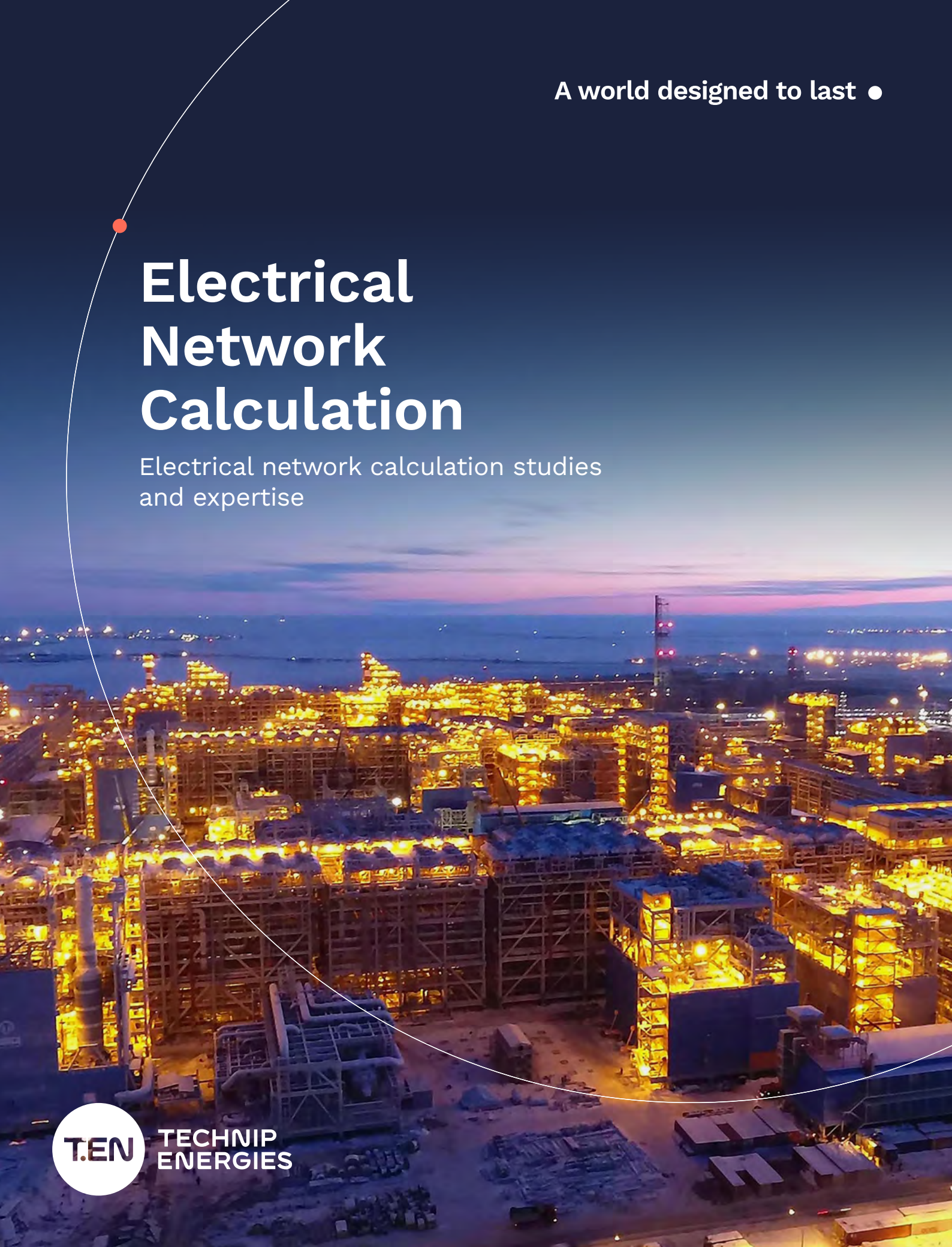
A world designed to last

Electrical Network Calculation

Electrical network calculation studies and expertise



TECHNIP ENERGIES

A unique offering

Technip Energies is a leading engineering and technology company serving the energy industry and its transition. Through our extensive portfolio of technologies, products and services, we break boundaries bringing our clients' innovative projects to life while accelerating the energy transition for a better tomorrow.

A presence across the entire value chain

Project Delivery

- Project management
- Engineering, Procurement and Construction
- Technology integration on complex projects
- Digital applications for project execution and safe and cost-effective operations and maintenance
- Project financing

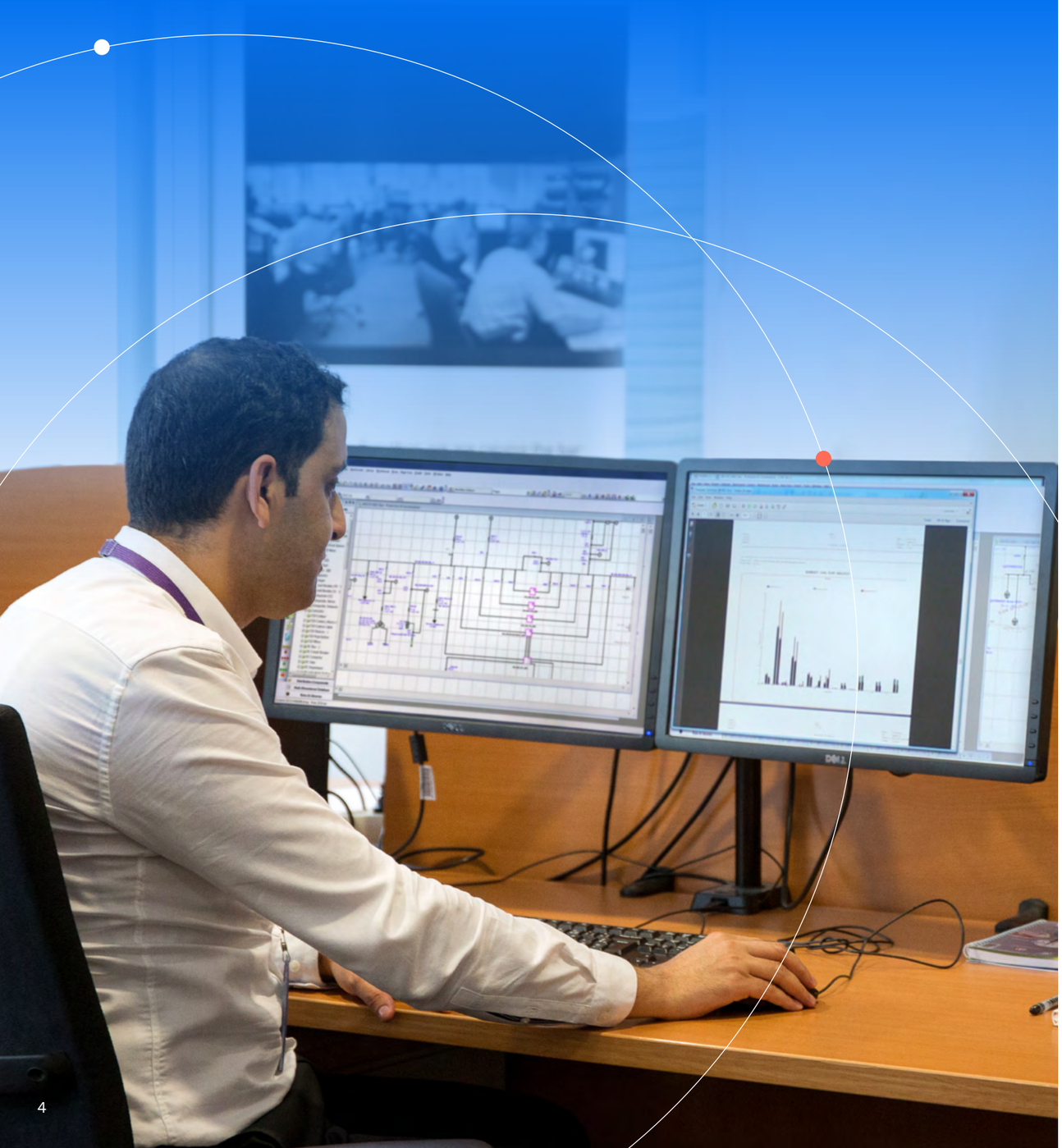
Technology, Products and Services

- Process technologies and licensing
- Proprietary products: Loading Systems and Cybernetix
- Concept, feasibility, FEED studies
- Advisory (Genesis) and Project management consultancy

Full coverage of diverse markets

- LNG & gas monetization
- Sustainable chemistry
- Hydrogen
- CO_2 management
- Offshore
- Refining
- Ethylene
- Petrochemicals
- Fertilizers
- Mining & metals
- Nuclear
- Life sciences
- Agritech

Electrical Network Calculation



Our mission

Our Paris-based Electrical Network Calculation Division's mission is declined around three main axes:

- Perform electrical network calculation studies for all types of downstream and upstream projects
- Support projects and develops calculation methodologies to comply with the highest international standards on electrical engineering
- Ensure continuous technology foresight on the development of equipment, standards and calculation technologies

Extensive expertise and experience

Technip Energies has developed best-in-industry expertise in electrical studies for major EPC projects by collecting and consolidating data, developing designs, experiencing methodologies and work processes, acting on commissioning and startup activities and reviewing and analyzing subcontracted electrical studies.

With electrical studies playing a key part in our EPC projects, our Electrical Network Calculation Division has gained vital experience over the years in performing electrical network studies, providing global overviews, ensuring full electrical network consistency, providing superior management and delivering top-quality calculations.

+20
years of experience in the industry

An experienced team

Our global team of electrical network calculation experts benefits from 20 years of experience in the industry.
Many of our engineers have been part of the division for 10 years or longer and offer an extensive knowledge base.

Our software tools

Our calculation and studies methodologies rely on specialized software tools such as:

- 4 ETAP network licenses with the latest release, 5000 bus
- 1 EMTP license
- 1 DigSilent PowerFactory licence

etap Powering Success
4 licences

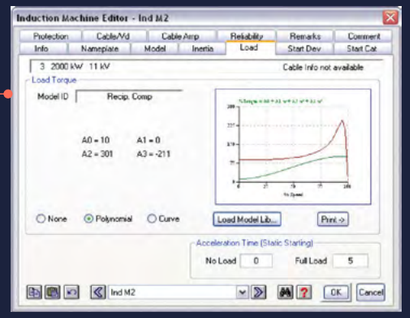
EMTP
1 licence

DIGSILENT
1 licence

Our offering

Technip Energies offers a portfolio of proven network calculation modules.

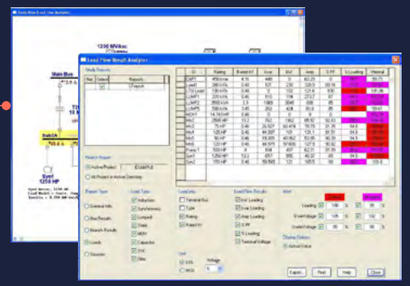
Motor starting



ETAP SOFTWARE

- Assesses the impact of motors' dynamic acceleration and reacceleration on electrical networks by considering the mechanical behavior of driven machines.

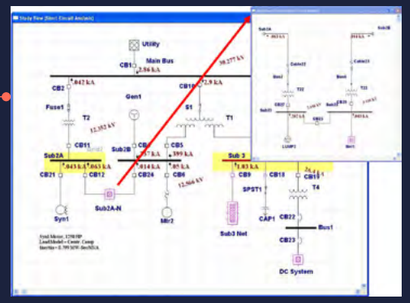
Load flow



ETAP SOFTWARE

- Confirms power flows and corresponding voltage variations to assess plant operation performance.
- Design banks capacitors for power factor.

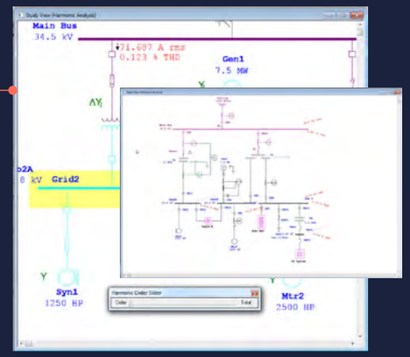
Short circuit calculations



ETAP SOFTWARE

- Calculates size equipment in accordance with transient fault conditions.
- Based on IEC 60909, three-phase single line to earth, double line to earth and line-to-line faults are simulated to cover the complete design.

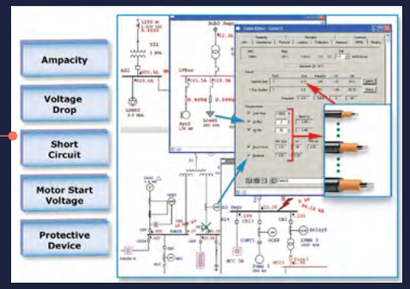
Harmonic studies



ETAP SOFTWARE

- Analyzes harmonic current and voltage sources at multiple locations in the power system, including voltage and current distortion evaluation according to IEEE519 standards.

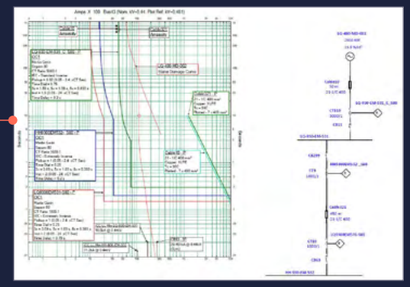
Cable sizing study



ETAP SOFTWARE

- Performs cable sizing studies according to IEC60364, IEC60092 and IEC60502 standards.
- Defines cable thermal analysis according to Neher-McGrath and IEC60287 methods.

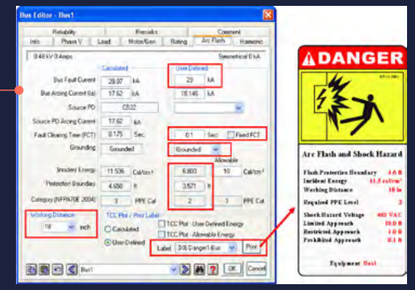
Selectivity and protections studies



ETAP SOFTWARE

- Performs global coordination and selectivity studies and chieves protections relays settings.

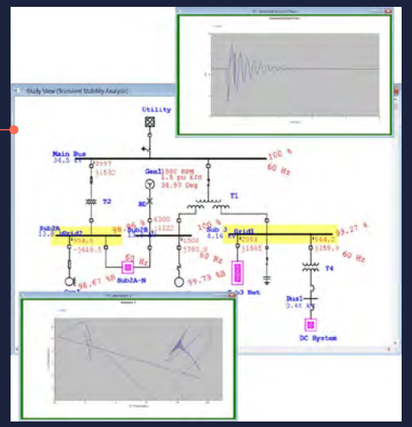
Arc flash study



ETAP SOFTWARE

- Analyzes the quantification of thermal energy that personnel might be exposed to during an arc fault.

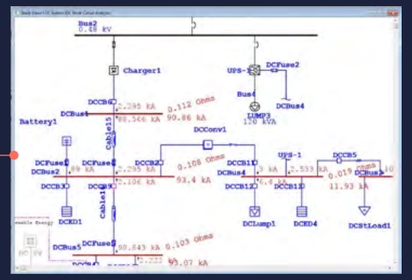
System stability studies



ETAP SOFTWARE

- Simulates system response during and after disturbances such as faults, load changes, motor starting, loss of generation and loss of excitation or governor.

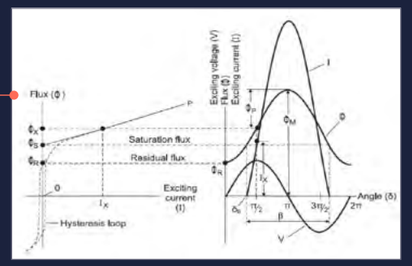
DC load flow and DC short circuit calculation



ETAP SOFTWARE

- Performs direct current (DC) load flow and short circuit current on DC electrical networks to assess protective device rating, cables ampacities and source capacities.

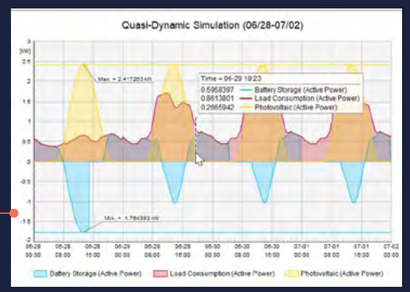
Transformer magnetization



EMTP-RV SOFTWARE

- Analyzes the phenomena of inrush power transformers' current and impact on the electrical network.

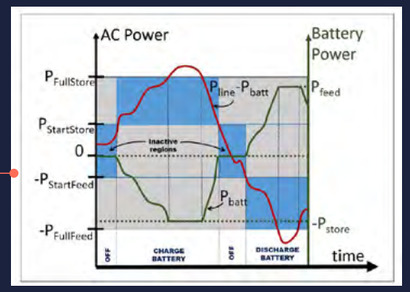
Electrical network studies for Renewable energies



DIGSILENT SOFTWARE

- Performs quasi-dynamic simulation with photovoltaic system based on solar radiation, Battery Energy Storage System and MV-LV load profiles.

Battery Energy Storage System (BESS) control



DIGSILENT SOFTWARE

- Studies strategy of BESS control system correlated with the generated photovoltaic power and the load profile.



Key client benefits

Offering	Safety	Maintenance OPEX	Regulations compliance	Sizing capex
Motor starting			•	•
Load flow		•	•	•
Short circuit calculations	•		•	•
System stability studies	•	•	•	•
Harmonic studies			•	•
Cable sizing studies	•		•	•
Selectivity and protections studies	•	•	•	•
Arc flash studies	•	•	•	•
DC load flow/DC short circuit calculation	•	•	•	•
Transformer magnetization		•		•
Quasi dynamic simulation	•	•	•	•

Our latest projects

Projects	Yamal LNG Modular LNG plant in North Siberia	Martin Linge Oil production platform in North Sea	ZapSib Neftekhim Polyethylene plant in Russia	ENI East Africa Floating LNG	BP TORTUE FPSO	ARCTIC LNG	Renewable energies (R&D)
Short circuit current study	•	•	•	•	•	•	•
Load flow study	•	•	•	•	•	•	•
Harmonic study	•			•	•	•	•
Dynamic motor study	•	•		•	•	•	
System stability study	•			•	•	•	•
Load sharing of GTG's study	•			•	•	•	
HV, MV, LV cables sizing (high, medium, low voltage)	•	•	•	•	•	•	•
HV transformer energization study	•						
DC short circuit current and load flow studies		•		•	•	•	•
HV, LV selectivity and protections studies	•	•	•	•	•	•	•
Arc flash study					•		
Quasi dynamic simulation							•



Christophe Cavelan
Head of Electrical Network Calculation Department
Tel: +33 1 85 67 49 92
christophe.cavelan@ten.com

Caroline Liegeois
Head of Electrical Department
Tel: +33 1 47 78 29 93
caroline.liegeois@ten.com

Jean-François Constans
Head of E & I Department
Tel: +33 1 47 78 33 36
jean-francois.constans@ten.com

www.ten.com

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