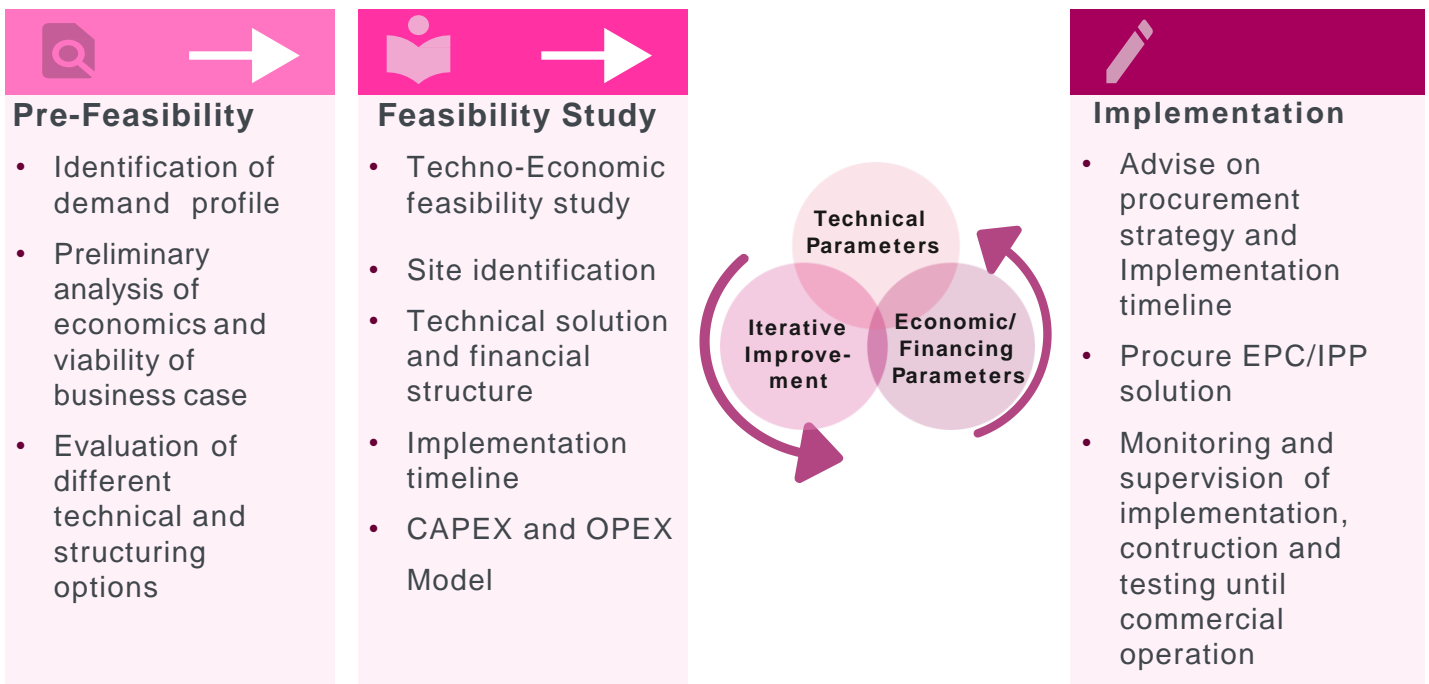


Clean Energy Solutions for Mines: Cost Reduction and Decarbonization



Suntrace runs an integrated techno-economic approach to identify the most competitive solution



1. Taking Stock

- Analyse mine power needs (load profile, generation profile expectations)
- Identification of the mine's potential, Propose scenarios for evaluation
- Status and next steps

2. Optimisation

- Tailor-made renewable concept including existing power supply / generation
- Optimize future power generation for the mine through Techno economic optimisation
- Determine cost benefit Risk and sensitivity analysis
- Tender specifications for procurement of EPC / IPP

3. Implementation

- Independent expert / Owner's engineer during development and implementation
- Support competitive selection of EPC, components or IPP / PPA
- Support project development, transaction, construction and operation



Roadblocks :	<ul style="list-style-type: none"> • Low tolerance for power supply disruption 	<ul style="list-style-type: none"> • High energy cost, especially in remote mining sites (offgrid) • Fuel price volatility 	<ul style="list-style-type: none"> • Displacing CO2 Emissions while complying with Energy Intensive Mining 	<ul style="list-style-type: none"> • Doubts over reliability of RES • Inexperience regarding the complexities of its financing
	Value Added : by Suntrace	<ul style="list-style-type: none"> • Cost competitive solutions including solar, wind, storage & fossil hybrid 	<ul style="list-style-type: none"> • Value of Incremental hybridization (20-100% RES Share) • Side step fuel costs 	<ul style="list-style-type: none"> • Use of Mine specific Hybrid RES -Fuel saving and associated reduction in CO2 emissions & maintenance costs • Independent expert, develop individual solution for each case • Techno-economic support from concept to operation

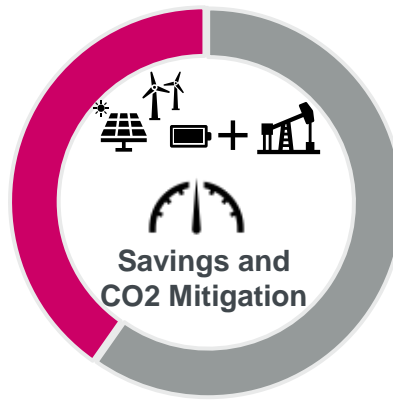
Incremental hybridization: A low carbon & energy cost future with renewables & energy storage

- The integration of Hybrid Energy Systems (Solar/Wind + BESS) provides economic and operating benefits. Battery storage can reduce the need of operating reserve from the gensets and enables reliable system operation for high solar power penetration while saving fuel costs.
- With higher Renewable Energy penetration subsequent decrease in LCOE has been observed. With decreasing Renewable Energy and Battery costs higher renewable share can be used to hedge against volatile fuel prices and mitigation of CO₂ emissions.
- Combination with other renewable energy resources such as wind should be considered when analysing a specific project location. The optimal solution for each project needs to be assessed on a case-by-case basis.



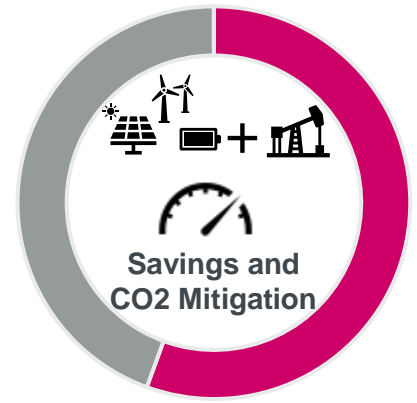
■ Conventional Energy Source

100 % Conventional Energy Source



■ Conventional Energy Source
 ■ Renewable Energy

60 % Conventional Energy Source
 + 40% Renewable Energy Source



■ Renewable Energy
 ■ Conventional Energy Source

45% Conventional Energy Source
 + 55% > Renewable Energy Source

On-Balance | Off-Balance Sheet?

Business Model	EPC Turn Key	IPP/ PPA (Power Purchase Agreement)
Characteristics	<ul style="list-style-type: none"> EPC turn-key solar plant, investment assumed by mine 	<ul style="list-style-type: none"> IPP finances, installs and operates solar plant under long term PPA contract.
Ownership of Plant	<ul style="list-style-type: none"> EPC until COD, then mine will be On-Balance 	<ul style="list-style-type: none"> IPP, Off-Balance of mine
Pros	<ul style="list-style-type: none"> EPC responsible (2yr warranty) EPC execution experience, highest savings Lower legal complexity, control over generation 	<ul style="list-style-type: none"> Investment by IPP investor (Off-Balance sheet of the mine)
Cons	<ul style="list-style-type: none"> Alignment of EPC and mine objectives Most EPC have no experience in mining Pay for risk margin of EPC 	<ul style="list-style-type: none"> Alignment with IPP and mine objective's (solar vs. engines ratio) Higher legal complexity: PPA and contractual paperwork for investment and finance Change in generation requires agreement with IPP Lower Savings



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Why Suntrace?

- Tailor-Made approach to optimize technical and economical aspects of the mines' needs along with integration of existing energy infrastructure and electrical network.
- Versatile capabilities combining meteorological, technical and financial know-hows under one roof, with a track record of more than 9 GW of solar power plant credentials in more than 40 countries.
- With a strong experience in conducting procurement of options (eg. Off-Balance Sheet [IPP/PPA] or On-Balance sheet (EPC)), we support in the development of various specifications and their competitive procurement.
- From concept to complete realisation: solar, wind and storage including hybrid solutions with conventional power systems
- Owner's Engineer and Technical Advisor of the world's largest off-grid solar-battery hybrid system for the mining industry, at the Fekola gold mine in Mali, West Africa.