# Planning and operation of freight terminals for large industrial units - Ports

Presented by –
Capt. A K Singh
CEO – Adani Hazira & Dahej Port

# Agenda :

- Indian Govt. Plans for Coastal development– Sagarmala Project
- Interface with Railways – Planning & Operation
- Adani's Interface with Railways
- Issues with Railways

# Indian Government Plans: Sagarmala Project

- The Sagarmala is a series of projects to leverage the country's coastline and inland waterways to drive industrial development.

- The project is mammoth with 150 initiatives with a total outlay of ₹4 lakh crore, spread across four broad areas –

1. modernise port infrastructure, add up to six new ports and enhance capacity.

2. improve port connectivity through rail corridors, freight-friendly expressways and inland waterways.

3. create 14 coastal economic zones or CEZs and a special economic zone at Jawaharlal Nehru Port Trust in Mumbai with manufacturing clusters to enable port-led industrialisation.

4. develop skills of fishermen and other coastal and island communities.

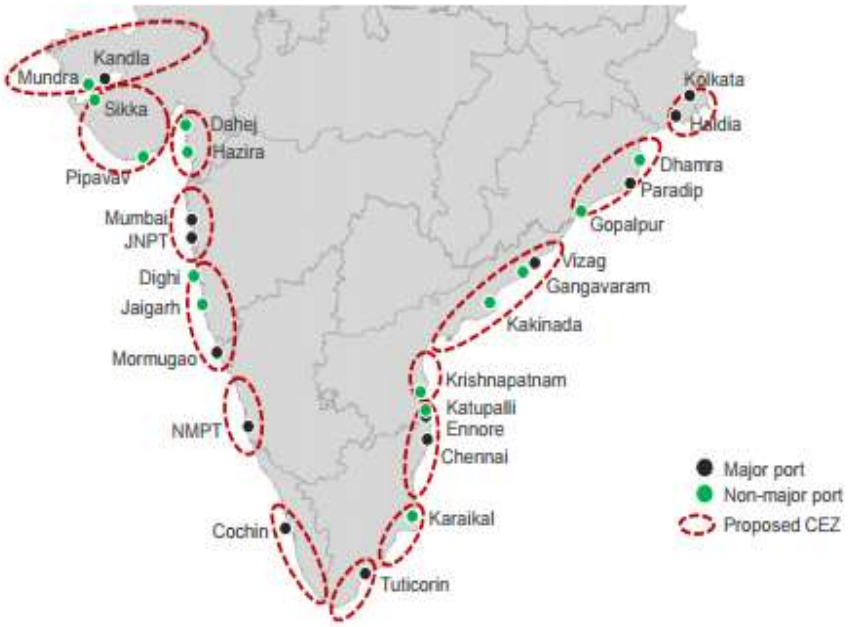
Planning and operation of freight terminals for large industrial units

# Indian Government Plans: Sagarmala Project

**Boost development through ports and shipping-**

- Develop three to four new mega ports
- Develop a world-class transshipment port with a capacity of more than 10 million TEU
- Create additional capacity of 1,200–1,500 MMTPA by strengthening existing ports
- Develop maritime and manufacturing clusters around the ports
- Develop 2–3 port-based smart cities and Coastal Economic Zones

Proposed CEZ in Sagarmala



# Freight Transport Market in India:

- **India spends around 18% of its GDP on logistics and transportation** as compared to less than 8% spent by the other developing countries.
- Indian freight transport market is expected to grow at a CAGR of 13.35% by 2020 driven by the growth in the manufacturing, retail, FMCG and e-commerce sectors.
- In India **road freight constitutes around 63% of the total freight movement** carrying more than 3000MMT (million metric ton) of load annually.
- **Rail freight constitutes around 27% of the total freight movement** in India, carrying more than 1400MMT of load annually.
- With the growth in core manufacturing sector and with the proposed "Make in India" campaigns it is expected that the freight movement of core commodities like iron ore, steel, coal, petroleum etc. will increase at a fast pace. NOVONOUS estimates that **Indian rail freight market will grow at a rate of around 10% CAGR over the next 5 years.**

- As per the Report published by Novonous

# Freight Terminals - Rail Connectivity Planning

- Railway Connectivity for a terminal has to be planned keeping in view the guidelines issued by Railway board and Ministry of Railways vide various circulars, manuals and schedule of dimensions etc.

- Railway connectivity mainly consists of -
  - Take-off / Jn. Arrangement with Indian Railway Network
  - Lead line from take off point to Terminal yard
  - Terminal & Handling Yards

# Freight Terminals - Rail Connectivity Planning

- All existing / indicated facilities should be planned keeping in mind best case future projection. Current business and future growth of the facility must be mapped properly.
- Dove-Tail the same with evacuation facilities of Railways in the region – No Bottle Neck philosophy.
- Prepare a master plan with provision of Phasing out the Project.
- Identify expected growth areas.
- The basic requirement of Railways must be incorporated as per their siding policy.

# Freight Terminals - Rail Connectivity Planning

Basic Infrastructure required at the terminal - **PORTS:**

- Common facility –
  - Receipt & Despatch Yard
  - Brake - Van Siding
  - Carriage & Wagon Examination Facility –if required by Railways
  - Engine Fuelling Point (Diesel Territory)

- Dry Bulk Handling –
  - Tippler
  - Hopper
  - Silo

- Liquid Loading Gantry

- Loading Line (Steel, Container, Fertiliser, Food grains)

- Interchange Yard

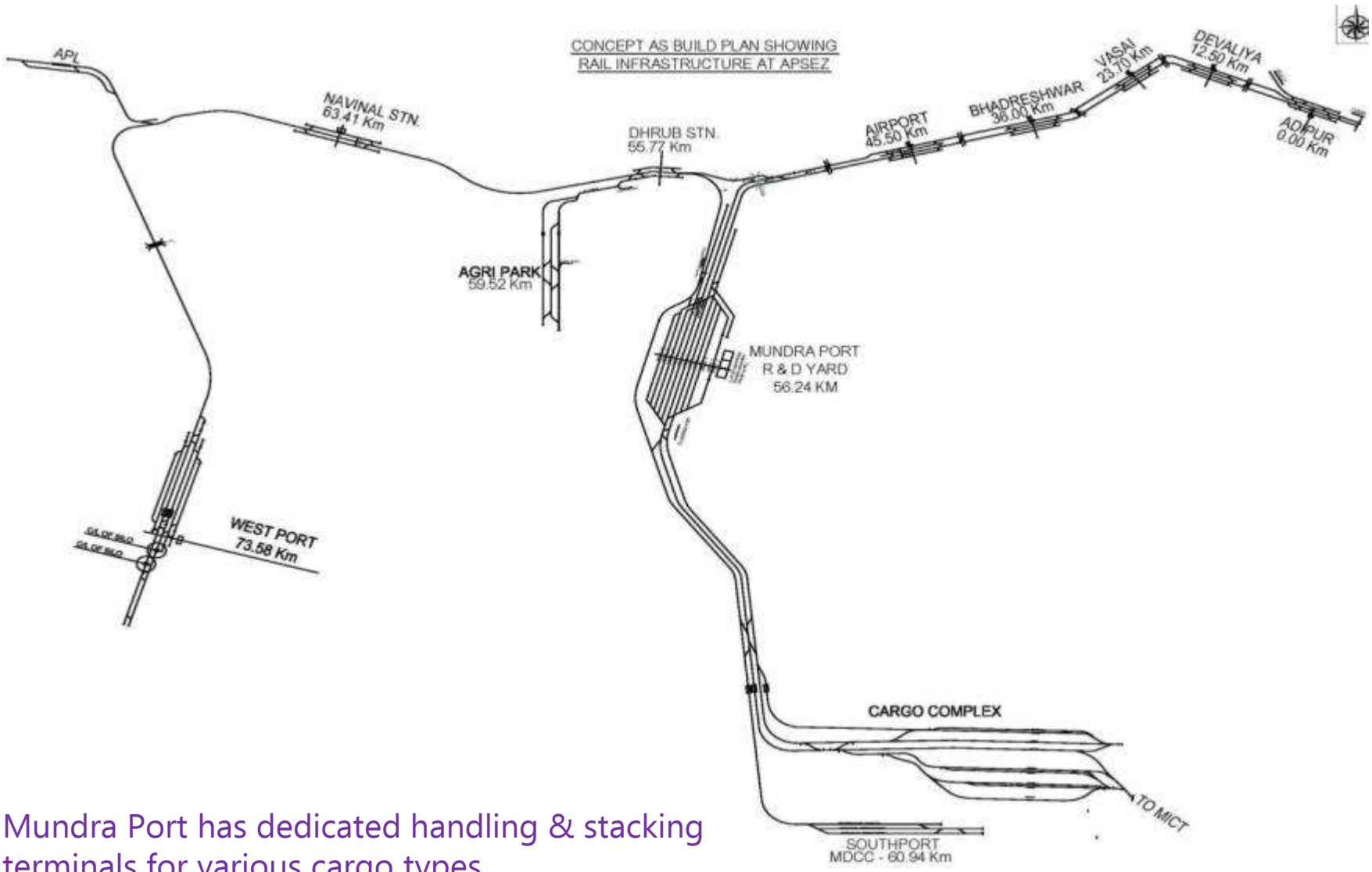
# Freight Terminals - Rail Connectivity Planning

Preparation of documents for Railways -

- Feasibility Report
- Detailed Project Report (DPR)
- Engineering Scale Plan
- Signal Interlocking Plan
- Land Lease Agreement
- Commercial Notification

All the above has to be processed by a gamut of officials (more than 20 layers) both at Divisional & Zonal Railway Level.

# Mundra Port - Existing Railway Key plan

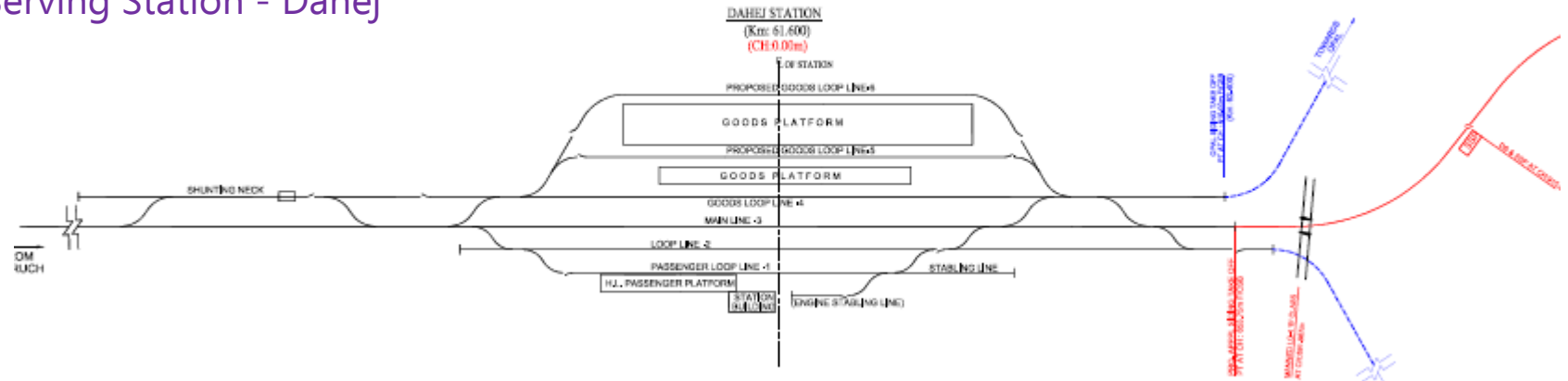



Mundra Port has dedicated handling & stacking terminals for various cargo types

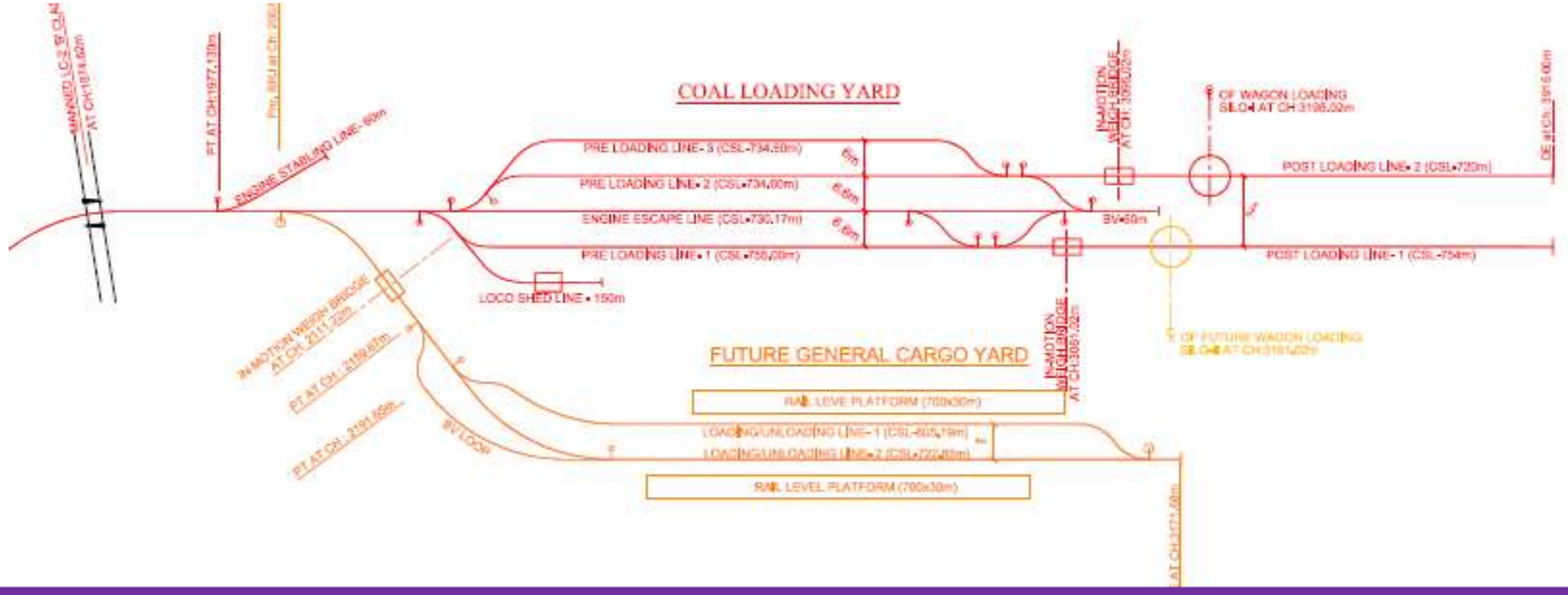
# Dahej Port - Existing Railway Key plan

KEY-PLAN
(NOT TO SCALE)

## Serving Station - Dahej

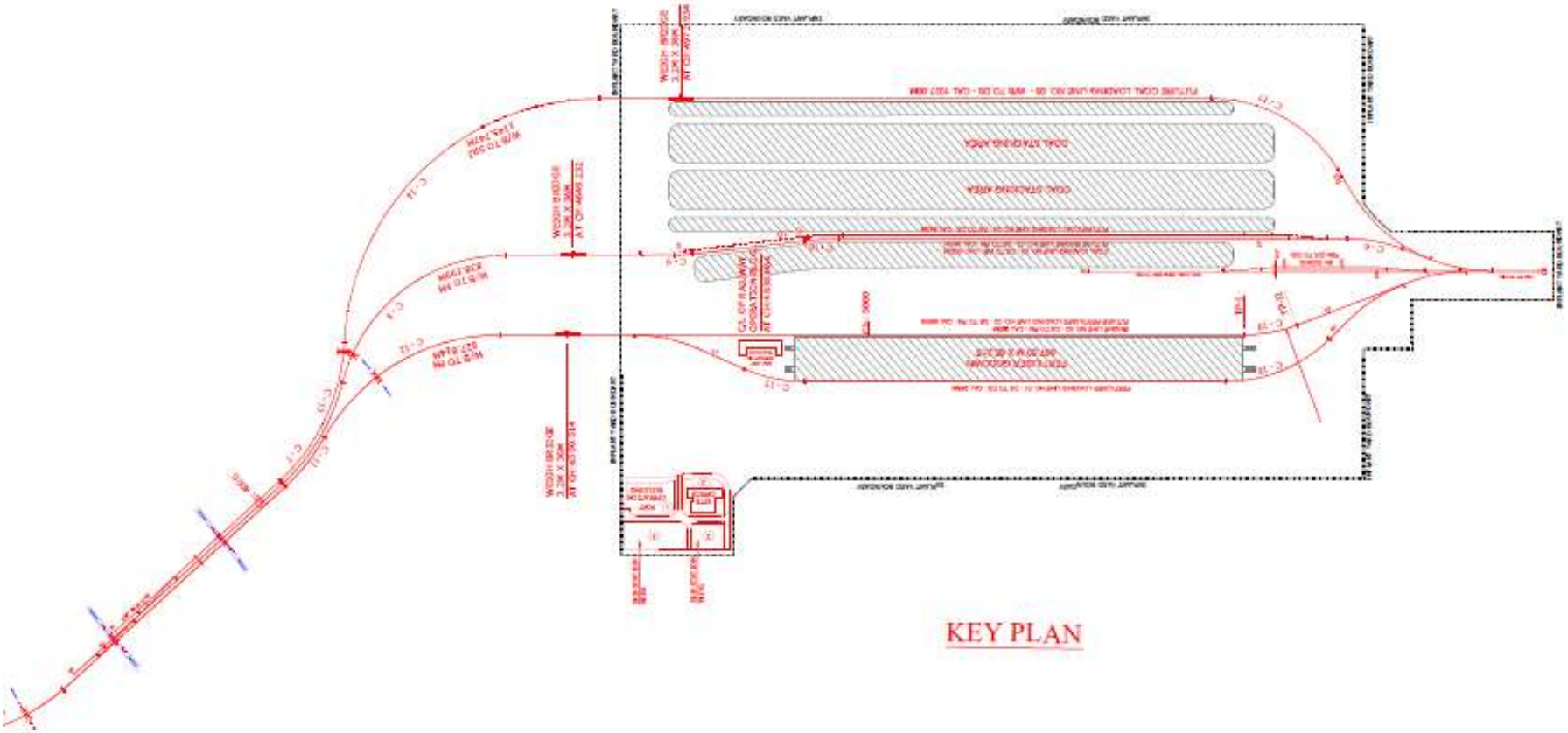



## R&D cum Handling yard

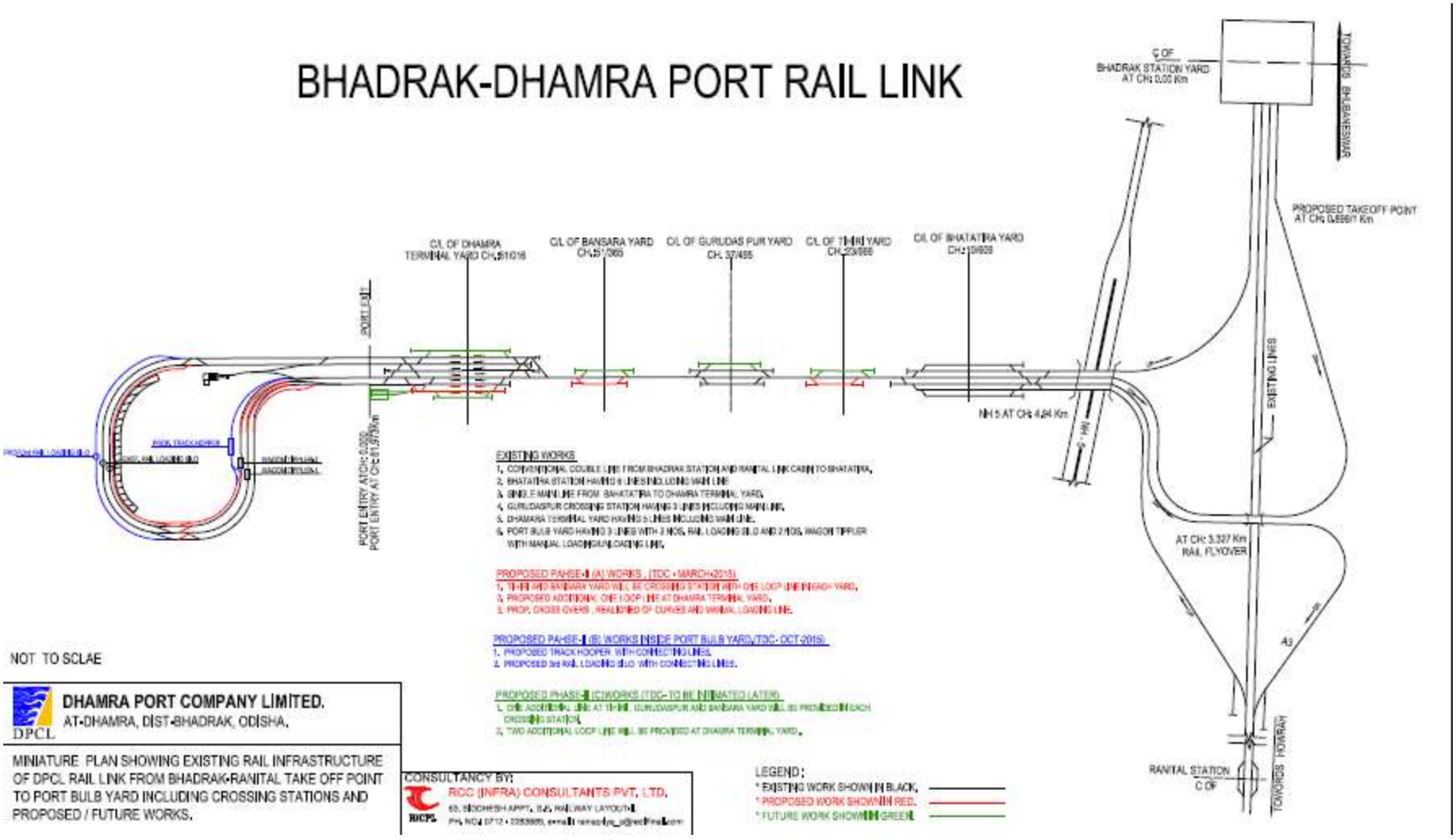



Planning and operation of freight terminals for large industrial units

# Tuna Port - Existing Railway Key plan



# Dhamra Port - Existing Railway Key plan




Planning and operation of freight terminals for large industrial units

# Adani Hazira Port – Master Plan

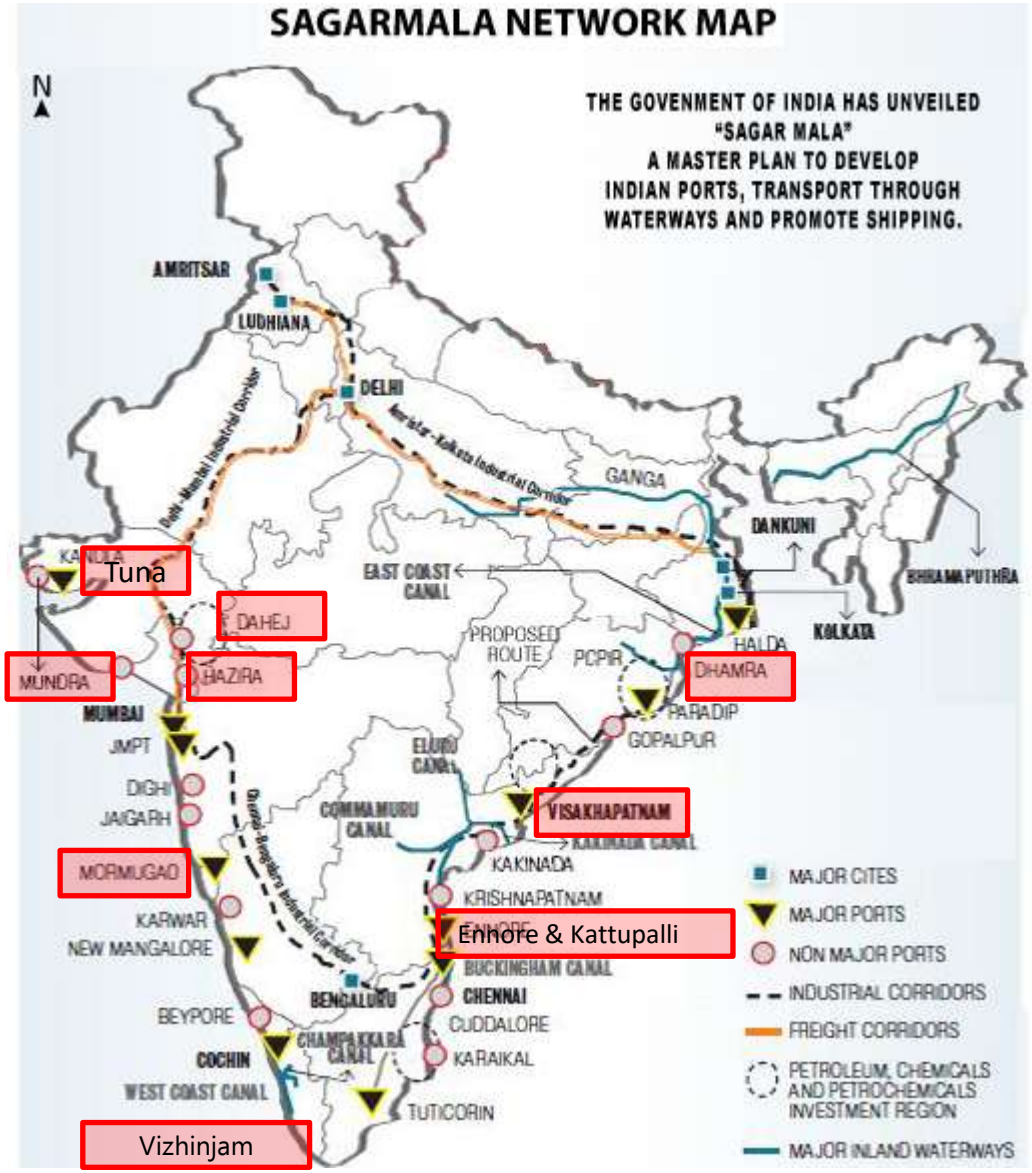
# Major Yard Operations:

RAILWAY YARD OPERATIONS COMPRISES OF TWO MAIN ACTIVITIES:

1. INTERNAL RAIL OPERATIONS –
   - The internal operations require utilisation of either the railway locomotive or company's own locomotive.
   - For major yards such as Mundra, Dhamra Port with multiple operations/loading, un-loading points there is no alternative but to have own locos.
   - The loading/un-loading facilities comprise of wagon tippler, track hopper for unloading bulk cargoes. Silo for loading of Bulk cargoes & RMCGs for container handling.
   - The yard will also have facilities for manual loading/unloading.

2. COORDINATION WITH CONCERNED DIVISIONAL AND ZONAL RAILWAY .

# APSEZ presence on the Indian Coast :

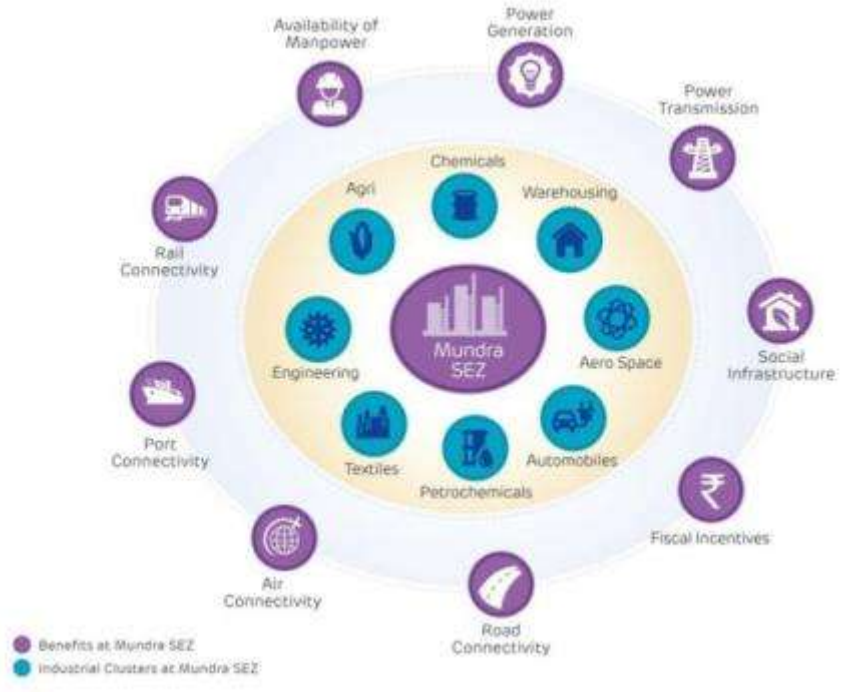



Planning and operation of freight terminals for large industrial units

# The Mundra template for port based manufacturing center:

<u>Integrated Infrastructure</u>

- Offering land in SEZ, DTA and FTWZ with cluster based zoning
- Excellent integrated utilities such as power, water, CETP
- Quality social infrastructure facilities - housing, education, healthcare and recreation
- Multi-modal connectivity with sea, air, rail and road linkages



| Year | 2011-12 | 2012-13 | 2013-14 | 2014-15 | 2015-16 |
|---|---|---|---|---|---|
| Cargo Throughput (In MMT) | 67.40 | 81.69 | 100.87 | 110.53 | 108.70 |
| Cargo Handled by Rail (In MMT) | 18.59 | 19.59 | 20.77 | 24.91 | 19.00 |
| No. of Rakes Handled | 7948 | 9479 | 10211 | 11524 | 10301 |

Planning and operation of freight terminals for large industrial units

# Mundra : Largest Private Port of India

## Cargo evacuation through Rail:

| | 2011-12 | 2012-13 | 2013-14 | 2014-15 | 2015-16 |
|---|---|---|---|---|---|
| Dry | 12.71 | 11.15 | 10.71 | 13.59 | 7.51 |
| Liquid | 0.02 | 0.01 | 0.02 | 0.00 | 0.00 |
| Container | 5.86 | 8.43 | 10.04 | 11.31 | 11.49 |
| Total Rail Cargo | 18.59 | 19.59 | 20.77 | 24.91 | 19.00 |
| Total Cargo Handled | 67.40 | 81.69 | 100.87 | 110.53 | 108.70 |
| % Rail | 28% | 24% | 21% | 23% | 17% |
| % Dry | 68% | 57% | 52% | 55% | 40% |
| % CT | 32% | 43% | 48% | 45% | 60% |

# Dry Movement through Rail:

Planning and operation of freight terminals for large industrial units

# Container Movement through Rail:

# Liquid Movement through Rail:

# Adani's Interface with Railway:

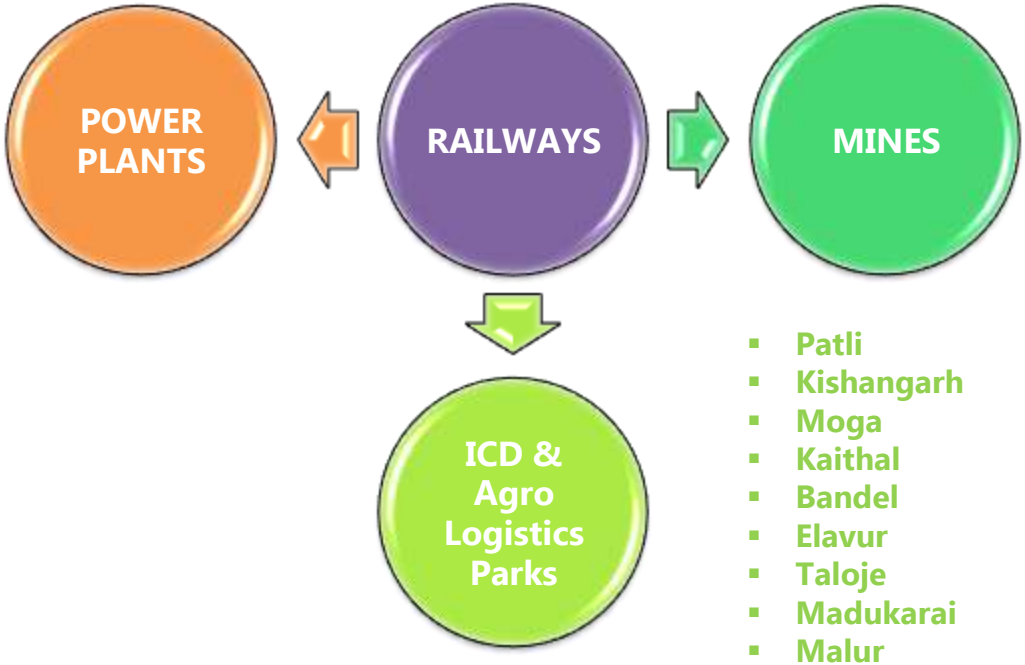
**Adani Ports & SEZ Operates out of a number of Railway linked Facilities which includes-**

- PORTS
- ICD'S
- POWER HOUSE
- AGRI LOGISTICS SIDINGS
- MINES

**Besides the above APSEZ is also a part of specific JVs –**

- KUTCH RAILWAY COMPANY LTD-SAMAKHIYALI-PALANPUR
- BHARUCH DAHEH RAILWAY COMPANY LTD-BHARUCH-DAHEJ
- NON GOVERNMENT RAILWAY JV WITH KANDLA PORT-TUNA-GANDHIDHAM-TUNA PORT.

# Adani Group Railway Interface




- Mundra
- Hazira
- Dahej
- Vishakhapatnam
- Mormugao
- Tuna
- Ennore
- Dhamra
- Katupalli
- Vinjinjham

- Mundra
- Tiroda
- Kawai
- Chindwara
- Bhadreshwar
- Raigarh
- Udupi
- Godda

- Parsa Kente
- Machhakata
- Jitpur

- Patli
- Kishangarh
- Moga
- Kaithal
- Bandel
- Elavur
- Taloje
- Madukarai
- Malur
- Kila Raipur

Planning and operation of freight terminals for large industrial units

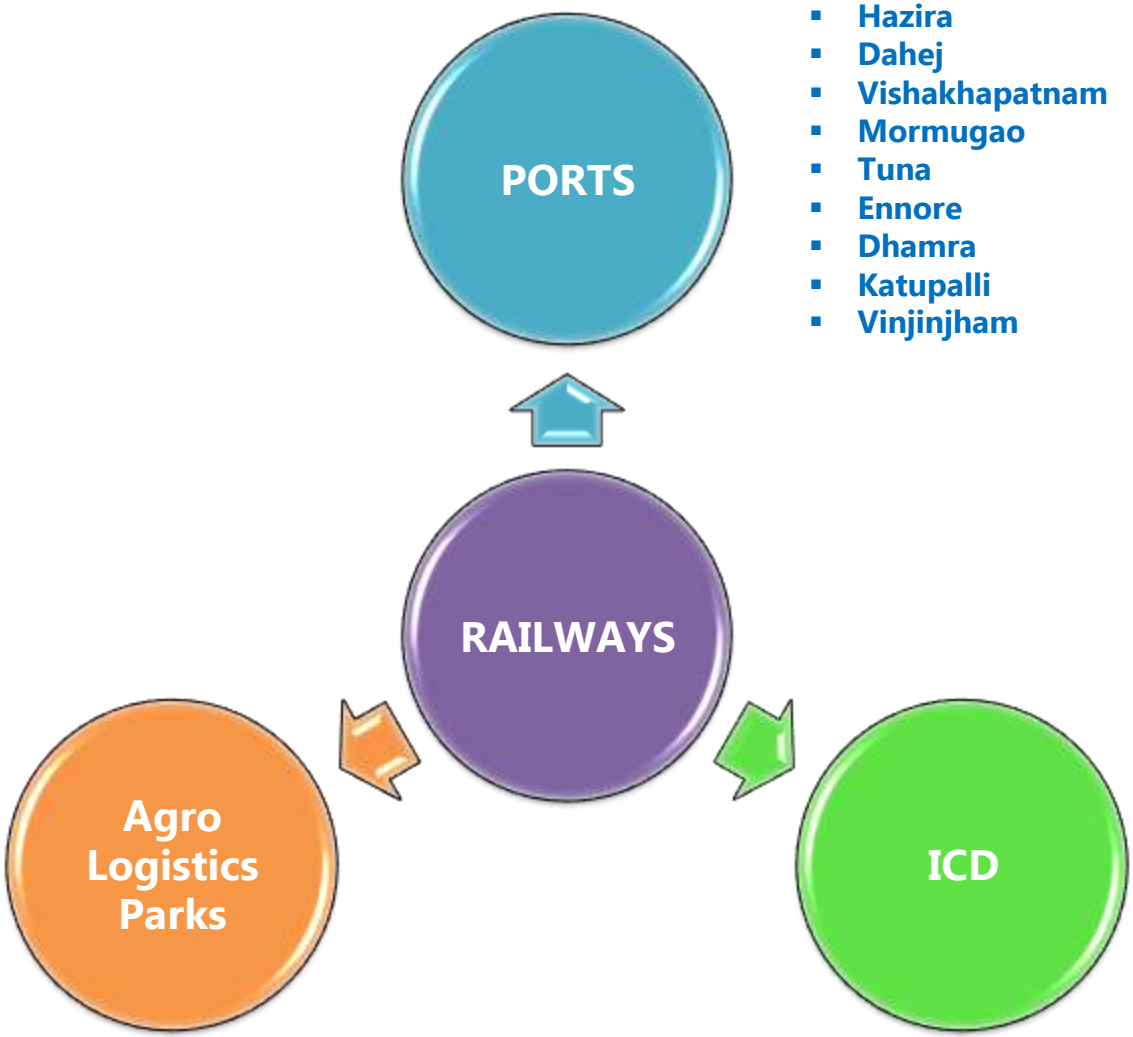
# Adani Group Railway Projects

## TOTAL TRACK LENGTH

**** Figures in TKM***

| Sr. No. | Project Location | Commissioned | Under Execution | Under Planning | Total |
|---|---|---|---|---|---|
| 1 | PORTS | 350 | 27 | 292 | 669 |
| 2 | POWER PLANTS | 72 | 40 | 83 | 195 |
| 3 | MINES | 43 | 60 | 38 | 141 |
| 4 | ICDs | 8 | 4 | 4 | 16 |
| 5 | FCI DEPOTs | 27 | - | - | 27 |
| | **TOTAL** | **492** | **131** | **417** | **1040** |

# APSEZ Railway Interface




- Mundra
- Hazira
- Dahej
- Vishakhapatnam
- Mormugao
- Tuna
- Ennore
- Dhamra
- Katupalli
- Vinjinjham

- Moga
- Kaithal
- Bandel
- Elavur
- Taloje
- Madukarai
- Malur

- Patli
- Kishangarh
- Kilaraipur

Planning and operation of freight terminals for large industrial units

# APSEZ Railway Projects

## TOTAL TRACK LENGTH

**** Figures in TKM***

| Sr. No. | Project Location | Commissioned | Under Execution | Under Planning | Total |
|---|---|---|---|---|---|
| 1 | Mundra | 220 | 9 | 110 | 340 |
| 2 | Dahej | 7 | - | - | 7 |
| 3 | Hazira | - | - | 92 | 92 |
| 4 | Vizag | 2 | - | - | 2 |
| 5 | Tuna | 11 | 1 | 2 | 14 |
| 6 | Ennore | - | - | 8 | 8 |
| 7 | Dhamra | 110 | 17 | 80 | 207 |
| | **TOTAL** | **350** | **27** | **292** | **669** |

# APSEZ : Snap shots

SouthPort

Adipur-MundraDouble Line

WestPort

Agri Park

Planning and operation of freight terminals for large industrial units

# APSEZ : Snap shots

## COAL LOADING THROUGH SILO AT WEST PORT & DAHEJ

# APSEZ : Snap shots

## BALLAST PACKING BY TTM AT MUNDRA

Planning and operation of freight terminals for large industrial units

# APSEZ : Snap shots

## RE-LOCATION OF EXISTING TURNOUT IN RUNNING LINES THROUGH T-28 MACHINE

# APSEZ : Snap shots

PANEL ROOM

# APSEZ : Snap shots

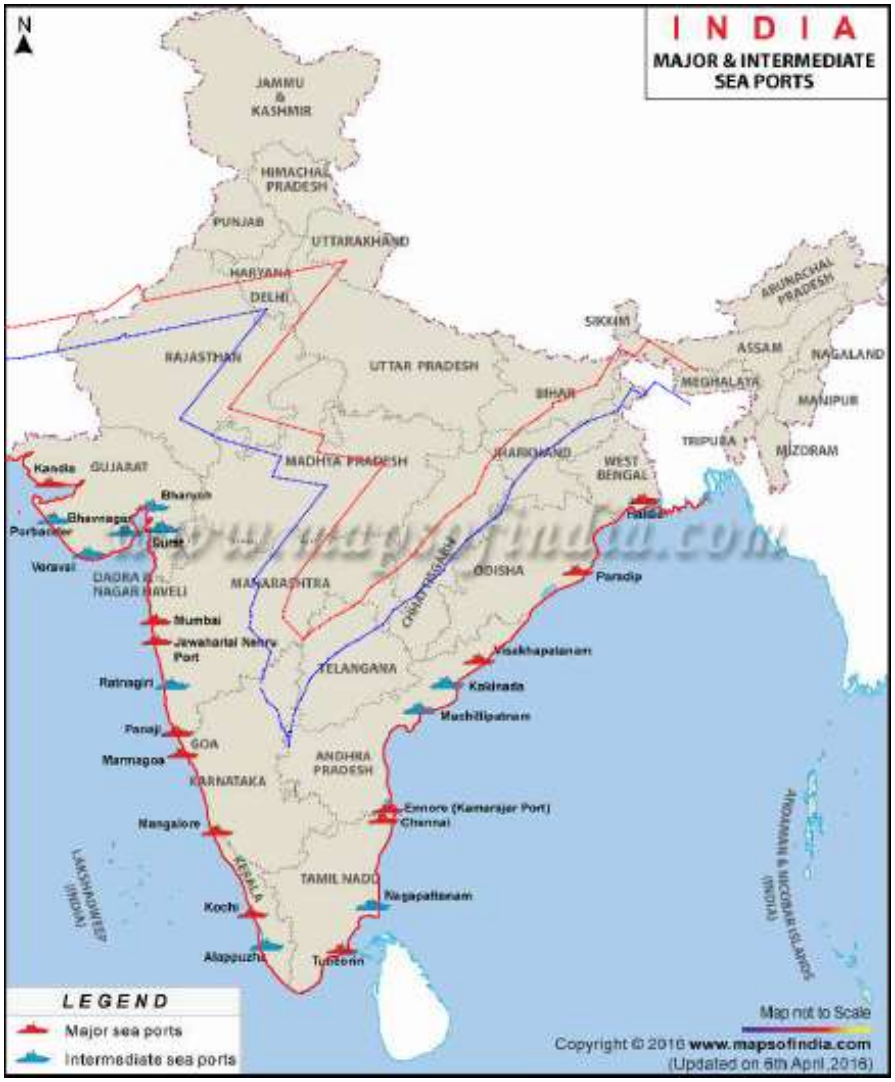
## OHE WORKS

Planning and operation of freight terminals for large industrial units

# APSEZ : Snap shots

## SIDING AT KILARAIPUR

# Hinterland mapping for Indian Ports




Immediate hinterland area where road movement is viable over rail.

300 Kms

400 Kms

# Indian Railways: Issues

- **Railways is a State monopoly. Many problems have their genesis in this single issue. Zones do not operate as business entities but as regulatory & administrative bodies.**
- In the competitive environment freight cost is a very important factor. On one hand shipping freight is down. On the other hand railway freight has become un-viable. Railways have reduced port congestion charges but the damage has already been done. ICD rail traffic is down to 18% from the earlier 27%.
- New policies to attract port connectivity by rail were not implemented in the spirit of the policy. eg. Participative Models e.g. Non-Government Railway (NGR) taken up by Adani at Dhamra, Tuna and Mundra. Example - apportionment of freight policies diluted resulting in under payment to the developer.
- Extraction of arrears by the Railways is in retrospect but all payment to the developer are without considering retrospective effect. All this results in trust deficit issues between the Railways and Developer.
- No support by the railways in land acquisition for connectivity from port to the main line.
- Application of old railway rules in port area when it comes to either development or upgradation of infrastructure; commercial rules; weigh-bridge calibration, certification for construction. etc.

# Operational Constraints in handling of Imported Coal :

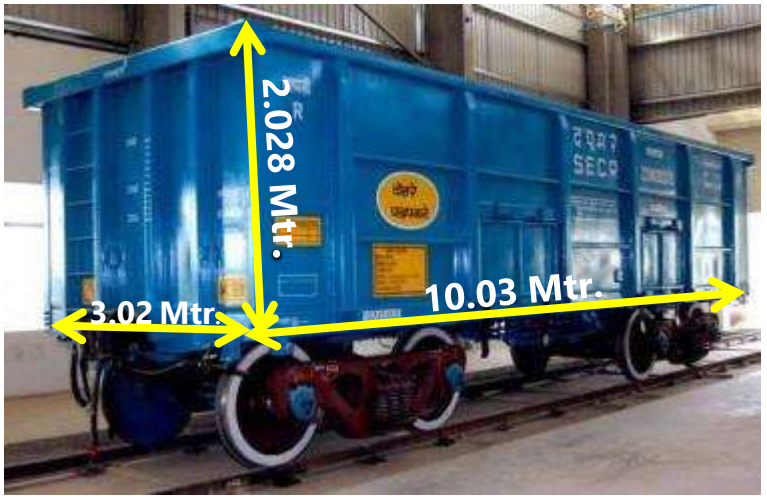
1. Indian Railway has increase carrying capacity of BOXN wagon by 17% from 58 MT in 2004 to 68 in 2012.

2. Carrying capacity for all type of coal is kept same, irrespective of large variation of difference in density of Indian coal and imported coal.

| Inherent Property | Indian Coal | Imported Coal |
|---|---|---|
| Ash Content : | 30% to 45% | 8% to 12% |
| Caloric value | 3300 to 4500 | 5000 to 6500 |
| Bulk Density (gm/cc) | 1.25 to 1.45 | 0.8 to 0.929* |

Source : Report of the group for studying range of blending of imported coal with domestic coal, Central Electricity authority.

BOXN wagon

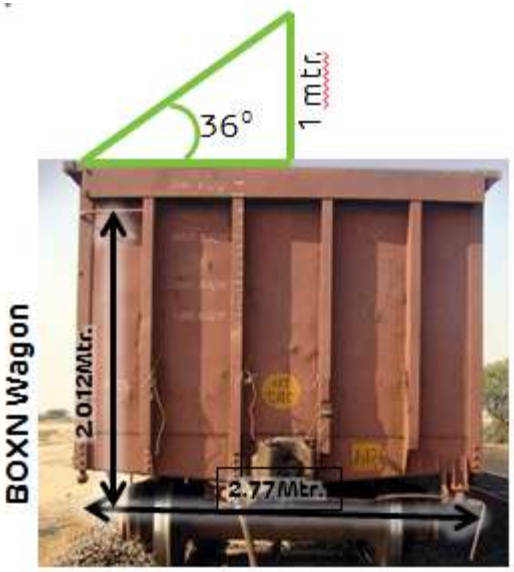



BOXN HL wagon

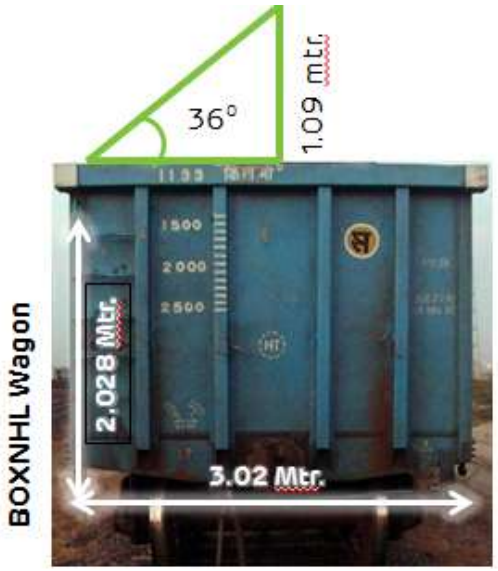
| | BOXN | BOXNHL |
|---|---|---|
| Carrying Capacity | 68.00 | 70.00 |
| Cube Capacity | 54.99 | 61.49 |

BOXN HL Wagon is 10% larger then BOXN wagon.

# Operational Constraints in handling of Imported Coal :




Total available volume including 1 mtr. heap loading is 65.15 Cube mtr. To accommodate 68 MT of coal with 0.93 density, total 71 cube mtr. Area is required. So, Maximum 61 MT of coal can be loaded without manual compacting. Dead freight of 7 MT. Depending on density, dead freight would change.




Total available volume including 1.09 mtr. heap loading is 73.11 Cube mtr. To accommodate 70 MT of coal with 0.93 density, total 73 cube mtr. Area is required. So maximum 68 MT can be loaded. Dead freight of 2 MT. Depending on density, dead freight would change.

# Operational Constraints in handling of Imported Coal :

| Wagon Type65 | Length | Width | Height | PCC in MT | Cube Capacity in M3 | Cube capacity with heap in MT |
|---|---|---|---|---|---|---|
| BOXN | 9845 | 2777 | 2012 | 68 | 54.99 | 60 |
| BOXNHL | 10034 | 3022 | 2028 | 70 | 61.49 | 68 |

- Cube Capacity of BOXN wagon is lesser by 10% of BOXN HL, though carrying capacity for coal is only 2.85% less.
- Even with heap loading, achieving 68 MT of carrying capacity in BOXN wagon is very difficult.

# Operational Constraints in handling of Imported Coal : BOXN Wagon

**Rapid Wagon Loading System (WLS)**

- Under rapid wagon loading system, free fall coal loading takes place.
- It is not possible to load 68 MT of imported coal as no compaction takes place in free flow loading by WLS

**Loading of Coal with Excavator**

- Image of BOXN wagon loaded with **Imported coal.** Height of 3 feet to above brim level required to achieve CC of 68 MT.
- Requires compaction while loading which is done by excavator (manual operation). Leads to detention and imprecise operation.

Customers are bearing huge dead freight if cargo up to brim level is loaded.

# Operational Constraints in handling of Imported Coal : HL Wagon

**Rapid Wagon Loading System (WLS)**

- Due to more cubic capacity, more cargo (up to 68 MT) can be loaded.
- No damage to wagon, environment friendly, speedy and efficient wagon loading system.

**Loading of Coal with Excavator**

- Image of BOXNHL wagon loaded with **Imported coal.** Height of 2.5 to 3' above brim level required to achieve CC 70 MT mechanically.
- Less Compaction required during mechanical loading by excavators.

# Operational Constraints in handling of Imported Coal :

Image of BOXN wagon loaded with **Indian Coal**, it is evident that Indian coal can be loaded well within brim level and PCC can be achieved.

**No compaction required** due to higher density of Indian coal

- Imported coal with lesser density cannot be loaded even by loading up to 3' above brim level due to its inherent angle of repose which makes the coal slide out.
- Problem is aggravated by increase in tare weight of old wagons due to numerous patch work repairs which results in reduced loadability.

# THANK YOU

adani™