

Decarbonizing Oil & Gas operations – Yes we can!

example of our collaboration with McDermott and io consulting on NetZero Carbon offshore platforms

IBC working committee - Ensuring Energy Security during Energy Transition

Eric KOENIG, Oil & Gas Segment Strategy Director - April 19th 2021



We play on both sides of sustainability strategy

Carbon Pledge 1,5°C climate objective

2025

Carbon neutral operations (with CO₂ offsets)

2030

Supplier decarbonization
Net-zero CO₂ operations (no CO₂ offsets)
Innovation for lower induced CO₂

2040

End-to-end carbon neutral value chain (carbon neutral products, with CO₂ offsets)

2050

Net-zero CO₂ supply chain (no CO₂ offsets)



Strategy and action in a pragmatic approach

Your partner

for strategy, analytics, resourcing and operational expertise to define and meet ambition

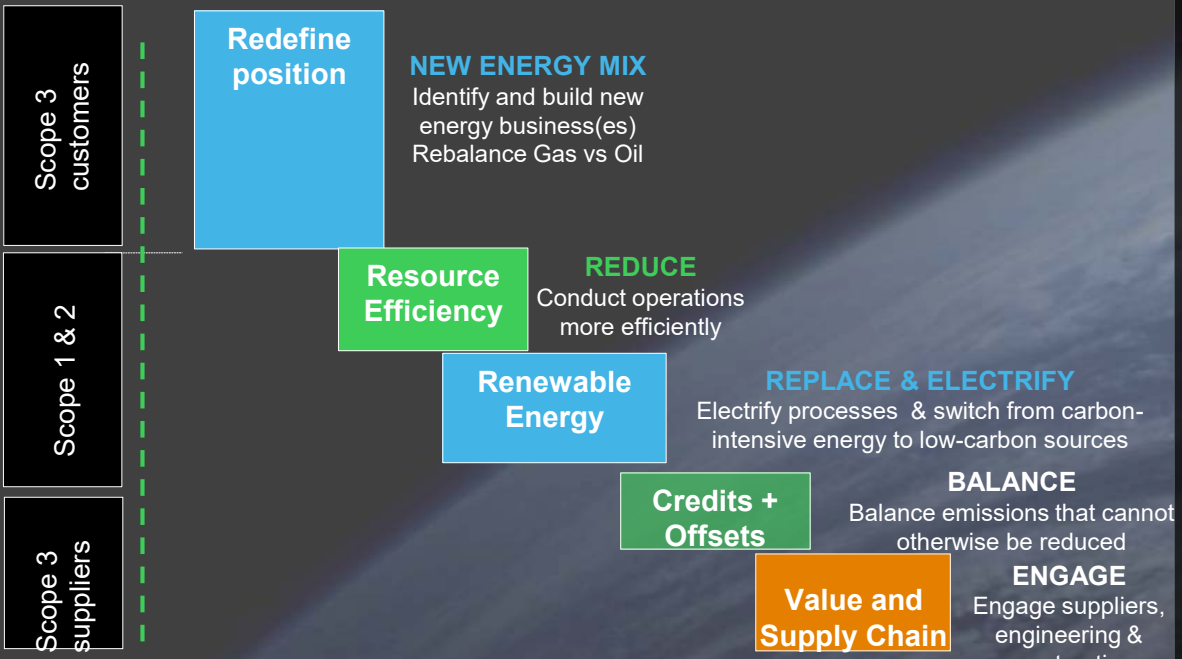
800 Megatons since 2018

CO₂ emissions saved & avoided for customers



Facing the Challenge Together

Schneider Electric Climate Change Advisory Services
Energy and Sustainability Services & Decarbonization solutions



Enterprise sustainability strategy definition



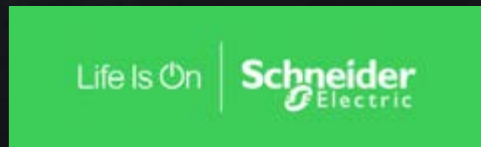
Building new Energy transition business



Ensure Carbon Neutral Greenfield projects



Reduce Carbon impact of Brownfield sites



1) You Can't Improve What You Don't Measure



Sustainability Reporting with

EcoStruxure™ Resource Advisor



Platform: Reporting & Dashboards



Analytics & Data Visualization



Utility Data Management



Procurement Management



Interval Data Management



Emissions Management



Sustainability Reporting



Goals & Project Planning



Survey Module

PROCUREMENT

EFFICIENCY

SUSTAINABILITY

New



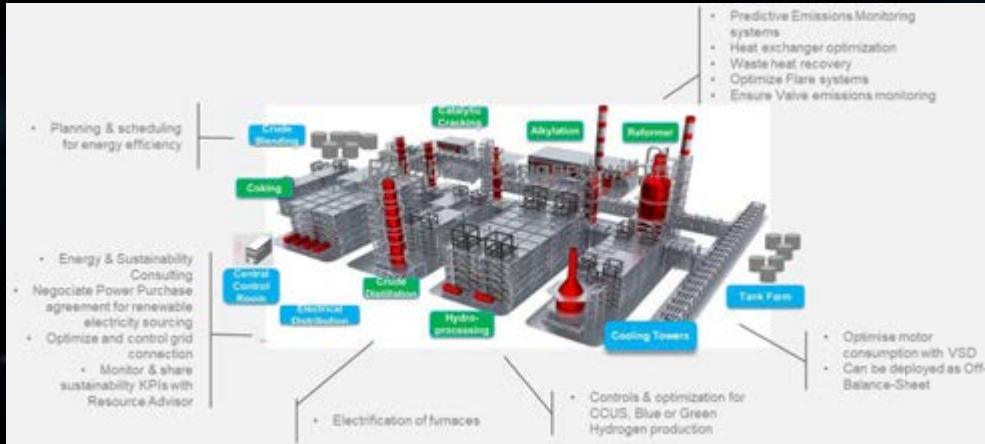
Enriching Resource Advisor with **GHG Manager** functionalities

Phase 1 **Resource Advisor** Enhancements for OGP

Phase 2 Add Plant Level Analytics with **EcoStruxure Plant**

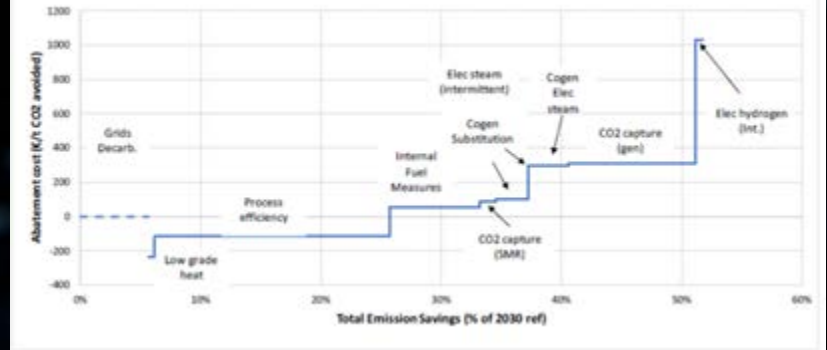
Phase 3 Integrate Modelling, Simulation, Optimization with **Aveva**

2) You can decarbonize current operations - eg Refinery Brownfield



Area of Savings	Avg Energy Improvement (affected processes)	Avg Profit Increase (M\$/yr)	Avg CO2 Reduction* (KTonnes/Year)
Improved Operation and Control	3%	\$75M	162
Heat Recovery Optimization	5%	\$170M	351
Advanced Process Technology	5%	\$70M	270
Utilities Optimization	2.5%	\$65M	135
Aggregate Benefit (450k/bbd Oil Refinery)	15.5%	\$380M	918

CONCAWE analysis: 25+% of decarbonization measures are cost negative



3) You need Design Paradigm Shifts to ensure substantial GHG reduction in Greenfield

- Evaluate trade-offs of cost vs CO_{2e} emission
- Consider energy efficiency in the design from the start, evaluate CAPEX vs OPEX tradeoffs
- “Offset” emissions impractical to eliminate; for example, a flare
- Account for material embedded CO_{2e} emissions
- Challenge all prior standard practices, net zero objectives can change prior norms
- Cost of CO_{2e} emission will significantly affect your design decisions, choose wisely.
- Consider autonomous operation & maintenance
- Use steady-state & dynamic modelling to evaluate options quickly and comprehensively

4) We collaborated on NetZero Upstream facilities

NetZero
UPSTREAM FACILITY

76% Reduction of Operational Emissions

17% Reduction of CAPEX Emissions

2% Total Expenditure Increase

Can you afford not to?

MCDERMOTT



Schneider
Electric

STUDY SCOPE

Deliver offshore facilities that are carbon-neutral in terms of all airborne and liquid emissions; accounting for all aspects of operation, logistics, embedded carbon and carbon offsets through engineered solutions from the point of commissioning through to decommissioning.



4

CONCEPTS EVALUATED

- 1) Minimise Carbon Intensity > Co-locate Renewable Supply
- 2) Lowest TOTEX > Import Power
- 3) Maximise Innovation > H2 Power Generation
- 4) Maximise Technology Readiness > Import Power

6

ADDITIONAL STUDIES

- 1) Comparative assessment of power supply including availability strategy, PPA & micro-grid dimensioning
- 2) Offsetting options
- 3) Fugitive emission prevention
- 4) Design flare out
- 5) Monitoring & control technologies to ensure remote operations & integrate asset performance management
- 6) Calculate embedded carbon and EPCI footprint



No platform crane
(use W2W vessel)



Remote operations



W2W Concept



Renewable Power
supply from shore



No flare concept



No fugitive
emissions

Optimize utilities

Complete Unmanned Concept

Life Is On



Schneider
Electric