Energy and Mines Outline

Adding Value to Mines

May 2021

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Energy and Mines

1. **The value of energy to a mine:** how important it is to have a stable and reliable power supply
2. **The concept of value for power generation systems,** as well having an EPC that understands mining and power
3. **The difference in off-grid and grid-tied systems** and what to look out for on both
4. **The value of a system that is completely integrated,** as well as a case study
5. **The value of having someone drive the process** from start to finish (development to execution and O&M)
6. **The value of a PPA** (Power Purchase Agreement)

Electricity

What it's worth to a mine

Electricity is a
critical mining enabler

Without electricity,
most mines cannot function

Mining Power System Requirements

Key Value Drives

Reliability and Predictability

/ Reduced down-time

/ Increased productivity

Overall Cost Reduction

/ Lower pkWh energy cost

Environmental, Social and Governance (ESG)

/ Carbon footprint reduction

"Mining is one of the most energy-intensive industries on the planet, but it is also one of the most important, with commodities from base metals to rare earths in high demand. Many mining companies have however begun incorporating renewable power sources into their operations, offsetting some of the carbon costs of mining."

(https://www.mining-technology.com/, 2 December 2019)

Solar EPC Considerations for Mines

Value and Reliability

The continued drive to reduce costs has forced solar EPC's to use lower cost equipment that has a lower CAPEX, but could have a major impact on future OPEX. To achieve the excepted plant life quality equipment and engineering is required.

Effectiveness and Efficiency

An EPC that really understands mining will be able to deliver mining projects quicker and more cost effective.

Mining Experience and Grid Experience

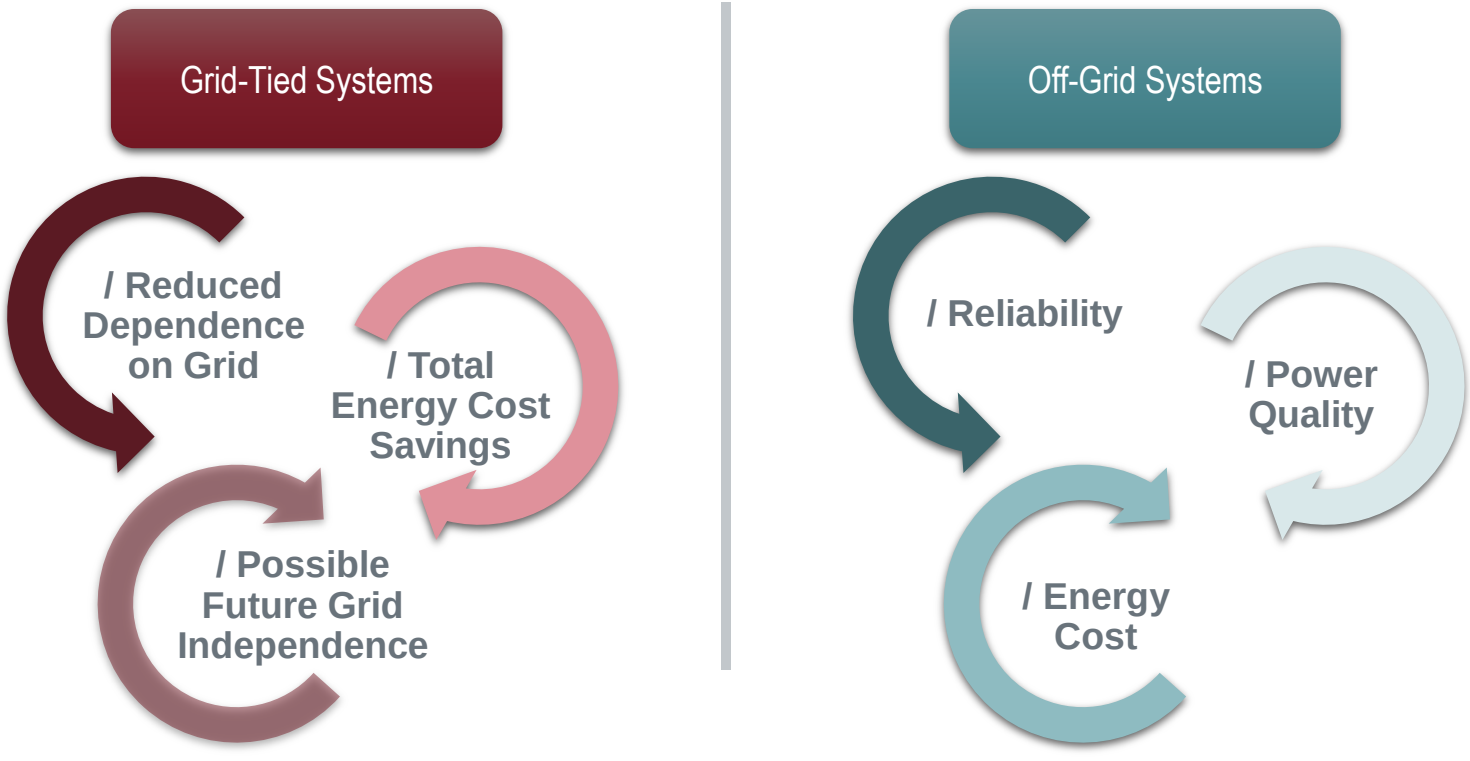
Mines have different requirements than other commercial/industrial applications. The cost impact as a result of a faulty system can be very severe. It is important that the solar EPC appreciate this reality.

Quality and HSE

There is a significant difference in the quality and HSE requirements between mining projects and commercial/industrial projects. DRA has a strong record in delivering projects to comply with the stringent quality and HSE standards in the mining environment.

Types of Mining Power Systems

Main Considerations



Key Driver: Reliability

Requirement: Total Integrated Solution

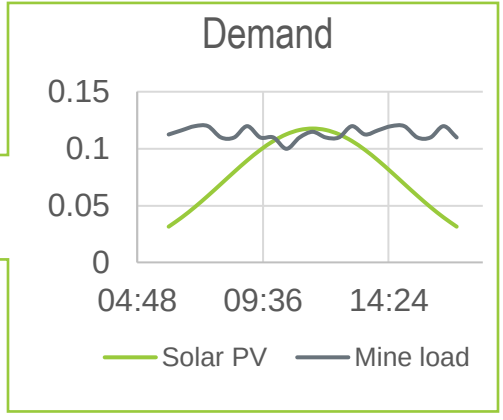
(Optional: Guarantee & PPA) Wrap

- Solar PV — Guarantee
- Thermal Generation — Guarantee
- Battery Storage — Guarantee
- Infrastructure — Earthworks & Civils, Substation & Reticulation

Power Purchasing Agreement

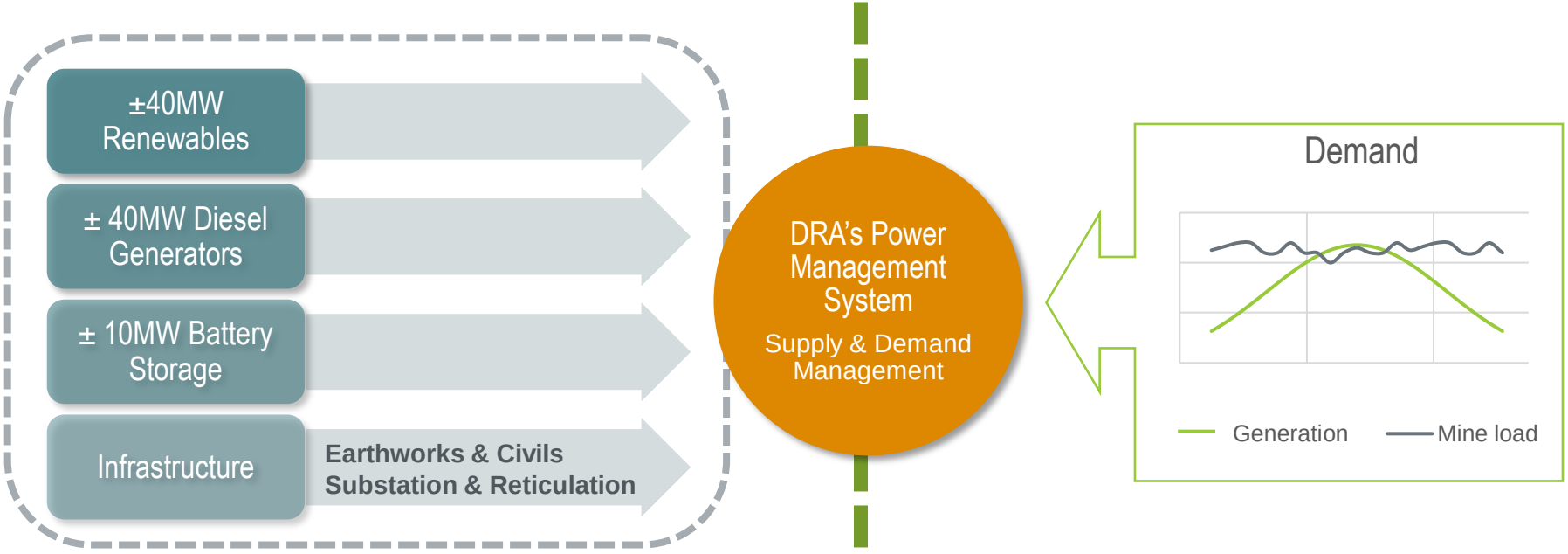
DRA's Power Management System

Supply & Demand Management



Total Integrated Solution

Case Study



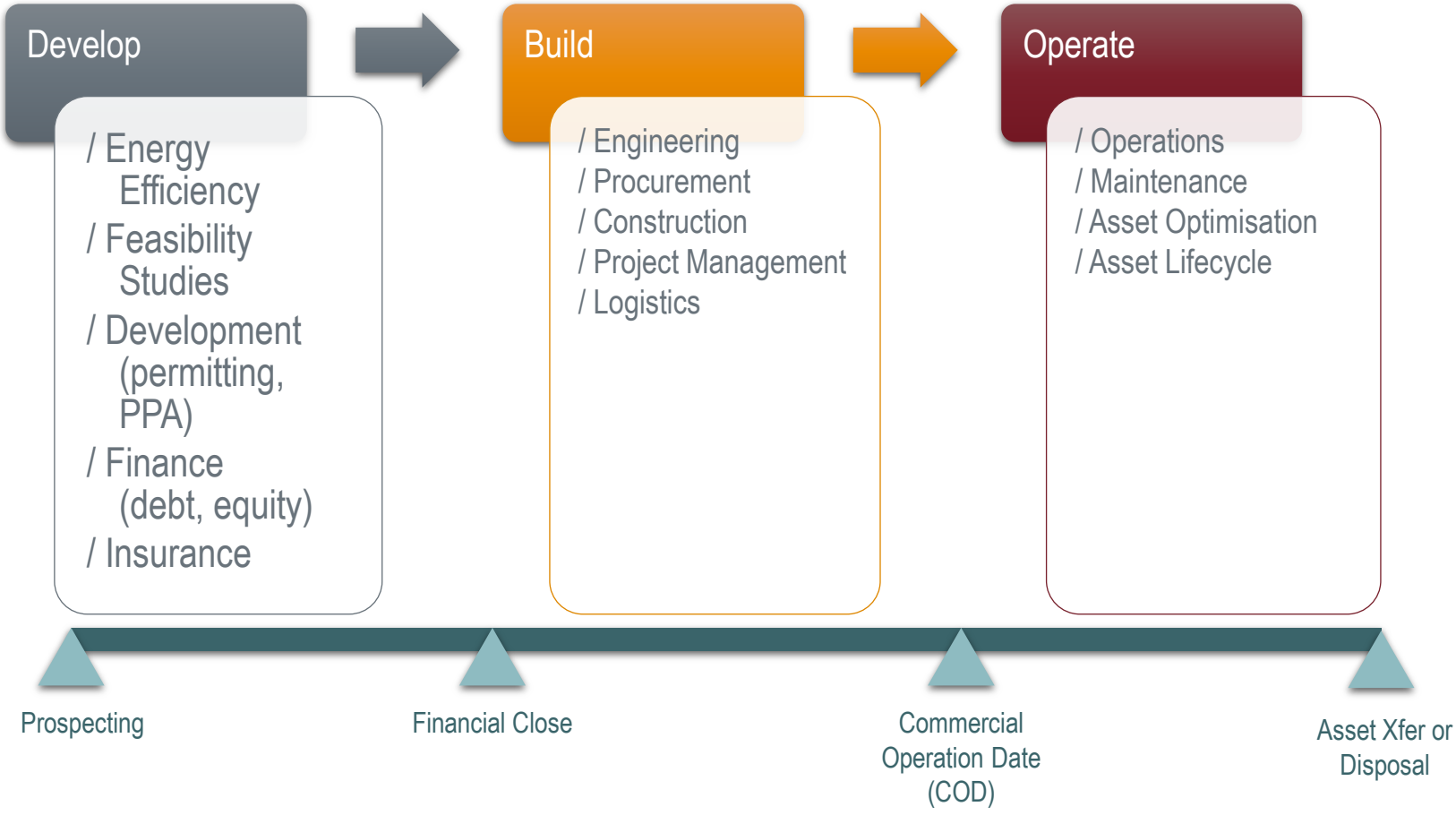
Total Integrated Solution

High Level Case Study

Generation

- ±40 MW of Diesel Generators
- ±45 MW of Hydro from Various Sites
- ±10 MW of Battery Energy Storage

Renewable Energy Project Value Chain



Typical Contracting Models for Solar PV in Mining

	EPC	EPCM	PPA
Accountability	Contractor accountable	Owner also accountable	IPP Accountable
Risk	Risk with contractor	Risk with owner	Risk with IPP
Time	Fixed completion date	No fixed completion schedule	Fixed completion date
Price	Fixed Price	No fixed price	Negotiated tariff
Procurement	Contractor responsible	Act as procurement agent for owner only	Contractor's responsibility
Quality/Performance Guarantee	Contractor provides guarantees at completion	Contractor does not provide guarantees	IPP provides guarantees
Owner's Involvement	Contractor in control	Owner in control	IPP in control
Defective Works & Services	Contractor to rectify defects	Contractor assists	IPP responsible for entire system

Why PPA?

It allows for the most efficient power system

IPP's have different earning expectations than traditional mining investors

It allows mines to focus on their available resources and core business – mining

Summary

Choose a partner that can guide you through the entire process

Reliable energy is very important to mines

Value: Having a system that allows mines to operate more efficiently – more important than having a system that only delivers lower cost energy

A well-designed system will improve the overall reliability of the power system, while also reducing the overall cost of energy, and help the mine achieve its ESG targets

An experienced mining power EPC adds real value and can reduce the impact on the mine's activities

A total system approach will increase the reliability of the system

A PPA will allow the mine to focus on its core business while saving money in the process

Technical Questions

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