

## Timor-Leste

### Chuditch Project Update

26 January 2022



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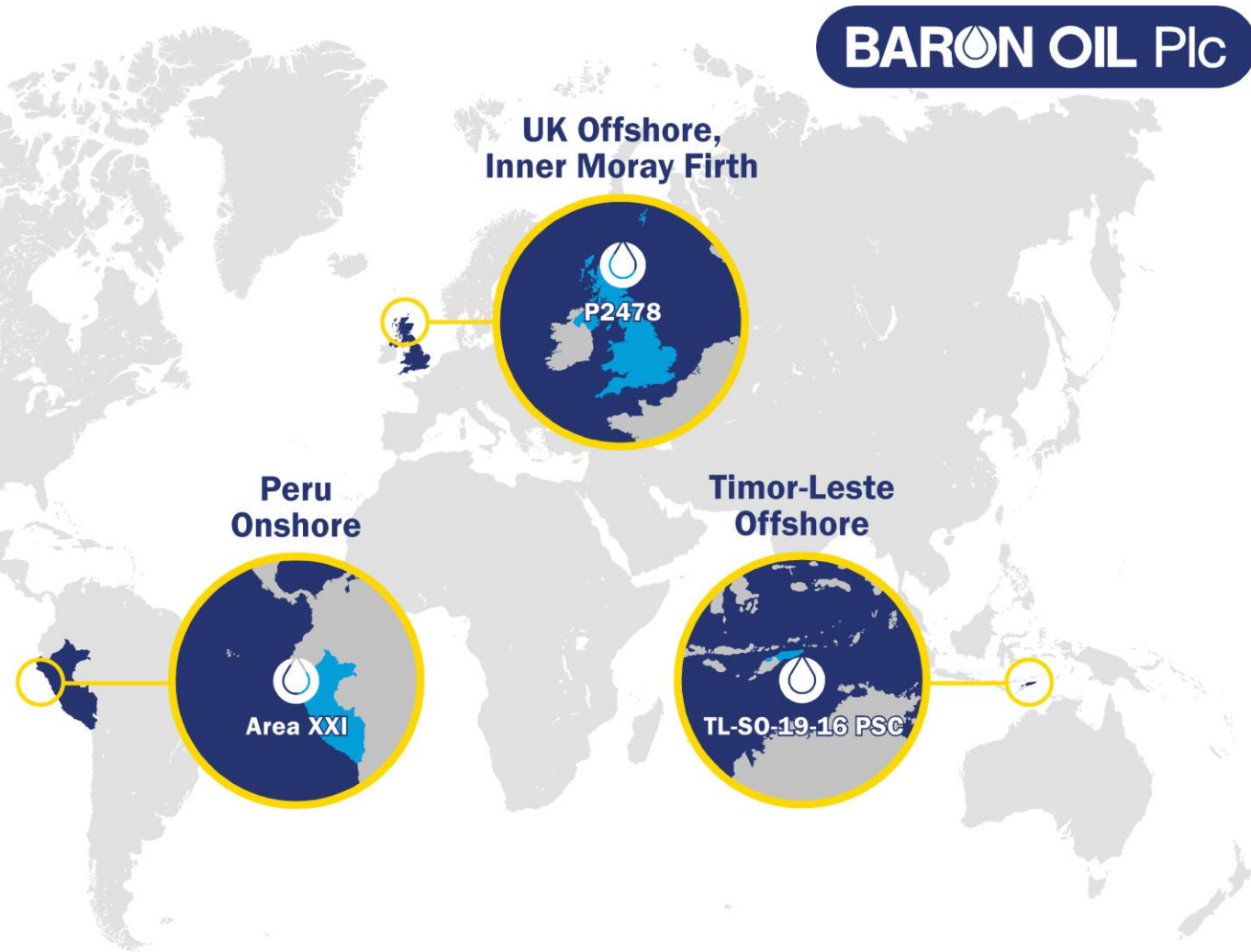
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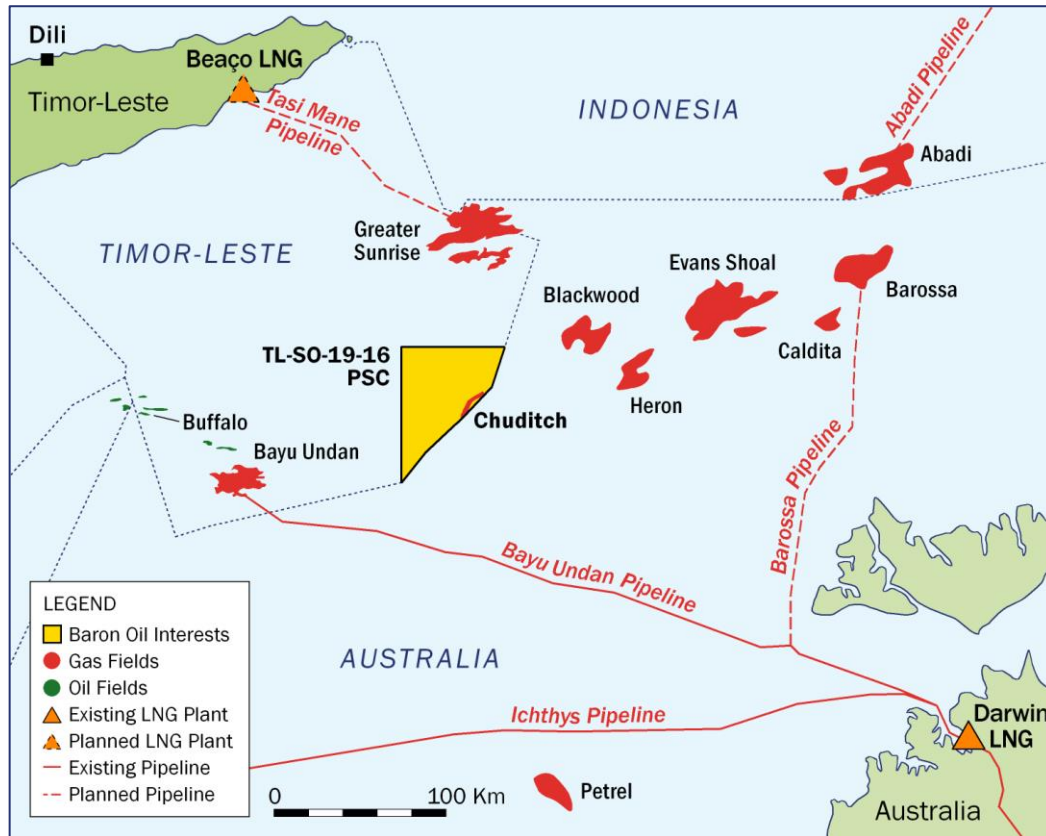


# Introduction

- **Focus on Chuditch, offshore Timor-Leste**
  - introductory comments
    - Jon Ford (Technical Director, Baron)
  - natural gas and the energy transition in Asia
    - Andy Yeo (Chief Executive Officer, Baron)
  - Chuditch update
    - Andy Butler (Managing Director, SundaGas Banda)
  - summary
    - Andy Yeo
  - Q&A session
- **Baron corporate strategy**
  - high potential impact projects
  - significant equity interests
  - low-cost entry into proven hydrocarbon provinces
- **3 existing ventures**
  - UK licence P2478, offshore Inner Moray Firth (32%)
  - Peru block XXI, onshore Northern Peru (100%, Operator)
  - Timor-Leste offshore TL-SO-19-16 PSC (75%, Operator)



# Chuditch at a key stage of evaluation



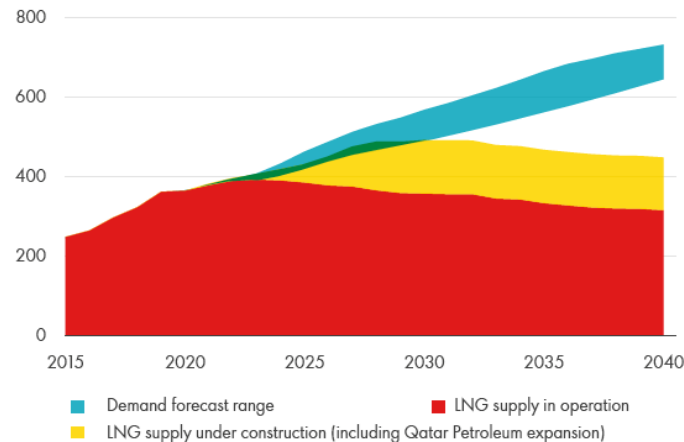
- Chuditch-1 gas discovery & offset analogous prospects
  - >500mmboe gross mean prospective resources estimated (SPE PRMS 2018)
- Technical studies on schedule
  - high fidelity 3D seismic reprocessing key
- 2023 potential drilling campaign
- Routes to commercialisation identified



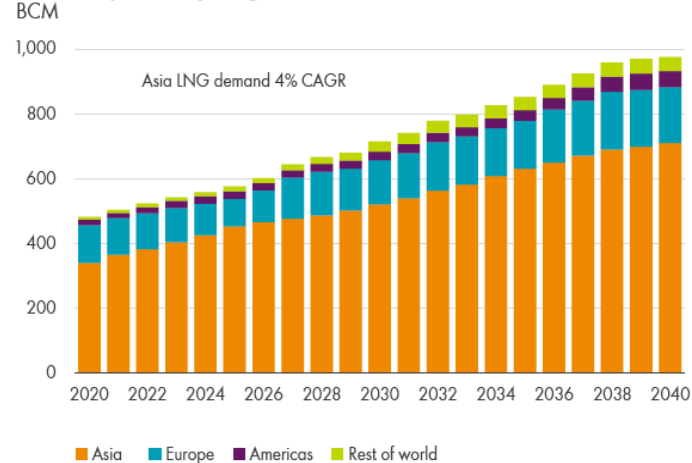
# Gas as the critical ingredient in Asia's energy transition

- Gas provides cost effective and flexible solutions to meet:
  - relentless demand growth in Asia's emerging and developed energy markets
  - the only fuel able to displace extensive coal usage across Asia
- Predicted sustained supply-demand gap for LNG to emerge this decade
- Asia gas prices highly robust
  - current Asian LNG Price (JKM) c.US\$25/MMBtu (equiv. of US\$150/bbl)
  - 10 year average Japan import LNG price c.US\$12/MMBtu
- Chuditch gas is located at the gateway to Asian energy markets**

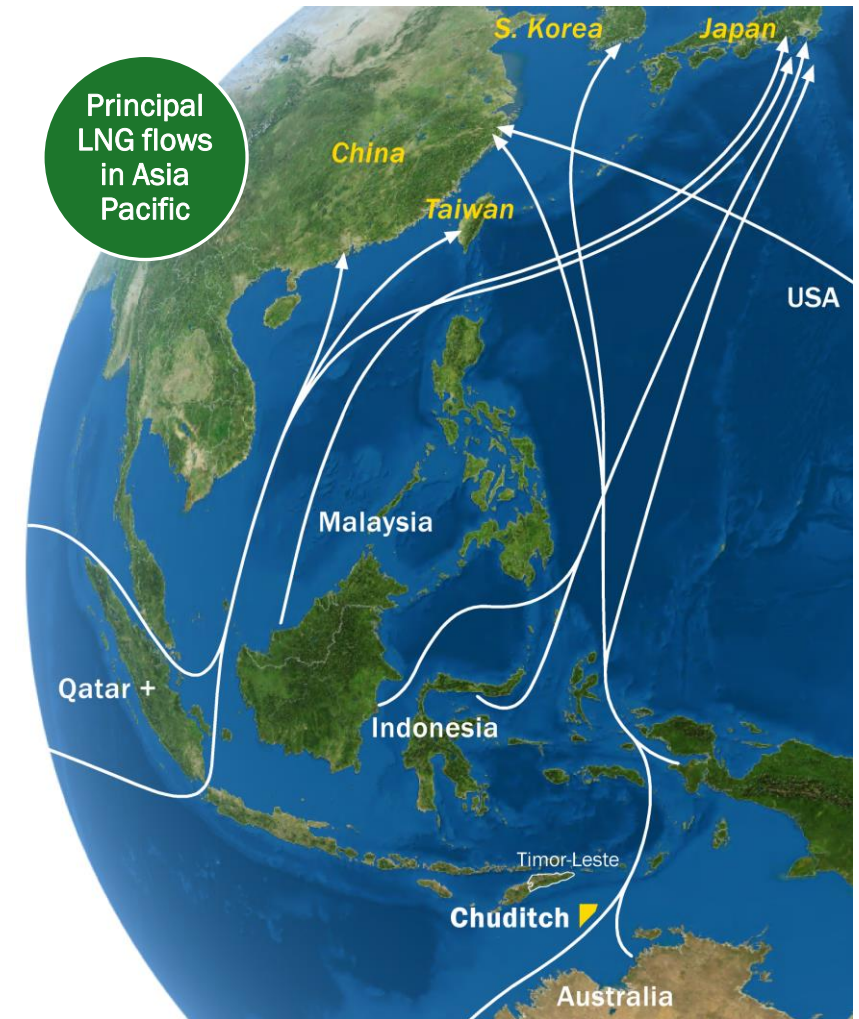
Emerging LNG supply-demand gap  
MTPA



LNG imports by region  
BCM



Source: Shell LNG Outlook, February 2021

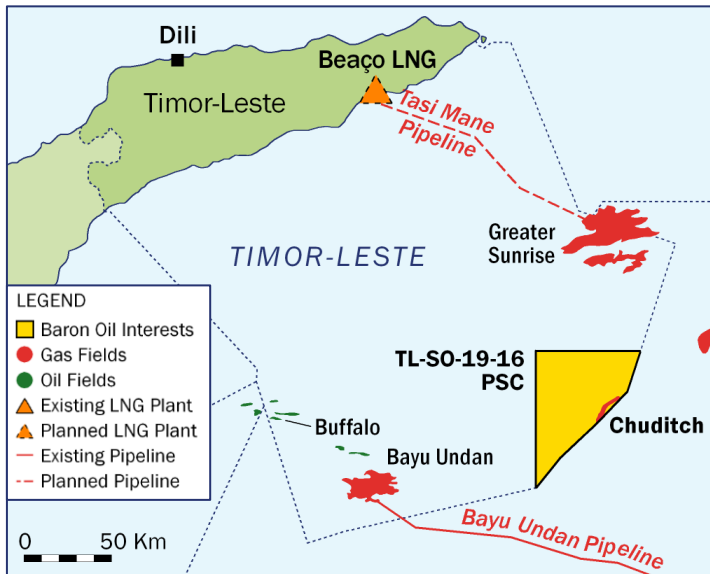


Domestic & relatively minor LNG flows not shown





# Introduction to Timor-Leste and its Natural Gas assets



- **Timor-Leste**

- young, vibrant, open, democratic republic
- substantial developmental challenges



- **Economy dependent on revenues from Bayu Undan gas condensate field**

- expected to cease production over the next 2 years
- national Petroleum Fund already being drawn down
- onshore exploration & offshore oil unlikely to generate sufficient revenues
- considering gas imports to convert oil-fired power plants
- gas discoveries Greater Sunrise & Chuditch need urgent progression

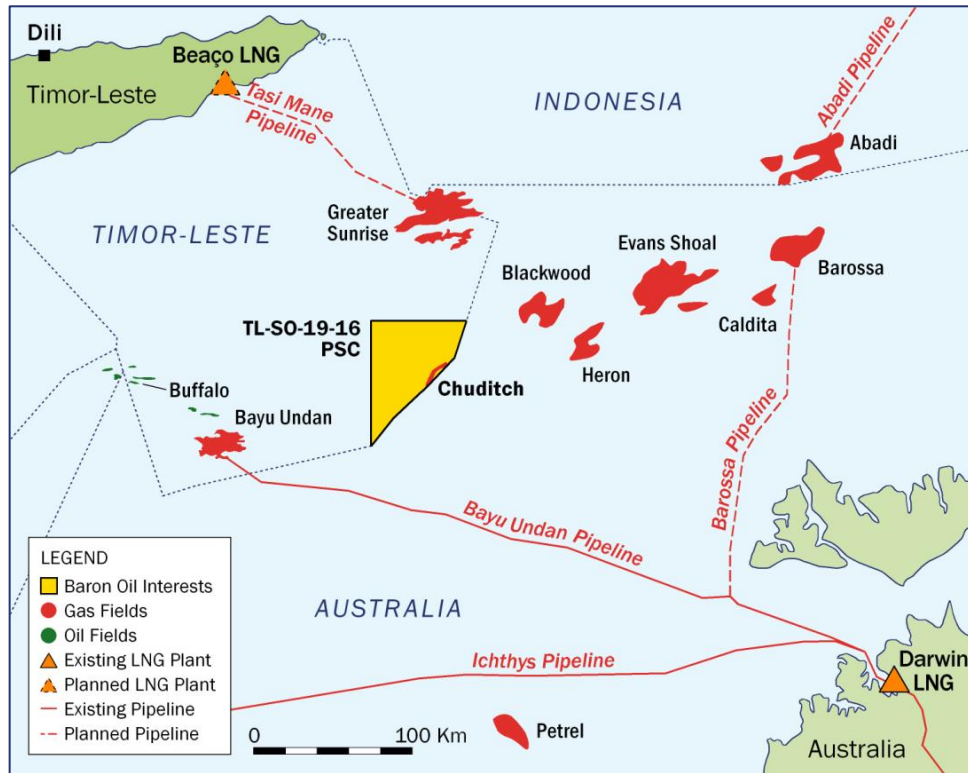
- **Business environment**

- spotlight on Timor-Leste since maritime boundaries resolved
- increased commercial and operational activities
- SundaGas Banda Dili office opened with key local personnel recruited
- good relationships with ANPM and JV partner TIMOR GAP

- **Opportunity for Chuditch to be a key gas development and revenue generator**



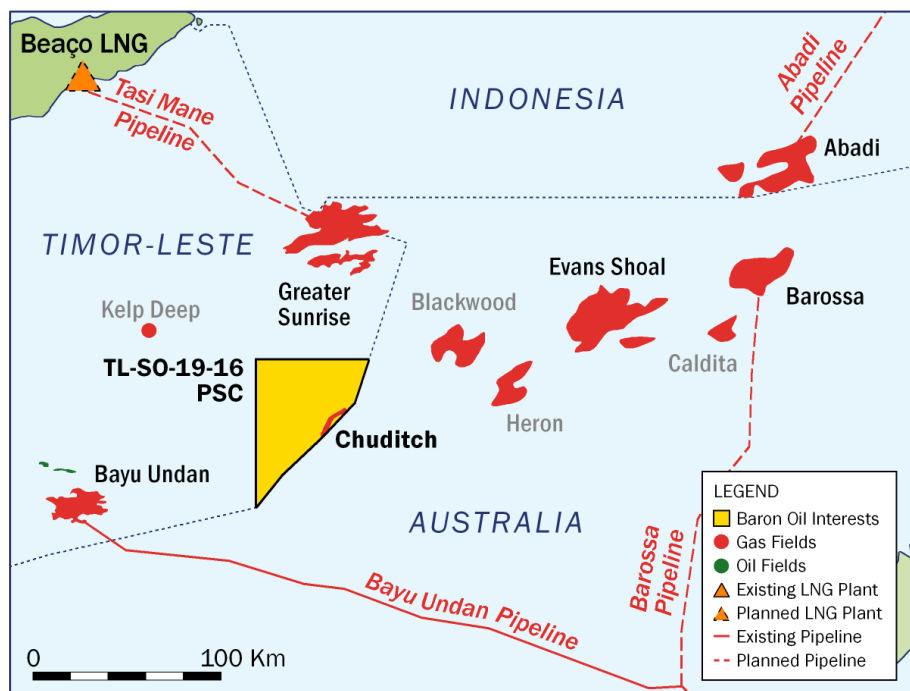
# Timor Sea: hub of commercial activity



- TIMOR GAP acquired 56.56% of Greater Sunrise in 2019
  - US\$650mm paid to Shell and ConocoPhillips
  - Woodside 33.44% operator, Osaka Gas 10% partner
- Santos acquired ConocoPhillips portfolio and infrastructure for \$1,265mm in 2020
  - Bayu Undan
    - extending field life via 3 infill wells drilled in 2021
    - initial well flowed 178 mmscfd + 11,000 bcpd
    - ANPM & Santos feasibility study for conversion to regional CCS hub
  - Barossa
    - FID March 2021, first gas 2025
    - interests sold to SK and Jera
  - Darwin LNG
    - planned upgrades and facility life extension to 2050
- Santos and Eni – Timor Sea co-operation MOU in 2021
  - covers field developments, infrastructure and Darwin LNG
- Carnarvon's Buffalo-10 appraisal/redevelopment well
- Current licence rounds in Timor-Leste and Australia



# Chuditch in the context of Timor Sea gas fields



- >20 Tcf of proven natural gas on trend
- Three main gas fields in Timor-Leste:
  - Bayu Undan depleted, earmarked for CCS
  - Sunrise development timing uncertain
  - Chuditch is more akin to Bayu Undan

Field	Operator	Status	Gas (Tcf) <sup>1</sup>	% CO <sub>2</sub>	Comment	1 <sup>st</sup> gas
Bayu Undan	Santos	Producing	0.6 <sup>2</sup>	6%	Late life production, future CCS hub	2006
Kelp Deep	n/a	minor discovery	-	28-34%	Sour gas in tight reservoirs. Appraisal sidetrack failed	n/a
Chuditch	SundaGas (Baron) <sup>3</sup>	Evaluating	3.4 <sup>4</sup>	18%	Upside >6TCF, to be drilled 2023	>2025
Greater Sunrise	Woodside	Appraised	5.1	5%	Development and LNG studies ongoing	>2025
Blackwood	ENI <sup>5</sup>	Appraised, Dormant	0.5	29-37%	Low relief, limited upside	unlikely
Heron	n/a	Appraised, Dormant	0.1	28-35%	Deep; small; no flow on test	unlikely
Evans Shoal	Eni	Appraised	5.5	30%	Development studies	>2025
Barossa	Santos	Developing	4.6	18%	FID taken in 2021	2025
Abadi (Indonesia)	INPEX	Discovery	5.0	8%	Development deferred	>2025

<sup>1</sup> Approximations made based on latest publicly available information, net of CO<sub>2</sub>;

<sup>3</sup> SundaGas Banda UL is a wholly owned subsidiary of Baron Oil Plc;

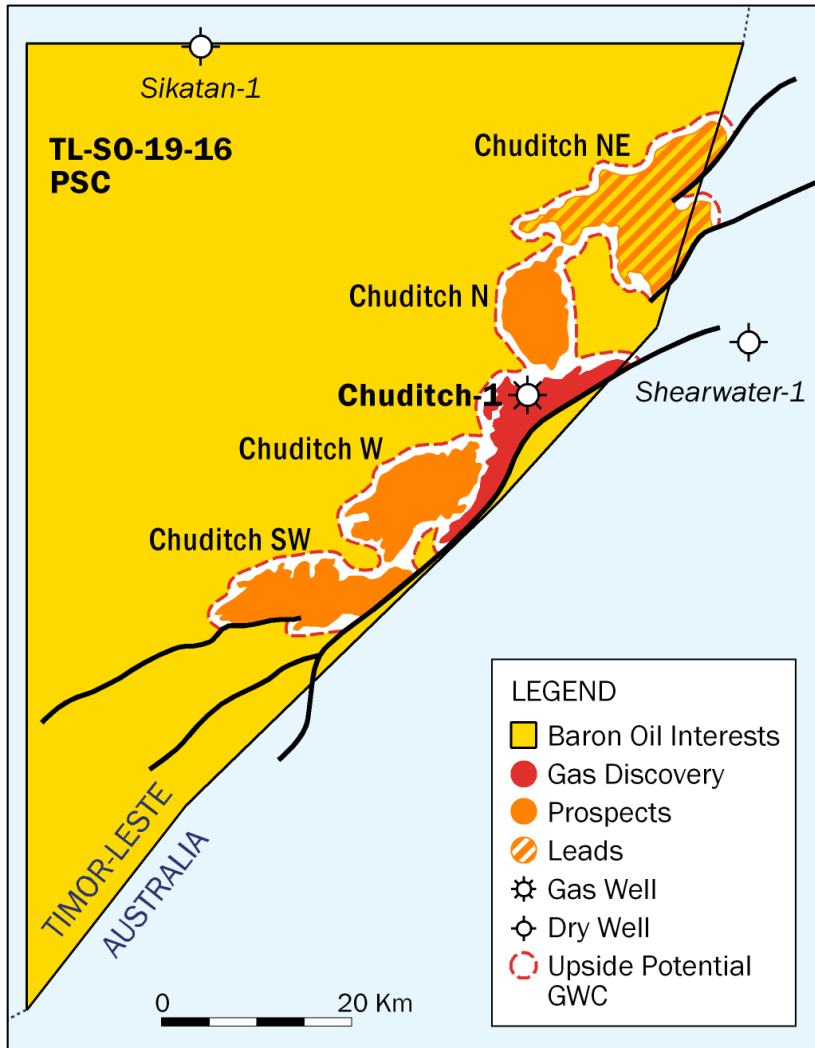
<sup>2</sup> Estimated remaining;

<sup>4</sup> Discovery + prospects ; <sup>5</sup> Extension approval pending





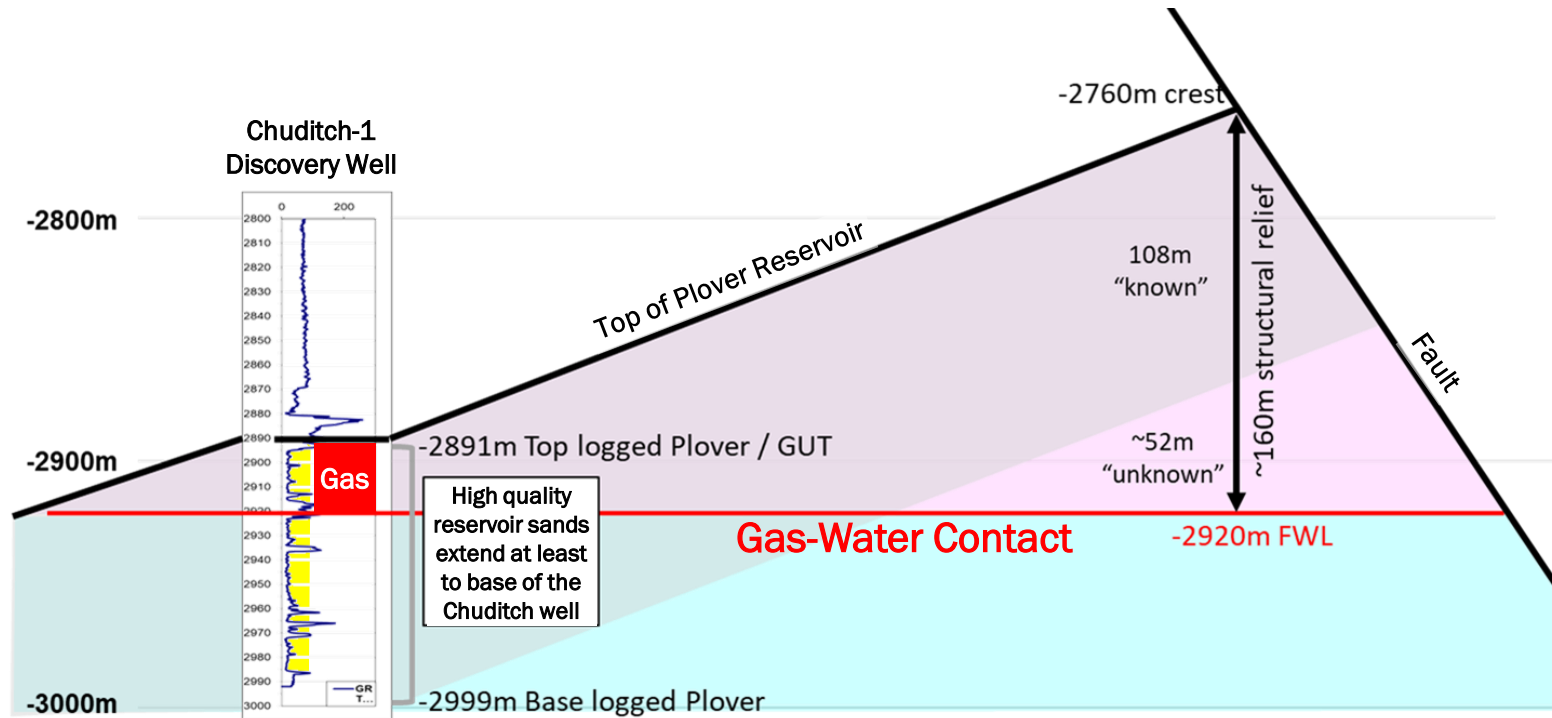
# Chuditch technical update



- Chuditch gas discovery
  - covered by the TL-SO-19-16 PSC
    - 75% SundaGas Banda, operator (wholly owned subsidiary of Baron)
    - 25% TIMOR GAP Chuditch (state owned, carried to first gas)
  - Shell operated discovery in 1998 in 65m water
  - same Jurassic 'Plover' reservoirs as all other gas fields on trend
  - three adjacent prospects and one lead along a >60km trend
- Significant prospective resources (discovered and potential)
  - mean resource case of 3,368 Bcf gas + 30 MMbbl of condensate\*
  - high resource case of 6,467 Bcf gas + 78 MMbbl of condensate\*
    - potential for a single connected accumulation
    - current assessments based on existing 2D seismic data
- 2022 work programme
  - complete critical 3D seismic reprocessing and interpretation
  - assess viability of Chuditch for appraisal and step-out wells in 2023
  - aim to convert Chuditch-1 resources from Prospective to Contingent



# Chuditch-1 unlocked large gas potential



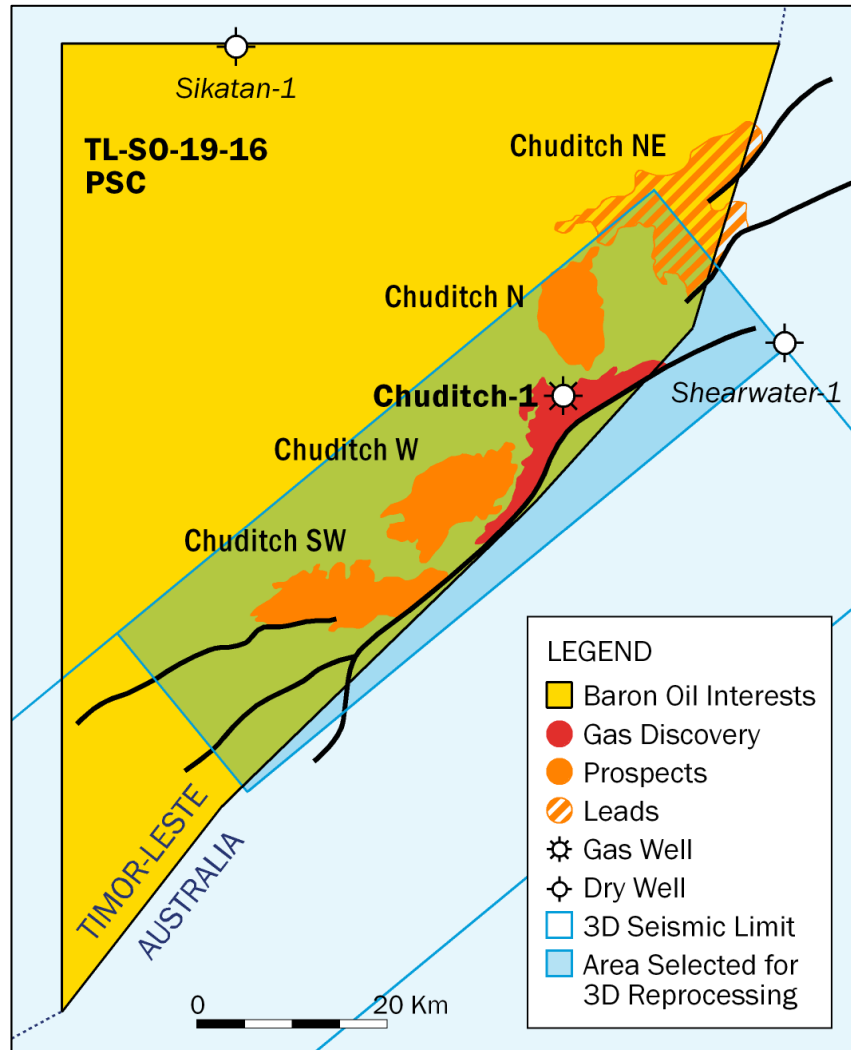
## Good quality reservoir in gas interval

✓ Net to Gross ( = % reservoir)	89.0%
✓ Net pay porosity	12.4%
✓ Net pay permeability	195mD
✓ Gas saturation	85.5%

- Chuditch-1 gas well discovered gas at the edge of a large structure
  - well drilled ~130m below crest
  - 25m gas column encountered
  - significant gas pay expected up-dip
  - appraisal well may target >100m gas
- High quality reservoir encountered
  - same Jurassic 'Plover' reservoirs as all other gas fields on trend
  - reservoir sands in well expected to continue up-dip into thicker gas zone
- Seismic reprocessing ongoing to accurately define the full structure

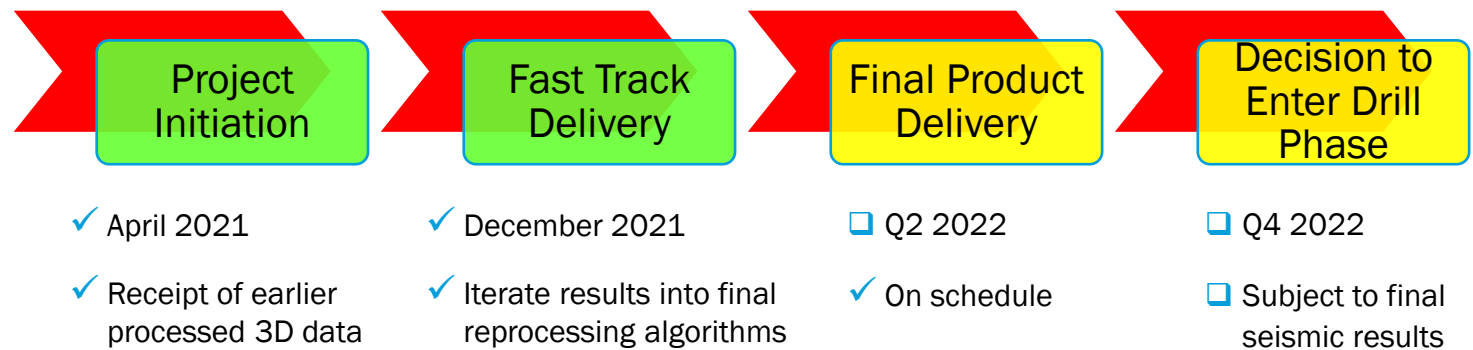


# 3D PSDM Reprocessing Project - Status

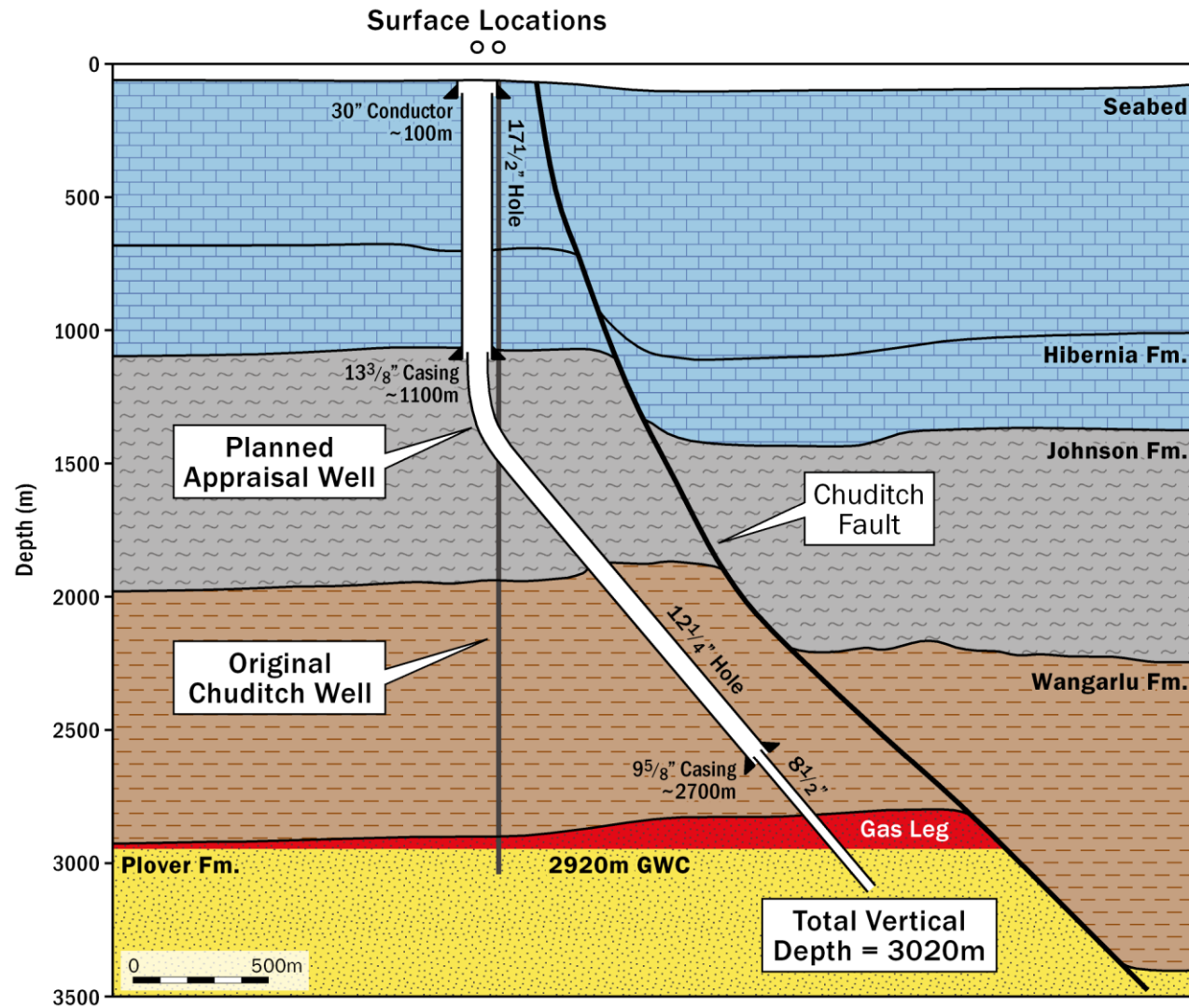


- 1,270 km<sup>2</sup> of 3D seismic data selected for reprocessing
  - area chosen based on 2D mapping of Chuditch trend
  - reprocessing work being carried out by TGS in Woking (UK)
- 3D PSDM seismic reprocessing necessarily time-consuming
  - computationally intensive
  - multiple geological iterations to obtain accurate subsurface image
- Project on schedule and budget
- Encouraging improvements in data quality to date

## 3D Seismic Reprocessing Project Timeline



# Preliminary design for a Chuditch appraisal well

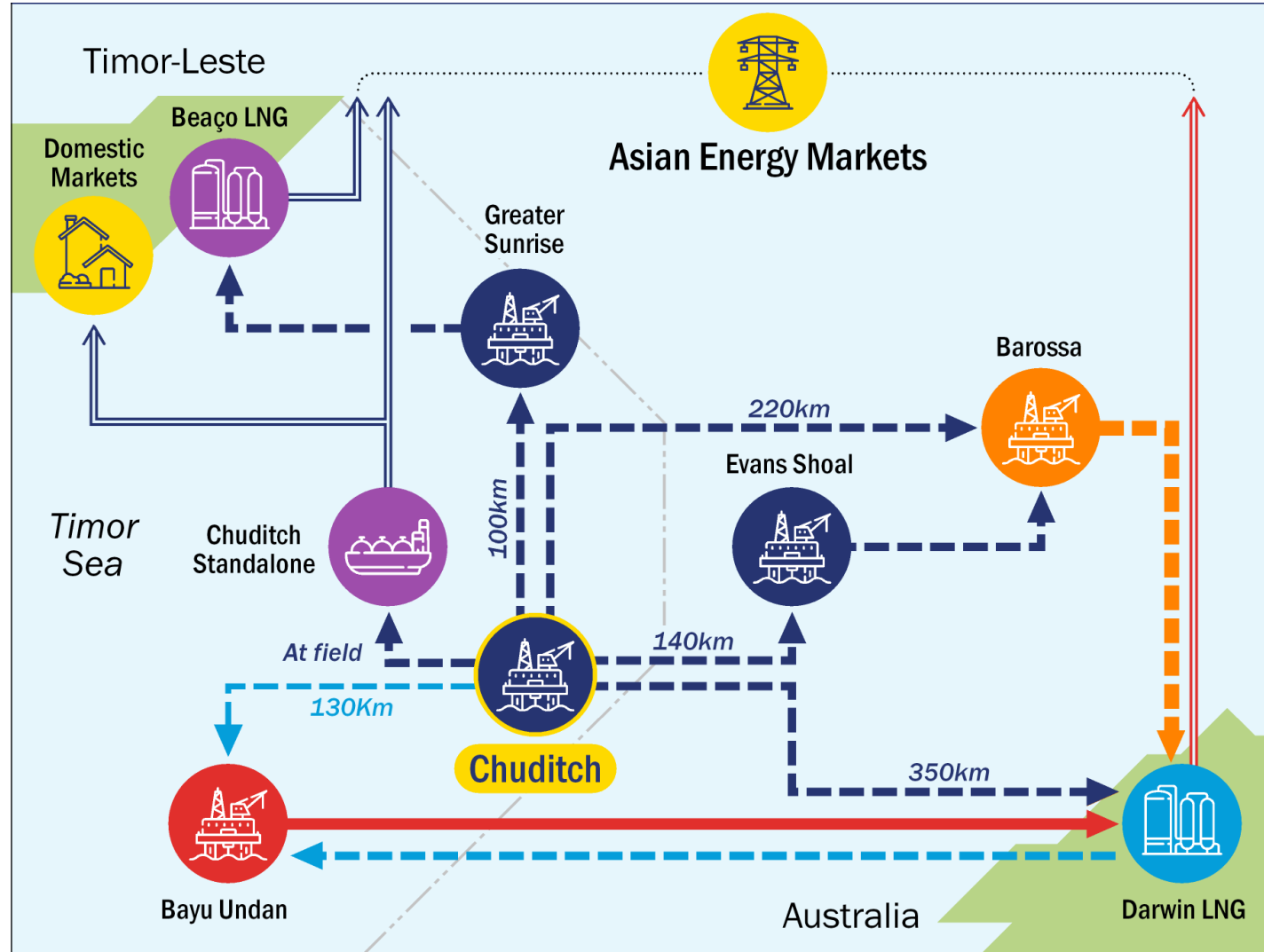


- Appraisal drilling anticipated 2023
  - subject to final results of 3D seismic reprocessing
- Preliminary well design study completed
- Notional deviated trajectory
  - Shell drilled vertically to avoid fault, but missed potential updip gas zone
  - surface location near discovery well
  - avoid potential hazards across fault
  - target >100m gas column vs 25m in discovery well
  - possible well path to be refined on final 3D data
- Well cost estimate in range US\$15m-US\$20m\*
  - \* excluding mobilisation, flow testing and additional wireline logging



## Multiple potential export options for Chuditch gas

- Pipeline to LNG
  - A. Beaçó LNG via Greater Sunrise
  - B. Darwin LNG via multiple pathways
- Standalone solutions
  - C. Floating LNG
  - D. Fixed Platform LNG
  - E. CNG
- Assume CO<sub>2</sub> disposal at Bayu Undan or other CCS hub sites



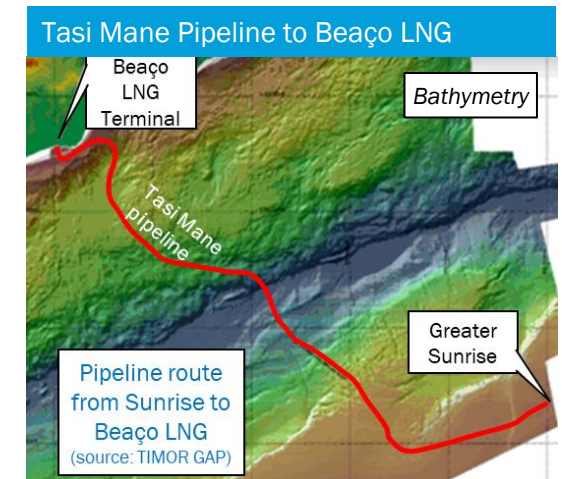
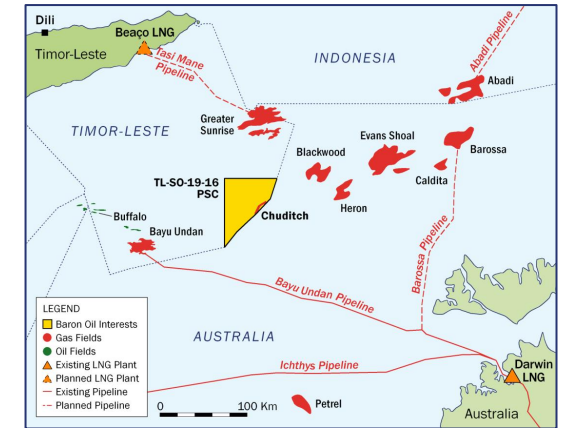
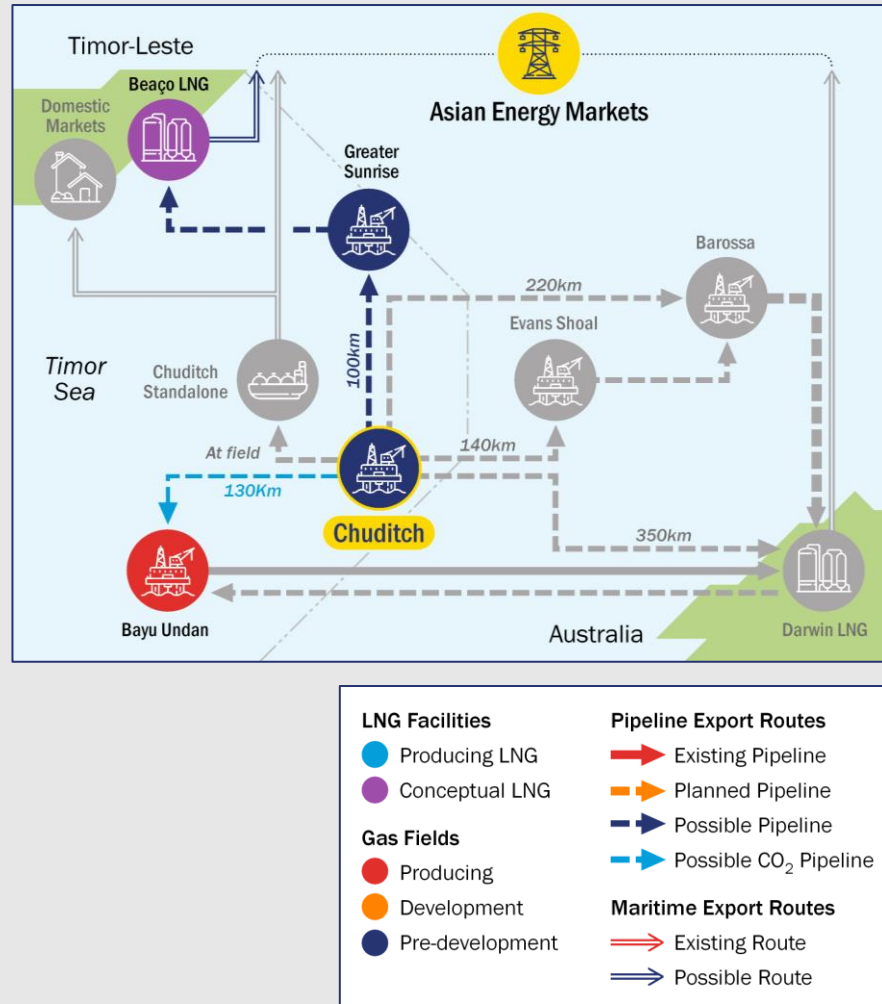
- LNG Facilities**
- Producing LNG
  - Conceptual LNG
- Gas Fields**
- Producing
  - Development
  - Pre-development
- Pipeline Export Routes**
- Existing Pipeline
  - Planned Pipeline
  - Possible Pipeline
  - Possible CO<sub>2</sub> Pipeline
- Maritime Export Routes**
- Existing Route
  - Possible Route





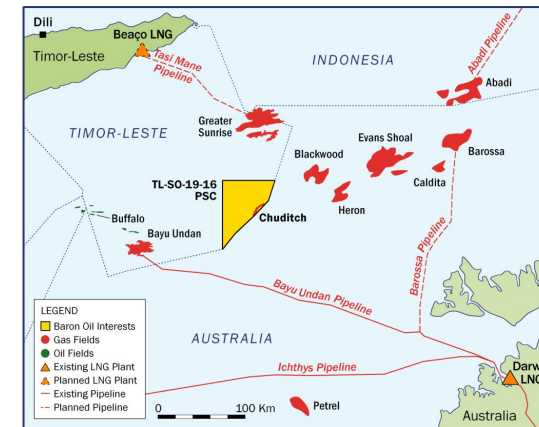
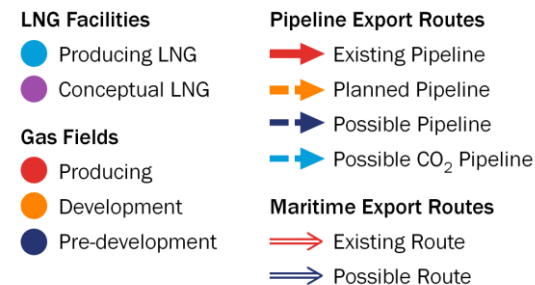
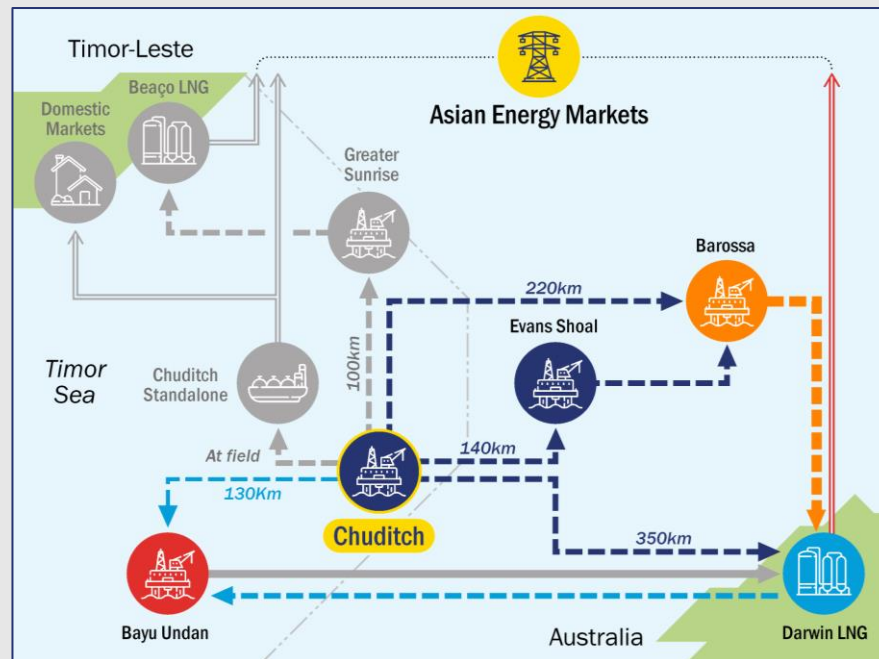
# Gas export option A: to future Timor-Leste (Beaço) LNG

- **Concept: Pipeline gas to Timor-Leste LNG**
  - via Greater Sunrise to Beaço LNG
  - possible alternative direct pipeline to Timor
  - CO<sub>2</sub> pipeline to Bayu Undan or other CCS hub
- **Opportunity: Timor-Leste only solution**
  - government understood to be keen to expedite Greater Sunrise development
  - possible reduced facilities at Chuditch with some processing at Greater Sunrise
  - no need to cross borders
- **Issues:**
  - Sunrise/Beaço LNG development uncertain (concept and timing)
  - Sunrise fiscal terms still being negotiated
  - deep waters between Sunrise and island
  - ongoing offshore and onshore studies (unitisation, development, terminal feasibility)



# Gas export option B: different paths to Darwin LNG

- **Concept: Export to Darwin LNG, Australia**
  - direct export via new pipeline; or
  - indirect via emerging Barossa/Evans Shoal infrastructure
  - CO<sub>2</sub> sent to Bayu Undan or other CCS hub directly, or indirectly via Darwin
- **Opportunity: Darwin LNG Expansion**
  - Upgrade project as Barossa comes online, extends facility life by >20 years
  - fixed development timeline at Barossa
  - Eni and Santos MOU on synergies may lead to further infrastructure development
- **Issues:**
  - requires tie in to third party facilities
  - potential queue for gas to Darwin
  - long pipelines may impact commerciality

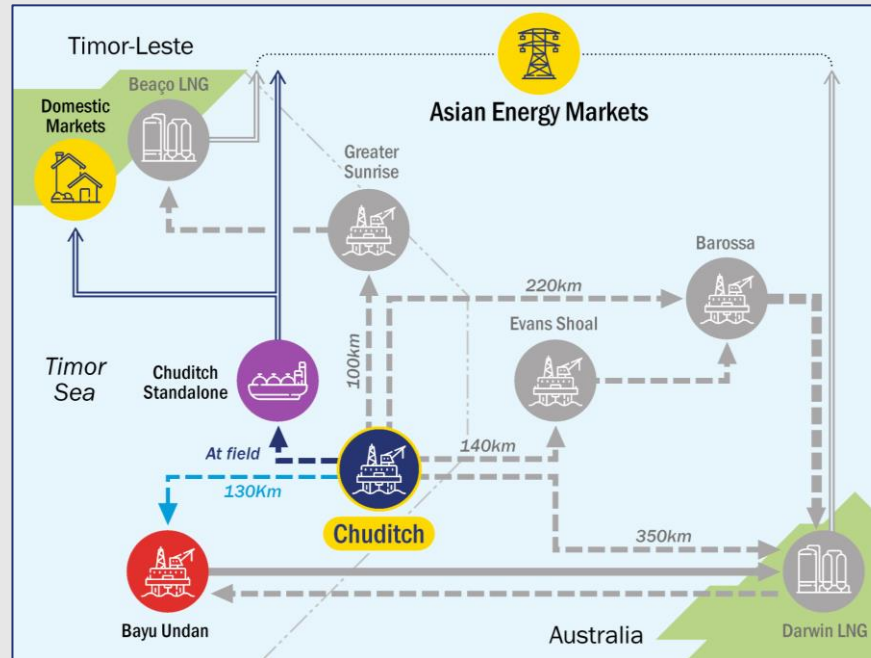


Santos plans significant upgrades of Darwin LNG at Wickham Point, to enable export of gas from multiple fields in the Timor Sea

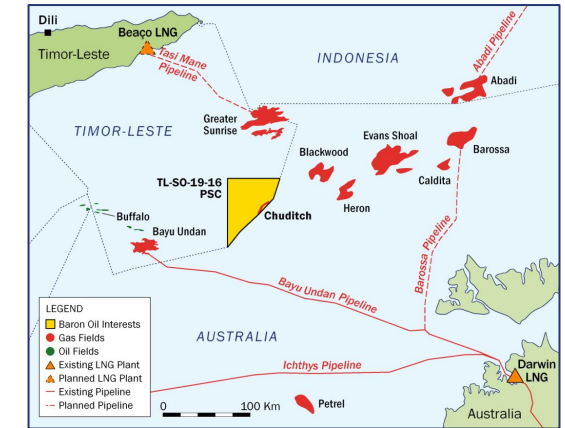


# Gas export option C: standalone Floating LNG (FLNG)

- **Concept: Floating LNG export at Chuditch**
  - no pipelines to other fields or cross border
  - in situ gas and condensate processing
  - carriers offload LNG & liquids for delivery
  - direct access to international markets
  - CO<sub>2</sub> pipeline to Bayu Undan or other CCS hub
- **Opportunity: FLNG technology established**
  - growing global utilisation since 2016
  - reduces pipeline requirements
  - scalable
  - facility redeployable at end of project
- **Issues:**
  - cost and complexity of FLNG projects



LNG Facilities	Pipeline Export Routes
● Producing LNG	→ Existing Pipeline
● Conceptual LNG	→ Planned Pipeline
Gas Fields	→ Possible Pipeline
● Producing	→ Possible CO <sub>2</sub> Pipeline
● Development	Maritime Export Routes
● Pre-development	→ Existing Route
	→ Possible Route



Floating LNG



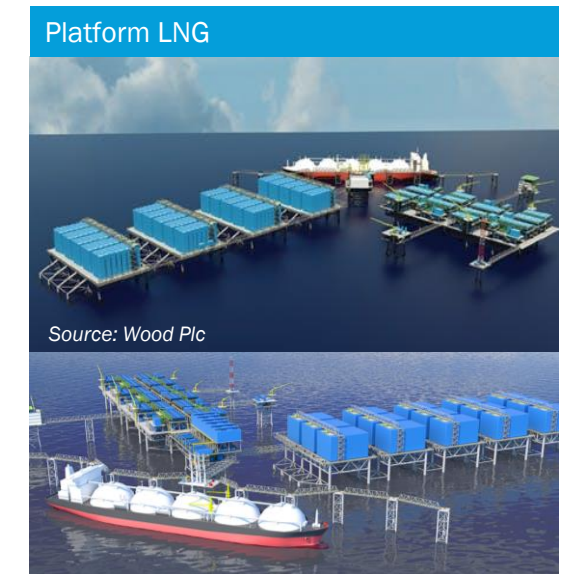
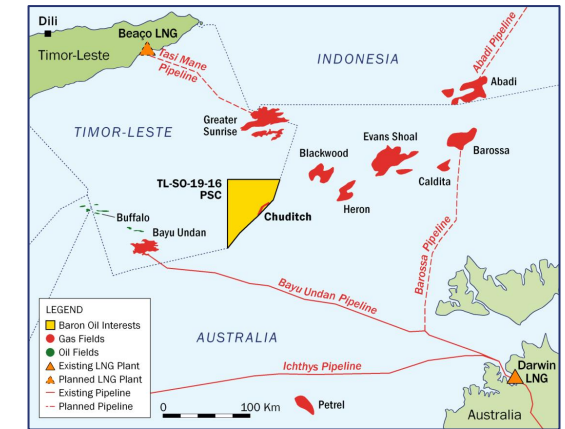
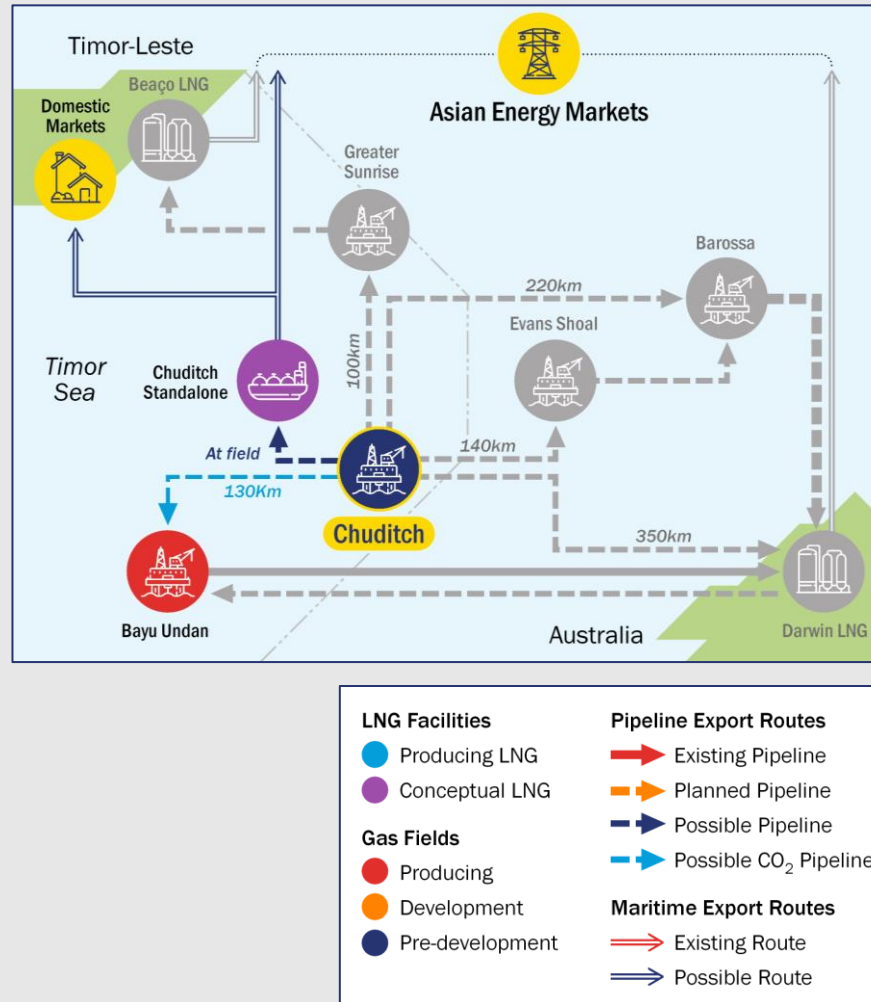
Petronas FLNG Satu, the world's first floating LNG facility, celebrated delivering its 50<sup>th</sup> shipment in 2021, with a production capacity of 1.2 million tonnes per annum





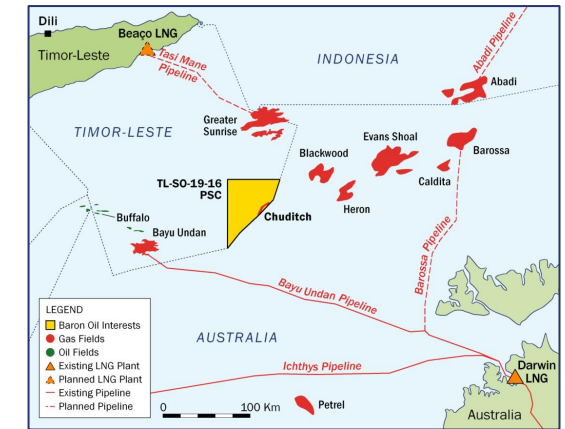
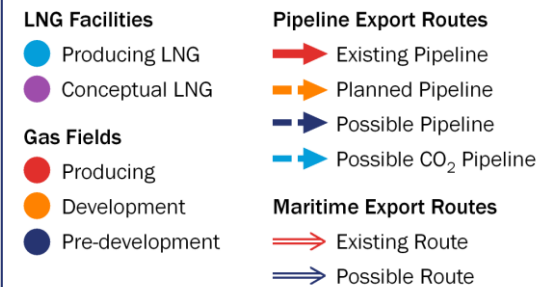
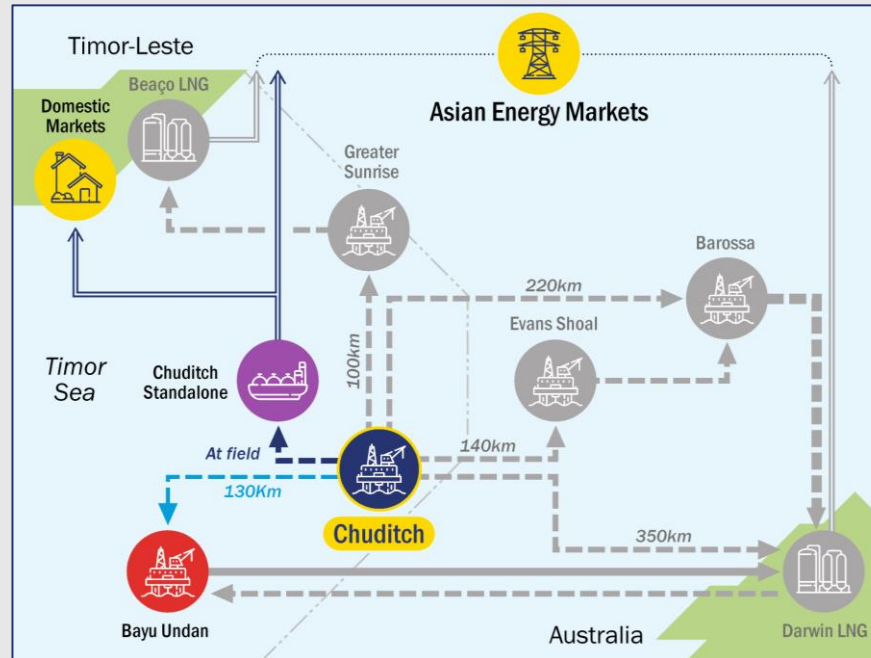
# Gas export option D: standalone Fixed Platform LNG (PLNG)

- **Concept: Platform LNG export**
  - modular platform with separate liquefaction, storage and personnel units
  - in situ gas and condensate processing
  - carriers offload LNG & liquids for delivery
  - CO<sub>2</sub> pipeline to Bayu Undan or other CCS hub
- **Opportunity: Conventional designs**
  - PLNG technology innovative but simple
  - Chuditch water depths sufficiently shallow
  - similar system planned for Bayu Undan by BHP in 1990s, prior to sale to ConocoPhillips
  - scalable, modular designs
  - should be cheaper and quicker than FLNG
  - proof of concept from LNG21 (US GoM)
- **Issues:**
  - no analogues yet operational
  - selection of LNG process important



# Gas export option E: standalone Compressed Natural Gas (CNG)

- **Concept: Compress gas at facility**
  - conventional platform development
  - compress gas by 99% for direct shipment
  - separate offloading of liquids
  - CO<sub>2</sub> pipeline to Bayu Undan or other CCS hub
- **Opportunity: Simpler cheaper gas export**
  - CNG important in Asia for transportation and electricity generation for scattered islands
  - no pipelines to other fields or cross border
  - allows flexible & phased solution
  - capital costs considerably lower than LNG
  - possible earlier first gas from Chuditch
- **Issues:**
  - not yet established offshore
  - Chuditch could potentially have too much gas for CNG scale solution



## Compressed Natural Gas (CNG)

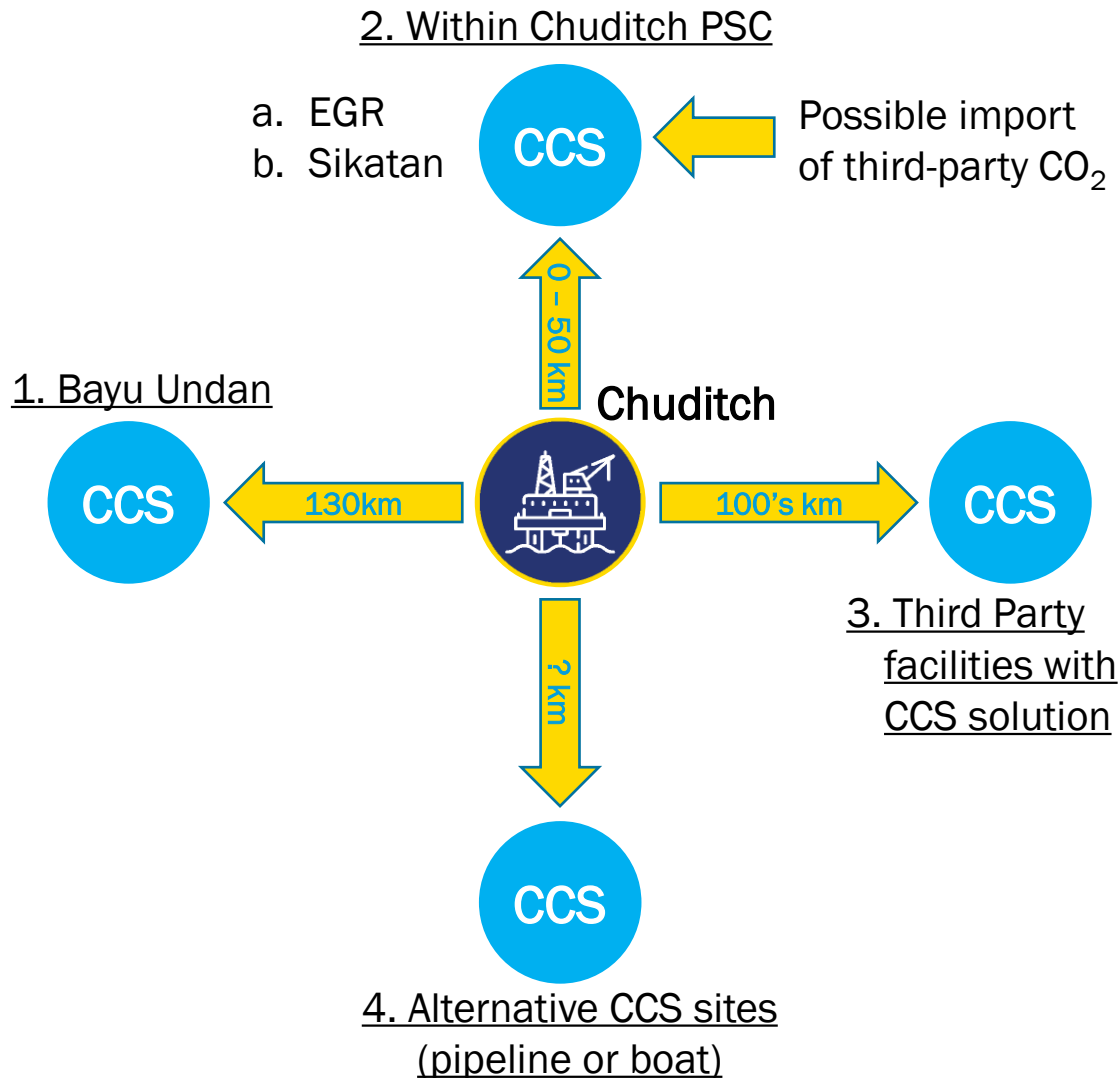


CNG provides flexible solutions for electricity supply to markets across SE Asia as well as being an important fuel for transportation.





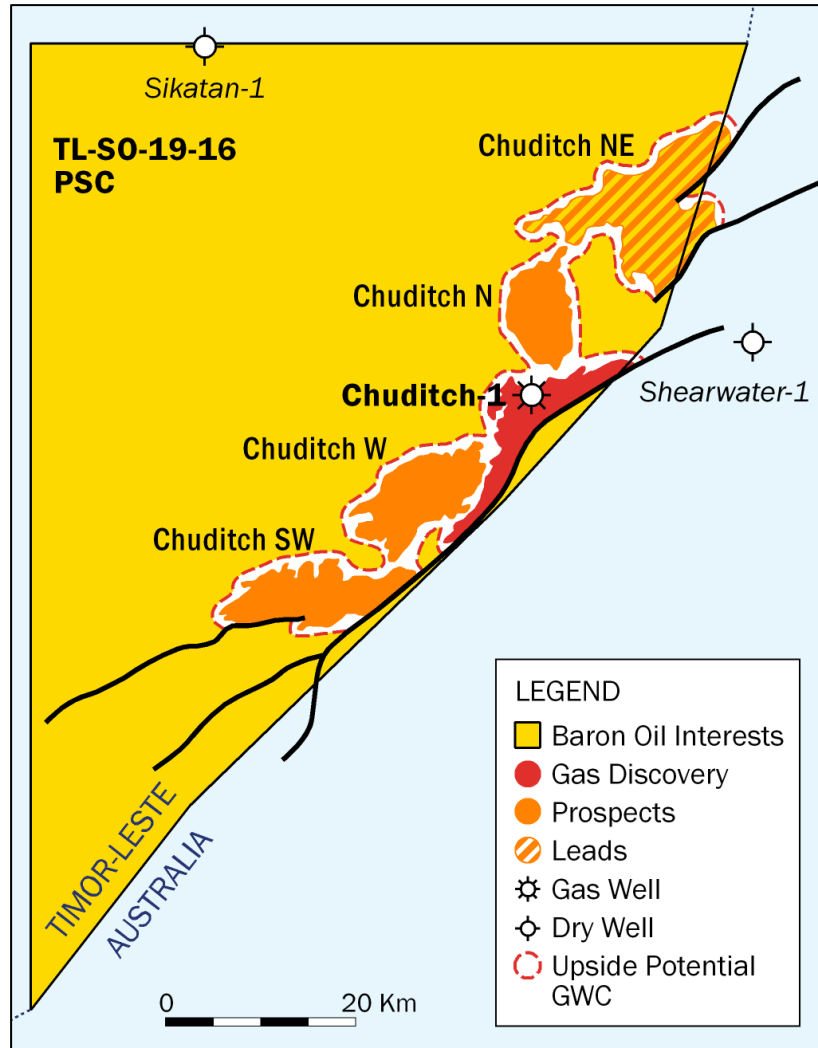
# Strategies for handling CO<sub>2</sub> in Chuditch gas



- Chuditch gas has 18% CO<sub>2</sub> (similar to Barossa)
  - expect to separate and store at appropriate CCS site
- Multiple possible CCS locations identified...
  1. Export to planned Bayu Undan CCS facility
  2. CCS solutions within PSC
    - a. Reinject gas at Chuditch
      - Enhanced Gas Recovery (EGR) scheme
    - b. Sikatan
      - CCS in Plover reservoir to north of Chuditch
  3. Export bulk gas for processing at third party facilities
  4. Export to other CCS facilities expected to emerge
    - e.g., Australia inaugural CCS licence round (2022)
- Development scenario studies ongoing



# Summary



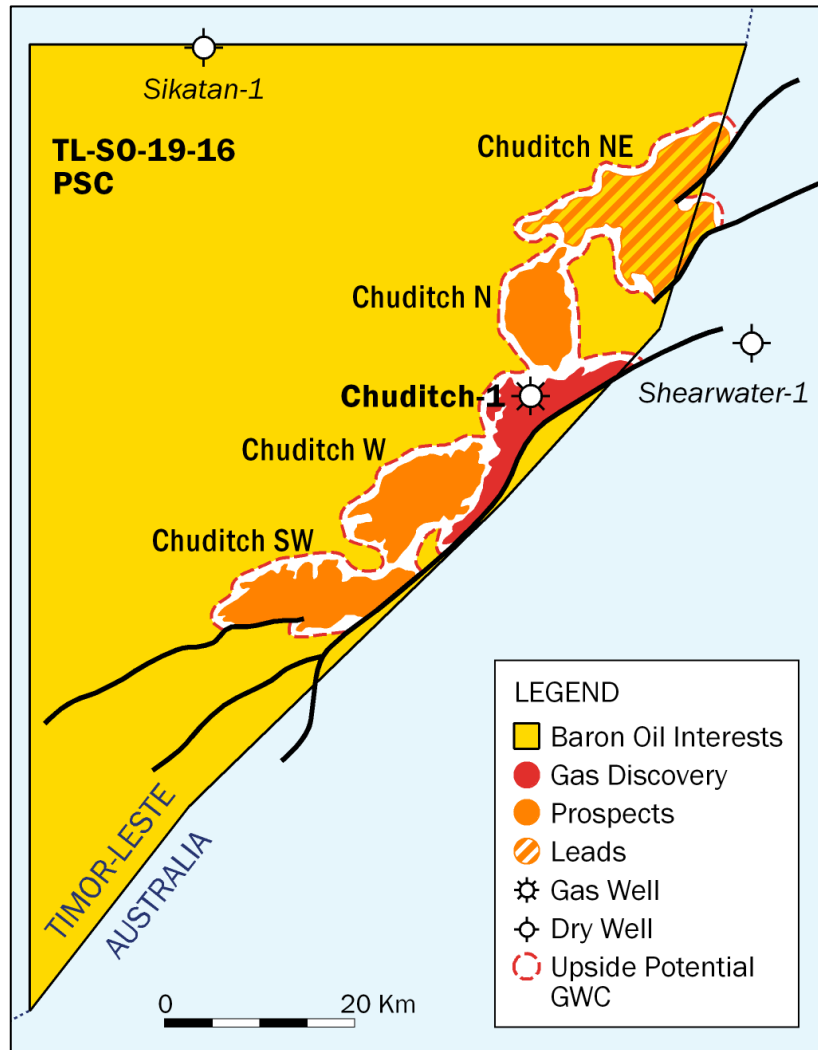
- Substantial gas discovery on a proven trend with upside
- Seismic reprocessing and other studies progressing well
  - final 3D PSDM on track for delivery in Q2 2022
  - Q4 2022 decision point for high impact drilling in 2023
- Multiple export solutions for gas identified
  - not dependent on any single concept/route
  - ability to move forward with standalone solutions
  - development strategies for handling CO<sub>2</sub> and CCS
- Farmout initiative ongoing
- This year is going to be important for Chuditch & Baron
  - anticipate acceleration in newsflow during 2022



## Appendix Supplementary materials and Glossary



# Chuditch Gas and Condensate Gross Hydrocarbon Resources



Prospect / Lead	P90 gas	P90 cond	P50 gas	P50 cond	P10 gas	P10 cond	Pmean gas	Pmean cond	POSg
Chuditch-1	457	1.1	713	3.3	1,077	8.4	729	3.9	100%
Chuditch West	163	0.5	405	3.1	987	12.4	483	4.8	51%
Chuditch SW	193	0.6	482	3.7	1,174	14.7	575	5.8	40%
Chuditch North	142	0.5	355	2.7	865	10.9	423	4.2	44%
Chuditch NE	389	1.3	970	7.5	2,365	32.1	1,158	11.6	20%
<b>Total (arithmetic)</b>	<b>1,344</b>	<b>4</b>	<b>2,924</b>	<b>20</b>	<b>6,467</b>	<b>78</b>	<b>3,368</b>	<b>30</b>	
<b>Total (MMBOE)</b>	228		507		1,156		591		

- Current assessments based on existing 2D seismic data
- Resource Report provided by THREE60 Energy, July 2021
- Resource Assessment based on 2D seismic mapping
  - Probabilistic In-Place estimations, recovery factor are deterministic
  - Risking applied based on current database and knowledge
- Resources currently categorised as Prospective but aim to convert Chuditch-1 gas to Contingent in 2022



# Glossary

	bcpd	Barrels of condensate per day
	Bscf or Bcf	Billion standard cubic feet of natural gas
	CCS	Carbon capture & storage
	Chuditch or Chuditch PSC	Production Sharing Contract for offshore petroleum operations in Timor-Leste, contract area TL-SO-19-16
	CNG	Compressed natural gas
	Contingent Resources	Quantities of petroleum estimated, as of a given date, to be potentially recoverable from known accumulations, but the applied project(s) are not yet considered mature enough for commercial development due to one or more contingencies.
	EGR	Enhanced gas recovery
	FID	Final investment decision
	FLNG	Floating liquefied natural gas
	High Estimate	Denotes the high estimate qualifying as Prospective Resources. Reflects a volume estimate that there is a 10% probability that the quantities actually recovered will equal or exceed the estimate
	JKM	Japan Korea marker
	LNG	Liquefied natural gas
	Mean Estimate	Reflects a median or best case volume estimate of resource derived using probabilistic methodology. This is the mean of the probability distribution for the resource estimates and can be skewed by high resource numbers with relatively low probabilities
	MMbbl	Million barrels
	MMBtu	Million British Thermal Units
	mmscfpd	Million standard cubic feet of gas per day
	MOU	Memorandum of understanding
	PLNG	Platform liquefied natural gas
	PSDM; PSTM	Pre-stack depth migration; Pre-stack time migration
	Prospective Resources	The total quantities of petroleum that are estimated to exist originally in naturally occurring reservoirs, as of a given date. Crude oil in-place, natural gas in-place, and natural bitumen in-place are defined in the same manner.
	SPE PRMS 2018	The Society of Petroleum Engineers’ (“SPE”) Petroleum Resources Management System (“PRMS”) is a system developed for consistent and reliable definition, classification, and estimation of hydrocarbon resources prepared by the Oil and Gas Reserves Committee of SPE and approved by the SPE Board in June 2018 following input from six sponsoring societies: the World Petroleum Council, the American Association of Petroleum Geologists, the Society of Petroleum Evaluation Engineers, the Society of Exploration Geophysicists, the European Association of Geoscientists and Engineers, and the Society of Petrophysicists and Well Log Analysts. The total quantity of petroleum that is estimated to exist originally in naturally occurring reservoirs, as of a given date. Crude oil in-place, natural gas in-place, and natural bitumen in-place are defined in the same manner.
	SundaGas Banda Unipessoal, Lda	Operator of the Chuditch PSC, a wholly owned subsidiary of Baron Oil Plc
	Tcf	Trillion standard cubic feet of natural gas
	TIMOR GAP Chuditch Unipessoal, Lda	Subsidiary of Timor-Leste’s National Oil Company, TIMOR GAP E.P.
	TTF	Gasunie Title Transfer Facility



# BARON OIL Plc

## Contact

Andy Yeo - Chief Executive

Jon Ford - Technical Director



[info@baronoilplc.com](mailto:info@baronoilplc.com)



Executive office  
PO Box 404, Hastings TN34 9LF



[baronoilplc.com](http://baronoilplc.com)

