

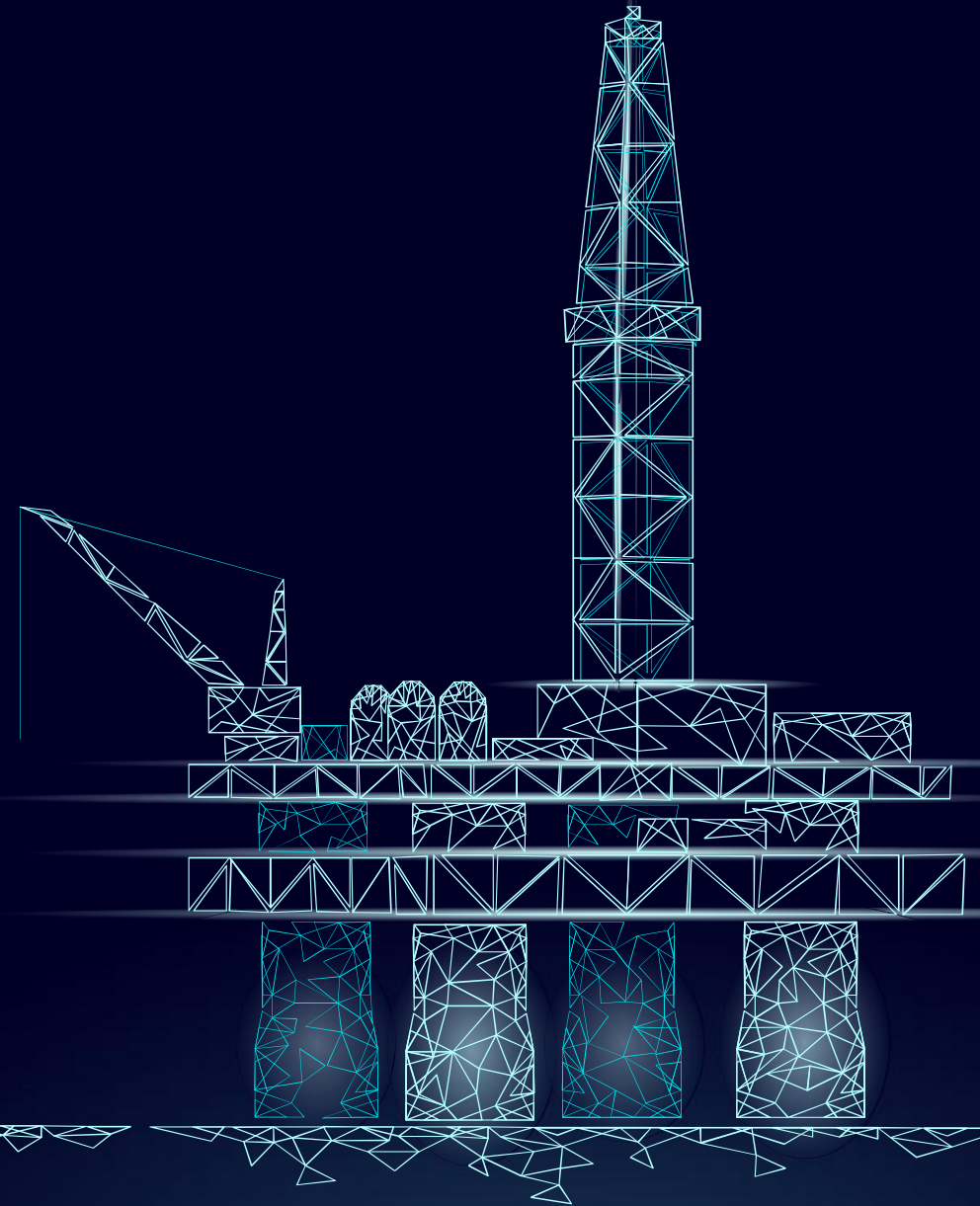
Digital Transformation in Petroleum Industry

Dr. C. Laxma Reddy

Executive Director, ONGC

&

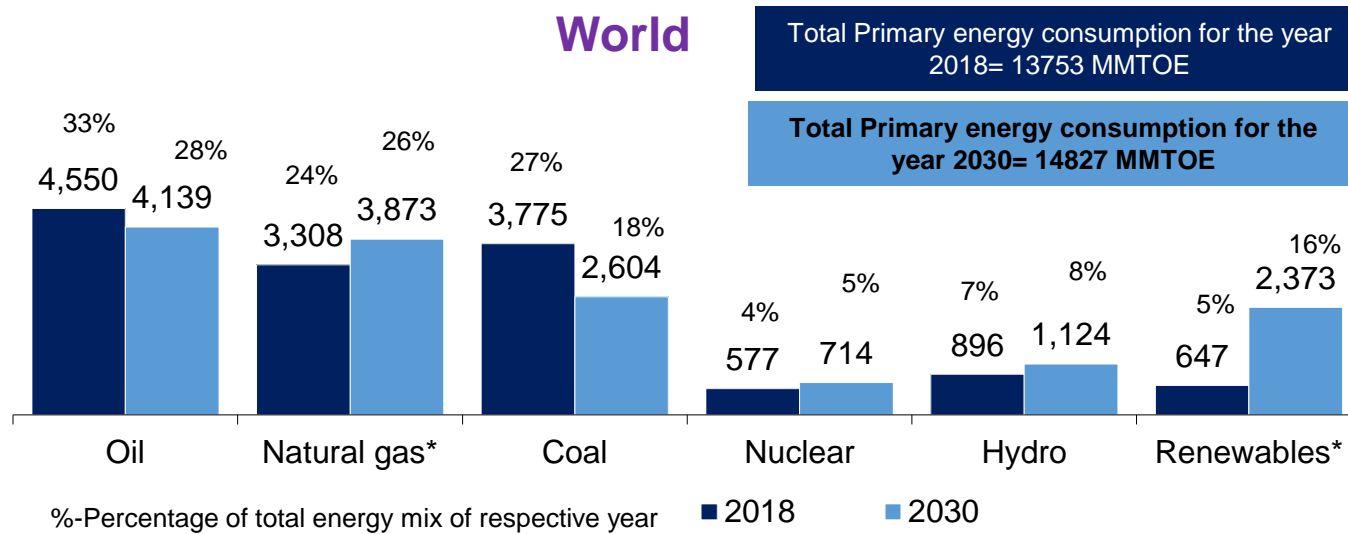
Former Additional Director General (Exploration),
DGH, MoPNG



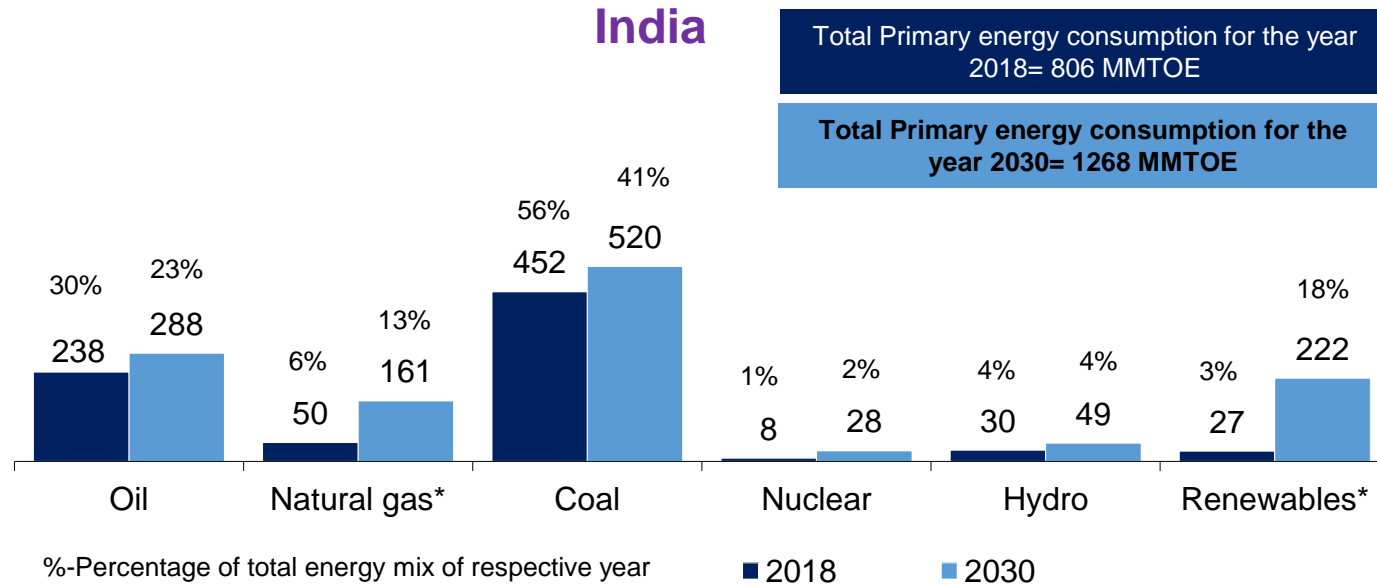
Energy Transition at a Snapshot

All data points are in MMTOE

World



India



- While the world's oil consumption will reduce, **India's oil consumption will grow till 2030**
- Renewables grow fastest for the world as well as for India
- Oil and gas demand will continue to grow in India** in all scenarios for the next one decade
- India's growing import dependence remains a concern: ~85% in Oil & ~46% in Gas

*Renewables include wind, solar, geothermal, biomass, biomethane and biofuels.

*Natural gas does not include biomethane.

Source- BP Energy outlook 2020

Challenges faced by the E&P Industry

The E&P industry faces multitude of challenges such as geological complexity, increasing capital & operating costs, changing consumer preferences, etc.

Oil Price Volatility

High uncertainty on revenue side



Maturing fields

Higher investments and operational costs



Carbon & Environmental Footprint

Increased competition from Alternate Cleaner Fuels



Workforce limitations

Lack of Skilled Manpower



Execution & Technological Challenges

Complex and tough environments



High reliance on specialized service providers

Difficult to onboard, monitor and collaborate



What it takes to succeed ???

- Undertake extensive **data acquisition** and adopt **advanced processing & interpretation techniques**
- Deploy latest **E&P technologies** and embrace **organization wide digitalization**
- Enhance collaboration between various stakeholders in government, industry, academia, investors & service providers
- Implement robust **risk assessment and mitigation frameworks and models**
- Develop **capabilities and strengths** across organization level
- Build conducive ecosystem for investments through right Policy, Fiscal and Regulatory Support by Government
- Adopt Innovative Business Models and Partnerships
- Work towards reducing Carbon Footprint of E&P sector

The key emerging underlying theme is the need for rapid adoption of new innovative technologies and embrace organization wide digitalization

Business Levers for Building Resilience

Building resilience in business models to adapt to the volatile and challenging business environment

Business Levers

1

Cost Reduction

2

**Maximize
Production**

3

**Operational
Efficiency/ Asset
Optimization**

4

**Safety
Improvement**

Digital Tools/Technologies

IoT Platforms

Digital Reporting

Data Analytics and Visualization

Artificial Intelligence

Machine Learning

Cognitive Computing

Digital Initiatives Across Upstream Sector

Key Upstream Area	Exploration	Drilling	Reservoir and Production	Supply chain & Transportation	Plant O&M	HSE
Solutions	<ul style="list-style-type: none"> Seismic Data management Accurate seismic data Interpretation 	<ul style="list-style-type: none"> Optimization of Rig movement Failure prediction Real time monitoring 	<ul style="list-style-type: none"> Reservoir Data management Recovery maximization Data analytics 	<ul style="list-style-type: none"> Inventory optimisation Pipeline management Logistics network optimization 	<ul style="list-style-type: none"> Predictive maintenance Real time monitoring Data driven maintenance scheduling 	<ul style="list-style-type: none"> Manpower and vehicle tracking Structure inspection
Technology	<ul style="list-style-type: none"> Integrated geo Cloud Cognitive AI 	<ul style="list-style-type: none"> Rig scheduler IoT, AI and automation Integrated data management platform 	<ul style="list-style-type: none"> Cognitive AI Reservoir physics & ML Integrated data management platform 	<ul style="list-style-type: none"> RFID stock management SCADA, DCS & Leak detection system 	<ul style="list-style-type: none"> IoT and AI Automation ML ERP 	<ul style="list-style-type: none"> Visual analytics IoT enabled (ROV)

Digital to emerge as a key enabler for building resilience across all business areas of E&P companies

Technology & Enablement Landscape

Enhance Efficiency, Reduce Costs, Protect Revenues and Margins



Develop Futuristic Strategies



Digital Capex Program Management



Value Chain Integration



Centre of Excellence



Cyber Security



Digital Backbone

- Embrace Digital technologies across operations – IIOT, Big data, AI/ML, NLP, AR/VR, Cloud, Blockchain, 3Dprinting etc.

- Construction program optimization through use of Drones & AR systems

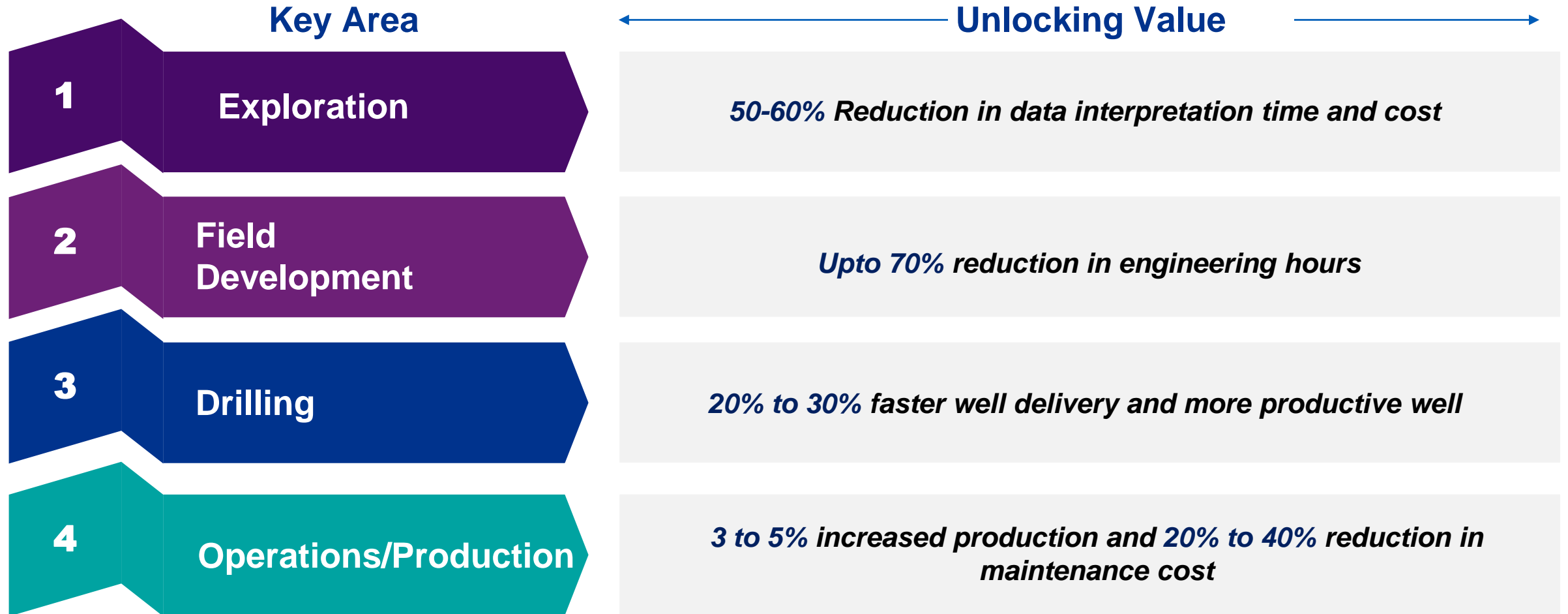
- Dynamic optimizer integrating IOT, cloud, AI/ML technologies for applications across value chain

- Demonstrate and incorporate best technology practices on personnel training and adopting and adapting to the digital shift

- Building a resilient cyber strategy and infrastructure

- Creation of Digital backbone with an assemblage of processes workflows, method and skillsets

Advantages of Adopting Digital Technologies



Geoscientific Data Initiatives undertaken by GoI

Hydrocarbon Resource Reassessment Study, (2017)**

49.1% increase
in Hydrocarbon resource estimate
as compared to 1995

National Data Repository

Centralised repository of
geoscientific data

2.603 Million LKM

2D data populated*

0.897 Million SKM

3D data populated*

National Seismic Programme and Andaman Survey

Launched to conduct
assessment of unapprised
areas

Target to acquire

~63,243 LKM

of 2D Seismic Data

Other forward looking changes

- No go areas in Andaman basin being released for E&P activities
- Govt. initiated **pre clearing of blocks with different agencies** such as Defence and Environment
- Govt. taking measures to expedite PEL grant

Easy Access to Quality Data through NDR

National Data Repository (NDR): Centralised repository of geoscientific data of Indian basins

Key features

Ease of Access

Integrated with GIS browser

Virtual Data Room

Seamless Data Exchange

Cutting Edge Technology

High Quality Data

Quality Data*

2D Seismic Data : **2.603 Mn. LKM**

3D Seismic Data : **0.897 Mn. SKM**

Seismic Reports: **15,528 nos.**

Well and log data: **19,317 nos.**

Well Reports: **40,245 nos.**

Users**



280
Companies



875
Users

Way Forward for NDR

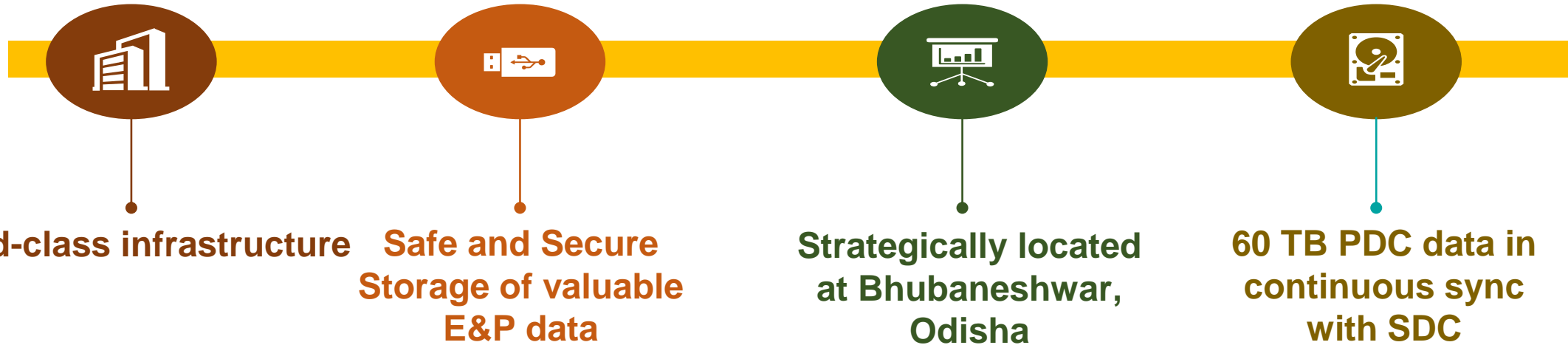
1. **Cloud based solution and expansion of storage**
2. **Deriving key insights through Data analytics**

* As on 31st January, 2021

** As on 15 February, 2021



Disaster Recovery and Business Continuity Centre of NDR

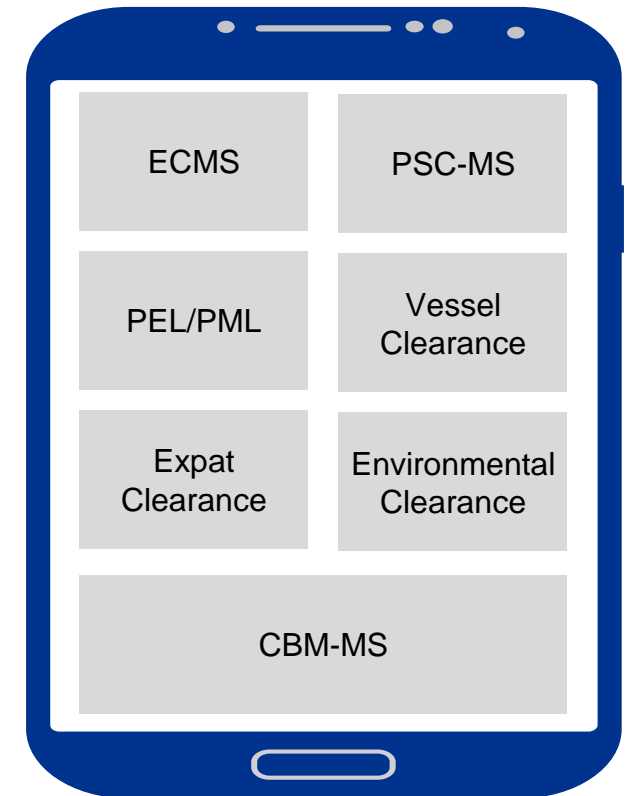


Online Platforms Implemented for Streamlining Approvals

Electronic Single Window System: Operational and under implementation in DGH

- a) **ECMS Application:** Online submission of digitally signed Essentiality Certificate.
- b) **PSC Management System:** Online Contract management for PSC Blocks/Fields completed.
- c) **PEL / PML Application System:** Online Application submission system for PEL / PML
- d) **Vessel Clearance Management System (VCMS):** Automation of vessel clearance between DGH and Operator.
- e) **Expat Clearance System:** Clearance for expats forwarded to MHA-FS.
- f) **Environmental Clearance:** Applications being tracked through Environmental Single window linked with PARIVESH Portal of MoEF&CC

All applications on one platform





Thank You.

