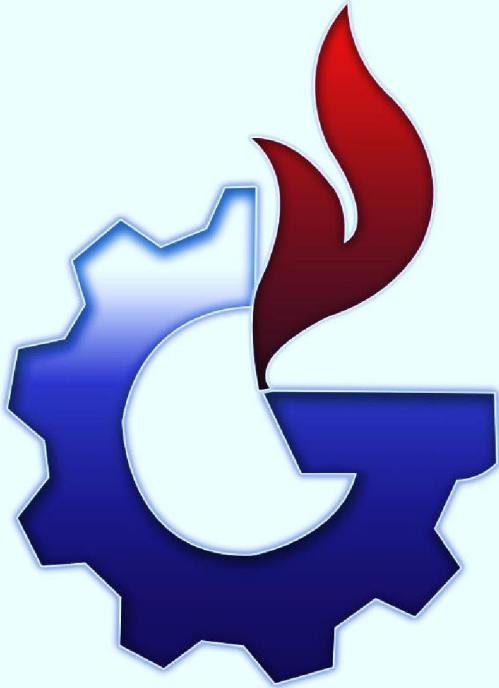




GAS METERING IN IRAN

(re) calibration workshop, 8-9th June 2017, FORCE Technology , Vejen, Denmark



By:
A. Moradi
E. Soltani

WHO ARE WE?

***Dr. Abolghasem
Moradi***

***Head of managing board
and CEO
Gas-Souzan Co.***



***Dr. Esmaeil
Soltani***

***Head of R&D Department
Gas-Souzan Co.***

Academic member of Univ.



GAS-SOUZAN COMPANY

- ◉ Founded 1980
- ◉ Turnover 2016: 140 MUSD
- ◉ 2500+Employees
- ◉ Invest 3% of turnover in R&D

Local leader for gas distribution, metering, regulation and related elements

- ◉ Gas regulators
- ◉ Gas meters
- ◉ Gas stations
- ◉ Valves
- ◉ Related accessories

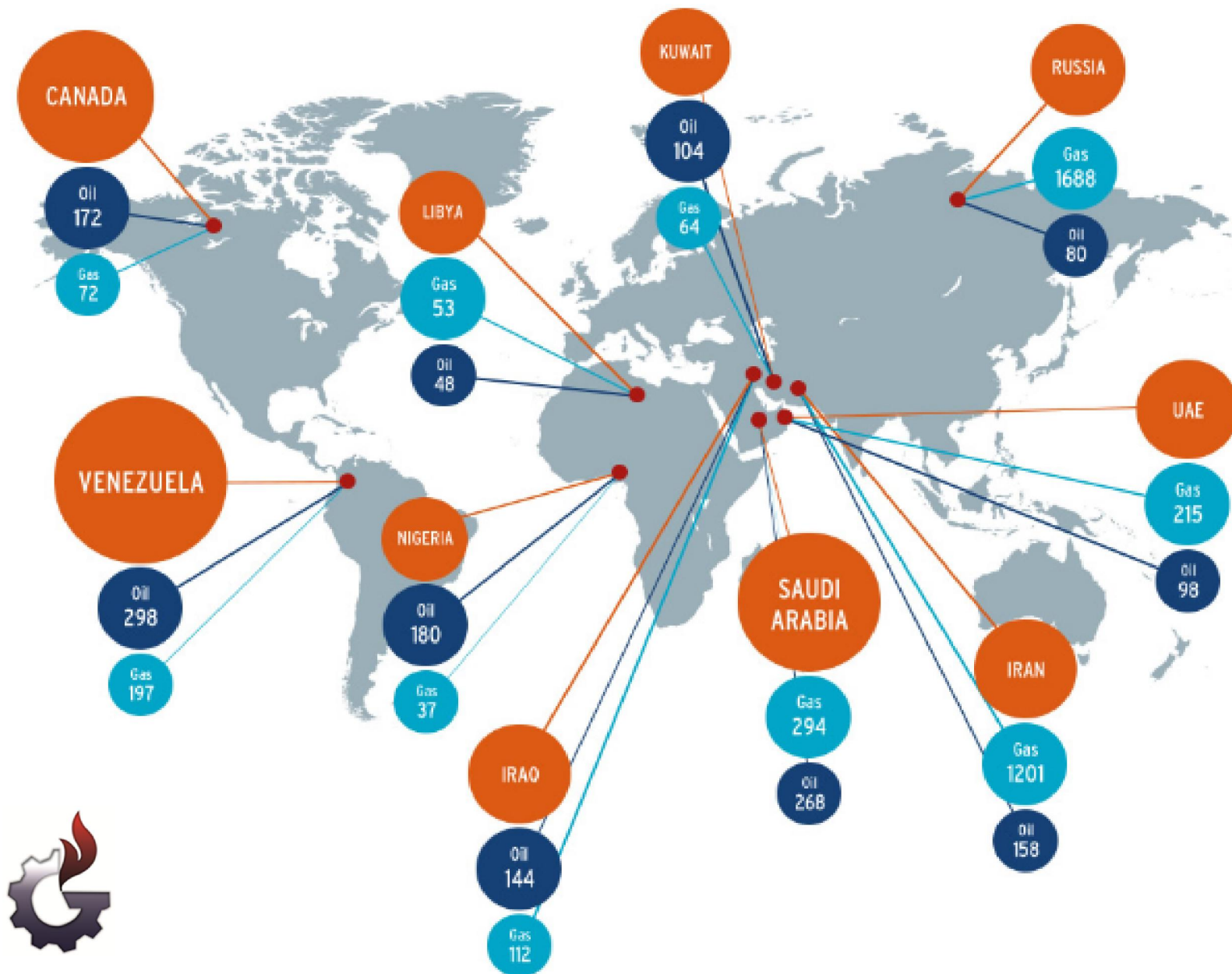


NATURAL GAS PROVEN RESERVES

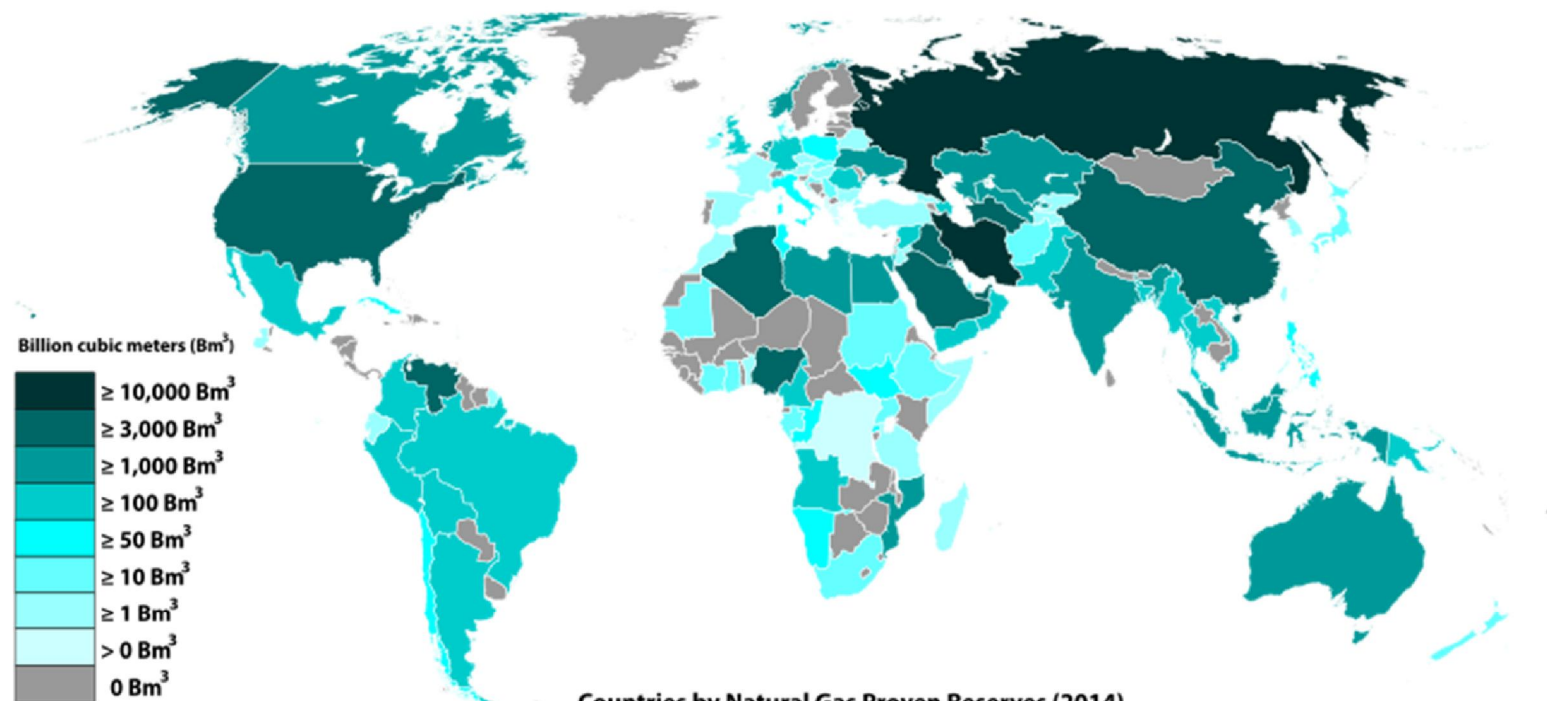
- ◉ IRAN has more than 18.2% total natural gas deposits(34TCM) in the world.
- ◉ The natural gas is 65% of proved reserves out of 260 TCM total oil and gas deposits.
- ◉ First natural gas extraction kicked off in 1966 and exported to Russia and Europe.



OIL AND GAS RESERVES BY NATION OIL(MMBBL) GAS(TCF)



COUNTRIES BY NATURAL GAS PROVED RESERVES



Countries by Natural Gas Proven Reserves (2014)



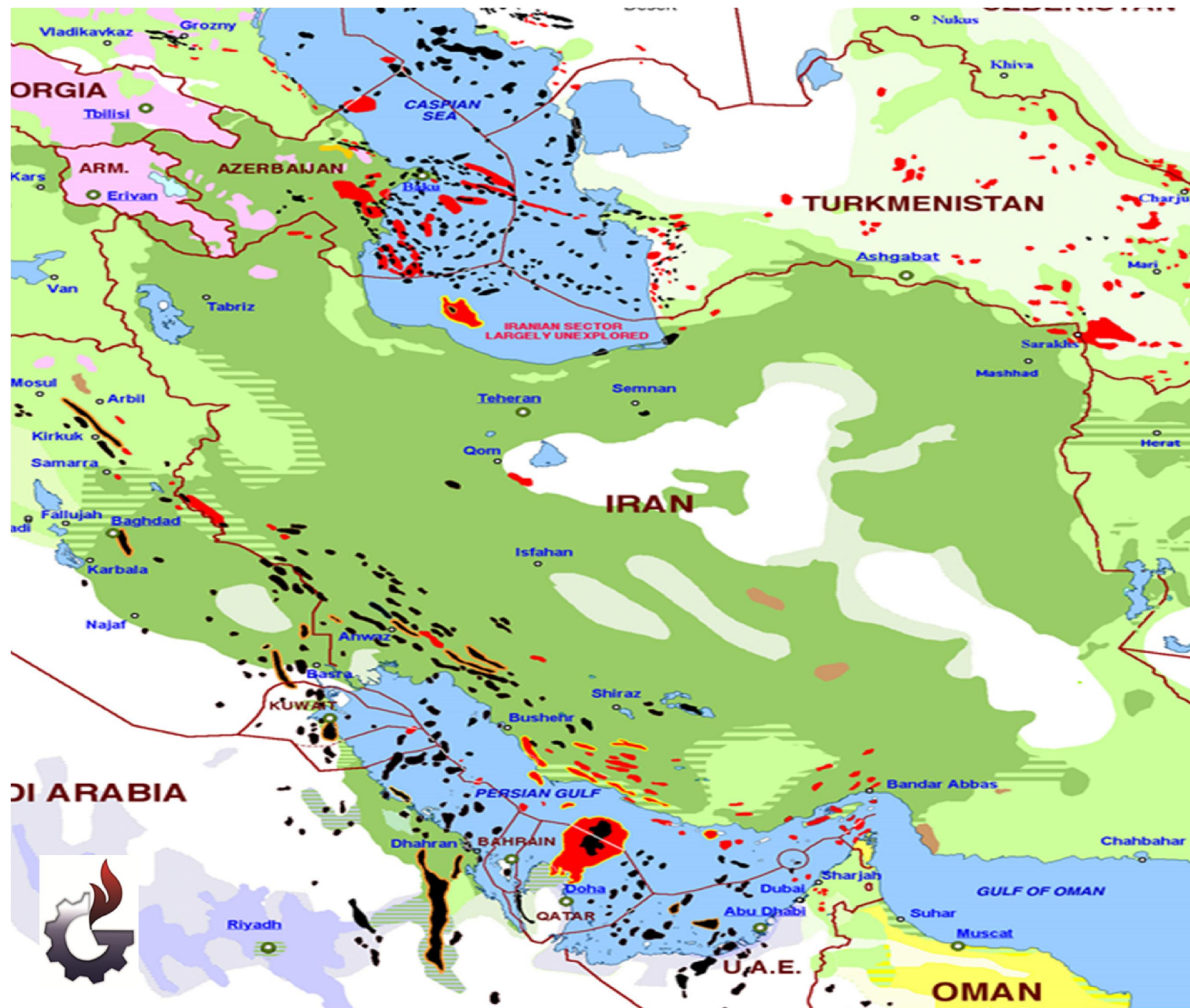
PROVED NATURAL GAS RESERVES RANKS

RANK	COUNTRY	DATE	MILLION CUBIC METERS
1	RUSSIA	Jan-16	47,800,000
2	IRAN	Jan-16	34,020,000
3	QATAR	Jan-16	24,530,000

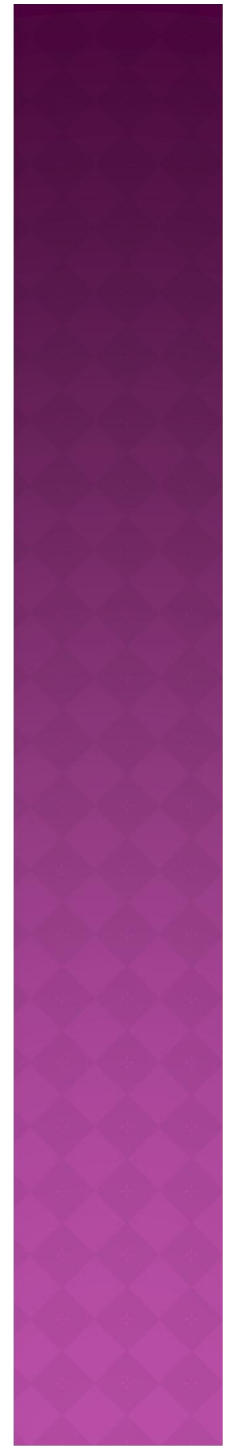
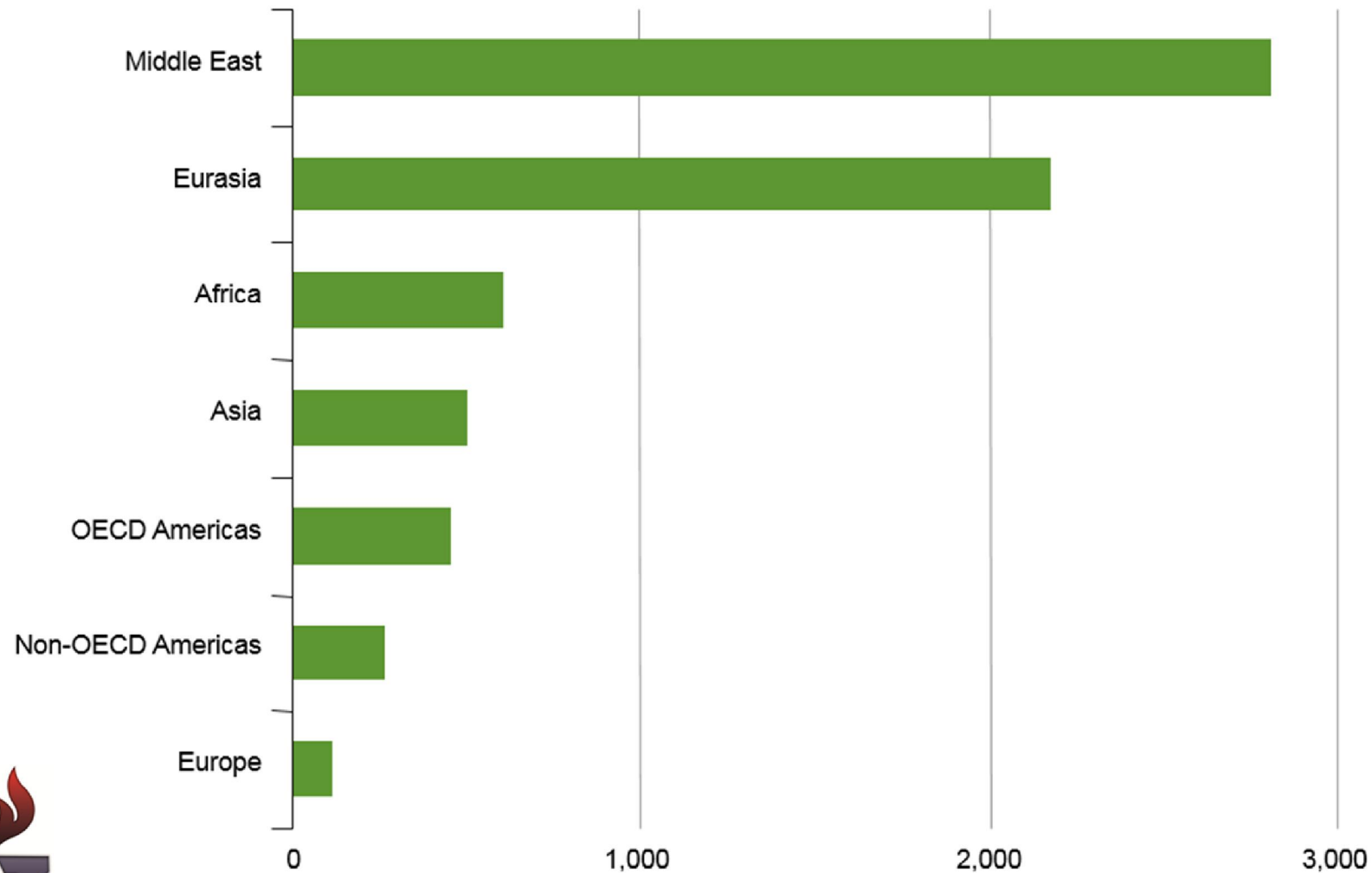
Share of IRAN:

- More that 18.2% of total proved reserves across the globe
- More than 42.3% of middle east deposits

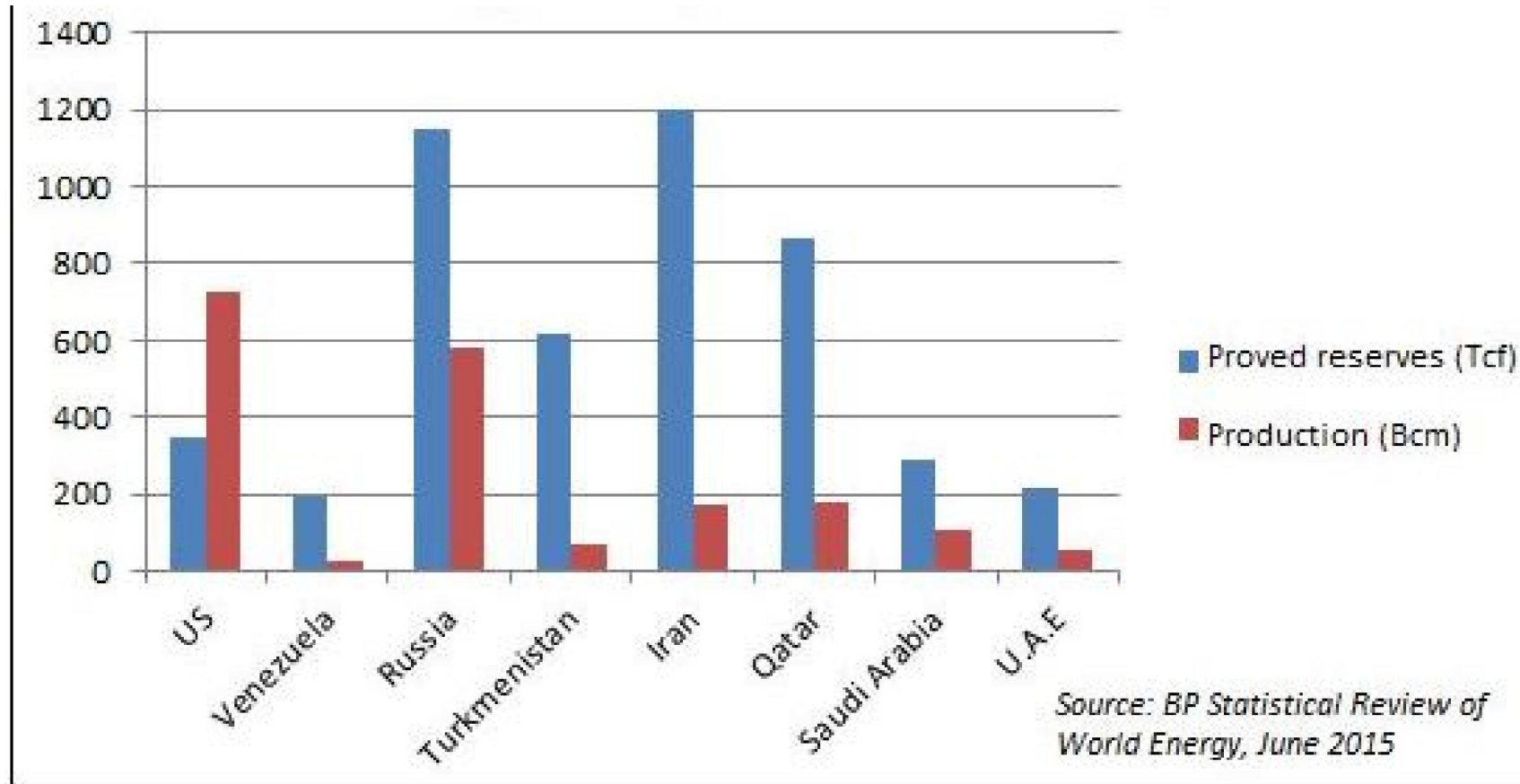




WORLD PROVED NATURAL GAS RESERVES BY REGION AS OF JANUARY 2016(TCF)



NATURAL GAS TOTAL PROVED RESERVES AND PRODUCTION



NATURAL GAS PRODUCTION AND CONSUMPTION IN IRAN

- ◉ Natural gas has a 70% share of energy consumption in Iran.
- ◉ More than 700(MCM/day) natural gas production in 2016.
- ◉ Expectation of 1.2(BCM/day) natural gas production in 2024.
- ◉ The increased values in future will export.



SHARE OF NATURAL GAS CONSUMPTIONS IN 2016

NO.	SOURCE	SHARE (%)	NORMAL OPERATION PRESSURE(BAR)
1	POWER PLANTS	30	< 3
2	HOUSE HOLD	46	< 1
3	INDUSTRIALS	17	> 50
4	EXPORT	4.4	> 90
5	OTHERS	2.2	> 60

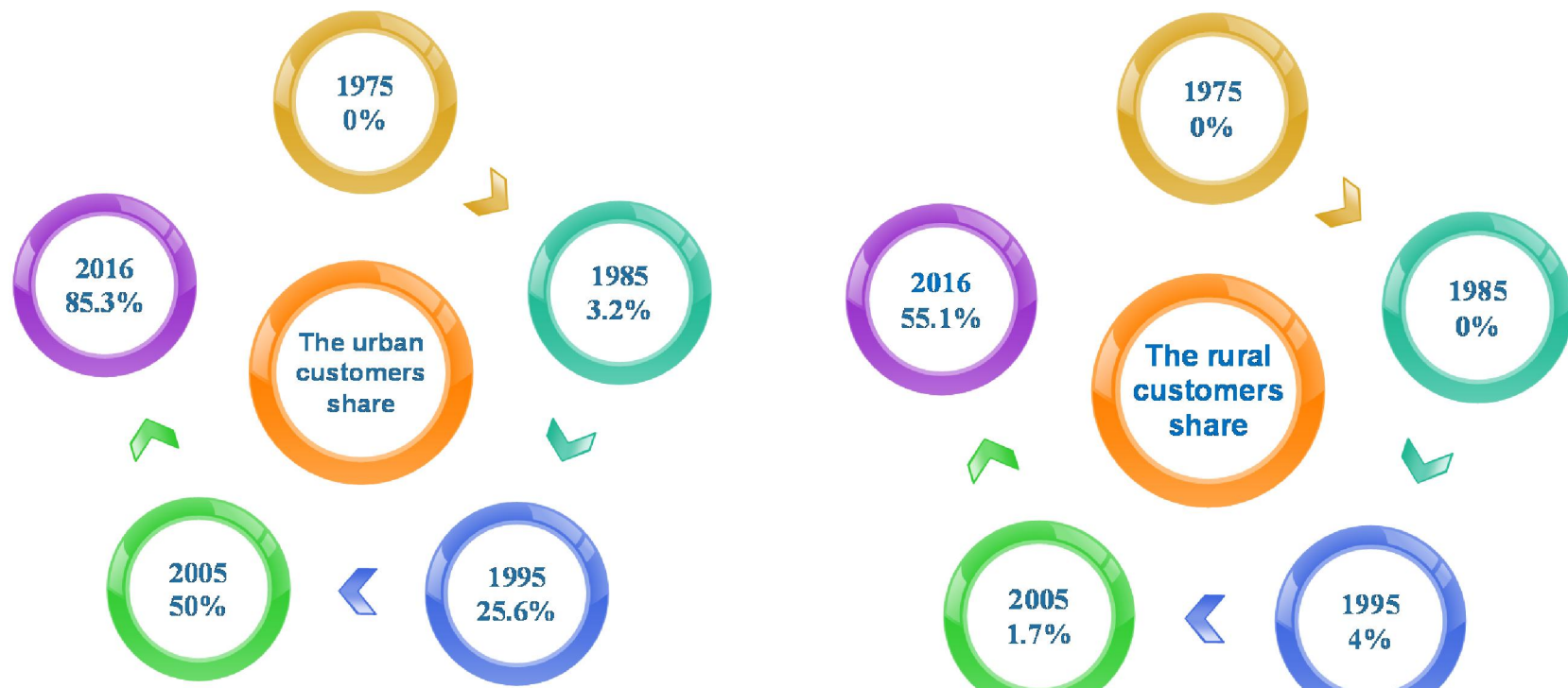
Natural gas grid property:

- 44 natural gas refinery, transport, distribution and reserve companies
- 35,000 km main transit pipelines
- 300,000 km city network pipelines
- 23,000,000 household customer



[illegible]

GROWTH OF HOUSEHOLD CUSTOMERS



GAS METERING SITUATION

Industrial Gas Meters	Domestic Gas Meters	Gas Stations	
		CGS	CGS-TBS
29,331	19,221,592	1151	701

Gas-Souzan role:

- Diaphragm gas meters from 1.6 to 250 m^3/h
- Turbine gas meters from 0.5 to 20 in
- Thermal mass flow meters
- Industrial Ultrasonic gas meters from 2 to 12 in
- Gas stations from 400 to 1,200,000 m^3/h
- Metering, TBS and CGS types
- Cabinet and flat types



GAS-SOUZAN PRODUCT SAMPLES



THE “REMARKABLE” ROLE OF GAS-SOUZAN IN NATURAL GAS DISTRIBUTION AND METERING

- ◉ Iran has to be self supportive on the fabrication of equipment
- ◉ Gas-Souzan has taken on this role since 80's
- ◉ More than 84% of total Iran market in gas transport and distribution network
- ◉ Importance of economy and social stability of Gas-Souzan
- ◉ Critical role of (re)calibration for the quality improvement guaranty
- ◉ Important attention of customers regarding the (re)calibration



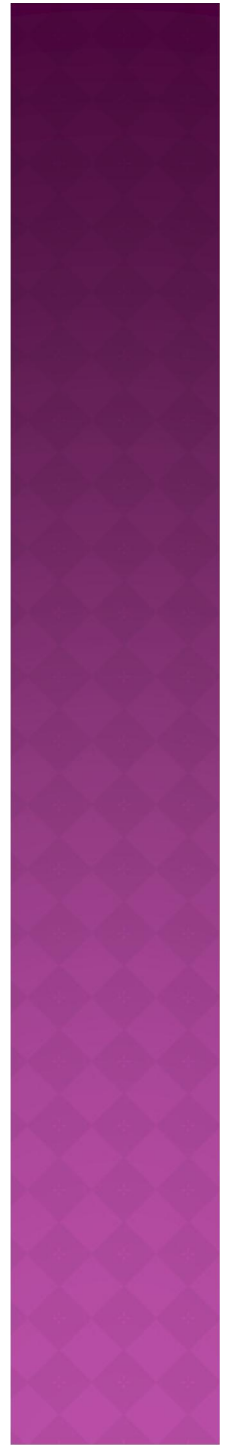
NATIONAL RULES FOR RECALIBRATION OF FLOW METERS

NO.	METER	CAPACITY (scm/h)	RECALIBRATION INTERVAL(year)	PERMISSIBLE ERROR(%)	
1	Diaphragm Gas Meter	$2.5 \leq Q_{max} \leq 25$	7	$2Q_{min} < Q_i < Q_{max}$	± 2
		$40 \leq Q_{max} \leq 160$	5	$Q_{min} < Q_i < 2Q_{min}$	± 3
2	Turbine Gas Meter	$160 < Q_{max} < 10000$	3	$Q_{min} < Q_i < 0.2Q_{max}$	± 2
		$10000 < Q_{max} < 50000$	2		± 1
		$Q_{max} \geq 50000$	1	$0.2Q_{max} < Q_i < Q_{max}$	
3	Ultrasonic Gas Meter	Dry Calibration	2	$2Q_t < Q_i < Q_{max}$	± 1
		Flow Calibration	8	$Q_{min} < Q_i < Q_t$	± 1.4

- In despite of national rules for the meters (re)calibrating, only the meters which need repairs only recalibrate.
- The industrial meters (re)calibrate by air in atmospheric pressure.
- A lot of meters have not been ever (re)calibrated yet.



INDUSTRIAL GAS METERS READY FOR REPAIR AND RECALIBRATION



CONCLUSION

- ◉ Due to amount of Natural gas production in Iran, the metering accuracy and reliability is so important.
- ◉ Different part of natural gas customers(domestic, Industrial, power plants, ...) are enthusiastic to have an accurate metering.
- ◉ The gas metering manufacturers are eager to calibrate their production according the international rules and references.
- ◉ According the number of existed meters in Iran, Investigation on a (re)calibration facility is so important and necessary.
- ◉ Base on installed meters specification in Iran, at first step a facility up to 12 inches and 60bar has more application.
- ◉ Regarding the Iranian national standards for recalibration of gas meters, Investigation for a calibration facility would be necessary.
- ◉ Local products have been in play since the 80's and are looking for partnership to close the gap to the state of the art in gas metering.





**Thank you
for your
attention!**