AVEVA PI WORLD

Engineering the Sustainable Plant of the Future

Day 2: Capital Projects Track

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Looking back at challenging year in Capital Projects

May 2020 Actions to Win*

SHORT TERM

Increased digitalization

- Digital collaboration tools for engineering and design
- Implement 4D (scheduling data) and 5D (cost) simulation to replan projects and reoptimize schedules
- Integrated digital-twin solutions to be used end to end, from project concept to commissioning
- Online ordering construction materials, managing scarce resources more accurately, and maintaining cash flow

Rebalanced supply chains toward resilience (versus efficiency)

- Building inventory, securing critical materials and long-lead items, and identifying alternative suppliers

Augmented consolidation

- Consolidation to support economies of scale and investment in IT, R&D and technology

LONG TERM

Vertical integration

- Standardisation and control of design and execution processes

Further investments in technology or digitization and innovation

- Standardisation and automation of design and construction, on-site and back-office processes

Increase in off-site construction

- Controlled environments for workforce movement and interaction in construction

Sustainability

- Acceleration toward sustainability as regulation and government incentives move in this direction

* How construction can emerge stronger after coronavirus, McKinsey and Company, May 2020

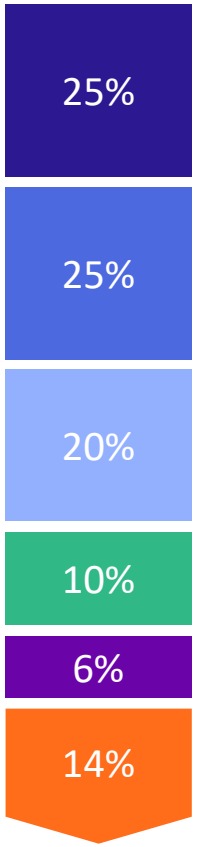
“Investors increasingly view corporate attention to Environmental, Social and Governance (ESG) criteria as closely linked with business resilience, competitive strength, and financial performance.”

-Bloomberg, June 2021

Current state of the market

Sustainability and energy transition

Energy transition framework under the 1.5°C Scenario (%) for 2050 *



Renewables (power and direct uses)

Energy conservation and efficiency

Electrification in end use sectors

Hydrogen and its derivatives

CCS and CCU Industry

Bioenergy with carbon capture and other carbon renewal measures

How much is needed?

US$10 Trillion
by 2030
John Kerry – U.S. Whitehouse envoy for Climate change

US$15-20 Trillion
by 2030
Goldman Sachs

US$23 Trillion
by 2030
U.S Department of Energy

US$100 Trillion
by 2050
HSBC Bank

US$131 Trillion
by 2050
IRENA

Impact on industrial market

- Environmental Sustainability Goals (ESG) related regulation change
- Stakeholder pressure on board oversight and transparency
- Electrification review and transition to renewable energy sources
- Carbon capture and storage
- NetZero focus on facilities and supply chains
- Growing hydrogen demand

* IRENA World Energy Transitions Outlook 2021

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“A sustainable capital project is one that pursues reduction goals for greenhouse gas (GHG) emissions and other finite resources, and one that leaves a positive legacy impact on GHG emissions, resource use and biodiversity.”

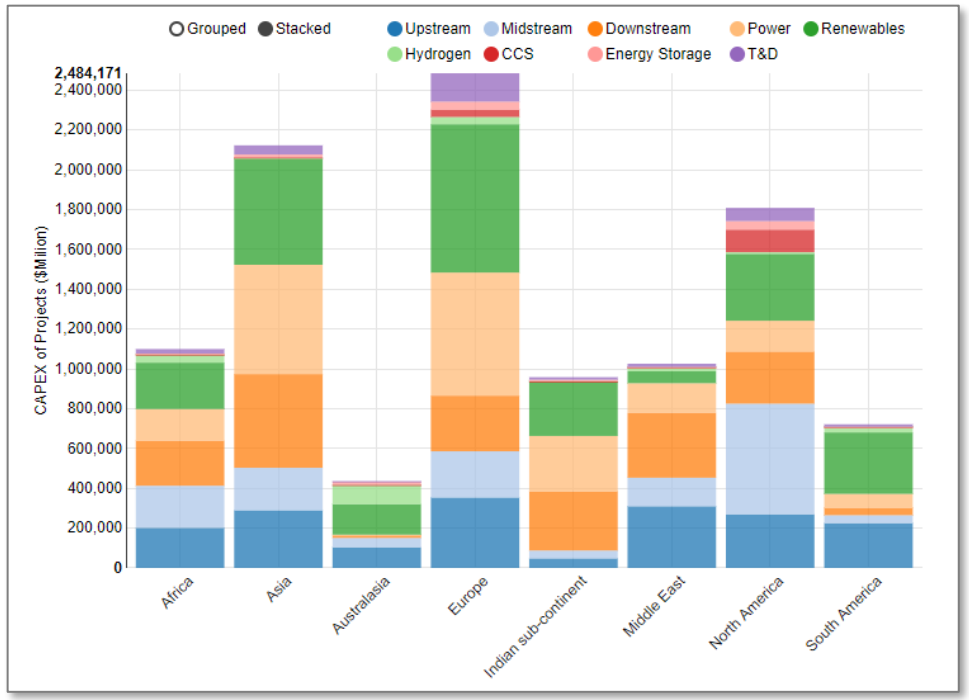
-Deloitte *

*https://www2.deloitte.com/uk/en/pages/infrastructure-and-capital-projects/solutions/sustainable-capital-projects.html

Current state of the market for capital projects

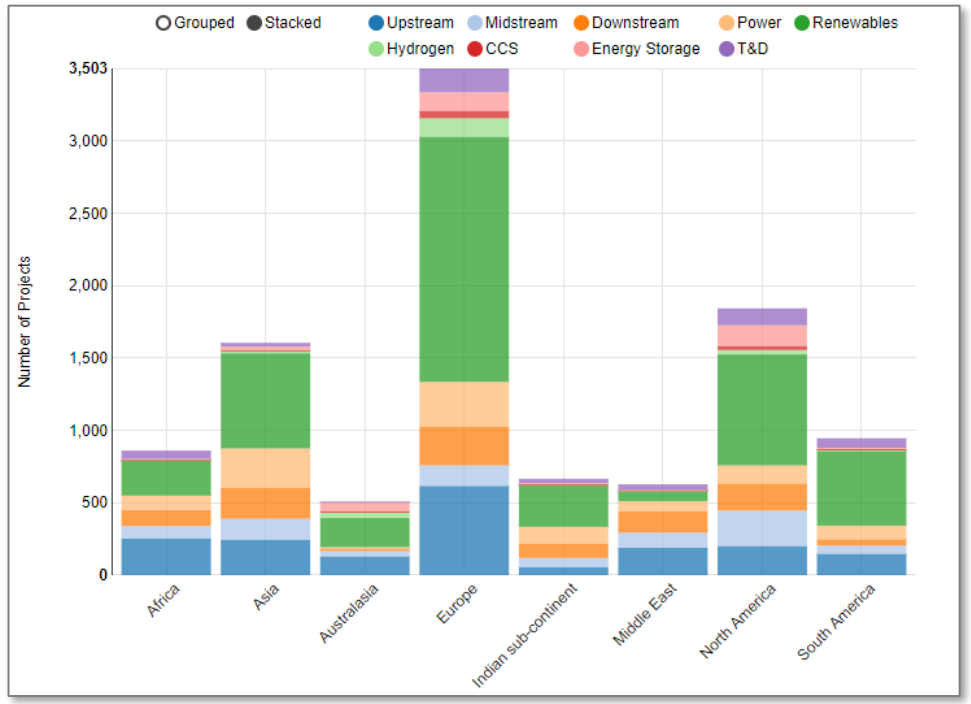
Shifting focus

CAPEX of future and active projects *



45-70% of capex is allocated to Power, Renewables, CCS and Energy Storage, Hydrogen, Transmission and Distribution in all regions except for the Middle East

Number of future and active projects *

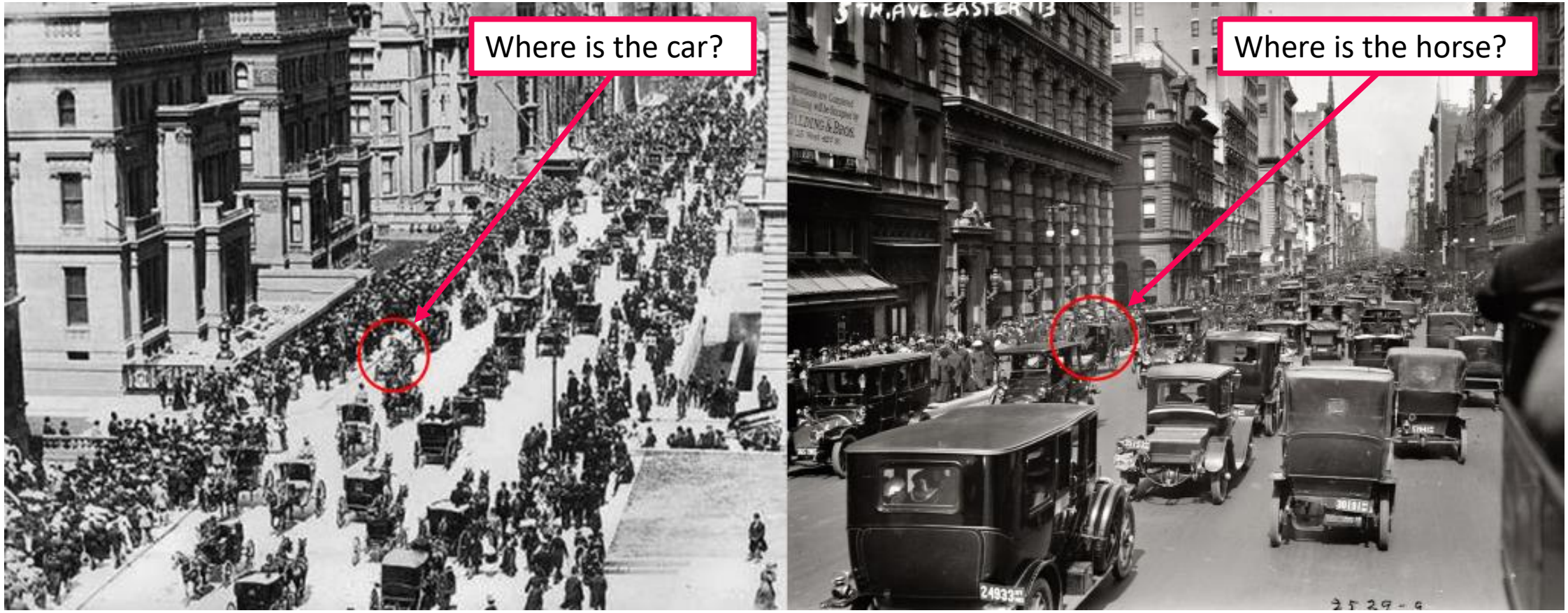


There is a greater number of capital projects for renewables than traditional projects in power and oil and gas

* EIC Data stream, 28 September 2021

Technology adoption in the 1900s

Will capital project change accelerate in the same way?



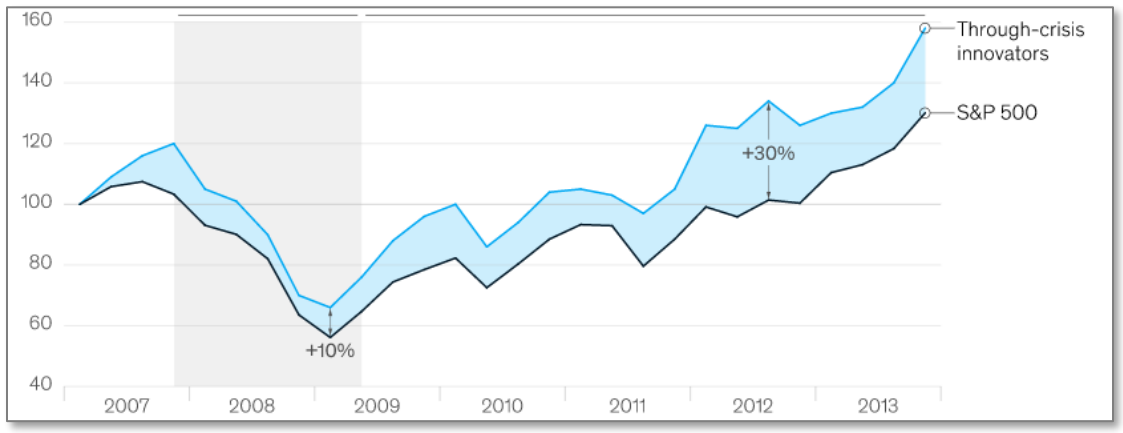
New York (1900)

New York (1913)

Adapting to the *next* normal in capital projects

Innovators and digitally mature organisations develop the sustainable plant of the future*

2008 financial crisis



Innovation leaders in capital projects

Value chain control and integration
Specialization and innovation
Internationalization
Sustainability

Technology adoption

Cloud technology
Information management
New business models
Sustainable capital projects

*https://www.mckinsey.com/~/media/McKinsey/Industries/Capital%20Projects%20and%20Infrastructure/Our%20Insights/The%20next%20normal%20in%20construction/The-next-normal-in-construction.pdf

Today’s presenters

Day 2 Capital Projects Track

Jay Ibrahim
President of Sustainable Technology Solutions
A Seamless Transition: Delivering digital twin value from FEED through operations
- Creating a Digital Asset in the time of the pandemic
- Sustainable digital project delivery
- Engineering data warehouse as the core of the Digital Twin

Wassim Ghadban
Vice President, Global Innovation & Digital Engineering
Redefining the Digital Twin to drive engineering efficiency & predictive operations
- Using engineering and construction data to create insight in Operations and across the asset lifecycle
- Why using a maturity approach to the Digital Twin is the most effective approach

Darren Martin
CTO, Wood plc
Unlocking solutions to the world's most critical challenges
- Leveraging digital technologies to create sustainable capital projects with Connected Build
- An overview of the upcoming activities during COP26 with AVEVA and Wood in partnership
- Taking a streamlined approach to engineering and construction in cloud

Hakim Bouhali
APAC Industrial Engineering Director
One Database for All Engineering & Design
- Making engineering accessible in real time across the globe
- Demonstrating efficiency gains of 50-70% using unified engineering data on a single platform in the cloud

Joe Puglisi
Project Manager, Internal initiatives
Leveraging Asset Information Management for enhanced CAPEX Value
- Bringing all project data on a single platform
- Data visualization in a collaborative environment for capital projects

Marius Blom
CEO and Managing Partner
Driving Sustainability in the Maritime Industry
- Creating a digital twin for undocumented ship from 1933
- Leveraging digital technology to adapt to the IMO 2050 sustainability schedule

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