

Mining Indaba

Decarbonisation using Hybrid
Technology - achieving High
Renewable Penetrations
V&A Aquarium

11th May 2022

Financial & Transactional Advisory
South Africa | Mauritius | Nigeria

Cresco is a hands-on financial advisory firm dedicated to helping ideas
across Africa to become reality



Mining Indaba

Decarbonisation and focus on Storage / Solutions

Cape Town – Aquarium
11th May 2022

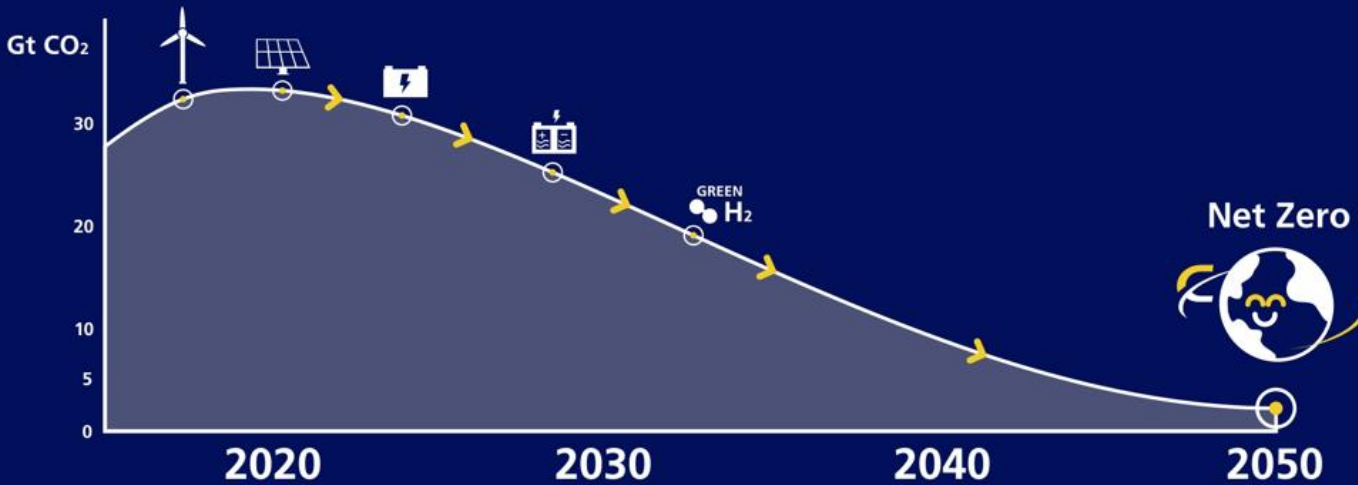


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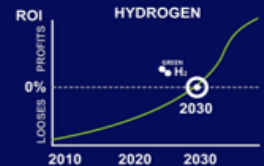
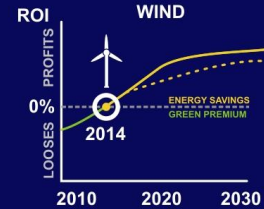
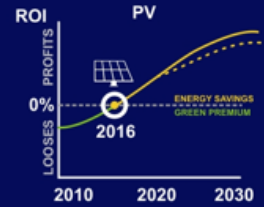


Power Sector Decarbonisation – - Technology Options using Toolkit Approach

The typical power sector decarbonisation technology interventions over time with reasonable target dates for larger users:



- Solar and Wind have achieved cost parity against most grid-connected utility tariffs
- Batteries and even hydrogen are fast approaching cost parity for some remote off-grid operations burning diesel
- Meanwhile, Hydro, Pumped Storage and Long Duration Energy Storage, as well as Hybrid PV-CSP can achieve high renewables penetration at competitive tariffs but high capex
- What is the right point to **evaluate, procure and implement** these technology solutions for your organization?

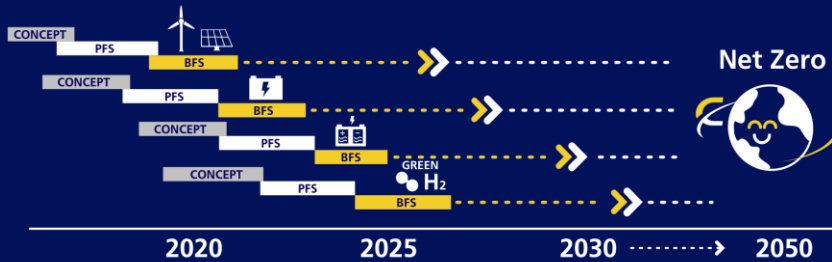


ENERGY SAVINGS
GREEN PREMIUM

Cresco Decarbonisation Solutions – Energy Toolkit

Cresco's Decarbonisation Solutions uses an Energy Toolkit approach to develop the strategy – both considering technology interventions – as well consideration of stakeholder issues

Energy Strategy for Decarbonisation Solutions



- Cresco's unique insight and Lessons Learned from conducting Energy Strategies and Procurement Support for more than 20 mines and adjudicating more than 200 bids
- Each client has bespoke requirements/funding approach but unfortunately all have similar technology option constraints



Battery and Energy Storage Systems (BESS)



Long Duration Energy Storage technologies (LDES)

PFS – Pre-Feasibility studies

BFS – Bankable Feasibility Studies

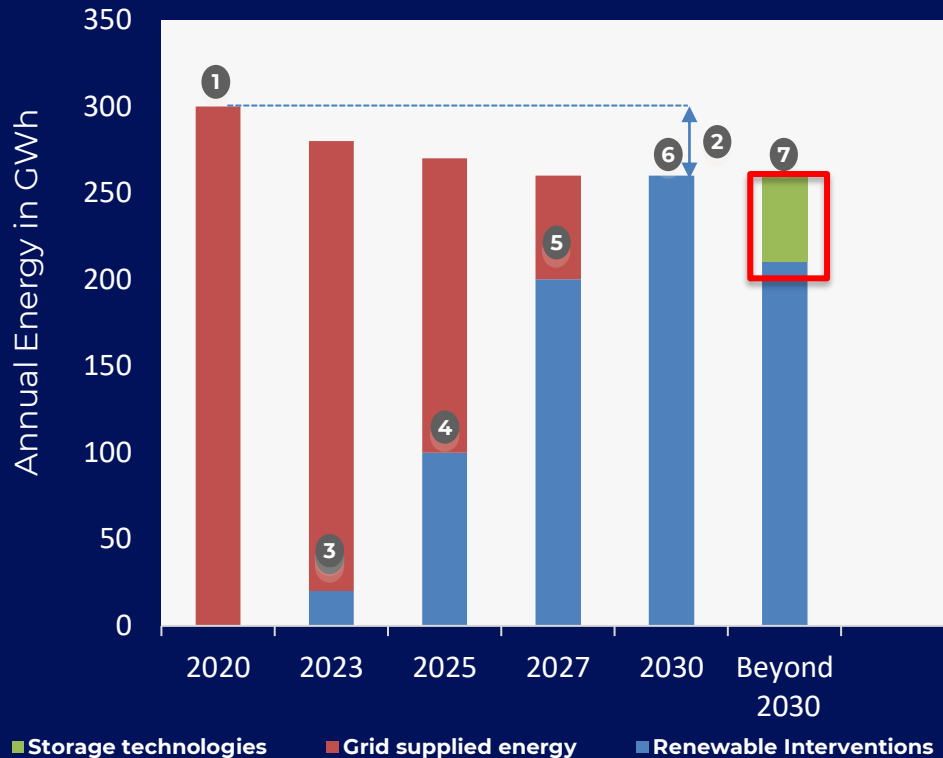
Cresco Toolkit Analysis

| | |
|--|---|
| Stock Take' Analysis of current power system | Commercial / Technical Analysis |
| 'Quick wins' to optimize power system by energy efficiency, optimization | Commercial / Technical Analysis |
| Tariff Competitiveness and Modelling (NPA considerations) | Commercial and Financial Modelling |
| Renewables adoption to maximize energy savings | Commercial, Technical and Financial modelling and analysis |
| Battery and Energy Storage considerations and adoption | Commercial, Technical and Financial modelling and analysis |
| Decarbonisation Strategy and Roadmap to Net Zero | Strategic analysis, visionary and innovative thought leadership |
| ESG Strategy, Opportunities and Implementation | Strategic analysis, visionary and innovative thought leadership, regulatory/legal, reporting/compliance |
| Green Hydrogen Strategy | Strategic analysis, commercial and technical analysis, financial modelling |
| Beyond Power System Decarbonisation Solutions | Strategic Analysis, Commercial / Technical Analysis |
| Low Carbon Product Development and Scope 3 Emissions opportunities and solutions | Strategic Analysis, Commercial / Technical Analysis |

Smaller Entity Case Study: 100 Loads / 27 Munis

- A typical client roadmap (behind the meter, wheeling / storage)

2030 100% RE ROADMAP



Milestones/ approach

- 1 2020 Grid Energy Consumption
- 2 2030 Energy Efficiency Target (additional 25% increase in EE from 2020)
- 3 Phase 1 Wheeling: Eskom sites and COCT
- 4 Phase 2 Wheeling: "Wheeling friendly jurisdictions" (Other Munis with precedent, City Power, Tshwane, NM Bay,)
- 5 Phase 3 Wheeling
 - Increase penetration in wheeling friendly jurisdictions
 - Bring Muni's online
 - Solve for maximum 80% penetration of total load
- 6 Phase 4
 - Solve last 20% 100RE through mechanisms available at the time eg.:
 - Net metering
 - Energy banking
 - Spot trading of energy on open marketplace
- 7 Phase 5
 - Efficiency initiatives post 2030,

Example Technology Options

Eskom - Connected Sites

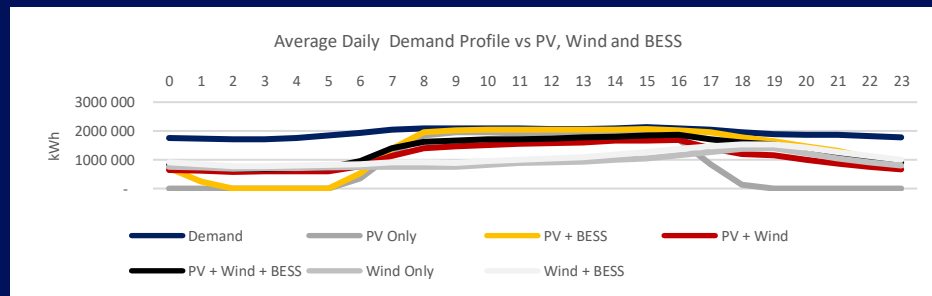
| | 1 | 2 | 3 | 4 | 5 | 6 |
|--------------------|-----|---------------------------|--------------|---------------------------|--------------|-------------------|
| 75% Target | | PV + Onsite Battery | PV + Wind | PV + Wind + Battery | Wind only | Wind + Battery |
| RE Penetration % | 46% | 75% | 75% | 75% | 71% | 75% |
| Curtailment % | 44% | 4% | 33% | 12% | 75% | 40% |
| PV Capacity (MW) | 10 | 10 | 5 | 5 | - | - |
| Wind Capacity (MW) | - | - | 5.5 | 3.5 | 20 | 10 |
| BESS (kWh) | - | 36 000 | - | 8 000 | - | 9 000 |

| | 1 | 2 | 3 | 4 | 5 | 6 |
|------------------------|-----|---------------------------|--------------|---------------------------|--------------|-------------------|
| Maximum% Target | | PV + Onsite Battery | PV + Wind | PV + Wind + Battery | Wind only | Wind + Battery |
| RE Penetration % | 46% | 100% | 81% | 100% | 80% | 97% |
| Curtailment % | 44% | 67% | 52% | 63% | 84% | 81% |
| PV Capacity (MW) | 10 | 40 | 5 | 10 | - | - |
| Wind Capacity (MW) | - | - | 10 | 15 | 40 | 30 |
| BESS kWh | - | 60 000 | - | 40 000 | - | 40 000 |

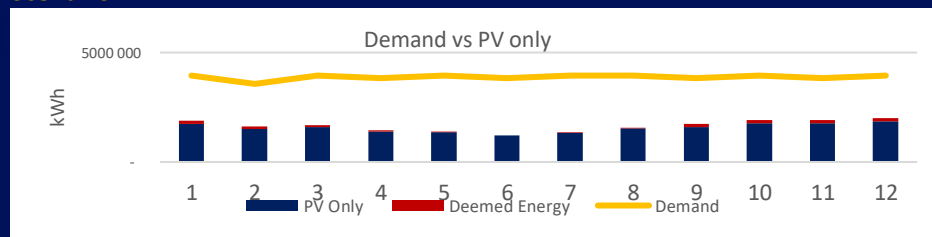
| | 1 | 2 | 3 | 4 | 5 | 6 |
|-----------------------|-----|---------------------------|--------------|---------------------------|--------------|-------------------|
| Optimal Target | | PV + Onsite Battery | PV + Wind | PV + Wind + Battery | Wind only | Wind + Battery |
| RE Penetration % | 40% | 75% | 56% | 70% | 46% | 58% |
| Curtailment % | 5% | 4% | 5% | 5% | 5% | 8% |
| PV Capacity (MW) | 5 | 10 | 2.5 | 3.5 | - | - |
| Wind Capacity (MW) | - | - | 3 | 3.5 | 3.8 | 5 |
| BESS kWh | - | 36 000 | - | 8 000 | - | 10 000 |

Typical Output Graphs

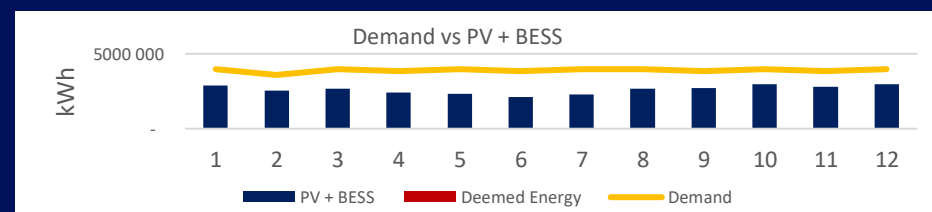
6 Technology Scenarios



Scenario 1



Scenario 2

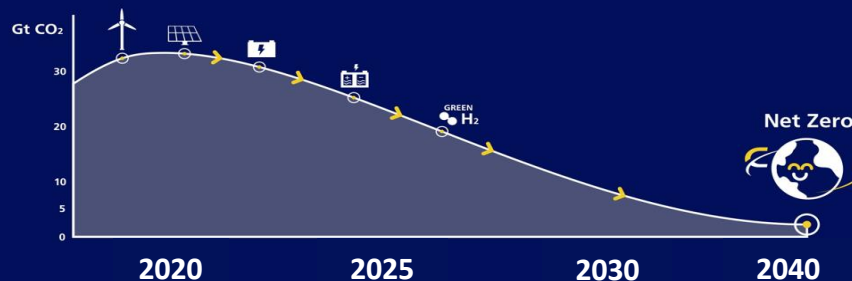


Cresco – Relevant Clients and Partners

Cresco has assisted a number of large energy users on differing decarbonisation journeys with differing “fit for purpose” solutions. Municipal wheeling increasing in focus – some new precedents to be set

| BUYERS OF ENERGY | SERVICE PROVIDERS (IPP / EPC / OEM / ENG) |
|--|--|
|  |  |

ENGINEERING AND CONSULTANTS

FINANCE



Cresco is supporting some of the world's largest energy consumers to evaluate, procure, implement & monitor decarbonisation solutions

Rob Futter

Executive Director



Robert has worked for Cresco Group for the past 13 years across industries but strong focus on mining and infrastructure. He focusses particularly on financial modelling and finance structuring for cross border opportunities. He is a qualified Chartered Accountant who has focused on project finance in Sub Saharan Africa for the past 15 years, with an additionally 4 years' experience in the UK / European market in similar areas. He has extensive financial modelling experience across various industries. Strategic business development services for start-up and technology entities.

Increasing focus on helping corporates achieve “optimistic” Net Zero targets with realistic tangible solutions



