PETRONAS accelerates digital transformation with decision ready data

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Our Statement of Purpose
A progressive energy and solutions partner enriching lives for a sustainable future.

PETRONAS at-a-Glance

- **Upstream**: extends across more than 20 countries globally, with 247 producing fields, 432 offshore platforms and 30 floating facilities
- **Downstream**: full spectrum of activities include refining (>800kbpdt), manufacturing & marketing of petrochemical products
- **Gas Business**: Comprises LNG (6.69MTPA) & Gas and Power (2,623km pipelines processing 2,060mmstcf/d gas)
- **Clean Energy Solutions**: Renewables Energy (i.e. solar, wind, hydrogen, green mobility)

A Dynamic Global Energy Group
We are a dynamic global energy group with presence in over 100 countries. We produce and deliver energy and solutions that power society's progress in a responsible and sustainable manner.
The “WHY” For Digital Transformation... Moving Forward Together 50.30.0

Financial Resiliency
50% improvement in cash flow from Operations by 2025

Growth
30% revenue by 2030 from new non-traditional business to complement growth in existing core

Sustainability
Net zero carbon emissions by 2050 with positive social impact and adherence to business ethics corporate governance
The “How”…Enterprise Architecture (EA) Implementation to accelerate digital transformation

Objective

Strategic technology blueprint to deliver business capabilities for the next 3-5 years

Standardised capabilities, data model to reduce cost, complexity and drive efficiency

Potential savings from application rationalization and license optimization

Future State

Value
50% improvement in cash flow from operations by 2025

Growth
30% revenue by 2030 from new non-traditional business to complement growth in existing core

Sustainability
Net Zero carbon emissions by 2050 with positive social impact and adherence to business ethics and corporate governance

Current State

EA aims to drive PETRONAS towards a more structured and streamlined digital organisation while supporting strategic priorities

Target Goals

Improve business agility for future growth

Single view of IT and Digital landscape

Improve process efficiency and operational excellence
Enterprise Architecture Implementation Approach

1. Capture Drivers
2. Validate & Analyse & 3. Optimise Portfolio
4. Create Roadmap

1. Strategic Intent
2. Current Business Capability
3. Target Business Capability
4. Information Architecture
5. Application Inventory
6. Application Health Check
7. Technology Roadmap

- Strategic Themes
- Target Business Capabilities
- Application and Technology Portfolio Health Check
- Technology Roadmap

- Alignment with Business Strategy
- Decision Making Tool
- Enhance Communication and Collaboration
Business Strategic Intent and Opportunities – Downstream Manufacturing

1. Integrated Operations
   7. Operationalize Target Information Architecture
   10. Cloud Adoption
   13. Software License Rationalization

2. Real Time Integrated Value Chain
   5. Sustainability
   8. Application Consolidation and Replacement
   11. Technology Version Upgrade

3. Future Forward Phygital Solutions
   6. Uplift Business Capability Model
   9. Application Retirement
   12. Business Continuity Plan Assessment

4. Digital Infrastructure and Solutions

5. Sustainability

6. Uplift Business Capability Model

7. Operationalize Target Information Architecture

8. Application Consolidation and Replacement

9. Application Retirement

10. Cloud Adoption

11. Technology Version Upgrade

12. Business Continuity Plan Assessment

13. Software License Rationalization

14. Maximize Application to support Business Growth

15. Application Technical Improvements

How do we prove the change?
>
>25%

Improvement in process and organization efficiency

How much are we willing to pay for it?

~10-15%

Reduction in digital and technology operating cost

How do we prove the change?
# Overview of AVEVA Products Placement (Downstream Manufacturing)

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## Core Processes

### Plan Product & Services

#### Plan Product Services
- **3.1.1 Establish Product Supply and Demand Planning**
- **4.1.1 Prepare Supply & Demand forecast**
- **4.1.1.2 Perform Supply & Demand Balance planning**
- **3.1.2 Facilitate Product Sourcing**
- **4.1.2.1 Verify Product Sourcing information**
- **4.1.2.2 Conclude Sourcing plan**

#### Govern Product Portfolio
- **3.2.1 Plan Product Supply**
- **4.2.1.1 Establish Product Supply and Demand Planning**
  - 1. AVEVA Process Optimization (BOMacs)
  - 2. AVEVA Unified Supply Chain – Plant
  - 3. AVEVA EOC (Enterprise Optimization Center)
- **4.2.1.2 Facilitate Product Sourcing**
  - AVEVA Unified Supply Chain – Spiraal Assay
- **3.2.2 Govern Product Portfolio**
- **4.2.2.1 Establish Inventory Setting**
- **4.2.2.2 Establish Product Master Data**

### Manage Production

#### Operate Facility
- **3.1.1 Operate Facility**
- **4.1.1.1 Operate Facility Normal**
  - 1. AVEVA Plant MES
- **4.1.1.2 Resolve Myself**
- **4.1.1.2 Startup**
- **4.1.1.2 Shutdown**

#### Plan and Record Production
- **3.1.2 Plan and Record Production**
- **4.1.2.1 Plan to Produce**
- **4.1.2.2 Record Production Data**
  - 1. AVEVA Plant MES
  - 2. AVEVA PI Systems
  - 3. AVEVA Production Accounting
- **4.1.2.2 Maintain System Data**
- **4.1.2.2 Reconciliation**
  - 1. AVEVA Production Accounting (ErrorSolver)

### Produce Product

#### Maintain Facility
- **3.1.3 Establish Maintenance Strategy**
- **4.1.3.4 Develop system / equipment strategy**
  - 1. MMPD on AVEVA Prism
High-Level Strategic Digital Roadmap for Downstream Manufacturing

** iMOM = Integrated Manufacturing Operations Management

**Integrated operations achieved at all OPUs**

- Target Information Architecture at OPUs
- Enhanced Network Connectivity (5G, Wireless connectivity)
- Phygital Use Cases (AI/ML, Digital twin ...)

**Established stranded data connectivity** (Subsystems, sensor, actuator & gauges & unstructured data (Specifications, Quality Data, Error Reports)

- POC Of Qualified Use Cases
- Unified Performance KPI's at OPUs

**Defined (Level 3)**

- Optimized Application Portfolio
- Centralized EDH

**Integrated operations across OPUs**

- Centralized view across enterprise
- Autonomous plants

**Qualitatively managed (Level 4)**

- Target Information Architecture across Downstream Business
- Contextualized Data Model for Downstream Mfg.
- AI based Optimization across OPUs and Downstream business
- Predictive & Prescriptive insights across downstream (leveraging AI/ML)

**Integrated operations across Downstream business (iMOM)**

- Cloud Governance (FinOps, CCOE)
- Remote Operation Centre*

**Optimizing (Level 5)**

- Iterative and Incremental
- Enhanced Network Connectivity (5G, Wireless connectivity)
- Optimized Application Portfolio
- Centralized EDH

**Future Forward Phygital Solution**

- KPIs and visualization across downstream
- Visualizations at OPUs

**Defined**

- Future Forward Phygital Solution
- Real Time Integrated Value Chain

**Iterative and Incremental**

- POC Of Qualified Use Cases
- Semi Autonomous Plants - Proven MVPs within OPUs (Field operator rounds, Connected Workers, E-Permits etc)

**Remote Operation Centre**

- Intelligent Platform

**Defined (Level 3)**

- Digital Infrastructure & Solutions
- Integrated Operations
**Downstream Manufacturing – Data Theme Opportunities**

**Definition**

- Integrated operations across downstream business
- Single version of truth, improved collaboration
- Enhance standardization, storage, optimize data extraction.
- To be accessed centrally, anytime anywhere
- Autonomous Plants - data analytics, AI, and first-principle models
- Advances Analytics to improve planning model accuracy
- To make better informed decisions for future campaigns
- Improved turnaround time and making critical data available for reporting & analytics
- Enables decision support at central level with higher business visibility across all OPU’s
- Unify performance KPI’s and visualization
- Central monitoring of carbon footprints from different sources like energy, utilities, water and material losses

**Integrated Operations collaboration**

- Collaboration, Single-source
- Standardization, Implement Downstream data Model
- Single source, anytime, anywhere
- Analytics, predictive ML,
- Analytics, Single Data Model
- Single source, collaboration
- Single source, Reporting, Analytics
- Collaboration, Data governance,
- Unified user experience
- Emission management integration
Addressing Data Challenge - PETRONAS Data Liberation

**KEY ISSUES**

Lacks reliable real-time data capability to operate and sustain the development and adoption of advanced analytics e.g. AI & ML.

Limited data accessibility to provide proactive Operations & Maintenance Solutions effectively across PETRONAS assets and plants.

**DATA ADJACENCY PROGRAM**

The Data Adjacency Program looks at liberating all the data across assets and plants and eventually ingesting them into PETRONAS Enterprise Data Hub (EDH) to ensure data integrity at source and consistent across organization, and to ensure availability and sustainability of data integrity (example PI Data, SAP data, etc.).

**DATA PAIN POINTS**

1. Existing data ecosystem designed for operating the facilities with some data are still stranded
2. Repository without ability to differentiate between final and working file
3. Unstructured Data being generated and utilized on daily basis
4. Manual retrieval and acquisition of data

**RESULTS**

- **Data Integrity & standardization at source**
  - Data cleaned and goes thru data standardization process.
- **Data quality & full data visibility**
  - Consistent quality data
  - Improve data quality to ensure trusted data is being consumed from repository

Liberated data is ingested into Enterprise Data Hub (EDH)

- Single Source of Truth (Curate Once, Use Everywhere)
- Integrated data ecosystem & stewardship
  - Structured data being generated and utilized on daily basis
Problem Faced by Digital Product Owner

• Analytic result untrustworthy. Unable to make decision and action.
• Troubleshooting time-consuming because lack of visibility.
• Loss of trust and low user adoption.
Factors Contribute on Data Reliability Issue

- Hardware Failure
- Network Failure
- Transmitter Faulty
- Wrong Configuration (Human Error)

Hard to Track with Thousands of Plant Data !!!
Decision Ready Data (DRD) Provides Data Reliability Visibility

Unreliable data impacting analytics
If the data reliability from a specific asset is consistently poor over a prolonged period, it will jeopardize the investment and success of the analytic tools that uses the data.

Finding unreliable data takes time
More data means more time spent for you to find the bad unreliable data and less time to act.
Decision Ready Data (DRD) Provides Data Reliability Visibility

- Analyze Plant Data Healthiness in Real-Time
- Visibility on Data Reliability for Proactive Action
- Use case specific monitoring
- High level status and individual tag health status.
Decision Ready Data (DRD) Provides Infrastructure Health Visibility

- System Uptime, Server Hardware Health & Network Status
- PI Server, PI Interfaces & Data Source Systems Monitoring
- Trigger Alert Notification
- PI-BA Jobs Monitoring
Decision Ready Data (DRD) Provides API for 3rd Party Integration

- 3rd Party Application Integration
- Data Status Based On Use Case
- End User Have Better Visibility On Data Status
- Increase Product Adoption

Data Status on 3rd Party application
Decision Ready Data (DRD) Outcome

- DRD has successfully safeguarded millions of value creation to Digital application by providing continuous reliable & good quality data.
- DRD provides data quality visibility, reduce data down-time and make time-series analytics trustworthy.
- DRD provide your organization the capability to act proactively on data quality issues.
- DRD provide more accurate analytic result for better decision making.

**Testimony**

“It’s a challenge to ensure uptime in our Advance Analytics solution with a complex oil and gas digital architecture.

It’s crucial to have a tool that can facilitate, providing us an overview of the solution, data, applications, and network insights. DRD eases our tasks in monitoring and tracking the overall health of application, enabling continuous value creation through high uptime.”

*Digital Product Owner*
PETRONAS implements enterprise data architecture to achieve transformation goals

Challenge
- Support the digital transformation required to improve company’s cash flow, increase revenue and achieve net zero emissions.
- Improve business agility and support new ways of working.
- Ensure integrity of operations data for decision making.

Solution
- Implemented an enterprise-wide data architecture (NervCentre) based on AVEVA™ PI System™ and AVEVA™ PI Vision™

Results
- Increased visibility to data quality and reduced data downtime.
- Able to proactively resolve data quality issues that arise.
- End-to-end visibility of the health of critical infrastructure.
- More accurate analytic results for better decision making.
Accelerating Digital Transformation at PETRONAS Downstream with focus on Operational Excellence and Efficiency

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Questions?
Please wait for the microphone.
State your name and company.

Please remember to...
Navigate to this session in the mobile app to complete the survey.

Thank you!
ABOUT AVEVA

AVEVA is a world leader in industrial software, providing engineering and operational solutions across multiple industries, including oil and gas, chemical, pharmaceutical, power and utilities, marine, renewables, and food and beverage. Our agnostic and open architecture helps organizations design, build, operate, maintain and optimize the complete lifecycle of complex industrial assets, from production plants and offshore platforms to manufactured consumer goods.

Over 20,000 enterprises in over 100 countries rely on AVEVA to help them deliver life’s essentials: safe and reliable energy, food, medicines, infrastructure and more. By connecting people with trusted information and AI-enriched insights, AVEVA enables teams to engineer efficiently and optimize operations, driving growth and sustainability.

Named as one of the world’s most innovative companies, AVEVA supports customers with open solutions and the expertise of more than 6,400 employees, 5,000 partners and 5,700 certified developers. The company is headquartered in Cambridge, UK.

Learn more at www.aveva.com