

Variable Speed Diesel

Market Assessment



Professor Chem Nayar
Dr James Hamilton

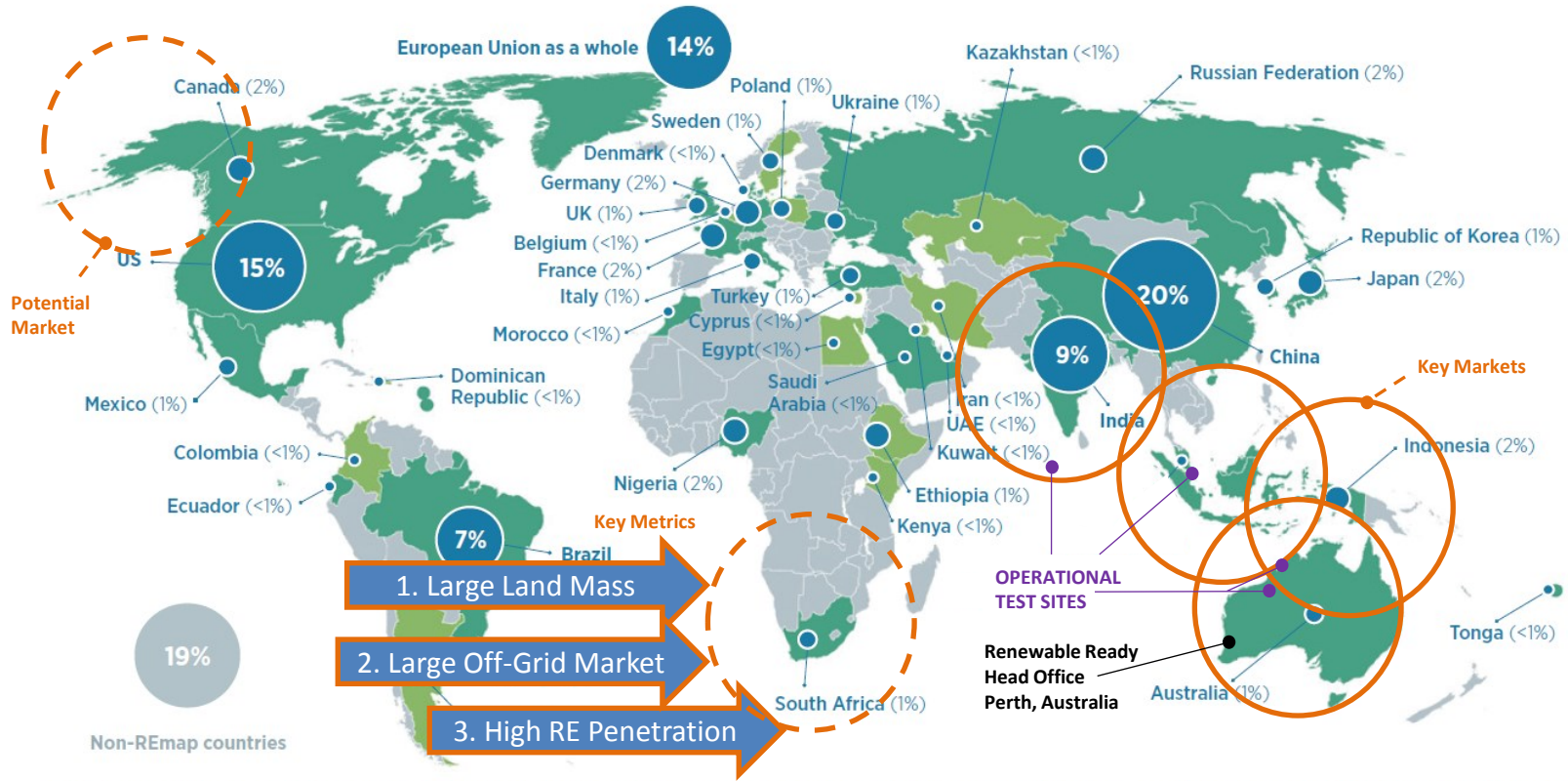
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1. Global
2. Australia
3. India
4. Indonesia
5. Papua New Guinea
6. South Africa
7. Brazil

Off-Grid Diesel Market Size

- Global market for off-grid hybrid diesel application exceeds 100GW (IRENA, 2017)
\$50B in asset sales across off-grid diesel markets.
- Renewable capacity within the off-grid sector is the fastest growing generation category, representing over 4GW in 2016 (IRENA, 2017).
- Total annualised market for diesel generators greater than 0.5MW is 27,879 units, of which Asia represents ~12%. (Diesel & Gas 40th power generation order survey, 2016)
- A variable speed diesel technology offers this market a step change in both efficiency and performance

Map of Global RE Activity



Note: Percentages indicate how much renewable energy each country consumes in 2030 if a doubling of the renewable energy share is achieved. Based on IRENA estimates.

Australian Market

- Pioneered both low load and variable speed technologies.
- 1,458 – 4,374MW of utility scale diesel capacity serving off-grid applications (BREE, 2013)
- 705MW of installed capacity across WA (BREE, 2013)
- 327MW of installed capacity across NT (BREE, 2013)
- 146MW of installed capacity across QLD (BREE, 2013)
- 254MW of installed capacity across SA, representing 361 generators (Department of Manufacturing, Innovation, Trade, Resources and Energy, 2013)

Indian Market

- India's urban population will grow from 435m to 600m by 2030, doubling electrical load.
- 20% of the population has limited or no electricity (IEA, 2017).
- 90GW of diesel generation is installed across India, representing 30% of all installed capacity. (CEA/CREC 2016).
- Growth rates are at 10% exceeding solar uptake (CEA/CREC 2016).
- 20% of India's load is water pumping (200TWh), with 30 million diesel pumps and tube wells in service (IRENA, 2017).
- 740,000 telecom towers each draw 3-5kW's consume 5.12B litres of diesel annually (IRENA, 2017).

Indonesian Market

- PLN's 1000 island program seeks to electrify 1000 islands by 2020, adding 620MW of solar PV to leverage existing diesel assets (PT PLN, 2013).
- Consumption to triple by 2030 (IRENA, 2017)
- Over 9GW of diesel generation is installed across Java, Sumatra, Kalimantan, Sulawesi & Nusa Tenggara and Maluku & Papua (IRENA, 2017)
- In addition over 30,000 diesel generators are in operation off-grid, representing approximately 1GW of generation. (IRENA, 2017)
- 137% growth in demand out to 2025 (IRENA, REMap 2017)

Papua New Guinean Market

- Inclusive of over 600 islands, 88% of the 7.4m inhabitants live in rural areas (ADB, 2014).
- Less than 10% electrification rates (ADB,2014).
- Diesel currently supplies around 37% of the 582MW installed networked capacity (IRENA, 2013).

South African Market

- South Africa serves as a spring board into Sub-Saharan Africa
- 3155 generator sets off-grid across sub-Sahara Africa, principally in Nigeria, Sudan and South Africa. (IRENA/IEA, 2016)
- Average unit sizing is 6.5MW contributing to 20GW of capacity. (Platts 2016)

Alaskan Market

- 94% of all off-grid generation is diesel (AEA, 2013)
- Over 1GW of diesel capacity installed off-grid (AEA, 2010)
- 622 generators identified within 181 remote communities (ACEP/UAF, 2013)
- Average generator size 200-300kW (ACEP/UAF, 2013)

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Questions

Please contact:

james.hamilton@renewableready.com

