



AVEVA WORLD

ACCELERATE INDUSTRIAL INTELLIGENCE



Engineering the Electrical Digital Twin

How ARUP is standardizing electrical engineering globally with ETAP

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Arup Associate Director & ETAP Chief Commercial Officer

Agenda

01 Speakers

02 About ARUP

03 Current challenges

04 New thinking

05 Digital twin and opportunities

06 Conclusion

Speakers



Raghu Somanathan Associate Director at Arup

- Leading delivery of complex infrastructure projects
- 20+ years of experience shaping resilient electrical systems
- Driving capability in power systems design and helping advancing digital twin concept



Hossain Shaikh Chief Commercial Officer at ETAP

- Driving AI-powered power systems and digital innovation
- 20+ years of leadership shaping global energy and automation transformation
- Key role in expanding markets and advancing digital twin solutions for sustainable energy management

Arup globally

Arup is an independent firm of designers, planners, engineers, consultants and technical specialists offering a broad range of professional services all over the world.

34 Countries

95 Offices

18,500+ People

1000+ Electrical Engineers



Infrastructure is becoming electrified

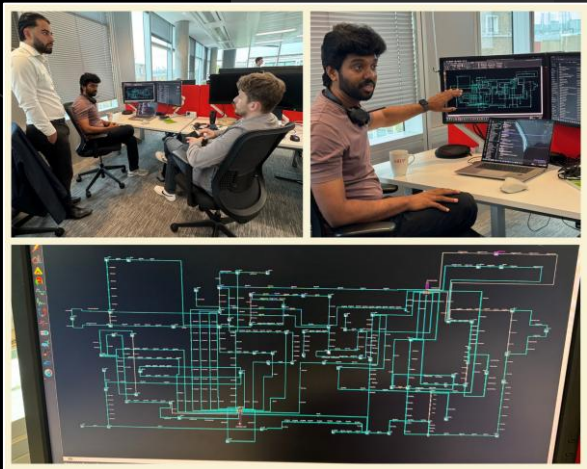
The systems ARUP designs today are larger, more complex, and more dynamic than ever before. Electrical systems are **no longer static** — they must be simulated dynamically.



A single Hyperscale DC ~
min 100MW



An entire town of
circa 20,000
homes



Gigafactories

High-intensity power
demands at scale



Data Centers

Critical uptime and
resilience requirements



Hydrogen Plants

Complex electrochemical
load profiles



Electrified Transport

Dynamic traction and
regenerative systems



Smart Cities

From plug to the grid



Renewables

Inverter based
interconnected grid



Electrical power for future

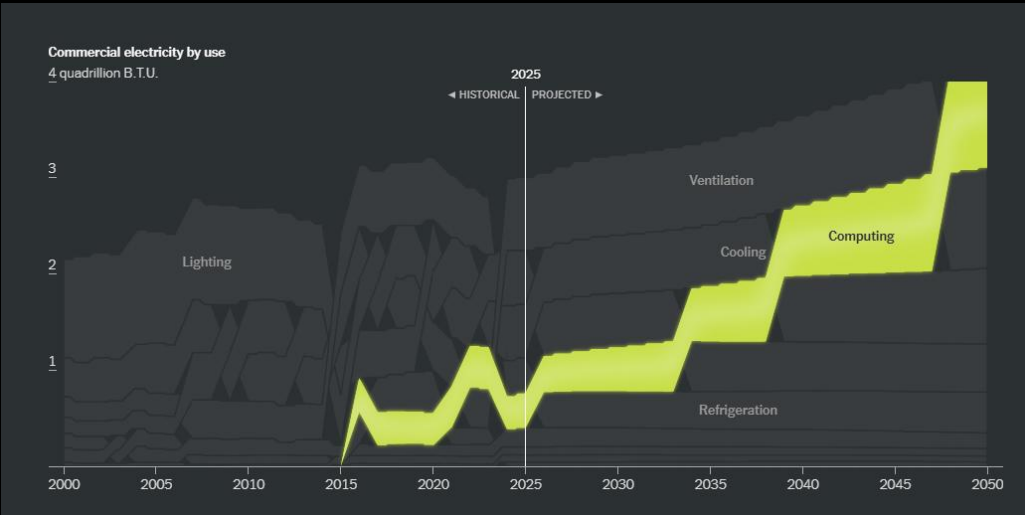
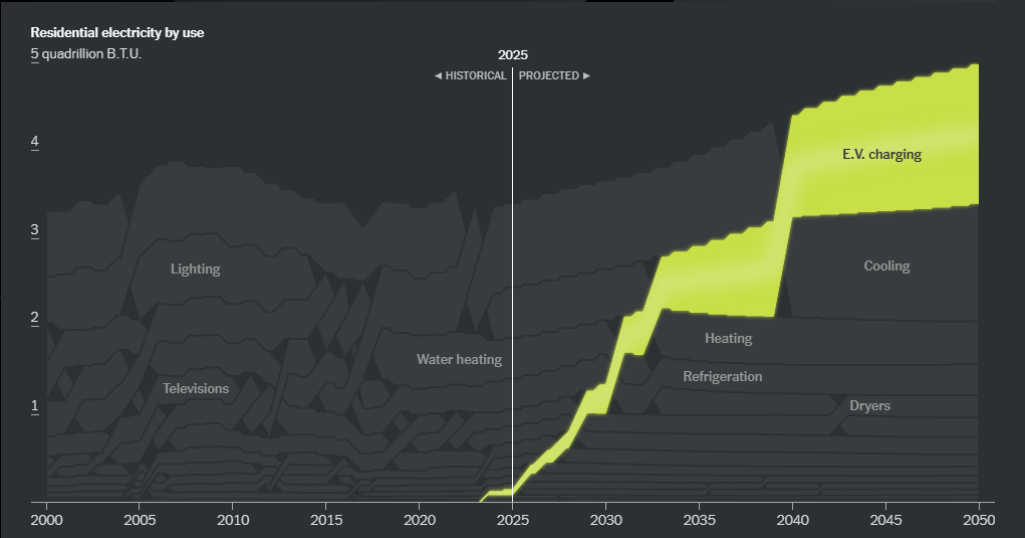
The New York Times

OPINION
GUEST ESSAY

It's the Age of
Electricity
and ~~America~~
Isn't Ready

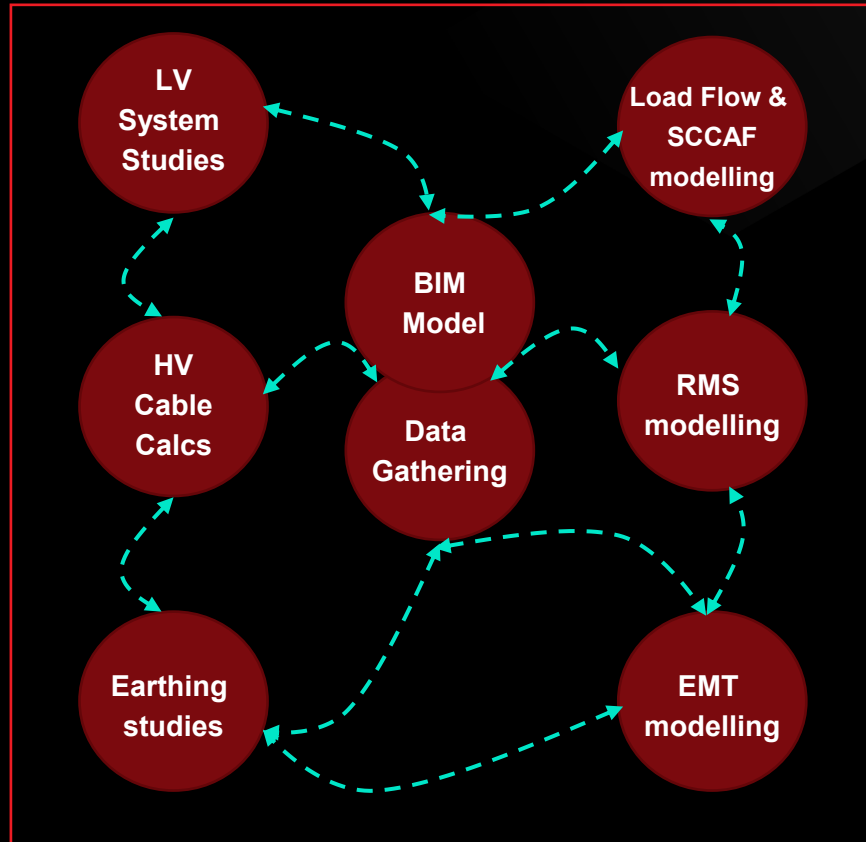
Probably the
rest of the
World!

Artificial intelligence's rapid growth is stoking concerns about the impact hundreds of new **data centers** could have on electricity prices and the grid.



Current approach to design and operations is siloed

Standardization objective: move from disconnected engineering files to a shared, governed electrical model that can evolve over the asset lifecycle.



Inefficient handoffs

Data is manually exported, retyped or reconciled between tools, increasing engineering effort and project risk.

Inconsistent methods

Different offices and project teams can develop different assumptions, libraries, templates and workflows.

Model, data and tools are siloed

No collaborative workspace, systems studies carried out via various software

LV, MV, HV, Renewable Design

Handled in a separate electrical design environment

BIM Models

Sits within specific tools which may or may not have links to power system software

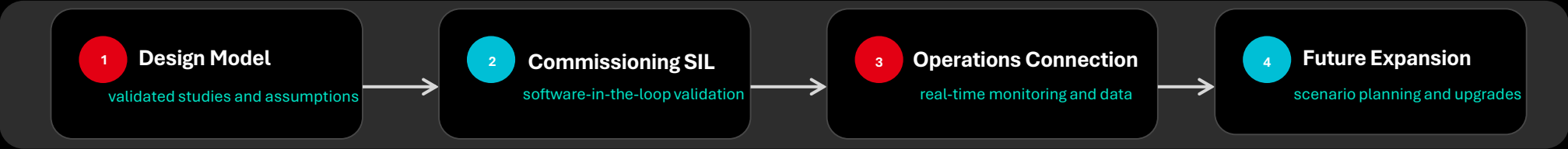
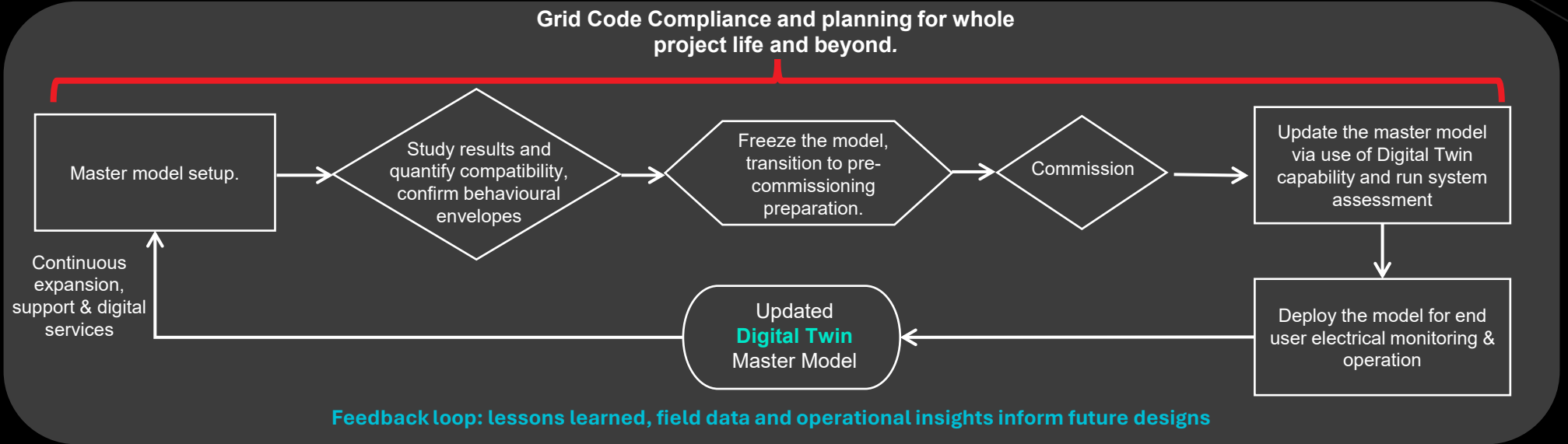
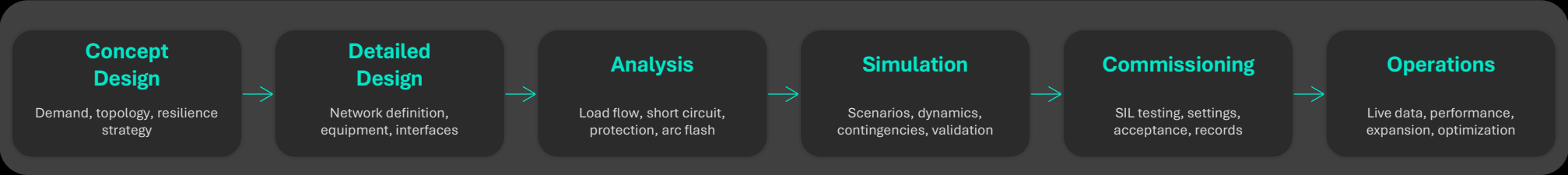
Delays and inefficiencies in system modelling and Operation

Risk of data corruption and lack of continuity from design through to commissioning and operations

Operations & Expansion

Managed by different systems during Operation and system modification, expansion with no connectivity

New thinking required for Digital Engineering & Services



Software-in-the-loop commissioning

Test protection settings, logic, operating scenarios and electrical behavior before energization — reducing risk and supporting acceptance readiness.

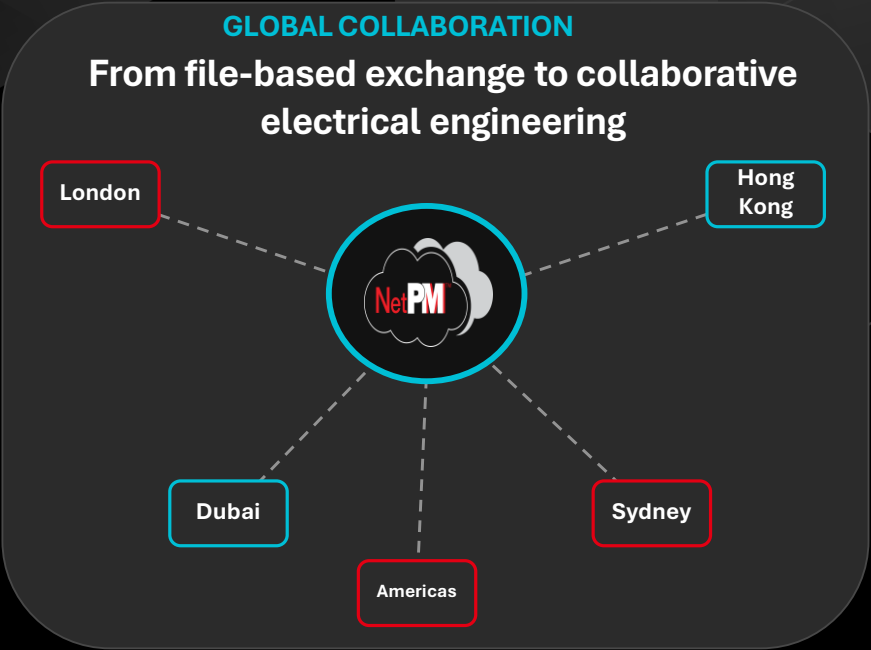
Operations-connected model

Connect the electrical repository to operational data, enabling performance review, incident analysis, what-if studies and expansion planning.

Capability Coverage Across Voltage Levels, BIM and Sectors

A single platform aligned to the breadth of Arup project delivery

Capability	LV	MV	HV	BIM / Sector Integration
Planning & concept	✓	✓	✓	Early option comparison
Network analysis	✓	✓	✓	Design validation
Protection & safety	✓	✓	✓	Coordinated assumptions
Simulation & scenarios	✓	✓	✓	Resilience studies
Data continuity	✓	✓	✓	Model-to-asset lifecycle



For Arup teams

Reduced handoffs and stronger global consistency.

For clients

Better traceability, risk management and asset readiness.

For future growth

Foundation for operations, digital twins and AI analytics.

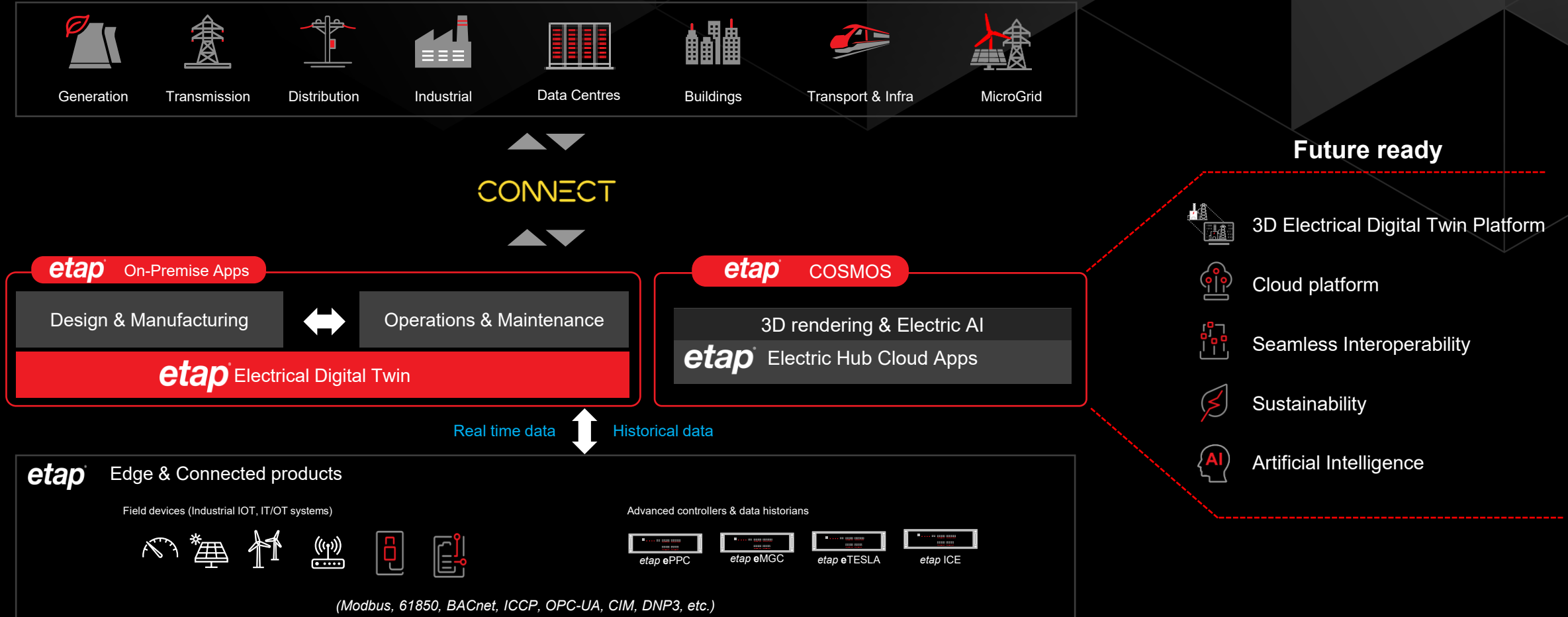
Collaboration benefit

Global teams coordinate around the same engineering model rather than exchanging disconnected files and better transparency with customer and partners.

ETAP gives Arup a global, collaborative, integration-ready platform for electrical engineering excellence.

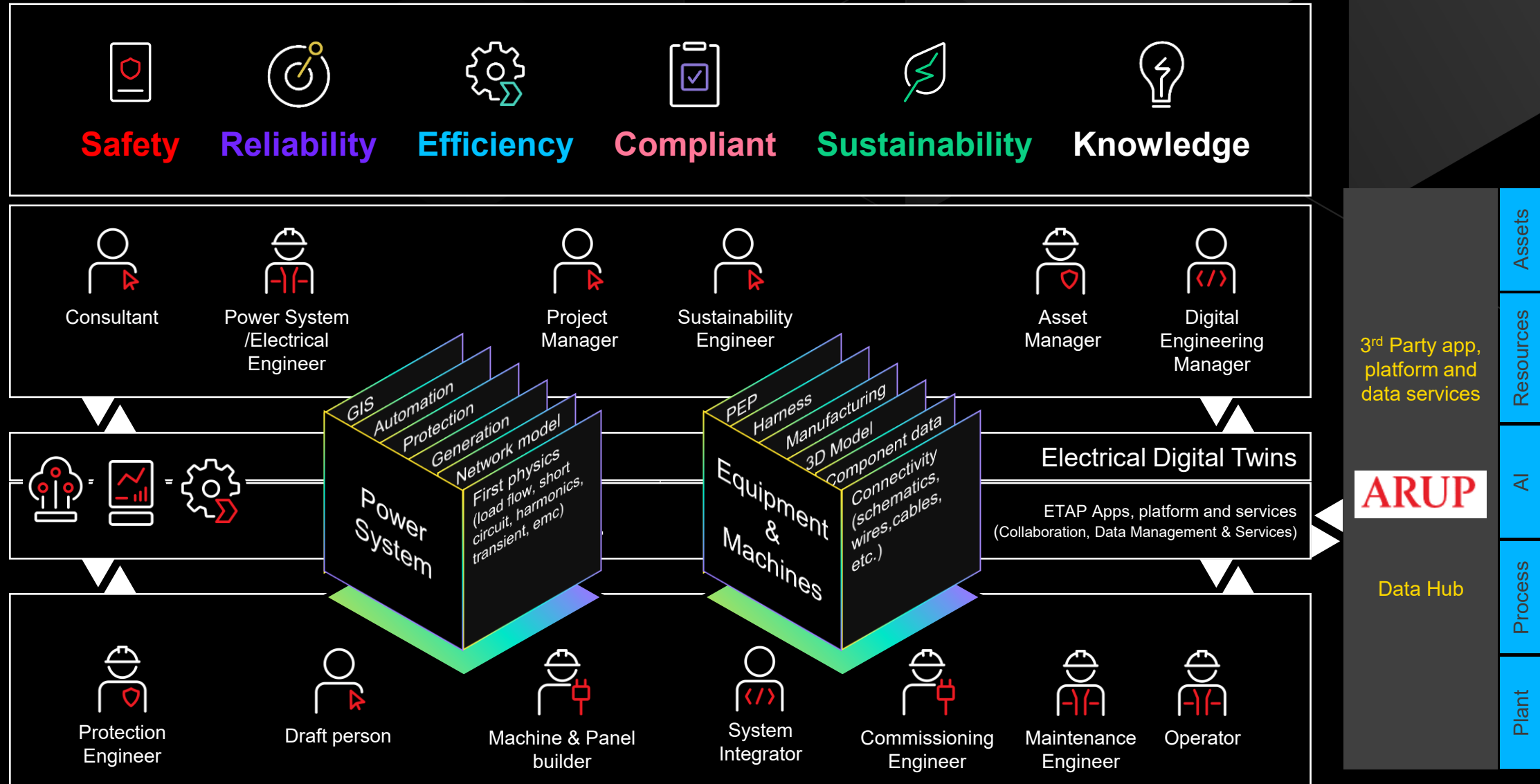
ETAP Electrical Digital Twin

Future ready portfolio strategy to drive SaaS/ Subscription adoption and more power systems



ETAP Digital Twin brings Continuous intelligence for Sustainability and Efficiency

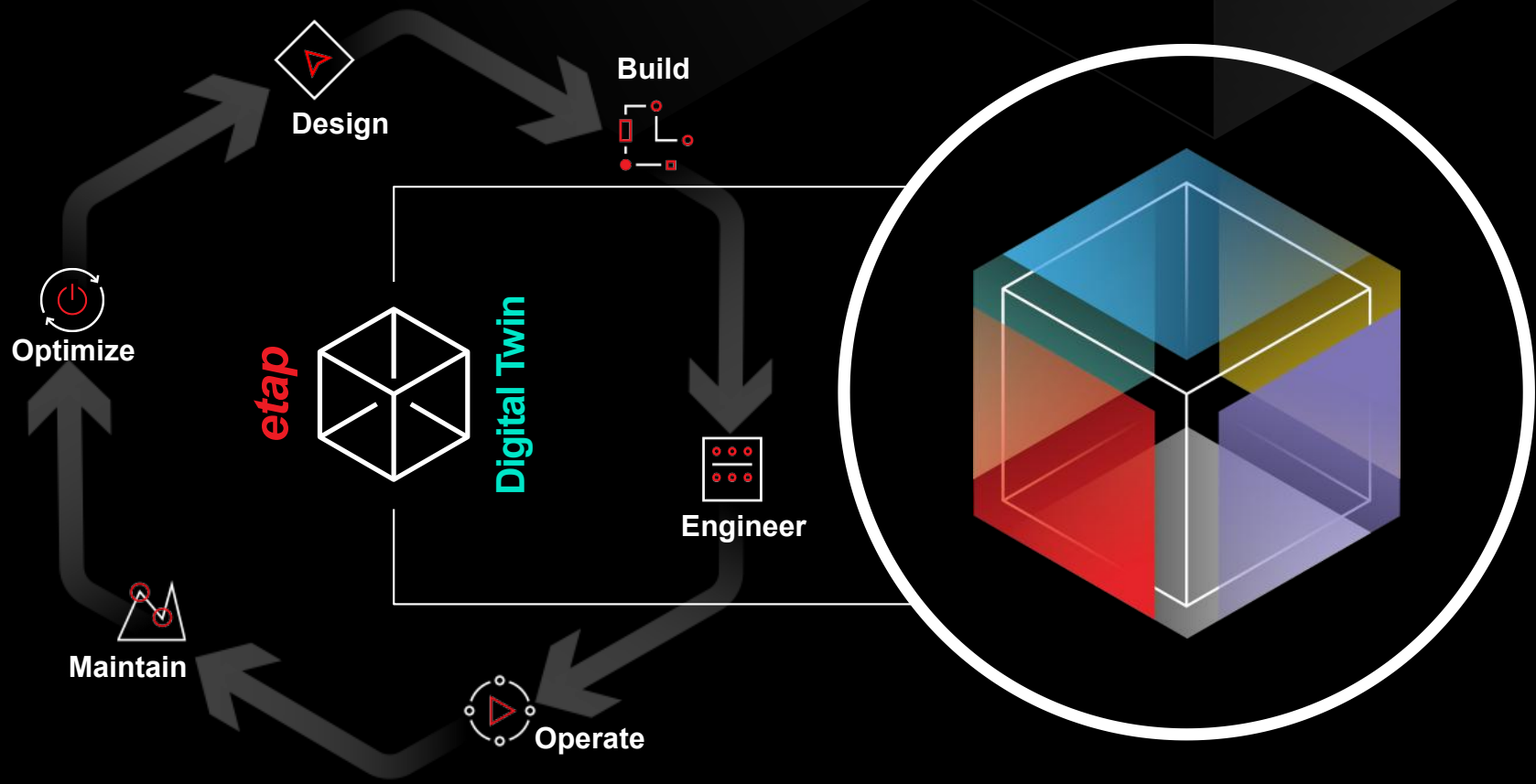
Infrastructure to Equipment



Data-rich, model driven Digital Twins

Unified Digital Twin Foundation

Multi-Dimension Digital Twin Platform



- AI Energy Intelligence
- Data Revisions
- Graphical Visualizations
- Configurations
- Sequence of Changes
- Physics Simulation & Analysis Models
- Real-Time Operation

ETAP AI Design Digital Twin Workflow

Data Sources & Ingestion

Network Planning & Protection Dept.

Excel / CSV

DataX Auto

XML / CIM

etapAPP

Network Planning & Protection Dept.

Existing Software Assets Capabilities

Planning

Protection

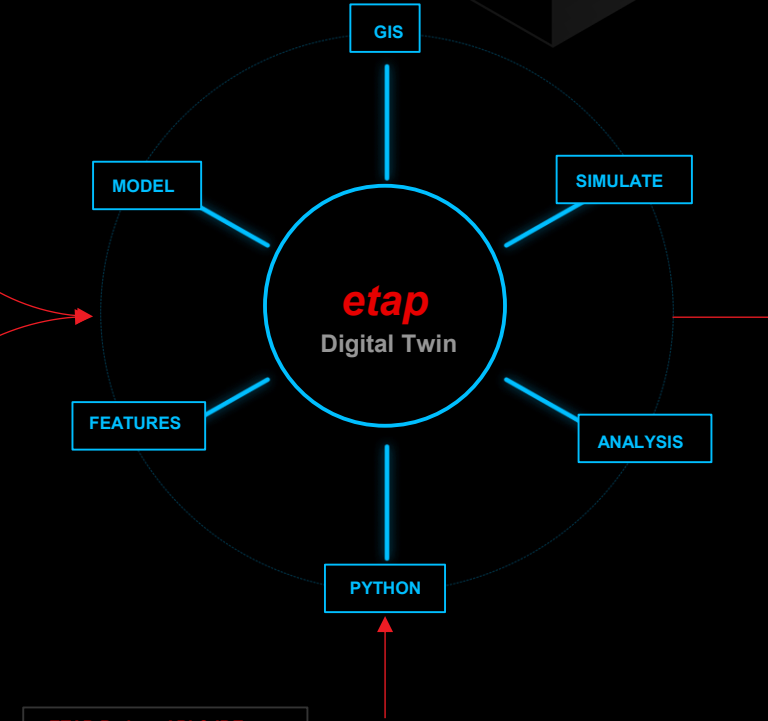
Cable

Dynamic

Maintenance

Renewable

SCADA Historian ESRI GIS Utility Network



ETAP-Python API & IDE

Presentations / Dashboards

Study Cases / Scenarios

Configurations / Topology

Base & Revisions / Data

Operation, Maintenance and Reliability

Network Modeling & Data Management

- Intelligent Single Line, multi line/schematic Diagram/3D
- System of Records
- Model Manager
- Data Warehousing & Asset Information Management

Power System Analysis

- Steady State Analysis
- Dynamic & Transient
- Protection & Safety
- Reliability & optimization
- AC, DC, 1Ph & 3Ph

Real Time Operation

- SCADA/PMS/EMS/DMS/REMS/MGC
- Predictive Simulation
- Event Playback / RCA
- Switching Management
- Simulate Before Operate
- Operator Training Simulator
- Real Time Analytics & Operational Planning

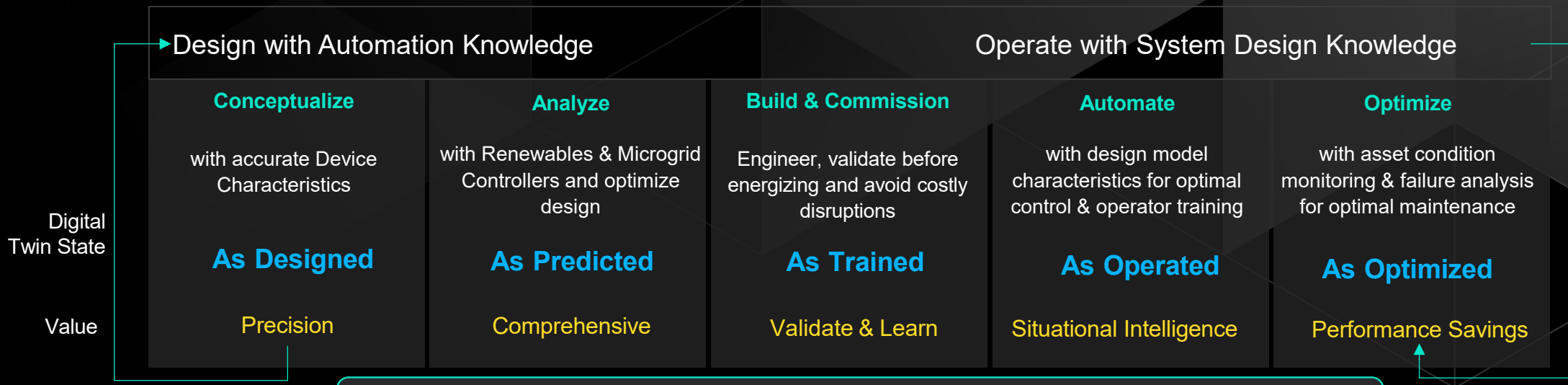
Maintain & Optimize

- Condition Monitoring
- Electrical Asset Management
- Power Quality & Grid Compliance
- Energy Optimization & Efficiency
- Digital Protection & Advanced Fault Analysis

AI Energy Intelligence

- AI Situational Intelligence
- AI driven Energy Optimization
- AI driven advanced Alaram Analytics
- AI Assistance chatbots
- Electric AI for advanced analytics & Automation

Design to Operation Lifecycle with a Centralised Digital Twin



ARUP made a deliberate, firm-wide strategic decision: establish a **global standard** workflow for electrical system simulation - consistent across every region, every project type, every engineering discipline.” ”ETAP Power System was selected as a global platform to support this strategy.

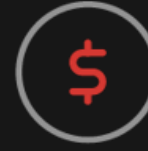
- 1 Standardization** Replaces fragmented point tools with a common electrical engineering platform.
- 2 Engineering depth** Supports LV, MV, HV, BIM and multi-sector workflows from concept to operation.
- 3 Global collaboration** Enables distributed teams and stakeholders to coordinate around the same project model.
- 4 Lifecycle value** Extends beyond design into commissioning validation, operations and future expansion.
- 5 Digital future** Creates the foundation for ETAP Digital Twin and AI Energy Intelligence for continuity.



To make ETAP the soul of progress, powering a sustainable future for generations to come.



Integrated platform for the project Lifecycle



Up to 40% savings from Design to Operate & Maintain



Single Source of Truth



Seamless project commissioning & Handover



Cross Discipline Engineering & Integration



Unified Digital Operation & Maintenance



Thank you