



Mud Volcanoes & Geothermal Fluids in Makran Coastal Area, Baluchistan Province, Pakistan

Source: Energy Foundation of Pakistan



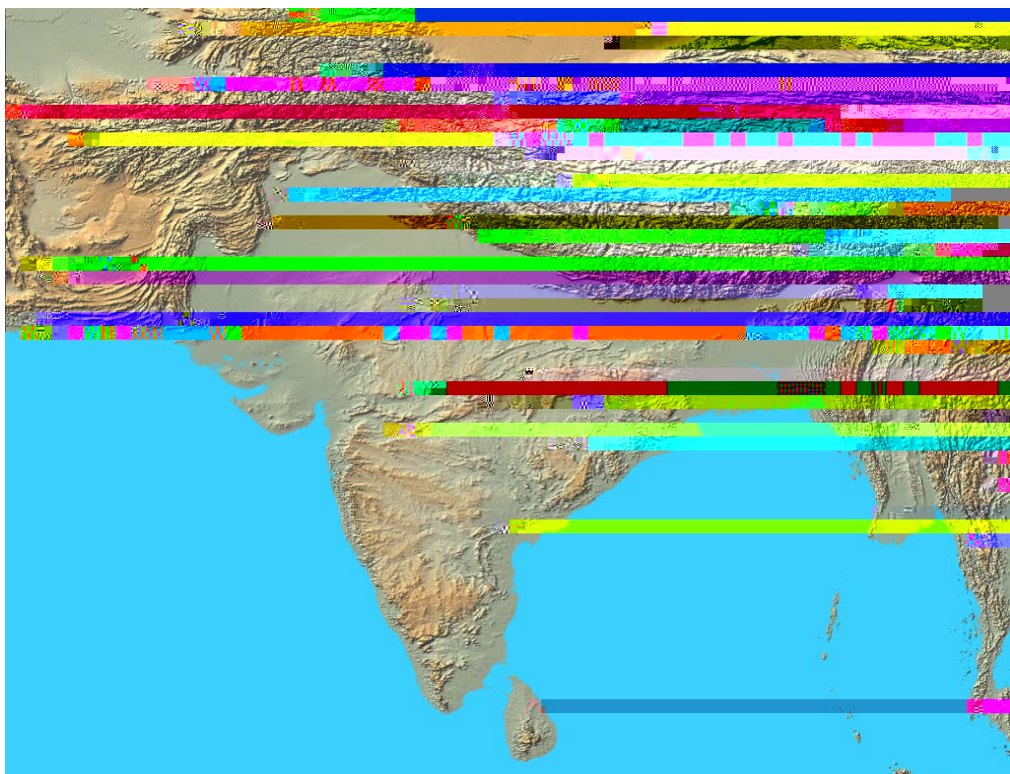
USAID and Pakistan Energy

- **Since 2009, the US Government Has Committed Close to \$1 Billion to Support Pakistan's Electricity Sector:**
 - Pakistan has been a key strategic partner to US efforts in South Asia
- **USAID Assistance Has Focused on:**
 - Reducing losses and improving collections, profitability, and performance of Pakistan's nine distribution companies
 - Funding strategic transmission lines connecting \$1.2 billion, 680MW of private wind projects to the grid
 - Improving energy sector policy and regulatory governance
 - Constructing and/or retrofitting select thermal and hydro-electric plants
- **USAID Support Has:**
 - Added about 2,800 megawatts (MW) to the Pakistan national grid
 - Increased distribution company revenues by \$460 million
 - Improved electricity service to over 38 million Pakistanis
 - Supported construction/ negotiation of Pakistan's 1st \$ LNG imports

Direction of Future USAID Energy Assistance to Pakistan

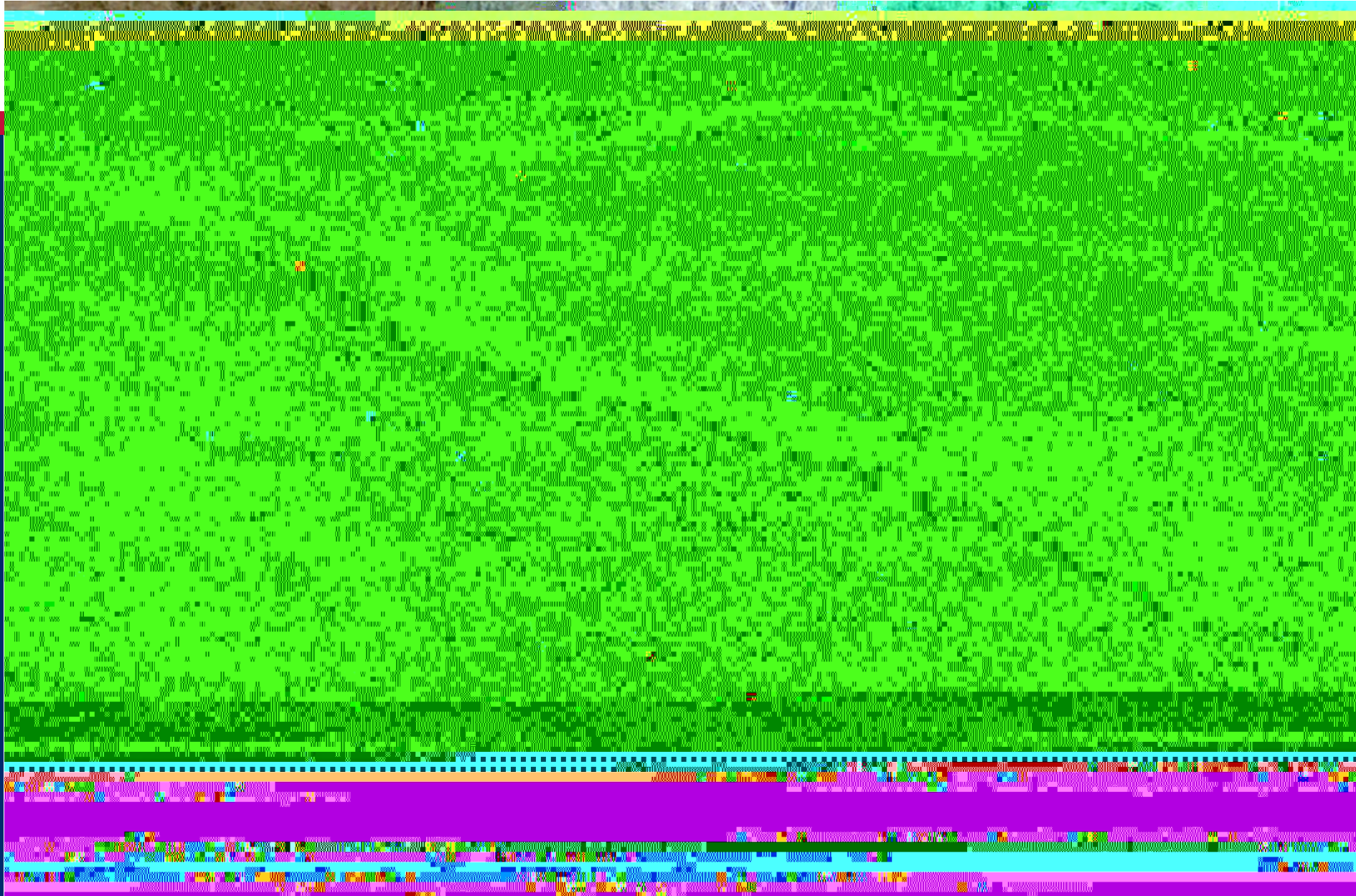
**Going Forward, We Plan to Focus More Heavily on Increasing/
Accelerating Private Investment in Clean Energy by:**

- **Strengthening Government of Pakistan (GoP) governance, policy, and investment enabling environment**
- **Providing Technical and Capacity Building Assistance to GoP agencies/ sub-units responsible for negotiating/ closing private sector deals**
- **Providing Select Government Grants to Leverage Private Projects**
 - o E.g. NTDC upgrades of transmission lines connecting wind, hydro, and solar generation to the national grid
- **Strengthening Distribution and Transmission Systems**
- **Supporting Grid and Off-Grid Private Business Opportunities**





Co-Location of Pakistan Industry and O&G Wells



3

Site	Depth	Temperature C°	Temperature F°	Well Status
1	3877	151	304	P/A
2	3651	158	316	P/A
3	3598	153	307	P/A
4	3350	161	321	P/A
5	3420	151	303	

Site	Depth (m)	Temperature C°	Temperature F°	Well Status
1	5730	160	320	
2	5840	139	282	P/A
3	4814	125	257	P/A
4	4223	119	246	P/A
5	3711	99	202	Hot Water Flowing
6	4940	136	277	P/A
7	4814	125	257	P/A
8	49007	4		



UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT

Scope of Work for Pakistan Geothermal Resource Assessment

1. **Identify and Review Available Geothermal Data** -- from existing, abandoned, and capped oil and gas wells, volcanism, geothermal outcroppings along faults, and geothermal spring resources.
2. **Conduct Initial Technical Review of Potential Opportunities in Three Target Markets:**
 - Grid-scale geothermal production
 - Geothermal co-production from O&G Wells
 - Potential Direct Use geothermal opportunities
3. **Develop Short- and Medium-term Development Strategy for Subsequent Development**
 - If Step #2 is encouraging, initially quantify potentials of opportunities, and develop priorities and strategy for further study and development
 - If the Step 2 indicates very limited potential, then cease work

Scope of Work for Pakistan Geothermal Resource Assessment (2)

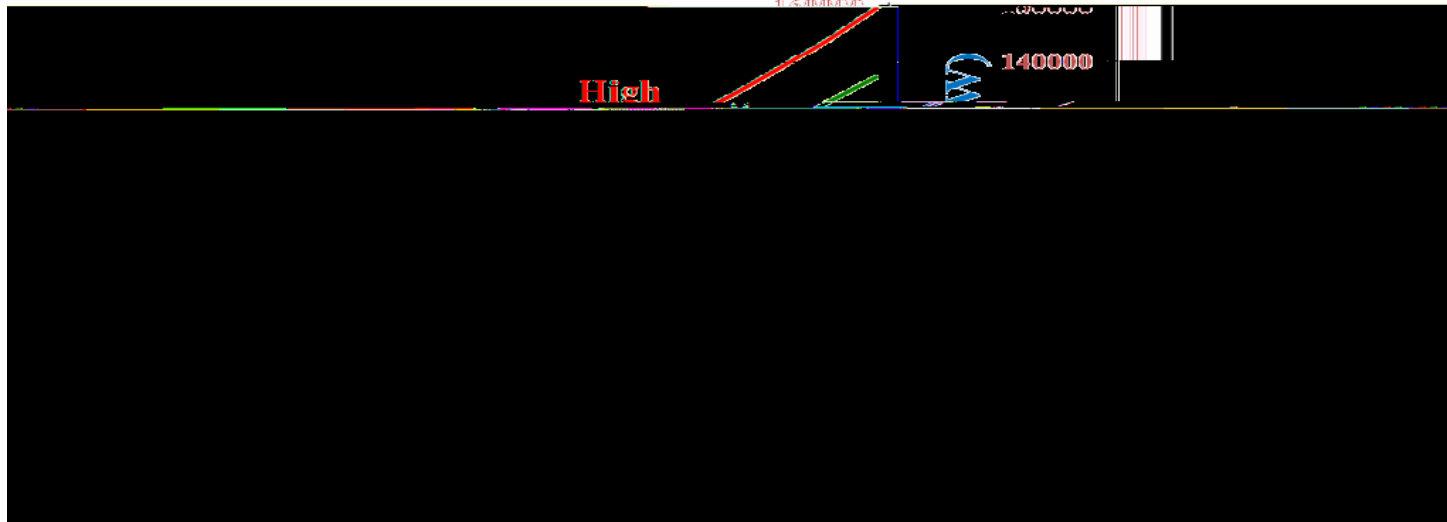
4. **Further Analysis and Investigation of Select High-Value Short- and Medium-term Commercial Market Opportunities**
 - Estimate potentials of high-value target markets
 - Further identify and analyze **specific** priority geothermal fields and wells
 - Evaluate commercial opportunities and markets
 - Co-locate industrial, commercial, and agricultural locations with specific geothermal sites
 - Identify potential business-to-business applications
5. **Review Legal and Regulatory Framework/ Barriers to Geothermal Development**
6. **Review Commercial Issues Associated with Geothermal Development**

Thank You!

Questions?

Pakistan's Current Energy Crisis: A Business Opportunity?

- x Power load shedding (6-10 hours) currently is biggest economic issue for Pakistan
- x Prime Minister Sharif set solving Pakistan's energy problems as the nation's number one priority, essential to improving its economy
- x Pakistan's Energy fuel mix is inappropriate and not sustainable
- x Per Capita power consumption is expected to increase from 800 to 2,538 kWh/yr by 2035, requiring the installation of over 100,000 MW of new generation capacity.
- x In comparison, Malaysia per capita use is currently 3,724 kWh/yr



100,000+
MW
expansion



Attractive Features of Pakistan IPP Market

- f* **One Stop IPP Development Window** (thru AEDB or PPIB)
 - o Standardized processes and guidelines for IPP developers
- o **Deal Terms**
 - o GOP Sovereign Guarantee on PPA purchase obligations
 - o Guaranteed 17-20% IRR, tariff indexation, and equity repatriation
 - o Bankable, standardized, internationally-accepted security agreements (PPA, IA, EPC, FSA, etc.)
 - o Protection against political risk & change in law
 - o Tax free regime (no corporate income, sales, withholding, customs, dividend taxes)
 - o Connection to the Grid is Responsibility of Purchaser
- **Guaranteed Repatriation of Equity and Shareholder Dividends**
- **Guaranteed Remittance of Pakistani Rupees into USD**

Attractive IPP Framework (3)

Attractive Renewable Energy-specific Investment Incentives:

- GoP provides sovereign guarantee on electricity purchase
- GoP guarantees return on investment between 17% to 20% (IRR)
- Front-end loaded, tariff regimes for power projects
- Net metering and banking of electricity allowed

Pakistan Local Attractions

- f* Karachi -- a growing financial market with energy deal experience
- f* Available strong, local, IPP partners (e.g. HUBCO, Sapphire, and numerous Pakistan industrial groups)
- f* Growing local banks with clean energy lending experience for local finance

Availability of Strong Local Partners to Offshore Investors

- x Experienced in Hands-on Country Political Risk Management
- x Possess Regulatory Know-how
- x Increase Ability to Attract Quality HR in Pakistan
- x Experienced in Bidding, Tariff and Security Package Negotiations, and History With Various GoP Decision-makers

- **Domestic Security Concerns** -- Both Perceived and Real
 - o Localized security risks
 - o GOP aggressively and successfully cracking down on terrorism
 - o Highlights the value/need for experienced local Pakistani partners
 - o IPP projects have been successfully operating for 20 years
- **Risks Presented by GoP Circular Debt**
 - o Pakistan's successful adherence to terms of IMF Standby Loan
 - o Strong donor pressure/ support to Pakistan's energy sector
- **Lack of In-Depth GOP Institutional Capacity**
 - o “Lack of capacity”, nevertheless GoP managed to financially close over 800 MW of IPPs in 2014
 - o Strong donor support in improving capacity