CRONIMET
Power Solutions GmbH

CRONIMET - MINING POWER SOLUTIONS

OPERATING WORLDWIDE

1. **Corporate Overview**
2. Business Model
3. Track Record
4. Target Markets
5. Contact

Corporate Overview

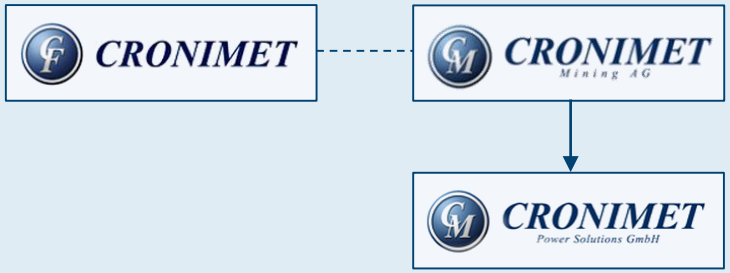
CRONIMET Mining AG

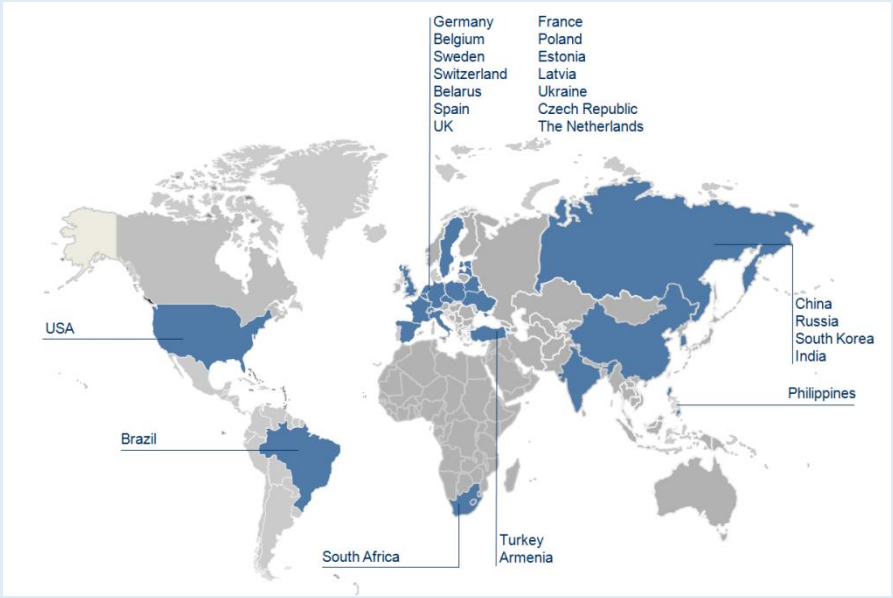
CRONIMET Mining AG

- CRONIMET Holding was established in 1980 in Karlsruhe, Germany
- The CRONIMET Group employs some 5,200 employees across four continents

CRONIMET Group is made of CRONIMET Holding and CRONIMET Mining

- **CRONIMET Holding**, with 56 offices globally, is a world leading stainless steal and raw materials recycling company
- **CRONIMET Mining**, established in 2004, is active across the entire raw materials value chain.
  - CRONIMET Mining entered the power and energy supply business in 2013, through its subsidiary CRONIMET Mining Power Solutions, based in Munich, Germany.





Homepage: http://www.cronimet-mining.am
http://www.cronimet.de

Corporate Overview

CRONIMET Mining - Power Solutions

CRONIMET Mining – Power Solutions GmbH

- A subsidiary of CRONIMET Mining AG
- Develops, plans, builds, finances and operates:
  - innovative captive hybrid power solutions for mining and industrial business worldwide
  - Large utility scale grid connected renewable energy power plants
- Geographic focus:
  - MENA
  - Central & Southern Africa
  - SE Asia
  - Australia

Homepage: http://www.crm-ps.com

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Business Model

CRONIMET Mining – Power Solutions

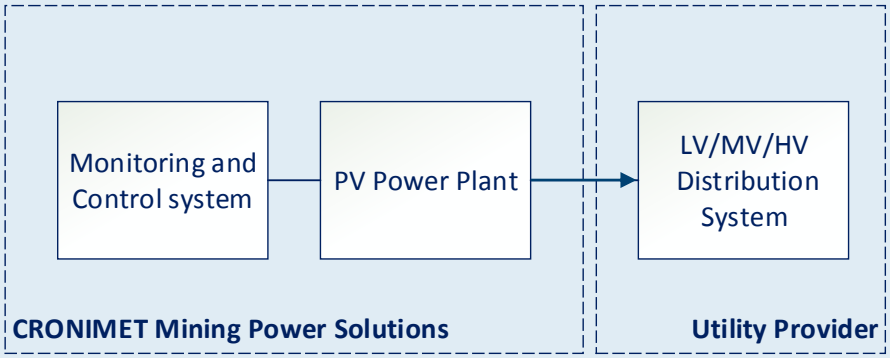
CRONIMET Power Solutions GmbH

TURNKEY SOLUTIONS FOR UTILITY SCALE RENEWABLE POWER FACILITIES

CRM – POWER SOLUTIONS	***DEVELOP***	***FINANCE***	***BUILD***	***OPERATE***
Process Management across all Renewable Energy Sectors: **PV** **Wind** **Biomass** **Hydro** **Geothermal** **Conventional Hybrids**	Deal Flow Process Mgt.	Financial Feasibility	Engineering	Monitoring
	Technical & Financial Analysis	SPV Structuring	Procurement of System Equipment	Maintenance & Repairs
	Power System Engineering	PPA, EPC, O&M, SPA, Debt	Construction	Reporting
	Pre-Construction Consents	CAPEX Financial Close	Commissioning & Testing	Asset Transfer

Business Model

Power Purchase Agreement (PPA)



PPA with Utility Provider

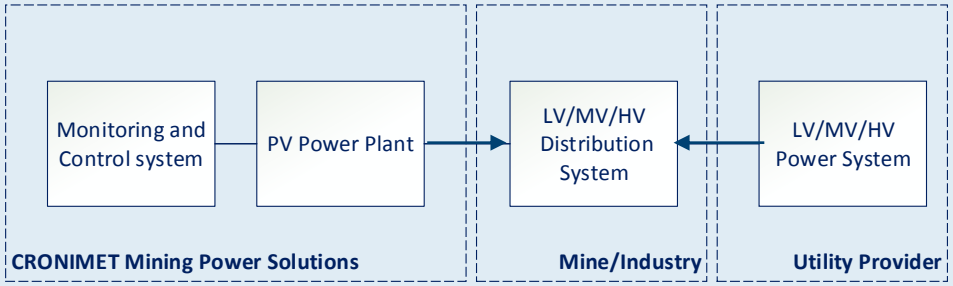
CRONIMET Mining Power Solutions supports **utility providers in developing countries**

- To improve the energy infrastructure
- Increase renewable energy consumption
- Satisfy energy demand

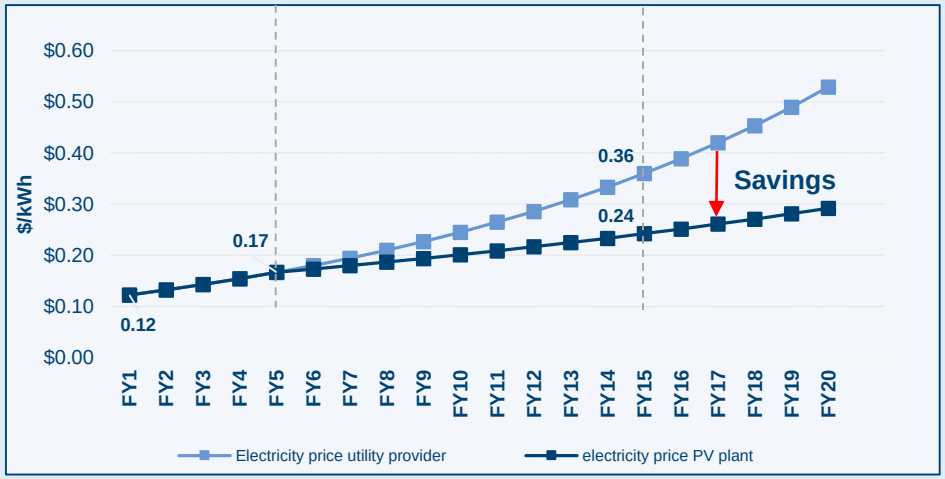
by providing them with turnkey solar PV plants at an negotiated PPA price per kWh.

Business Model

Power Purchase Agreement (PPA)



A 2 MWp PV power plant can save over USD 9.5 mill. over 20 years



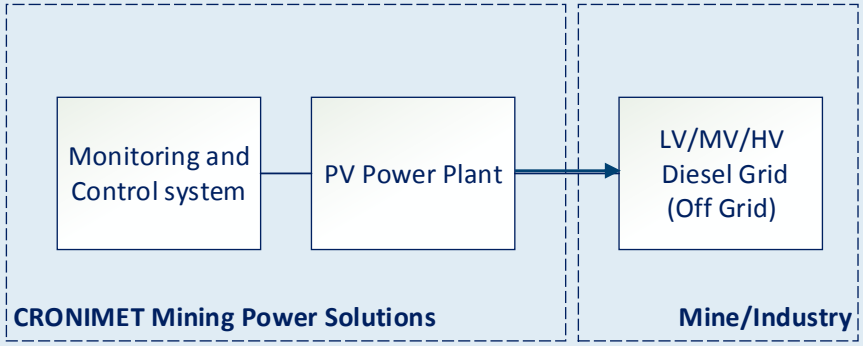
PPA with Mining Company

CRONIMET Mining Power Solutions provides PV power plants for grid connected **mining / industrial companies to support them**

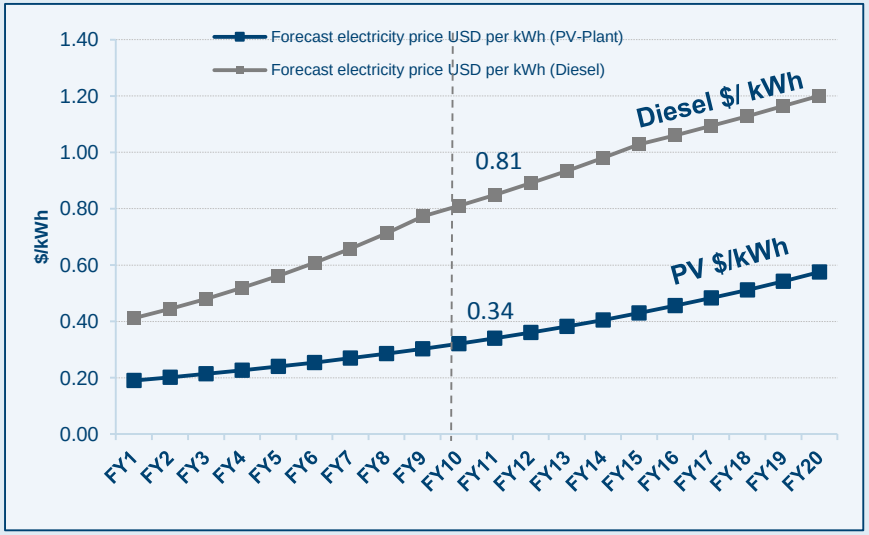
- Decrease their energy costs
- Payback time of the PV plant under 5 years
- PPA price increase after FY5 only 3.5%
- Utility prices – unforeseen development

Business Model

Products- PV/Diesel Hybrid System



Energy Cost Savings Over 20 Years exceed $ 52 mill.

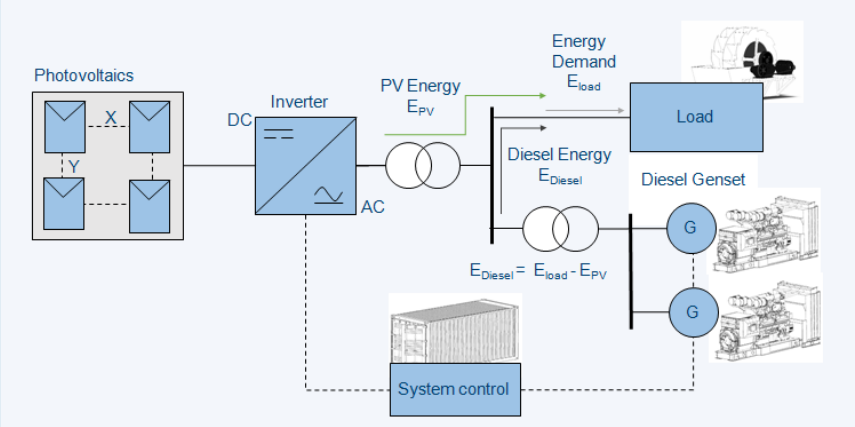


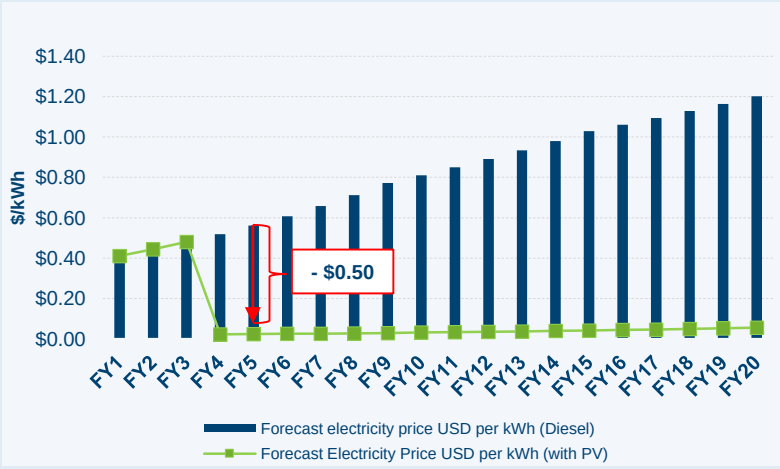
- **Power Purchase Agreement**: an investor provides a PV Plant and sells the produced PV electricity to the end consumer at a price determined in the PPA.
- PPA price is to escalate only by the CPI rate of the country, as only increase of the O&M costs influence the PV energy price.
- Diesel price per kWh in FY1: over 140% higher than the suggested PPA price.
- In time, the energy cost savings increase immensely, as diesel fuel price rises by more than the annual CPI rate.

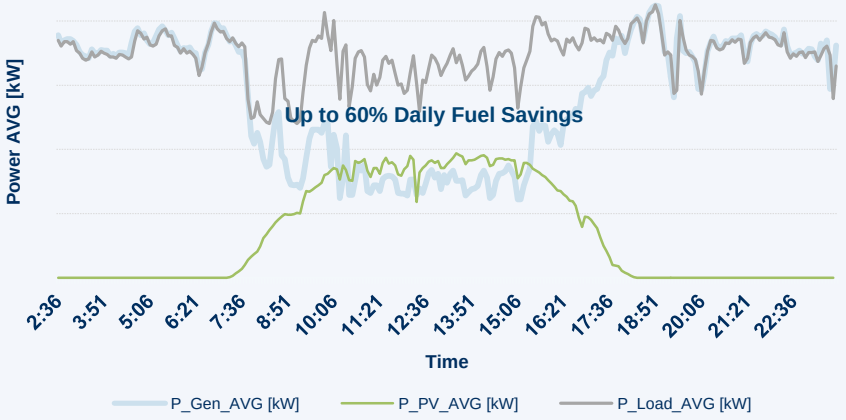
Business Model

Products- PV/Diesel Hybrid System (Thabazimbi)

- Speedy development and installation realization
- 60% PV penetration with passive system control
- Up to 60% diesel savings during daylight hours
- Mature technology
- Virtually no variable operating costs
- PV plant electricity is recognized by the diesel genset control system as a negative load, which reduces diesel energy output.
- Guaranteed grid stability







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Track Record

Mining - Thabazimbi

CRONIMET Power Solutions GmbH

"We sought immediate energy efficiencies"

Chrome Ore Mine, South Africa

CRONIMET Chrome South Africa (Pty.) Ltd.	
Location and Deposit	North Western Bushvelt complex, 250 km NW of Johannesburg
Size	2,444.2 ha
Resources	5.6 Mt LG 6 and MG with 38% Cr203 (opencast) 33.0 Mt LG 6 with 43.6% Cr203 (underground)
Mining Right	30 years (granted in March 2010)
Processing	Up to 40 ktpm (opencast) By developing the underground mine up to 90 ktpm
Products	Mining Product: Chromium ore
Energy Resource	Captive Diesel Fired Generators / Photovoltaic Hybrid
Energy Consumption	1.6 MVA

Track Record

Products- PV/Diesel Hybrid System (Thabazimbi)

CRONIMET Power Solutions GmbH

Thabazimbi PV Diesel Hybrid Plant

(Project "Zimbi")

Location:	South Africa
Installed PV Power:	**998 kWp**
Installed Diesel Power:	**1.6 MVA**
Produced PV Energy p.a.:	1,800,000 kWh
Project Development:	Three Months
Financing:	Two Months
Construction:	Three Months
Commissioning:	November 2012

- **The 1 MWp PV Plant will reduce the diesel consumption of the mine by 450,000 liters per year.**
- **Diesel price per liter (2013) = $1,20** (source: www.aa.co.za)
- **Potential diesel savings per year = $540,000**

Track Record

Planning – "Thabazimbi"

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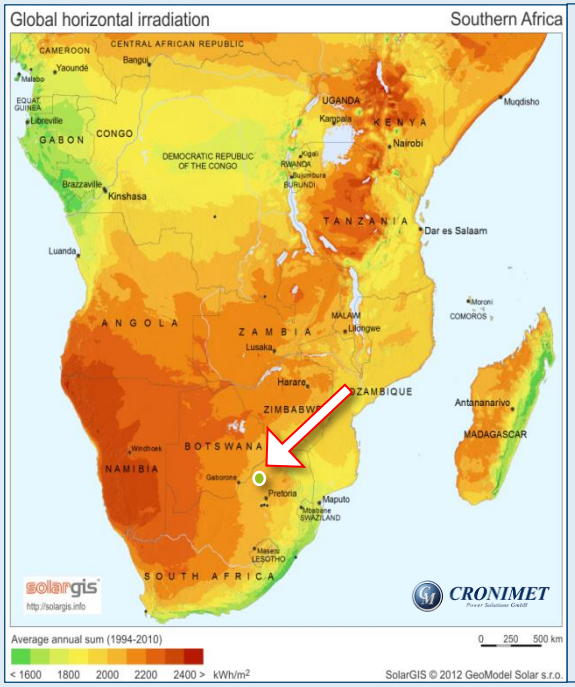

Solar irradiation energy yield (per year):	1850 kWh/kWp
1 MW of Photovoltaic (97% Availability)	x 1000 kWp
Total Annual Electricity from PV	**1,800,000 kWh**
Genset Efficiency Ratio (1/4 liter = 1kWh)	x 0.25
Annual Diesel Savings (liters)	**450,000 liters**
Cost of Diesel / liter (2012)	x $ 1.15 / liter
Annual Diesel Savings ($$$)	**$500,000**
PV Plant Expense (CAPEX)	**$2.66 million**

Track Record

Cronimet Mining – Power Solutions

- An experienced and innovative partner for energy solutions, having developed, structured, built and transferred over 20 MW of PV.
- CRM – Power Solutions management team combines transaction and advisory experience in over: 2000 MW PV, 3000 MW Wind, 500 CSP, 500 MW Hydro, 500 MW Geothermal, 500 MW Biomass, and 500 MW Waste to Power

Germany - “Gut Werchau”, **7.7MW**
2012

Romania - “Lucas”, **6 MW**,
2013

Italy - “Medicina”, **4.5 MW**
2011

South Africa - “Zimbi”, 1**MW**
2012

Germany - “Schierling”, **0.5 MW**
2013

Germany - “Schlieben Berga”, **0.3 MW**
2013

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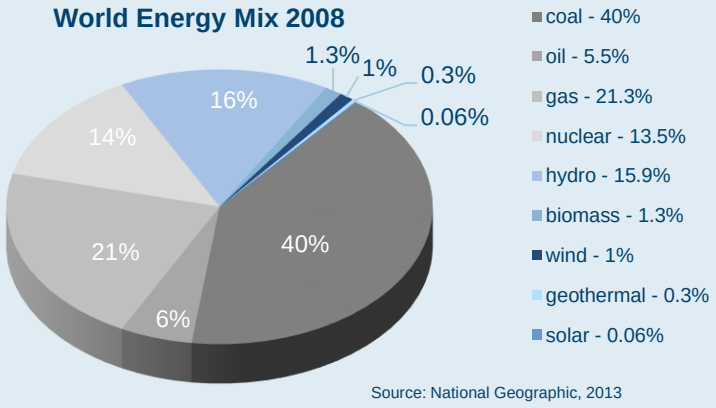
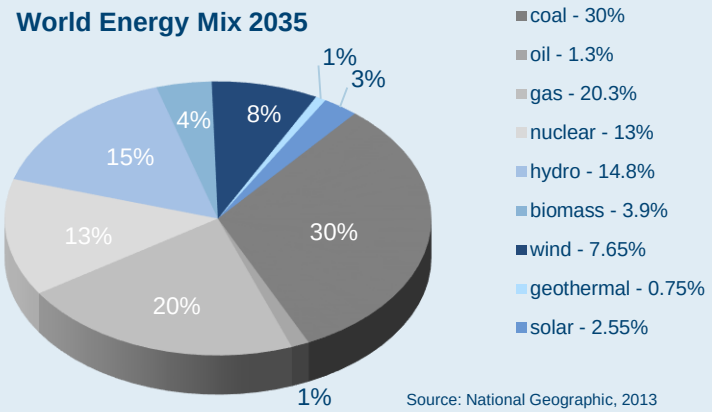
Target Markets

Global Power is Going Renewable

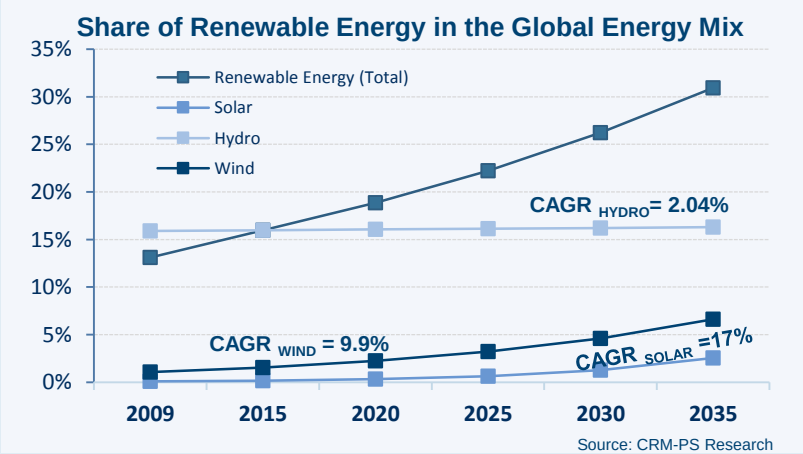


Source: National Geographic, 2013



Source: National Geographic, 2013

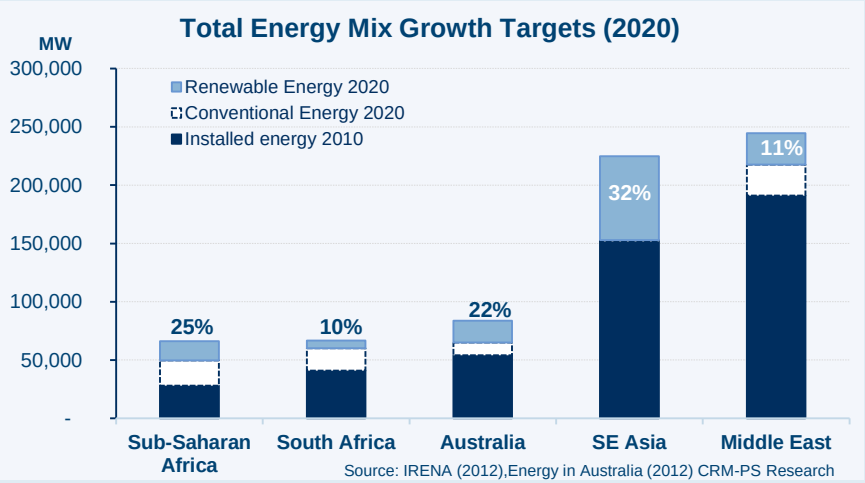
- In 2008, fossil fuels accounted for 67% of 4,843 GW installed energy capacity world-wide. (EIA, 2011).
- By 2035, 10% of coal based energy generation and 5% of the oil based energy generation will be replaced by renewable energy. (**7,300 MW**)
- In 2008, renewable energy accounted for an estimated 18.7% of the global energy mix. This share is forecasted to grow to 31% (**7,300 MW**) of the global energy consumption by 2035 (IEA, 2012).
- Today, approximately 50% of all newly installed capacity derives from renewable energy (IRENA, 2012).

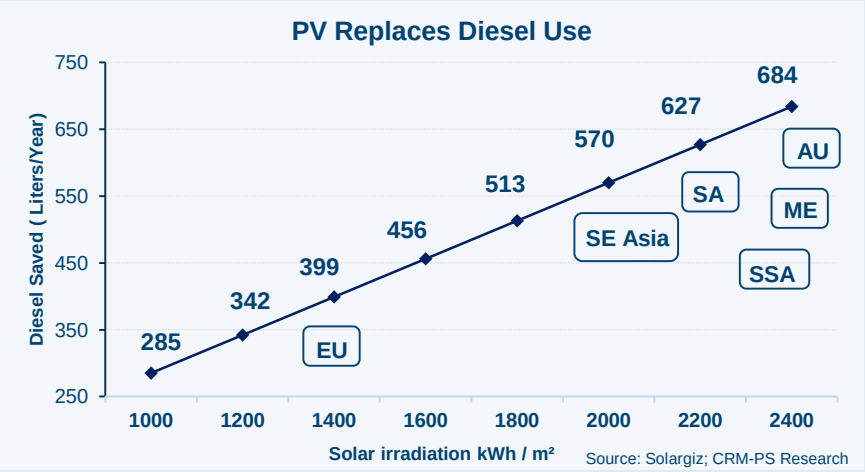


Source: CRM-PS Research

Target Markets

Renewable Energy





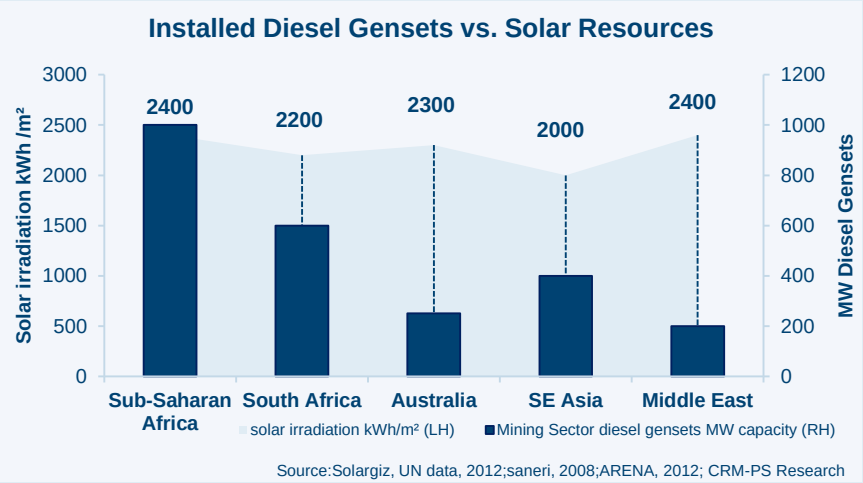
- Our target markets are: Central/Sub-Saharan Africa; South Africa; Australia, South East Asia; and the Middle East.
- Over the next 10 years, the growth of renewable energy capacity will out pace conventional energy capacity.
- For every 1kWp of installed PV capacity, a mining operation can save between from 450 to 680 liters of diesel per year.

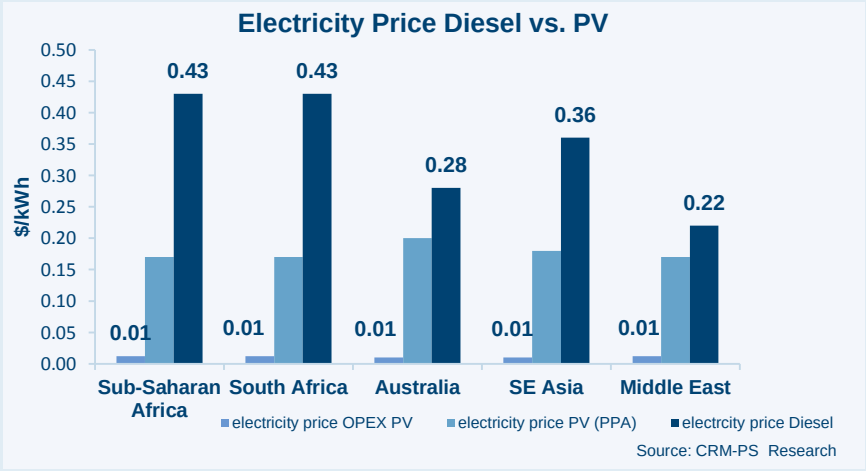
"For us, every 1% improvement in productivity translates to a $170-million saving."

BHP CE **Andrew Mackenzie**

Target Markets

Mining Energy Consumption





- An estimated 2.5 GW of captive diesel gensets are currently powering mining operations throughout our immediate target markets.
- In countries that rely on fossil fuel imports, the cost of diesel energy can exceed $0.40/kWh, while the LCOE for PV is less than half the cost of diesel.
- Fuel supply can be scarce, unreliable and expensive, causing blackouts and driving up operating costs.
- A PV plant operates at a 98% lower cost than operating costs of a diesel genset.
- Combined with a diesel genset, a PV power plant can significantly reduce the operating costs of a mine while will reducing up to 2000 tons of CO_2 per 1MW per year.

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Contact

Michael Belz

Business Development

CRONIMET Mining Power Solutions GmbH
Ottobrunner Str. 39
82008 Unterhaching

Tel.: +49 89 919 290 172
Mobil: +49 162 89 333 33
Email: michael.belz@crm-ps.com

Steffen Kammerer

Managing Director

CRONIMET Mining Power Solutions GmbH
Ottobrunner Str. 39
82008 Unterhaching

Tel.: +49 89 919 290 174
Mobil: +49 176 6091310 7
Email: steffen.kammerer@crm-ps.com