CORPORATE BROCHURE

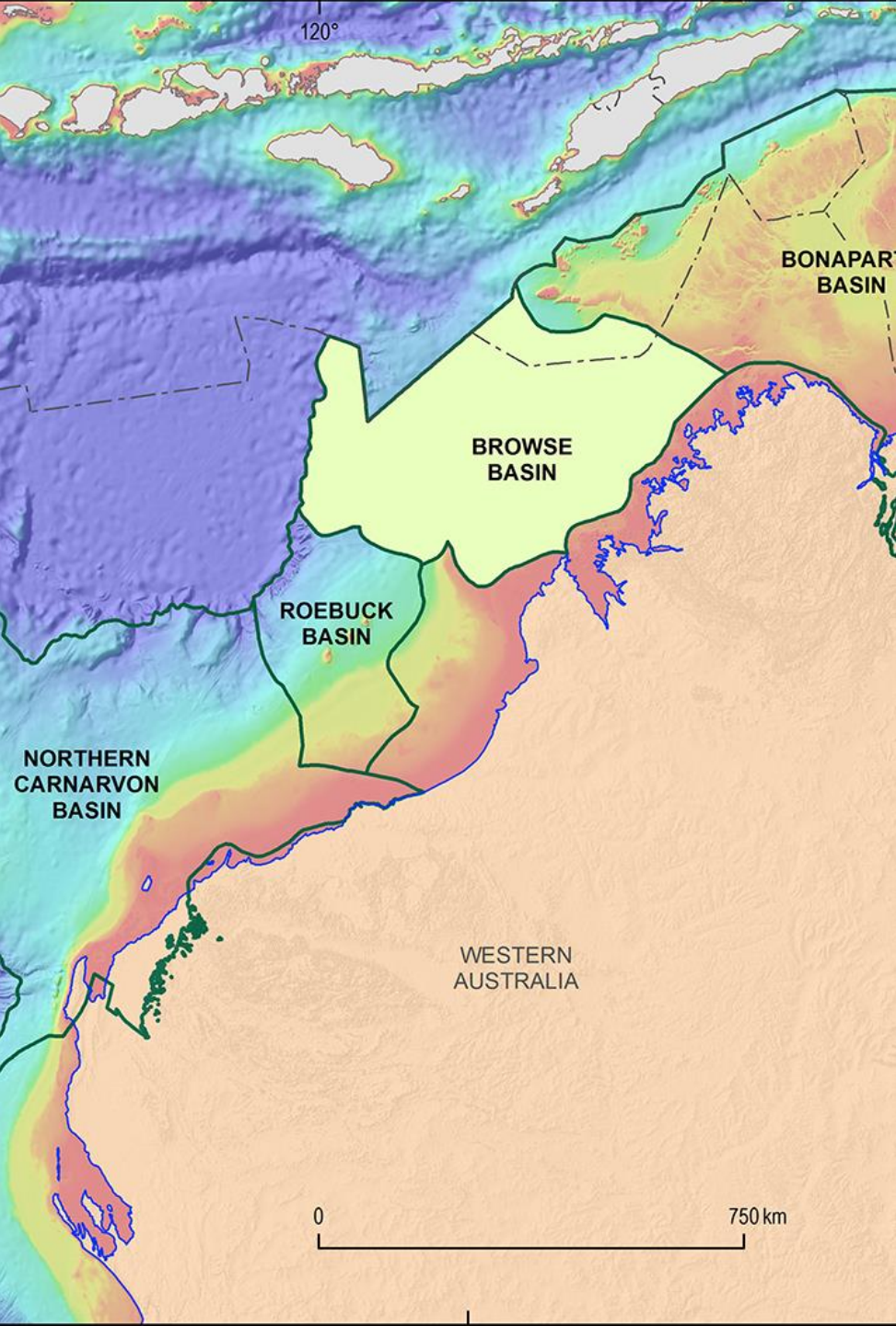**BROWSE ENERGY**

Australian Company Number 614 663 188

April 2020

BROWSE
ENERGY

The name Browse Energy, comes from Australia's Browse Super-basin. It is located offshore Western Australia, approximately 425 km north of Broome. The basin continues to be a premier exploration target and four hydrocarbon families/petroleum systems have been identified. In 2018, two main hydrocarbon accumulations, Ichthys and Prelude, commenced production of liquefied natural gas (LNG) and condensate by INPEX and Shell. Also, Woodside's Browse project is Australia's largest untapped conventional gas resource.

Our experts have proudly worked on some of these world lass projects including:

➢ Integrated Production Modeling for Woodside's Browse Project and supporting development concept select

➢ Integrated Production Modeling for INPEX's Ichthys Project and supporting development concept select

➢ Integrated Production Modeling for ConocoPhillips' Browse Basin Project and supporting development concept select

About us

Founded in Perth, Western Australia, we're providing Petroleum Engineering Services at the highest level of quality and building successful, enduring partnerships with all our clients. We strive to deliver transparent and confident advice to our client at all time and we work extensively with our partners in complementing our services

Companies we have recently worked for:

Services

Our Services can broadly be described as follows:

❏ Integrated Subsurface Studies

 ➢ Geophysical interpretation
 ➢ Basin Modelling
 ➢ Exploration prospects evaluation
 ➢ Static and Dynamic Reservoir Modeling
 ➢ Reserves estimation and classification
 ➢ Due diligence and project reviews
 ➢ Smart well design and modelling
 ➢ Well Testing (Planning, Supervision, Interpretation)
 ➢ Analytical reservoir studies and training
 ➢ Guidelines and Peer Reviews
 ➢ IOR-EOR Assessment
 ➢ Capital Planning, Economic Analysis and Risk Assessment

❏ Integrated Production Modeling

 ➢ Surface Network Modeling
 ➢ Production allocation,
 ➢ Production optimization and forecasting

❏ Digital Oilfield (Petex, OVS)

 ➢ Production Surveillance and Monitoring
 ➢ Realtime optimization
 ➢ Workflow Automation

❏ Drilling & Well Engineering

 ➢ Well Modeling (concept screening)
 ➢ Smart well design (horizontal, multilateral)
 ➢ Inflow Control Valve modeling
 ➢ Well Completion Basis Of Design
 ➢ Tubing Size and Material Selection
 ➢ Tubing Stress Analysis
 ➢ Artificial Lift Design and Sand Control
 ➢ Completion and Work-over program
 ➢ Well Stimulation design
 ➢ Advanced Hydraulic fracture Modeling
 ➢ Well Blowout and kill modeling
 ➢ Well hydraulic Analysis
 ➢ Well Plan and Drilling program
 ➢ Drilling Optimization

BROWSE ENERGY

Our Projects

List of recent projects undertaken by our Browse Energy is given below:

Client	Project description	Date
Oil Search, Australia	PNG's Agogo: Static and Dynamic Model Construction and Calibration to assess Infill drilling opportunities.	2019-2020
Western Gas, Australia	Equus Project: Reviewing and rebuilding 4 dynamic reservoir models for phase1 development plan, Reviewing and rebuilding the integrated production mode	2019
ConocoPhillips, Australia	Barossa Project: Reviewing the Integrated Production Model (PROSPER, GAP, Resolve, Eclipse)	2019
Victoria Government, Australia	Underground Gas Storage Dynamic Simulation	2018-2019
Santos, Australia	VanGogh Project: Phase 2 Infill Drilling Campaign Assessment for VanGogh Oil Field	2018-2019
INPEX operations, Australia	Ichthys LNG: Integrated Production Modelling, production optimization and forecasting and providing support to field development concept select	2017-2019
OMV, New Zealand	Maui and Pohokura Fields: providing support for model migration from Shell to OMV, constructing integrated production model (PROSPER, GAP, RESOLVE, ECLIPSE)	2018-2019
Woodside, Australia	Tidepole Project: providing production readiness support Constructing Smart Well models (Prosper and GAP) and preparing well Operating envelopes and guidelines	2016-2017
ConocoPhillips, Australia	Browse Basin: constructing the integrated model (PROSPER, GAP, MBAL, RESOLVE), providing production forecasting, sensitivity analysis to support field development concept select	2016-2017

BROWSE
ENERGY

Integrated Subsurface Studies

Seismic Interpretation to Dynamic Modelling

❑ Browse Energy assist the clients in conducting integrated subsurface studies and reservoir characterization.

❑ We can support projects from a single well evaluation to fully integrated multi-well studies, data room evaluations.

❑ We carry out Geophysical, Petrophysical, Static, Material Balance and Dynamic modelling.

❑ We use commercial industry standard platforms such as Petrel, Eclipse, INTERSECT, tNavigator, REVEAL, CMG, etc for our modelling considering clients objective, requirements and resources.
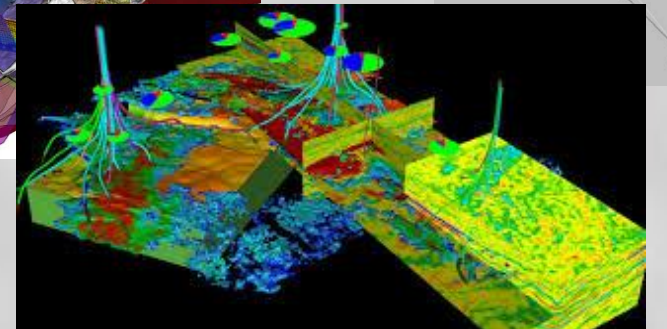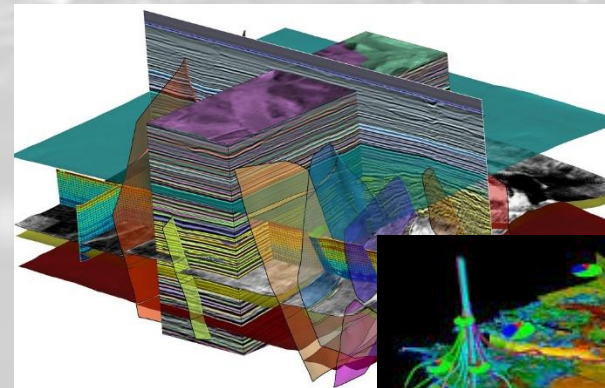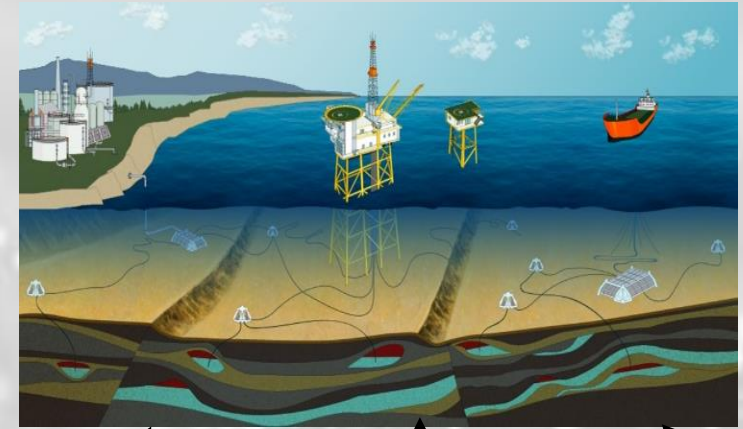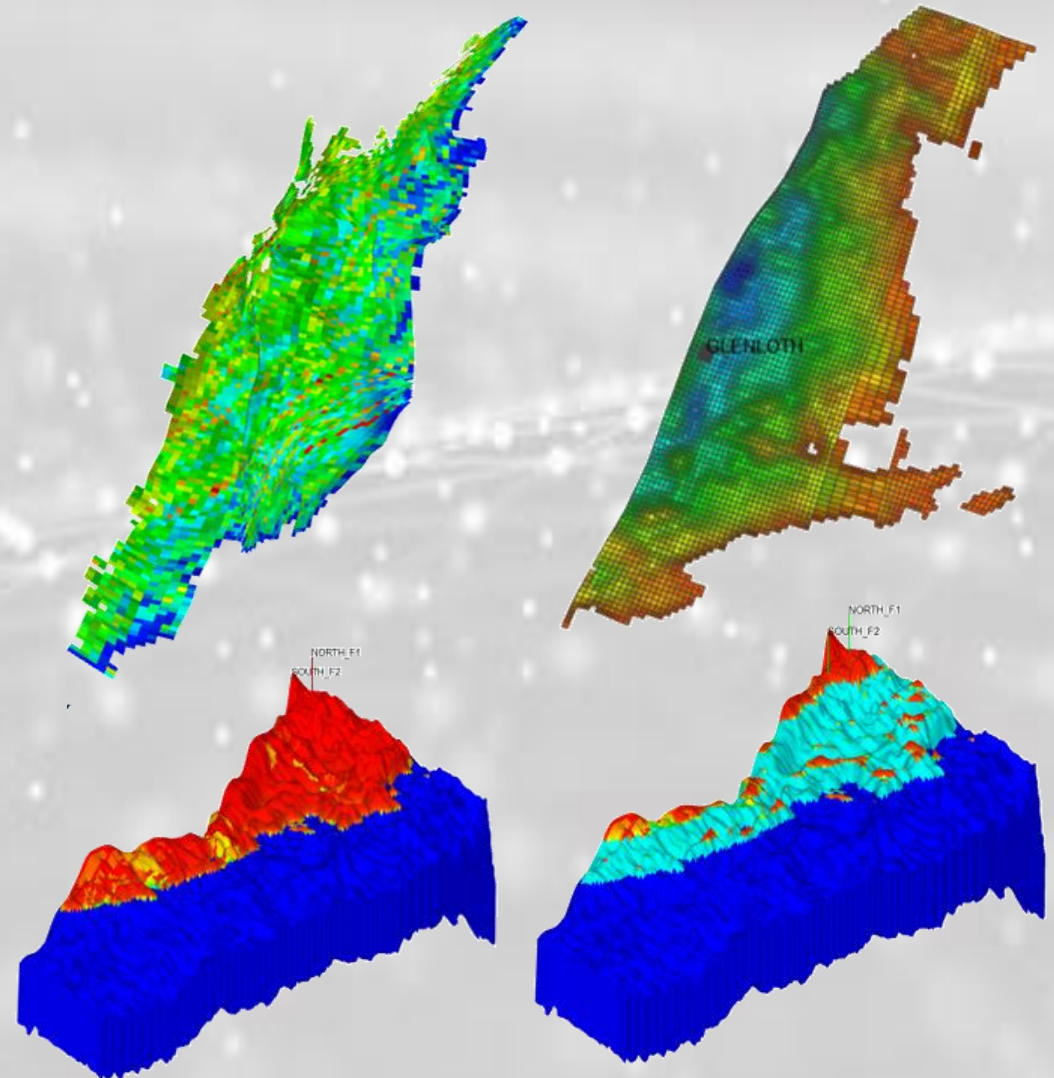
Reservoir Modeling Case Studies

Greenfield Gas Condensate, Australia

Scope of Project:

❑ Reviewing and rebuilding 4 dynamic reservoir models for phase1 development plan,

  ➢ DST history matching
  ➢ Aquifer modelling
  ➢ Production forecasting for Low, Mid, and High realizations
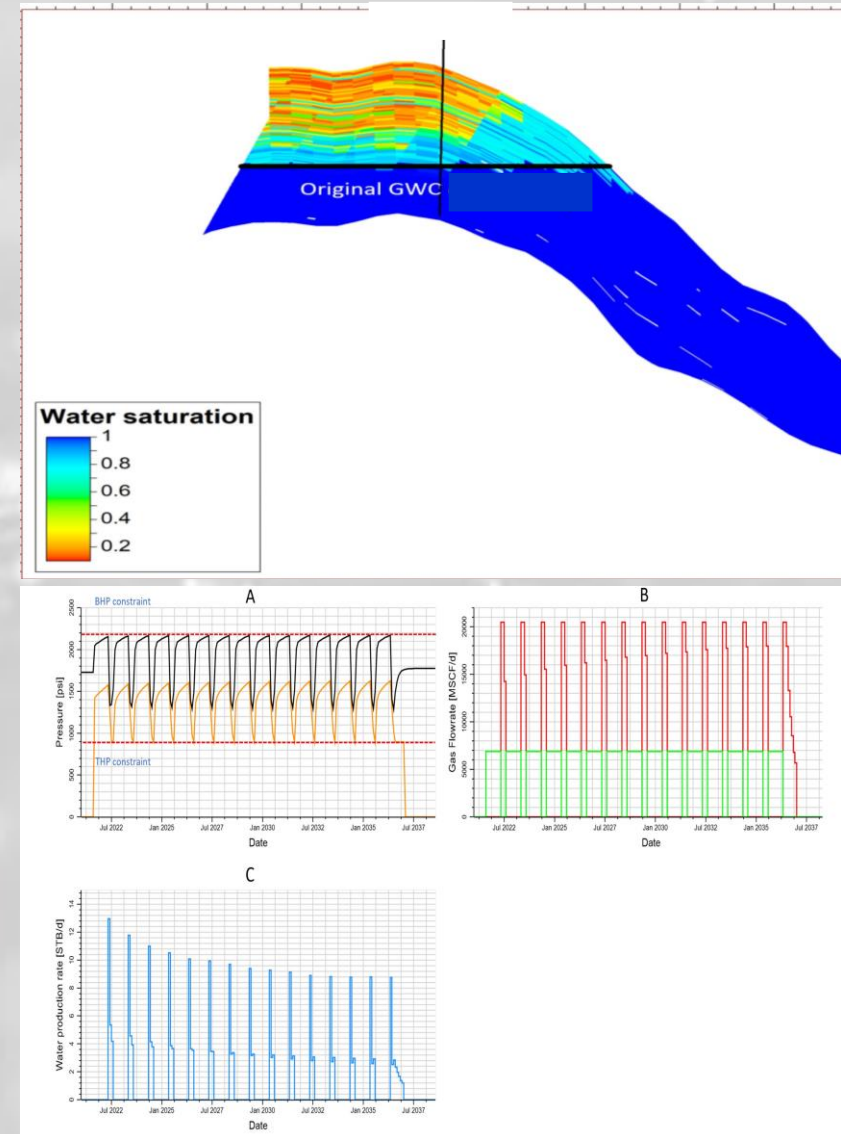 ➢ Reserve estimate

Reservoir Modeling Case Studies

Underground Gas Storage, Australia

Scope of Project:

❑ Static model construction for an Otway Basin

❑ Dynamic model construction and history matching

❑ Underground Storage Facility scenario's forecast

Reservoir Modeling Case Studies

Brownfield Oil Field, Australia

Scope of Project:

❑ Static model update with recently drilled 2 new horizontal infill Wells data

❑ Material balance model construction to asses cross fields hydrocarbon exchange

❑ Model construction and history matching to captured Inter-field recorded contacts

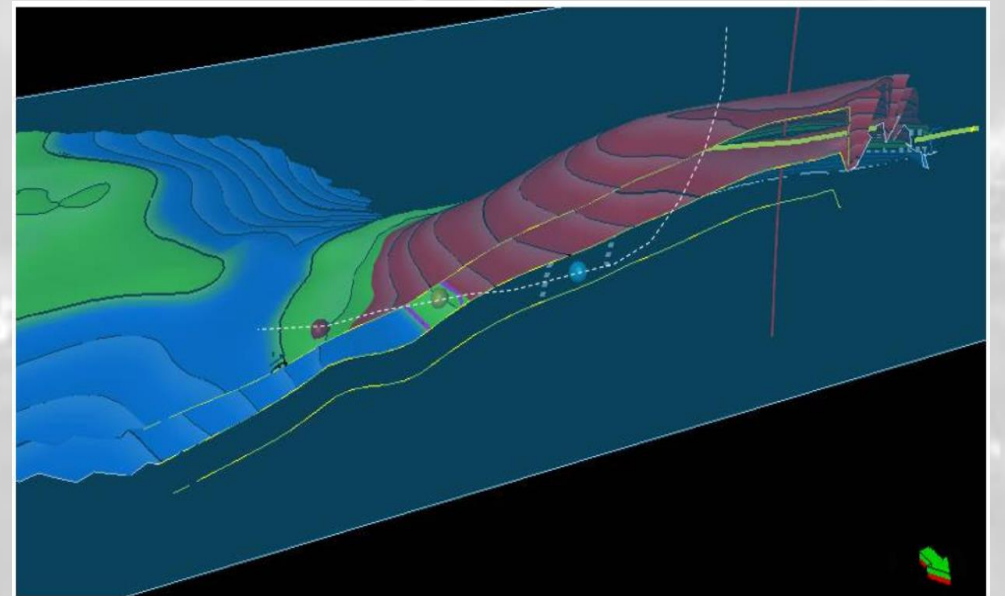❑ Phase 2 infill drilling production forecast and optimization
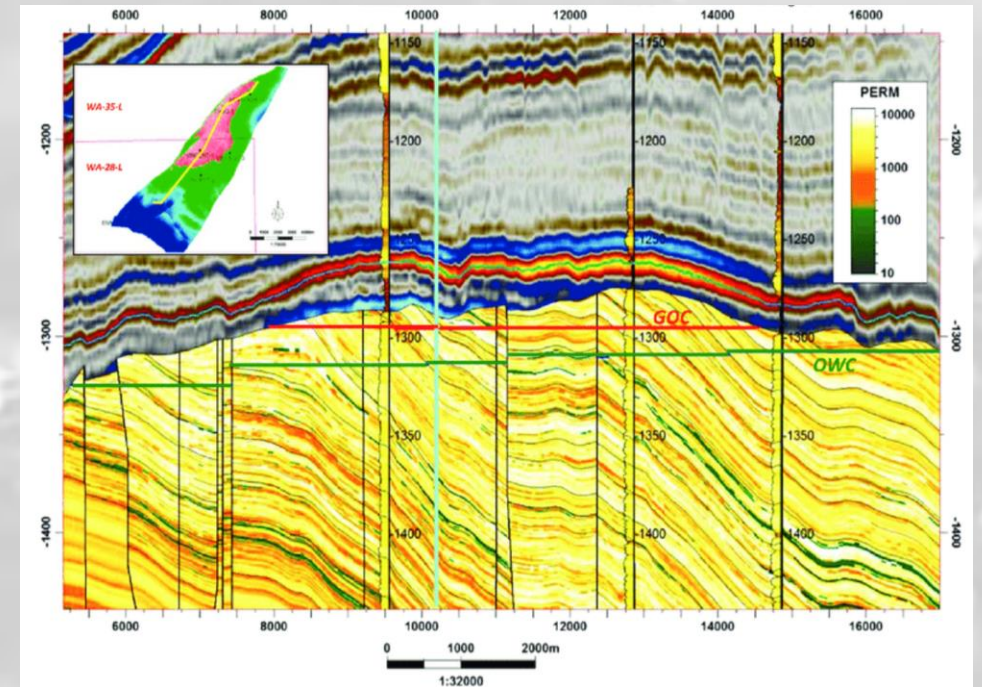
Reservoir Modeling Case Studies

Brownfield Oil Field in PNG, Australia

Scope of Project:

❑ QC and review of newly built static model

❑ Dynamic Model construction and History matching

❑ Infill drilling opportunities performance evaluation

❑ Gas cap blow down scenario forecast

Integrated approach

❑ Integrated workflow:
each module (reservoir, well, surface network and process facility) interacts seamlessly and managed by one master controller, Resolve. Hence, it is easier to manage consistent input data and assumptions and view the results for multiple scenarios.

❑ Integration of multiple disciplines:
Petroleum, Reservoir, Process Engineers and the Asset Manager can view and work on the integrated model together. They can also analyze the results and make integrated decisions for optimization and sensitivity study.

❑ Integrated solution:
using one integrated approach to model the dynamic behaviour of the fluid flow, saturations and pressures at every node in the system, ie. from reservoir to the process facility. Any changes in any of the module, eg. Pipeline sizing, will have impact on the reservoir, wells, process facility, and the overall production system. Hence, an optimum solution can be drawn from the IPM.

Integrated Production System Modeling

Integrated Production Modelling (IPM)

RESOLVE (Master Controller)
- Event Scheduler
- Workflow Manager
- Data Transfer between each module

MBAL or Eclipse (Reservoir)

- Calculate the fluid flow and pressures in the reservoir.
- Fluid Saturations and Compositions in the reservoir.

GAP (Surface Network)

- Wells.
- Pipelines.
- Pumps, Compressors
- Flares
- Separators

Excel or Hysys / Unisim (Process Facility)

- Product splits calculation, important for a Retrograde Condensate field to determine LNG, DomGas, Condensate, LPG, Fuel and Flare.

+

Excel (Cost Model)

- Building Cost Blocks
- Revenue with assumed sale price of the products.
- Scheduled escalation factors and currency exchange.

BROWSE
ENERGY

12

Integrated Production System Modeling

❑ Modelling the entire production system from the reservoir through the wells, surface gathering system and processing plant facility

❑ Seamless integrated workflow from reservoir to the processing plant/facility.

❑ Where?

➢ **Brownfield Development**: production allocation, production optimization, identifying new opportunities (infills, compressions, optimizing offtakes, drilling timing and sequence, compression timing), and mid to long term production forecasting for reserve booking, model calibration and production debottlenecking

➢ **Greenfield Development**: screening different Field Development scenarios by running IPM together with cost models for the highest economic value. (what if scenarios, optimizing flow line sizing, drilling sequence, etc)
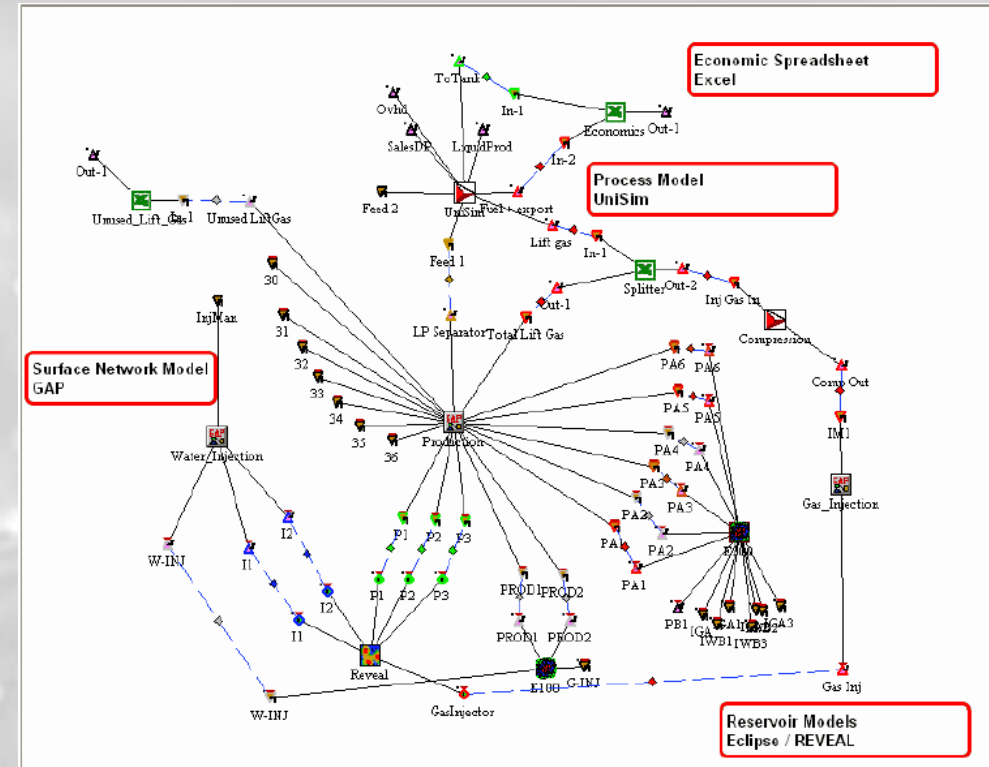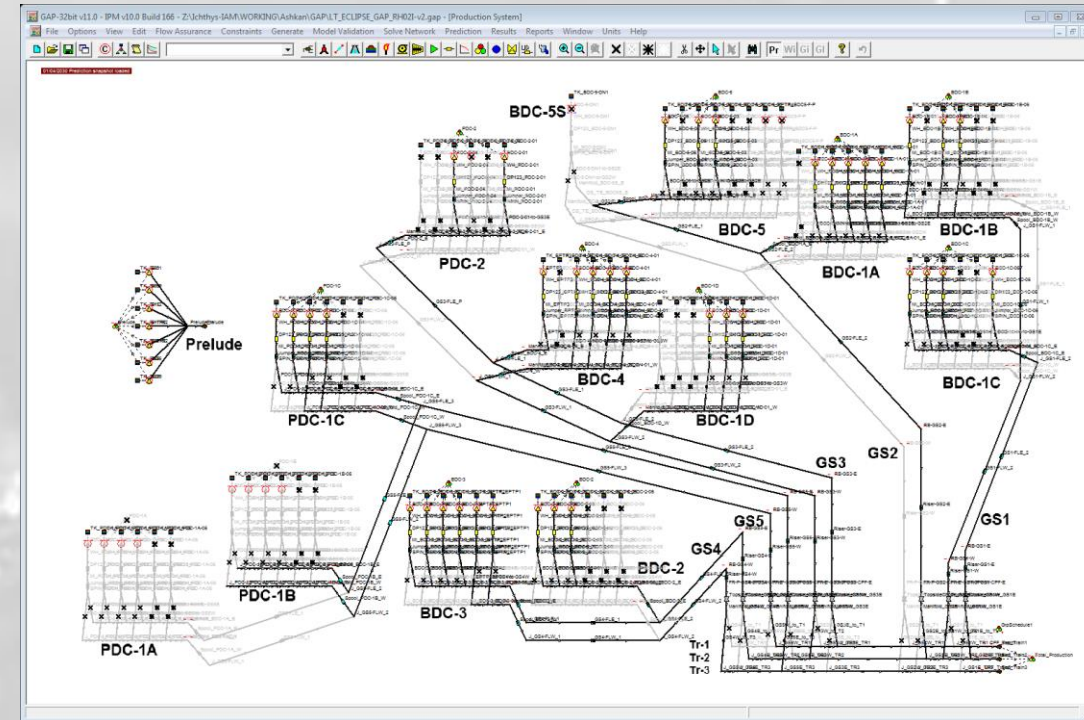
IPM Case Studies

Greenfield Gas Condensate, Australia

Scope of project:

❑ Reviewing existing Integrated Production Model and improve/develop production workflow

❑ Production forecasting and for development concept select

❑ Production optimization
  ➢ Optimizing condensate production
  ➢ Optimizing compression timing
  ➢ Optimizing routing well to flow line and flowline to processing trains
  ➢ Incorporating flow assurance constrains
 ➢ Incorporating condensed water calculating

IPM Case Studies

Brownfield Gas condensate, New Zeeland

Scope of project:

❑ Constructing the network models for two assets in GAP and matched to client inhouse network models

❑ Constructing eclipse models (Low, Mid, High) and matched to client in-house subsurface models

❑ Integrating subsurface and surface models in Resolve and developing the production workflows (logic)

  ➢ Well initial rate setting
  ➢ Gas contract adjustment
  ➢ Gas reinjection
 ➢ Well scaling
  ➢ Well priorities
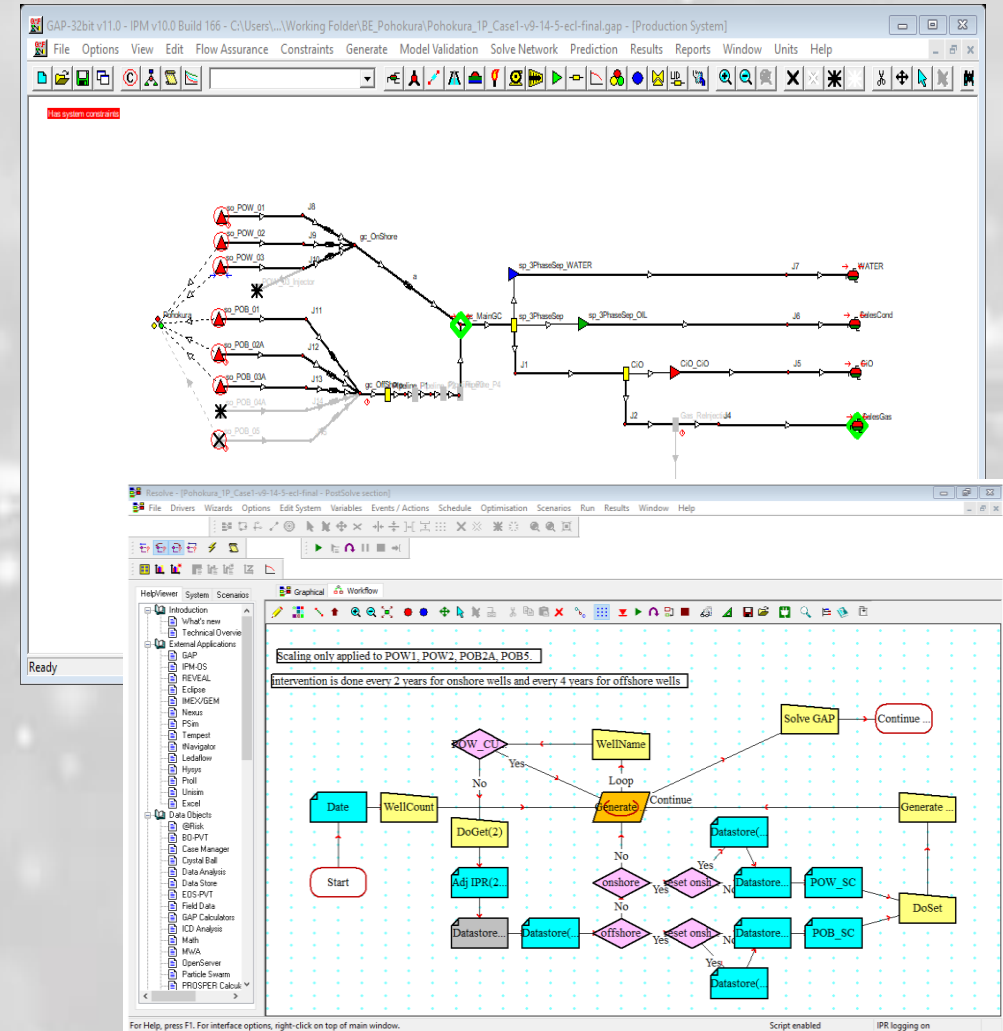
IPM Case Studies

Greenfield Gas Condensate, Australia

Scope of project:

❑ Constructing Integrated Production Model (MBAL, PROSPER, GAP, Resolve)
  ➢ history matched MBAL models to eclipse models

❑ Evaluating field start up timing and sequencing for field development planning

❑ Evaluating insulating levels for pipelines and determining the flowline temperature to mitigate WAX deposition

BROWSE
E N E R G Y
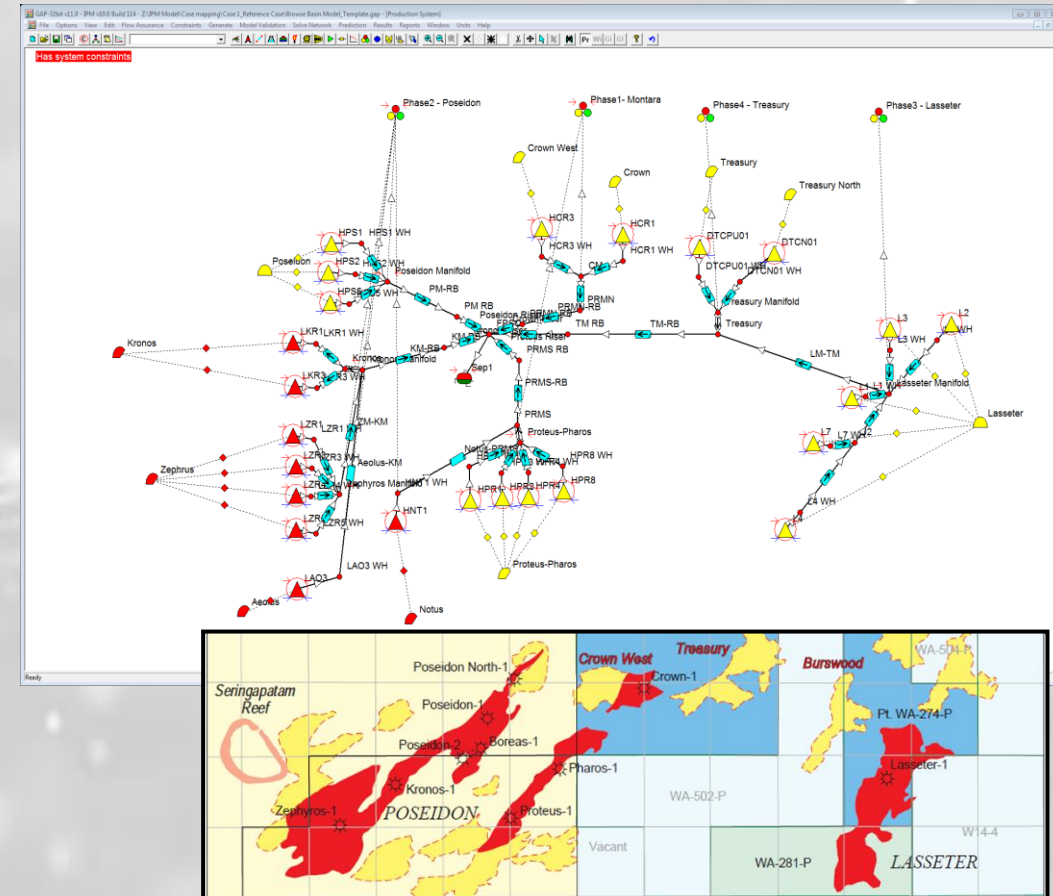
Digital OilField
Real time asset monitoring & optimization

Digital Oilfield is the implementation of real-time data processing systems, along with integrated models to support the various business processes.

Benefits:

➢ Maximize Recovery

➢ Improve Operational efficiency

➢ Production optimization

➢ Collaboration and Decision support

➢ Data integration and Workflow automation

➢ Minimized time spent on data processing

➢ Lower cost to data and decisions
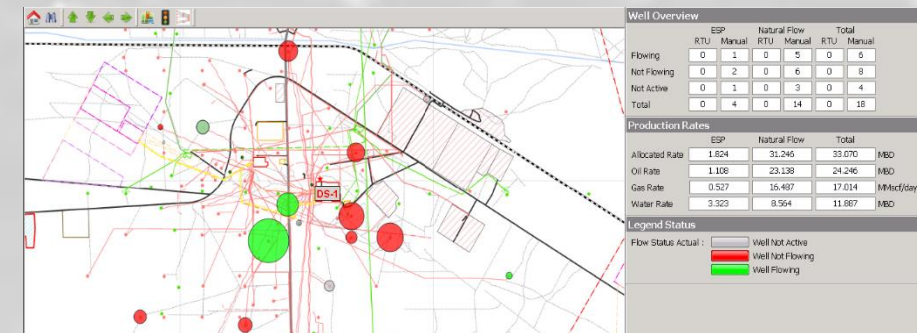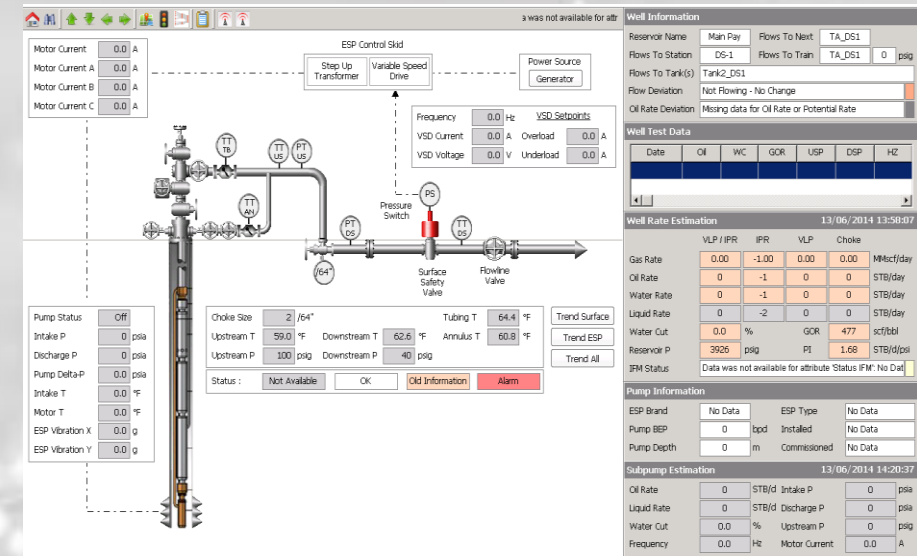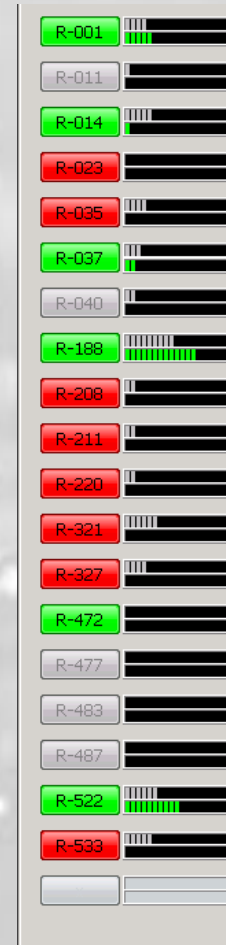
Digital Oilfield

Typical implementations:

❑ Automating data collection and validation from datastores

❑ Well and network models can be used for automated data validation and workflows. some basic workflows are as follows

  ➢ Well test validation,

  ➢ Well model calibration (well models kept up to date)

  ➢ Network validation (and calibration)

  ➢ Production forecasting and real time optimization

  ➢ Production allocation (well routing optimization)

  ➢ Virtual meters (to enable real time surveillance and schedule well tests and future work-overs when they're needed)

❑ Web style portal can also be developed for users at various levels

  ➢ Alarms can be set on production parameters to prevent undesired operation and ensure operating within optimized region
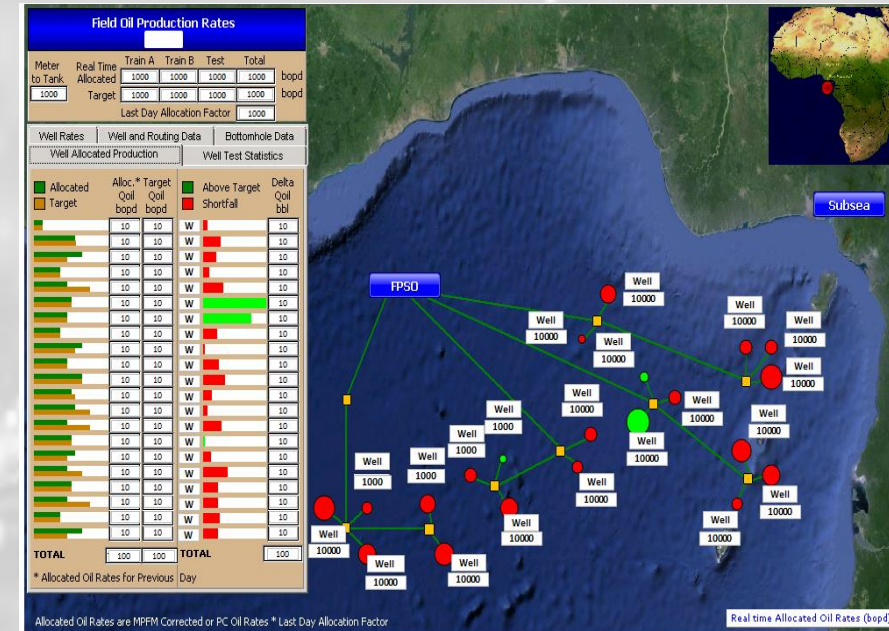
Digital Oilfield

❑ Digital Oilfield (DOF) is Integration and Automation of Data Management, Engineering workflows and Visualization.

❑ Integrated Production Model, characterizes the entire system from reservoir, wells and surface facilities

❑ DOF Integrates real time data and Automates data processing from multiple sources effectively to serve different workflows such as "surveillance", "allocation" and "forecasting"
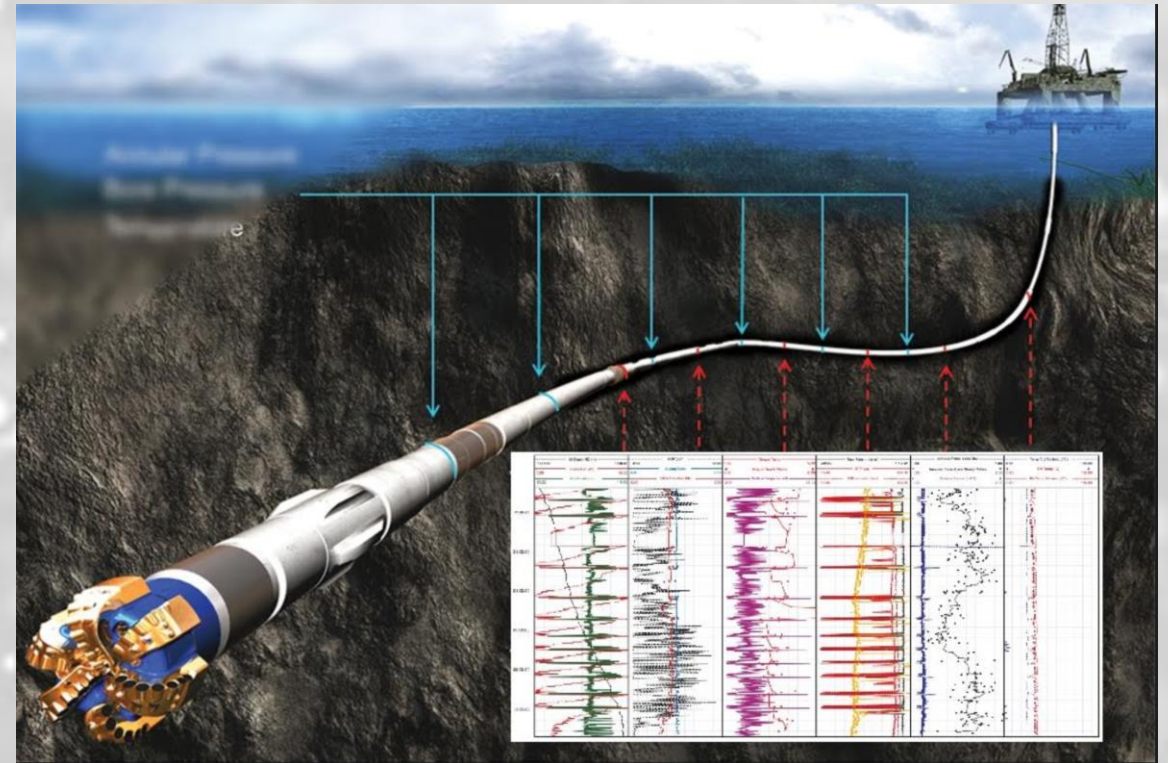
Industry leading DOF solutions

Drilling Services

We can provide pre-drilling, while-drilling and post-drilling solutions.

➢ Well Kick Simulation

➢ Dynamic Kill simulation

➢ Hydraulics Analysis

➢ Well Design & Optimization

➢ Well Plan & Drilling Program

➢ Drilling Optimization

BROWSE
E N E R G Y

Our Team

Our competent specialists can support upstream projects at any scale and they come with many years of experience by working on numerous projects with many international and national resource companies.

BROWSE
E N E R G Y

Our Team

□ **PETROLEUM ENGINEERING**

➢ Ashkan Dadpou, Principal PE, Managing Director
➢ Yaser Abdy, Principal RE, Technical Manager
➢ Suresh Satiavan, Reservoir Engineer Consultant
➢ Craig Radford, Petroleum Engineer Consultant
➢ Amir A. Zadeh, Petroleum Engineer Consultant

□ **WELL ENGINEERING**

➢ Siamak Mishani, PhD, Drilling Engineer Consultant
➢ Taisir Shanableh, Drilling Optimization Consultant
➢ Nathan Tarom, PhD, Well Completion Consultant

□ **GEOSCIECE**

➢ Benedict Alamiyo, Principal Geological Modeller
➢ Adrian Young, Principal Geophysicist
➢ Martin Story, Principal Petrophysicist
➢ Nikolaos Sykiotis, Senior Geological Modeller

BROWSE
E N E R G Y

Our Partners

Contacts

For enquiries please contact us:

https://www.browseenergy.com.au/

Office@BrowseEnergy.com.au

Level 29, The Forrest Centre
221 St Georges Terrace, Perth WA 6000