

How Acuvate is helping
Energy (Oil & Gas) Industry
to get the maximum out of DIGITAL

Johan Krebbers & Poonam Chug



Housekeeping - Asking speaker a question

Get in touch with us at advisors@acuvate.com or follow us on LinkedIn @Acuvate

We want to hear from you! Please submit your questions. We'll reserve time for Q&A at the end of the webinar.

Leave To submit questions, click on the Q&A at the top right corner Q&A X Ask a question Clicking on the Q&A icon will open a window where you can type your question. Click on the 'Ask a question' button & type your question. No questions yet Start the discussion by asking a question Ask a question



Agenda

- About Acuvate
- Acuvate's famous (7 steps) Standard Digital
 Framework
- Acuvate's Data Platform for the Energy market
- Examples: Business Challenges in Energy
- Digital Solutions for Energy with Data & Al
- What next? Where to go when you need / more information.



About Acuvate

Acuvate is a global player in next-generation digital solutions & services that modernize, automate and transform enterprise applications. With over 17 years of experience, we have been enabling our clients globally to steer their digital transformation strategy using AI, Data & Cloud.

We build & develop smart & sustainable solutions to help our customers transform their conventional processes to match the next-generation technological trend.

OUR FOCUS











17+ Years in the Industry

3 Continents, 7 offices North America, Europe, Asia



Al and Machine Learning in Microsoft

Analytics on Microsoft Azure

Microsoft Microsoft Azure Advanced Specialization







Trusted partner of Several Fortune 500

companies across the globe











blueprint

Google

Partner







OUR GLOBAL CLIENTELE





















Oil & Gas, Energy











GREIF

TRUSTED BY

Manufacturing











Government















BFSI











orient





ENTERPRISES WORLDWIDE **INCLUDING**

FORTUNE 500

SEVERAL

Healthcare and Pharma













Technology, **Telecommunications** & Others

DATAMARK













NEWPARK









What is Org Brain?

Acuvate's framework, constructed using Azure Open AI, aims to facilitate enterprises in expediting their Al advancements.

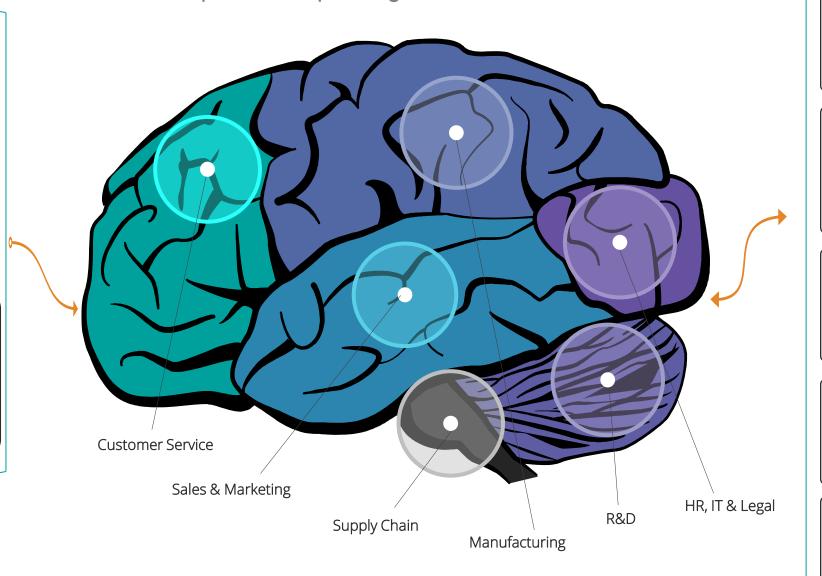
Data Sources

External

- Social Media
- Open Source
- Brand.com
- Retailers / eComm
- 3rd Party (Nielsen, etc)

Internal

- Structured (ERP / LoB)
- Unstructured (File repositories)
- Dark Data (excel files, ppts etc)
- Database/ Data Warehouse





User Persongs



Employee

- •Can you get me Payslip for last month?
- •How do I reset my SAP password?
- •Create the JD for a marketing executive role.



Marketing Marketing

- •Show the market spread for Yummiez chicken soup by region.
- •Compare the Yummiez chicken campaign performance in Thailand and Malaysia?



Factory Workers

- •Which of my assets had downtime last week?
- Which steam turbine sensors are reading outside normal range?



Factory Supervisors

- Calculate the average Asset Utilization for each month and region.
- What is the average OEE for UAE



•What is the procedure to perform cleaning in place? Please tell me about Manual Scanning Systems



Participating in Polls

Your opinion is valuable to us! Please take part in our polls to help us understand your views.

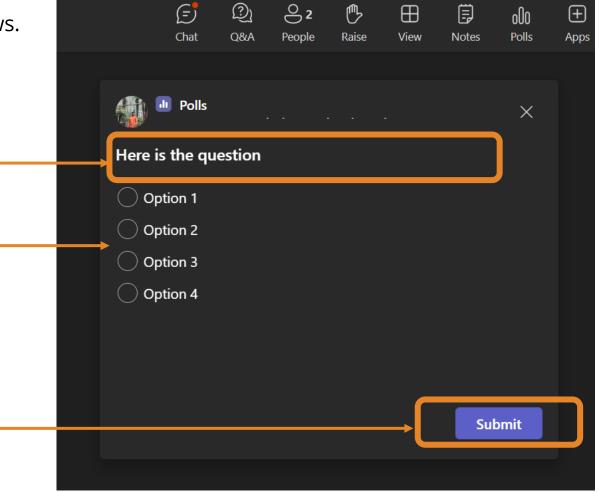
Submit Your Vote:

A new window will pop up with the poll question.

Choose your answer from the provided options

Confirm Your Selection:

After selecting your option, make sure to hit the 'Submit' button to record your response..





Poll 1 Which of these emerging technologies do you believe holds the most promise for transforming the Energy (Oil & Gas) industry





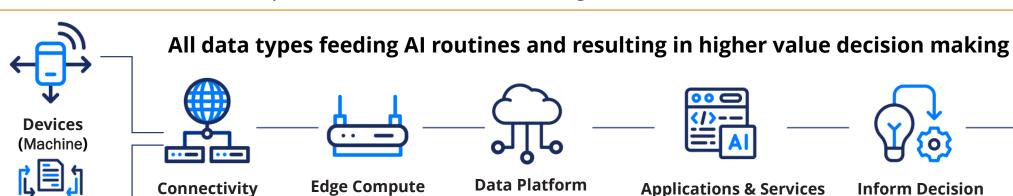
Acuvate's End to End Data Services

- DIGITAL driven.
- End to End: From collecting the right data as input to getting maximum Business value out of each process.
- Need for increased Speed and Efficiency drives Demand for Realtime execution of business workflows.
- Our prime focus initially at ENERGY & MANUFACTURING, but growing towards other Industries.
- Scalability important given the expected explosive growth of data.
- Being able to exploit latest AI (ML / MV / GEN) developments.
- OT and IT support.
- Getting ready for Digital Twins.

Acuvate's Standard Digital Framework

Acuvate's framework, to Modernize, Optimize and Transform businesses to Digital Decision Automation





Files / Applications

Data Flow Both ways

Setpoints

- Multiple devices (sensors) collect data for processing (e.g., videos, images, temperature, pressure, etc.)
 - Apps can produce input as well and then to be used as input..



Manufacturing

4G or 5G or others as base connectivity to transport large volume of data with low latency Other protocols for other type of messages

Oil & Gas, Energy

- Edge compute will be used for timecritical use cases and/or high-volume computing
- Data will normally be transferred to a single cloud-based store per company: It will be the Acuvate Data Platform

(Cloud Compute Storage)

AI (ML / MV) will be used to provide insights from data collected and translated into information Both data (ML) and images (MV) can be used for this. Increasingly as well Gen-Al

(AI-ML/MV)

Inform decision makers using various methods (e.g., XR, email, set-point, Digital Twin, etc.) and of course Gen-Al as increasingly important

Makers

Decision makers make the final call on actions to be taken. Autonomous is as well possible whereby AI makes the call

Support Decision

Making



CPG, Retail, Supply Chain



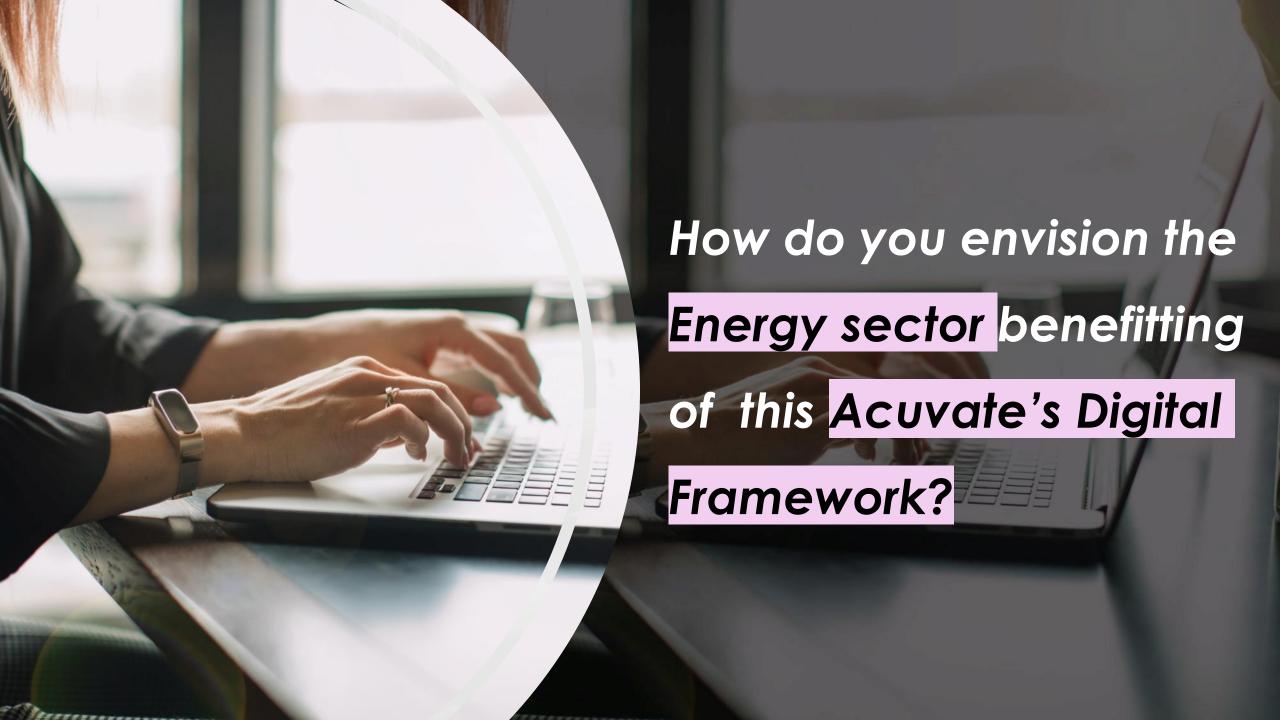
Government



Healthcare



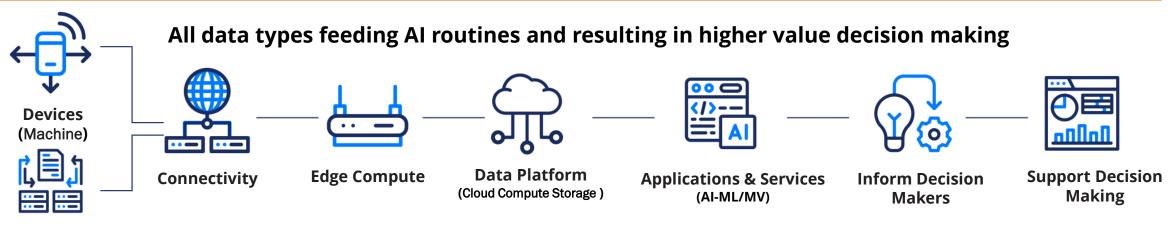
BFSI



Applying Acuvate's Digital Framework for Energy

Acuvate's framework, to Modernize, Optimize and Transform businesses to Digital Decision Automation





Files / Applications

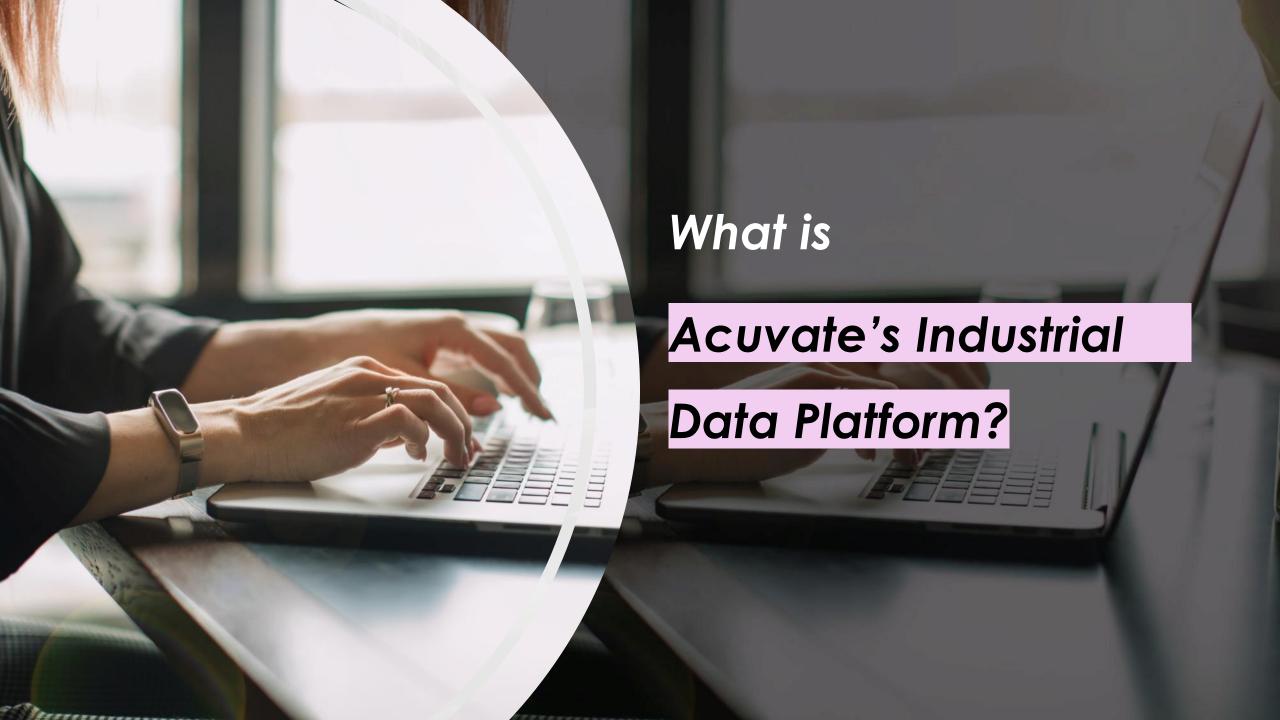
Data Flow Both ways



- For Energy, good support 2 for Timeseries data is crucial + Linking to Asset Data and P&ID; Using GEN-Al to read / report / analyse your Timeseries data; Input for AI-ML for, for example, Predictive Maintenance.
 - Think about 5G for your offshore production platforms
- With Edge real-time support + support robots and drones replacing staff by doing Operator rounds; Spotting problems (leakages) + reading meters, etc.
- **Acuvate Data Platform** will function as your Company Data Platform with all data (any datatype). is important for your AI activities (step 5).

Oil & Gas, Energy

- Acuvate Data Platform with all data (any datatype). is important for your AI (ML / MV) activities. ML for **Predictive Maintenance** and MV potential Damages. Increased usage of Gen-Al.
- Start thinking about Digital Twin (step 6) (Operations / Maintenance / Engineering) in stepby-step approach: However, access to all data is important.
- Getting IT and OT closer: In too many companies still too separate and that is not ok since IT can help OT and OT can help IT.



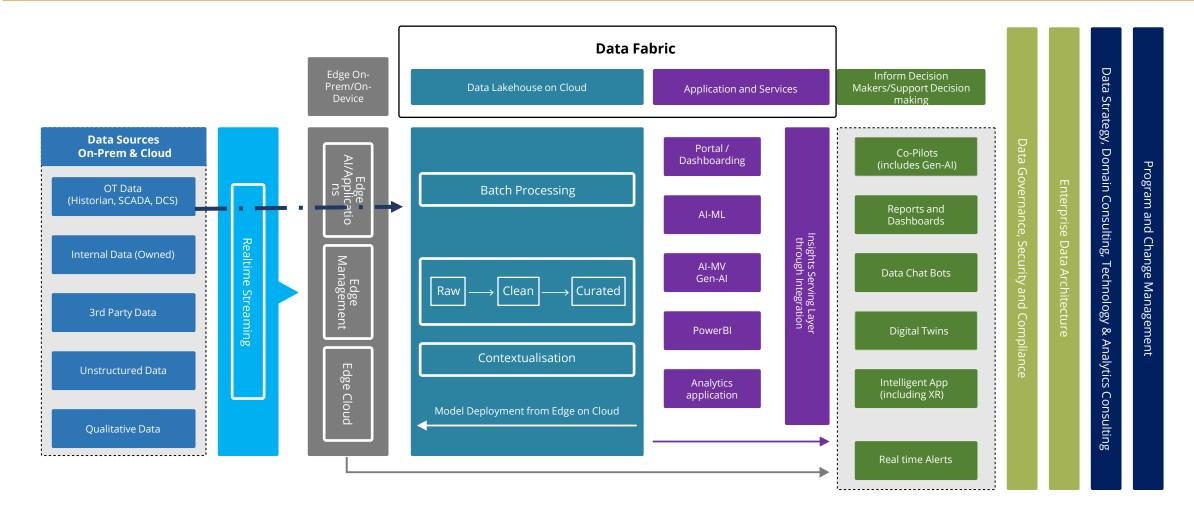


Acuvate's Industrial Data Platform

- Scalable to support ever increasing data volumes.
- This version is focused at Energy and Related File input data.
- For this reason, there is direct support for your important filetypes such as Timeseries, etc.
- Several features to manipulate your important data types.
- Full support for AI (MV-ML) GEN-AI modelling and related data / query support.
- Link to EDGE version so data can be stored in edge and/or main data platform
- Fully imbedded in the Acuvate 7 steps approach (see slide 9).

Acuvate's Industrial Intelligence Data Platform - Master



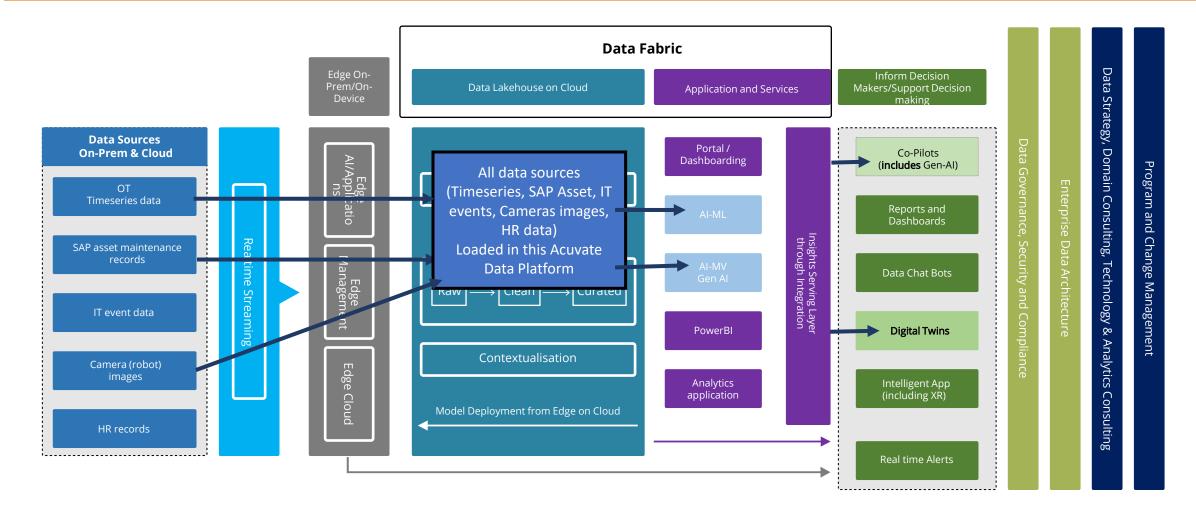


Data Catalog with Active Metadata Management

Data Observability and Data Operations

Acuvate's Industrial Intelligence Data Platform – Energy Example



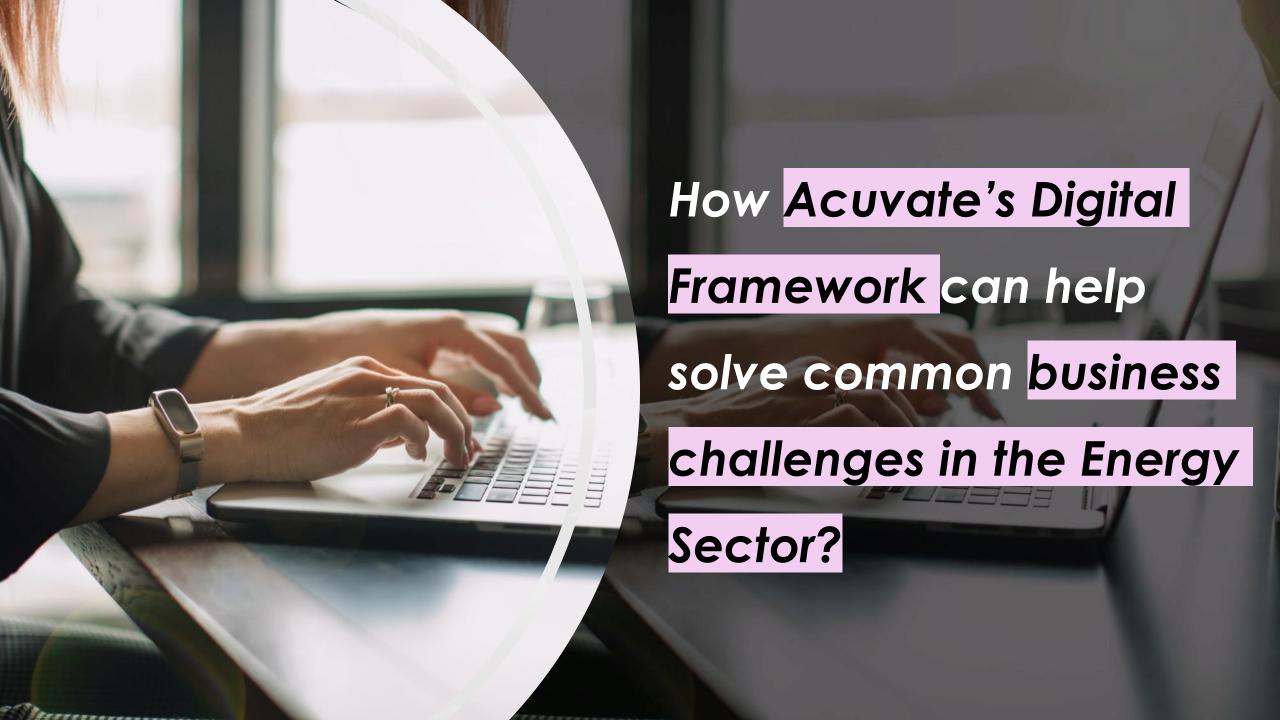


Data Catalog with Active Metadata Management

Data Observability and Data Operations

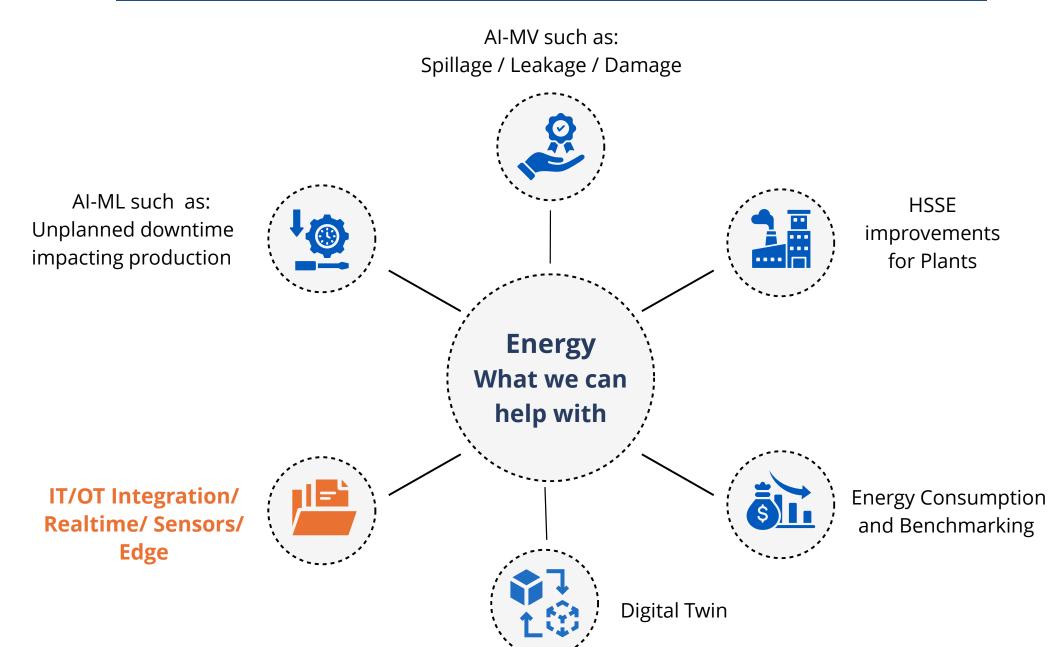


Poll 2 In your organization, what is the biggest challenge in adopting digital transformation strategies within the **Energy sector?**



All examples fully imbedded in our Acuvate 7 steps approach (slide 9)







IT (Information Technology)

IT is standards based such as WIFI; 4G/5G; Intel; MS Windows, LPWAN (Low Power Wide Area Network), etc.

There is a trend making the reporting Data collection part of the IT set up since it does not need the more stringent OT availability requirements; The latter are meant for all processes driving process automation and therefore running the actual facilities.

OT (Operational Technology)

And relates to all activities used for running critical processes underpinning the plant: For example the Process Control Domain (PCD) for Energy companies driving their process automation.

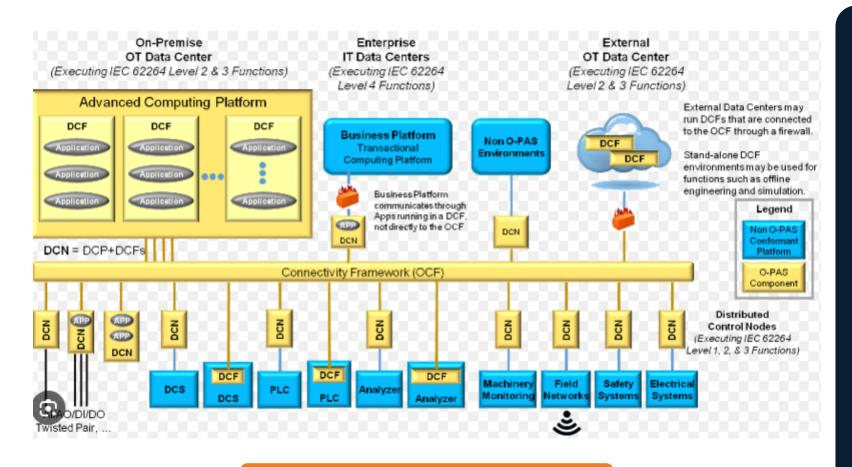
OT is still mainly proprietary based, whereby mixing and matching of equipment of different suppliers often is not allowed ie PCD based on Siemens or Honeywell or Yokogawa, etc. equipment. This means less flexibility and higher cost.

Given the criticality OT service levels are more stringent.

IT and OT \rightarrow OT (Energy) future developments



Some years ago a trend has started to make OT also standards based" One example: The O-PAS $^{\text{\tiny M}}$ Standard is a "standard of standards" developed by the Open Process Automation $^{\text{\tiny M}}$ Forum (OPAF). The standard defines an open, interoperable, and secure architecture for industrial process automation systems.



TO BE AWARE OF

Standards based

Mix and match of hardware suppliers possible in future

Non critical items such as reporting → IT based

IT based eqp is lower cost than OT based eqp

Includes satellite support (direct sensor to satellite connection)

Process Control Domain (firewalls / managed (Timeseries) data out)

New standards for interfacing

Acuvate will advise on when to use IT and when to use OT based facilities

Sample O-PAS architecture

Examples of sensors (indoor and outdoor)



Different types of sensors



Acuvate will advise on what sensor to use when





Support for broad spectrum of interfaces

MONITOR:

Battery powered: One Year or more

Supports various network configs including satellites

All data (IT/OT) stored in Acuvate Data Platform

Sources: Fields, Platforms, drilling, transport, wells, etc.

Intrinsic safe

Monitoring volumes

Bi-directional

Edge options for Energy



When to use Edge:

- Low latency and/or high data throughput is/are needed
- What:
- Compute + Storage very close to where data is collected → Allows for realtime response.
- Compute + Storage in the same region as where data is collected →
 MS Azure, etc. Cloud based.
- Single platform (ideally Open Source) for all use cases.
- Fully remotely managed.
- Also 5G with support for low latency → 5G has the lowest latency in this market and therefore important.
- Supprt for INTEL / AMD / NVIDIA / ARM processing → Dependent on use case.
- Different resiliance levels.
- Drones / Robotics (+camera): Collecting images and analyzing realtime (5G + Edge-Al-MV).

Edge usage examples:

- (Remote) Inspection: Using drones with cameras + realtime MV analysis.
- Leakage / Spillage: Using robots spotting it + realtime MV analysis.
- (Remote) platform support & management eg drilling / Production.
- (Edge) Quality Control: Immed action in case of non-compliance without Stopping production line.

Acuvate will advise on what edge server to use when









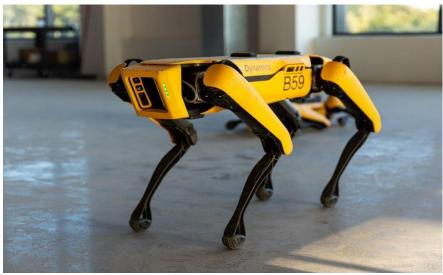
Sensor / Edge Energy examples





Example 1:

- Drone with 5G camera (your sensor) flying over onshore Production areas.
- Cameras images are set in realtime to nearby Edge device,
- AI-MV (Machine Vision) on Edge analyses the data immediately and immediate actions are initiated in case of leakages / spillage.



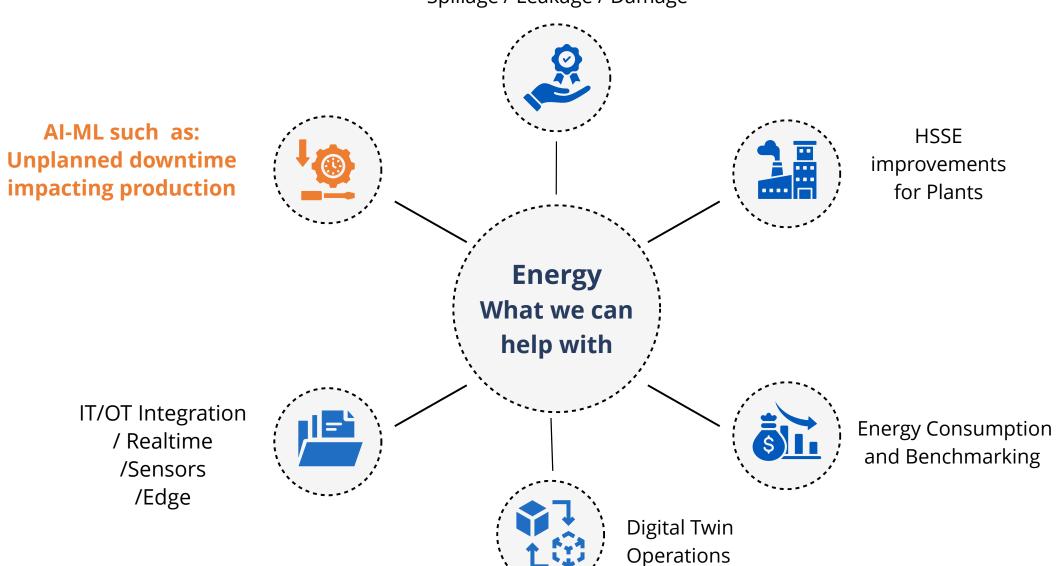
Example 2:

- Robot (with intrinsic safe support) with **5G camera (your sensor)** walks on offshore Gas production platform (does Operator round).
- Camera images are sent to Cloud based enterprise Data Platform (in case not time critical).
- AI-MV analyses the data for Meter Readings / Damages / etc. and in case of issues (like meter readings out of range) informs Operations.

All examples fully imbedded in our Acuvate 7 steps approach (slide 9)

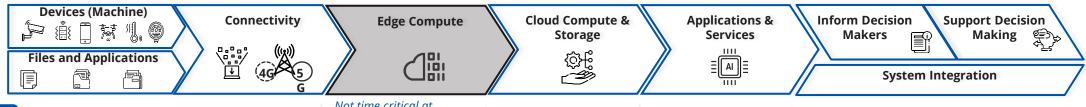


Al-MV such as: Spillage / Leakage / Damage



acuvate

Unplanned Downtime Impacting Gas Offshore Production



Data Flow

- Sensors deployed on all critical operational assets
- Purpose: Measure pressure, speed, flow, etc.
- OT and IT

 Time series data transport

 Asset data (maintenance records) access Not time critical at present (predictions timeframe are in days), may change when real time prediction is required from other

equipment

- All data from the edge sensors (both historical and realtime)
- Enterprise storage is company owned
- Predict future asset failure using ML models, initial improving model
- Potential PaaSbased set up, not company-owned

Only reporting potential future failure so action can be taken in time

Scenario



- Collect event and/or timeseries data from these critical assets, potentially using sensors.
- Collect as much data as possible from selected assets and surroundings as ML models will be strengthened with more data.
- If there is a lack of data, look at options of creating and using synthetic data.

- Timeseries data will be stored long term in Enterprise storage.
 - Al (ML) application requests all the data it needs for ML model development, from Enterprise storage to copy in its own storage cache.
 - Development of the ML model is done through an iterative process and a quality ML model (fully data driven) will require multiple steps to detect anomalies/potential failures.
 - SME involvement working with data scientists is required to develop the model.
- Models will be stored and maintained by Al applications.

- The process from data collection to execution of models is fully automated.
 - Only alerts to operations in case of anomalous data behavior (e.g., resulting in expected asset failure in X days).
 - Operations takes action to replace suspected assets in time, therefore avoiding unplanned downtime.
 - Various options for visualisation of entire operations (e.g., XR options on OpenXR platform).

Expected Benefits

- Proactive detection of abnormalities and preventative actions
- Improve productivity from reduced unplanned downtime
- Reduce maintenance cost due to early spotting of issues
- Shorter turnaround times due to more targeted maintenance

Key Value Creator

Increased availability of the plant translates to increased productivity

Digitalized Preventative Maintenance for Plants' Optimal Production Speed



Before: Fixed-interval + Conditional Maintenance

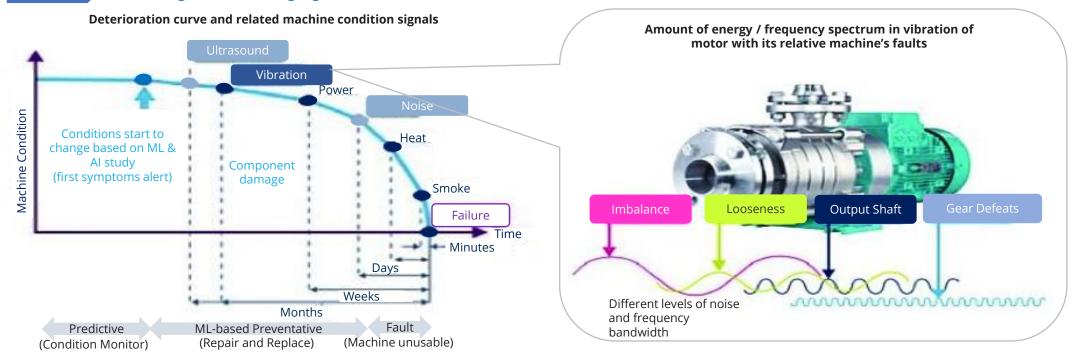
- Fixed: Less conditional awareness
- Conditional: Risky, maintain only failure sign shown
- Machine shutdown for manual data/alarm collection
- Longer downtime, less productivity

After digitalized: ML-based Preventative Maintenance

- Apply sensors on motor for timely and more frequent data collection
- Apply ML/Al over historical/real time data to predict upcoming machine failures
- Fast exception detection and troubleshooting; Longer service life
- Stop the machine if exceed warning threshold (E2E Latency: < 10ms)

01

In preventative maintenance, sensors are available to monitor all aspects of motors, allowing to see damaging trends over time



Source: Market Study/Engagement

All examples fully imbedded in our Acuvate 7 steps approach (slide 9)



Al-MV such as: Spillage / Leakage / Damage



Leakages leading to safety hazards and negative environmental impact





Data Flow

- Cameras (sensors) collect data (e.g., images, video, corrosion, damage, leakage, emission (GHG))
- Cameras: Fixed;
 Robotics; Drones; etc.
- Mainly imagery and time series data transport
- Asset maintenance data

Not time critical at present, however, could change to real-time in case of new emission laws

- Historical video realtime sensor data from multiple cameras
- Loaded and kept in Enterprise storage
- Machine Vision (MV) to identify potential leaks, on-site safety hazards and security threats
- All detection is fully automatic

 Alarm based reporting when leaks, emissions, hazards, etc. are detected

Scenario

- **Application Logic**
- Industrial assets such as civil structures (e.g., Oil rigs, drilling equipment, etc.) retrofitted (watching critical areas) with IoT Camera sensors to gather image data
- Dependent on the scope of predictive maintenance multiple cameras will be fitted (fixed / drones / robotics / etc.) to be able to collect all necessary data: Will be an iterative process to get cameras on right positions.
- If there is a lack of data, look at options of creating and using synthetic data

- Image data collected by the cameras will be stored (long term) in Enterprise Data Platform.
 - AI (MV) application requests the data it needs, for model development, from Enterprise storage to copy in its own storage.
 - Development of the MV model is done through an iterative process, a quality MV model (fully data driven) will require multiple steps to detect anomalies/potential failures
 - Model will be stored and maintained by Al application

- Process from data collection to execution of models is fully automated
 - Only alerts operations when anomalies detected in results (leaks / emissions /spillage)
 - It will take multiple steps to get to the proper recognition of problems.
 - SME input is required to identify leakages, emissions, etc.

Expected Benefits

- Early identification of leakages can lead to smaller environmental impact
- Theft and vandalism prevention
- Enhanced audit trails and compliance

Key Value Creator

Timely identification of leakages reduces downtime impact and ensures operators are within emission boundaries

Leakages leading to safety hazards and negative environmental impact





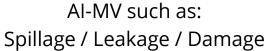
Performing Operational Rounds

- AI (Machine Vision) as the prime AI technology to analyze video images.
- When using 5G ready cameras images go realtime to edge or cloud for AI (MV)
 processing and then realtime action can be proposed or taken (autonomous).
- It will take time before AI (MV) gives the quality results you expect but when mature you get far better results then from Operators (sees leakages much earlier). Also role for GEN-AI.
- Robotics (Robots and Drones) play an increasing important role here.



All examples fully imbedded in our Acuvaté 7 steps approach (slide 9)







Lowering number of HSSE incidents





Edge Compute & Cloud Compute & Storage



Applications & Services



Inform Decision
Makers

Support Decision

Making

System Integration

Data Flow

- Cameras (fixed / drones / robotics / people) and sensors capture real-time behavioural, asset and facility insights
- (all images)

Video, imagery and sensor data transport Time-critical: Edge Al camera will identify anomalous behaviors and defects in facility.

 Other data is stored in the cloud. All collected data stored in Enterprise storage

 Al applied to detect potential threats and hazards and ensure compliance (PaaS) Alert-based notification of suspicious activities

Scenario



- Cameras, sensors and edge devices installed throughout the facility to gather high-resolution video and imagery data.
- Drones are deployed to increase coverage (including hard to reach areas) and transmit live data through 5G.
- Camera coverage drives the quality of the HSSE coverage.
- Cameras should have High-Definition image quality.

- Al (MV) models created using the data gathered to manage infrastructure, staff and operational risks.
 - Data processed by AI at 5G edge generates real-time virtual fencing for automated occupancy management (e.g., lifting of goods).
- Machine vision (5G-based) can detect real-time potential threats.

- Automated compliancy to safety standards such as OSHA, IOGP 577, CCOHS
 - Actionable insights generated can provide decision makers with recommendations to prioritise specific tasks
 - Al-generated inspection checklists and emergency response plans

Expected Benefits

- Worker safety (real-time monitoring & hazard alert)
- On-site worker safety compliance/ PPE/ cost reduction
- Increased productivity (reduced hazards/ accidents)

Key Value Creator

Reduced number of safety incidents and related work absenteeism with improved staff morale

Machine Vision Provides Real Time Security Inspection for Early Detection



AI for Personnel Safety





Outfit detection

 Identify outfit of employees whether meets safety protection standards, such as safety helmets, purifier caps, workwear, and insulation boots.

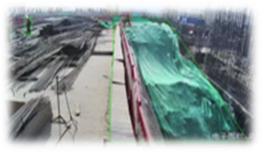


Geo-fencing

- Camera + Al analytic for detection
- Identify workers and generates alarm if someone enters dangerous zone

Sending photo





- Real-time Image recognition monitoring to detect non-compliance of safety regulations
- Generate automated alerts and halt dangerous machinery when trespassing occurs

Pre-warning instead post-incident alert





Behavior detection

- Camera + Al analytic for detection
- Detect mobile phone usage and smoking



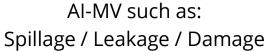
Fire and smoke detection

- Sensors + Al analytic for detection
- Generate alarms when detecting fire or smoke



All examples fully imbedded in our Acuvate 7 steps approach (slide 9)







Energy Consumption



Energy Consumption: Collect data about energy usage of any plant + identify the most consuming parts of the plant using GenAI:

- It is first all about collecting the data:
 Operational data on energy usage; Do we need more sensors? Which components use most energy; Which components can be switched off, etc.
- Start small and grow with focus at high energy usage parts.

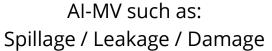
Energy examples:

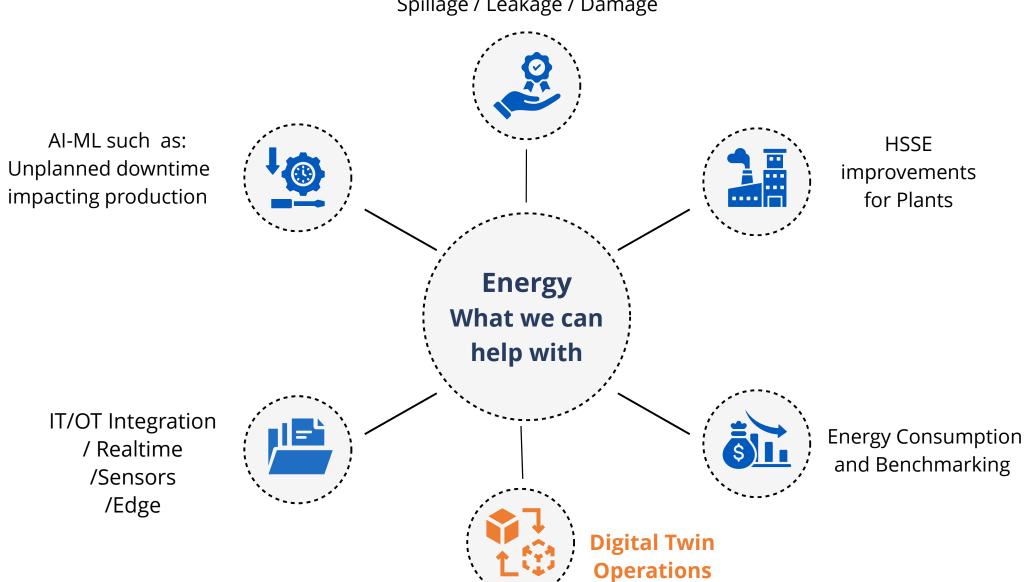
- Do we still need that component being energy inefficient.
- Have we switched off all devices not being used anymore to save energy.
- Are we using devices at optimum energy level?



All examples fully imbedded in our Acuvate 7 steps approach (slide 9)









Digital Twin: Avoiding siloed data which leads to ongoing operational inefficiencies

- Digital Twin should have access to all data sources in Data Platform to ensure that we do get a dynamic Digital Twin 100% aligned with the Physical set up.
- Of-course Digital Twin should integrate well with AI for both ML and MV so
 the Digital Twin can predict (show) future issues / problems / failures / etc.
- Actively use the Digital Twin to align various data sources to get to a single real time view.
- Over time in Energy Digital Twin to become the most important interface for Operations, Maintenance, Engineering, etc.
- It is important to maintain up to date physical laser scans.
- Use Gen AI in conjunction with Digital Twin: Gen AI as the overall search interface and for Digital Twin to display the info.









Streamlining Geoscience Knowledge Capture with AI-Assisted Documentation

- Acuvate's Knowledge Capture Assistant revolutionizes how geoscientists manage their wealth of data and insights. By employing advanced Conversational AI, the system captures and converts spoken expertise into a structured knowledge base, reducing the manual effort traditionally involved in data documentation.
- It enables real-time voice and text entry, integrates with existing digital knowledge systems, and employs a custom speech and voice model tailored for geological terminology.
- This innovative solution ensures that critical geological information is easily stored, tagged, searchable, and accessible, paving the way for efficient knowledge transfer and continuity within research organizations.

Read the full case study

UK's Leading Waste Management Company Implements Machine Learning for Enhanced Driver Safety and Reduced Insurance Costs

- The waste management company has integrated a machine learning solution to analyze telematics and tachograph data for its fleet of 1300 drivers to predict and prevent driving incidents.
- By forecasting potential accidents and identifying high-risk drivers, the company can focus on targeted training, thereby improving overall driver safety. This proactive approach has led to a decrease in accidents, enhanced driver safety, and a reduction in insurance payouts.
- Future plans include integrating weather data for more refined predictions.

Read the full case study







Scan this QR for More Case Studies

Digital Solutions for Energy with Data & Al



Troubleshooting assistance for Plant workers
Content summarization for quick access to insights.
Multilingual Capability
Knowledge Capture Assistant

Assistant Systems

Quick access to OT data.
Graph plotting to get insights
Data cleansing
Predictive insights
Real time data, alerts and automated actions
to drive operational decision making
Production Planning & Scheduling

Supply Chain Optimization (Loading/ Unloading)
Warehouse Management Integrations
HSE optimization
Quality Control & Traceability
Process Automation & Optimization
OEE Optimization
Predictive Maintenance

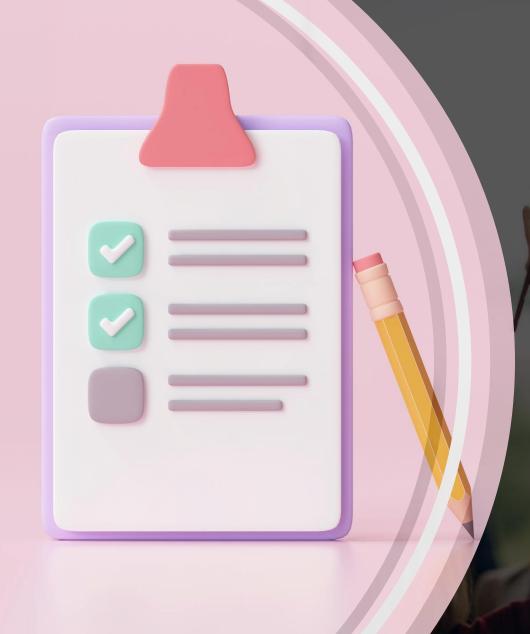
Improve Operational Efficiency Reduce Cost Reduced downtime of production lines
Energy conservation
Wastage reduction
Utilise spare capacity and avoid
unnecessary capex spend within the asset
cost base

Data Classification Data Summarization Data Creation

User Intent Understanding Pattern Recognition Pattern Completion

Prediction

Prescription



Poll 3 How likely are you to explore Acuvate's Data Platform and Digital Framework for your

Energy-related projects?



Talk to Our Advisors

We have Advisors very familiar with the (Oil & Gas) Energy market, all its business elements and the Acuvate approach as explained, at an high level, in this pack.

These Advisors will help you to define the problem / challenge / issue you need to get solved.

Once defined they can give you a first approach how to get this solved.



Scan this QR & connect with Advisors
OR
or Write us at advisors@acuvate.com

We will respond you within 24 hours

Visit our company site www.acuvate.com for all information

ACUVATE

Where Acumen Drives Innovation

We are a global player in next-generation digital solutions & services that modernize, automate and transform enterprise applications. With over 17 years of experience, we have been enabling our clients globally to steer their digital transformation strategy using Cloud, Data & Al. We build & develop smart & sustainable solutions to help our customers transform their conventional processes to match the next-generation technological trend. We have a strong presence in the US, Europe, and Middle East, where we serve multiple ultra-large customers as well as SMBs from various sectors such as Public Sector, CPG, Retail, Oil & Gas, Energy, Manufacturing, BFSI, Healthcare, etc.

We specialize in New-age Al solutions, Migration & Modernization, Data & Analytics, Digital Workplace Solutions - like Power apps, Teams apps, Virtual Agents and more. We have transformed several reputed enterprises globally, including many Fortune 500. With our multi-skilled experts and packaged Al accelerators, we deliver unparalleled efficiencies and accelerate time-to-value for our customers.

Contact: info@acuvate.com















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Read the full case study

Global Oil & Gas Major Optimizes Site Surveillance & Safety with Acuvate's Site Monitoring Solution

- A leading global oil and gas company has implemented Acuvate's site monitoring solution to enhance the surveillance and safety of its multiple oil and gas sites worldwide.
- The solution simplifies the management of site operations, ensures safety standards are maintained, and activity is monitored effectively, thus reducing the need for extensive human resources.
- Key features include clear zone definition, a unified dashboard for site supervision, an alert monitoring system, and fast emergency evacuation processes.
- This technology has significantly improved the efficiency of site managers, supervisors, and administrators, and has led to improved safety for site workers and the workplace

Read the full case study

