



LNG TERMINAL AT GANGAVARAM

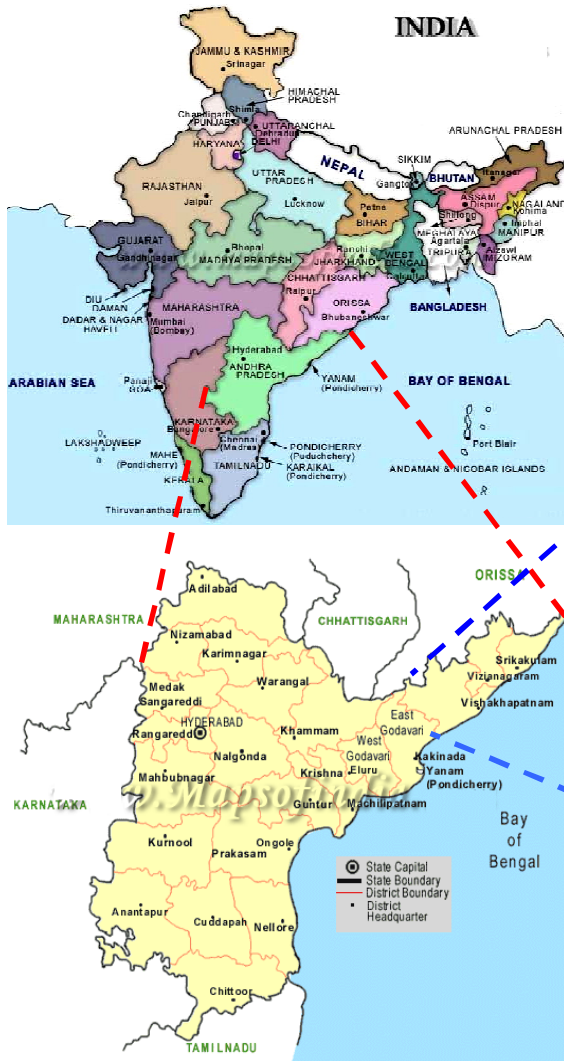


Capt. Sanjay Gupta
Petronet LNG Limited

OVERVIEW

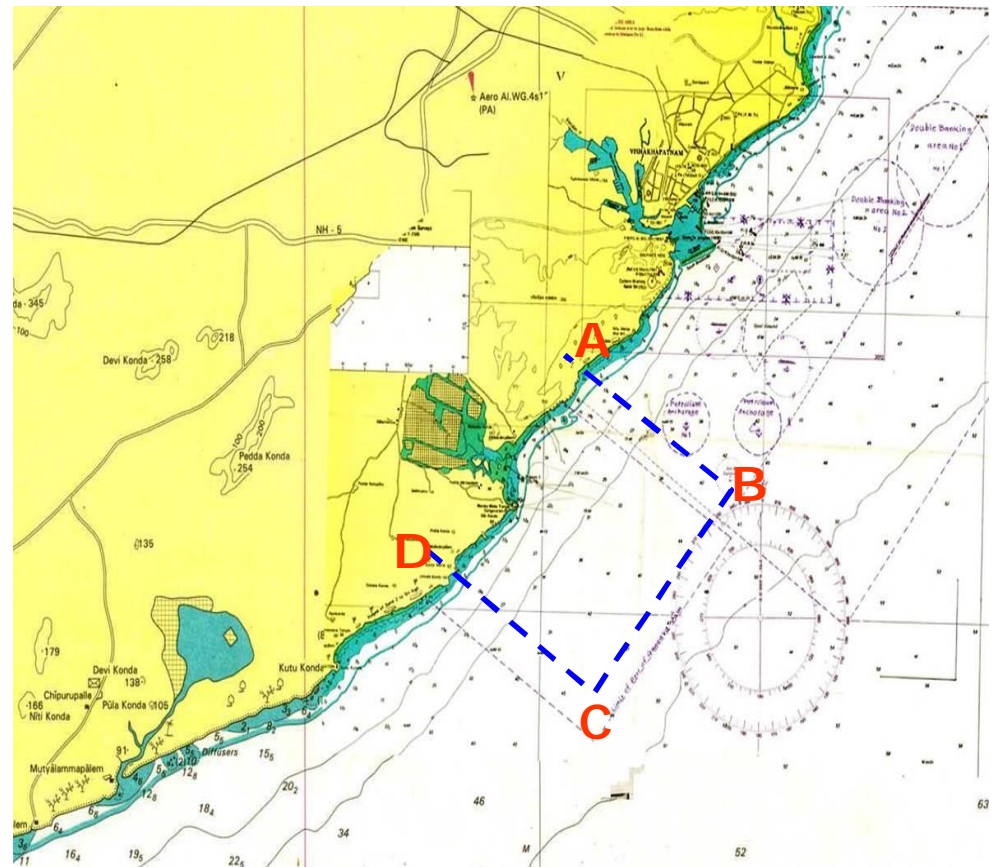
- Proposed location of Gangavaram Port
- Proposed LNG and Marine Facilities
- Implementation Methodology
- Status of Activities completed, Pipe line connectivity and Customer Tie-up
- Market Study and Demand Assessment
- Required Support of State
- Kakinada – Srikakulam Pipeline Route and East Market, MBBV and East West Pipeline

PROPOSED PROJECT LOCATION



GANGAVARAM PORT

- Gangavaram Port is a protected port which is an added advantage in setting up LNG terminal.
- Gangavaram is in proximity of major industries such as Vizag Steel plant, Vizag refinery etc which need eco-friendly fuel to operate.
- Gangavaram Port is one of deepest ports in South-East Asia (20 m).
- Port is in operation since 2008.



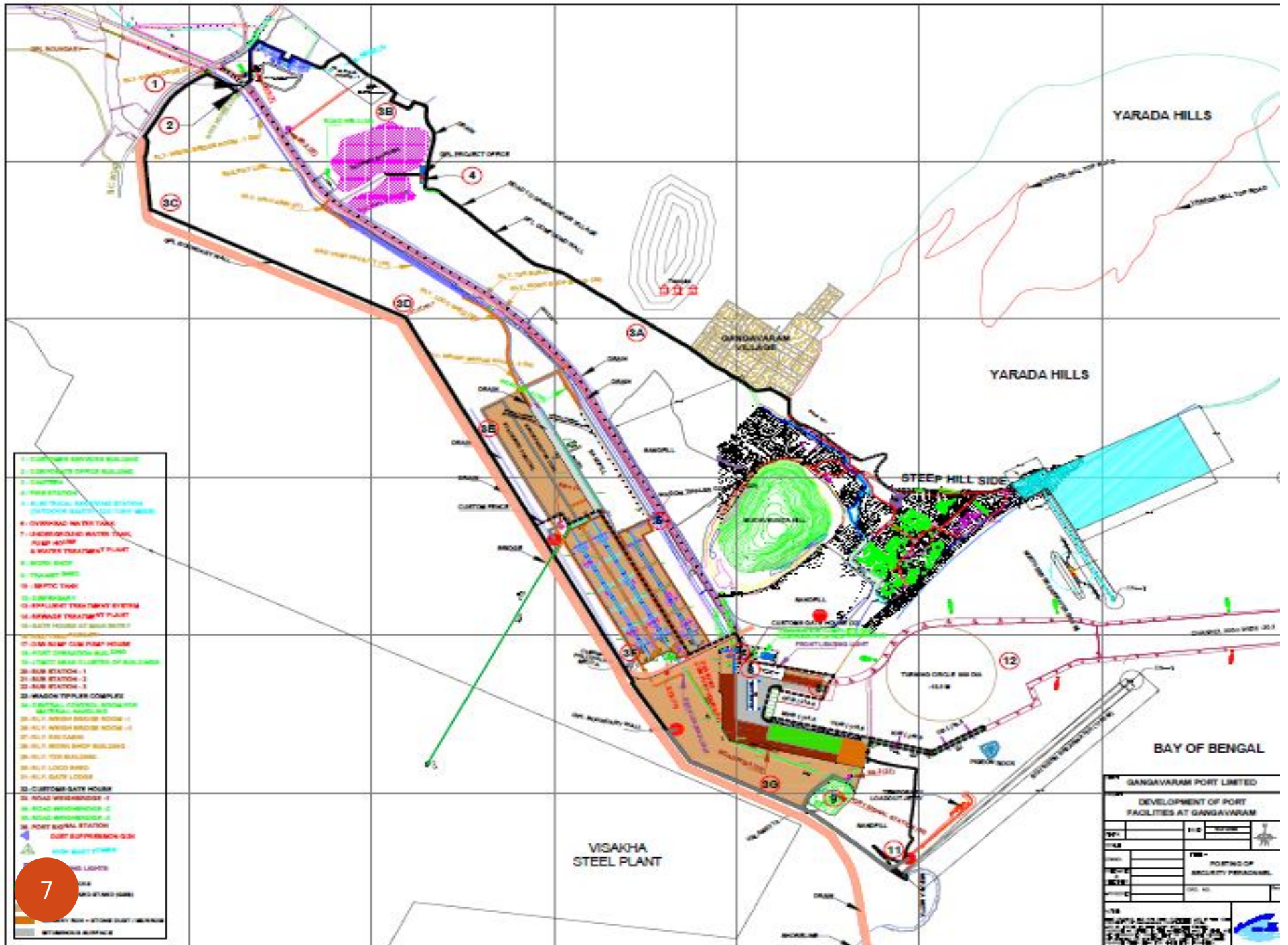


GANGAVARAM PORT

- Gangavaram Ports Ltd. (GPL) is Joint venture between state Govt. of AP India and a consortium on a PPP model.
- Gangavaram Port is located at about 15 kms South of Vishakhapatnam port. Nearest major airport is Visakhapatnam.
- Port has proximity to major industrial and mineral belts of Eastern and Central India.
- Port is connected to the main broad gauge national network of Chennai - Vishakhapatnam Howrah rail corridor. Road connectivity is by a 4 lane expressway of 3.8 kms connecting the port with national highway No. 5 (Chennai - Kolkatta).

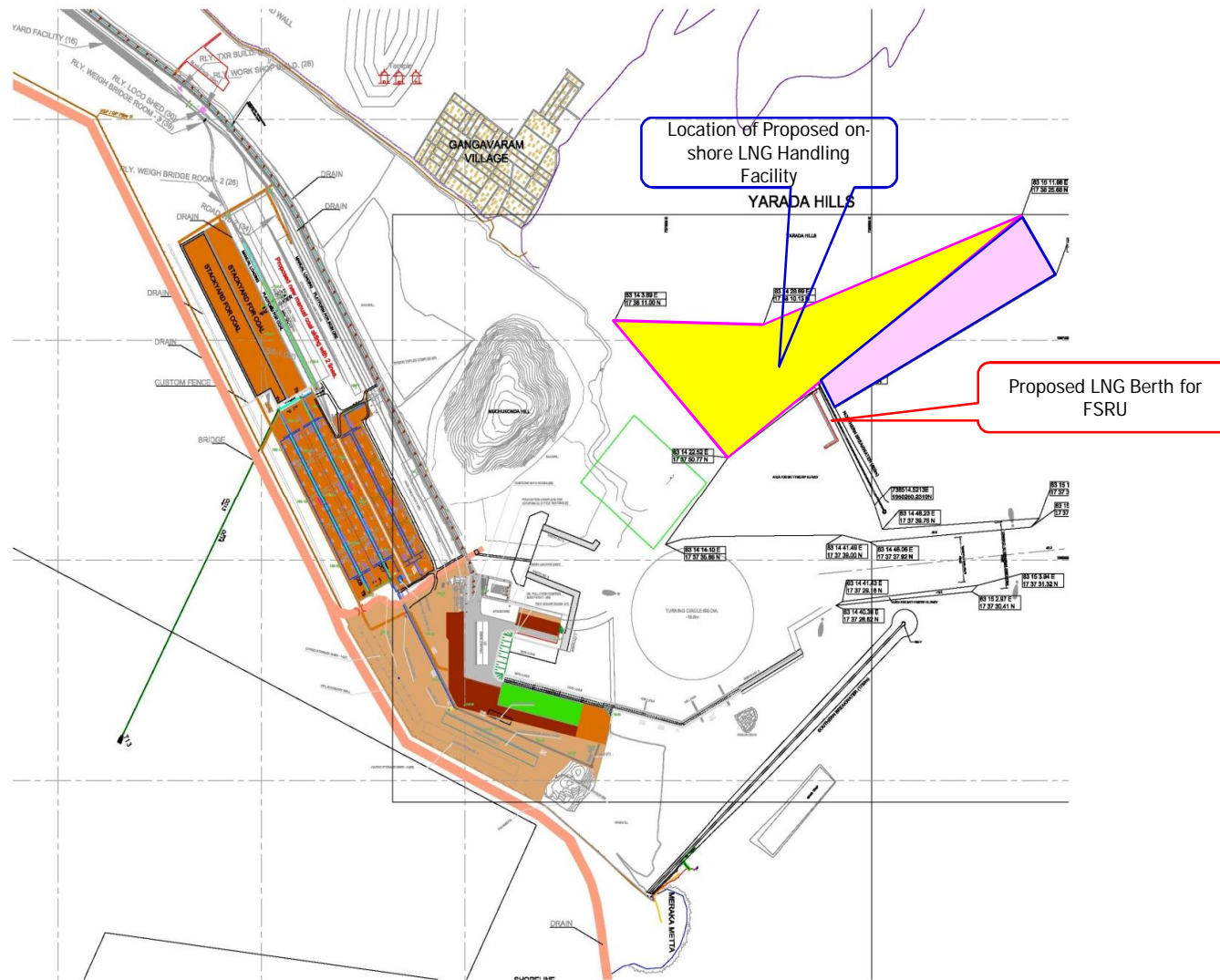
GOOGLE MAP





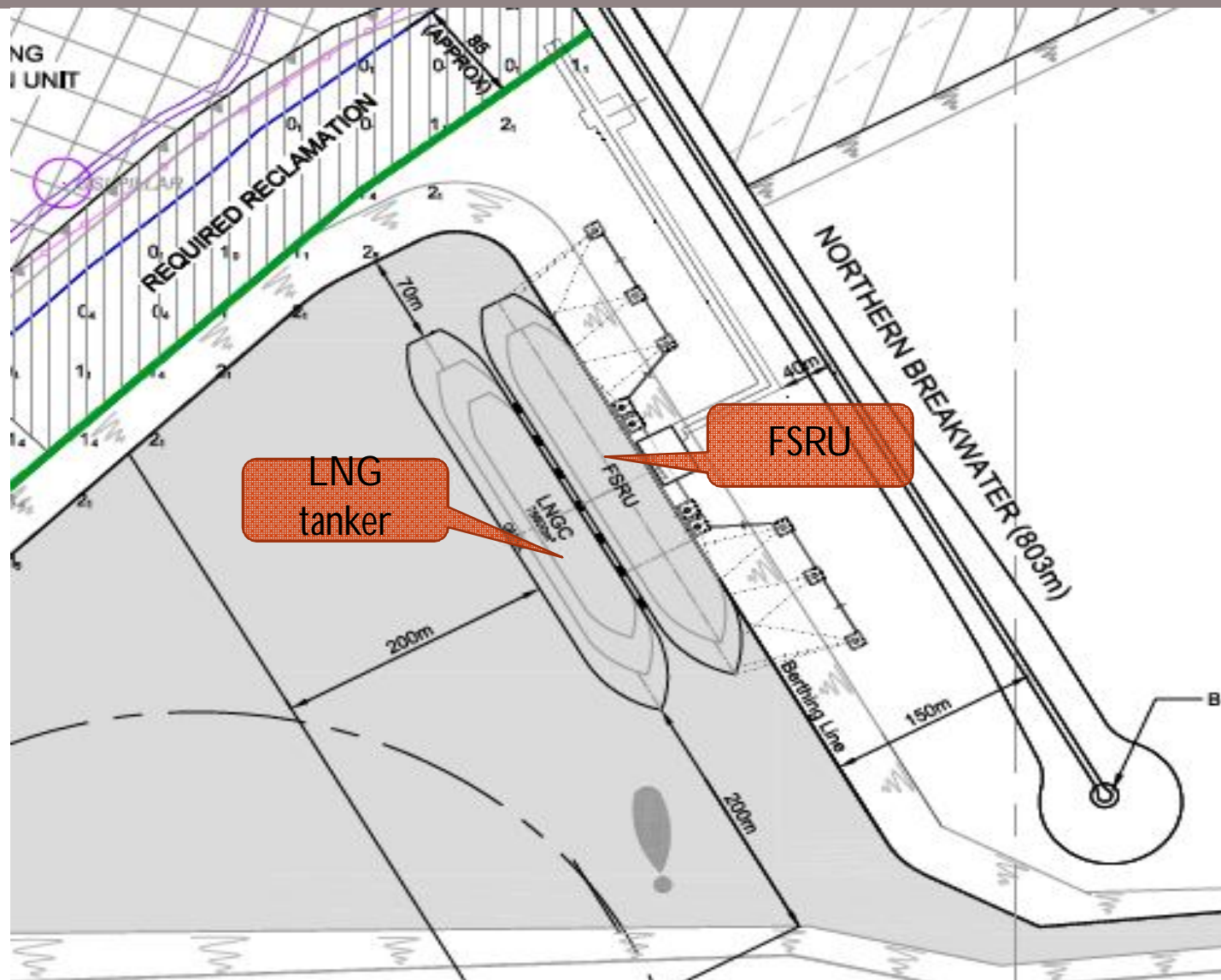
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PROPOSED LNG FACILITY





LNG Marine Facility Preliminary Layout Offshore





PROJECT STATUS

- Term sheet executed with Gangavaram port.
- Feasibility study completed
- Environment clearance obtained.
- FEED completed.
- Expected completion of marine facilities 1st quarter 2018.



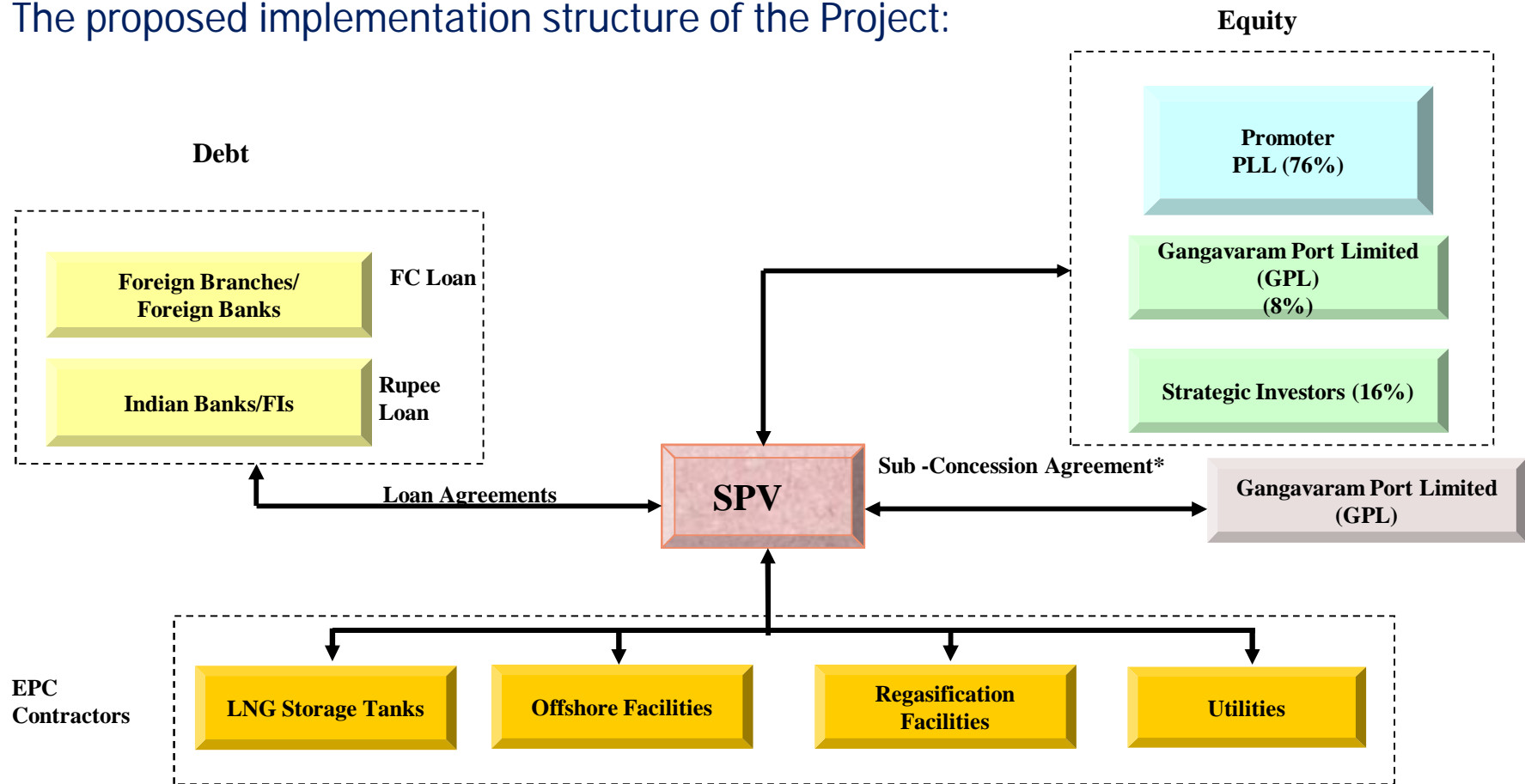
GANGAVARAM TERMINAL

- LNG terminal to be developed as SPV with GPL as partner
- 5 mmtpa onshore terminal proposed. Can be ready in about 36 months from award of EPC contracts
- Facilities to include 2 Storage tanks, marine & regasification facilities
- Estimated cost of Rs 4,500 crore
- To commence earlier supplies, FSRU option being examined

Commitment of minimum 2 mmtpa (8 mmscmd) offtake of gas required to proceed with the project construction

PROJECT IMPLEMENTATION METHODOLOGY

➤ The proposed implementation structure of the Project:



*A term sheet has been signed between PLL & GPL. Other agreements to implement the commercial terms agreed in the term sheet, to be signed subsequently



STATUS – ACTIVITIES COMPLETED

➤ Activities Completed

- Collection of all site specific data (e.g. soil data, geo-technical data)
- Preparation of FEED for the three packages
 - Package 1: Marine Facilities
 - Package 2: Regas Facilities
 - Package 3: LNG Storage Tanks
- Tender document for selection of EPC Contractors
- Pre- Qualification Bids have been received
- Preparation of Business model through SBI Capital Markets Limited
- NOC from PESO (CCoE, Nagpur) and APCZMA obtained
- Environment clearance from the MOEF received
- Approval from GoAP received



STATUS – PIPELINE CONNECTIVITY

- Communication sent to APGDC for connectivity with Kakinada – Srikakulam pipeline
- Discussions also held with RGTIL and GITL for connectivity with East-West and Mallavaram-Bhilwara Pipelines
- Multiple connectivity will ensure smooth evacuation– State Government may facilitate

Binding agreements for pipeline connectivity in a defined time frame required for project viability



STATUS – CUSTOMER TIE UP

- Customer tie-up
 - Market assessment carried out through CRISIL
 - Customer meetings organized at Hyderabad and Vizag
 - Detailed discussions held with HPCL (Vizag refinery), Essar Steel, RINL, Nagarjuna Fertilisers and power plants of GVK, GMR, Lanco and Reliance
 - Power sector demand – being highly price sensitive – has not been considered in our projections
 - Power sector demand necessary to capture to make project viable
 - Discoms required to commit 1 mmtpa offtake of LNG based power for a minimum period of 10 years to take care of project

MARKET STUDY IN AP & TELANGANA

PLL appointed CRISIL for conducting primary survey in AP and Telangana to assess demand for natural gas from large industry consumers

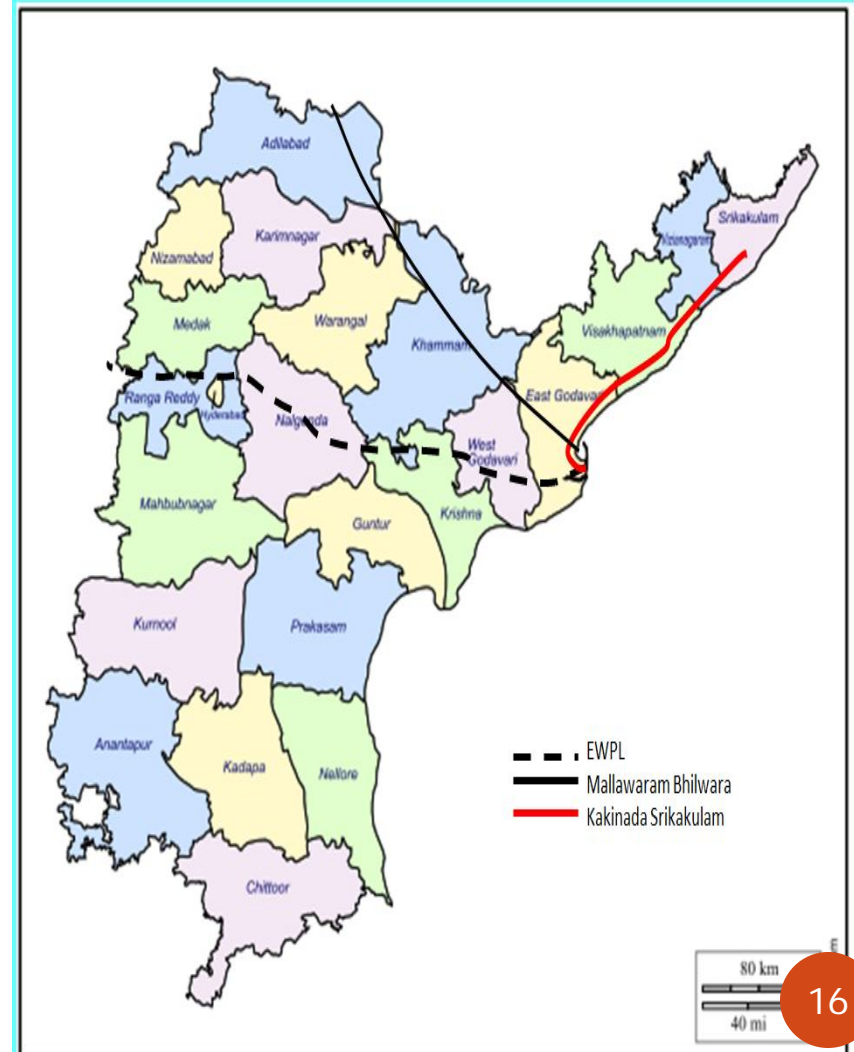
Districts in AP and Telangana were shortlisted based on their accessibility to the natural gas trunk pipelines:

- **East West Pipeline (EWPL)** (Existing)
- **Mallavaram – Bhilwara Pipeline** (Proposed)
- **Srikakulam – Kakinada Pipeline** (Proposed)

A list of key districts selected for primary survey based on the industrial presence in these districts

Districts	State
East Godavari	Andhra Pradesh
Krishna	Andhra Pradesh
Medak	Telangana
Nalgonda	Telangana
Rangareddy	Telangana
Srikakulam	Andhra Pradesh
Vishakhapatnam	Andhra Pradesh
Vizianagaram	Andhra Pradesh
West Godavari	Andhra Pradesh

Natural Gas Trunk Pipelines in AP & Telangana

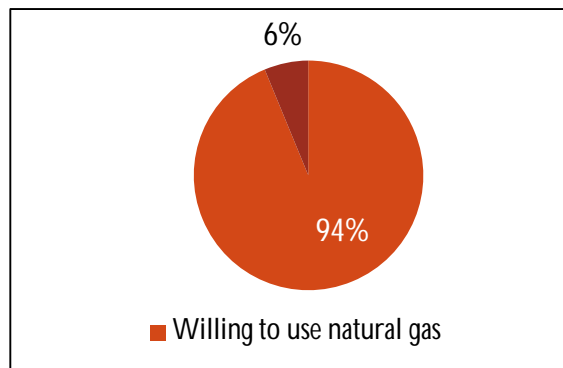


INDUSTRY CONSULTATION WORKSHOPS

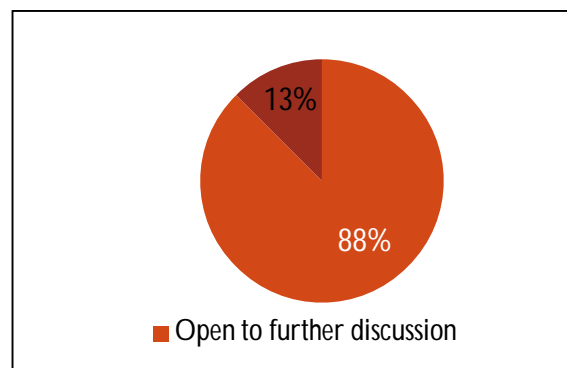
- Industry Consultation Workshops conducted in **Hyderabad** and **Visakhapatnam** to understand the exact nature of natural gas demand from consumers and issues/constraints linked to natural gas supply

Workshop	Industry sector participants	Power sector participants
Hyderabad	10	15
Visakhapatnam	26	0

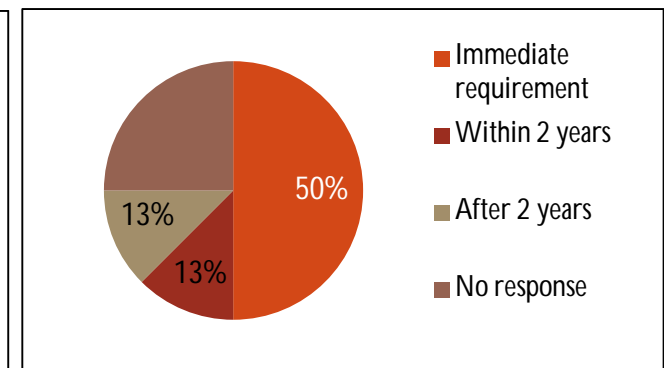
Feedback from industry participants



~ 95% participants indicated that they are willing to use natural gas



~90% participants indicated that they would like to be contacted further



50% participants indicated an intention to shift to natural gas immediately



NATURAL GAS DEMAND ASSESSMENT: RESULTS

- Fuel requirement data collected for 60 energy intensive units in AP & Telangana through primary survey
- Unconstrained demand potential of ~7 MMSCMD estimated from the surveyed units with a convertible demand potential of ~ 3 MMSCMD from these units

District	State	Industry Units Surveyed	Unconstrained Demand in mmscmd
East Godavari	AP	4	0.6
Krishna	AP	7	0.3
Medak	Telangana	12	0.9
Nalagonda	Telangana	8	0.4
Rangareddy	Telangana	6	1.1
Srikakulam	AP	5	0.5
Vishakhapatnam	AP	9	0.8
Vizianagaram	AP	5	1.9
West Godavari	AP	4	0.3
Grand Total		60	6.9

Description	Realizable Demand In mmscmd
Convertible demand from Surveyed industry units of A.P. & Telangana	3.16
Additional demand from key large industries of A.P. & Telangana (HPCL, Nagarjuna Fert & Essar)	4.94
Demand Potential for Unsurveyed districts in A.P. & Telangana on the basis of alternate fuel consumption.	1.06
Total	9.16

Current potential demand not sufficient for two LNG terminals in the State



STATUS – LNG SOURCING

➤ LNG sourcing

- Sourcing not a concern in current circumstances
- Discussions on with various international suppliers from Qatar, Mozambique, Spain, US-based projects, Malaysia and portfolio suppliers
- Possible to quickly conclude deals at reasonable prices

Ready to work with a State Government entity in a transparent way



SUPPORT REQUIRED FROM STATE

- State Government may make plans to establish a gas grid to connect industrial hubs within the State – all gas trunklines originating in AP to connect to Ganagavaram
- Power sector units in the State should commit to buy RLNG from Ganagavaram project for a minimum 10 year period
- Waiver of applicability of VAT on Capital goods procured for the project as also sale of gas for 5 years
- Continuity of license rights of JV company
 - Confirmation required that GoAP will allow the JV company to continue with the license and operations of the LNG Terminal, in the event of early termination of the Concession Agreement – requires a direct agreement between GoAP and JV company
- All local clearances / approvals to be granted in a quick time frame



WAY FORWARD ON GANGAVARAM PROJECT

Activity	Envisaged time frame (months)
Signing of definitive agreements with Gangavaram port (sub-license, lease) & other equity holders (shareholding agreements)	3-4
Pipeline connectivity commitment	4-5
Capacity booking with GAIL, HPCL, BPCL, etc	4-5
Consumer tie-up with fertilisers, steel, power sector players with back to back sourcing	4-5
Financial closure	6
EPC contract award	6-7

All the above activities to run concurrently





KAKINADA – SRIKAKULAM PIPELINE ROUTE

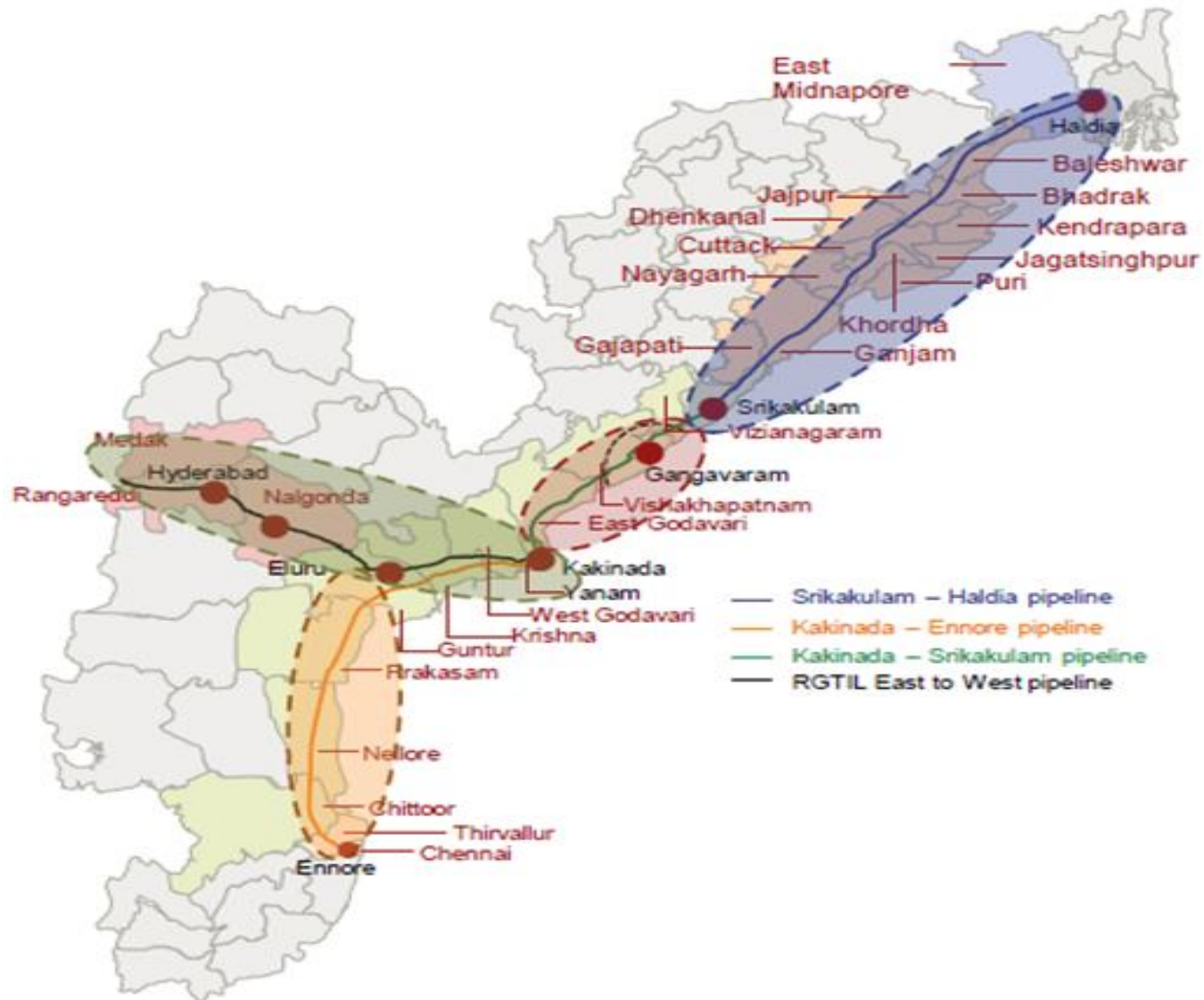
Pipeline Length:

295 Km (275 Km Trunk + 20 Km spur to Vizag steel)

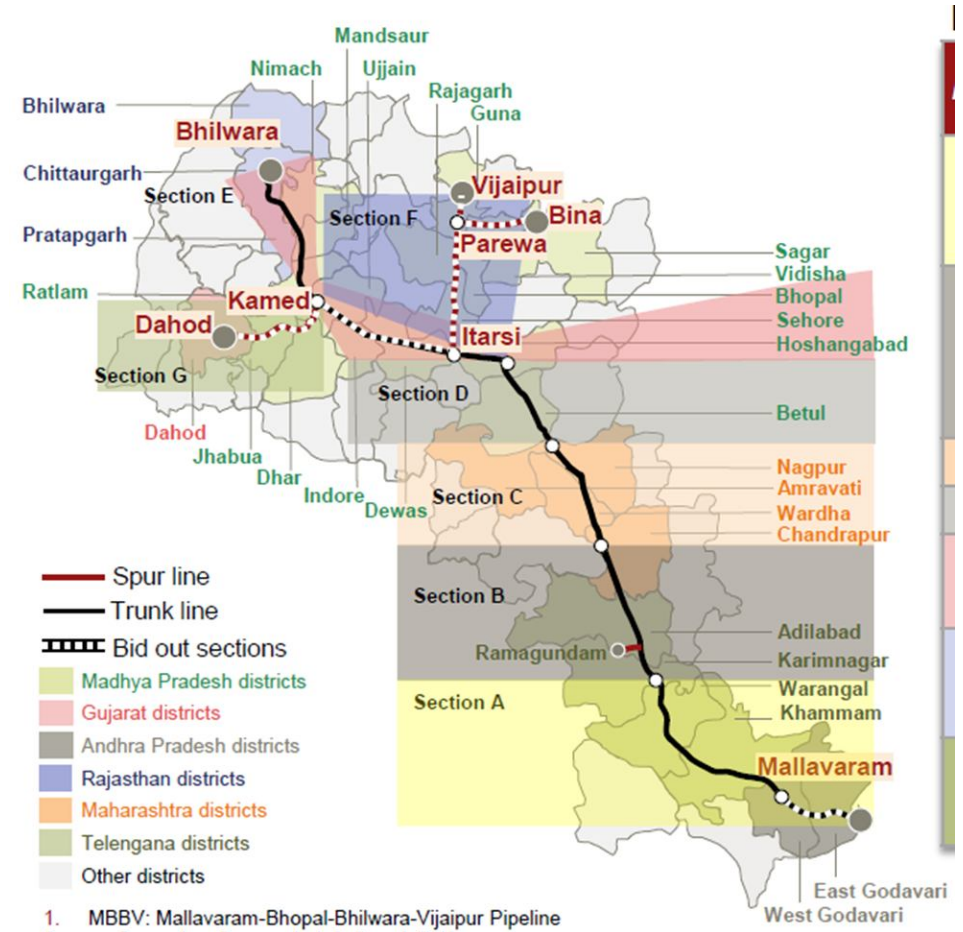
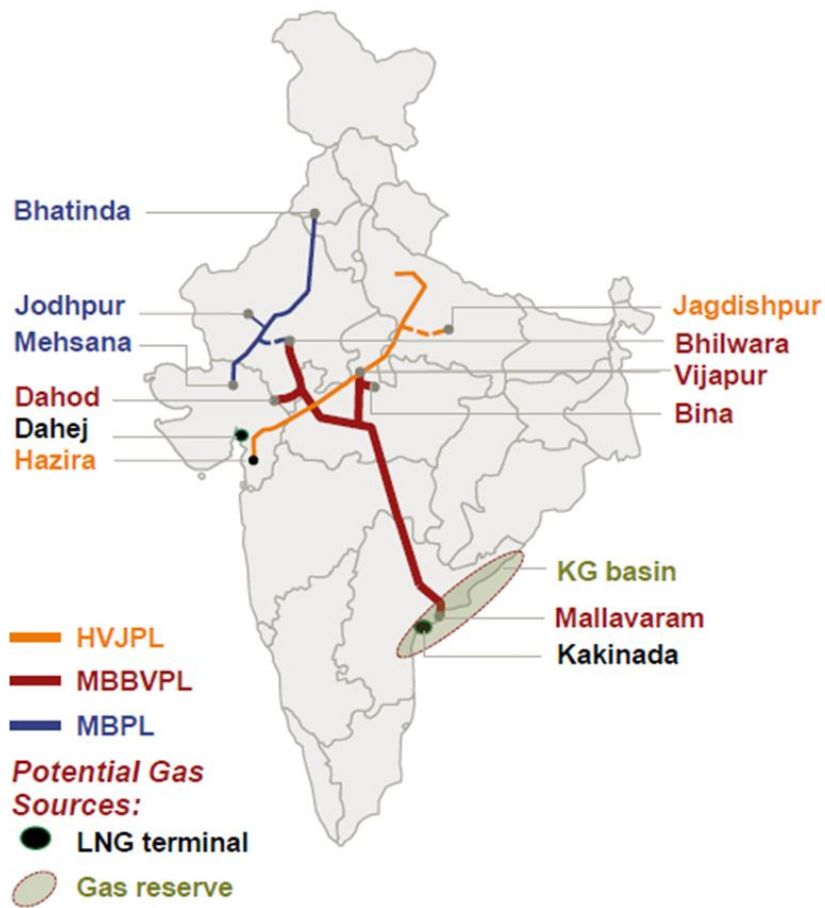


1. APGIC – Andhra Pradesh Gas Infrastructure Corporation
2. APGDC – Andhra Pradesh Gas Distribution Corporation , a joint venture of GAIL and APGIC
3. RGTIL – Reliance Gas Transportation Infrastructure Limited

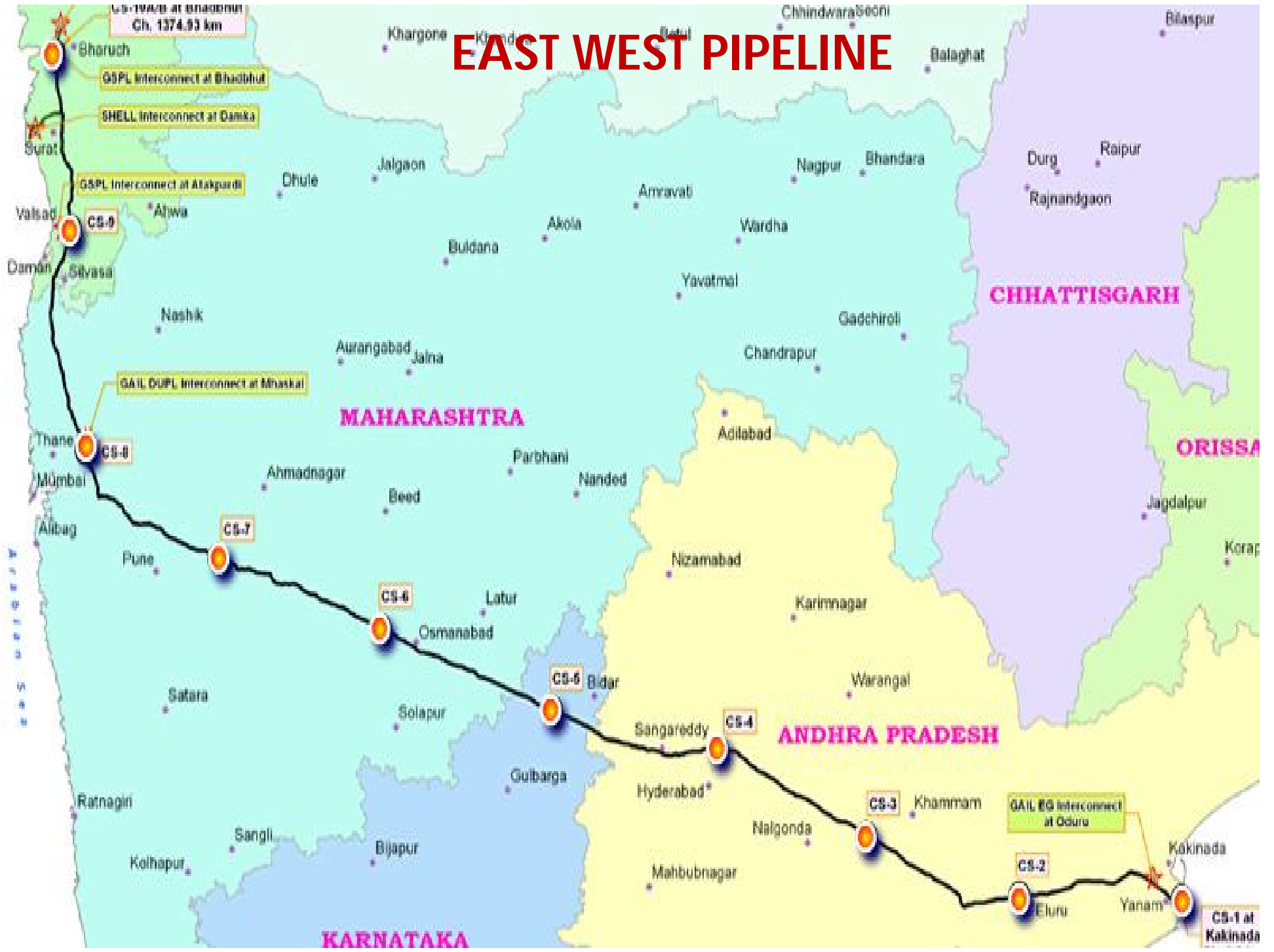
EAST MARKET PIPELINE



MBBV PIPELINE



EAST WEST PIPELINE





Thank You