

ATTY. FERNANDO S. PENARROYO

ENHANCING THE REGULATORY FRAMEWORK
FOR NON-CONVENTIONAL GEOTHERMAL
RESOURCES

NATIONAL GEOTHERMAL ASSOCIATION OF THE PHILIPPINES

FIRST PHILIPPINE ANNUAL GEOTHERMAL CONFERENCE
02 OCTOBER 2019



CONTENTS

- Background
- Mitigation and Risk Strategies
- Early-stage Fiscal Incentives
- Alternative Support Strategies
- Diversity in the Electricity System
- Conclusion

MALAMPAYA GAS-TO-POWER PROJECT DEPLETION

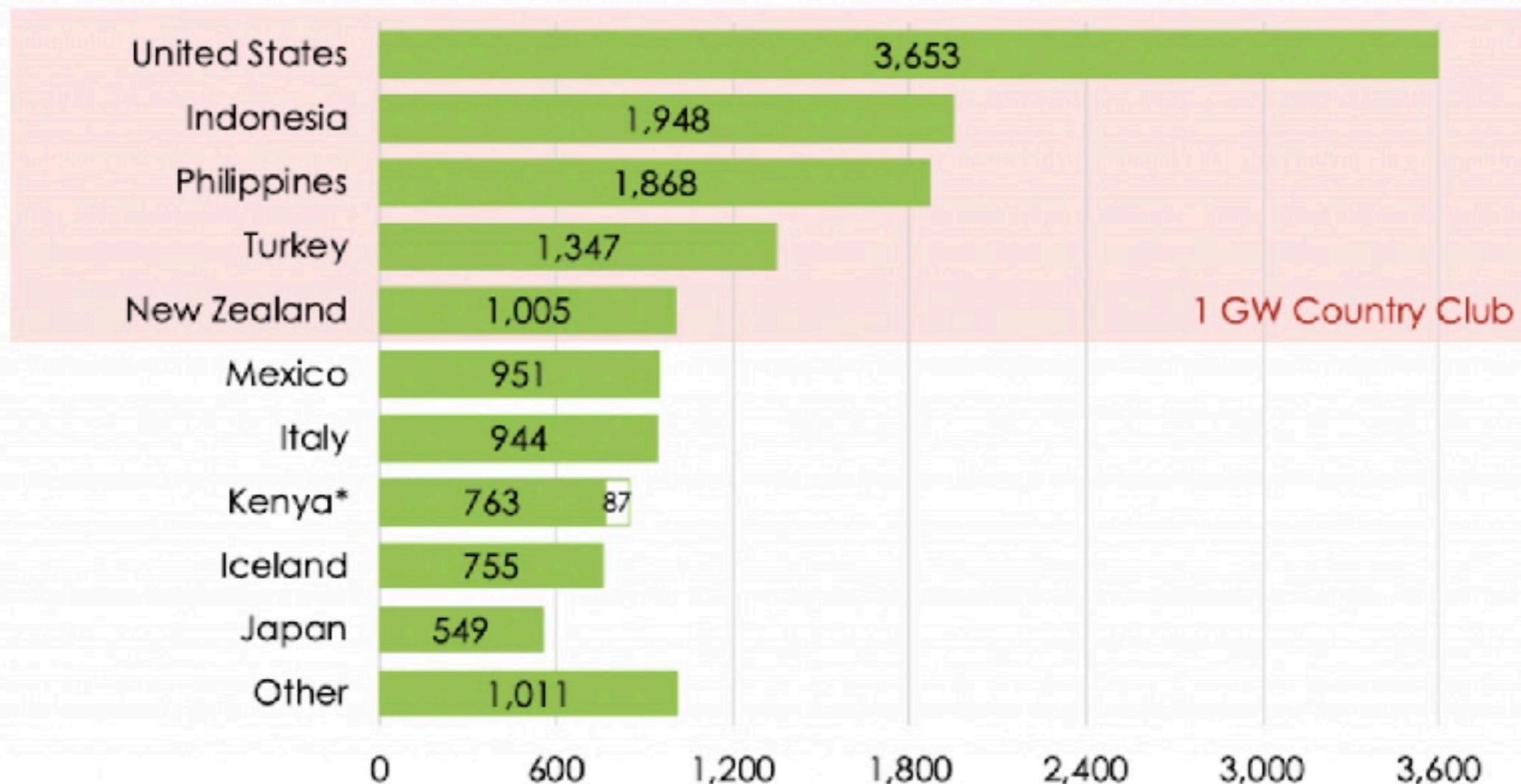
- Employs deepwater technology to draw natural gas that fuels three gas-fired power plants and provides 30% of Luzon's power generation requirements
- Delivers through 6 Gas Sales and Purchase Agreements and fuels 2,700 MW of power stations (baseload plants) and 500+ MW (mid-merit and peaking plants)
- Data from the DOE indicated that given the present production level and continuous decrease in reservoir pressure, drop in supply is expected by 2022.
- SC 38 will expire in 2024 with no certainty in an extension and while it may have enough gas, this may not be sufficient to last beyond five years.
- **Geothermal energy is a viable alternative.**



TOP TEN GEOTHERMAL COUNTRIES

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INSTALLED CAPACITY - MW (JULY 2019) – 14,900 MW IN TOTAL

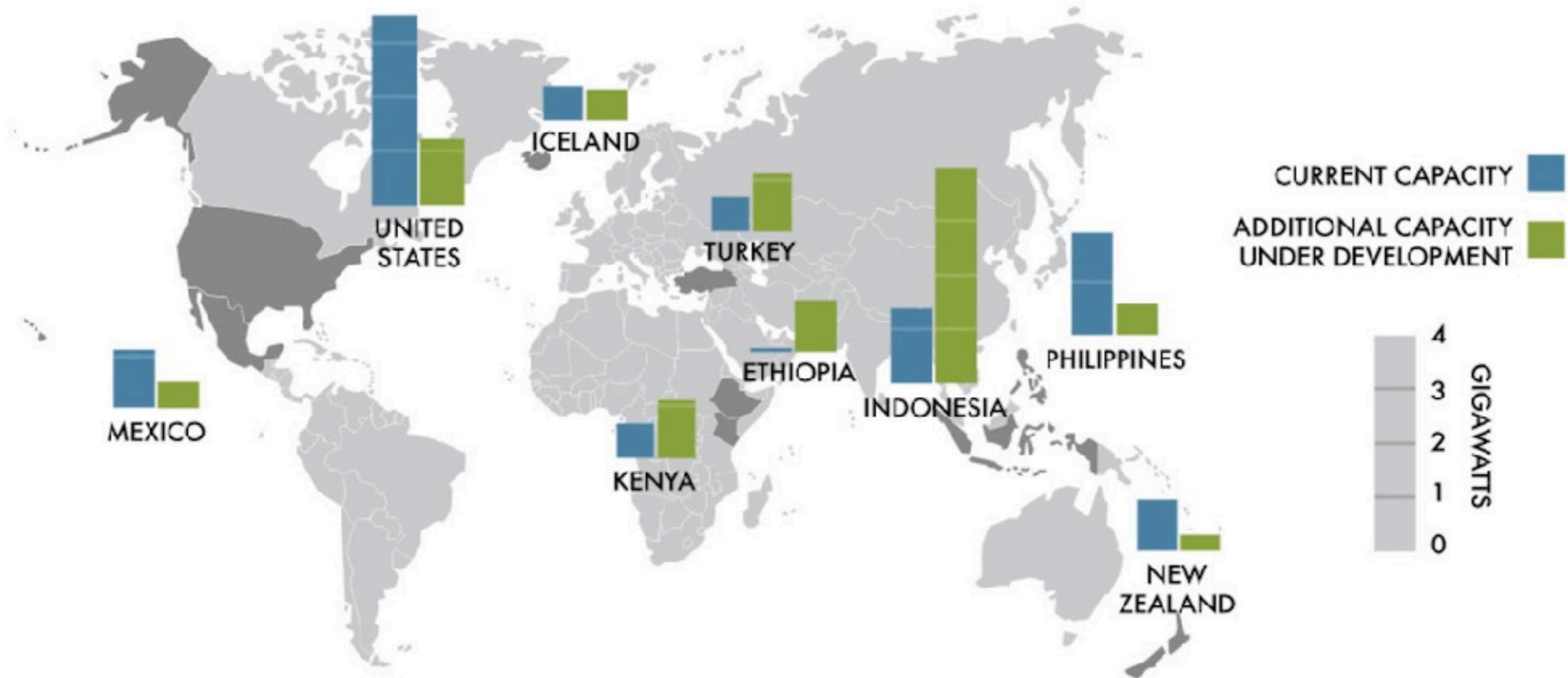


* Kenya – Olkaria V Unit 1 online, Unit 2 in commissioning - Source: TGE Research (2019), GEA (2016), IGA (2015)

Global Geothermal Power Generation Capacity - 29 July 2019 (source: ThinkGeoEnergy)

BOOSTING GEOTHERMAL AROUND THE WORLD

Many nations are in the process of ramping up their geothermal electricity generation, so much so that the Geothermal Energy Association has forecast that global geothermal electricity capacity could reach about 18.4 gigawatts by 2021 and 32 GW by the early 2030s, from 13.3 GW in 2015.



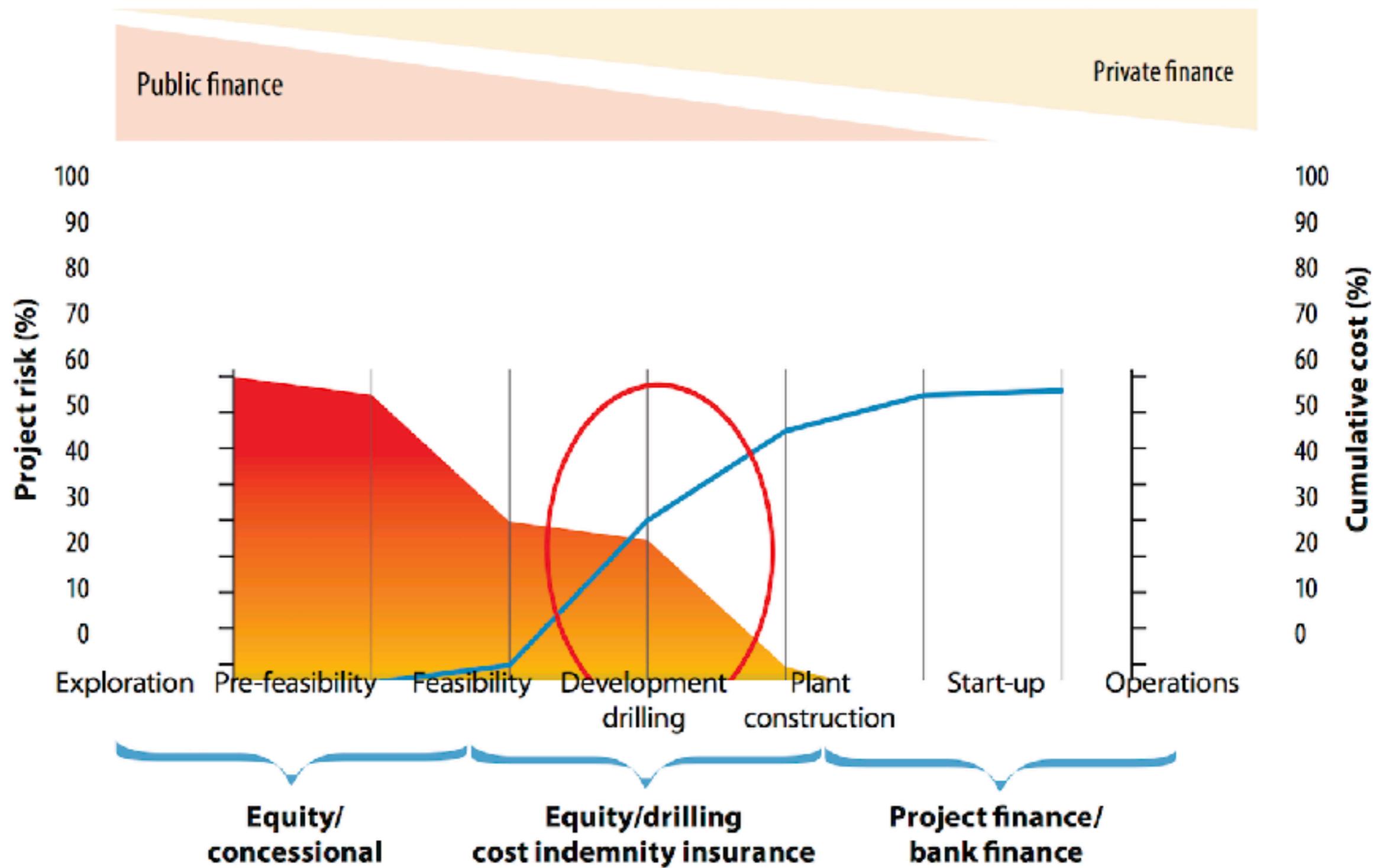
Source: 2016 Annual U.S. & Global Geothermal Power Production Report, Geothermal Energy Association

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LICENSE TO OPERATE A STEAM FIELD

- Technical and financial qualifications to engage in geothermal operations in the Philippines;
- The area being applied for is open and available for geothermal activities and is not located within any of the areas where it is prohibited;
- An approved ECC, showing that the impacts of in the area can be mitigated and/or remediated through proper environmental protection measures;
- An approved Declaration of Commerciality, showing that the field can be operated profitably, and can give government a fair share in revenues.
- The endorsement/approval of the local government units (Province, Municipality/City, and Barangays) that will be impacted by the proposed activity;
- The consent of the indigenous peoples, if the area being applied for is within their ancestral domains; and
- Requirements for power plant operation - GIS, Approved PPSA, Certificate of Compliance as a Generation Company



Source: Parhelion and GeothermEx (2014) and ESMAP (2012), unpublished)

MITIGATION AND RISK STRATEGIES

- **National Geothermal Database** - serves as a central depository for geothermal resource data available to the public on a centralized web application to encourage both investors and developers to access information
- **Geothermal Resource Classification System** - addresses the probability of risk based on a standardized set of geothermal resource criteria and attributes
- **Structured Co-Funded Exploration Drilling Program** - undertaken in two ways: (i) government-led exploration and resource confirmation is conducted before the development rights are transferred to the private sector to complete, and (ii) the private sector is responsible for developing all stages of a geothermal project, but the government shares the cost of the high risk exploration stage

MITIGATION AND RISK STRATEGIES

- **Structured Loan Guarantee Program Supporting Early Investment** - loan guarantee program be directed at an entity, Investment Aggregator, or a group of entities, that would make direct equity investments and loans to geothermal projects in the identification, exploration, or delineation drilling phases of development
- **Geothermal Resource Risk Insurance** - seeks to pool exploration risks across a portfolio of development projects by insuring the productivity of a well prior to drilling, where some or all of the losses would be covered if certain pre-specified goals are not achieved. Two types of insurance may apply: a post-damage guarantee or a guaranteed loan. Limited application for two main reasons:
 - (1) globally, geothermal development is a small sector, and insurance companies have, to date, been unable to amass an appropriate scale for such coverage to be efficient; and
 - (2) given the significant uncertainty during the exploration stage, the premiums are typically high.

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EARLY-STAGE FISCAL INCENTIVES

Not risk mitigation mechanisms, but reduce the up-front cost of geothermal exploration and lower the financial exposure developers would face during exploration drilling.

- **Investment Tax Credit** approach is available in the US and provides a tax credit of 10 to 30% of the capital investment costs in a project.
- **Production Tax Credits** -single most important program supporting renewable generation in the US, which pays 1.5 cents/kWh for electricity produced and sold
- **Carbon Limitations** - either by pricing carbon emissions into the cost of electricity or through the production of carbon offsets via emission-free electric generation



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ALTERNATIVE SUPPORT STRATEGIES

- **Renewable portfolio standards**, which include a mandated target percentage of renewable power in the energy portfolio of a country or utility company
- **Feed-in tariff**, which sets the minimum prices for renewable energy and mandates off take
- **Loan guarantees** for geothermal projects
- **Development of associated infrastructure** (roads and transmission lines) is another way to facilitate geothermal development, particularly in remote areas



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DIVERSITY IN THE ELECTRICITY SYSTEM

- **Removing the Automatic Pass (ERC)** - removing the ability for generators to automatically pass-through fuel and foreign exchange fluctuations would help level the playing field among differing energy resources.
- **Issuing Stranded Asset Risk Warnings** across the financial value chain (BSP and SEC) - “carve-out clause” can reduce the amount of power a utility must buy from a generator and exempt DUs from the consequences of coal plant overbuilding and high coal costs.
- **Overhauling procurement practices** by introducing least-cost mechanism auctions (DUs and ERC) - enforcement of a competitive selection process with transparent bidding would put an end to self-negotiated generation rates and a significant step toward open competition for the procurement of the lowest-cost option for power capacity.

CONCLUSION

- Resource risk and high upfront investment costs are major barriers to geothermal development.
- To mobilize risk capital during the uncertain early stages of geothermal development, governments must take action to reduce the risks to developers and/or otherwise incentivize developers to invest in geothermal exploration.
- In some cases, public intervention is needed to absorb some of the resource risk.
- It is important that any specific risk mitigation instrument is applied in coordination with other incentives that enhance the overall investment climate for geothermal development.

ACKNOWLEDGMENTS AND REFERENCES

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ABOUT THE SPEAKER

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