



# New exploration cycle in Croatia: *INA perspective*

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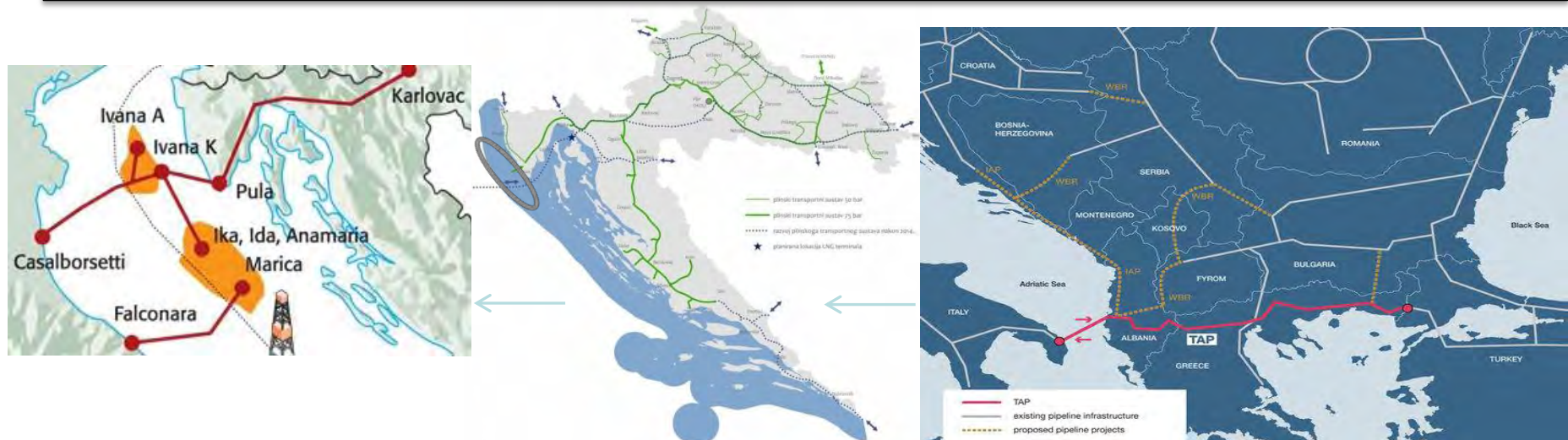
# Existing oil and gas infrastructure in Croatia

- Croatia has a network of over 2500 km of gas and over 600 km of oil pipelines ensuring excellent export options for oil and gas in continental region and gas infrastructure on North Adriatic
- Panonian future oil discoveries have connection to refineries and several export options
- Oil and gas from Croatia can be transported towards the north
- Connection of North Adriatic production fields with Italian and Croatian coast
- Gas discoveries proximal to North Adriatic would be the most efficiently be produced by connecting on existing gas infrastructure
- New oil discoveries in Adriatic offshore will be offloaded by FPSO and sold on Mediterranean market

### Crude oil pipelines network



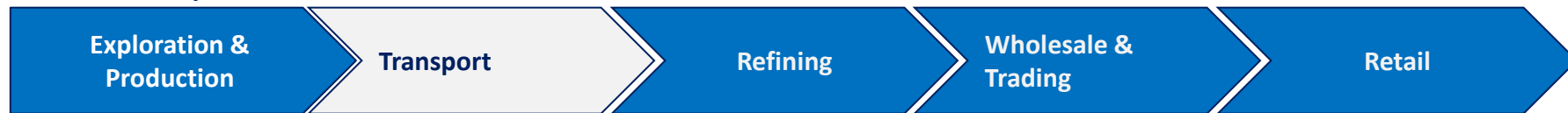
### Gas pipelines network



# INA's activities along the oil and gas value chain



## Oil industry value chain



- Onshore and offshore activities
  - Reserves: 266 MMboe SPE 2P (2012 YE)
  - Production: avg. 40 Mboe/day (2013)
  - Direct presence in Croatia, Egypt and Angola (Syria under Force Majeure)
  - Via CROSCO (upstream service company) further presence in Albania, Hungary, Libya, Oman
- 2 refineries
  - 134,000 bbl/day refining capacity: Rijeka 90,000 bbl/day, Sisak 44,000 bbl/day
- Extensive logistic infrastructure including large storage facilities, tank and rail cars
- 444 fuel stations
  - Market leader in Croatia
  - Further presence in Slovenia, Bosnia and Herzegovina, Montenegro

## Gas industry value chain



- Presence in Croatia via Prirodni Plin
- Presence in distribution network in Croatia via Croplin

### Legend

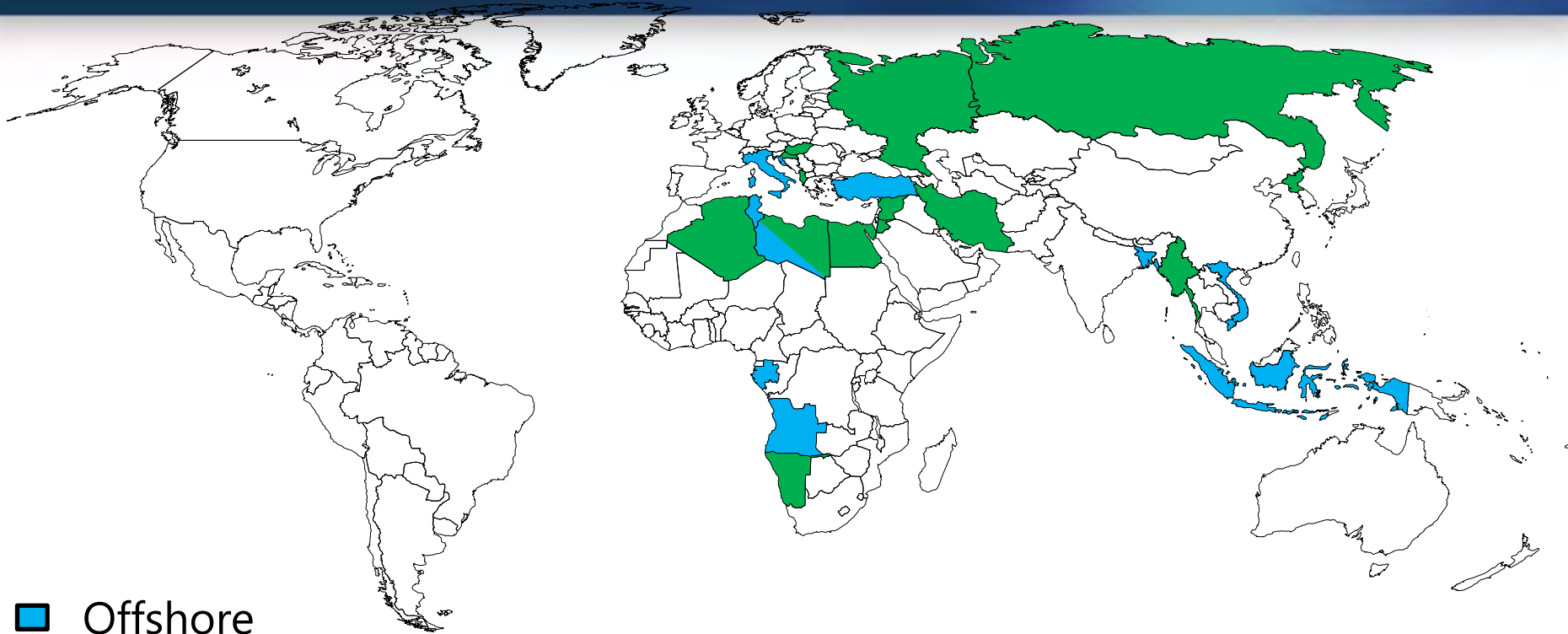
- Current fields of operation
- Fields outside the current operation of INA



## Rich domestic and international experience in E&P business

- During the past, presence in over a 20 countries, both onshore and offshore
- Strong regional player – tradition of oil and gas production for more than 60 years
- Main activities in Croatia , discovered; 58 onshore fields, 14 offshore fields
- **1.4 billion boe discovered to date**
- **1.173 billion boe** produced (1952-2013)

# International experience



■ Offshore

<b>Operator</b>	Gabon	Lybia	Tunis	Bangladesh	Croatia
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<b>Non Operator</b>	Vietnam	Turkey	Italy	Angola
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■ Onshore

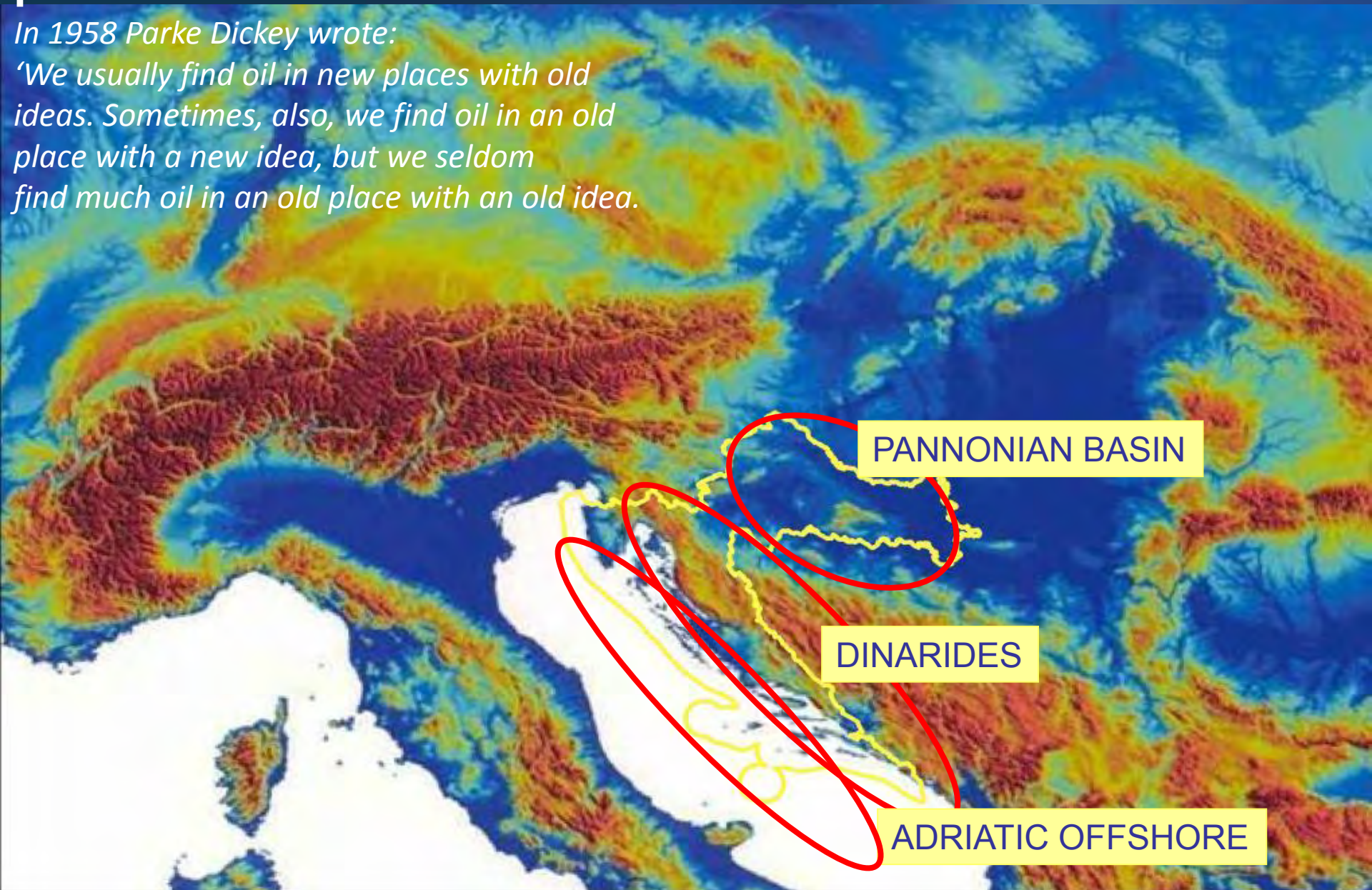
<b>Operator</b>	Jordan	N.Korea	Egypt	Albania	Syria	Namibia	Iran	Russia	Lybia	Cro
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<b>Non operator</b>	Cyprus	Hungary	Burma	Indonesia	Algeria
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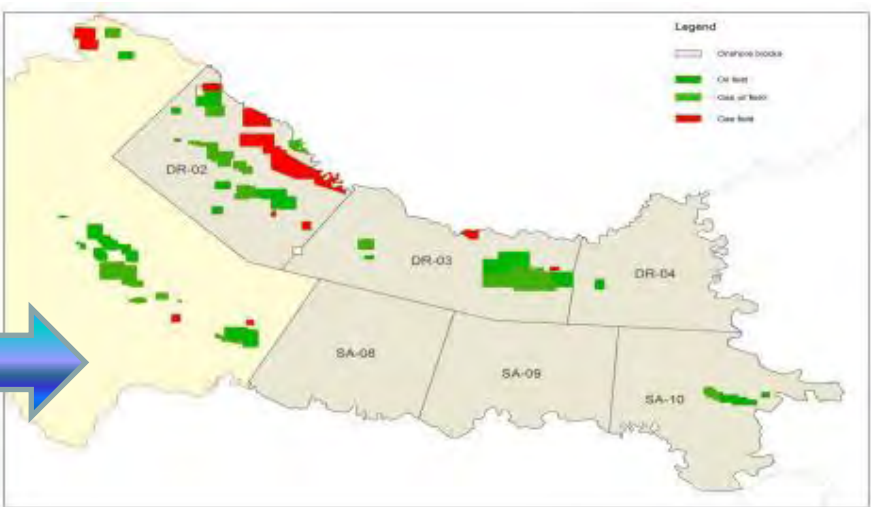
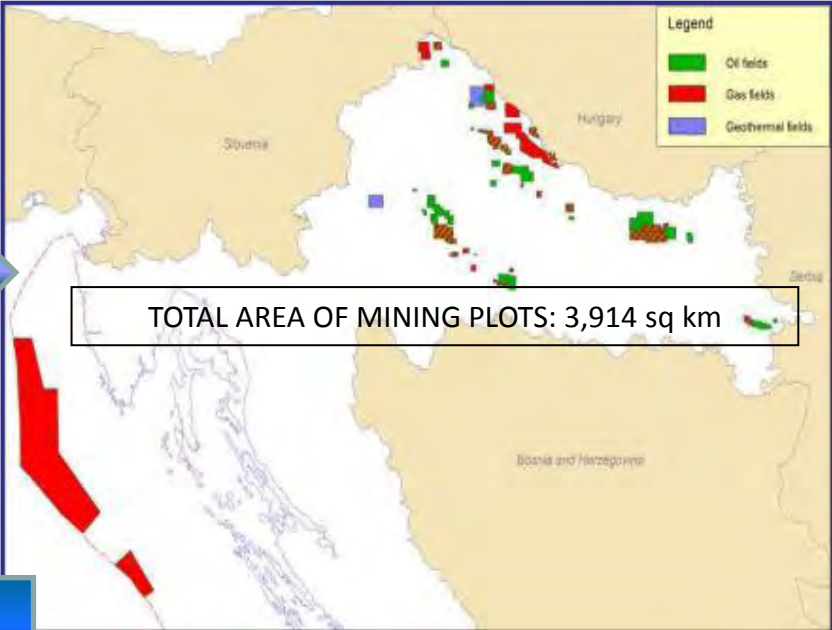
# In the interim period – inventory of exploration potentials

*In 1958 Parke Dickey wrote:*

*'We usually find oil in new places with old ideas. Sometimes, also, we find oil in an old place with a new idea, but we seldom find much oil in an old place with an old idea.'*



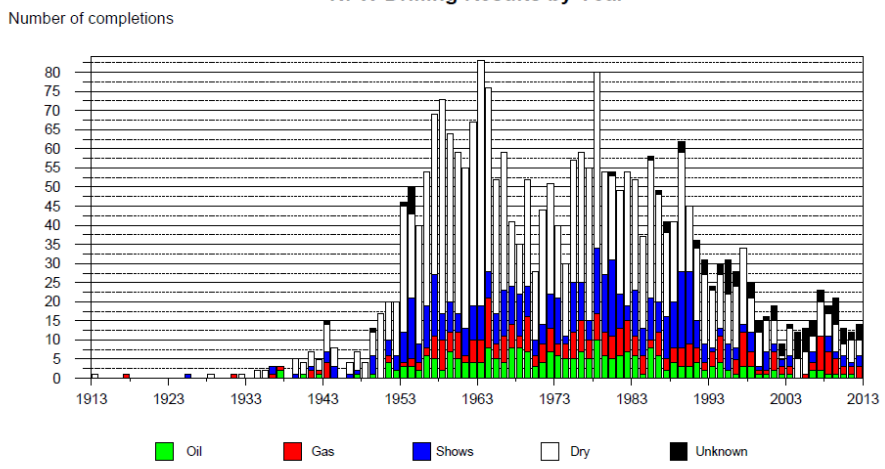
# Croatia - exploration licenses evolution over the past 5y period



# Panonian basin historical highlights

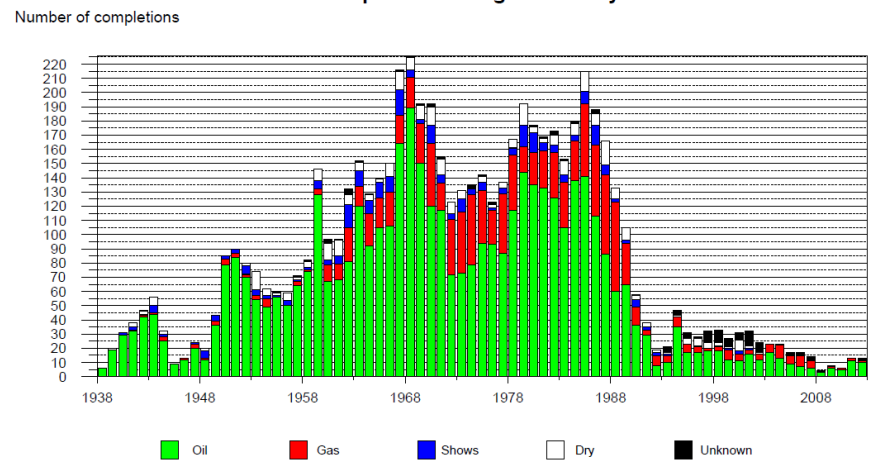


### NFW Drilling Results by Year

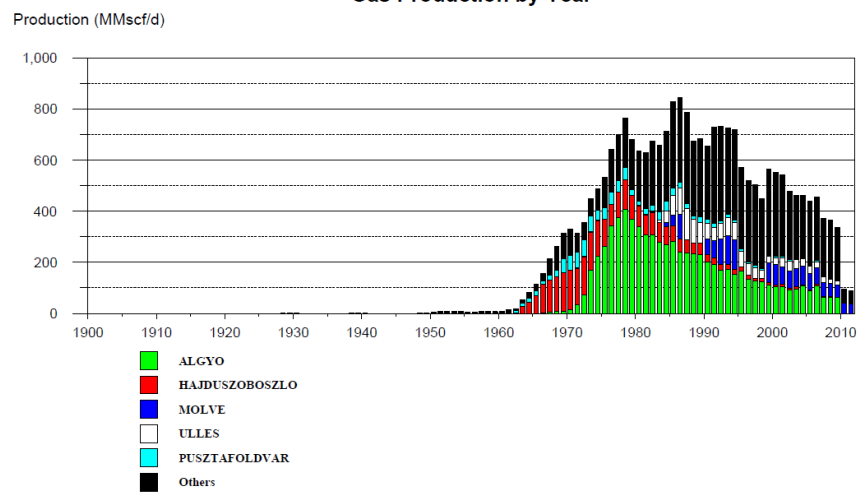


Missing data

### Development Drilling Results by Year

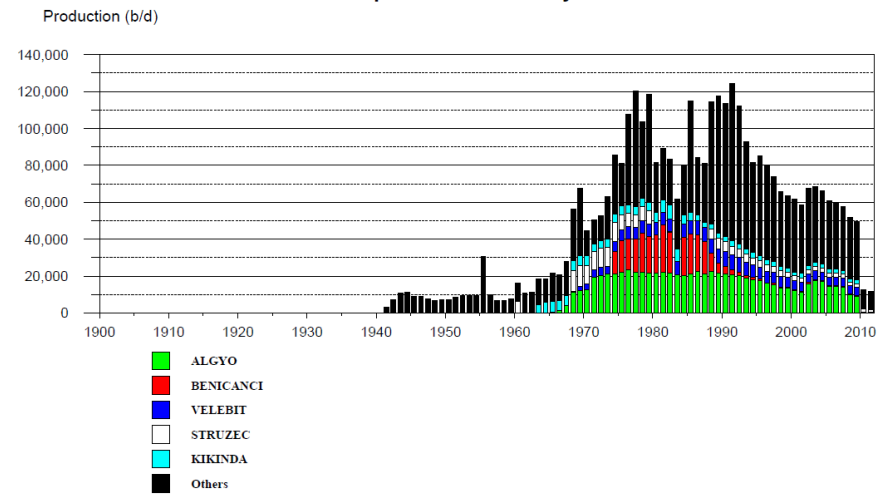


### Gas Production by Year



Production for 2009 is largely missing.

### Liquids Production by Year



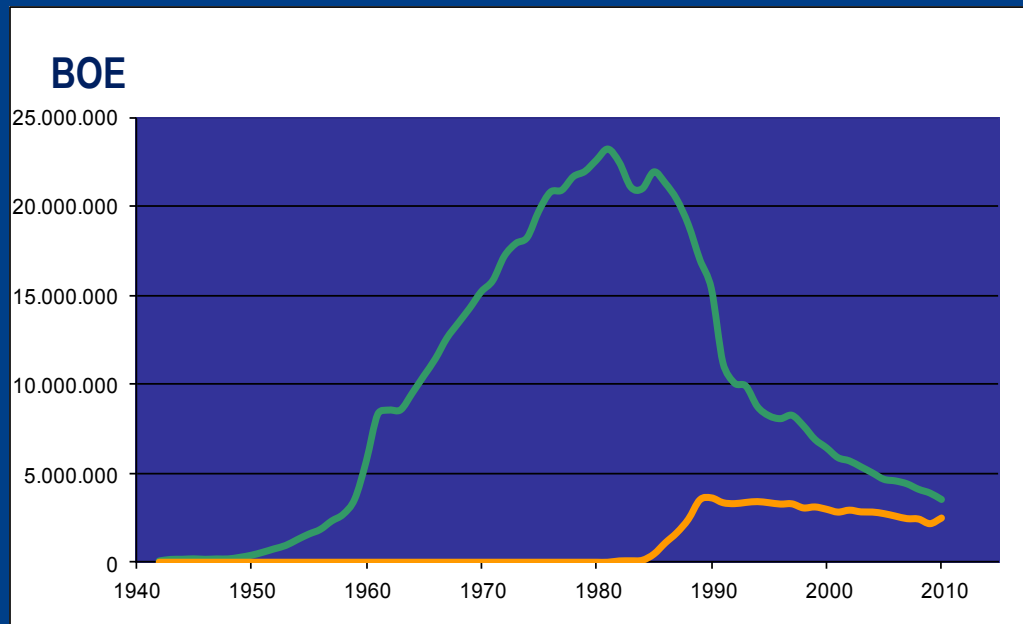
Production for 2009 is largely missing.





INDUSTRIJA NAFTE, d. d.

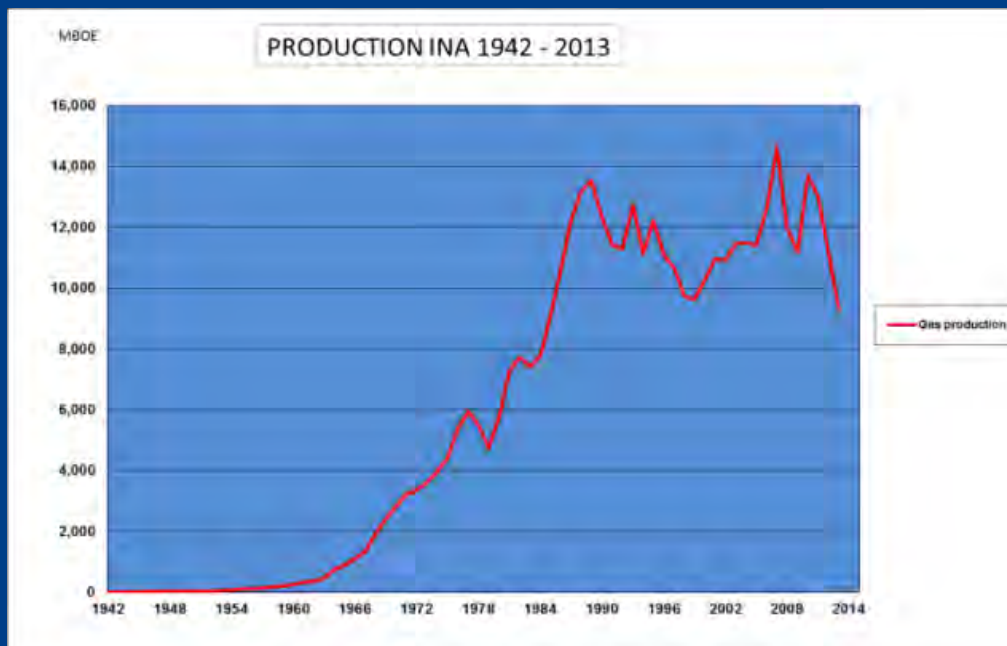
## INA – OIL PRODUCTION HISTORY ON SHORE



- In 2014 oil production declining trend reversed, partly due to stimulation programs
- 4,000 BBL/D READY TO BE PUT ON STREAM, pending government approvals

- New gas discoveries to put onstream
- Međimurje gas project
- CO2 management through EOR project
- North Adriatic – Izabela field put on stream in 2014
- Unconventionals?
- New exploration in Adriatic and Panonian?

## INA – GAS PRODUCTION HISTORY ON SHORE

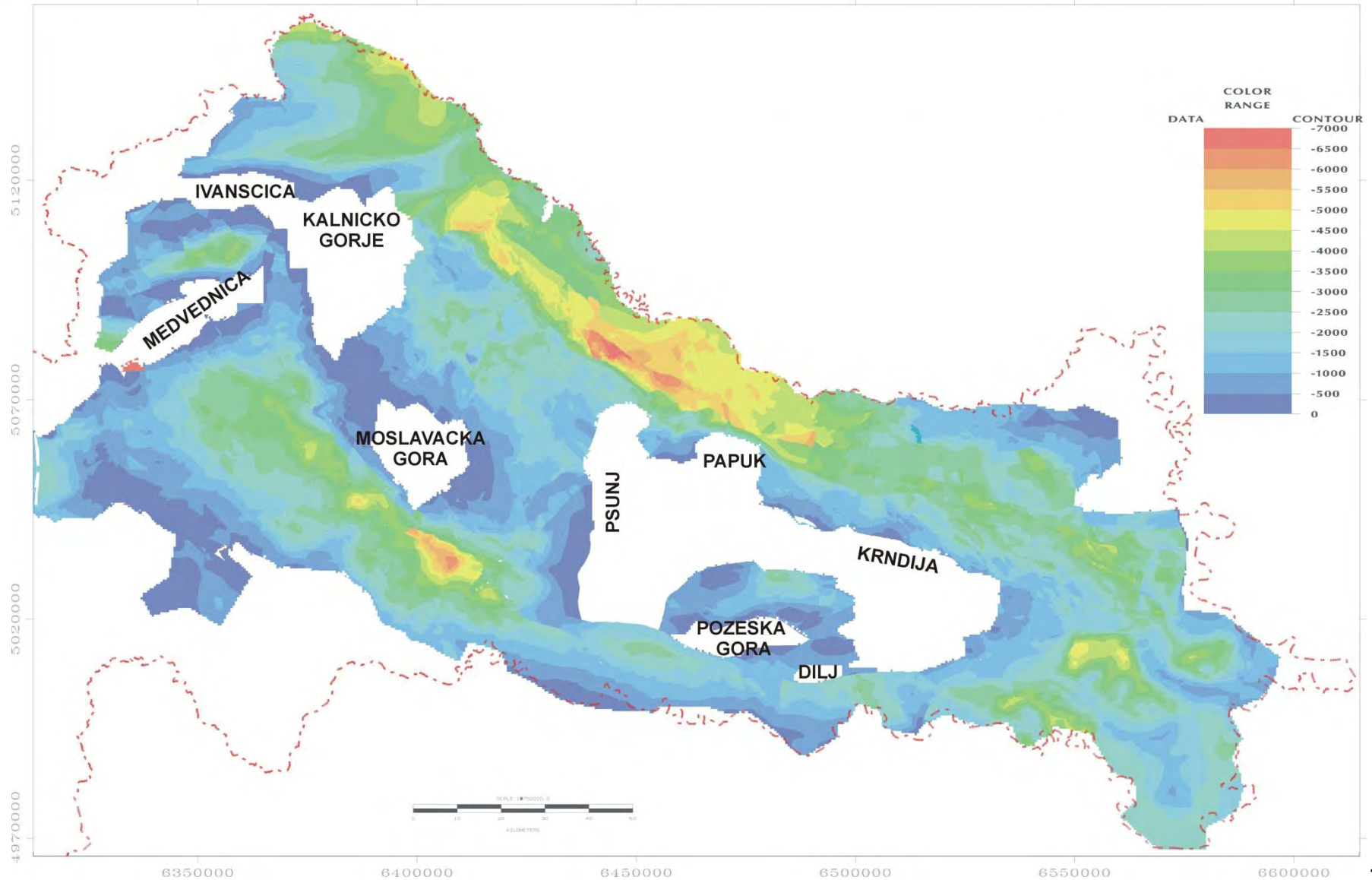


**Onshore producing fields:**

**•34 OIL FIELDS**

**•16 GAS-CONDENSATE FIELDS**

# Panonian basin Neogene sediment thickness map



## Highly explored area

- More than **950 exploration wells** – over **2 million meters** drilled
- **Few thousands** of development and production wells
- More than **30 000 km of 2D** and app. **2800 sq km 3D** seismic
- Majority of HC production

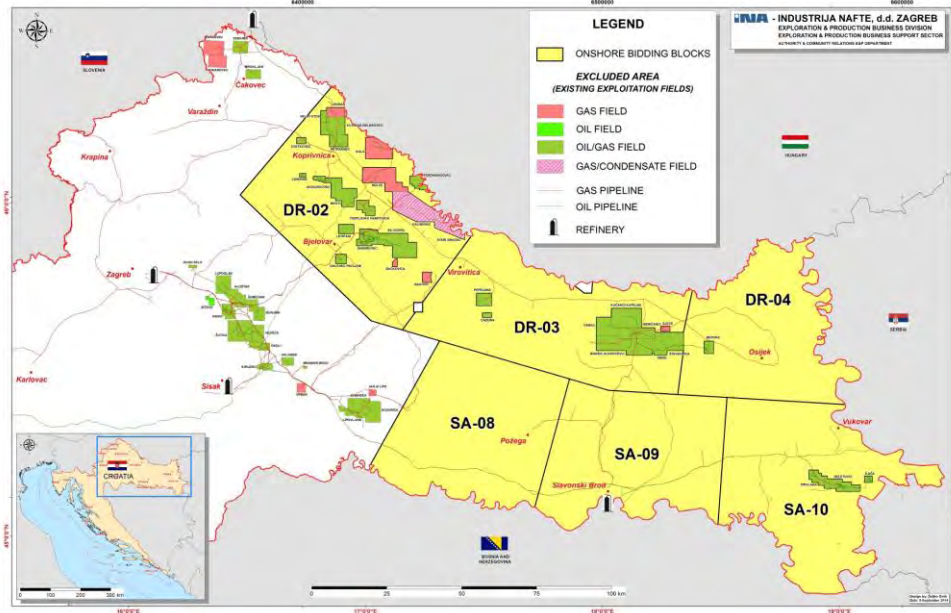
## Possibilities for the future:

- Deeper, complex targets
- Unconventionals, tight oil & gas
- Shallow gas
- Remaining satellite fields

# Pannonian exploration, INA track records 2009-2013



- All exploration licences either not renewed or revoked from INA
- Current exploration is limited with in existing mining plots as near field exploration
- Drilling 3 - 7 exploration wells annually
- Success ratio more than 60%
- Approx. 20 MM boe discovered, mostly oil
- STRING OF PEARLS; 4 „satellite” fields; Selec, Hrastilnica, Đeletovci Zapad, Bunjani Jug & gas-condensate field Dravica
- Campaign of tight oil & gas reservoirs stimulation kicked off in 2013, continued in 2014
  - 4 wells tight shale reservoirs fracturing program
  - 23 conventional development wells fracturing program
- Areas for further exploration have been prioritized
- After prospect inventory, INA identified a number of ready to drill prospects in both conventional & unconventional domain



- Mature area - intensive historic exploration and production – easy oil is already produced
- Approx. 85% of exploratory wells outside producing fields investigated section between 0-3500m
- Only 11% of the wells drilled down to 5500m
- Deeper section (bellow 3500m) is becoming more interesting for unconventional gas exploration
- INA carried out extensive revision of the Pannonian potential over the last 5y period
- Areas for further exploration have been prioritized
- After prospect inventory, INA identified a number of ready to drill prospects in both conventional & unconventional domain

- 1st cycle of exploration activities suspended in the late 80-ies.
- Exploration focus shifted from Ravni Kotari area & islands to Lika & Central Dalmatia where new HC play has been proposed
- New studies carried out recently

## Exploration started in late 1950`s

- 1959 – 1st exploration well RK-1 drilled
- Approx. 20 wells drilled, only 1, 400 km of poor quality crooked 2 D lines
- Only heavy (immature) oil indications with gas high in H<sub>2</sub>S

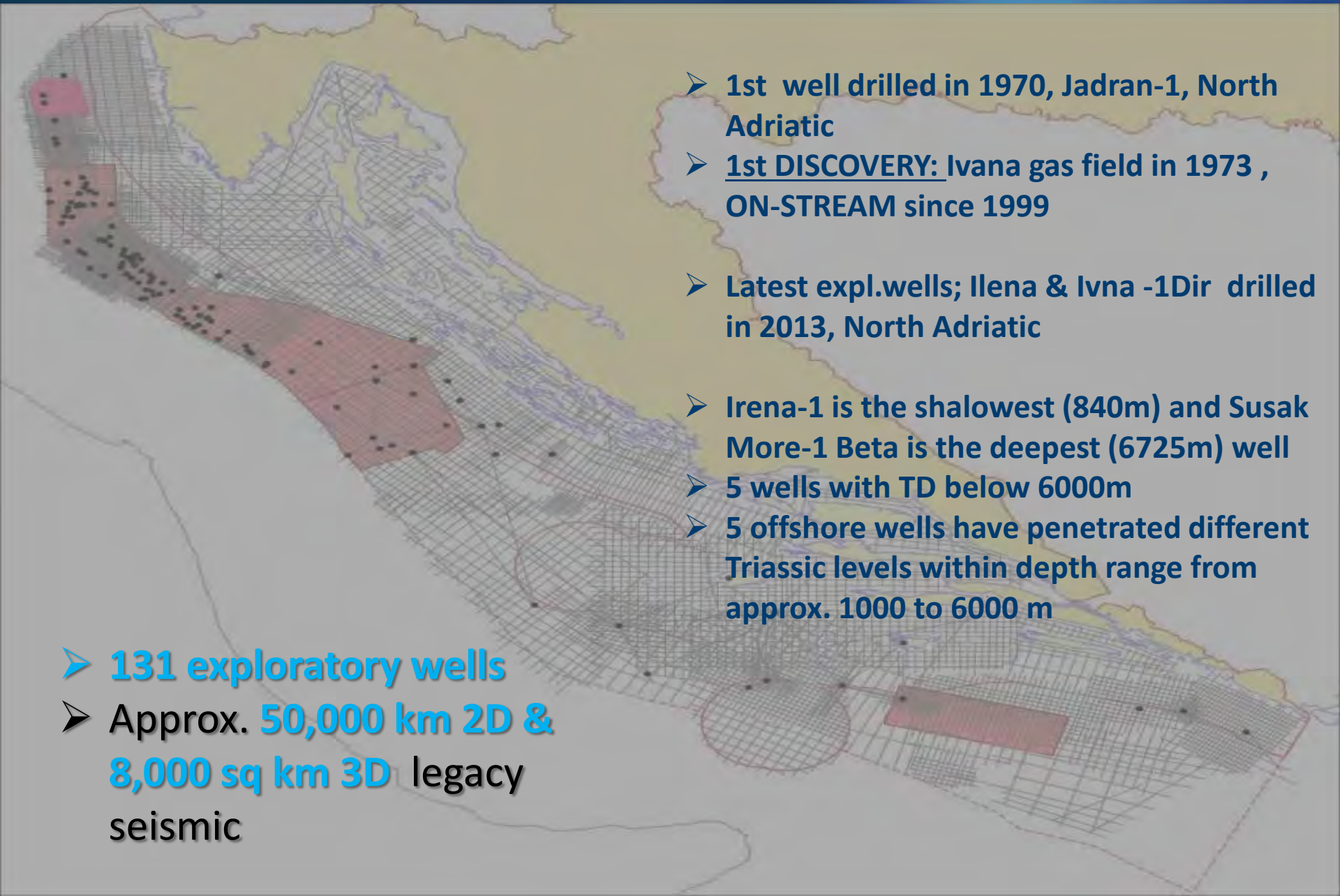


# Adriatic exploration track records

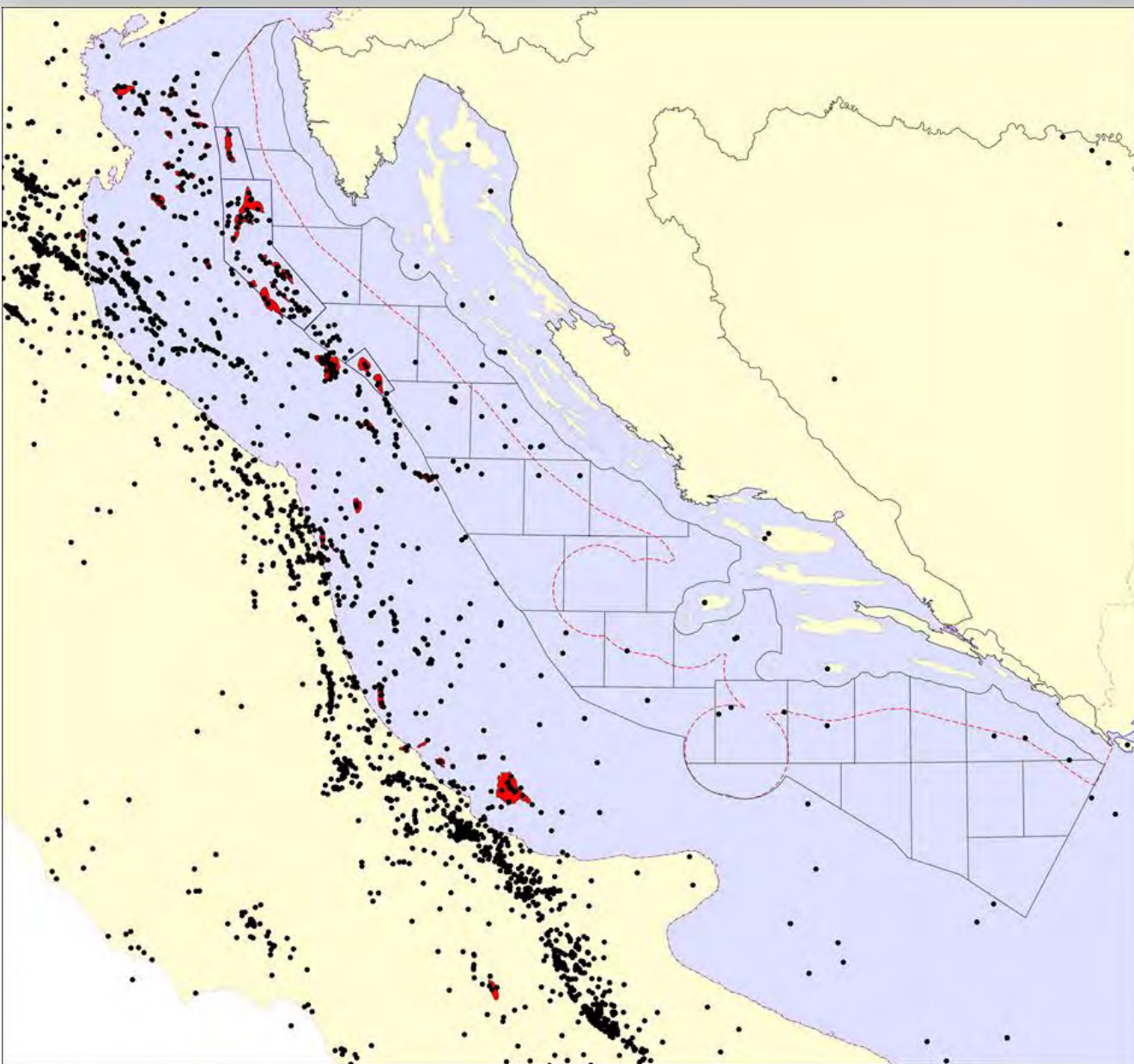


- **131 exploratory wells**
- **Approx. 50,000 km 2D & 8,000 sq km 3D legacy seismic**

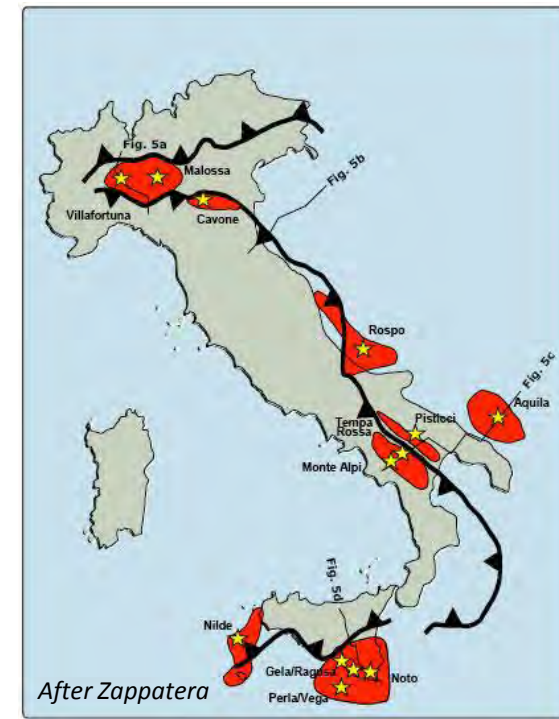
- **1st well drilled in 1970, Jadran-1, North Adriatic**
- **1st DISCOVERY: Ivana gas field in 1973 , ON-STREAM since 1999**
- **Latest expl.wells; Ilena & Ivna -1Dir drilled in 2013, North Adriatic**
- **Irena-1 is the shallowest (840m) and Susak More-1 Beta is the deepest (6725m) well**
- **5 wells with TD below 6000m**
- **5 offshore wells have penetrated different Triassic levels within depth range from approx. 1000 to 6000 m**



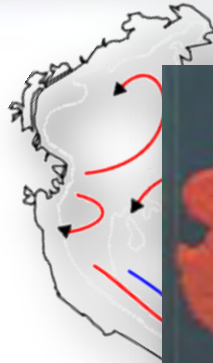
# Exploration intensity– Italian vs. Croatian Sector



- Croatian Sector of Central and South Adriatic is considered under explored.
- Several wells recorded oil shows in Cretaceous and Triassic
- Several discoveries in the same play were made in Italian sector; Aquila, Gove, Falco, Rovesti, Rospo Mare, Elsa, Miglianico







- Water depth at south
- Weather conditions
- Low reservoir pressure
- Deeper reservoirs
- Low geothermal gradient implicating high source rock risk, especially in central and north zone
- Hydrocarbon trap preservation risk – no model for oil type; from extremely heavy to light oils!
- Cost & Risk
- Impact on Environment

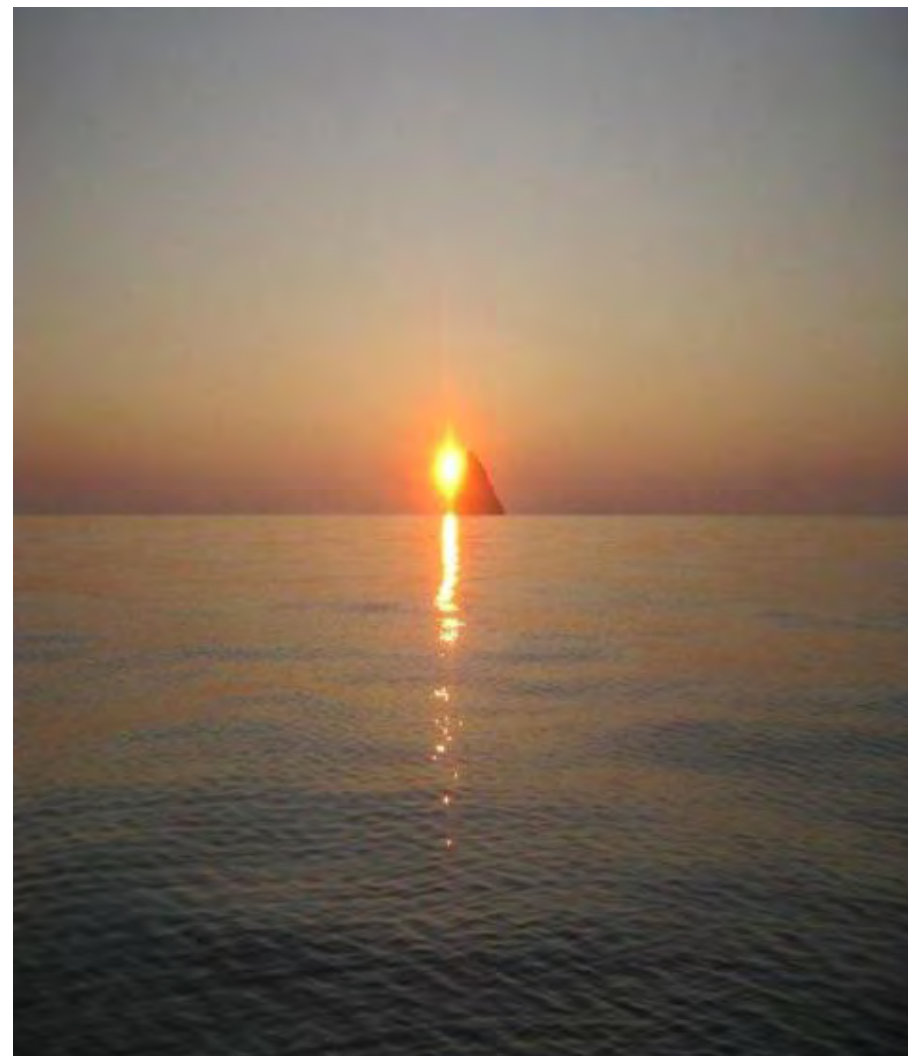
- Thorough revision of the Adriatic potential carried over the last 5y period, new concepts & plays proposed

## NORTH ADRIATIC

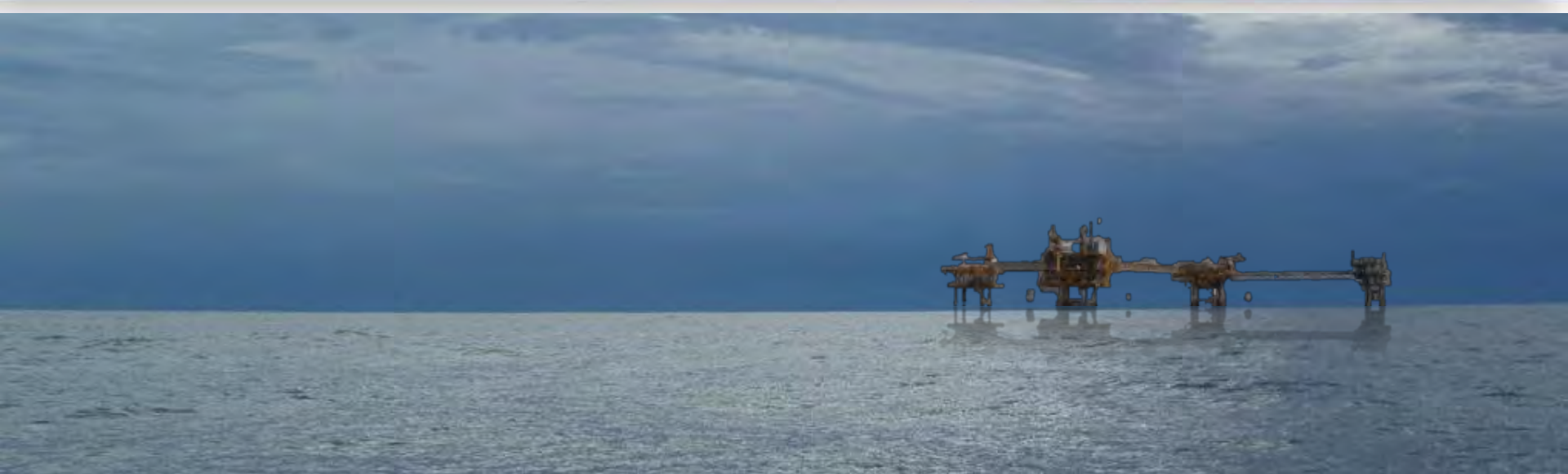
- INA with the Italian partners had 85% success ratio in the North Adriatic gas exploration over the the period 2000-2009
- Within last 5y focus on thin gas layers exploration, turned out riskier play than originally expected

## CENTRAL & SOUTH ADRIATIC

- Interpretation based on new piece of seismic data and new studies
- Public available Italian offshore data integrated in the interpretation
- Introduced some new techniques and methodologies in the offshore exploration
- New leads and prospects identified



- During the past, presence in over a 20 countries, both onshore and offshore; operators and non operators
- Strong regional player – tradition of modern oil and gas production for more than 75 years
- Multi-decade offshore experience
- In-house knowledge of geological structures and characteristics
- Well-established and functioning co-operation in Adriatic exploration and production with JV partners Eni and Edison
- Local company = no language barriers
- High potential to speed up the work program of a partnership



- Organic growth is seen as one of the Company key drivers
- Strategic goal is to consolidate our domestic portfolio and add value to INA assets in Croatia through getting exposure to new exploration Licenses both onshore & offshore
- Competitive advantages: expertise & long term experience in the area
- Diversified inventory of drillable prospects identified in Croatia, from conventional to unconventional plays, within low to high risk range, onshore & offshore
- INA has high potential to speed up the work program of a partnership; more efficient navigating around administrative barriers, knowing the system no language barriers, competent experts etc.

# SRETNO!

