ESMAP
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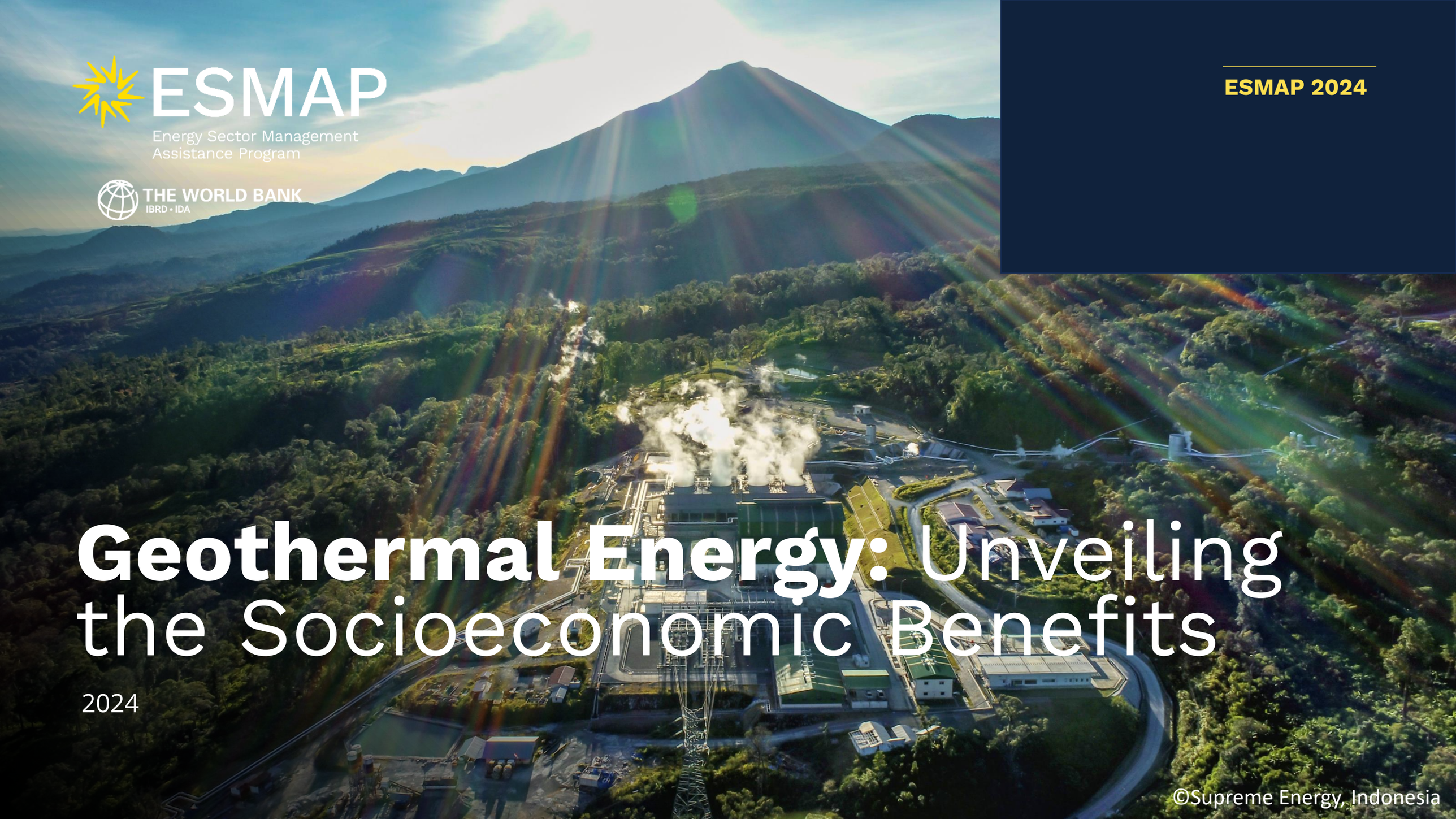
ESMAP 2024

Geothermal Energy: Unveiling the Socioeconomic Benefits

2024



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About the Report

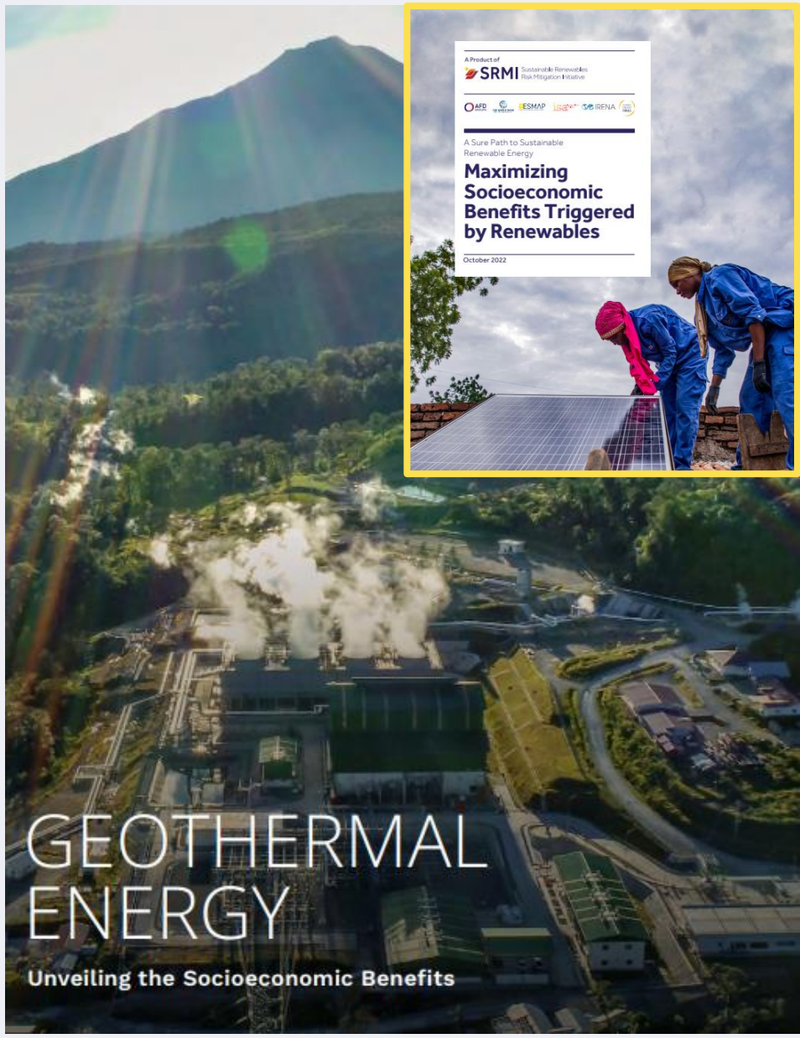
- Designed to complement the handbook “A Sure Path to Sustainable Renewable Energy: Maximizing Socioeconomic Benefits Triggered by Renewables.”
- Focuses on socioeconomic benefits that can be influenced during geothermal project planning, development and operation.
- These benefits extend beyond the risk mitigation requirements of environmental and social safeguard frameworks.

50+

Stakeholders consulted

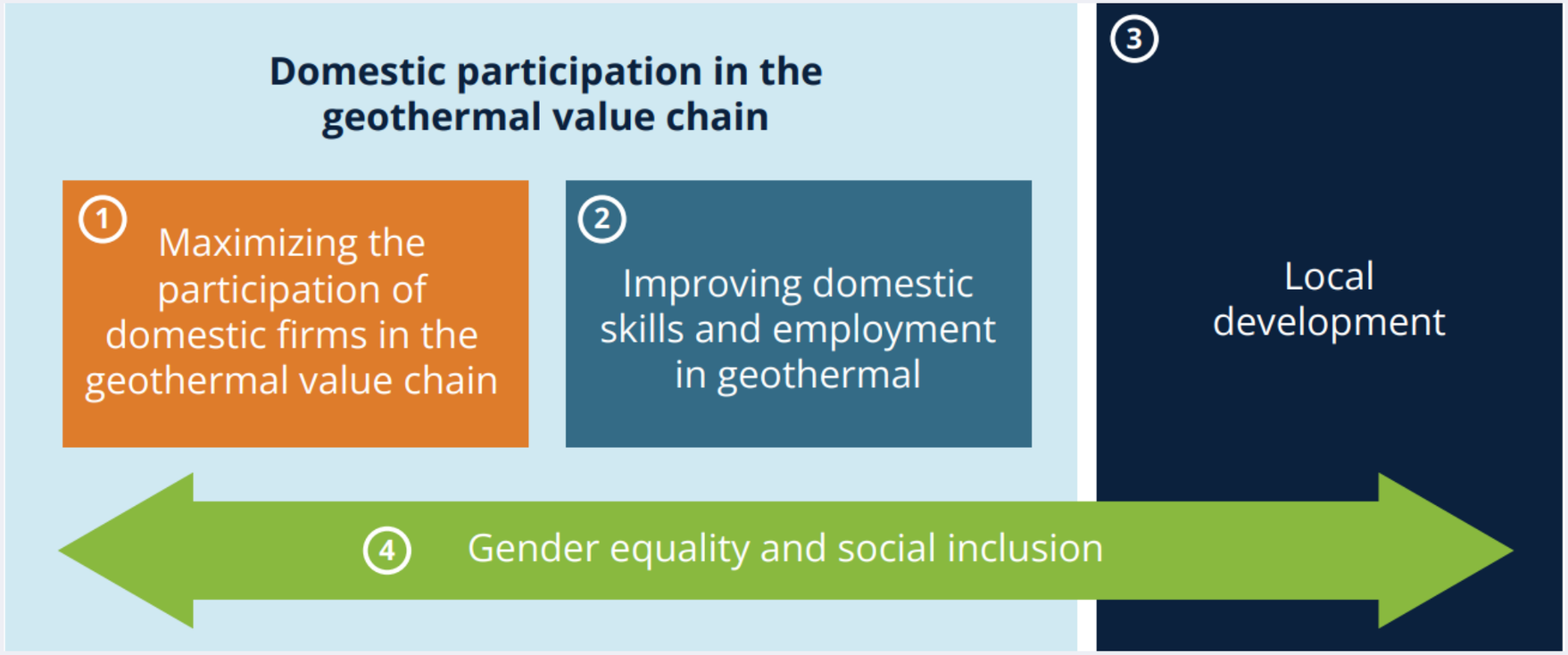
27

Case studies showcasing best practices



Types of Socioeconomic Benefits

- The report examines benefits across four categories, derived from the World Bank's Sustainable Renewables Risk Mitigation Initiative.



Domestic Participation in the Geothermal Value Chain

- Understanding the geothermal value chain is crucial for identifying areas to maximize benefits to the project country.
- Localization efforts, particularly in construction and operation and maintenance segments, offer substantial room for growth.
- Governments are using project procurement to encourage localization along the geothermal value chain, however careful consideration is needed.
- Many strategies exist to create a more enabling environment for the growth of domestic businesses, from the development of specialized financing programs to the creation of industry associations.

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Domestic Participation in the Geothermal Value Chain

VALUE CHAIN SEGMENT	SUBSEGMENT
Planning and legislation	Resource mapping
	Geothermal planning
	Stakeholder consultation
	Policy and regulation development
Enabling infrastructure investments	Preliminary Environmental and Social Impact Assessment (ESIA) for exploration and permitting
	Infrastructure development
	Power contracting
	Exploration drilling
Feasibility and financing	Environmental and Social Impact Assessment for the project
	Community engagement
	Test drilling
	Financial modeling and feasibility
Project design and procurement	Plant and steam field design
	Well drilling
	Procurement of material and equipment inputs
Construction and commissioning	Power plant construction
	Steam field development
	Transmission line installation
Operation and maintenance	Equipment repair, minor and major overhauls, makeup wells and training*
Decommissioning	Disassembly of equipment and facilities, reconstruction on land

GOVERNMENT STRATEGY	DESCRIPTION
Request developers to produce a plan for how they will work with domestic companies	Requesting such a plan can ensure that developers have investigated areas along the geothermal value chain where domestic companies can participate. It will increase the likelihood that a developer has identified potential firms that can provide the required goods and services and is set to engage these companies.
Require that one project partner must be a domestic company	Requiring international developers and/or engineering, procurement, and construction companies to partner with domestic developers can help to build up domestic knowledge in project development. It can also help domestic developers and contractors establish a track record. The domestic partner can be a sleeping partner, or a financial or technical partner.
Incentivize developers to direct a percentage of total procurement spending to domestic companies	Governments may set incentives for developers that can commit to procuring a certain percentage of goods and services from a project country (see box 2.4). These targets may then become contractual obligations, for example, in the power purchase agreement. Such incentives may be set to encourage procurement from companies owned/led by women and socially disadvantaged groups.

Spotlight: Iceland

- Organizations that connect institutions, researchers, and enterprises may support industrial development and help companies become more competitive by stimulating technology transfer.
- Iceland’s Renewable Energy Cluster brings members from across the country, including educational and research organizations, energy companies, engineering and consultancy companies, and start-ups, to create a platform supporting entrepreneurship and the export of geothermal knowledge and technology.

Spotlight: Turkey

- Geothermal heated greenhouses have expanded by 400 percent since 2002.
- The Turkish Ministry of Agriculture and Forestry encourages investment in geothermal greenhouses and offers incentives, while financial institutions provide low-interest loans with flexible terms.
- Government support has led to significant socioeconomic benefits, with projects like a 71.7-hectare greenhouse in Aydin producing 20,000 tons of tomatoes annually and employing 750 people.

Geothermal Skills and Jobs

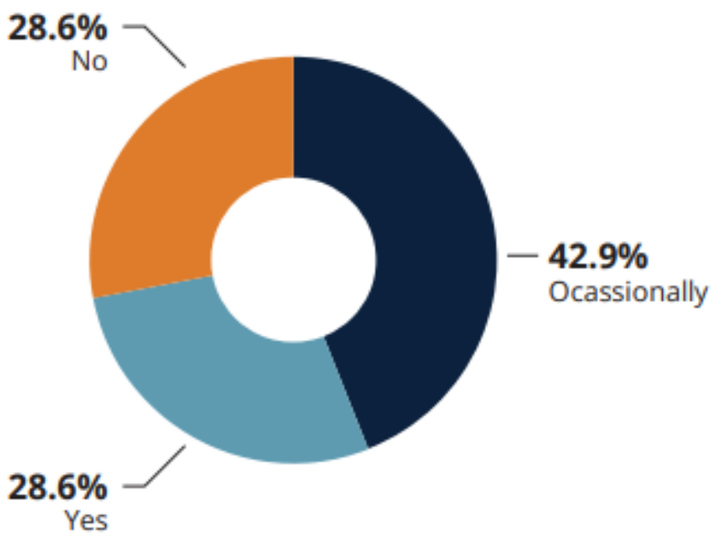
- Construction and O&M offer significant job creation potential, with construction roles being short term and O&M generating employment over the project cycle.
- Direct use projects provide quality employment opportunities, particularly for women, youth, and marginalized groups.
- Skill shortages are prevalent, especially in high-skilled positions, limiting the potential benefits to project countries. Response is needed across all tiers of educations – from apprenticeships, to technical and vocational training, and higher education (university level).

196,000

Geothermal jobs in 2021

296,000

Geothermal jobs in 2030



Share of surveyed developers that find it difficult to recruit highly skilled talent in project countries (%).

Spotlight: United States

- The US Department of Energy’s Geothermal Office hosts the Geothermal Collegiate Competition annually, engaging students nationwide in addressing real-world challenges.
- The 2022 winning team from the University of Oklahoma received $10,000 for designing a system to repurpose six abandoned oil and gas wells, providing geothermal energy for over 730,000 square feet of buildings.
- Team members, initially enrolled in the university's oil and gas program, have shifted focus to geothermal studies, inspired by their competition experience.

Spotlight: Indonesia

- Supreme Energy employs 187 staff, with 117 working at their two geothermal plants (170 MW total).
- The company devised a strategy to grow talent in-house rather than sourcing talent from abroad by:
  - Hiring new graduates and providing professional development opportunities
  - Recruiting experienced staff from the oil and gas sector and providing specialized geothermal knowledge through training and job shadowing.
  - Hiring from local communities and offering a combination of in-class and on-the-job learning, leading to roles such as power plant operator, technician, field chemist, and well testing officer.

© Supreme Energy, Indonesia

Local Development & Benefit Sharing

- Equitable benefit distribution is vital for successful community collaboration and obtaining a ‘social license to operate.’
- Benefit sharing can broadly be grouped into three categories:
  - Infrastructure and service enhancement;
  - Community skill and capability enhancement; and
  - Revenue and/or ownership sharing arrangements.
- Legal frameworks in some jurisdictions mandate localized benefit distribution through mechanisms like royalties and production bonuses.
- Including benefit sharing considerations in procurement documents can align developers' actions with community expectations and government plans.

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Spotlight: New Zealand

- The Māori business entity Tauhara North No. 2 Trust has a 35 percent equity stake in the Nga Awa Purua Power Station (140 MW) and a 50 percent equity stake in the Ngatamariki (84 MW) and Rotokawa (34.5 MW) developments in New Zealand.
- Revenue from these commercial operations, estimated at $NZ 6 million per year, is directed to grants, scholarships, and programs to support Māori people.

© Tauhara North No. 2 Trust

Spotlight: Philippines

- EDC shifted its CSR philosophy from philanthropy to transformation. This involved focusing on environmental protection, education, and social enterprise development, empowering communities for long-term sustainability.
- One initiative is EDC's environmental conservation program, which has planted over 6 million trees and restored 10,000 hectares of land. Beyond environmental benefits, this program has spurred social entrepreneurship, with community members leading initiatives like tree seedling sales and forest-friendly coffee production. EDC supports community organizations with business training, permits, and initial capital, promoting self-sufficiency and resilience.

© EDC, Philippines

Gender Equality & Social Inclusion

- Women and marginalized groups face unique challenges to realize the socioeconomic benefits along the geothermal value chain:
  - Greater barriers to the development of businesses
  - Underrepresented in the geothermal workforce
  - At the community level, cultural barriers and social norms often stand in the way of meaningful consultation and equitable delivery of benefits.
- These issues require attention and tailored responses. Progressive policies, support programs, and targets for increased participation have proven effective.

© LaGEO, El Salvador

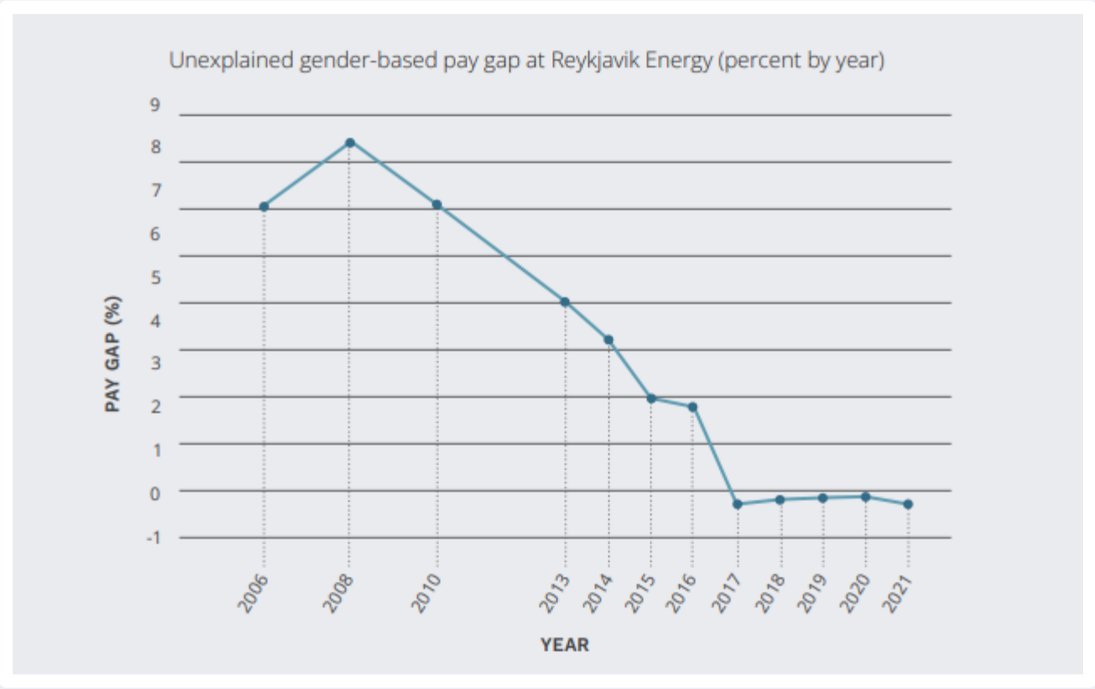
Spotlight: Kenya

- Kenya's Constitution aspires to improve gender equality and social inclusion, mandating that:
  - Women must hold 30 percent of roles in public committees and decision-making bodies
  - 30 percent of the government's procurement budget is dedicated to SMEs run by women, youth, and people with disabilities
- This regulation applies to the geothermal entities owned by the Government of Kenya, including the Geothermal Development Company, as well as the majority state-owned power utility KenGen.

© KenGen, Kenya

Spotlight: Iceland

- In 2008, Reykjavik Energy documented a gender pay gap of 8.4 percent, meaning that women were earning only 91.6 percent of what their male counterparts were earning.
- In 2017, Reykjavik Energy worked with researchers to design a model that allows pay to be calculated without gender bias.
- The company has statistically eliminated its gender pay gap ever since it adopted the model for use.



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THANK YOU

Stephanie Pinnington
spinnington@worldbank.org