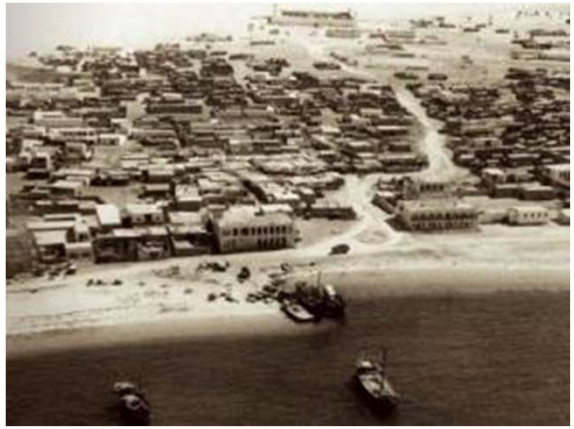
The oil and gas industry can create large value to hosts countries

1 Potentially enormous economic benefits…

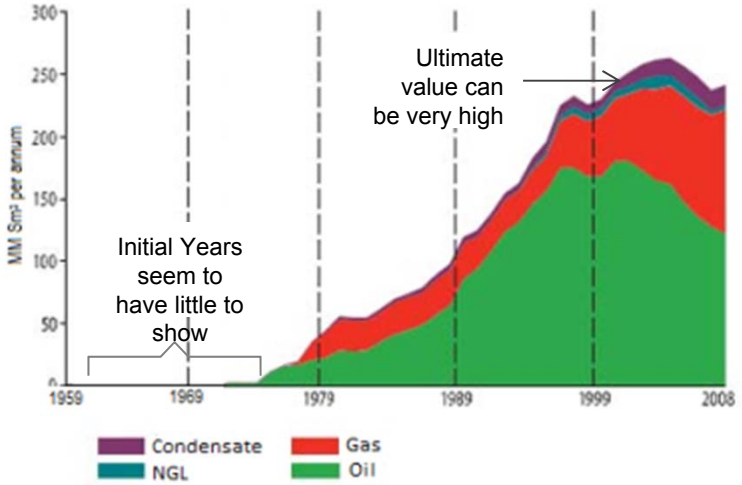
Example 1: Abu Dhabi in 1960



Example 2: Abu Dhabi today

2 Which take time to materialise

Norway oil and gas production



A Timeline of failure, patience and success

- **1958:** Norwegian Geological Survey says: "The chances of finding…oil…off Norwegian coast can be discounted"
- **1963:** Norway asserts rights over North sea acreage
- **1966:** Exploration drilling starts; initial wells are dry
- **1969:** Ekofisk found (enormous discovery)
- **1971:** Ekofisk begins production
- **2012: Petroleum product exports ~US$ 95bn p.a.**

South Africa has possible resources of ~9 bn barrels of oil and ~60 tcf of gas offshore, but uncertainty is high

South Africa's offshore reserve basin

South African Coastal Province:
Coastal land and adjoining water to depths of at least 2,000 m

Oil

Natural gas

9 bn barrels of oil

Equivalent to 40 years of South African oil consumption[1]

60 tcf of gas

Equivalent to 375 years of South African gas consumption[1]

1 At current level: 595 kb/d oil consumption and 160 Bcf/y gas consumption

SOURCE: Petroleum Agency SA, EIA

OPERATION PHAKISA

The opportunity for the country is big …

ILLUSTRATIVE

Direct, indirect and induced effects, average over 20 years

Deep-water development - assumptions

- 30 exploration wells
- 20% success rate
- Average discovery size of 450 mmboe

Oil & gas production = 370 000+ b/d

= 20,000 barrels of oil equivalent

Equivalent to 80% of current oil and gas imports[1]

Jobs = 130 000+

= 10,000 jobs

Represents 2.5% of current unemployed labour force

GDP = USD 2.2 bn+

= $200 mln

Represents 1% growth of GDP

1 410 kb/d petroleum import and 60 kboe/d natural gas imports

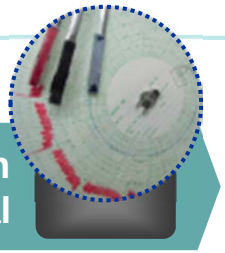
SOURCE: OECD STAT, ILO labor Sta, Global Insight, MGI Economics research analysis, Rystad U-cube, EIA, Stats SA, team analyses

… and could bring significant value

Oil and gas production

	Direct govern-ment revenues	Jobs	Profits remaining in South Africa	Development of downstream industries
Direct	Taxes, royalties and other levies paid on oil and gas production / profits	Jobs to develop projects and keep producing oil and gas	Profits to (local) companies which are reinvested in South Africa	N/A
Indirect and induced	▪ Taxes from suppliers / service providers ▪ Taxes from the suppliers to the suppliers / service providers	▪ Jobs in suppliers / service providers to the industry ▪ Jobs in suppliers to the suppliers / service providers to the industry	Profits to local suppliers / service providers to the industry that will also cascade down to their suppliers	Development of downstream industries such as power, chemicals, fertiliser

Upstream oil and gas faces different challenges at different stages of the life-cycle; South Africa is at the initial stage



10 yrs	5 yrs	30 yrs	2 yrs
Exploration & Appraisal	**Development**	**Production**	**Abandonment**
Risks ▪ Dry hole or non-commercial discovery ▪ Industrial accidents/Environmental degradation	▪ Lower recoverable reserves than expected ▪ Project not commercially viable ▪ Industrial accidents/ Environmental degradation	▪ Production performance lower than expected ▪ Security (Piracy/Politics) ▪ Industrial accidents/ Environmental degradation	▪ Environmental degradation
Investment ▪ ~ US$150-250m + US$500m - 1 bn for appraisal	▪ ~ US$5 bn	▪ ~ US$300m per year in operating cost	▪ US$~ 500m-1 bn
Revenue ▪ 0	▪ 0	▪ ~US$1 bn per year or more	▪ 0

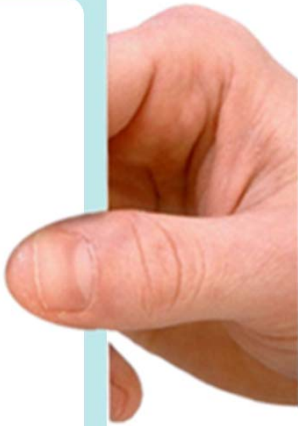
The lab aspired to determine the extent of South African offshore oil and gas reserves, through exploration

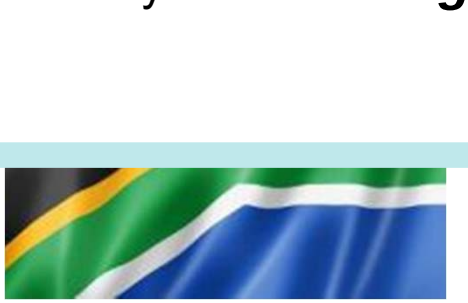
South Africa should ...

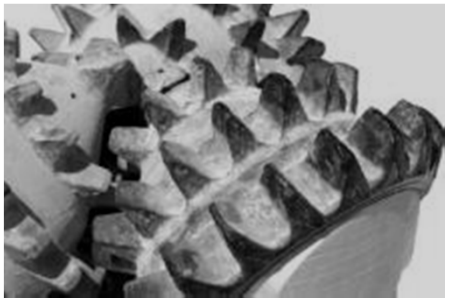
… create an environment that ***promotes exploration*** …

… in order to ***drill 30 exploration wells*** in the next 10 years …

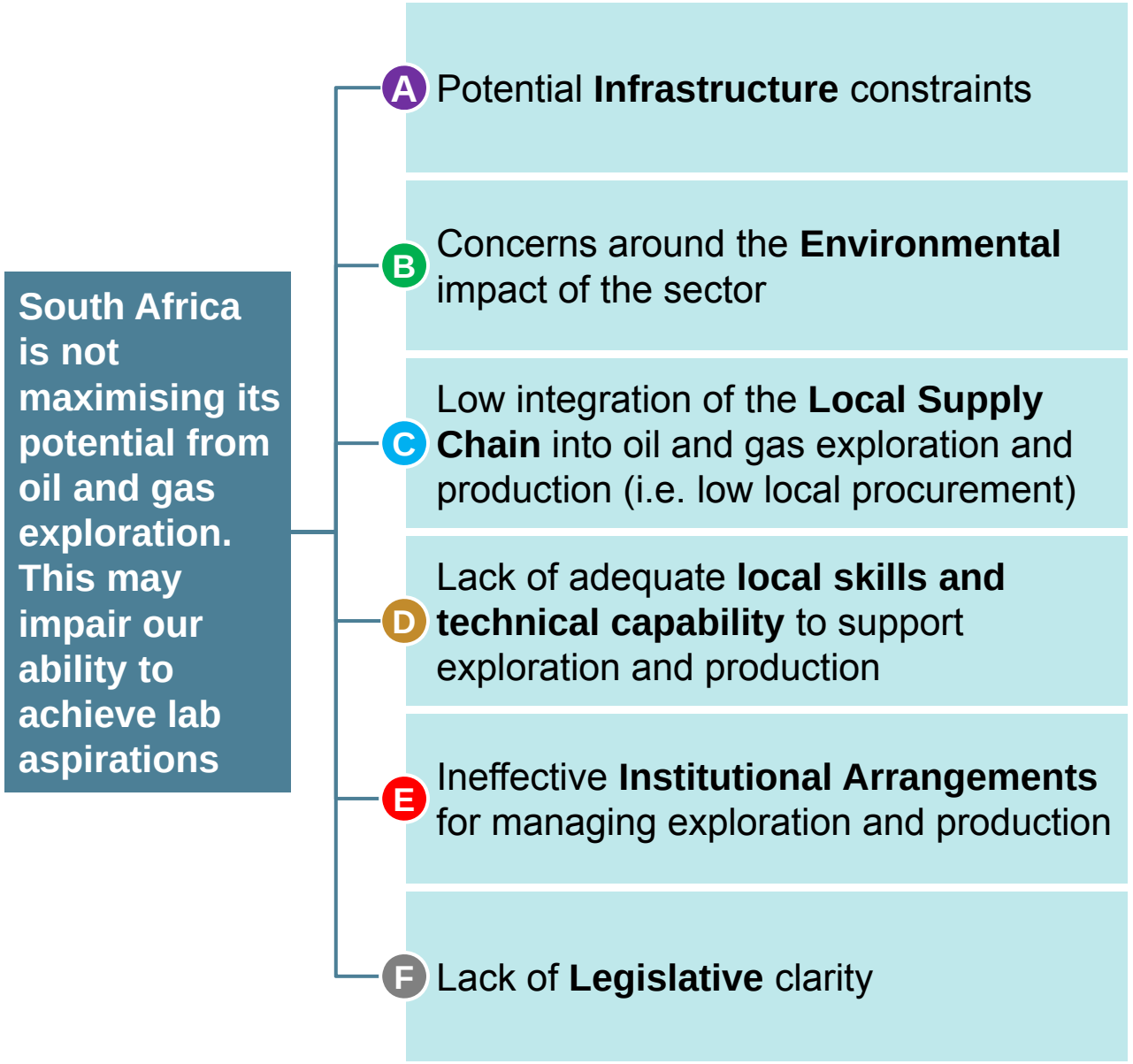
… while simultaneously ***maximising the benefits for South Africa***




In order to reach this aspiration, six barriers need to be resolved



What does South Africa need?

A **Infra-structure**		To enable successful offshore oil and gas exploration, **adequate infrastructure** like **port facilities**, **pipeline networks** and **multi-purpose research vessels** need to be developed
B **Environ-ment**		To address **the environmental concerns related to offshore oil and gas exploration and production**, several initiatives are proposed, of which **joint emergency response drills** and the operationalisation of the **international oil pollution fund** are two examples of “quick wins”
C **Supply chain (local content)**		In order to **support local content development**, an integrated plan needs to be developed - a champion organisation could be instrumental to drive this roadmap and involve stakeholders at an early stage
D **(Local) skills**		Although limited opportunities arise to develop local skills in the exploration phase, the potential for R&D, particularly in the sub-surface area, has been assessed. A **skills strategy roadmap**, based on global best practices, should be developed for the exploration and production phase
E **Institutions**		To maximise value for the country, adequate **institutional governance** is critical in terms of ensuring efficient and effective reservoir management, licensing, planning, data management and auditing
F **Legislative**		To affirm investor confidence, **clarity and stability** must be provided on the full legislative, regulatory and contractual package

Based on these needs the Offshore Oil & Gas Exploration lab has identified 11 initiatives

A Infrastructure

- **A1** Develop phased gas pipeline network

B Environment

- **B1** Conduct joint industry/ government emergency response drills
- **B2** Operationalise IOPC fund
- **B3** Exploit the broader research opportunities presented by offshore oil and gas exploration

C Localisation of Supply Chain

- **C1** Develop/implement local content roadmap

D Capability Development

- **D1** Develop/implement skills strategy roadmap
- **D2** Develop capability for sub-surface research and data gathering

E Institutions

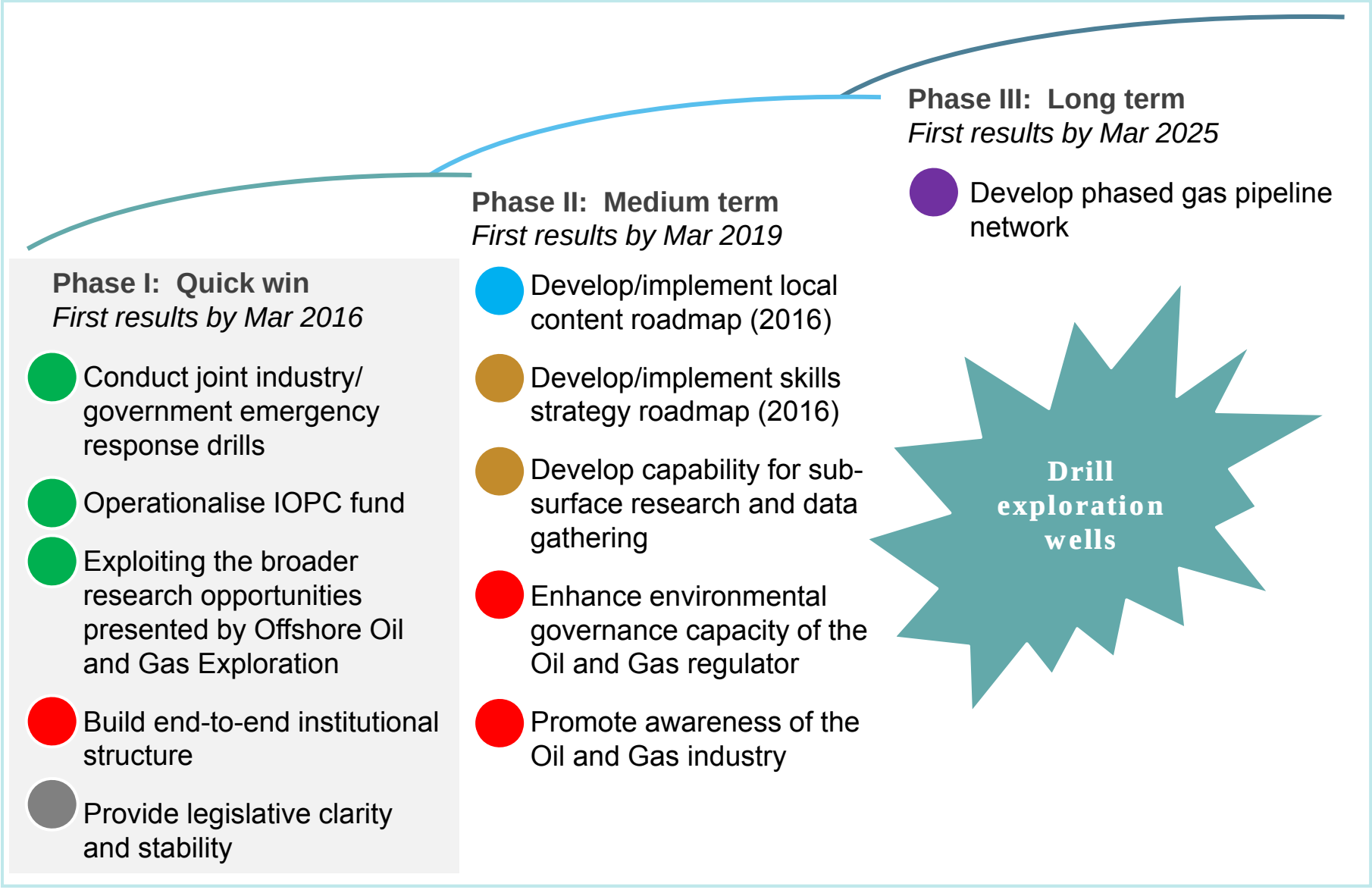
- **E1** Build end-to-end institutional structure
- **E2** Enhance environmental governance capacity of the oil and gas regulator
- **E3** Promote awareness of the oil and gas industry

F Legislative

- **F1** Provide fiscal terms clarity

IOPC - International Oil Pollution Compensation

The oil and gas lab has identified specific initiatives with a phased roll-out



IOPC – International Oil Pollution Compensation

Initiatives have been ranked in priority and budget requirements have been specified

Detailed in following pages

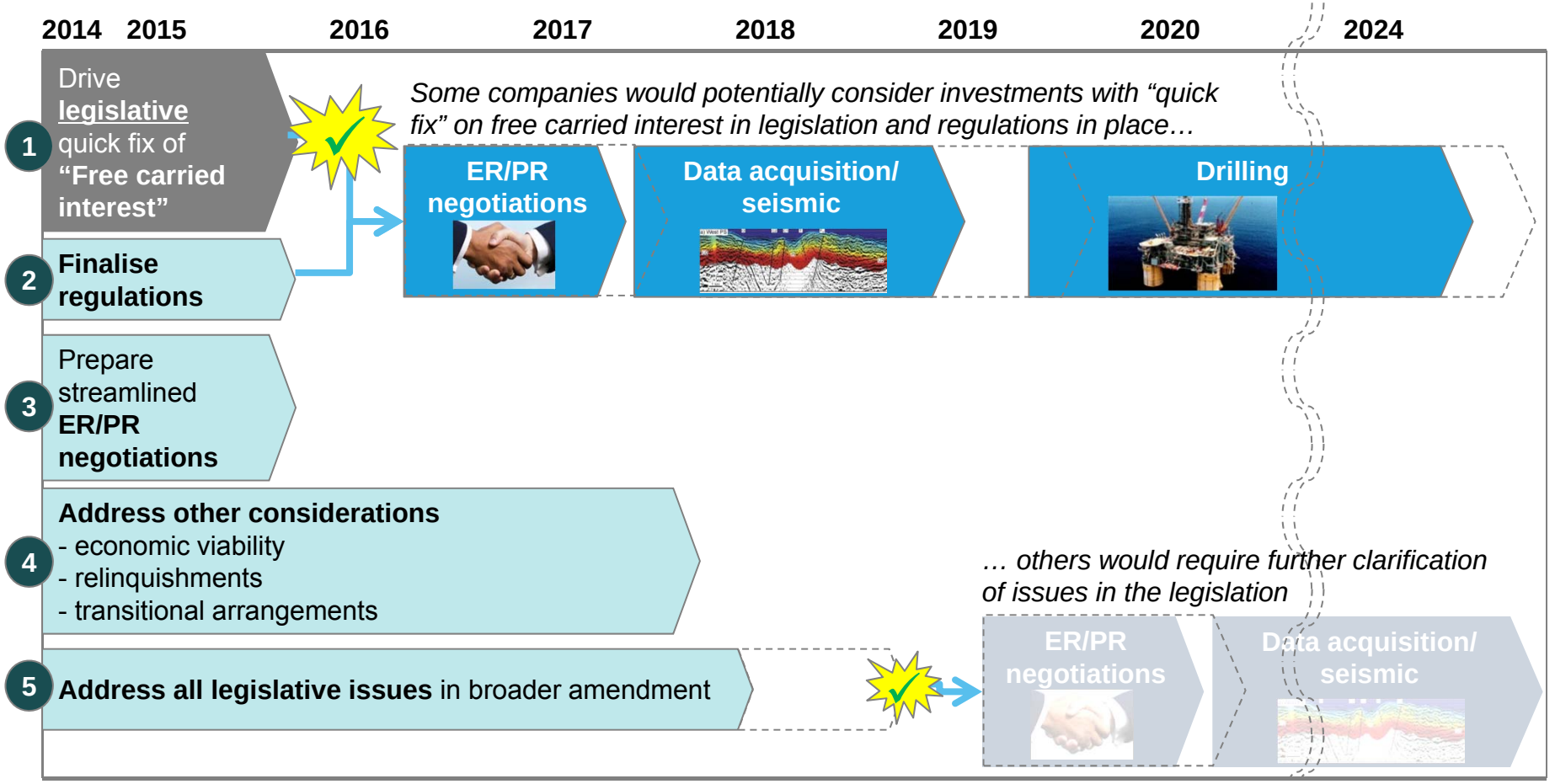
Highest priority

- F1 Provide legislative clarity and stability
- E1 Build end-to-end institutional structure
- D1 Develop/implement skills strategy roadmap
- C1 Develop/implement local content roadmap
- B3 Exploiting the Broader Research Opportunities Presented by Offshore Oil And Gas Exploration
- B1 Conduct joint industry/government emergency response drills
- E3 Promote awareness of the Oil and Gas industry
- B2 Operationalise IOPC fund
- A1 Develop phased gas pipeline network
- D2 Develop capability for sub-surface research and data gathering
- E2 Enhance environmental governance capacity of the Oil and Gas regulator

F1 The legislative workstream has identified specific action steps to address issues which can prevent exploration

NOT EXHAUSTIVE

Illustrative timeline of creating legislative stability and certainty



- Picture assumes projects that are technically and economically viable
- Assuming no delays from e.g. conflicts with marine protected areas

SOURCE: Phakisa oil and gas lab

ER - Exploration Right; PR – Production Right

E1

The lab recommends empowering a 1-stop-shop regulator via a smooth transition process

Step 1

Department of Mineral Resources 1-Stop-Shop

Operation Phakisa
Within 1 year

In the short term this fulfils the selection criteria and can be accommodated in the proposed MPRDA Amendment if upstream Oil and Gas is established as a separate region or clauses 47 to 64 and 66 to 69 are kept in abeyance

Step 2

Regulator 1-Stop-Shop

Long Term
> 5 years

In the long term, as commercially viable deposits are discovered, a better option is to establish upstream Oil and Gas under separate legislation, which also establishes the regulator in its own right

The impact of the options…

- Department of Mineral Resources endorsed and Cabinet approved a model that can be immediately implemented
- Operational institutional structure for regulating and licensing of the upstream oil and gas sector
- Efficient institutional systems and processes:
  - regulate timelines and service level agreements between role players
  - clarify prequalification criteria for prospective licensees
- Institutional capability across all exploration and production technologies as well as economic modelling, environmental and operational oversight and enforcement

C1 The localisation of supply chain initiative reflects lab aspirations for broader South African benefit from oil and gas

Lack of SA suppliers' participation in upstream oil & gas exploration supply chain/procurement

- Total procurement spend on goods and services in the exploration phase is small relative to the entire project value chain
- Lack of information of SA companies capable of producing and supplying goods and services
- No agreed upon local content targets, instruments and enforcement agencies

Root causes

- Oil and gas exploration is not associated with high levels of procurement spending when compared to the development and production phases of the project cycle
- SA has not had a lot of exploration activity in the recent past – company and supplier development suffered as a result
- No overarching industry and public entity bodies involved in registration, verification and support to local supplier development (with exception of PetroSA)
- Government and industry have not agreed upon policy objectives and targets for local content
- No industry wide supplier and enterprise development training and support programmes are in place (with exception of PetroSA)

D1 A champion organisation needs to drive the development of local skills for the offshore oil and gas industry

Steps to develop local skills

1. **Form a working group** (Government, Industry and Tertiary Institutions) to **develop the skills strategy roadmap** for the Industry and Governance based on the activities related to offshore oil and gas project life cycle.

1.1 The skills strategy roadmap must include the **mechanism for knowledge generation**. This can be through University Chairs, Centres of Excellence and Centres of Competencies.

1.2 The skills strategy roadmap must identify the **professional associations** (e.g. Society of Petroleum Engineers SPE) to drive knowledge and skills exchange.

2. Develop the **pathway for vocational technological and engineering skills** for the oil and gas industry.

A champion organisation is required

- To form the working group that will develop the skills strategy roadmap
- **To own and implement the strategies as detailed in the skills strategy roadmap**
- To ensure that the Institutes of Higher Learning have the capabilities and capacities to develop the required skills