

# Excerpts from presentation by Michel Buonaiuto, Development Team Lead at Santos to IN-VR's Timor-Leste Online conference, 9 July 2020

## Introduction to Santos & Bayu Undan

July 2020

Santos



Bayu-Undan Facility



Michel Buonaiuto

Michel Buonaiuto

# Bayu-Undan

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<b>Water Depth:</b>	80-100 m
<b>Discovered:</b>	Bayu-1 drilled in 1995
<b>Appraisal:</b>	10 appraisal wells 1995-1998 ; ~ 1km core ; 12 DSTs
<b>Fluid type:</b>	Retrograde Gas Condensate (High Liquids Content)
<b>Drive Mechanism:</b>	Strong aquifer drive (plug backs to reduce water production)
<b>First gas:</b>	Feb 2004 gas recycling only ; Feb 2006 gas exports to DLNG
<b>Development:</b>	Extraction and sale of LPGs, condensate and LNG
- Phase 1 :	8 producers, 4 gas injectors, 1 shallow water disposal well
- Phase 2 :	4 producers and 1 shallow water disposal well
- Phase 3a :	2 subsea producers (1 suspended)
- Phase 3b:	3 producers (1 subsea ; 2 platform)



## Bayu Undan, Santos & Timor Leste Success Story

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### To Date

- Production and revenue exceeded initial development plan
- Maximise economic recovery and maintain sales gas plateau

### Future

- Opportunity for another Infill Well campaign
- Decommissioning Project

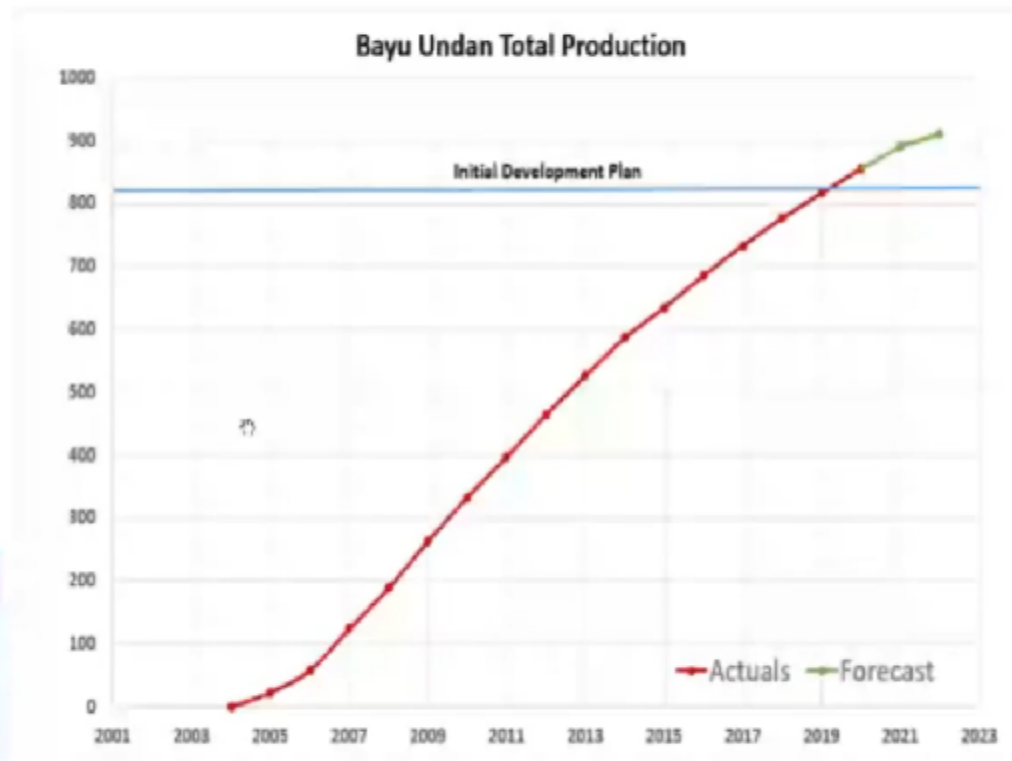
### Bayu-Undan Timor-Leste Revenue

Initial development plan

**\$3.1B**

Actual to YE 2019

**\$21.8B**



4



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## Bayu Undan TL Local Content

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- Over US\$164.5 MM local content expenditure as of Dec 2019
  - Goods and Services \$69.6 MM
  - Training & Employment \$82.9 MM
  - Community Invest & CSR \$12 MM
- 343 Timor-Leste nationals employed across activities at Bayu-Undan
- Timor-Leste employment represents 37% of total offshore workforce
- Dili Engineering Office: ~50 personnel providing technical and administrative services.



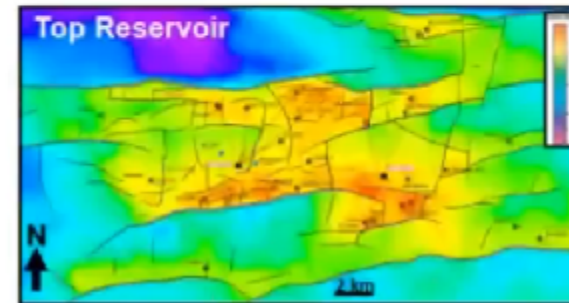
Dili Office: Cost effective organization supporting offshore, LNG, and international operations



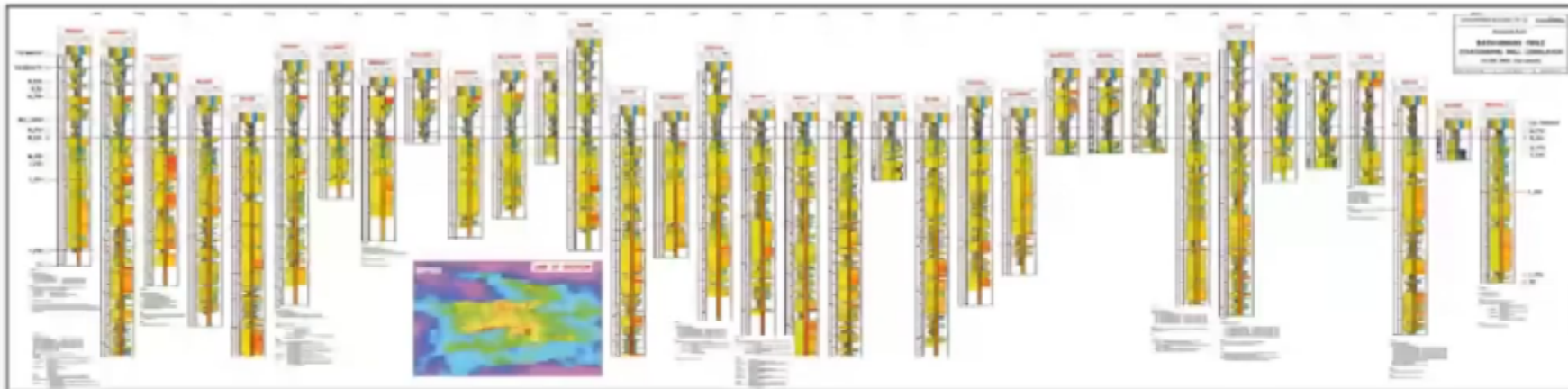
# Bayu-Undan Reservoir

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- + Original 200m+ vertical column height. Common Free-Water-Level
- + Jurassic fluvio-deltaic reservoir with low-clay Quartzose sandstones
  - High perm, high net-to-gross with moderate porosity
- + Strong very large regional aquifer – bottom & edge drive
- + Highly faulted / fractured. No fault compartmentalisation.
  - Excellent lateral and vertical pressure communication
  - Drives water & lean gas breakthrough



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World-class hydrocarbon and reservoir quality

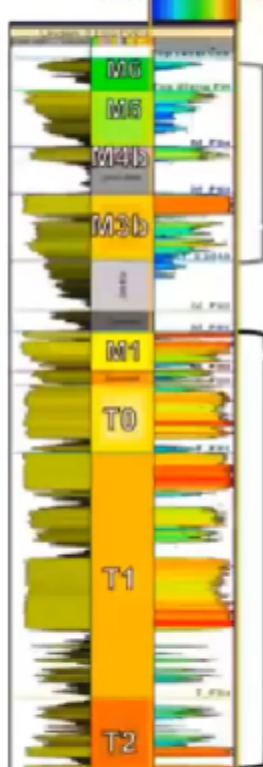
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# Reservoir Mechanisms and Recovery Implications

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Low to No-Flow Sand

High-flow Sand



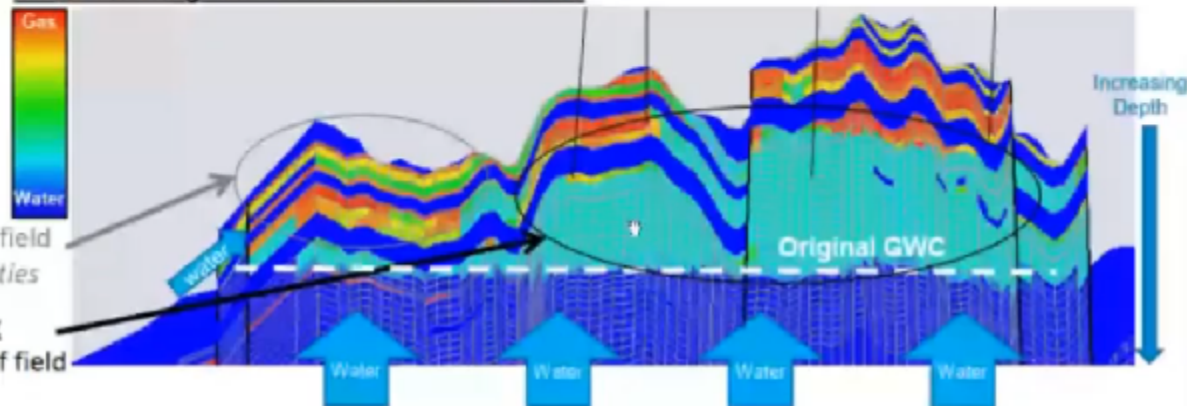
## Upper Elang Sands

Water from Edges of field  
*Remaining opportunities*

## Plover & Lower Elang

Water from Bottom of field

Model showing Gas Saturation in Late field life



- **Strong aquifer-drive reservoir**
  - Water expands naturally to replace net gas removed
  - Maintains low pressure depletion
- **Gas recovery:**
  - ↑ Wells per area, sand connectivity and pressure support
  - ↓ Water partially traps Gas & impacts well productivity on breakthrough

Future gas within mostly shallower zones and distal edges of the field

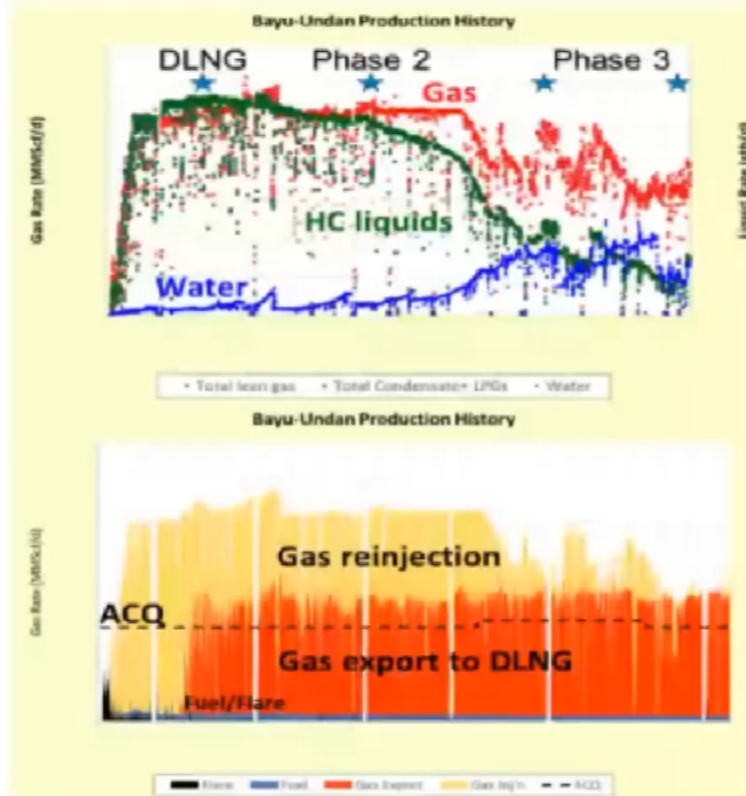


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# Long Term Production Trends

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- + Initial Full gas recycle
  - World's first offshore full liquids fractionation project
- + Subsequent partial gas recycle → export to DLNG
- + Water breakthrough impacts productivity
  - Gas deliverability declining with increasing water production
  - Condensate and LPGs decline due lean gas breakthrough and declining gas production
  - Majority of produced gas now being sold
- + Further drilling accessing incremental resources and maintaining gas capacity, extending field life

Strong production and operations: world-first development attracting continuous positive investment



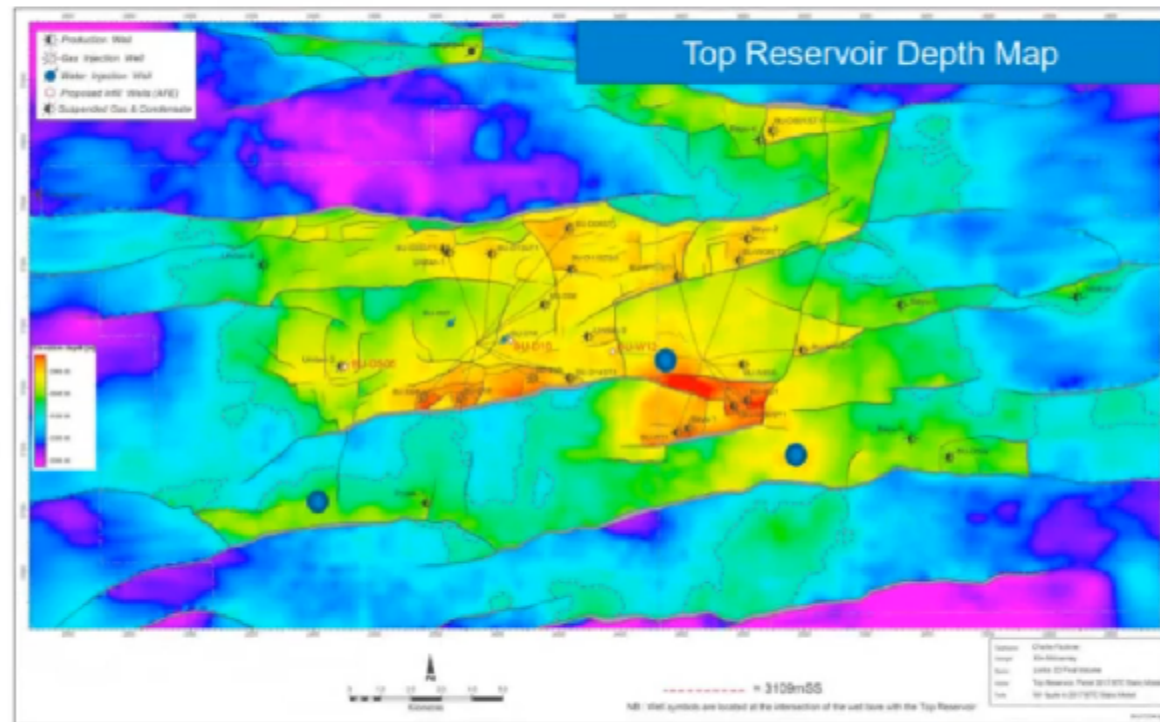
# Bayu Undan - Phase IIIC Infill Opportunity

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- + 2019 production data drove review of additional infill opportunities
- + 15 infill well locations examined between 2017 and 2020
- + Three opportunities high graded



● Infill Well Opportunity

Working on opportunities to maximise & extend field production as long as possible

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# Summary

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## + Santos

- Experience in developing & operating onshore and offshore facilities, FPSO & platform structures, subsea & pipelines
- Cost effective and innovative decommissioning
- Strong commitment to local capability build and development using local suppliers

## + Bayu Undan

- Production and revenue exceeded initial development plan

## + Bayu Undan Local Content

- 343 Timor Leste nationals employed across Bayu Undan activities
- Timor Leste represents 37% of total offshore workforce
- Timorese career progression and development
- Supports Timor Leste Community Investment

## + Phase 3C Infill Wells

- Opportunity to extend field life
- Maximise economic recovery



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