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Harvesting Best Practices: A Comparison of Kenyan and Turkish Geothermal Project Aspects



Presented by: Mike Long



Outline

Introduction to Successes

Technical Features by Country

Project Structure Options

Summary

Our Perspectives

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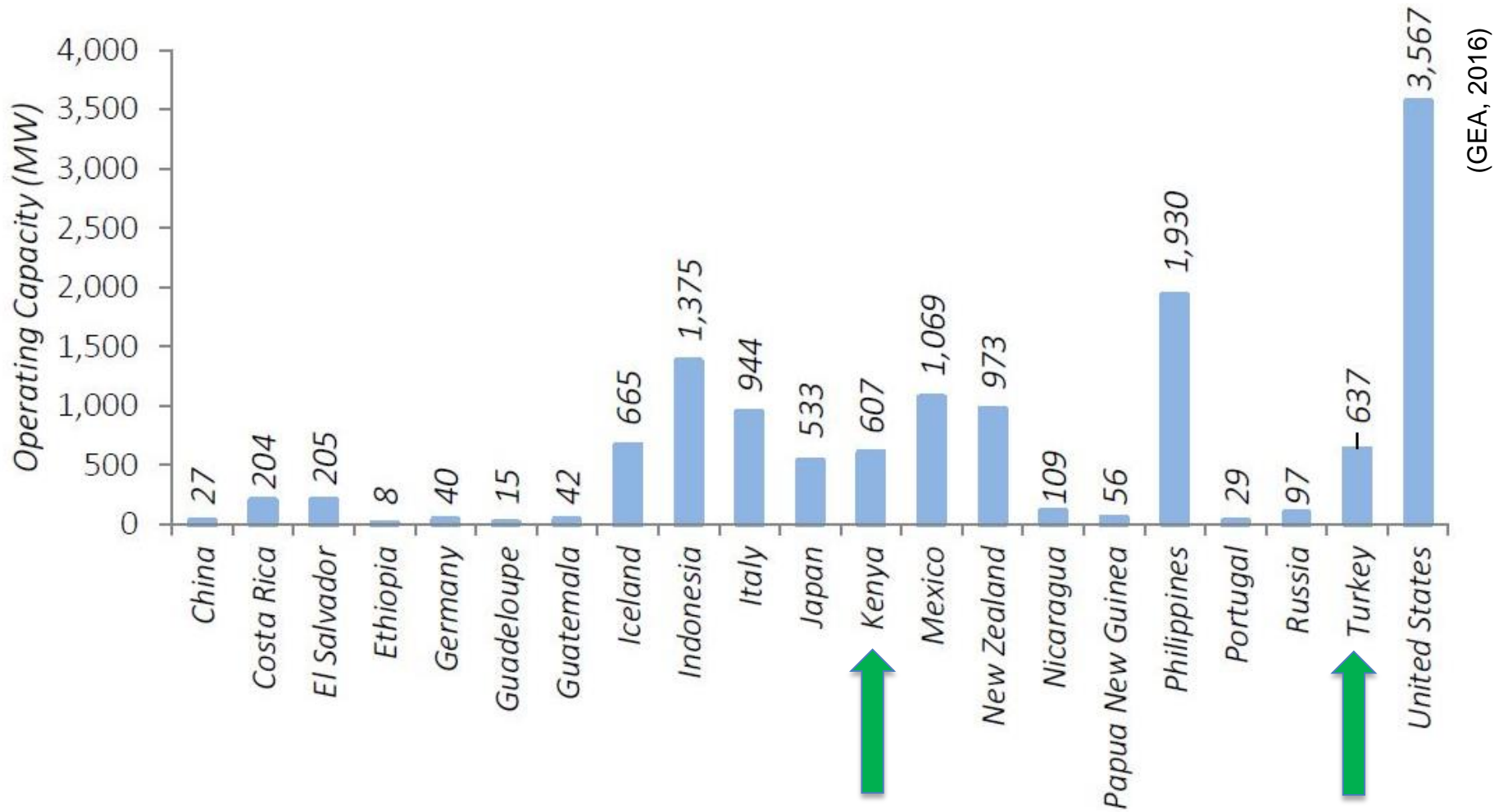
Ural Halaçoğlu

Project Engineer
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Owner: Contractor, Operator

What's Booming and Where



Kenya – Plant Technical Features

MEGAPLANTS

- High enthalpy
- Large size



Olkaria IV 2 x 70 MW single flash plant
(Toshiba, 2015)

WELLHEAD UNITS

- Shorter time to market
- Small and more easily relocated



Wellhead unit at Olkaria
during ArGeo 2012 tour

Turkey – Plant Technical Features

BINARY

- Moderate enthalpy
- Fast deployment



Efeler-2, 22.5 MW binary plant
(Guris, 2016)

COMBINED CYCLES

- Fine tuned to meet resource
 - Large size



80 MW Kizildere-2, water-cooled
combined cycle

Project Structure Options

Feature	Kenya	Turkey
Plant and Steamfield Management	May be separate (e.g. GDC/developers)	Unified under a single operator
National Incentives	FIT – \$88/MWh, with goal of <\$80/MWh	FIT - \$105/MWh, with national manufacturing incentives
Owners/Developers	Parastatals or specialty development groups	Diverse portfolio industrial companies (usually with strong access to financing)
Contracting Strategies	Engineer-Procure-Construct (EPC)	Design-Bid-Build (D/B/B)

Development Challenges - Kenya

Feature	Challenge	Opportunity
Project Financing	GoK – multinational development banks are primary new project funding source	MOE/KenGen/GDC shift to PPP model
Financial Viability	\$88 FIT may not meet IPP financial hurdle rates	Risk mitigation programs, increased tariff
Project Risk Guarantees	GoK provision of sovereign guarantees	Alternative PRGs provided by international finance groups

Development Challenges - Turkey

Feature	Challenge	Opportunity
Project Financing	Turkish based banks providing primary funding source	Additional multinational and DFI funding to increase capacity
Project Sizing	Numerous developers with small concessions limiting project size	Consolidation of concessions to allow greater economies of size
Unique resource conditions	Trend to lower enthalpy, high gas content resources	Options for gas capture and injection, alternative power cycles

Conclusion: Trends and Opportunities

Feature	Kenya	Turkey
Past Development Driven By	Primarily KenGen/Olkaria projects, financed by international development finance institutions	FIT plus strong access to financing by private industrial groups
Looking Forward	<p>More diverse cycle types</p> <p>Attracting large capacity developers with bandwidth to overcome development challenges</p> <p>More wellhead generation, with 'hopping' to prove fields earlier</p> <p>How can in-country industries support growth?</p>	<p>Consolidation of small operators</p> <p>Cogeneration opportunities</p> <p>Creative solutions to gas handling</p> <p>Contractors willing to offer EPC</p>

Thank you for your attention!

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