



## Hydrocarbons In Pakistan

Since 2009 Scotforth has been studying Pakistan, a country where:

- There are major petroleum reserves
- RSDD-H observes confidently many of the known fields
- RSDD-H has identified analogous high quality, low risk untested prospects.

Pakistan has had a long oil and gas exploration history with considerable success but also significant failure. The country hosts a number of large and rather complex exploration arenas - as normal for major Mountain Front, Deformed Belt and Foreland basin habitats. The Petroleum Resource Potential ("PRP") of these geological provinces and various "Total Petroleum Systems" (USGS nomenclature) have been assessed by the USGS in a number of studies. An older but still very useful, rather classical overview of the country's petroleum geology is provided by Iqbal B. Kadri (Published (1995) by Pakistan Petroleum Limited).

The major discovered petroleum reserves include inter-alia, those of the Lower and Middle Indus basins (mainly the Kirthar and Sulaiman Fold Belts) and further north, those of the Potwar-Kohat province. Other geological basins and play districts in Baluchistan, Peshawar, some parts of the Kohat Plateau and of the Punjab Platform remain less explored. New discoveries continue to be made and it can be reasoned geologically that Pakistan has many fields yet to be discovered.

**From our RSDD-H research it is apparent that the country has major untested Petroleum Resource Potential. Giant fields remain to be discovered. Numerous "fields of the future" await drilling. Some of this potential locates in the proven provinces, some in new as yet unproven provinces and districts. Opportunities are clear and numerous.**

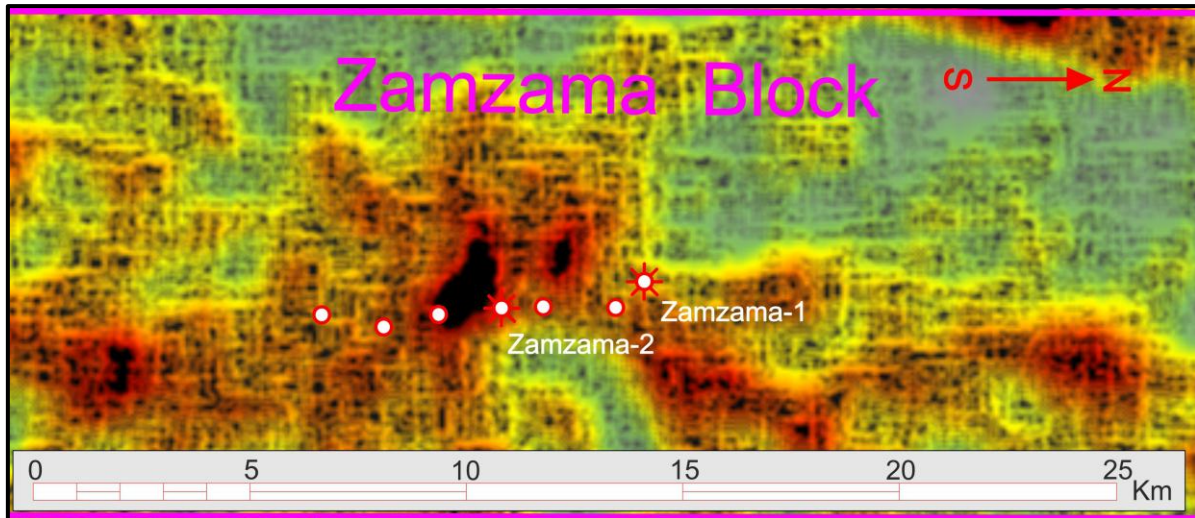
A portion of this PRP will doubtlessly continue to be discovered by conventional high cost, higher risk seismic-led campaigns. This will take time, immense investment and have high finding costs per boe. However, **strategic guidance and focused exploration led by RSDD-H can result in excellent discovery rates and major reserves additions at much reduced finding costs.** The case for new investment will become much more appealing.

Scotforth can guide interested parties and allies into its Pakistan prospect book and/or advise them of the prospectivity outlook for their existing lands and prospect inventories and indeed for intended new ventures. Multi-million dollar losses on poorly focused exploration programmes can be avoided, value creating investments can be targeted, secured and pursued.

The following **RSDD-H processed satellite images** illustrate just some of the RSDD-H spectral "footprints" ("Hydrocarbon Lead Indicators" or "HLIs") of known fields as well as providing first sighting of a number of low risk new HLI-identified prospects – largely not yet recognised by industry.

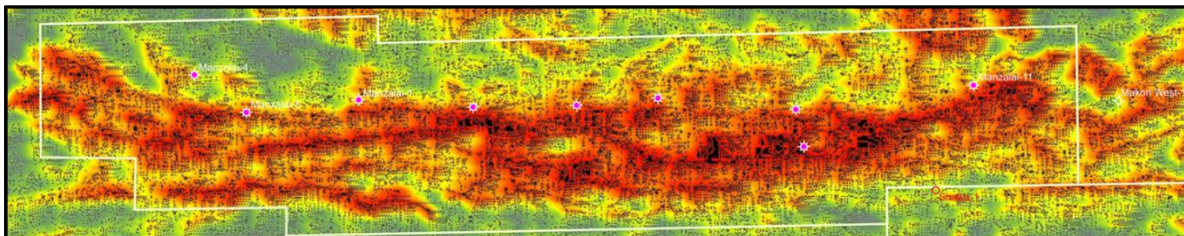
## EXISTING FIELDS AND DISCOVERIES

Zamzama Field (2.3TCF): Dadu District, Indus Basin, Sindh Province, discovered 1998



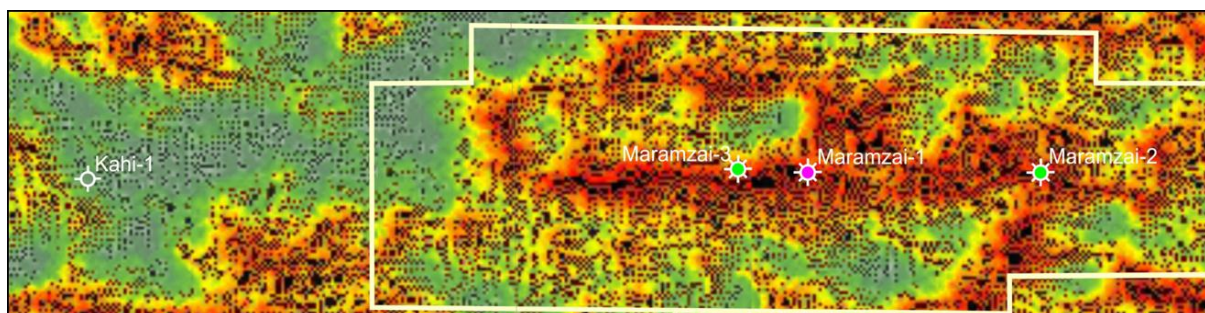
RSDD-H IPD image (rotated 90°): Hot orange / black HLI “core” feature; low prospectivity terrains in green / yellow. HLI pattern suggests further field extensions await penetration.

Manzalai: Kohat Plateau (1+ TCF), discovered 2002



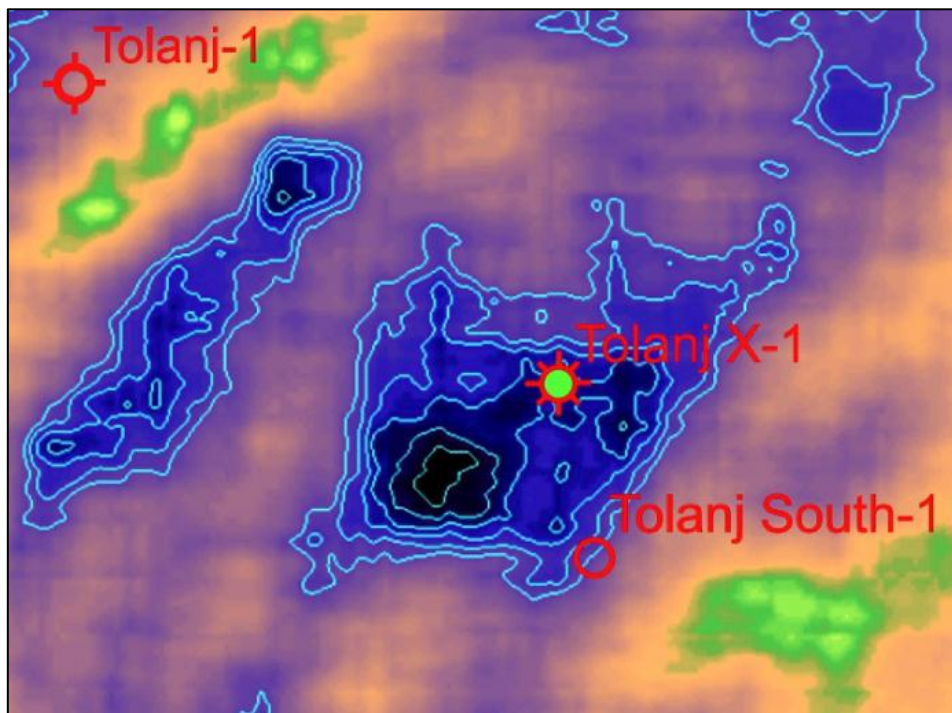
RSDD-H IPD image: Strong HLI anomaly of this gasfield. It suggests the existence of field extension and infill drilling opportunities versus the current well count. Gas wells in pink; note the “off anomaly” D&A Makori West-1 well at right edge of display.

Maramzai: (ca. 1TCF) Kohat Plateau, discovered 2009



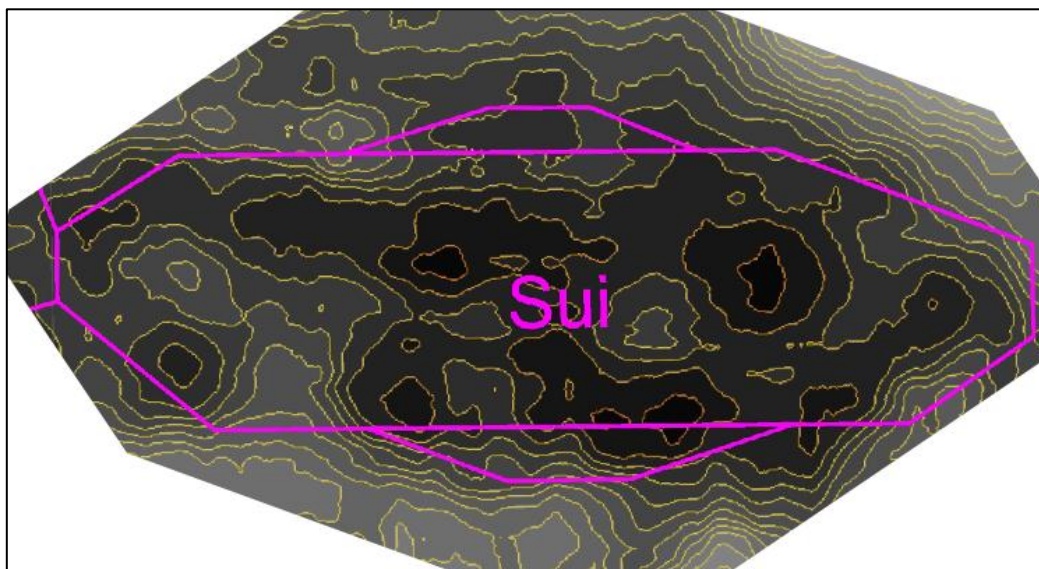
RSDD-H IPD image: Main field in hot orange. Note the “off anomaly” D&A Kahi-1 well in low prospectivity terrains (green). Several local HLI leads and prospects indicate possible further exploration, appraisal and field development opportunities here.

Tolanj Discovery District: Kohat Plateau (reserves not yet available), discovered 2011



RSDD-H SID Image: Two HI prospects (blue-black contoured anomalies). Tolanj X-1 discovery well on one anomaly, Tolanj South-1 appraisal well in HI marginal location newly announced as a D&A, essentially as predicted. Second HI anomaly remains untested. Tolanj-1 D&A was drilled in a “no HI anomaly” location.

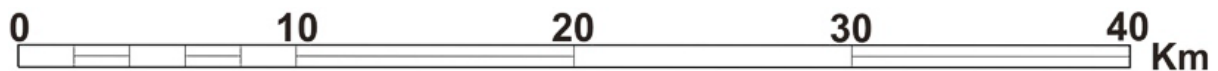
Sui Gasfield (12 TCF): Sulaiman Fold Belt, Middle Indus, (12TCF), Discovered 1952



RSDD-H processed IPD image: Intense (black core area) but heterogeneous HLI within the field's Production Lease area flanked by high RBU gradients into non-prospective surrounding terrains.

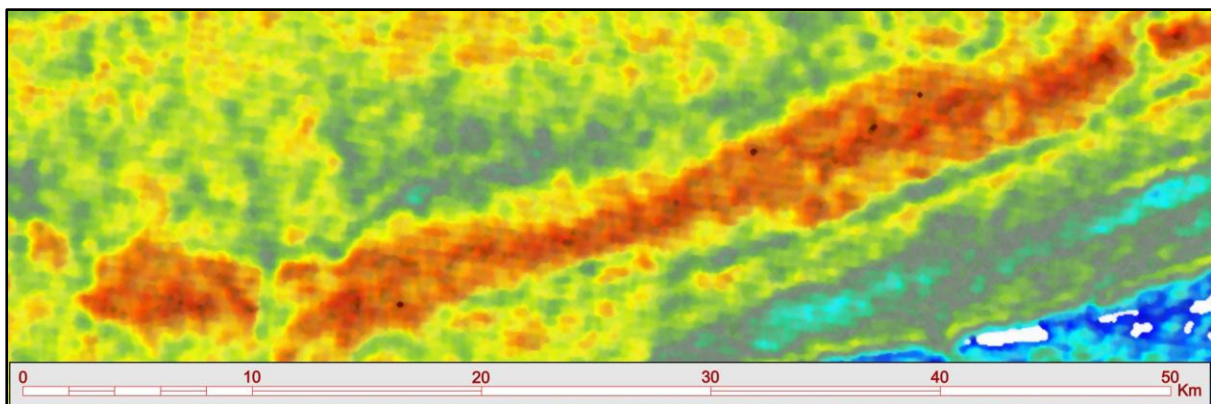
## NEW PROSPECTS

**Punjab Platform: Infra-Cambrian Play Fairway, An Initial Exploration Focus Area (400+km<sup>2</sup>)**

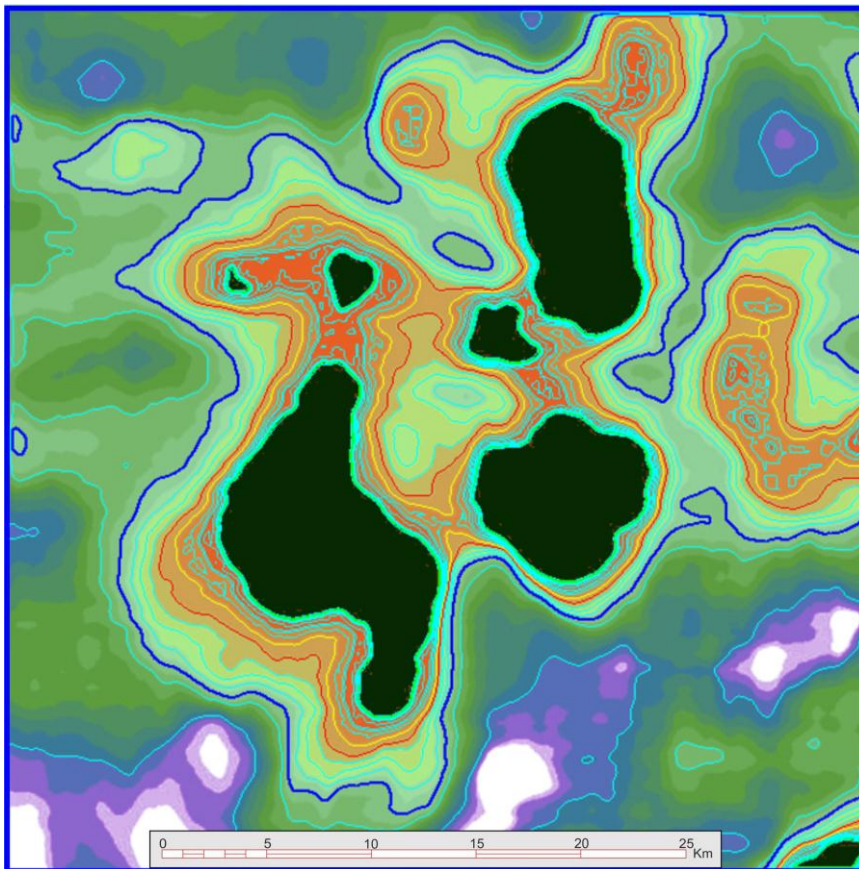


**RSDD-H IPD Image: Initial Exploration Focus Area (“IEFA”) with four undrilled HLI Leads. Schematic tectonic lineaments overlay added. This IEFA merits exploration progression, having more than 200km<sup>2</sup> of HLI response. RSDD-H observation of nearby oilfields in India (Baghewala et al) on similarly processed data provides encouragement here.**

**Baluchistan Basin: Major under-explored play district with many untested HLI features**



**RSDD-H IPD processed image: A large Regional Exploration Focus area (“REFA”) HLI prospective trend (hot orange) identified under regional reconnaissance surveying. Surrounding Low Prospectivity terrains display in pale yellow through green to blue and white.**

**Middle Indus: Large multi-cored HLI Exploration Focus Area (“EFA”): (500+km<sup>2</sup>)**

RSDD-H SID processed image: An undrilled large Exploration Focus area (“EFA”) of over 500km<sup>2</sup> containing three main HLI prospects (Black) with ancillary “satellites” and lesser intensity leads. This could be a super-giant field complex. It is surrounded by Low Prospectivity terrains beyond the EFA’s dark blue contour boundary (dark green to white areas).

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Scotforth is now ready for successful exploration engagement in Pakistan. (1st June 2016)