent difference between the increasing demand for packaged drinking water in rural and urban areas.
- Urbanization factor has been taken into consideration to understand the rate of development in the Islands and shifting of population from rural to urban areas.
- ***Urbanization Factor***= $\text{Urban Population} / \text{Total Population}$
- **Forecast:** The urbanization rate of Andaman & Nicobar Islands has been growing constantly for the last two decades. We have used the growth rate of urbanization in the last two decades to project future values of urbanization.

3) Tourism

- Tourism forms a major part of Andaman & Nicobar Islands' Gross State Domestic Produce (GSDP). In addition to this, a significant portion of the population is dependent on tourism for their sustenance. With an increase in the number of tourists arriving in the island, the demand from the tourism industry is set to increase in the coming years.
- **Accounting Seasonal Variety in Tourism:** The seasonal variations in the influx of tourists have been considered for different months of the year.

4) Gross State Domestic Product (GSDP)

- An increase in the wealth of Indian citizens will boost tourism and therefore boost the economy. Hence, the GSDP of Andaman & Nicobar Islands is linked with the overall GDP of India. The overall GDP of India can be referred to as a figure of reference to understand the growth.

○ **Marketing Challenges**

NVVN can consider the following challenges in its business of packaging water

- Packaged drinking water sent by established players from the mainland will provide stiff barriers to entry in the market.
- Establishment of a separate marketing and distribution business for the project might lose focus since business decisions will be taken based on the main project of power generation.
- Deciding the distribution channel, various modes of distribution can be considered either directly through retailers, setting up a franchise or outsourcing the distribution business. A suggestive action that NVVN might consider for the development of distribution channel is through the existing '**HUB & SPOKE CONCEPT**' in the Islands. The existing channel is shown below.

Area	The Spokes*								
	Hub	Beaches	Island Resorts	Adventure	Mobile	Cruise	Heritage Culture	Nature	Forest
North Andaman	Diligpur	✓	✓	✓	✓		✓	✓	✓
North – Middle Andaman	Mayabunder	✓	✓	✓	✓		✓	✓	✓
Middle Andaman	Rangat	✓	✓	✓	✓				✓
South Andaman	Port Blair, Havelock, Neil	✓	✓	✓	✓	✓	✓	✓	✓
Little Andaman	Little Andaman	✓		✓	✓			✓	✓
Nicobar	Car Nicobar Katchal Gr. Nicobar	✓		✓	✓	✓		✓	✓

* These are excursion points from a hub, each aligned with a particular product. As more than one spoke is aligned with the hub, individual locations have not been mentioned.

- Phased development is recommended for the hubs in respect of products as follows:

		Existing	New
		Short Term 0 – 5 years	Short Term Medium Term 2 – 10 years
Locations	Existing		
	New	Medium Term 5 – 10 years	Long Term > 10 years

- **Tourist Arrival Forecast (Past data showing the quantum of growth)**

Projections for Tourist Arrivals in A&N Islands

Year	Short Term 2007	Medium Term 2012	Long Term 2022
Port Blair	1,14,114	1,28,419	1,62,631
Rangat	5,307	11,945	22,692
Mayabunder	3,269	7,357	13,975
Diglipur	11,726	18,475	26,739
Little Andaman	111	2,197	5,566
Car Nicobar	Existing Inflow*	Cruise Tourists*	7,901
Katchal			585
Great Nicobar			3,253
Total	1,34,527	1,68,393	2,43,342

Further challenges can be understood from interaction and data collection from local dealers and consumers in the area of business.

- **Project Assumptions**

The following assumptions have been considered for the project. As the projects proceeds, this section will be updated accordingly.

- Adequate land will be available for the plant installation.
- A skilled workforce will be available for plant operations.
- Project financing will be available as a part of the parent project.

- **Project Constraints**

The following project constraints can provide challenges instead of the project being viable and the market demand is considerable.

- Distribution channel for distribution of packaged drinking water since the islands are separated by sea and logistics are limited.
- Inhouse expertise to initiate the project since NVVN has no prior experience with water packaging business.

4) Basis and Presumptions

This project has been drawn based on the following presumptions:

- This project is based on a single shift basis and **300 working days** in a year.
- The cost of machinery & equipment /materials indicated refer to a particular make and the prices are approximate to those prevailing at the time of preparation of this profile.
- Depreciation has been taken as –On machinery & equipment **@ 15%** which is same as the power plant equipment depreciation rate.
- Interest on debt part of total capital investment has been taken **@ 8.75%** per annum.
- Breakeven point has been calculated at full capacity utilization.

- For the smooth functioning of the unit, it is suggested that the unit should have a good stock of quality raw material
- Working capital requirement is considered for 3 months

○ **Technical Aspects: Processing and Bottling**

The major steps involved in the purification process are given below:

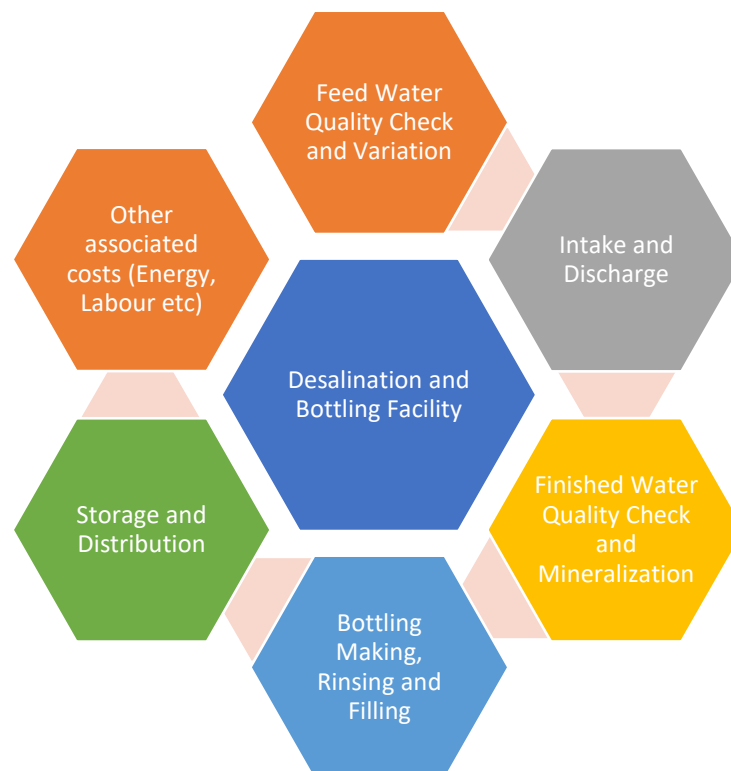
- Water treatment & Purification (It will be the part of Desalination Plant itself)
- Mixing of negligible mineral and necessary for human life
- Bottle Filling
- Inspection and Packing
- Dispatch

○ **Energy Consumption-**

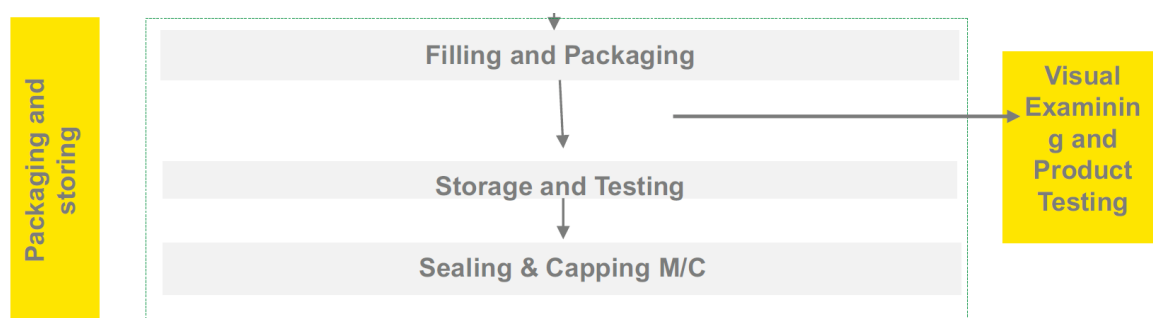
3-6 kWh/m³ by Desalination process through Reverse Osmosis

10-16 kWh by bottling machine and rest of the process

○ **Process**



○ **Packaging and Storing Process**



○ **Equipment's Required**

Equipment's /Components	Units
Storage Tank for Storing Desalinated Water	1
Feed / Transfer Pump	1
UV Sterilizer Units	1
Ozonisation Unit with Re pressurization Pump	1
Ozone Ventury with Static Mixture	1
Ozonator With O2 Gen.	1
Storage Tank (Final / RO Water)	1
Pet Stretch Blow Molding	Units
Air Compressor	1
Compressor Air Dryers & Filters	1
Chiller for Mold cooling	1
Bottle Mold	1

Total Cost- Rs 50,00,000/-

5) Financial Aspects

Assumptions for Salary and Wages

Designation	No.	Salary	Amount (In Rs./Month)
Production Manager-cum-Chief Chemist	1	40000	40,000
Lab. Assistant	1	30000	30,000
Production Supervisor	2	20000	40,000
Skilled Workers, including Electricians and Mechanic Driver	3	15000	45,000
Un-skilled Workers	3	9000	27,000
Total	10	Lakhs/Month	1.8200

<https://drive.google.com/file/d/1EHtbLwQN2ymwNYjf-3fVmmB8UvRXJUTs/view>

○ Input Sheet Assumptions

Insurance Premium Cost		% Of CAPEX	0.35%
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INPUT PARAMETER			
Water Discharged After Conversion		KL/Day	8
Desalination Plant Cost		Rs Lacs	0.00
Bottling Plant Cost		Rs Lacs	50.00
O&M Expenses		Rs Lacs	1
Total Land Lease Payment/year		Rs Lacs	0
Electricity Cost/Unit		Rs/Unit	6
Electricity Consumption by Desalination Plant		kWh/m3	3
Electricity Consumption by Bottling Plant		kWh	10
Debt		%	80
Repayment Period(Including Moratorium)		Years	13
Interest Rate		%	8.75
Pre Tax ROE for the first 10 years	10	% p.a	17
Pre Tax ROE from 11th year onwards	15	%p.a	22
Weighted Average of Post Tax ROE		%	14.0%
Selling Price of Bottle			15

RESULTS

Actual Cost of Production of Bottle	4.91	Rs/Lit
Revenue/year	73.63	Lakh Rs/Year

	Project IRR	Equity IRR
Actual Cost of Production of Bottle	9.30%	11.32%

○ Project and Working Capital Assumptions

(Note: -Bottling plant has almost the same assumptions as of the LNG Power Plant)

Sub-Head	Sub-Head(2)	Unit	Assumptions
Capacity	Water Discharged After Conversion	KL/Day	8
	Water Required For Plant	KL/Day	3
	Remaining Water for Mineral Water Plant	KL/Day	5
	Reduction in Efficiency/Year	%	0.0%
	Number of Working Days	Days	300
	Useful Life of Plant	years	25
		-	

Capital Cost	Water Treatment Plant Cost	Rs Lacs	0.00
	Bottling Plant Cost	Rs Lacs	50.00
	Total Cost		50.00
Debt: Equity			
Debt Component	Debt	%	80
	Equity	%	20
	Total Debt Amount	Rs Lacs	40
	Total Equity Amount	Rs Lacs	10
Equity Component	Loan Amount	Rs Lacs	40
	Moratorium Period	Years	0
	Repayment Period(Including Moratorium)	Years	13
	Interest Rate	%	8.75
PRE TAX ROE	Equity Amount	Rs Lacs	10
10	Return on Equity for the first 10 years	% p.a	17
15	Return on Equity 11th year onwards	%p.a	22
	Weighted Average of ROE	%	20
	Weighted Average POST TAX ROE	%	14%
	Discount Rate for 10 years	%	8.16%
	Discount Rate for the rest of the years	%	7.45%
	Weighted Average Discount Rate	%	7.74%
	Annuity factor for plants life	%	10.53
Fiscal Assumptions	Income Tax	%	34.61%
	MAT Rate	%	21.55%
	80 IA benefits	Yes/No	
Depreciation (Salvage Value 10 percent)	DEPRECIABLE AMOUNT	90%	45
	Depreciation Rate for first 13 years	%	5.83
	Depreciation Rate year onwards	%	1.18
	Plant&Machinery Income Tax Depreciation		15%
i) Raw Material			
1) PET/PVC bottle including cap labels etc. 1 lit. size @ 3.60 Rs		Rs Lakhs/Month	5.4
2) Chemicals and Reagents etc. (L.S.)		Rs Lakhs/Month	0.5
3) Corrugated boxes, strip, tap etc.		Rs Lakhs/Month	3

Total		Rs Lakhs/Mont h	8.9
ii)Salary and Wages		Rs Lakhs/Mont h	1.82
iii) Utilities			
i) Electricity Consumption By desalination Unit		Rs Lakhs/Mont h	6
i) Electricity		Rs Lakhs/Mont h	2.5
ii) Fuels and other		Rs Lakhs/Mont h	0
Total		Rs Lakhs/Mont h	8.5
iv) Other Contingent Expenses (Recurring Expenses)			
Postage and Stationery		Rs/Month	1000
Telephone/Fax Charges		Rs/Month	1000
Consumable Stores		Rs/Month	2000
Repairing and Maintenance		Rs/Month	100000
Transport Charges		Rs/Month	2500
Advertisement and Publicity		Rs/Month	2000
Sales Expenses		Rs/Month	4000
Licence and other Fees		Rs/Month	1000
Miscellaneous Expenses		Rs/Month	2000
Total		Rs Lakhs/Mont h	1.155
Working Capital (per month)			Total (Rs in Lakhs)

Raw Materials/Packaging Materials			8.9
Salary and Wages			1.82
Utilities			8.50
Recurring Expenses			1.16
Total			20.38
Insurance Premium		% of Book Value	0.35%
Land Lease/year		Rs Lac/Year	0
Interest on working capital		%	11.00
O&M Expenses		Rs Lacs/Month	1
O&M Expenses Escalation		%	NA
SELLING PRICE OF BOTTLE		Rs/Lit	15
	Tax Holiday Start Year	Years	1
	Tax Holiday Duration	Years	0
	MAT Setoff Start Year	Years	16
	MAT set off allowed u/s 115JAA (3A)	Years	10
	MAT Setoff Duration	Years	5
NOTE:- DATA IN THE PEACH COLOURED CELLS ARE EDITABLE			

Financial Analysis

Financial analysis of the project has been done considering above assumptions after data collection and is contained in the accompanying Excel file.

Link:

<https://drive.google.com/file/d/1JBET2d0nCnBQpv3X0Pt6xljoq3uoo6rt/view?usp=sharing>

○ **Loan Calculations**

Loan Amount	40	lakhs	
Term	13	Years	
0.0875			
Initial Payment	Repayment	Remaining Payment	Interest
40.0	3.1	36.9	3.4
36.9	3.1	33.8	3.1
33.8	3.1	30.8	2.8
30.8	3.1	27.7	2.6
27.7	3.1	24.6	2.3
24.6	3.1	21.5	2.0
21.5	3.1	18.5	1.8
18.5	3.1	15.4	1.5
15.4	3.1	12.3	1.2
12.3	3.1	9.2	0.9
9.2	3.1	6.2	0.7
6.2	3.1	3.1	0.4
3.1	3.1	0.0	0.1

EMI= Rs 0.43 Lakh/Month

○ **Results**

		Project IRR- Post Tax			Equity IRR - post tax		
	Tariff (Rs/Unit)	Project IRR	NPV @ Interest Rate	Payback Period	Equity IRR	NPV @ Interest Rate	Payback Period
The actual cost of production	4.91	9.30%	4.99	7	11.32%	4.06	10

6. Future Scope

- Trend analysis of growth in tourism already shows us that the demand for packaged drinking water will increase.
- Gives NVVN a business opportunity to diversify from its core business, reducing risk and hence increasing the ability to raise capital or procure debt for projects of similar nature.
- Gives NVVN a strategic location for business with neighbouring countries of Indonesia, Maldives, Sri Lanka and Vietnam.
- Increase in capacity of desalination can further help NVVN to set up water distribution business in the Islands.

○ **Reference**

- https://www.amtaorg.com/Water_Desalination_Processes.html
- <https://www.bottlingindia.com/mineral-water-bottling-plant-cost>
- <https://cdn.vibrantgujarat.com/website/writereaddata/images/pdf/project-profiles/Watering-plant.pdf>
- <http://tourism.gov.in/sites/default/files/andaman.pdf>
- <http://www.indiaenvironmentportal.org.in/files/waterpolicyforanislands.pdf>
- http://environmentclearance.nic.in/writereaddata/Online/TOR/01_Nov_2018_1459056737NAXSZ4DPREFR.pdf
- http://censusindia.gov.in/2011census/dchb/3500_PART_A_DCHB_ANDAMAN%20&%20NICOBAR%20ISLANDS.pdf