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SHELL'S OPEN SOURCE RTDIP PLATFORM

Real-time data ingestion platform now an LF Energy Project.

Speaking at the LFE Summit in Paris, Bryce Bartmann who is chief digital technology advisor in Shell's computational science and digital innovation organization, expounded on the major transition in energy systems and the need for oil and gas companies to respond. The energy mix is changing, decarbonizing and decentralizing. Oils have new competitors with new business models and digitalization is also happening 'at a rapid pace'. One key enabler of the transforming energy system is open source software, 'open source is fundamental to us'. This represents a changed culture in Shell from proprietary systems, especially with regard to data. Moreover, 'people want to work with open source and communities.' To boost both its new energy and open source credentials, Shell joined LF Energy in 2022 and Bartmann is now a strategic member representative and member of the LFE governing board.

Bartmann presented Shell's real time data ingestion platform RTDIP. Real time data is 'being generated everywhere around' us. When combined with data science and AI, real time provides insights that were simply not possible before. The RTDIP has been four years in the making and currently ingests data from over three millions sensors in real time and houses some 4 trillion records in its Databricks <u>Delta Lake</u>. The latter, 'built on open source technologies', powers over 50 Data Science, AI and analytics projects at Shell and is now 'available as a project on LF Energy'.

Bartmann wants to make open source a part of how Shell's users work and think. Open source is leveraged in Shell's strategic values, defining standards and support interoperability. Shell does not want to suppliers' clouds. Standards are good for Shell and ensure a level playing field, speeding the journey through the energy transition. Particularly in the context of electrifying systems and industries.

Building the data lake was a great decision. Now some 50 apps are up and running providing data science, AI and predictive maintenance. RTDIP runs in LNG, upstream and smart buildings, collecting data and providing visualization. A core RTDIP capability is the pipeline SDK that ingests data from windfarms, smart meters and oil rigs. Other LFE projects have been rolled-into the mix such as LFE Fledge Power, a multi-protocol translation gateway for power systems. Connectivity is provided by Fledge LFE's IoT solution and an Apache Spark pipeline into the Delta Lake.

RTDIP is now a fully-fledged <u>LFE project</u> that promises 'easy access to high volume, historical and real time process data for analytics applications, engineers, and data scientists'. The system can runs locally or in the cloud. Components also include Databricks a/a, the <u>Azure key vault</u>, <u>AWS secrets manager</u> and <u>Dagster</u> for scheduling. Development is currently hosted on Azure – the team is also working with AWS and 'talking to' Google. RTDIP also uses Apache Spark and Python and supports BI tools including Databricks and Power BI. Users include digital twin developers.

Returning to potential application in the energy transition, Bartmann said, 'think bigger' about applying AI to renewables and energy solutions. Data scientists can help decarbonize hard to abate sectors like cement and steel with 'system level modeling'. Look to solutions like Avelia, a 'blockchain-powered sustainable aviation fuel' co-developed by Shell Aviation, Accenture, and the Energy Web Foundation. In the Q&A, Oil IT Journal asked Bartmann about how Shell's massive and incumbent OSIsoft/PI System platform fitted in with the RTDIP. It turns out that RTDIP was originally built on too of PI. This showed that the idea worked and became the justification for building an open source stack that would better suit Shell's strategy and support data science. Shell has built lots of connectors including OPC-UA to bypass PI but Shell is 'not actually planning to replace (all of) its OSISoft platform.

Comment: One thing is for sure. Shell is not short of data projects. In the last couple of years we have reported on the Shell-backed open subsurface data universe OSDU, the Shell/Baker Hughes/C3.ai/Microsoft 'Open AI Energy' and now LF Energy RTDIP. What can one say? The more the merrier!

Read our short report from the LF Energy Summit elsewhere in this issue and visit the LFEnergy Summit home page.

LANGUAGE! LANGUAGE!

Fortran, Cobol and SAS, computer languages from the last millennium are still widely used even though they are no longer in favor with students. But old code bases can still be mission-critical. Presentations from U Miami, LANL and SAS suggest how to brush-up the legacy with AI/ML. Cobol underpins banking – but programmers are retiring. ChatGPT OK for numerical methods – so long as it doesn't 'hallucinate'.

In a presentation made at the **Rosenstiel** school of marine and atmospheric science's Compass Friday event, Milan Curcic spoke on 'Advancing earth system prediction with machine learning and state-of-the-art measurements'. One issue is how to add an ML component to the legacy code base, much of which is in Fortran. ML is usually done in Python Frameworks but 'virtually every weather ocean wave climate model is written in Fortran'. Curcic observed that this is 'not just a historical thing' the latest models used by NOAH researchers are also in Fortran. Integrating with ML is a 'point of friction'.

One solution would be to rewrite earth system models in another language. But this would be difficult and prohibitively expensive. A Python front end to earth system data is conceivable but would suffer from a maintenance and performance perspective. Curcic is proposing a different route and has written a neural net training algorithm in Fortran – a parallel deep learning framework that has been used to accelerate model building in chemistry, weather and climate. The work has been supported in part by a small grant from NASA Goddard and Google. The Department of Energy has also been solicited for further development. Curcic also praised the new LFortran compiler that targets multiple architectures such as multi-core CPUs and GPUs. Watch Curcic's talk on Youtube.

HPC Wire published recently on a <u>new report</u> from the **Los Alamos National Lab** that sounded the alarm over the declining number of Fortran programmers and the reduction of Fortran teaching. The situation is awkward for the mission critical codes in that LANL develops. Many large scale physics codes have migrated to C++ and Python now dominates as an analysis language. While LANL sees Fortran as staying strong on future CPU hardware, it calls into question its performance on GPUs 'precluding its effective use of important advances in computing technology'. LANL also regrets the absence of portability tools for Fortran. HPC Wire observes that the LANL message 'isn't new but part of long-term chorus of worry about Fortran's decline and the impact of that decline on HPC and legacy scientific codes'.

Le Monde reported recently on how the EU banking sector is short of Cobol programmers. Cobol programmers are a species in danger of extinction as the expert coders retire! But Cobol is still in demand as it is the code than runs in the background of ATM machines, flight reservations and cash registers. Cobol is not popular with younger coders who nickname it 'Completely obsolete business-oriented language'. Companies may be tempted to re-write their applications is Java or Python – but such migrations cost tens of millions of euros and are not without risk. In 2018 the UK Trustee Savings Bank set out to migrate from Cobol to Java, resulting in monster bugs that froze five million users from their accounts as monies 'evaporated'. In 2022 TSB was fined almost £50 million for its errors – and that was in addition to the £32 million shelled out to compensate clients. The moral? Don't fix what ain't broke.

In another facet of the language conundrum, **Altair** recently put in a pitch for the venerable <u>SAS language</u>. While today's analytics and ML developers have many free-to-use resources like Python, R, and SQL, there's a catch. While it may no longer be the preferred choice for coders who have grown up with open source, the long-established, SAS language remains a staple of the data science ecosystem. As a result, many enterprises still rely on a host of business-critical applications that were written in SAS.

A <u>Cornell preprint</u> on Arxiv by Ali Kashefi and Tapan Mukerji discusses the use of ChatGPT for programming numerical methods in different programming languages, for debugging and improving written codes by users, for completing missed parts of numerical codes, rewriting available codes in other programming languages, and for parallelizing serial codes. The 50 plus page paper concludes that ChatGPT 'can generate codes for implementing numerical algorithms in different programming languages such as C, C++ and others'. It can also debug and improve code efficiency and parallelize C++ codes to OpenMP. It fails in the following areas, generating singular matrices, produces arrays with incompatible sizes and shapes, halts when generating long codes (e.g. for serious scientific simulations) and includes 'unknown libraries' (hallucinations?). ChatGPT also cannot tell if code is generated by humans or by itself.

OIL INDUSTRY IN DECLINE – WHAT ABOUT IT?

Industry is in the doldrums and the next oil boom may never happen. What is an industry accustomed to profligate IT spend do? Focus!

First some important information from **Rystad** whose <u>research</u> has found that claims of underinvestment in the global oil and gas industry are 'overblown amid efficiency gains'. While upstream investment has 'tumbled' since 2014 (down 35%), efficiencies in the upstream industry more than compensate. Rystad's Espen Erlingsen said, 'Contrary to popular opinion, the world is investing appropriate amounts of money in fossil fuel production to satisfy demand. Cost savings mean operators can produce the same amount of oil at a lower cost, and we don't foresee an oil supply crisis due to underinvestment on the immediate horizon'. In other words, don't hold your breath waiting for the next oil boom.

Another Rysted <u>report</u> highlights the other squeeze on the oil and gas industry. Today's recoverable oil reserves (1,600 billion barrels) are enough to warm the planet to 1.9°C if consumed by 2100. Conversely, according to Jarand Rystad, if global warming is to be 1.6°C, only half of the world's recoverable reserves would be required. 'It's not unreasonable to conclude that policies and technological advances can reduce oil consumption and boost the energy transition, bringing us closer to a 1.6°C scenario'.

I guess that this is stating the obvious in that if the world does get around to electrifying transport and other sectors, then the oil and gas industry will decline. Of course this is a politically charged question but whatever your point of view, it is well worth reflecting on what a declining oil and gas industry will mean, particularly for its IT sector.

There are two sides to this question. First the argument that IT is a key enabler of efficiencies and that in a declining industry, more IT will help keep things going, replacing all those expensive knowledge workers. The SPE sees 'digital transformation' as one of the 'grand challenges' the oil and gas industry faces for the next decade. But it's almost 20 years since the same SPE kicked off its version of the digital oilfield meme. The digital efficiency argument has reached a peak with the advent of ChatGPT (for my opinion of that read my last editorial). Having heard this kind of efficiency talk ever since we started tracking the oil and gas IT sector (in 1996) I am more than skeptical.

The move to the cloud continues to be touted as a cost-saving and efficiency-generating paradigm shift. It is not. The move to the cloud has channeled earlier outsourcing ventures – like document management – which look cheap at first – then get uncomfortably expensive as the service provider leverages its lock-in.

CloudZero's <u>2022 report</u> found that the cloud spend issue has now 'surged front and center', with 73% of respondents saying it's a C-suite issue.

The IT industry in general has been far too successful in creating a kind of Brownian motion to keep investment flowing. To date oil and gas, particularly the majors with their huge cash-generating capability, have been enthusiastic buyers of everything that IT has to offer. IT spend, like the carbon footprint of the cloud data centers (see this edition's Going Green section), has just continued to rise and rise.

Such profligacy in a declining industry is, to use a popular word, unsustainable. On the other hand, the potential for cost savings is immense. IT spend needs refocusing. There is too much time and money spent on nebulous IT tropes such as digital transformation. Areas like the cloud, interoperability or IT/OT convergence need more focus. Exactly what is meant by these overarching terms, what are folks trying to achieve? IT needs to cool down, get closer to the business and, as my Splunk T-shirt says,' *Planter moins, jardiner plus**'.

* Losely – Quit going to the nursery and get on with some gardening!

IOGP KICKS-OFF DIGITAL TRANSFORMATION COMMITTEE

International Oil & Gas Producers Association addresses 'digital transformation' with a multiplicity of committees and workgroups.

Rob Kelly (**BP**) chairs the newly founded IOGP Digital Transformation Committee (DTC) with help from vice chairs Keith Johnston (**Chevron**) and Milenija Stojkovic Helgesen (**Equinor**). According to the IOGP, emerging technologies are 'creating new rules for businesses and transforming the entire energy industry at an unprecedented pace'. The DTC was founded to keep up with such advances deliver a roadmap for members 'to navigate the numerous opportunities and challenges ahead'.

In what is billed as a 'first' for IOGP, an 'agile' approach will be used to speed delivery of its results. These are to include 'insights and recommendations on key focus areas for digital transformation', identifying the required digital skills (to be published as a 'library of skills') and selecting 'relevant, high-impact digital personas on which to focus skills initiatives in the near term'.

To support the ambitious agenda, no less than four 'expert groups' will be formed. These are 1) an opportunities screening expert group (OSEG) to 'groom the backlog' of the IOGP's digital opportunities, 2) a change management and strategic communications expert group (CMEG), 3) a digital skills expert group (DSEG) and 4) a digital platforms expert group (DPEG) to advise on infrastructure.

Comment: The 'digital transformation' trope continues to offer unlimited opportunities for 'agile' committee work. What it actually means has always been unclear. The IOGP already does a good job of publishing its plethoric reports via a 'digital' website in the form of 'digital' PDF documents. All of which can be searched 'digitally'. 'If it ain't broke, done fix it' comes to mind. An unrelated 'digital transformation' (of the EU's CEN/CENELEC annual reports – which were previously PDFs) meant that the 2002 report is to be published as a dreadful (but 'digital') <u>video</u>! Please IOGP, don't go there.

LINUX FOUNDATION ENERGY SUMMIT 2023

Shell joins LF Energy. EU Carbon footprint of ITC and the state of green software in the energy transition. On the 'agile open source state of mind'. Carbon footprint of ChatGPT. DoE FEMP on 'catalyzing America's clean energy industries and jobs'. PowSyBl and the EU grid.

LF Energy is an open source foundation focused on creating a technology ecosystem to support rapid decarbonization with a 'neutral, collaborative community to build the shared digital investments that will transform the world's relationship to energy'. According to a <u>new report</u> from LFE, the energy sector is in the midst of a major transformation, with 76% of utilities implementing digitalization plans, and 64% using open source to 'accelerate innovation'. LFE's remit excludes fossil fuels. However, since major oils are moving into renewable energy, particularly Shell, now a major sponsor of LFE, and microgrids and electrification of oil and gas facilities is on the agenda, Oil IT Journal popped in to the 2023 LFE Summit to see what's happening.

Host Lucian Balea from **RTE** (France's electricity network utility) welcomed Shell as a new top level LFE member, observing that while Shell was the only oil company on board, many service companies like Aveva and GE are involved. Currently there are some 25 LFE projects up and running.

Mark Van Stiphout from the **European Commission** gave a keynote on the 'contribution of open source to the green deal'. Europe is the first continent with a 'climate neutral continent' objective, in particular to reduce its dependency on Russian gas. The Council has set a target of 42.5% renewables by 2030 (today it is 30%). Internal combustion engine vehicles are to be phased-out and replaced by e-vehicles. Gas and oil boilers to be replaced with heat pumps(!). What role has open source software in the transition? Open source is 'the key to future energy'. Open source supports innovation and 'perennial' IT solutions. The EU has launched a digital twin of EU electricity grid, a joint venture between EU distribution system operators. Since 'we don't know exactly what will be needed in 2030, an agile, open source state of mind is needed to support the EU electricity grid of the future'.

Chris Xie (**Futurewei**) wondered what our energy future might be with pervasive ICT* and AI. The CO2 emissions of ChatGPT3 have been put at the equivalent of 56 years of emissions from a single US home. 6G mobile networks will herald even higher power consumption. The challenges of ICT and AI power consumption need to be addressed by promoting 'carbon-efficient' programing languages and 'zero bit, zero wait' mobile networks. Network carbon intensity is coming under the radar of the ITU telecoms organization. Rust is low, C is ok, Java worse with Python worse still**. LF's Anna Hermansen described ongoing collaboration between LF Research and Futurewei. Two new reports have just been published. 'The Open Source opportunity for microgrids' and an 'Energy Transformation Readiness Study'. The latter found that while open source is used more that proprietary software, take-up is hampered by performance, support and security barriers. More generally, attempts to reduce the carbon intensity of ITC are tracked by the Green Software Foundation with a web page dedicated to the State of Green Software.

* Information technology and communications.

** *More on the topic <u>here</u>.*

Mary Sotos, Director of the US DoE's <u>Federal Energy Management Program</u> (FEMP), highlighted the role that <u>Executive Order 14057</u> is playing in 'catalyzing America's clean energy industries and jobs'. She highlighted FEMP's energy data and sustainability <u>website</u> and the <u>REopt</u> optimization platform that is used to evaluate distributed energy resources for integrated energy systems.

Nicolas Omont (<u>Artelys</u>) explained how the main EU electricity coordination centers (Coreso and TSCnet) are using the open-source library <u>PowSyBl</u> in a 'continent-wide coordination of the power grid'. Note too that Artelys, a provider of decision support and optimization tools, has an <u>oil and gas footprint</u> with notably, downstream activity for <u>TotalEnergies</u>.

Steve Dahlke from the US **Electric Power Research Institute** cited Presidential Executive Order 14057 which calls for 24/7 carbon-free electricity. EPRI with, notably <u>Iron Mountain</u>, is studying energy use in data centers. Despite earlier deals signed for Google, Engie, Microsoft and others, there are 'not too many buyers for carbon-free electricity today'. Pricing is an issue as are 'asymmetrical financial and operational risks'. 'Emissionality', strategies that minimize emissions reduction – possibly by including non renewables, may reduce demand for carbon free energy. Data quality is also an issue.

LFE has spread its net far and wide and some of its projects appear rather thinly populated. The 2022 <u>Carbon Data Specification Consortium</u> (CDS) project that sets out to 'track the carbon intensity of consumed energy and the carbon emissions associated with power systems, to guide grid decarbonization, and decision-making' provides a lot of <u>information</u> on the developing spec. But despite its claimed aim of 'accessibility', trying to make sense of the various websites, Git repositories and documentation is a bit of a run-around.

More from the <u>LF Energy Summit</u> home page.

UK QUANGOS DELIBERATE ON OFFSHORE 'DIGITALIZATION'

UK Offshore Energy Digital Strategy Group updates report on UKCS data and digital maturity. 'Progress' reported on unlocking the potential of digitalization across the oil and gas and renewable energy sectors. Despite multiple calls for 'collaboration', data sharing 'remains a challenge'.

The UK Offshore Energy Digital Strategy Group* (OEDSG) has produced a new version of its report on 'UKCS data and digital maturity'. The 2023 study updates an earlier version produced in 2020. The latest analysis is said to 'reveal oil, gas and renewables progress on unlocking the potential of digitalization across the oil and gas and renewable energy sectors'.

Some thirty oil, gas and renewable operator companies contributed to the survey with input from technology developers and supply chain companies. An 8% per cent improvement in the pace and integration of digitalization was reported across key metrics relating to strategy, leadership, training and capabilities. In comparison, the survey identifies a lag in data maturity which suggests more companies need to focus on developing data strategies if they are to capitalize on the opportunities ahead. There are signs that companies are increasingly adopting a wider range of digital technology and data, indicating that the situation will improve in the future.

The top-level conclusions (entreaties?) are that digital maturity still needs improvement, particularly in smaller organizations. Collaboration between operators and the supply chain is needed to 'drive effective cross-industry digitalization'. Leaders need to foster a data-driven culture and equip employees in with the necessary skills and knowledge.

The 2020 edition of the report found, inter alia, that 'a recognized business model for collaboration had not yet emerged'. Examples of genuine collaboration (outside of contracting arrangements) were rare. Industry had yet to find the business model for collaboration, where multiple organizations shared the benefit and acceptance of risk.

We were interested to see just how 'genuine collaboration' has improved in the last three years. The 2023 report uses the word 'collaboration' 160 times – an average of 4 times per page over the 48 page oeuvre! Despite the word count, it would appear that 'organizations continue to be wary of data sharing'. While there is increasing adoption of 'data related technologies' (for example, cloud platforms, data mesh) that enable greater levels of collaboration, collaboration based on data remains a challenge, particularly where sharing of data may be seen to be a risk to an organization's competitive advantage.' What can one say ... 'Duh'?

Indeed, what can one say about this verbose hymn to digital. It is wrong on so many counts. The multiple quangos telling companies what they should be doing. Undefined terms (what is digitalization, digital transformation?). The notion that the 'cloud' or 'data mesh' in themselves can influence how much data is shared. The confounding of 'digital' with 'net zero'. What is wrong with confidential data and competition anyhow? Perhaps most telling is the contradiction in the OEDSG venture itself. OEDSG is primarily a 'collaboration' that has failed to deliver anything more than hot air. One likes to think that the individuals involved in this venture are all smart folk. But they have collectively'collaborated' on something that is definitely less than the sum of its parts.

OEDSG has representation from a staggering number of Quangos* and industry bodies viz. Offshore Energies UK, Opportunity North East, the Net Zero Technology Centre, the Technology Leadership Board, the North Sea Transition Authority, The Crown Estate (<u>owned by King Charles</u>!) and Crown Estate Scotland (described elegantly as '<u>yet another Quango</u>'). Deloitte supported the effort with survey design.

* Quasi-autonomous governmental organizations.

SOFTWARE, HARDWARE SHORT TAKES

Azure Data Manager for Energy. Kubernetes options for ArcGIS Enterprise. Aggreko's Emissions Calculator. GD1 from Teledyne Gas and Flame Detection. Emerson's AMS Device Manager Data Server. New Micropilot sensor from Endress+Hauser. Hexagon's Reality Cloud Studio. Honeywell Forge news. Time-lapse inversion from Ikon Science. Geovariances releases Isatis Python library. New ResInsight from Ceetron. Bystamp Keymo, a digital rubber stamp. Zededa: LF Edge for oil and gas.

Microsoft has announced the <u>Azure Data Manager for Energy</u>, a 'secure, hyperscale, fully managed cloudbased data platform for the energy industry'. ADM4E comprises an OSDU data platform running in the Azure cloud, leveraging SLB's 'extensive domain expertise'. The 'PaaS' (Platform as a Service) offering is managed by Microsoft and provides upgrades to the latest OSDU milestone versions after testing and validation. The solution provides security and data encryption with access control provided by Azure Active Directory. The service claims 'out-of-the-box' compatibility with industry-leading applications from SLB, including Petrel. Microsoft is now piloting integration with SharePoint for data ingestion, Synapse for data transformation and Power BI for data visualization. Early adopters include Aker BP and TotalEnergies.

Trevor Seaton, blogging on the **Esri** website offers some advice on new <u>Kubernetes options</u> for deploying ArcGIS Enterprise 11.1. To evaluate the Kubernetes option, Esri has a page for '<u>Determine whether</u> <u>Kubernetes is right for you</u>'. Also of note is a new ArcGIS Image Service on Kubernetes.

Aggreko's new <u>Emissions Calculator</u> allows users to see real-world percentage reductions in emissions and fuel consumption that can be made by switching Aggreko's Greener Upgrade power generation option. The calculator uses information based on the energy demands of multiple sites to determine potential reduction of carbon dioxide, nitrous oxides, particulate matter and fuel consumption.

Teledyne Gas and Flame Detection is unveiling its <u>GD1</u> laser-based gas detector with 'full SIL2 3rd party approval'. The GD1 SIL2 is 'the market's first open-path gas detector for hydrogen sulfide safety-related applications'.

Emerson's <u>AMS Device Manager Data Server</u> allows users to replicate intelligent field device data outside the process control network, making it accessible from both Emerson and third-party destinations like plant historians, control systems, data lakes, visualization and dashboard applications.

Endress+Hauser's new generation of <u>Micropilot 80 GHz radar</u> sensors provides solutions across all industries and applications. The sensors are suited for challenges when measuring points aren't easily accessible, located in dusty areas and harsh environments with extreme process temperatures and process conditions. The new sensors come equipped with wizards for various HMI environments. Digital communication protocols include HART, Profibus and Ethernet/APL.

Hexagon has launched its <u>Reality Cloud Studio</u> (RCS), 'powered by HxDR', Hexagon's digital reality platform. RCS includes geospatial data services, collaboration tools and automated data processing. The hosted tool includes an API gateway for custom app creation. The solution is said to 'mark a significant advancement in Hexagon's platform approach to building a central source for digital reality data'.

Honeywell has announced several new product offerings in its Honeywell Forge (HF) range. HF Performance+ unifies OT and IT data in a single real-time operational monitoring application. HF Sustainability+ provides emissions management. Other novelties include a process digital twin and a connected workforce competency management tool. More from <u>Honeywell</u>.

The 2023.3 release of **Ikon Science**'s RokDoc includes 'state-of-the-art' 4D inversion. The time-lapse Ji-Fi app provides 4D fluid tracking capabilities for production and injection scenarios including carbon capture utilization and storage. Additional sand, shale and carbonate rock physics models that capture compaction and clay evolution have been added to the RokDoc and rock physics modelling libraries. Also new is a fractured-carbonate rock physics model that streamlines data sharing and integration with geomechanics workflows. Deep QI machine learning and rock physics functions automation now includes an XGBoost option, combined with grid search for parameter tuning. More from Ikon Science.

Geovariances has released <u>Isatis.py</u>, a Python package for geostatistics that exposes the same algorithms as in its flagship Isatis.neo package. The library also allows loading and writing data to the Isatis.neo database. Isatis.py is parallelized and multithreaded and is said to manage models with millions of cells.

The 2023.06 of **Ceetron**'s open source and free ResInsight fluid flow modeler is ready for download. The new tool has a 3D seismic data display functionality, new summary and producer-injector connectivity tables and more. Read the <u>release notes here</u>.

French startup **Bystamp** has come up with an intriguing piece of hardware – a 'digital' rubber stamp called Keymo. Touching an onscreen PDF document with the device adds a secure electronic signature. The stamp uses patented optical and Bluetooth pairing and authentication technology. Coupled with the request of a confidential PIN code, it allows a strong authentication before launching the electronic signature procedure. (No we don't understand how it works either!) More from <u>Bystamp</u>.

Zededa's new Edge computing solution promises 'efficient and sustainable oil and gas operations'. Moving the massive amounts of wellsite data to the cloud for processing is impractical. The solution is to processing data 'at the edge' i.e. onsite. Zededa's hardware and <u>LF Edge</u>-based software is said to 'make edge computing effortless, open, and intrinsically secure, extending the cloud experience and agility to the edge. More in the product data sheet.

PTN OIL & GAS AUTOMATION AND DIGITIZATION 2023

PTAC on digital tools. Petronas' enterprise data hub. FlowForma on engineering document management. AAPG on leak detection. Siemens on analyzer reliability. Willowglen on cybersecurity in operations. Technip Energies's asset information model. Aramco and the 4th Industrial Revolution. GlobaLogix and the business case for new scada. Samp's shared reality model. Energy metering with Vutility Drop.

Allan Fogwill, COO of PTAC, the **Petroleum Technology Alliance Canada**, presented on digital tools for oil and gas. PTAC's 180 member-strong innovation ecosystem currently has some 180 projects underway. Many focus on clean tech notably the Alberta Upstream <u>Petroleum Research Fund</u>, the <u>Canadian Emissions</u> <u>Reduction Innovation Consortium</u> (Caneric) and two Methane Consortia. Digital tools under the PTAC purview target, inter alia, reduced operating costs, reduced methane emissions, increased reliability and better regulatory compliance and reporting. The digital oilfield also brings automatic detection of leaks, production forecasting, management by exception and AI-driven maintenance and repair scheduling. Caneric represents a comprehensive methane management database for methane reporting in the context of '<u>equitable origin</u>' credit creation. Digital solutions, along with subject matter experts provide actionable information and can optimize the use of skilled trades and engineers in the face of labor shortages.

Ariful Islam from **Petronas**' Dagangan Berhad unit, the domestic marketing arm, presented on PDB's analytics journey. This leverages EDH, the enterprise data hub that was established in 2020. A subsequent 'Pivot' project is now collecting scattered, disparate data into a landing zone where a single source of truth is being built in a data lake. Controlled access is provided by PDB Insight (PowerBI also ran). The solution addresses retail sector merchants, drivers and vehicles. Citizen data scientists are using AI in various projects (sales performance forecasting, demand volume forecasting, price sensitivity) each of which is expected to achieve a modest 1% improvement in sales.

Paul Stone (FlowForma) presented a case study of the eponymous tool as deployed at Dresser. FlowForma Process Automation is an award-winning process automation tool with a claimed 200,000+ users. The solution is described as a '3-in-1 tool' with forms/workflow/document generation capabilities that support digital transformation with intelligent workflows and process automation. Dresser has deployed FlowForma to migrate its key engineering document processes such as manufacturer engineering documentation approval, patent disclosure submission and IT change management to an automated workflow that has saved some 15% of the time spent. The solution was enthusiastically endorsed by Dresser's Imelda Bettinger who exclaimed 'The old processes took years to build. A change request took a month to realize. Now people are embracing FlowForma and coming up with their own ideas for new workflows.'

Following an overview of methane monitoring solutions, Susan Nash, who is director of innovation, emerging science and technology at the **American Association of Petroleum Geologists**, addressed the integration issue. She advocates a two step approach, mastering monitoring and leak detection followed by carbon management. The latter includes certification of carbon measurement, registration and credits leveraging non-fungible tokens*, all in a 'seamless workflow'. The idea is to demonstrate responsibly sourced gas that can be converted to certificates that can be bought and sold on carbon exchanges. But, Nash warns, don't try to own the whole chain. Better to work in 'win-win' partnerships.

* For those wondering how an eminently fungible asset such as natural gas can be tied to an NFT, read Neil McNaughton's 2018 <u>editorial</u> and <u>letter</u> in the Financial Times.

Lukas Bimmerle presented **Siemens**' work on data-driven optimization of analyzer and instrument reliability. High availability and accuracy of measurements are crucial for optimized process. Accurate measurement can allow for set points to be closer to the envelope – increasing yield and or product quality.

Also frequent calibration and software-based statistical quality control can lead to early identification of inaccuracies, tighter process control and less waste. Today, continuous emission monitoring systems are 'run to failure'. Suddenly the plant is in shutdown. Siemens approach is to monitor diagnostic health data for each physical component. When an anomaly is discovered, softwareinforms the user, identifies the cause of the problem and suggests a solution. Siemens <u>Ultramat 23</u> can be so configured. Siemens' <u>GProms</u> supports software simulation of plant processes to identify measures to reduce emissions.

Ian Verhappen (Willowglen Systems) showed how to integrate cybersecurity into facility operations. ISO 27001 governs the IT side of the cybersec equation and here, compliance certification is available. On the OT side IEC 62444 rules although certification documentation is currently work in progress. The US NIST 800 series provides best practices for IT/OT environments. Critical infrastructure is governed by many different regulatory bodies and the recent increase of incidents has led to the development of new tools and devices – and yet more false alarms. Operators are already swamped by process-related alarms and cyber is out of scope for many. Industry's response is to share cyber threat intelligence confidentially via initiatives such as MITRE ATT&CK, a 'globally-accessible knowledge base of adversary tactics and techniques based on real-world observations'. Attack data is modeled and shared with STIX. Threat levels are monitored with TAXII a 'trusted automated exchange of indicator information'. How do you cross the IT/OT cyber divide? One solution is Willowglen's SentientQ unified SCADA platform and security manager.

Anupam Acharya presented **Technip Energies**' <u>asset information model</u> a.k.a; a digital twin and single source of the truth. Curiously there was no mention of the CFIHOS initiative where Technip has a <u>presence</u>!

Fawaz AlSahan (**Saudi Aramco**) reviewed a number of 'smart sensors*' that are heralding the 4th industrial revolution. Sensors are becoming smarter, more compact, need less maintenance, and are able to provide more and accurate data about processes in the oil and gas industry. Non-intrusive smart sensors are evolving and providing quick solutions for process measurement. Temporary or permanent installation can help with operation challenges, enhance crude quality, reduce emissions and manage hydrocarbon losses. Smart sensors are enablers of IR 4.0 'especially when combined with analytics/ML'.

* loosely defined as being compact, providing multiple data streams from a single sensor and with built-in diagnostics and a self-testing capability.

Chuck Drobny presented some of <u>GlobaLogix</u>' learnings as an oil and gas scada specialist. The electronic infrastructure on legacy wells won't support new end devices and the cost of upgrading the entire Scada platform is prohibitive. New installations offer capabilities that may be unknown to customers and may require specific configurations. The business case for new scada can be hard to make but it is key to clearly define the objectives upfront. Project management techniques need to be applied to prevent delays and cost overruns. Because few sites have an accurate inventory, and as-built documentation is often missing, a site survey is a good idea to kick-off a project.

Thomas Grand demonstrated <u>Samp</u>'s 'shared reality' solution, a 3D streaming web portal that works with zero plugins and zero training, on standard machines. An automatic object segmentation engine identifies equipment, leveraging patented optical equipment recognition technology. This helps align tags, P&ID and 3D reality capture 'in a matter of hours'. Samp also provides APIs to add new equipment and data types.

<u>Vutility</u>'s Joel Berntsen asked, 'Which assets do refineries actively monitor for energy?', answering his own question with 'Not many!' Few motors in a refinery have current monitoring on them. Traditional monitoring kit is expensive, requires engineering and maybe a shutdown to deploy. Enter Vutility's 'Drop' series of patented, proprietary wireless energy metering solutions that are 'installed in minutes'. Applications include equipment monitoring of pressure, vibration, temperature and personnel safety tracking. Software provides contextualization of multiple IIoT sensors with cloud analytics and visualization. LoRaWAN is the preferred connectivity, providing a bandwidth-efficient standardized IoT info@oilit.com // www.oilit.com

protocol with regional configurations supported in over 160 countries. While operators already monitor critical assets, other operational assets are often left unmonitored with manual processes, resulting in 'significant gaps between potential, optimized productivity and actual output'.

More from the PTN Oil & Gas Automation and Digitization home page.

FOLKS, FACTS, ORGS ...

Halliburton, Lloyd's Register Foundation, AFL, BCCK, Trellis Energy Software, Bentley Systems, Flotek Industries, Society of Exploration Geophysicists, SEG Foundation, Norwegian Petroleum Directorate, Offshore Energies UK, XONA Systems, Asset Guardian Solutions, Black & Veatch, Pipeline Research Council, Oxford Flow, Bluefield Geoservices, Wood Mackenzie, Object Management Group, Information Junction.

Halliburton has added Janet Weiss and Maurice Smith to its board of directors. Shannon Slocum, formerly SVP Global Business Development and Marketing, has been promoted to President, Eastern Hemisphere.

Adam Sobey has been appointed to lead the **Lloyd's Register Foundation-Alan Turing Institute**'s <u>data-</u> <u>centric engineering program</u>. Sobey is a Professor in the Maritime Engineering group at the University of Southampton.

Marc Bolick is joining **AFL** as president of product solutions. He was previously VP of Corning's Wireless Business Unit. AFL, a provider of communications hardware to the energy and other markets, is a wholly owned subsidiary of Fujikura of Japan.

EPC **BCCK** has promoted Naomi Baker to VP engineering. The company has also appointed Drew Schiller as director of business development-gas processing. He was previously director of energy services for Halff Associates.

Trellis Energy Software has appointed Rana Basu as VP Growth. The company also reported the 2022 hiring of Scott Vogan as VP Sales. Basu previously founded Consurgo, a network of energy trading professionals focused on hydrocarbon trading risk management. Vogan hails from Accenture.

Allen Li has joined Bentley Systems as General Manager, China. He hails from SAP.

Flotek Industries has promoted president Ryan Ezell to CEO. Interim CEO Harsha Agadi moves to non-executive chairman.

John Eastwood has been selected by **Society of Exploration Geophysicists** voting members to serve as president-elect for 2023–2024. Eastwood worked for ExxonMobil/Imperial Oil for more than 30 years. View the list of all the newly elected board members and district representatives and their bios on the <u>SEG</u> <u>Elections page</u>.

The SEG Foundation has appointed Sarah Hewitt as MD and Sarah Castro as Manager at the Houston HQ.

The Norwegian Petroleum Directorate has appointed Kjersti Dahle as director at its TAS (technology, analysis and coexistence) unit.

Offshore Energies UK has appointed three new board members, Jillian Owen (Apache North Sea), Abdou Beloucif (Baker Hughes) and Sayma Cox (North Sea Midstream Partners).

Operational technology security specialist <u>XONA Systems</u> has appointed Ron Fabela as Field CTO. Fabela was co-Founder of SynSaber and has worked in cybersecurity roles at companies such as Gravwell, Dragos, Lockheed Martin and Booz Allen Hamilton. He also served active duty in the US Air Force.

Asset Guardian Solutions has hired Claudine Beaver as senior account manager. She hails from CodeWeavers.

Black & Veatch has promoted Narsingh Chaudhary to President, Asia Pacific and India, succeeding Hoe Wai Cheong who retires at the end of 2023.

PRCI, the **Pipeline Research Council International** has named Walter Crommelin (Gasunie) as Vice Chair of the Executive Board, filling the unexpired term of Shahani Kariyawasam.

Oxford Flow has announced the appointment of Adam Eckersley as Chief Technology Officer. He hails from Severn.

Bluefield Geoservices has opened a new 'state-of-the-art' facility in Bedlington, England with access to the Port of Blyth. The new location will be used both to service existing geotechnical equipment and as an engineering hub for future product development. The company also announced the hiring of Patrick O'Donnell to the position of business development lead.

Wood Mackenzie has hired Elise Sommer as Specialist Events in Calgary. She was formerly community development manager with PPDM.

Deaths

The Object Management Group reports the death of **Brad Kizzort** (Chief Technologist at Peraton), following a 14 month battle with brain cancer. He was a longtime Co-Chair of the Space Domain Task Force.

Renowned data modeler **Matthew West, OBE**, director of Information Junction, has died. West joined Shell in 1978 and worked in information management and data modelling. He was a key technical contributor to ISO 15926 – 'Lifecycle integration of process plant data including oil and gas production facilities' and later a trustee and authoritative contributor to the Ontolog Forum. West was also a technical lead on the UK Digital Twin program.

DONE DEALS

360 ELM acquires Astute E&R. Aberdeen Drilling School acquires IAS International. DNV bags Enviroguide and Nixu. Enverus' 'momentous' revenue milestone. ESG acquires Pandell. Resurgens invests in Detechtion. Thermo Fisher acquires MarqMetrix.

Calgary-based **360 Energy Liability Management** has acquired **Astute Environmental and Regulatory**. The deal bolsters 360's core competency in upstream oil and gas site closure and extends activity to the midstream/downstream sectors. More from <u>360</u>.

Aberdeen Drilling School, part of the RelyOn Nutec group, has acquired **IAS International**. The deal will double ADS' customer base by 2024 and increase headcount by 150% over the next 18 months. The company has also appointed Graeme Eglintine and Petru Cioban as directors. More from <u>Aberdeen Drilling</u>.

DNV has acquired Dublin, Ireland-based **Enviroguide Consulting**. The deal expands DNV's portfolio of environmental solutions with biodiversity, contaminated land, waste management, ESG, and environmental impact assessment services. More from <u>DNV</u>.

DNV has also acquired **Nixu** in a \in 98 million deal. DNV now boasts a 500-strong cyber security team working on IT and industrial control system environments to 'build business resilience across multiple industries'. Nixu CEO Teemu Salmi will lead the combined business.

Enverus has announced a 'momentous milestone' as its annual recurring revenue has 'crossed the \$500 million threshold'. The added growth derives from power and renewables, energy transition research and ESG solutions.

ESG, a provider of energy SaaS solutions, has acquired **Pandell**, developer of land and financial applications for the energy sector. The deal is part of a broader strategic vision to be an end-to-end energy software provider. ESG serves over 300 blue chip energy players and over 40 million end users worldwide. More on Pandell's Lithium web application toolset <u>here</u>.

Resurgens Technology Partners, a software-focused private equity firm, has made a 'platform investment' in **Detechtion**, a provider of real time asset performance management solutions. Detechtion products including remote asset monitoring, asset performance management, and field service management technologies. The deal is Resurgens' sixth investment in a \$500 million fund and represents a continuation of the firm's strategy to invest in the growth of vertical software companies. AGC Partners served as financial advisor to Detechtion. More from <u>Resurgens</u>.

Thermo Fisher Scientific has acquire **MarqMetrix**, expanding its Raman spectroscopy portfolio with inline process analytical technology. MarqMetrix technology offers a simplified method to make precise and accurate measurements throughout the manufacturing process for a wide range of applications, including biopharma and pharmaceuticals, oil and gas and chemicals. MarqMetrix will integrate Thermo Fisher's Analytical Instruments segment. More from <u>Thermo Fisher</u>.

THE SUSTAINABILITY CONTROL TOWER

SAP pushes 'blockchain-based' ESG credibility. But reporting rules are work in progress and ESG is losing favor with investors. Has ESG been 'weaponized'?

According to a recent Kelly Cannon's (**SAP**) <u>blog post</u>, the transition from fossil fuel-based energy systems to net-zero carbon sources means that oil, gas, and energy companies must simultaneously reduce costs from existing operations and invest in new business models to lead the sustainable energy transition. SAP is helping oil and gas companies make the transition with innovative solutions that can optimize legacy energy sources, integrate low carbon alternatives and reinvent business models.

What are these solutions? 1) GreenToken by SAP is said to leverage a 'unique digital twin on a blockchain' to assure sourcing transparency and ESG credibility data across the supply chains. By keeping core operations clean and scalable, companies can 'focus on sustainability, foster a culture of innovation, and differentiate themselves from competitors'.

Companies need to establish a 'dedicated optimization office' to deploy technologies including automation, optimization and AI. Digital solutions such as a green ledger play a key role in collecting and analyzing data to drive sustainability goals. The SAP <u>Sustainability Control Tower</u> also ran, an overarching dashboard that sets targets, monitors progress and delivers actionable insights. Also involved was **Evolution Software**'s <u>Flexinergy</u> energy and emissions reporting platform.

Sustainable procurement is said to be key to a sustainability strategy. Companies should seek-out suppliers that adhere to sustainable practices, reduce scope 3 emissions and implement robust measurement systems. Companies should prioritize compliance with regulatory requirements, including due diligence laws and SEC reporting*. Watch the supremely 'green' and improbably 'diverse' <u>SAP video</u> on YouTube.

* SEC emissions reporting is currently only a <u>proposal</u>. In fact, before any hard and fast regulations have been put in place, there has been something of a backlash against the whole ESG movement. The Financial Times reported that 'asset managers have lashed out at the growing number of US blue-chip companies that are using environmental and social factors to decide bonuses for senior executives, quoting State Street Global Advisors' Ben Colton as saying 'They are subjective, fluffy and easily gamed'. In a similar vein BlackRock boss Larry Fink was reported by Reuters as saying that he has stopped using the 'weaponized' term ESG.

REGULATORY ROUND-UP

IOGP reports on international P&A legislation. NSTA digital platform for mandatory supply chain action plans. UK Energy Technology Platform sees take-up. NSTA relaunches wells operations notifications system. US Energy Information Administration to update National Energy Modeling System. Interstate Oil and Gas Compact Commission favors use of taxpayer dollars to plug orphan wells. New AI-derived seabed sediment map of the North Sea. Australian Research Data Commons unveils 2030 Geophysics Collections data plans. available. Menon Economics evaluates NPD data

The **IOGP** has just published Volume 2 of its <u>Report 585</u> on international offshore decommissioning regulations. Volume 2 covers plugging and abandonment. (Volume 1, published earlier this year covers facilities). The new volume reviews the national legislation and guidelines for offshore P&A for some 35 countries. Volume 1 is available here https://www.iogp.org/bookstore/product/overview-of-international-offshore-decommissioning-regulations-volume-1-facilities/.

NSTA, the North Sea Transition Authority, has launched a digital platform through which operators can submit and update their supply chain action plans. SCAPs contain important information about operators' contracting activities. The SCAP reporting process was rolled out in January 2018 after an NSTA study showed that poor engagement with suppliers was contributing to North Sea projects being delivered late and over budget. SCAPs help the NSTA monitor changes in costs, find gaps in supply chain capability, promote best practice and identify lessons learned. A SCAP is now mandatory for all field development and decommissioning projects. More than 200 have been lodged with the NSTA since the process began. More from the <u>NSTA</u>.

NSTA reports take-up for the UK Energy Technology Platform (UKETP) with users up 67% to 892. The hike followed the provision of a £27,500 grant to allow suppliers and operators use the portal for free for a six month period during which UK suppliers added 69 technologies to the site, taking the global total to more than 660. A further £30,000 grant has been made available to allow users to enjoy continued free access for six months, to 15 November 2023.

NSTA has also 'relaunched' WONS, the wells operations notifications system. WONS allows operators to submit online applications and notifications for well activity. NSTA can then give submissions proper technical scrutiny before issuing consent. The new portal includes permitting for carbon storage licenses and allows users to record more detailed information on the identity and role of companies responsible for the wellbore and associated data.

The US **Energy Information Administration** (EIA) is to update NEMS, its National Energy Modeling System. NEMS I used to produce the EIA's Annual Energy Outlook. New requirements to include emerging technologies and fuels such as hydrogen production and transport, carbon capture and seasonal energy storage mean that the model needs a refresh. Consequently, the AEO will not be published in 2024. The 2025 AEO will better address existing laws and regulations in the reference case, including up-to-date provisions in the inflation reduction act and regulatory actions that could be finalized in the coming months.

The Interstate Oil and Gas Compact Commission (IOGCC) has approved <u>Resolution 23.053</u> from Texas Railroad Commissioner Jim Wright who urged the US Department of the Interior to follow the statutory language passed by Congress with respect to the Federal Orphan Well Plugging Program. Wright was pushing for the use of taxpayer dollars to utilized to plug as many orphan wells as possible.

DATA

The **Geological Survey of the Netherlands** has issued a new, artificial intelligence-derived seabed <u>sediment</u> <u>map of the North Sea</u>. The map is intended to support activities such as shipping, fishing, construction and operation of wind farms, cable trenching and pipeline construction. AI has allowed researchers to capture the ratio of sand, mud, and gravel in a grid model for all 58,500 square kilometers of the Dutch North Sea bed. Making the map involved 'state-of-the-art techniques and enormous computing power'.

The Australian Research Data Commons has been working on a 2030 <u>Geophysics Collections</u> project to make the large volumes of geophysical data that have been acquired by universities, industry and government agencies since the 1950s more accessible. The project makes raw, high-resolution versions of AuScope-funded magnetotelluric and passive seismic data accessible online, compliant with <u>FAIR</u> and <u>CARE</u> principles, and integrated with existing government datasets at the National Computational Infrastructure (NCI). The datasets are suitable for programmatic access in high-performance computing environments at NCI. They lay the foundations for more rapid data processing by 2030 for next-generation, scalable and data-intensive computation, including data assimilation and computation using artificial intelligence and machine learning.

A report, 'The value of the Norwegian Petroleum Directorate's data', prepared by **Menon Economics** for the **NPD** underscores its value. Poster child for the NPD is the Johan Sverdrup field, discovered by Lundin in 2010 using old seismic and well data in Diskos. Now production income from the field is estimated at NOK 1,430 billion over 50 years. The report leverages data on how companies are using the data and shows how NPD's data is still key to providing operators with a greater understanding of the subsurface, supporting value creation on the shelf. Currently NPD manages almost 15 petabytes of data. The Report (in Norwegian) can be <u>downloaded here</u>.

GOING, GOING ... GREEN

Automation Technology's zero emission actuator. Envana Catalyst for drilling transparency. KBC on GHG mitigation. Seeq for Microsoft Sustainability Manager. Siemens 'blockchain for clean energy'. TotalEnergies, Colorado State team on methane protocol. TotalEnergies leverages OGMP 2.0 reporting framework. Greenpeace France can proceed with 'greenwashing' legal challenge to TotalEnergies. Accenture's Methane Emissions Monitoring Platform. New Teledyne FLIR G-series leak detectors. SAP study on sustainability performance and reporting. MIT tallies CO2 vs CH4 global warming. SGN and Oxford Flow evaluate hydrogen readiness. Opis: Idle UK/French petrochemical plants receive \$127 million of carbon permits.

Automation Technology has launched a zero emission electro-hydraulic actuator solution to eliminate the carbon footprint of pipeline operations. The solution uses grid electricity (or photovoltaics in remote locations) to eliminate methane venting during valve operations. More from <u>ATI</u>.

Halliburton has teamed with Siguler Guff to launch **Envana Software Partners**. The new venture provides critical emissions management software to track greenhouse gas emissions in the oil and gas industry and beyond. The venture's first offering, <u>Envana Catalyst</u> is a hosted solution to increase transparency of the environmental impact of drilling, completions, and production operations.

A <u>Whitepaper</u> from **KBC** proposes a new approach to manage and reduce greenhouse gas emissions. Focus is on decarbonizing the global refining industry using low and no-carbon energy technologies. The paper discusses how energy management systems monitor, control and report GHG emissions, how to combining energy management and accounting systems for emissions management and provides advice on Scope 1, 2 and 3 emissions reporting with a hydrocarbon accounting system.

Seeq has announced the Seeq Solution for Microsoft Sustainability Manager, integrating time series process and emissions data preparation and analysis to reduce the environmental impact of process industry operations. More from <u>Seeq</u>.

Siemens 'blockchain for clean energy' a.k.a. <u>Clean Energy Certification</u> (CEC) promises a 'fast and easy way to verify the renewable origin of your products'. The solution has been deployed at Nobian's chloralkali electrolysis plant in Germany to certify the sustainable origin of green hydrogen. Even more improbably, CEC is 'proving' the green origin of the e-fuels used by Porsche's motorsport fleet at <u>Haru</u> <u>Oni</u>'s eFuels facility.

TotalEnergies is partnering with **Colorado State University** to develop an international protocol for the qualification of methane emissions measurements'. The transatlantic initiative is needed because there currently exists no agreement on how to validate methane emissions measurement methods. The scope of the partnership is available <u>here</u>. TotalEnergies is also enhancing its reporting as part of OGMP 2.0, the second phase of the United Nations Environment Program's Oil & Gas Methane Partnership. OGMP 2.0 outlines a reporting framework that encompasses the entire gas value chain. In 2022, TotalEnergies was awarded the 'Gold Standard' merit badge.

This did not impress the folks at **Greenpeace France** and other NGOs who won a preliminary legal battle in May when the Paris Tribunal judged that the collective ONGs' legal action could be judged. The ONGs accuse Total of greenwashing and misleading publicity over its net zero claims.

Accenture has created a <u>Methane Emissions Monitoring Platform</u> to facilitates the integration of multiple data streams and provide methane insights into business operations to drive action. The Azure cloud-based

platform measures baseline methane emissions in real time from gas distribution systems, and can also detect leaks using satellites, fixed wing aircraft and ground level sensing technologies. The system is also used to 'optimize' cold venting and flaring!

The latest **Teledyne** <u>FLIR G-series</u> OGI cameras promise allow quicker detection of gas leaks, helping to avoid lost product, lost revenue, fines and safety hazards. OGI technology uses an infrared camera which matches spectral response to specific gases. The solution targets offshore platforms, LNG shipping terminals, oil refineries, wellheads and processing plants. Camera imagery are automatically uploaded to FLIR's <u>Ignite</u> cloud software from the field.

SAP has commissioned a <u>study</u> from the IBM Institute for Business Value and Oxford Economics to investigate sustainability performance and reporting. The thesis is that sustainability needs to be managed with the same rigor as financial performance. The proposed strategy is to extend the data 'backbone' of the ERP system. The study quizzed over 2,000 senior executives to find that 'those who outperform their competition in both environmental and financial outcomes also boast the most deeply engaged ERP'.

Researchers **from MIT** have been evaluating the relative contributions to global warming from natural gas as it is burned to produce C02 and as it leaks from production systems. The jury is out but while CO2 emissions are probably the larger factor, methane leaks are still important, and recent studies suggest they are likely undercounted. More on the work from MIT XXXX https://climate.mit.edu/ask-mit/how-much-does-natural-gas-contribute-climate-change-through-co2-emissions-when-fuel-burned

The UK **Southern Gas Network** (SGN) has partnered with Oxford Flow to test the readiness of its gas network for 100% hydrogen. The company is also to deploy Oxford Flow's hydrogen-ready IM-S gas on its <u>LTS Futures</u> (Local Transmission System) demonstrator.

A <u>investigation</u> by Dow Jones' Opis unit found that three idle UK and French petrochemical plants were allocated a tidy \$127 million in free carbon permits. Three EU facilities operated by Saudi Arabian SABIC, UK conglomerate INEOS and French oil major TotalEnergies received the monies from the British and French governments, 'even though the plants were offline or emitting very little carbon'. A spokesperson for the UK Department of Energy Security and Net Zero told OPIS that it was waiting for the information from the country's Environment Agency and that it 'may need to consult lawyers'.

STANDARDS STUFF ...

Eclipse Foundation rolls-out Sparkplug 4.0.0. ISO's new Industrial Data Ontology to replace ISO 15926 Part 14. Inaugural release from International Sustainability Standards Board. Modelica Version 3.6. EITI updates transparency/governance standard for oil, gas and mining. OAGi moves Industrial Ontologies Foundry to membership model. Open Geospatial Consortium announces API compliance certification, RFIs for Open Science Persistent Demonstrator. PPDM on data accountability and auditability. OMG Systems Modeling Language V2.

The Eclipse <u>Sparkplug 4.0.0</u> release plan has been approved by the Sparkplug Specification Committee. The new version will improve support for multiple Sparkplug host applications, expand the 'Sparkplug aware MQTT server' profile and improve overall specification clarity

While the situation seems to be in flux, it would appear that Standards Norway has proposed a replacement for ISO 15926 Part 14. The new Industrial Data Ontology, ISO TC 184/SC 4 N3778 describes an OWL (web ontology language) for industrial data and information that will be used to 'build vocabularies and

manage asset models that employ reference data libraries and exploit OWL DL'. IDO is intended for use in all life cycle phases of industrial assets and processes. Follow <u>ISO TC 184/SC 4 here</u>.

The International Sustainability Standards Board (ISSB) has issued its inaugural standards—IFRS S1 and IFRS S2, 'ushering in a new era of sustainability-related disclosures in capital markets worldwide'. The standards will help to improve trust and confidence in company disclosures and help inform investment decisions. More from <u>the IFRS</u>.

Version 3.6 of the Modelica Language has been released with new features including multilingual descriptions, selective model extensions and '100+ minor improvements'. More in the <u>release notes</u>. The Association has also announced that the <u>Modelica international conference</u> will be held from October 9 to 11 in Aachen, Germany.

The Extractive Industries Transparency Initiative has updated its standard for transparency and good governance of the oil, gas and mining sectors. The <u>2023 EITI standard</u>, the fourth edition, strengthens EITI disclosures and governance requirements to improve understanding of the impact of the energy transition, address corruption risks, promote gender equity and strengthen revenue collection.

OAGi, the open applications group integration standards organization that addresses interoperability challenges among ERP systems, has moved its Industrial Ontologies Foundry (IOF) to a membership model. This will enable 'expanded development and promotion of ontologies and to provide better service and support to our user' The work was previously funded by NIST. More from <u>OAGi</u>.

The Open Geospatial Consortium has announced a <u>compliance certification</u> process for its Processes Standard API. OGC compliance 'provides confidence that a product will seamlessly integrate with other compliant solutions, regardless of which vendor created them'. The OGC has also released an executable test suite for the OGC API Processes Part 1: Core Standard. Products that implement the Standard and pass the tests in the ETS can now be certified as OGC Compliant. Ecere's <u>GNOSIS Map Server 1.0</u> has been designated as a reference implementation of the new standard.

OGC has also issues a request for information in regard of a proposed Open Science Persistent Demonstrator. The multi year OSPD initiative is to address open Earth Observation (EO) platforms, EO data visualization and decision-making based on scientific evidence. Replies are due by September 17, 2023. More from <u>OGC</u>.

The PPDM Association has just published a white paper on data accountability and auditability. PPDM CEO Trudy Curtis argues that data standards that are designed around a specific technology come with significant overhead including methods to support the specific container structure, to identify individual records, to apply defaults and more. Accessing such data is 'unwieldy and error prone'. The preferred route is to describing data and technology separately. Enter the PPDM Data Object Framework that 'focuses equally on what a good data object looks like and what data professionals should know about them to successfully create and steward them in various technical environments'. More from PPDM.

The Object Management Group has released <u>Systems Modeling Language V2</u> (SysML v2) with a capacity to modeling increasingly complex systems with improved precision, usability and interoperability. The tool was endorsed by Frédéric Bourcier (CATIA VP with Dassault Systèmes) who observed that 'We are witnessing a strong adoption of model-based systems engineering in next generation cyber systems. SysML V2 will accelerate the trend.'

SALES, PARTNERSHIPS, DEPLOYMENTS

LOGIC and Restrata VantagePOB. Hess selects Landmark DecisionSpace 365. Landmark iEnergy for Petrobras. Petrobras deploys SLB Delfi. DecisionSpace 365 for Repsol. Halliburton opens Digital Center in Saudi Arabia. AGR and Add Energy combine. DNV and Siemens Energy team on 3D printing QA. Optime subsea wireless for Wintershall Dea. Halliburton teams with Nabors on drilling automation. Ignition Cloud Edition now on AWS marketplace. Yinson deploys Kahuna Skills Management. MFE adds Voliro T Drone to inspection offering. Nvidia partners with Snowflake. Recon gets Sinopec deep shale process control. SLB teams with Enivibes on pipeline monitoring

LOGIC (Leading Offshore Energy Industry Competitiveness) and **Restrata** have announced a new service to support Restrata's VantagePOB customers in the UK and overseas. The people on board solution is powered from a 24x7 operations and emergency response hub in Aberdeen Harbor. VantagePOB was developed as a collaborative industry project to harmonize aviation logistics systems and processes across UKCS operators and launched in 2004. It is now in use worldwide for personnel tracking and flight scheduling, and is owned by CGI Inc. More from <u>CGI</u>.

Hess has selected the **Halliburton Landmark** DecisionSpace 365 well construction applications powered by the iEnergy hybrid cloud to 'plan, design, and construct safe, cost effective and productive wells'.

Halliburton has announced that Petrobras will use the Landmark iEnergy digital platform to address its subsurface challenges. The companies executed a contract that gives Petrobras access to the entire Halliburton Landmark DecisionSpace 365 Geoscience.

Meanwhile, **SLB** has been awarded a five-year contract by Petrobras for an enterprise-wide deployment of its Delfi digital platform. The contract scope covers Petrobras' digital transformation from exploration, development, and production operations, including moving subsurface workflows to the cloud to significantly accelerate decision making. The award represents one of Petrobras' largest investments in cloud-based technologies.

Repsol has deployed the **Halliburton Landmark** DecisionSpace 365 well construction Suite to automate and streamline its well design process.

Halliburton is opening a new Digital Center (HDC) in Saudi Arabia to serve as the primary hub for realtime and remote operations in country. This center co-locates Halliburton product lines including project management, iEnergy and iDOS in a single environment.

AGR and Add Energy are combining their drilling, reservoir and energy transition technologies under the AGR brand. The move follows the acquisition of AGR and Add Energy by global energy, marine and engineering consultants ABL Group ASA.

DNV and **Siemens Energy** are to create a quality assurance platform for the 3D-printing industry. Siemens Energy's AM Cockpit platform provides automated QC of the 3D metal printing process. DNV's Independent Quality Monitor (IQM) platform adds a customer portal to continuously quality-assure digital solutions. IQM was developed under the EU InterQ project that targets zero-defect manufacturing.

Optime Subsea has tested and qualified a high-speed wireless communication system for completion of subsea wells. The system, part of Optime Subsea's Remotely Operated Controls Systems (ROCS), was tested at the Wintershall Dea-operated Nova field on the Norwegian shelf in 370 meters of water. Note that the wireless link is from topside to seabed, not the subsurface!

Halliburton has collaborated with **Nabors Industries** on a well construction automation solution. The deal sees Halliburton's Well Construction 4.0 tool, the LOGIX Autonomous Drilling Platform combined with Nabors SmartROS rig controls and automation platform and RigCLOUD high-performance digital infrastructure platform.

Inductive Automation's Ignition Cloud Edition is now available in the **AWS** marketplace. The pay-as-yougo option extends on-premises data and enterprise operations, bringing 'elasticity' to control system design. More from Ignition.

FPSO operator **Yinson Holdings** has deployed the <u>Kahuna Skills Management</u> platform to assure the health, safety, and compliance of its offshore fleet workforce.

MFE Inspection Solutions is now offering inspection services using a <u>Voliro T Drone</u>. The T Drone provides thrust-vectoring, six degrees of freedom control and a high torque, 30 Newton force capability for demanding operations. More from <u>MFE</u>.

NVIDIA and **Snowflake** have partnered to bringing accelerated computing to the data cloud with the new Snowpark Container Services, a runtime for developers to manage and deploy containerized workloads. By integrating the capabilities of GPUs and AI into the Snowflake platform, customers can enhance ML performance and fine-tune large language models. More from <u>NVIDIA</u>.

Recon Technology has been awarded a RMB 6.1 million contract to provide the process control systems for Sinopec's <u>deep shale gas field</u> in Chongqing City, China. The 'Ground Control* Project' includes autonomous monitoring and control system at the deep shale gas field.

* To major Tom?

SLB and Eni's **Enivibes** unit are teaming to market E-vpms (Eni vibroacoustic pipeline monitoring system) technology. The proprietary pipeline integrity technology will be offered to the global market through SLB's 100 country outlets. E-vpms can be retrofitted to any pipeline, regardless of age, 'providing immediate integrity data essential for maintaining a network's continually reliable operation'. More from <u>Envibes</u>.

PIDX 2023 SPRING CONFERENCE

eSource on digital trends and Society 5.0! OFS Portal on AS4 and the four corner e-business model. Topl's permissionless proof-of-stake. Baker Hughes on PIDX adoption. PwC on Upstream G&A. PIDX partners with DocStudio.

Anthony Aming (<u>eSource Solutions</u>) enumerated several current trends in digital transformation including notably 'XaaS' (everything as a service) and 'blockchain beyond crypto', i.e. with 'more meaningful use cases'. The main IT/Cloud providers are 'preparing to offer block chain as a service, with real use cases, compatible with mobile technologies'. Looking beyond the current Industry 4.0 meme, Amin postulated a (rather scary) 'Society 5.0' world with a 'big data analyzed by artificial intelligence, and the results fed back to humans' and where 'people, things and systems are all connected in cyberspace with results that exceed the capabilities of humans'. Bringing things down to earth, Aming cited a 2017 Harvey Nash/KPMG <u>CIO</u> <u>survey</u> that found only 41% of companies have an enterprise-wide digital strategy, and only 18% rate their use of digital technology as 'very effective'. Working through the order-to-cash and billing cycle time processes, Aming demonstrated how eSource Solutions' 'GetBilled*' solution simplifies the SAP order to cash process.

* We would have preferred 'GetPaid'!

Chris Welsh (**OFS Portal**) presented on PIDX's role in integrating operators' purchase to pay and suppliers' order to cash systems. He showed in particular how the three corner model (buyer, supplier and third party service provider) can alleviate some of the intellectual property issues associated with a direct buyer-to-supplier connection. With the advent of multiple third-party intermediaries (Swift, Peppol, Oasis Open and others) a four-corner model allows data/IP owners to connect to their own service provider, reaching other trading partners irrespective of access point. The independent service providers use a standard network protocol such as the Oasis <u>Applicability Statement 4</u> (AS4), an open standard for the secure and payload-agnostic exchange of business-to-business documents using web services. PIDX is currently looking into adding AS4 as a secure mechanism for PIDX transports and exploring the viability of a 4-corner delivery network for PIDX transactions.

Hand Behrens presented <u>Topl</u>'s 'modular, permissionless proof-of-stake blockchain' with potential uses in energy including supply chain automation, trading and risk management, ESG reporting and data management. Topl is planning to decentralize the Topl protocol in 2023. Behrens' case for the use of blockchain in these contexts was, as they say in the Scottish courts, 'not proven'.

Aparna Kakani (**Baker-Hughes**) presented the results of a survey of industrial use of PIDX standards. The survey was carried out under the auspices of the PIDX standards adoption council, set up in 2021 to track take-up. Most-used standards cover field tickets, invoicing and order creation, with most companies producing their own PIDX documents using the <u>online standards</u>. On blockchain, most were either unaware of or did not want to know about use cases. The survey found that some standards and schemas have zero adoption. There were also calls for more use cases, modernization of the standards with JSON, and an ongoing effort to track adoption. The complete results of the survey are summarized in <u>Kakani's presentation</u>.

Steve Wright and Manas Satapathy (**PwC**) presented the results of the PwC L48 <u>Upstream G&A Diagnostic</u> <u>survey</u>. G&A cost and exploration and development capital have been cut roughly in half on a BOE basis and headcount is about a third of its 2015 level. As oil and gas is currently facing more headwinds, future economies will come from further digital transformations, as industry moves 'from pureplay cost-cutting to efficiency-driven growth'. 'Sustainable digital value creation requires a holistic approach based on integrated IT platforms and supported by change management'. The authors opine that many previous initiatives have limited their focus to data. More emphasis is needed on analysis, decision support and visualization. Reference was also made to <u>The Critical Few</u> a publication from PwC's Katzenbach Center that is described as 'a practical guide for leaders at all levels on leveraging culture to accelerate and sustain transformation'.

Alisa Konchenko (<u>DocStudio</u>) and Kris Pronske (<u>DTN</u>) showed how processes can be streamlined by automating PIDX product and company code creation. The current way of adding a product code is a manual process involving sharing a spreadsheet. The proposed solution involves an API accessing a code list housed by a trusted clearing house that checks for codes already in use and other glitches. PIDX is partnering with DocStudio to provide an online solution to request new codes. DocStudio's robotic process automation promises an 'efficient and scalable approach'.

Matt Danna and Matt White presented **ServiceMax**' <u>FieldFX</u>, said to be the 'de facto field service management software for the oilfield.

More from this and other PIDX events <u>here</u>.

BLOCKCHAIN, BITCOIN AND OTHER NONSENSE

Bitcoin and blockchain continue to fascinate the oil and gas industry. EnergyFunders on the 'inevitable intersection between oil, gas and bitcoin. For MIT, jury is out on bitcoin and climate. Everline rolls-out S3 distributed ledger for pipeline ops. US DHS finances Neoflow's energy blockchain for crude oil. Texas Bitcoin Foundation funds bitcoin mining education program.

Oil IT Journal readers will be well aware of our skepticism in regard to blockchain – not to mention crypto and Bitcoin. But there is so much activity in this sorry space that we feel obligated to report.

First item comes from the **AAPG** Explorer magazine in the article 'Oil and Gas, and Bitcoin: <u>An Inevitable Intersection</u>'. This is essentially puffery for EnergyFunders whose CEO Laura Pommer offers 'relationship counseling' to bring oil, gas and bitcoin together. More specifically she argues that abandoned US well sites should be converted to Bitcoin mining, leveraging the otherwise stranded methane to power the number crunching.

An **MIT** publication looks into the relationship between Bitcoin mining and the climate. The <u>MIT CEER</u> paper puts the power requirements of the miners amounts to some 15.4 gigawatts. How can this be good? The climate benefits apparently stem from 'grid balancing services, support of renewable energy expansion, methane emissions reductions via flare gas utilization and more ...' During the winter storm Elliott December 2022, Bitcoin miners 'curtailed' some 100 exahashes, lightening the load on the grid. On the other hand, industry claims that the majority of US Bitcoin mining is 'fueled by sustainable energy' are dubious and the potential climate benefits of Bitcoin mining warrant closer attention. More transparency on locations and energy sources of large publicly-listed Bitcoin miners are needed to 'dismantle unsupported industry claims, improve assumption-based academic models, and point regulators to areas where Bitcoin mining may bring climate co-benefits'. More from the <u>Crypto Carbon Ratings Institute</u>.

EverLine's recently launched S3 Platform is said to brings a new level of trust and safety to pipeline operations. The compliance management system leverages verification protocols and distributed ledger technology to capture, check and audit pipeline compliance data. SP3 aggregates compliance requirements, location data, and operator qualifications to verify that the right work was performed on time, at the right location. Distributed ledger technology is said to 'promote efficient accessibility and render the record immutable'. More from <u>EverLine</u>.

The US **Department of Homeland Security** has awarded a contract to <u>Neoflow</u>, an 'energy blockchain company' for the continued development of the Neoflow Platform for Crude Oil. The DHS Science and Technology Directorate's Silicon Valley Innovation Program (SVIP) made the award. The contract was awarded under the auspices of a DHS solicitation for 'preventing forgery and counterfeiting of certificates and licenses'. The solicitation supports the development of standards-based technologies to continue DHS's efforts in utilizing the W3C's <u>Verifiable Credentials</u> along with distributed ledger technology to 'modernize operations'. The Neoflow Platform will 'digitally trace' natural gas and crude oil as it moves through the supply chain between Canada and the US. SVIP is one of the DHS' programs to fund innovation and work with private sector partners to advance homeland security. Companies participating in SVIP are eligible for funding to develop and adapt commercial technologies for homeland security use cases.

The <u>Texas Bitcoin Foundation</u> has teamed with Texas State Technical College to launch the first-ever professional certification programs in bitcoin mining. The programs, which are funded by philanthropists Felicia and Gideon Powell, will prepare students for employment by the growing number of bitcoin mining companies that operate in Texas, said to be a 'preferred jurisdiction' for bitcoin mining. Gideon Powell is

CEO of Cholla Petroleum and an avowed 'bitcoin advocate'. More on the program from <u>TSTC</u>. *As they say,* 'Only in Texas!'

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