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Intelligent, telco-grade off-grid power solutions



Green Power for Mobile

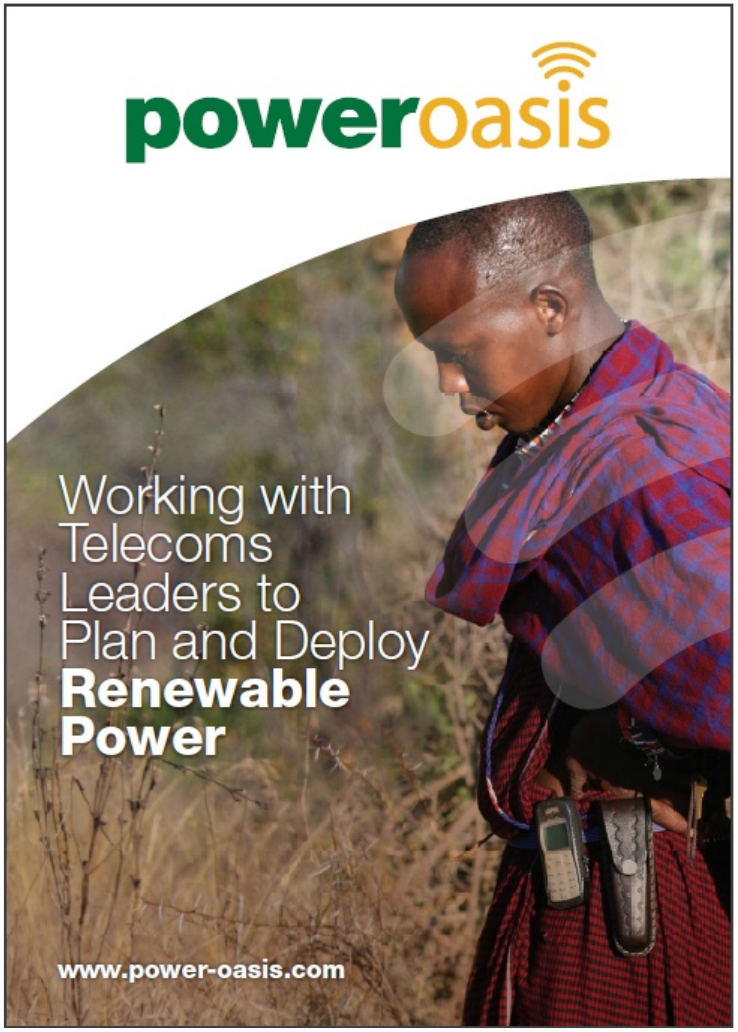
Working Group

Ivan Harris, Chief Operating Officer

19th November 2008

About PowerOasis

- Unique combination of telecoms and renewables expertise.
- Deployments:
  - Test sites in the UK,
  - Live sites in Namibia (GSM and WiMAX, since 2007)
  - Live Sites in South Pacific (GSM, 2008).
- Scoping and dimensioning tools, power control and remote monitoring products.
- Partner-based go to market strategy.



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Market Drivers

- 1.85bn new customers in 5 yrs, 90% in emerging markets.
- Next two billion subscribers will require 1.5 - 2 million new base stations, more than half of them off-grid.
- GSMA Green Power for Mobile target >118,000 sites by 2012 to be powered by renewables.
- Power is a top 3-5 OPEX item (as high as 50% in some parts of Africa).
- 335,000 Cellular Base Stations to Include Solar Power by 2013.
- Zain Employing 8,000 Staff to Protect its Base Stations.
- Emerging markets are a significant growth opportunity for operators at a time when subscriber growth in established markets is slowing down.
- Operators who do not exploit this opportunity limit their growth and allow their competitors to gain market share.

Challenges

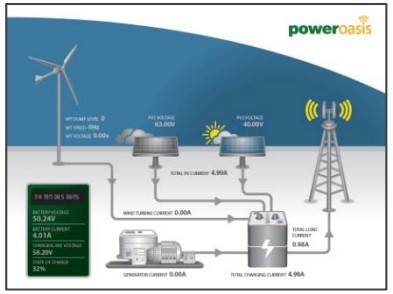
- Depending on distance from the grid, terrain and local costs, establishing new grid connections may not be economically viable.
- For diesel generators the delivered cost of diesel, which includes the price of fuel and the transportation costs, can result in unviable fuelling and maintenance OPEX.
- The market does not yet understand how to choose sites that provide the required return on investment and how to dimension chosen sites to reduce CAPEX and OPEX.
- Existing renewable solutions are bespoke and are not designed specifically for telecoms applications, resulting in lack of standardisation, an inability to treat the BTS and transmission links as separate power consumers and limited OMC alarming capabilities
- Remote monitoring is not an integral feature of most solutions requiring integration, configuration to report power information in telecoms context and establishing the remote communications mechanism.

Three Offerings

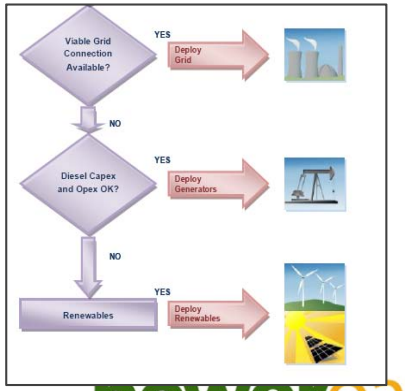
- Intelligent renewable power controller (the PowerOasis SSC)



- Remote monitoring



- Methodology and tools to undertake renewable power economic and technical modelling



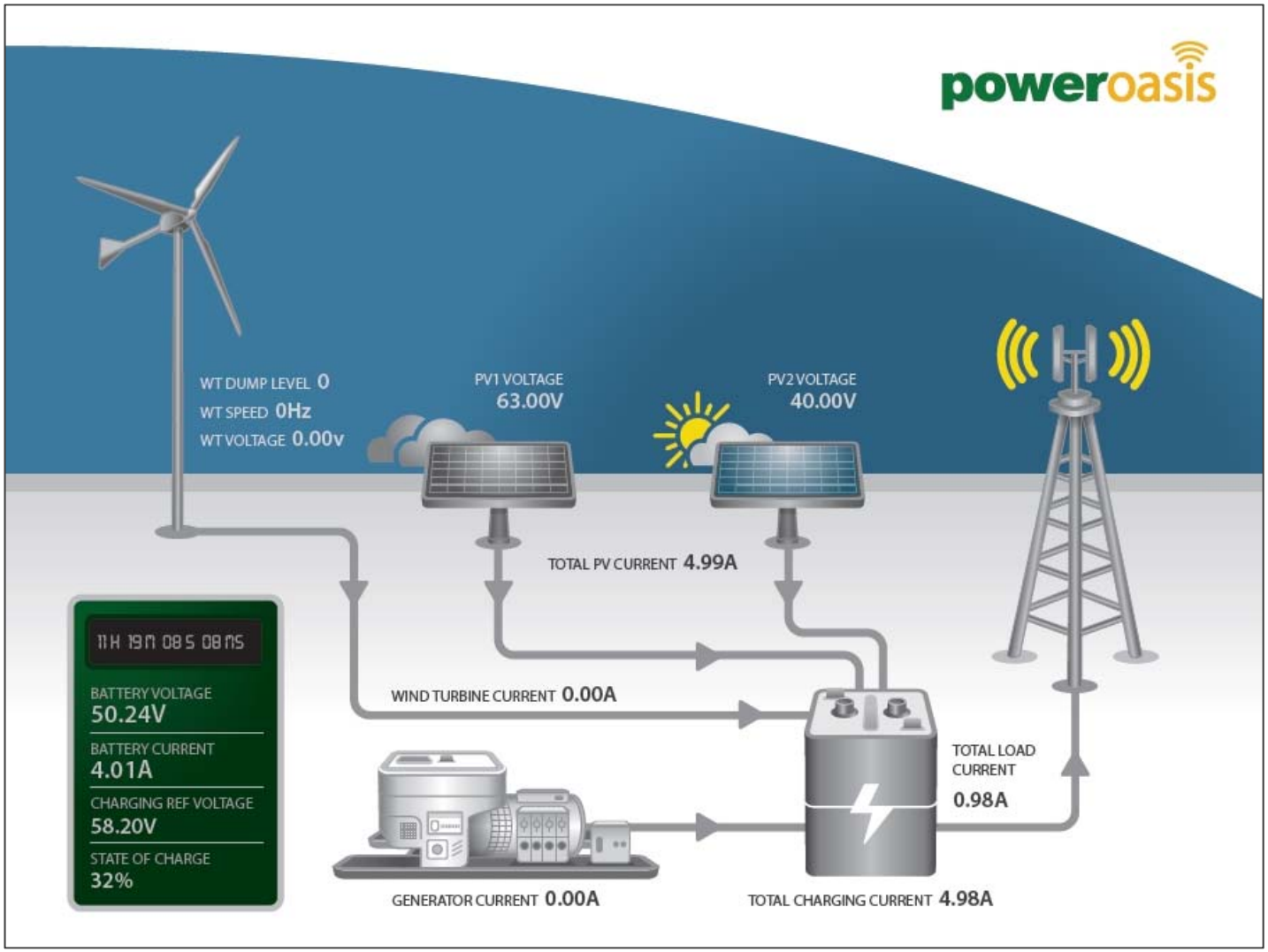
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Supervisory System Controller



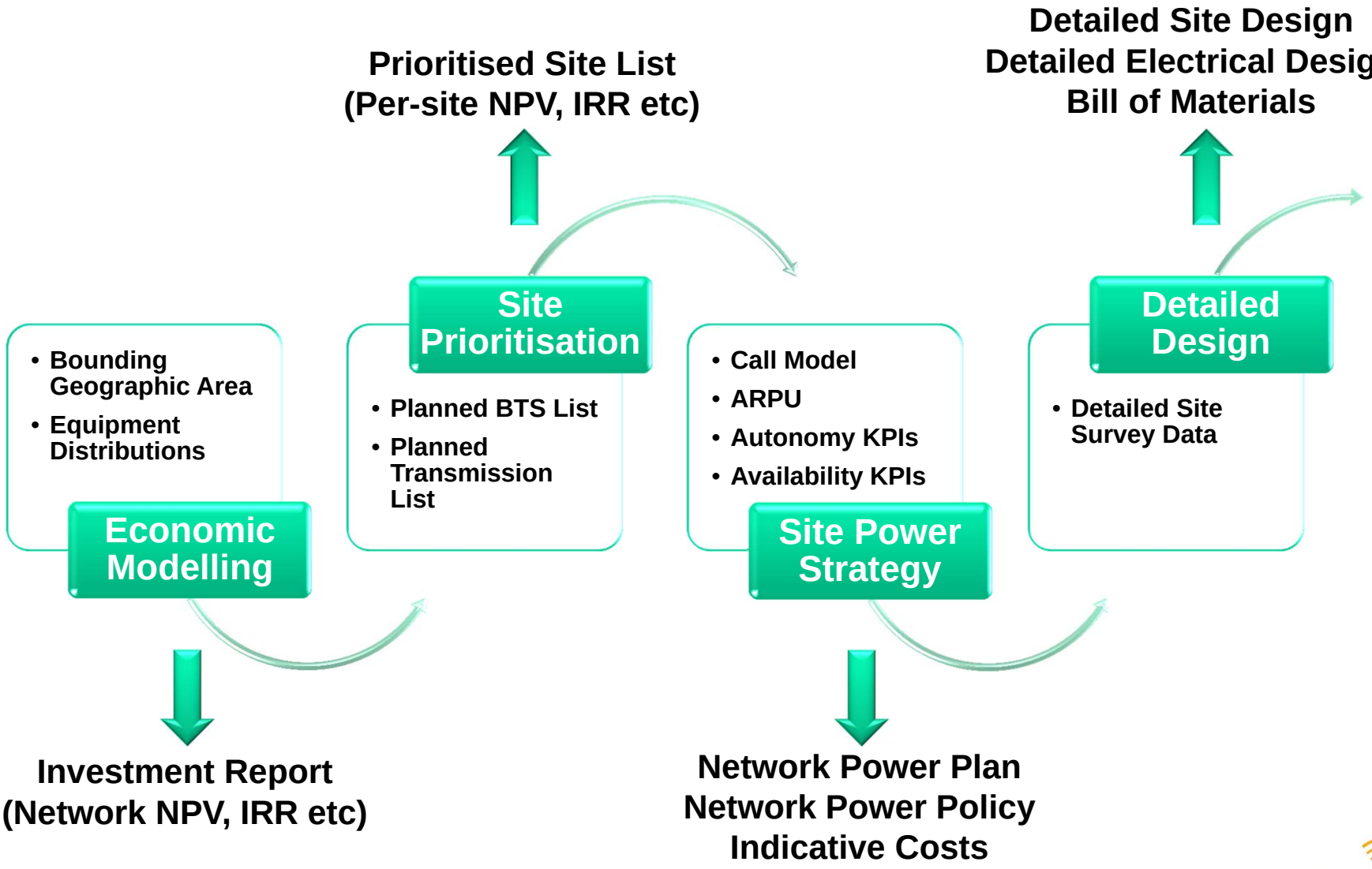
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Remote Monitoring



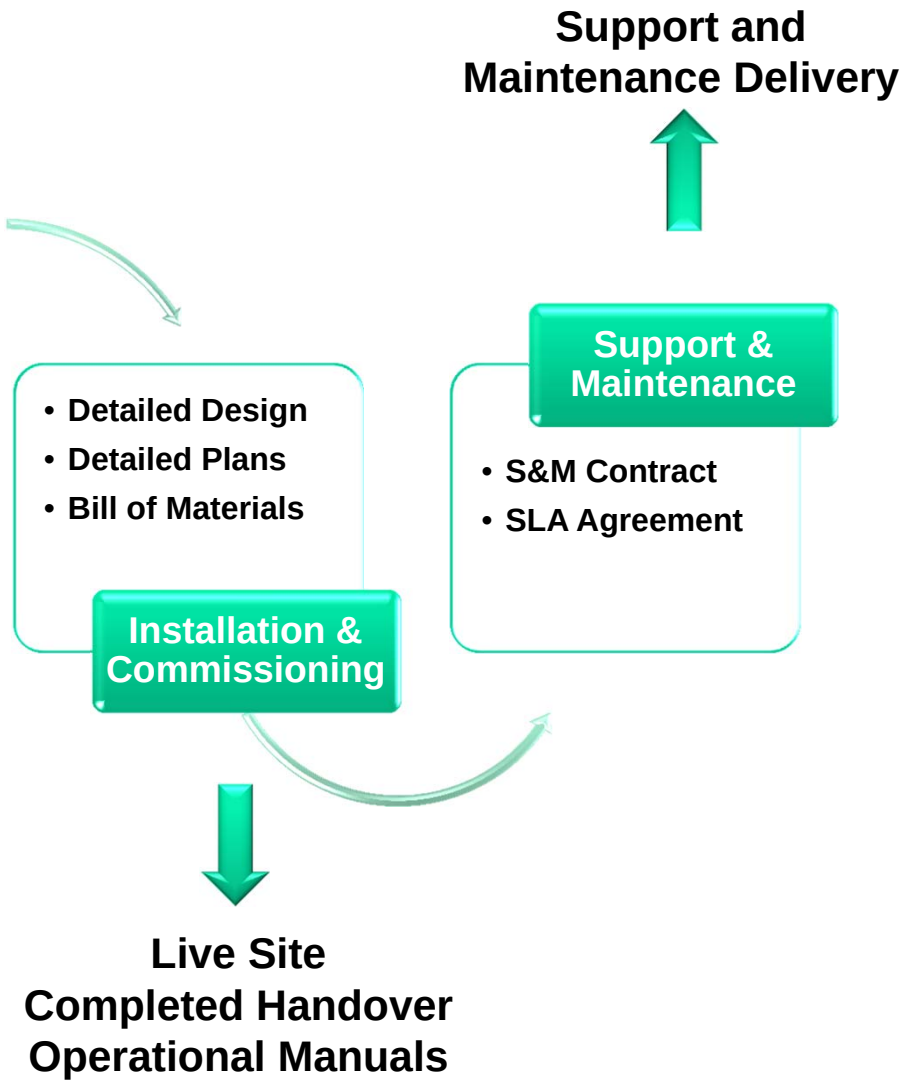
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Renewable Power Planning



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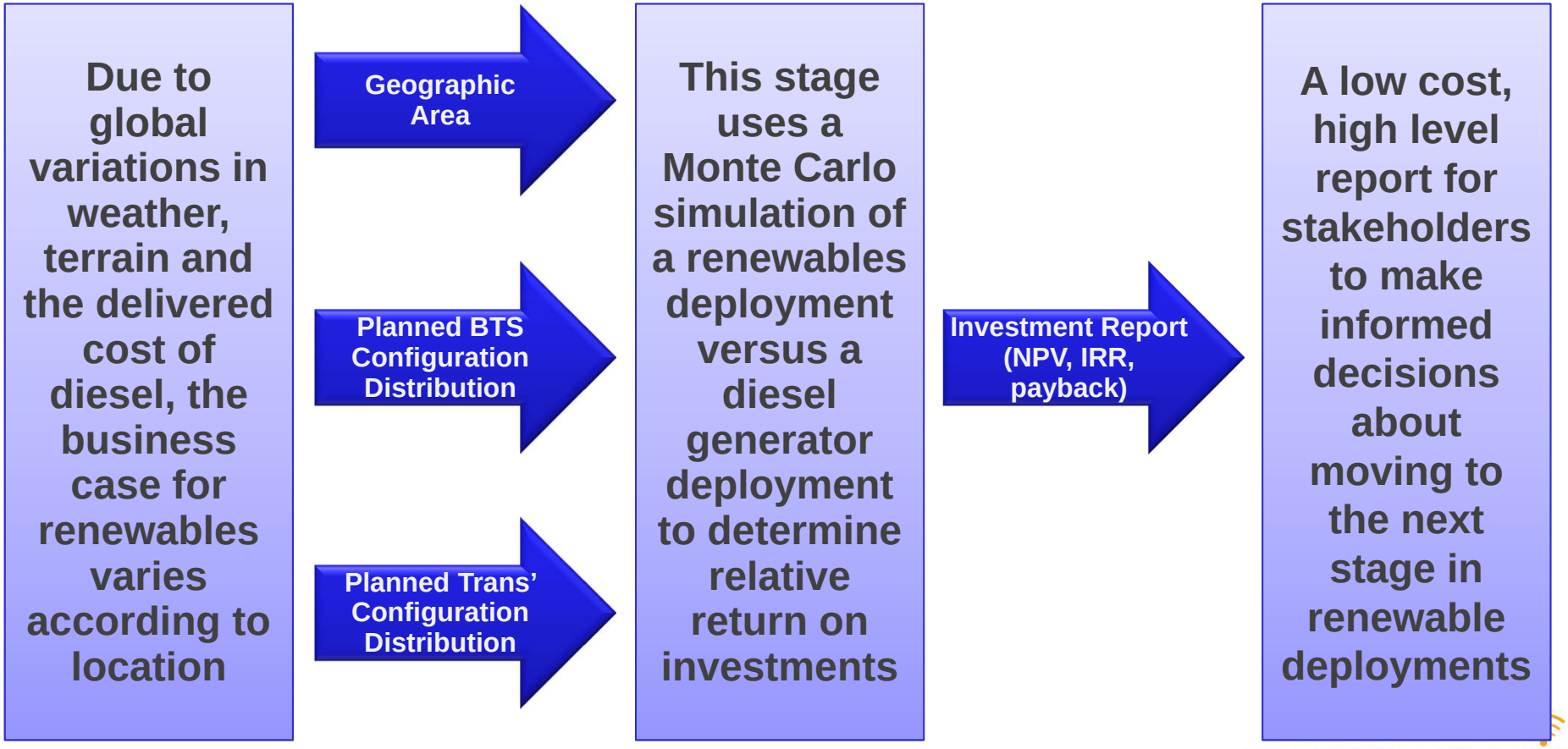
Renewable Power Deployment



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Renewable Power Planning
Economic Modelling

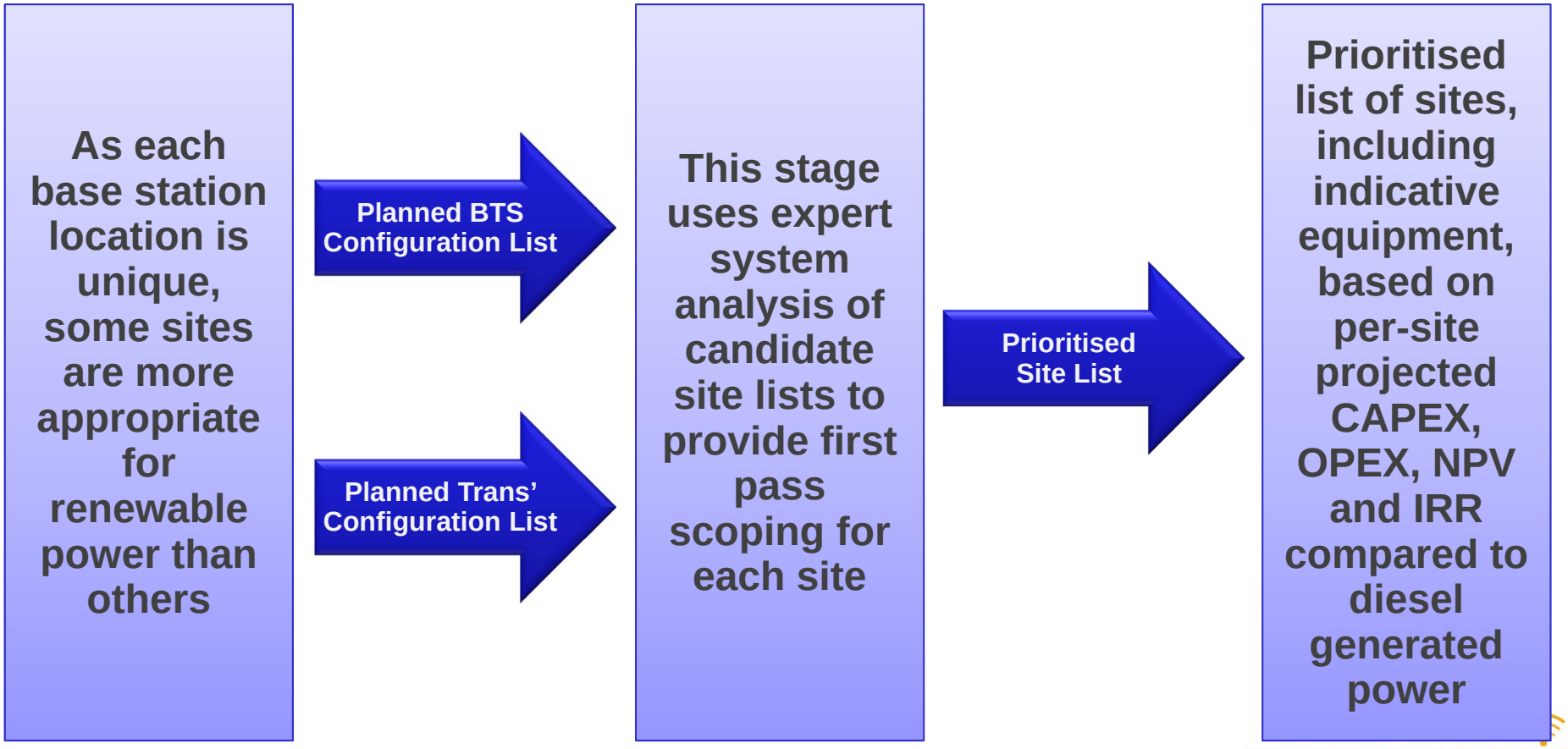
The purpose of this stage is to determine a business case for the use of renewable energy to power a mobile network in a region



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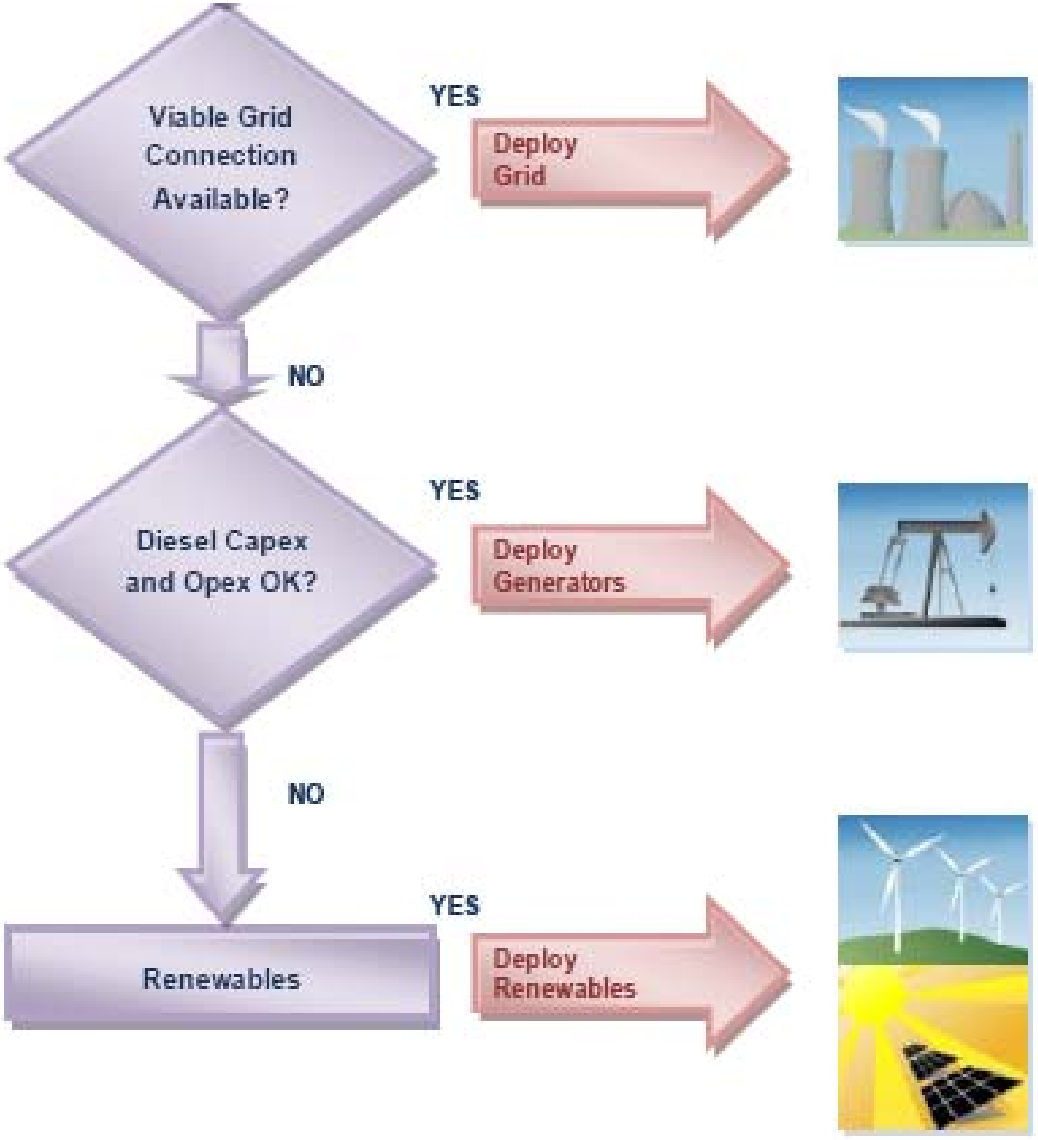
Renewable Power Planning
Site Prioritization

The purpose of this stage is to generate a prioritized list of existing or planned sites in terms of economic viability for renewable energy to maximise return on investment and minimise project risk



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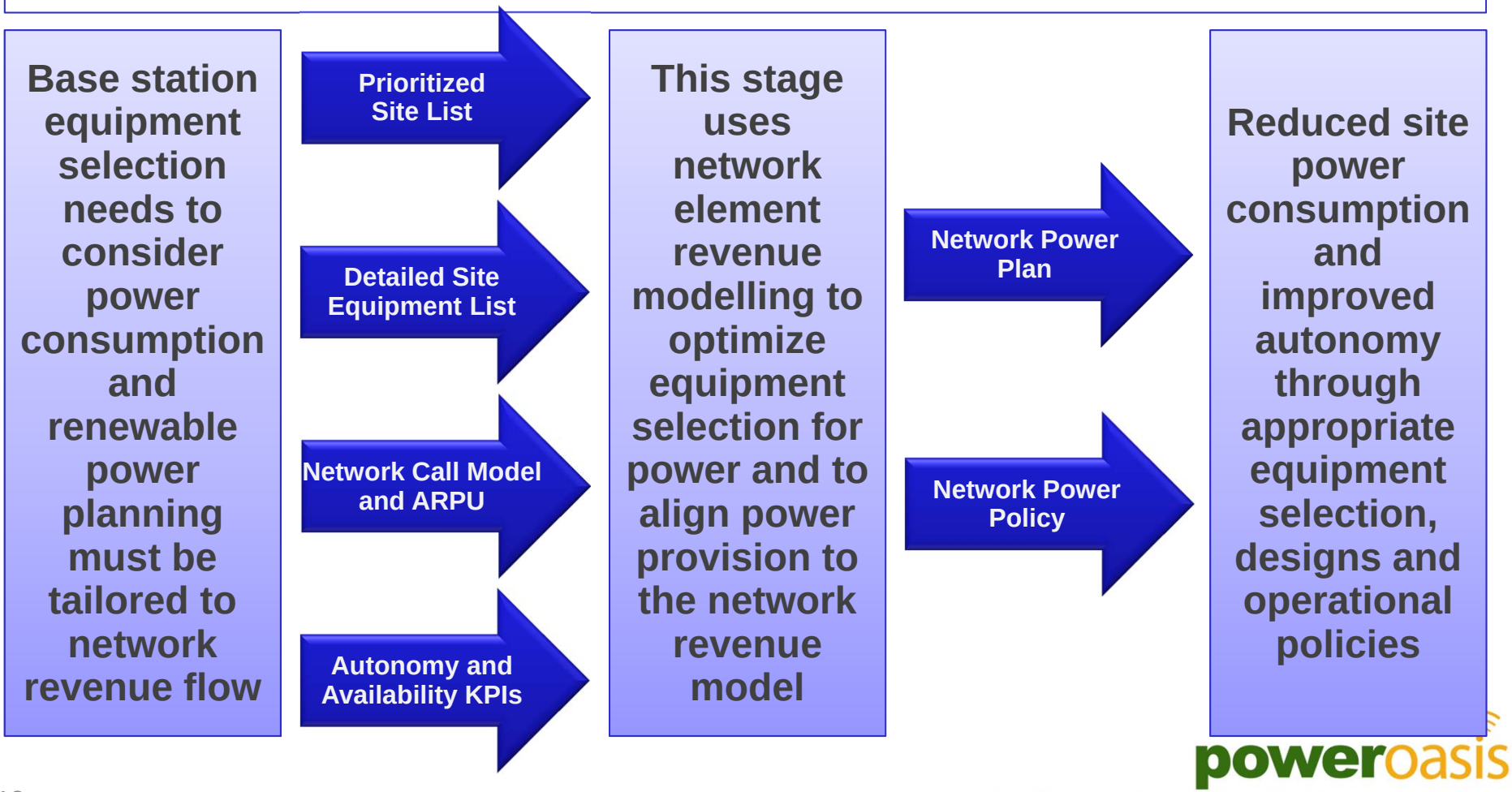
Renewable Power Planning
Site Prioritization



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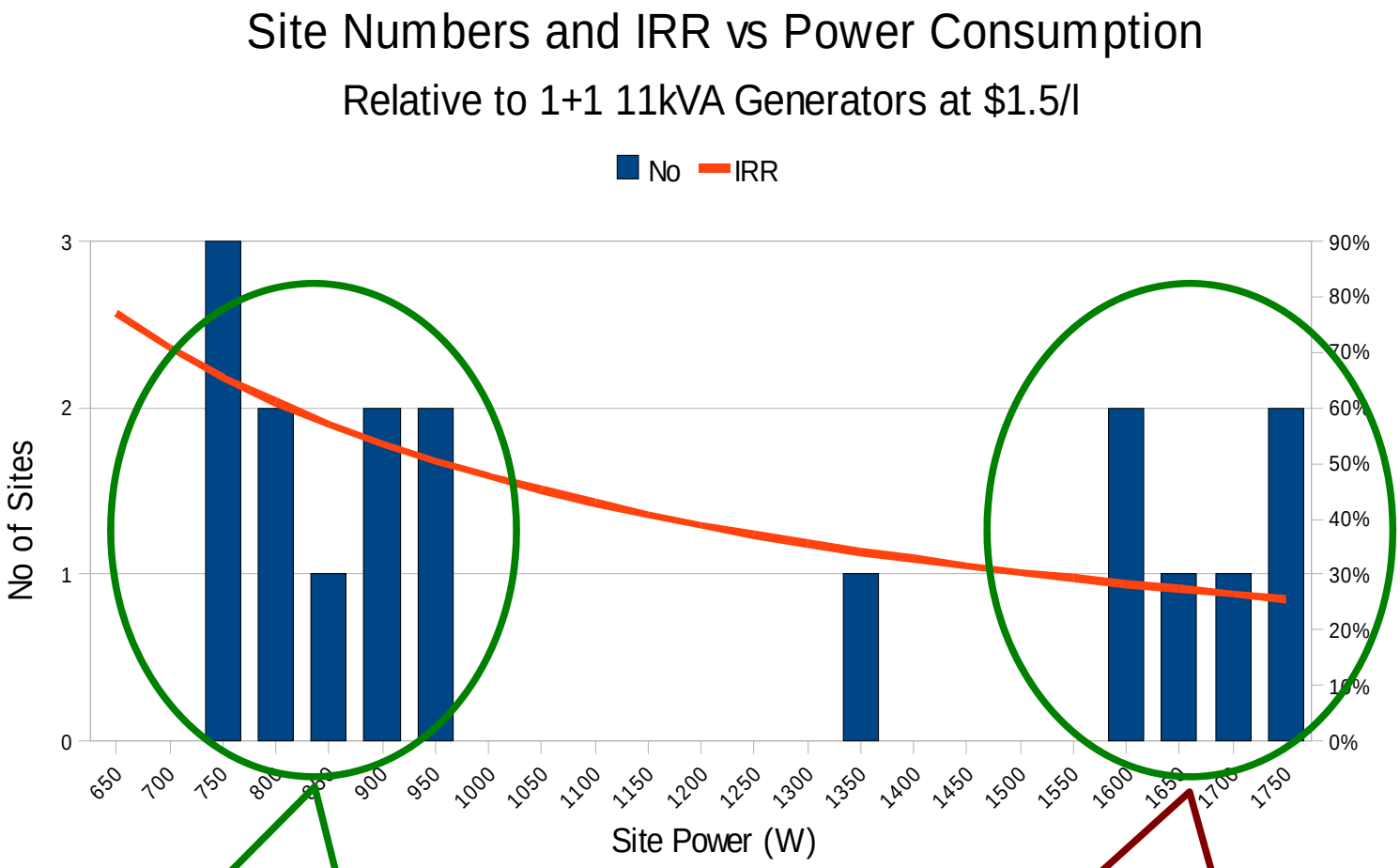
Renewable Power Planning
Site Power Strategy

The purpose of this stage is to optimise telecom equipment load and ensure that site power availability is aligned to revenue flow in the network



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Renewable Power Planning
Site Power Strategy



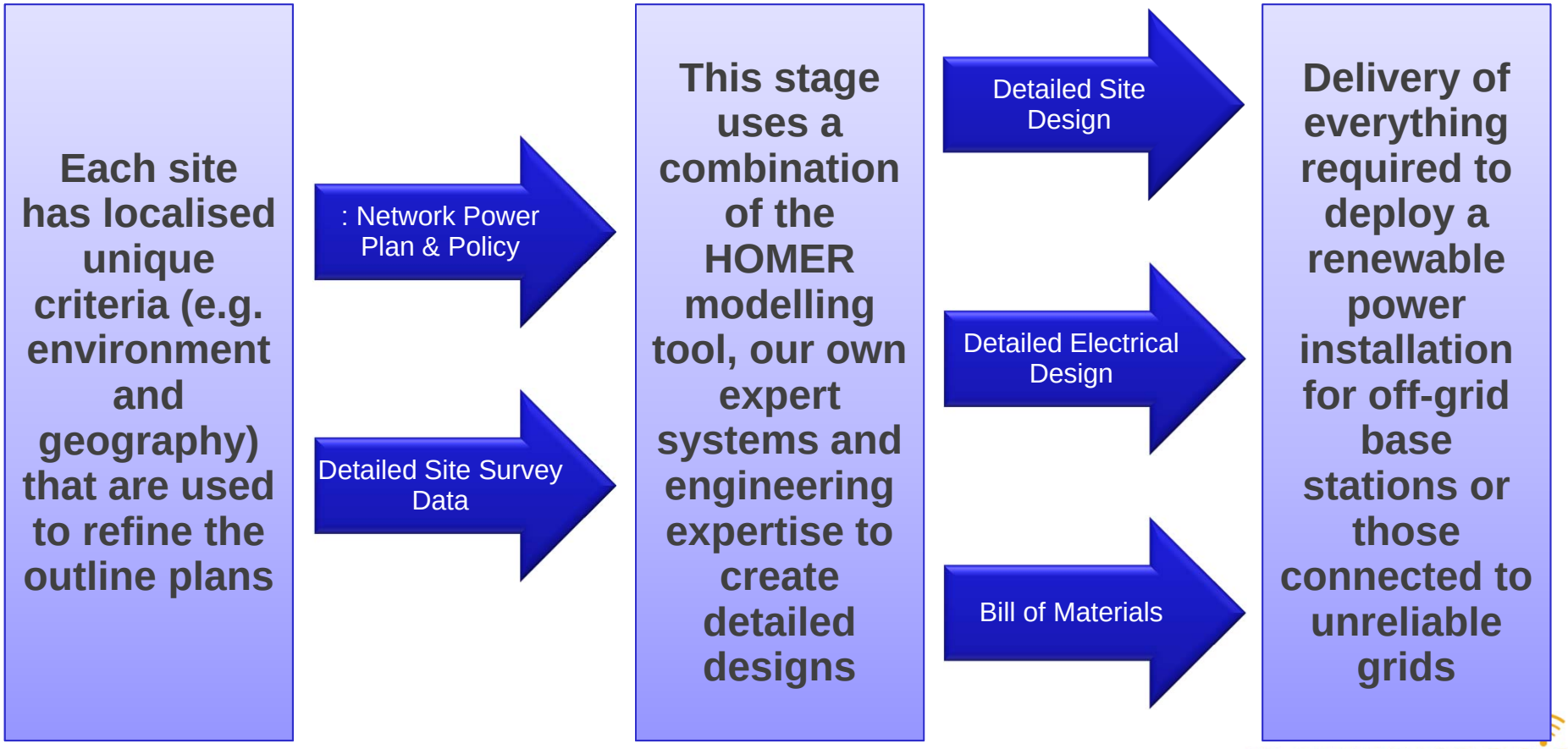
Sites optimized for green power

Sites not optimized for green power

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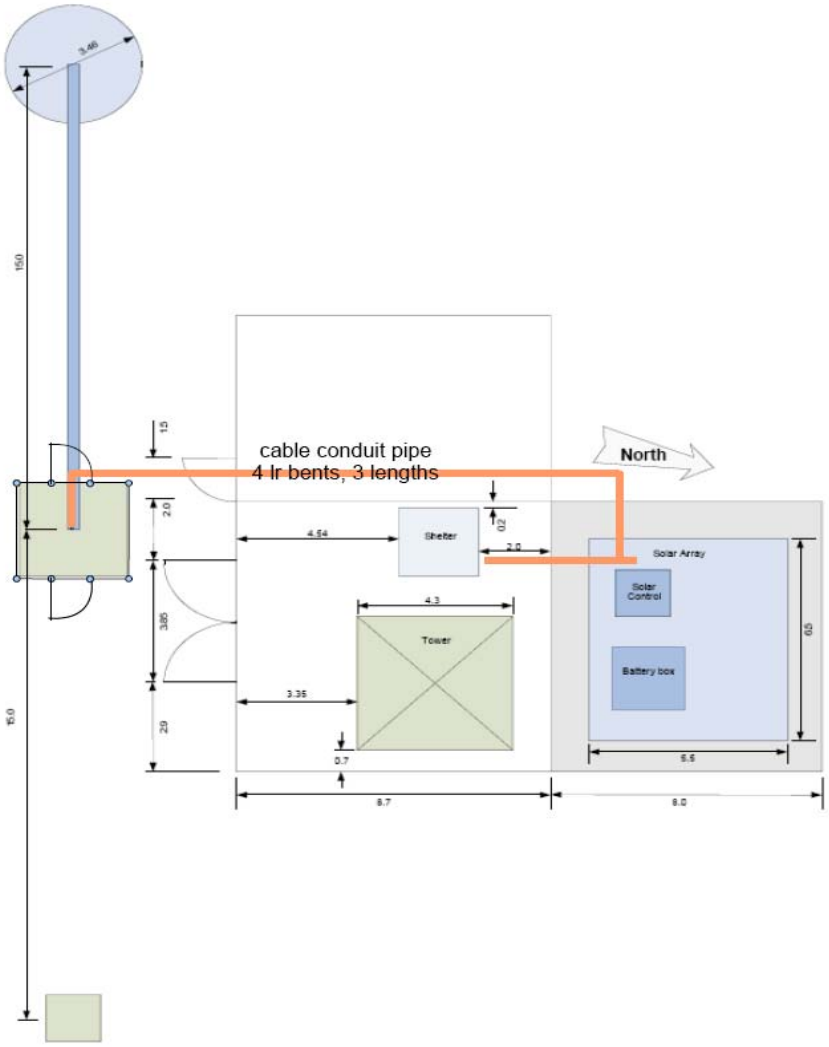
Renewable Power Planning
Detailed Design

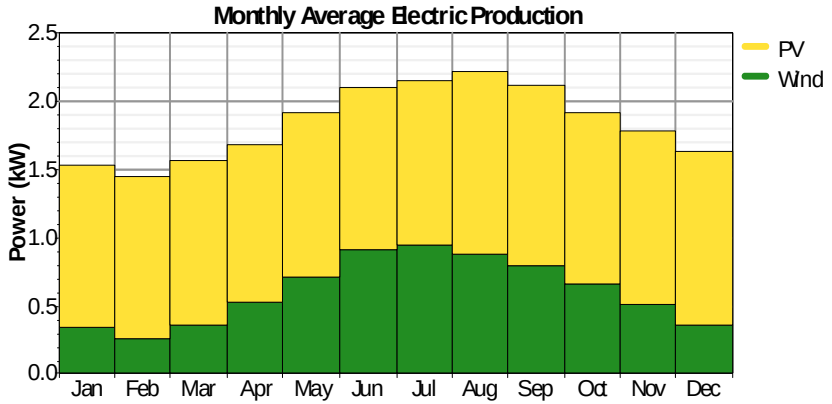
The purpose of this stage is to produce detailed installation plans including final renewable dimensioning and equipment positioning

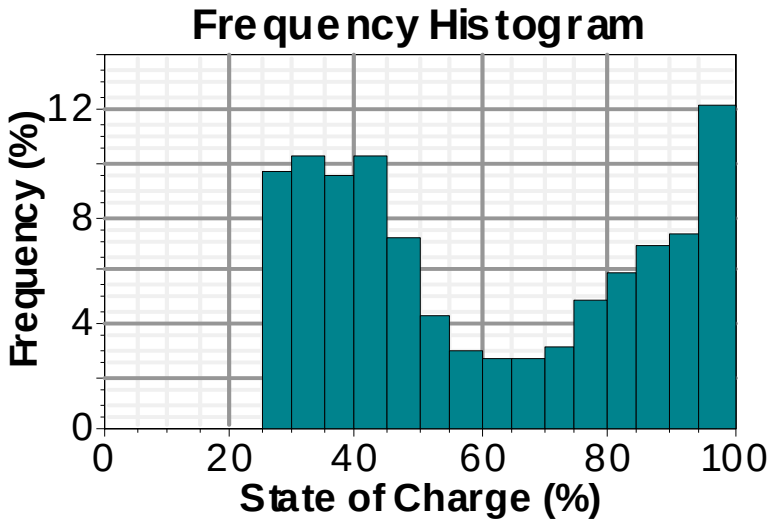


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Renewable Power Planning
Detailed Design







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Renewable Power Deployment

- Solar Arrays
- Wind Turbines
- Diesel Generators
- Batteries
- Power Controllers
- Base Stations
  - BTS
  - Transmission
- Remote Monitoring









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Renewable Power Deployment



Wind turbine

Turbine Controller



PV Array

PV Controller



Optional Backup Generator

Genset Controller



Batteries

Power



Outdoor BTS



OMC

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Renewable Power Deployment



Wind turbine

Local Maintenance Terminal



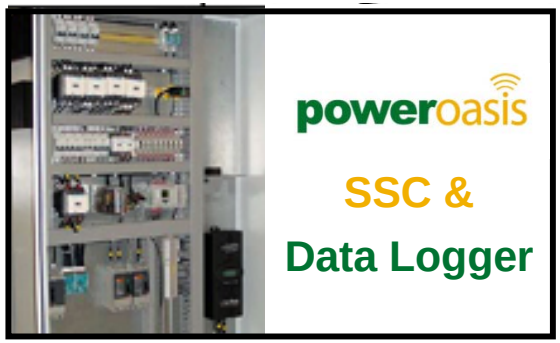
GPRS Interface



Remote Maintenance, data collection and analysis terminal



PV Array



Mgt Interface

Load Control

Power



Outdoor BTS



Optional Backup Generator



Batteries

OMC

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Renewable Power Deployment





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Renewable Power Deployment









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Thank You

Alternative Power Solutions for Telecoms Networks



ivan.harris@power-oasis.com +44 (0)7525 190 139

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