

TRAFFIC ANALYSIS & FEASIBILITY OF THE DEVELOPMENT OF GREEN FIELD PORT -AT CUDDALORE, TAMILNADU

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ABSTRACT

This paper reviews the Traffic Analysis and Feasibility for the development of Green field port at Cuddalore. Study of strategic locations close to Industries and analysis on cargo movement and traffic analysis on the existing ports in the Indian coast has been performed with reference to the Cuddalore Port, situated in Tamil Nadu. Vessel size analysis has been performed in order to know what type of vessel, expected to come to the port, in accordance with the Indian Port Association. The East coast ports handle about 62% of total Container, General Cargo & liquid bulk vessels which are called at Indian Major Ports of East Coast by Chennai.

From the analysis of the world wide fleet and the Indian scenario, mostly serving vessel size ranging between 50000 to 80000 DWT which may be due to draft restriction and limited handling facilities. In East coast ports have facilities to serve vessels of 100000 DWT and above. Cape size vessels are expected to arrive in the Indian ports in the future; so considering the future scenario, design vessel sizes are recommended accordingly. This paper features on the various aspects of analysis and feasibility made with reference to Cuddalore Port.

Key Words: Port Planning, Vessel Size, Traffic Analysis, Cargo Movement, Port Facilities

INTRODUCTION

Essential to make a Analysis of traffic and feasibility study before planning or designing a port or any offshore structure. A project plan includes the feasibility study which is done to determine the best way to satisfy a particular requirement.

NEED FOR PORT

India is one of the fastest economically growing country. Where ports and harbours constitute a great role in developing Indian economy, by international trade of import and export. Tamil Nadu contains a peninsula kind of coastal area from Chennai to Cape Comorin. Tamil Nadu lists two government port in major and one PPP mode major port. Whereas 7 government ports, 15 captive ports and ship yards are available including ports on planning and construction process at Tamil Nadu. TNMB

is planning for many minor ports to be developed and planned in this decade. Cuddalore is one of the areas preferred by TNMB to develop an intermediate port between Chennai and Tuticorin. At present Karaikal port, a private port is working as an intermediate between Chennai and Tuticorin. But even then TNMB wants a port at Cuddalore because of its natural harbour basin, trade demand and importantly economical consideration, still Cuddalore port is not been developed.

OBJECTIVE OF STUDY

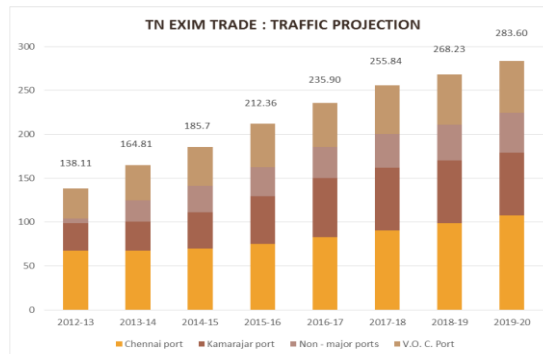
To check the Traffic Analysis and feasibility for development of a Green field port that is proposed in the district of Cuddalore, Tamilnadu under various cases and criteria. This project gives an idea what all departments and authorities are to be considered and discussed to grand permission to build the port. Now here we

make an attempt to provide an assessment of feasibility study of a green field port from a commercial, technical and environmental perspective of proposed cuddalore port its trade,

environmental aspects, storage facilities, handling capacity, design of breakwater, wind & wave data analysis.

Commodity wise Traffic projections

COMMODITY	POTENTIAL
POL	39.6
IRON ORE	13.8
COAL	93.9
FERTILIZERS & FRM	5.9
CONTAINERS	83.1
OTHERS	47.3
TOTAL	283.6



Tamilnadu EXIM Traffic Growth Projections

Year	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020
Chennai Port	67.62	67.7	69.99	75.22	82.66	90.73	98.9	107.22
Kamarajar	31	33	41.39	54.39	67.44	71.44	71.44	71.54
Non Major	5.4	24.2	29.7	33	35.2	38.3	40.8	45.4
V.O.C Port	34.09	39.91	44.62	49.75	50.6	55.37	57.09	58.94
Total MMTA	138.11	164.81	185.1	212.36	235.9	255.84	268.23	283.6

MARKET STUDY

Present and Future scenario for developments in the vicinity of Cuddalore:

The estimation of the future cargo-handling demand for the proposed port development is

one of the most important tasks in the whole feasibility study. The estimated future demand becomes the basis for determining the port capacity, the size and the rate of investment for the port development.

S.no	Name of the Present and Future industrial development	Raw materials	Amount
1.	SRM energy	Coal	6 MTPA
2.	Nagarjuna Oil Corporation Limited (NOCL):	Crude oil	6 MTPA
3.	Goodearth Shipbuilding Pvt Ltd shipyard	Steel	50000 tons
4.	Tannex Power Generation Limited	Coal	Indian coal - 0.760 MTPA Indonesian coal -0.600 MTPA

DETAILS OF MAJOR INDUSTRIES IN REGION:

SRM Energy India thermal power plant:

Mumbai based SRM energy group company is in the process of implementing 3x660 MW (1980 MW) Thermal power plant and signed an Agreement for 5.0 million tons per annum imported coal from Indonesia. MoU has also been signed for supply of another 5 MTPA to 7 MTPA from mines in

Malawi. Tamil Nadu Electricity Board is likely to purchase 250 MW with a possible increase to 500 MW.

Nagarjuna Oil Corporation Limited (NOCL):

Nagarjuna Oil Corporation Limited (NOCL) has partnered with industrial experts from the field of petrochemicals and hydrocarbons, to establish a petroleum refinery, which will be the second petroleum refinery in the State of Tamil Nadu.

Tannex Power Generation Limited (TPGL):

Tannex Power Generation Limited (TPGL), Tamil Nadu, planning to set up a Coal based Thermal Power Plant of capacity 2 x 55 MW . Marungur Village, Panruti Taluk, Cuddalore District of Tamil Nadu, fuel requirement of Indian Coal 0.760 million tons and Indonesian Coal 0.600 million tons.

Cuddalore power plant - Government project:

IL&FS is developing a 3600 MW imported coal based Thermal Power

DETAILS OF MINOR & MAJOR INDUSTRIES IN REGION

Cuddalore also hosts the heavy chemical, pharmacological and energy industries

Company	Area	Production
Chemplast Sanmar Indl Alcohol Plant Phase-2	Cuddalore OT	PVC film Mgs
TANFAC	Cuddalore OT	Aluminum fluoride
Vanavil	Cuddalore OT	Dyes & chemicals
SPIC Pharma Chemicals	Cuddalore OT	Penicillin
Asian Paints Limited	Cuddalore OT	Paints
Clariant Chemicals	Cuddalore OT	Emulsions, textile chemicals

Company	Area	Production
Salem steel Plant	Salem	Steel Products
Salem Dairy	Salem	Aluminum fluoride
Vanavil	Cuddalore OT	Dyes & chemicals
SPIC Pharma Chemicals	Cuddalore OT	Penicillin
Asian Paints Limited	Cuddalore OT	Paints
Clariant Chemicals	Cuddalore OT	Emulsions, textile chemicals

The major industry is the Neyveli Lignite Corporation (NLC) for which coal can imported and transported from this proposed port. The market study clearly shows that there is a need for a port in the selected location. The total

Project in Tamil Nadu would import 15-25 million tons of coal per annum along with other plants and machinery IL&FS has acquired a mine in Indonesia, which will cater to the coal requirement for this project.

Goodearth Shipbuilding Pvt Ltd shipyard:

Goodearth Shipbuilding Private Limited (GSPL) is planning to develop a shipyard in Silambimangalam, Cuddalore. the proposed yard as per the master plan developed with Korean Shipbuilding experts.

amount of cargo to be handled in the port is more or less the sum of the amount required for each project mentioned in the above table along with the coal to be transported to NLC

List of upcoming power plants near the vicinity of Cuddalore:

S.no	Project	Location	Capacity	Required coal
1	IL&FS	Cuddalore	3600 MW	15
2	SRM Energy pvt.Ltd	Cuddalore	1800 MW	6
3	Ind Bharath	Cuddalore	450 MW	-
4	ETA power	Nagapattinam	1320 MW	5.88
5	Nagai power Pvt.Ltd	Nagapattinam	300 MW	-
6	Patel PEL power Ltd	Nagapattinam	1000 MW	4.38
7	NSL power	Nagapattinam	1320	5.88

Traffic forecast for region for port

Company	Capacity Per Annum	Future Vessels
IL&FS – Vessels	15 MTPA	216
ETA power – Vessels	5.88 MTPA	120
NSL power limited	5.88 MTPA	120

Patel del power ltd	4.33 MTPA	90
	Total	546

For Coal:**Coal Volumes for Green Field Port by Potencial Thermal Plants**

Developer	FY18	FY19	FY20	FY21	FY22	FY23	FY24
Govt Power Plant	2.	2.0	2.0	2.0	2.0	2.0	2.0
Private Power Plants	8.0	10.0	12.0	14.0	16.0	18.0	20.0
Total Volumes	10.0	12.0	14.0	16.0	18.0	20.0	22.0

Table above shows the potential coal volumes for thermal power plants derived on the above basis until 2024. The basis assumption is that even if only 10,000 MW of the planned 20,000 MW .

Coal Volumes for Green Field Port by Cement Plants

Developer	FY18	FY19	FY20	FY21	FY22	FY23	FY24
Govt Plant	25.	25	25	27	28	28	28
Private Plants	250	280	290	300	310	320	330
Total Volumes	275	285	305	327	328	348	358

Table above shows the potential coal volumes for Cement Plant

For crude:

Major types of tankship include the oil tanker, the chemical tanker, and Gas carrier. Tankers can range in size of capacity from several hundred tons, which includes vessels for servicing small harbours and coastal settlements, to several hundred thousand tons, for long-range haulage.

Assume that 6 MTPA capacities handled in a single berth with size of 10000-60000 DWT. Generally oil tanker ship is used to handle crude oil.

Panamax tankers are primarily used for both the transportation of crude oil and petroleum products and have displacement between 50,000 and 80,000 dwt and trade in short haul. Handysize tankers have displacement between 50,000 and 10,000 dwt. They primarily carry finished petroleum products as their smaller size makes them less economic for the transport of crude.

Container ship:

Container ships are cargo ships that carry their entire load in truck-size intermodal containers, in a technique called containerization. They are a common means of commercial intermodal freight transport and now carry most seagoing non-bulk cargo. Container ship capacity is measured in twenty-foot equivalent units (TEU). Fresh vegetables are been exported in containers in large quantity in containers from cuddalore to

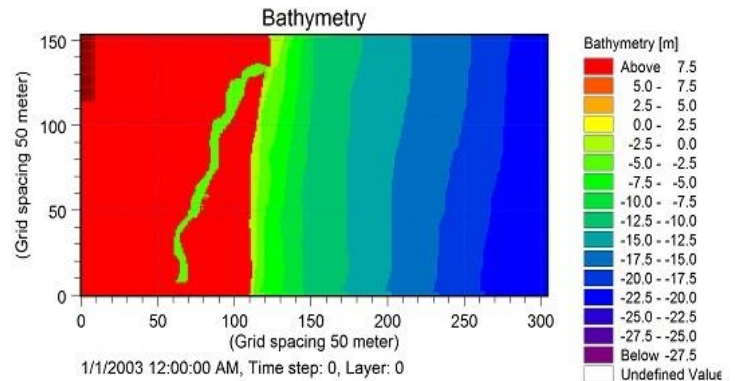
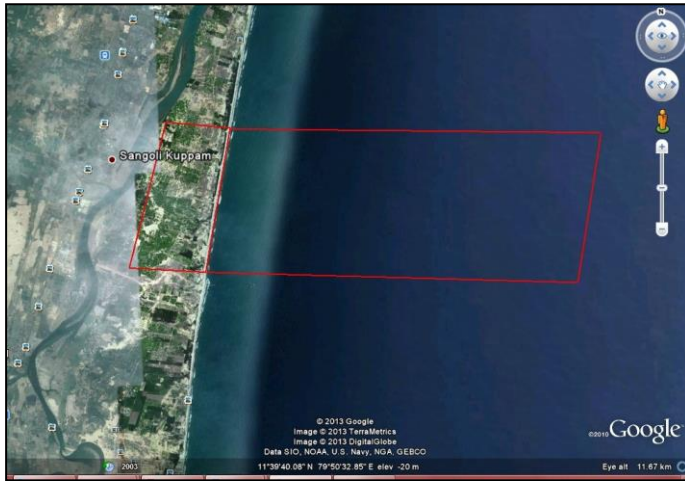
many countries. Certain type of cargoes are refrigerated, certain been salted and few been exported in its own state depending on its decaying quality. Assume that 3000-5000 TEU's capacity handled in container terminal.

SITE INFORMATION**Location**

Cuddalore (pronounced as Kadaloor) is a city in Tamil Nadu, southern India. It lies 25 kilometres (16 mi) south of Pondicherry on the coast of the Bay of Bengal. The Cuddalore port, located around 200 km south of Chennai, has infrastructure such as breakwater, administrative buildings and barge loading and unloading berths and about 100 acres of land, under the control of the TNMB. Cuddalore is located between two major ports namely Chennai port and Tuticorin Port. Cuddalore is located geographically in such way that many districts like Salem, Villupuram, Trichy, Coimbatore etc will be connected via road, rail and inland and sea water way from this seaport better than any other location. Cuddalore has good steep bathymetry in a very short distance away from the shore. These steep contours make way to sail ships across this Cuddalore coast. With a little bit of dredging the water front can be made deep enough for the entry of even panama.

- F-Northern Port Limit Boundary(11°39'49.22"N ,79 °50'08.73"E)

OCEANOGRAPHY AND METEOROLOGY: Bathymetry



Climate:

Cuddalore has hot and humid summer, cool winter and two distinct monsoons seasons (south-westerly and north-easterly). Hot Summer in February, Rainy season: South-West

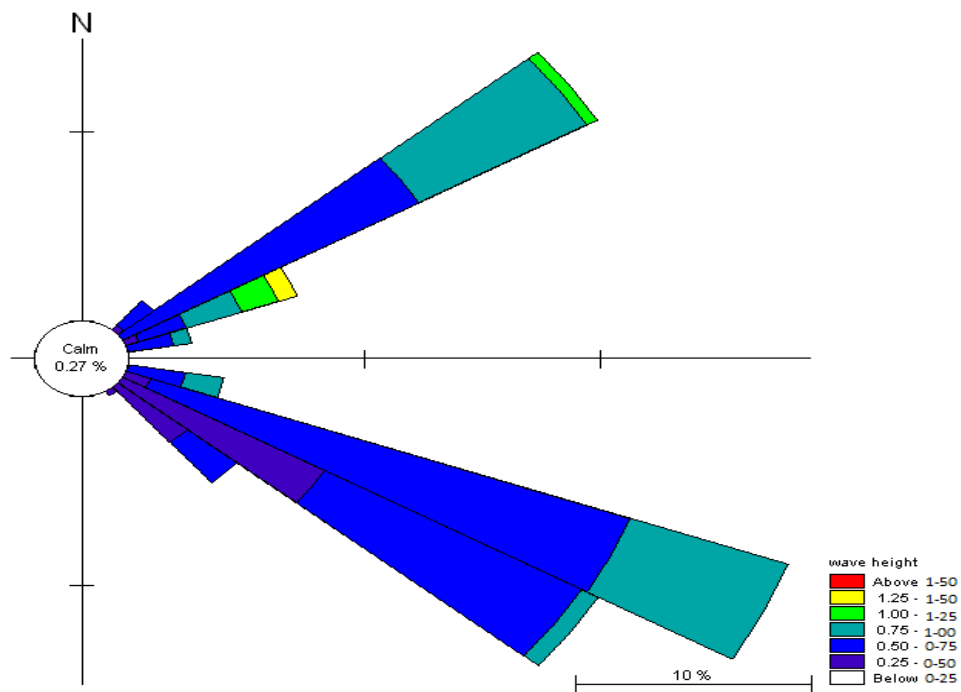
Monsoon: March to September Rainy Season: North-East Monsoon: October to December Cold: Winter: January Meteorological/climatic conditions of Cuddalore are presented

Parameter			
Temperature			
Mean	daily	maximum	33.7
Mean	daily	minimum	24.1
Average maximum temperature			31.5
Average minimum temperature			23.9
Wind speed (kmph)			1-19

Wave rose diagram for wave height Wind and Cyclones

Cuddalore, being a part of Indian subcontinent, experiences tropical cyclones which originate from the depression generated in the Bay of

Bengal during the north east monsoon season (October to December). The occurrence of storms in this region is about once in three years. Cuddalore is also affected by cyclone generated waves during this period.



From tide table the below chart has been plotted for the year 2014:

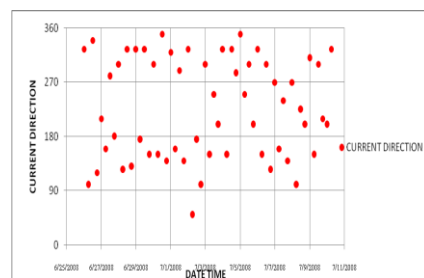
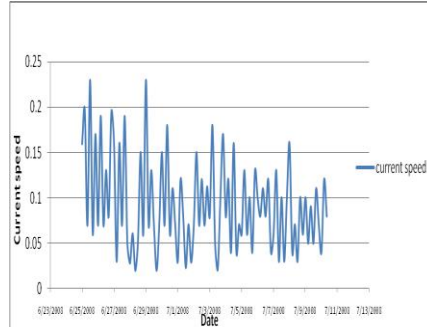
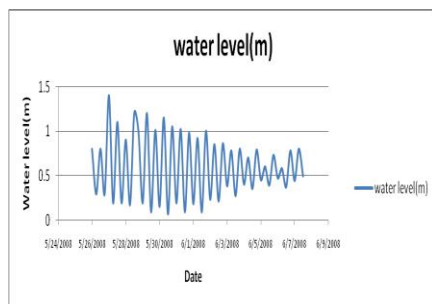


Fig. Currents:

The Tidal current along the Cuddalore coast is 0.5 knots or 0.25 m/s. The wind driven

current due to the wind drift corresponding to a wind speed of 50 m/s during cyclonic conditions would be 1.5 m/s. In addition to the above two

currents, piling up of water against the coast during the passage of cyclonic storm causes the

sea surface to slope upwards towards the coast, which produces a slope current.

Table 2. SWOT analysis for Green field port Cuddalore – Tamil nadu

STRENGTHS	WEAKNESSES
Privatization - No Government interference or externally imposed budget constraints	High levels of competition suppressing freight rates and Charges
High traffic flow to hinterland industrial areas	Over-utilization of infrastructure especially road
Competition	
Well-developed infrastructure Comprehensive cargo handling Equipment	Over-reliance on road-transport Traffic congestion in hinterland Areas
Economic development Can attract loan capital for financing terminal investment	Traffic regulations—night-time restrictions and congestion charges
OPPORTUNITIES	CHALLENGES
High revenue to government from Trade	Volatile or unsustainable freight Rates
	Control of imported products Anti smuggling and anti terrorist security measures
Multimodal transport connections/trade-offs	Trade imbalance Increase in freight rate charges
Globalization of trade Economic growth from Intl Trade	
	Pressure on terminals in urban areas to be converted to other uses Environmental legislation
Attraction of loan capital for financing	

Methodology to Access and Analysis of Port Traffic

Action	Activity	Target
Step-1	Determine extent of hinterland and scaneconomic activity in the hinterland	<input type="checkbox"/> Industrial developments <input type="checkbox"/> Industrial Infrastructure <input type="checkbox"/> Major companies
Step-2	Determine potential cargo mix	<input type="checkbox"/> Dry & Liquid Bulk, Break bulk, Containers
Step-3	Undertake potential competing Port for assessed Traffic	<input type="checkbox"/> Kattupalli Port <input type="checkbox"/> Kamarajar Port <input type="checkbox"/> Chennai Port <input type="checkbox"/> Karaikal Port <input type="checkbox"/> V.O.C (Tamil Nadu) Port
Step-4	Cargo analysis	<input type="checkbox"/> Market dynamics <input type="checkbox"/> Potential sources - major companies, industries or sectors
Step-5	Assess cargo potential for a new Greenfield Facility	<input type="checkbox"/> Port competition <input type="checkbox"/> Macro-economic considerations

REPORT KEY FINDINGS

The Key findings & rationale for developing a new Greenfield Port facility has been summarized hereunder in brief.

- 1) Targeting the coal requirements of proposed power plants in the central Tamil Nadu coastal belt is the primary traffic potential for an alternate greenfield Port

- 2) Proposals for adding 24,000 MW in the Central TN already exist and an addition of only 15,000 MW by the year 2035 which will require about 53 Million Tons of coal per annum, it a coal requirement of about 27 MMTPA
- 3) Potential for developing an LNG Terminal of upto 5 MTPA also exists as per Vision 2023's stated

- 4) The proposed Petroleum, Chemical and Petrochemical Investment Region (PCPIR) in Cuddalore - Nagapattinam
- 5) The Ministry of Hydrocarbons has classified the Palar & Cauvery basins on the Tamil Nadu Coast as Category – I basins
- 6) Railway distance of Mettur Thermal Power station from Kamarajar (erstwhile Ennore) Port is about 392 Kilometers and from V.O. Chidambaranar (erstwhile Tuticorin) Port is about 430 Kilometers, whereas distance to Cuddalore Junction is only 243 kilometers



Indian Standard for the Surface Water (CPCB Standard):

S.no	Characterization	A	B	C	D	E
1.	pH	6.5-8.5	6.5-8.5	6.5-8.5	6.0	-
2.	Colour,Hazen unit,max	10	300	300	-	-
3.	Total suspended solid	Not specified	Not	Not specifid	Not	Not specific
4.	Total dissolved	500	-	1500	-	2100
5.	Free ammonia(as	-	-	-	1.2	-
6	Sulphate (as SO_4),	400	-	400	-	1000
7.	Total hardness as	Not specified	Not	Not specified	Not	Not specified
8.	Total alkalinity as	Not specified	Not	Not specified	Not	Not specified
9.	Lead (as Pb) mg/l,max	0.1	-	0.1	-	-
10.	Dissolved oxvgen,	6	5	4	4	-
11.	BOD, mg/l,max	2	3	3	-	-
12.	COD	Not specified	Not	Not specified	Not	Not specified

Noise levels generated by equipments:

Equipment	Noise level (db)	Reference distance
Earth movers		
Front loaders	72-84	0.9 m
Backhoes	72-93	0.9 m
Tractors	76-96	0.9 m
Scrapers, Graders	80-93	0.9 m
Pavers	86-88	0.9 m
Trucks	82-94	0.9 m
Material handlers		0.9 m
Concrete mixers	75-88	0.9 m
Concrete pumpers	81-83	0.9 m
Cranes	75-86	0.9 m
Stationary		0.9 m
Generators	71-82	0.9 m

CONCLUSION

The Traffic Analysis and Feasibility study reveals that effective in encouraging the development of Green field port Cuddalore with facilities planned at strategic locations, especially where significant export volumes exist, or in some cases close to large internal markets.

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