# NATIONAL RENEWABLE ENERGY CO CO LLC
# OIL & GAS FIELD SERVICES

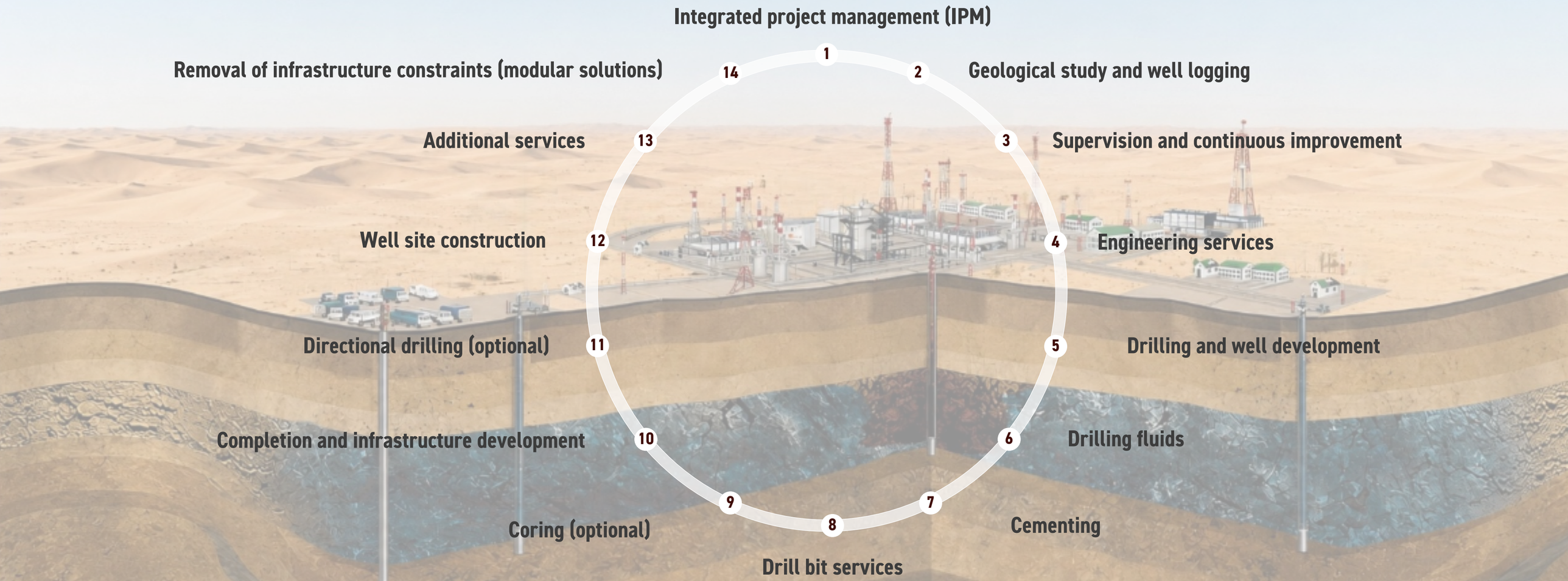
NRE

nreoilgasservice.com

## PROPOSED AREAS
## OF COOPERATION IN TURKMENISTAN



# 1.1 INTEGRATED ONSHORE OILFIELD SERVICES




## In-country value

- New engineering and digital solutions to increase oil production potential while keeping operations environmentally sound
- Integrated services built on our expertise in hard-to-recover reserves (HTRR) and brownfield redevelopment will increase production volumes and export potential
- Training of local personnel and localization of services in Turkmenistan

# 1.2 INTEGRATED OFFSHORE OILFIELD SERVICES



- Integrated project management (IPM)
- Drilling fluid services
- Quality control of chemical reagents
- Cementing
- Casing cutting
- Directional drilling
- Whipstock setting and window milling
- Drill bit services
- Integrated coiled tubing services
- Upper and lower completion
- Well logging and interpretation*
- Fishing and remedial operations
- Real-time drilling data transmission
- Casing and tubing running services
- Other technological and geological services
- Casing and tubing running supervision
- Non-destructive testing (NDT) inspection
- Supply and installation of packers and bridge plugs
- Well testing, including DST*

* Including services for the exploration and appraisal (E&A) stage

# 1.3 OPERATING MODEL

## OUR COMPETENCIES COVER THE FULL OILFIELD SERVICES CYCLE

1. RESERVOIR ENGINEERING CONCEPT
2. INFRASTRUCTURE MODEL ANALYSIS
3. PRODUCTION POTENTIAL ENHANCEMENT MEASURES*
4. COST-EFFECTIVENESS ANALYSIS
5. SERVICE CONTRACTING
6. FIELD SUPERVISION AND OFFICE SUPPORT
7. IMPLEMENTATION

CONTINUOUS INTERACTION BETWEEN THE CLIENT AND THE IPM TEAM

### HSE ON SITE

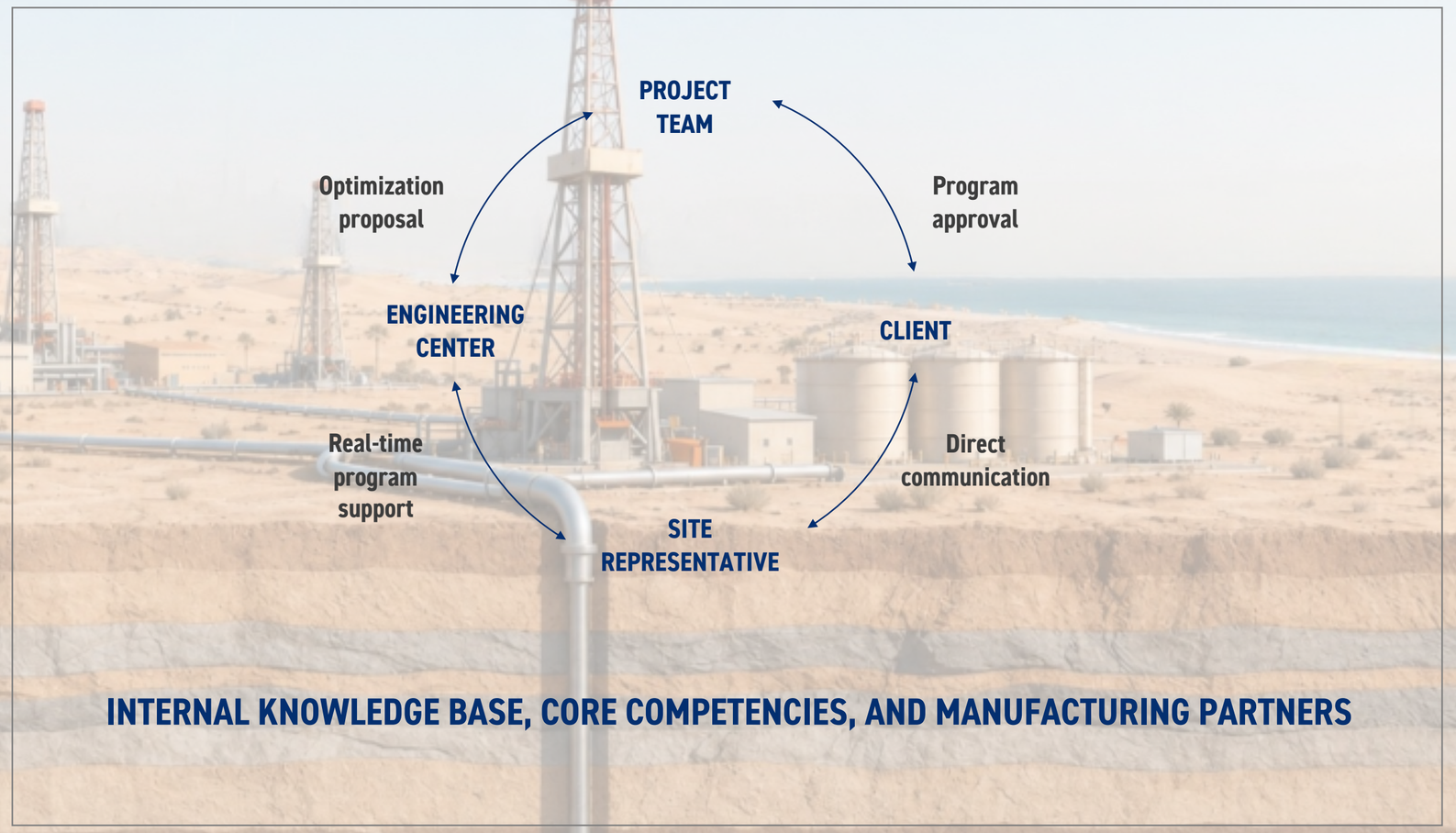
- Safe operations
- HSE commitment
- HSE leadership

### ORGANIZATION ON SITE

- Client interface
- Logistics and procurement hub
- Inspection and replacement of equipment
- Camp and living conditions management

### OPERATIONS ON SITE

- Management of production processes
- Accountability for quality
- Well construction process optimization




**INTERNAL KNOWLEDGE BASE, CORE COMPETENCIES, AND MANUFACTURING PARTNERS**

* New well design, sidetracking, well performance optimization, removal of infrastructure constraints (modular solutions), well completion, well interventions (hydraulic fracturing, acidizing, etc.)

# 2. PRODUCTION SHARING AGREEMENT (PSA)

## STATE

(owner of oil & gas resources)

- License blocks
- Grants resource use rights

## STATE CONCERN

- Resource user (license holder)
- Export and foreign trade
- Infrastructure

## NRE (CONTRACTOR)

- Geological study, exploration and development drilling, field infrastructure development, oilfield services, ancillary services
- Technical expertise

## JOINT VENTURE

- Baseline production – retained by the resource user
- Incremental production – shared between JV partners in an agreed proportion

# 3. OILFIELD EQUIPMENT SUPPLY

## 1. DRILLING EQUIPMENT

- Heavy drilling rigs (pad and stationary)
- Mobile drilling rigs (MDR)
- Top drive systems (TDS) and mud pumps
- Drilling fluid circulating and solids control systems
- Blowout preventer (BOP) equipment and manifolds

## 2. WORKOVER, WELL SERVICING & COILED TUBING

- Well servicing and workover hoisting units
- Coiled tubing units (CTU) and nitrogen units
- Hydraulic fracturing equipment and fleets

## 3. CEMENTING EQUIPMENT

- Cementing units (high-pressure pumping units)
- Batch mixers and slurry blending units
- Cementing monitoring and control stations
- Casing accessories (stage cementing collars, packers, float equipment)

## 4. DOWNHOLE & CORING TOOLS

- Drill bits (PDC, tricone) and core heads
- Positive displacement motors (PDM) and turbodrills
- Core barrels and inner core tubes (liners)
- Fishing tools (taps, overshots, mills)

## 5. TUBULAR GOODS (OCTG) & RUNNING SERVICES

- Drill pipe, casing, and tubing (OCTG)
- Hydraulic power tongs with computerized torque-turn control
- Spiders, elevators and casing centralizers
- Non-destructive testing (NDT) instruments and flaw detectors for tubulars

## 6. GEOPHYSICAL LOGGING & WELL TESTING

- Logging units and wireline winches
- Well logging tools and instrumentation
- Mud logging units (geological and technological monitoring)
- Drill stem testers (DST), wireline formation testers, and packer plugs

## 7. WELLHEAD & COMPLETION EQUIPMENT

- Christmas trees, tubing heads, and casing heads (wellhead assemblies)
- Packers (mechanical, hydraulic, swellable) and liner hangers
- Downhole screens (wire-wrapped, slotted, sand control screens)
- Multistage fracturing (MSF) sleeves and ports
- Whipstocks and window-milling tools

## 8. MODULAR & PROCESS EQUIPMENT

- Compact modular separation and loading units
- Mobile oil treatment units and final-stage separation units
- Booster pump stations and automated group metering units
- Tank farms (vertical and horizontal steel tanks) and chemical injection skids
- Skid-mounted process shelters, diesel power plants and living quarters modules

# 4. INTEGRATED UTILIZATION OF ASSOCIATED PETROLEUM GAS

**DEVELOPMENT OF MODERN INDUSTRIAL INFRASTRUCTURE FOR THE COLLECTION, TREATMENT AND INTEGRATED PROCESSING OF ASSOCIATED PETROLEUM GAS (APG) GENERATED DURING OIL PRODUCTION TOGETHER WITH AN EXPERIENCED PARTNER – 3S TECHNOLOGY**

## KEY AREAS OF ACTIVITY

- Building APG gathering systems directly at the fields
- Constructing modern gas processing facilities
- Developing gas treatment, purification and transportation systems
- Introducing technologies to recover valuable hydrocarbon fractions
- Producing marketable energy and petrochemical products
- Developing gas chemical production facilities
- Reducing process losses and gas flaring volumes

## STRATEGIC OBJECTIVE

**Efficient APG utilization and new industrial value chains**

**20–40%**

lower CAPEX than conventional schemes

**6–12 months**

payback on reference projects

## 3S — PROVEN GAS PROCESSING TECHNOLOGY

**1997**

Development started; first patents granted in 1998

**12**

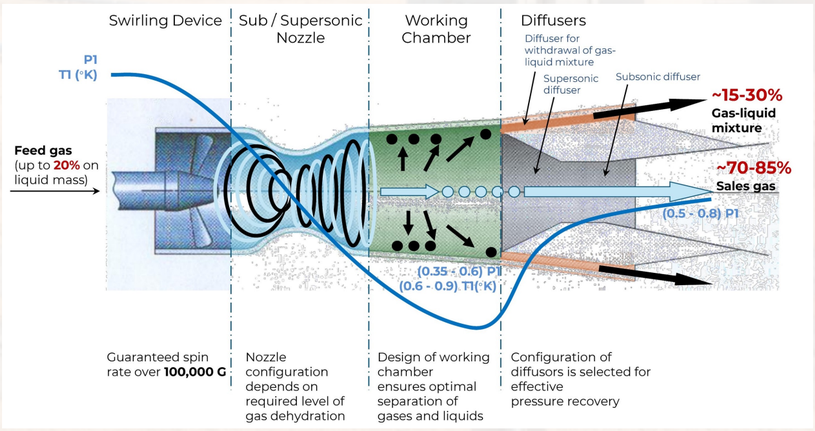
industrial units installed, incl. for Rosneft, Novatek and PetroChina

**10 bcm**

of gas per year processed by 3S units (over 1,000 MMSCFD)

**24 patents**

in 15+ countries, including Turkmenistan, Azerbaijan and Kazakhstan




### Installed units

- Single unit: 36–222 MMSCFD (42–250 thousand $Nm^3/h$)
- Largest: Komsomolskaya CS (Rosneft), 222 MMSCFD
- Combined: ~10 bcm of gas per year
- Separator size: ~3 m long, ~1.7 m in diameter

# 5. OIL SEPARATION AND TREATMENT SERVICES

## OBJECTIVE

**Production and treatment of hydrocarbons before permanent field infrastructure is built:**

- ✓ **Development of small and medium-sized fields** where conventional methods are not economically viable
- ✓ Operation of **fields in hard-to-reach regions**, such as the Arctic or remote offshore areas
- ✓ **Execution of pilot projects** to evaluate the commercial potential of new fields prior to major capital investments

## SOLUTION

| | |
|---|---|
| CMSLU | Oil separation and loading into tank trucks or the client's pipeline transport system |
| MWCTC | Well testing, oil separation and treatment, and oil transportation |
| MOTU | Full-cycle oil treatment to GOST / export-grade specifications (including dehydration and desalting) |

## IMPACT

- Minimal survey and design costs
- Lower construction and installation costs: no permanent structures requiring construction permits
- Material savings
- Shorter project timelines
- Optimized field infrastructure layout

## BENEFITS

- Compactness and **mobility**
- Low **capital intensity**
- Operational **flexibility**
- Environmental **safety**
- Deployment **speed**

## VALUE

- RELIABLE, FULLY CONTROLLED EQUIPMENT SUPPLY
- SERVICE PARTNER
- **TRANSPARENT** CONTRACTING **COSTS**
- TURNKEY SOLUTION – **MANUFACTURING, REPAIR, AND FIELD SERVICES**

**COMPACT MODULAR SEPARATION AND LOADING UNIT**



**CAPACITY:**
**400 M³/DAY**

**MOBILE WELL COMPLETION AND TESTING COMPLEX**



**CAPACITY:**
**350 M³/DAY**

**MOBILE OIL TREATMENT UNIT**



**CAPACITY:**
**2,400 M³/DAY**

# 6. PIPELINE MAINTENANCE AND INTEGRITY

## 1 INSPECTION AND MONITORING

- **UAV aerial inspection:** thermal imaging leak detection, LiDAR laser scanning for ground subsidence and pipe exposure
- **Gas leak detection:** drone-mounted laser methane analyzer for non-contact pinhole leak detection
- **Right-of-way (ROW) monitoring:** automated control of encroachments and geodynamic risks along the pipeline route
- **Corrosion monitoring:** ultrasonic thickness gauging, corrosion rate sensors and I&C monitoring systems

## 2 REPAIR AND MODERNIZATION

- **Mobile MRO units:** rapid deployment of repair crews with specialized equipment to the pipeline route
- **Hot tapping / in-service repair:** defect repair by installing steel and composite sleeves under pressure
- **Pumping station upgrades:** replacement, overhaul, and reliability enhancement of pumping units
- **Water injection pipelines:** modernization of injection infrastructure for stable reservoir pressure maintenance
- **Emergency response (ER) and spill containment:** readiness of emergency response teams for rapid spill localization

## 3 ROUTINE MAINTENANCE

- **Cathodic protection (CP) maintenance:** audit and adjustment of electrochemical protection systems against stray currents
- **Corrosion inhibition:** regular metered chemical injection to protect internal pipe walls
- **Pipeline pigging / internal cleaning:** scheduled runs of cleaning and magnetic pigs to remove deposits
- **Isolation valves:** maintenance and tightness testing of mainline gate valves

## PREDICTIVE ANALYTICS

Condition-based maintenance and repair rather than reactive failure response

### DATA

Integration of inline inspection (ILI) results, telemetry, drone imagery, and failure history

### MODEL

Digital calculation of remaining useful life, corrosion rates, and loss-of-containment risks

### DECISION

Automated repair prioritization and MRO budget optimization (cost reduction)

# PROPOSAL FOR COOPERATION

1

## INTEGRATED ONSHORE AND OFFSHORE OILFIELD SERVICES PROJECTS

2

## INTEGRATED APG UTILIZATION PROJECT WITH 3S TECHNOLOGY

**ALSO ON OFFER**

PRODUCTION SHARING AGREEMENT (PSA) • OILFIELD EQUIPMENT SUPPLY • OIL SEPARATION AND TREATMENT • PIPELINE MAINTENANCE AND INTEGRITY

# CONTACT US

# COMPANY PROFILE

## LEGAL INFORMATION

Company Name: National Renewable Energy Co Co LLC
Trade License No.: 975064
Date of Establishment: 31 August 2021

## OFFICE & CONTACTS

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Dubai, United Arab Emirates
P.O. Box: 300000
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Mobile: +971 54 405 0707

# APPENDIX

# ONSHORE WELL CONSTRUCTION

## EXPERIENCE:




IPM Holding is a reliable partner providing the full cycle of oil and gas well construction (appraisal, exploration and production wells) of any complexity, including extended-reach and multilateral wells, to client requirements.

State-of-the-art technologies, advanced engineering, proprietary transport solutions and full support at every project stage ensure safe and efficient operations in Russia and abroad.

**The fleet of 25 drilling rigs is regularly maintained and upgraded for specific project needs.**

# OFFSHORE WELL CONSTRUCTION

## EXPERIENCE:



Our team has extensive experience in offshore projects, including the Shtokman, Kirinskoye, Dolginskoye and Geofizicheskoye fields and the Ayashsky, Bautinsky and Severo-Obsky license areas.

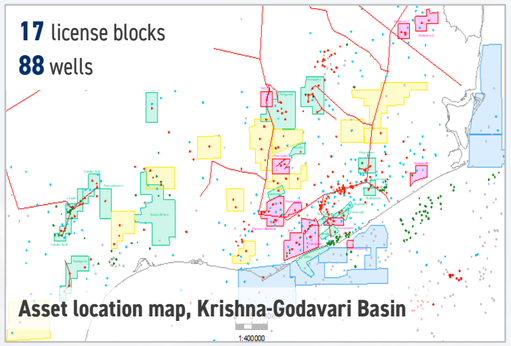
Since its founding, the company has completed five complex projects for key industry clients.

This offshore expertise is directly applicable to projects in the Caspian region.

# INTERNATIONAL EXPERIENCE: CASE STUDY – INDIA

## PHASE 1 – CURRENT

- Workover operations on existing wells
- Wellbore cleanout
- Well recompletion to adjacent reservoirs
- Formation productivity restoration
- Artificial lift implementation and optimization
- Hydraulic fracturing on existing wells
- Sidetracking (ST)
- Drilling of new wells



Asset location map, Krishna-Godavari Basin

### GEOLOGY AND SEISMIC DATA

- Conceptual geological models built for 100% of the license area
- Tectono-sedimentary model verified
- Seismic data quality audit and assessment completed
- Velocity modeling and well-to-seismic tie completed

### WELL DATA AND RESERVOIR ENGINEERING

- Geophysical, well testing, PTA, PVT, and production data analyzed and systematized
- Well log interpretation using a proprietary petrophysical model
- Lithology, porosity and fluid saturation evaluated
- Operational well test and production analysis, well nodal analysis completed

### VALUE CREATION AND COMMERCIAL MODEL:

- Development of conceptual models and long-term Field Development Plans (FDP)
- Remuneration: share of actual incremental production

## PHASE 2 – FUTURE

- Gasification
- Electrification
- Manufacturing
- Infrastructure development (ports, terminals)

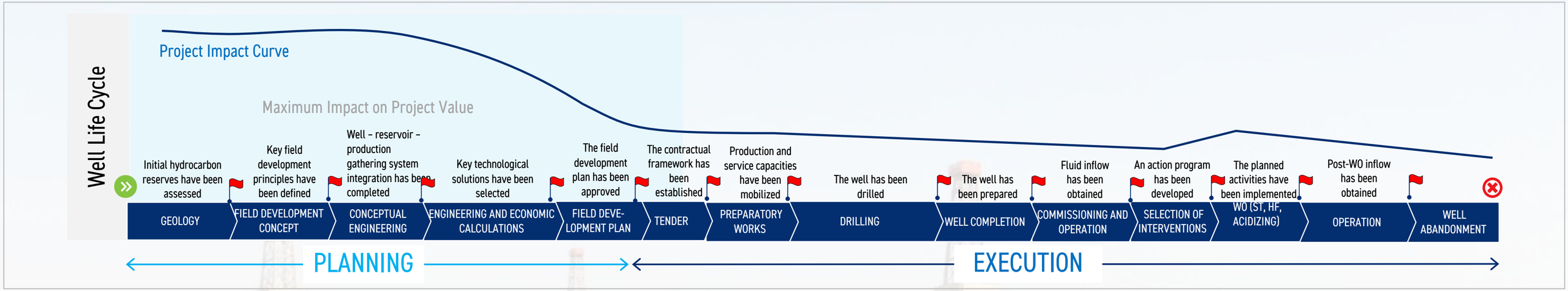

Machilipatnam port in Andhra Pradesh, India


Kakinada port in Andhra Pradesh, India

# CASE STUDIES: ENGINEERING & TECHNICAL CENTER



# ENGINEERING & TECHNICAL CENTER CAPABILITIES




## GEOLOGICAL SERVICES

- Verification of the Seismic and Geological Model
- Assessment of Risks and Opportunities of the Production Profile
- Well Potential Assessment
- Development System Optimization (max. Q, min. $)
- Development of an Uncertainty Reduction Program
- Selection of the Minimum Required Well Logging Suite
- Production History Analysis
- Seismic and Geological Model Update
- Identification of Remaining Recoverable Reserves Zones
- Selection of EOR Methods
- Assessment of Production Rate (Q) Upside Potential

## TECHNOLOGICAL SERVICES

- Analysis of Issues in Previously Drilled Wells
- Well Design Risk Assessment
- Development of Alternative Solutions for Key Issues (min Time / NPT)
- Selection of Technical Solutions for the Optimal Development Plan
- Preparation of Pilot Operation Designs
- Field Development Plan Audit
- Preparation of Drilling Programs
  Preparation of Terms of Reference for Service Companies
- Drill-the-Well-on-Paper (DWOP) Sessions
- Analysis of Current Issues and NPT Breakdown
- Selection of Integrated Technological Solutions
- Audit of the Current Well Construction Management Process Model
- Organizational Improvements (CI systems, technical limits, supervision, etc.)
- Technical Feasibility Analysis of Well Interventions
- Selection of Integrated Technological Solutions for Workover Operations

## COST ENGINEERING

- Cost Estimate Review
- Benchmarking
- Identification of the Optimal Q / CAPEX Ratio
- Scenario-Based Project Execution Assessment
- Cost Assessment of Proposed Measures
- Assessment of Implementation Profitability
- Identification of Scenarios for NPV Maximization

**ALL SOLUTIONS ARE FOCUSED ON INCREASING Q / CAPEX**

**ACCOUNTABILITY FOR RESULTS**

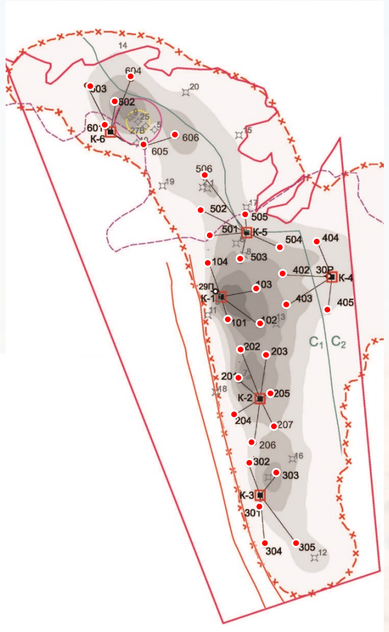
**CUSTOMIZATION / FLEXIBILITY OF INVESTMENT SOLUTIONS (CHANGE MANAGEMENT)**

**FOCUS ON ASSET BUSINESS EFFICIENCY**

# CASE 1. FIELD N: DRILLING AND FIELD DEVELOPMENT PLANNING

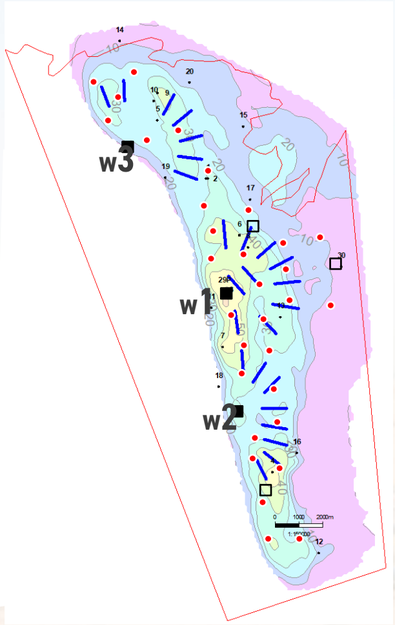
## BASE CASE

- 6 well pads
- 32 directional wells

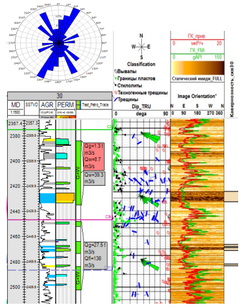


## PROPOSED ALTERNATIVE

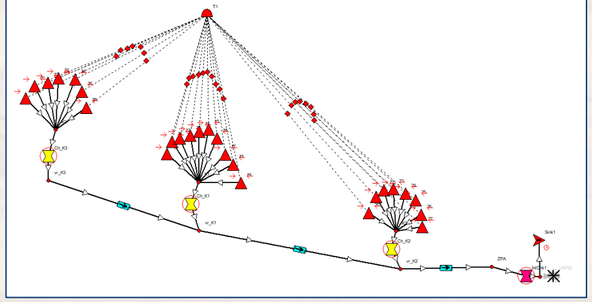
- 3 well pads
- 25 horizontal wells




### REFERENCE WELL: ADVANCED LOGGING + FMI INTERPRETATION



### GEOLOGICAL STRUCTURAL MODEL (HORIZONS)



## OBJECTIVE

- Verification of the technical and cost assessment of drilling, the development system, and the in-field gas gathering network

## PROJECT FEATURES

- Medium-size carbonate gas field at the development preparation stage (concept stage). Challenging surface conditions (river floodplain)

## KEY RESULTS

- ✓ Review of the seismic and geological model
- ✓ Identification of productivity drivers and risks
- ✓ Analysis of surface and climatic conditions
- ✓ Analysis of surface facilities concepts
- ✓ Changes to the development system and well designs were proposed, enabling a twofold reduction in the number of well pads (minimization of surface facilities being the key challenge)
- ✓ Local optimizations to the well construction project were proposed, resulting in reduced cost and operational risk
- ✓ Local optimizations to the field facilities project were proposed, reducing overall cost
- ✓ An alternative routing of shorter pipeline corridors was proposed
- ✓ An integrated model was developed, scenario analysis was performed, and a robust solution for pipeline diameters was identified
- ✓ An implementation roadmap was developed, accounting for verification of geological hypotheses
- ✓ The production profile was calculated

Project duration: 3 months

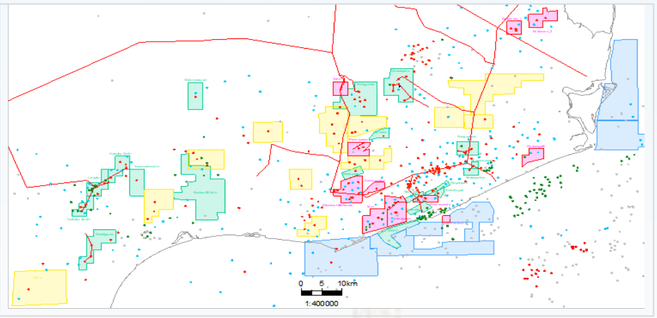
## CUSTOMER VALUE

- Estimated CAPEX reduced by RUB 19 billion while maintaining target production (Q)

# CASE 2. FIELD GROUP O: DRILLING AND DEVELOPMENT PLANNING

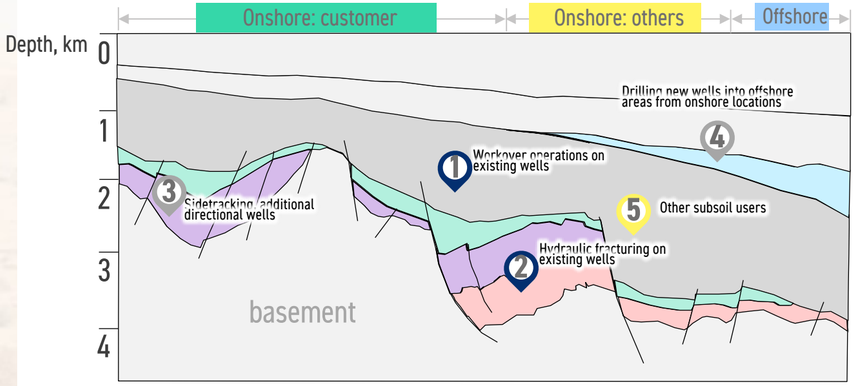
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## MAP OF LICENSE BLOCK LOCATIONS WITHIN THE OIL AND GAS BASIN OF COUNTRY Y

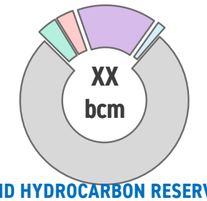



- Customer license blocks
- License blocks of other private companies (onshore)
- License blocks of other private companies (offshore)
- License blocks offered for tender by the state-owned company
- Gas wells
- Oil wells
- Dry wells

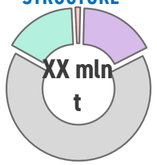
## SCHEMATIC GEOLOGICAL CROSS-SECTION OF THE BASIN

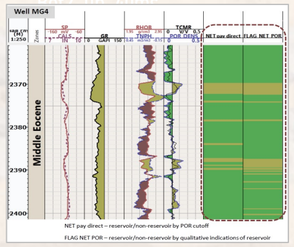


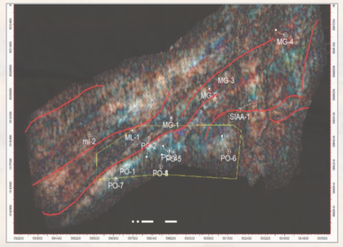

## GAS RESERVES STRUCTURE

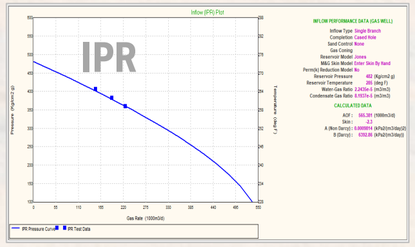



## LIQUID HYDROCARBON RESERVES STRUCTURE




## OBJECTIVE

- Workover and well intervention program for the existing well stock, including hydraulic fracturing, ahead of new drilling

## PROJECT FEATURES

- Highly complex geology with abnormally high formation pressure (pressure coefficient up to 1.8); reserves in small isolated accumulations; a large share of producing wells is in decline

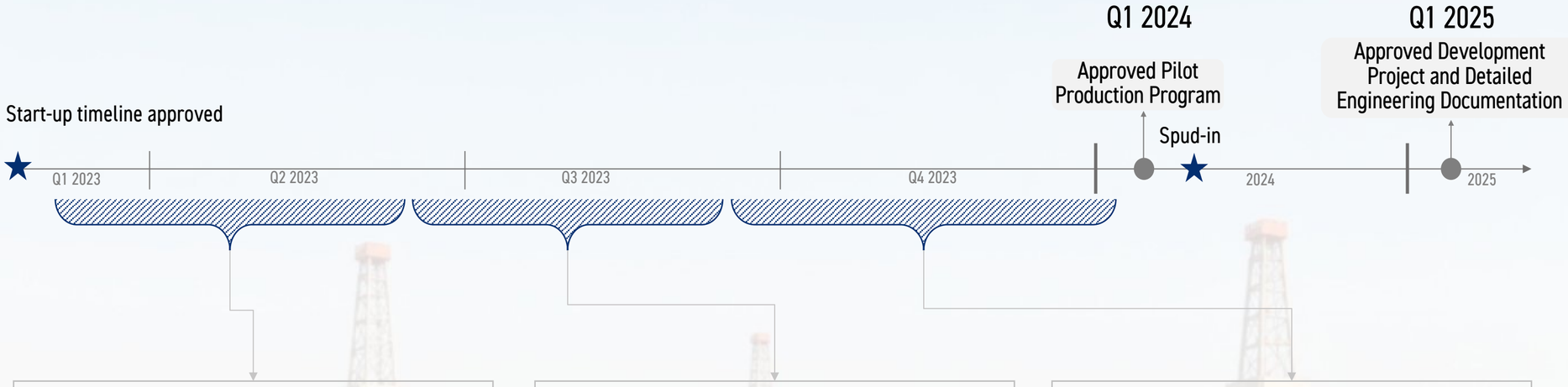
## KEY RESULTS

- ✓ Well log data were re-interpreted, seismic data were analyzed, and a geological concept was developed
- ✓ Remaining recoverable reserves were evaluated
- ✓ Geophysical data, well tests, pressure transient analysis, PVT data, and production data were analyzed and systematized
- ✓ A well intervention program was developed and approved by the customer
- ✓ An audit of the well stock, drilling results, and drilling complications was conducted
- ✓ Hook-load requirements for mobile drilling rigs and coiled tubing units were calculated
- ✓ Time budgets by workover and coiled tubing operation type were prepared
- ✓ Required crew configurations for workover and coiled tubing operations were prepared and cost-estimated
- ✓ Required quantities of chemicals and materials were calculated and cost-estimated
- ✓ Workover duration calculations were performed and an execution schedule was developed
- ✓ A production profile was calculated

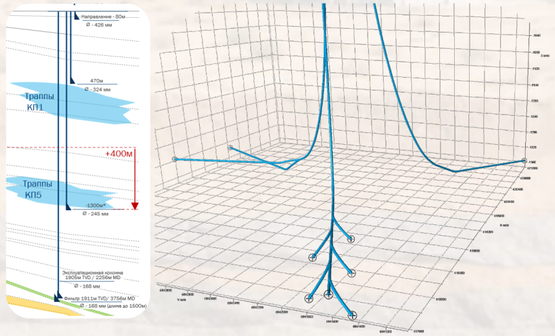
## CUSTOMER VALUE

- **60 operations (43 wells)** – workover operations on existing wells
- **18+ operations** – hydraulic fracturing on existing wells
- **2 wells** – sidetracking
- **8 wells** – new drilling, including extended-reach drilling

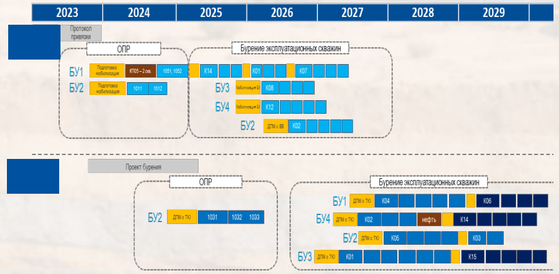
# CASE 3. FIELD X: EARLY START OF DRILLING WITH INCOMPLETE PROJECT DOCUMENTATION



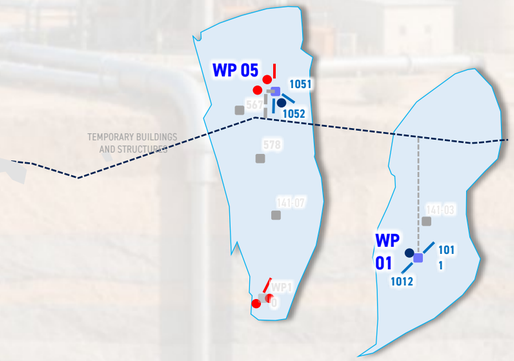

- Drilling technological capability calculations to support the selection of the optimal development system
- Analysis and justification of alignment with the existing Development Project of Field K
- Analysis and consideration of drilling complications observed in the historical well stock




- Participation in the development of alternative drilling schedule scenarios
- Evaluation of alternatives for flexible response to changes based on pilot operation results
- Development of a roadmap for drilling project implementation




- Development of drilling rig and equipment mobilization scenarios
- Comparison of drilling options using rotary steerable systems and mud motors, including market analysis of RSS suppliers and manufacturers
- Start of drilling execution and engineering preparation of well pads and access roads




## OBJECTIVE

- Drill wells on a compressed schedule to meet the mandated field start-up date

## PROJECT FEATURES

- The Field Development Scheme and project documentation were not complete at the start of planning
- Work based on preliminary data
- Parallel execution of activities

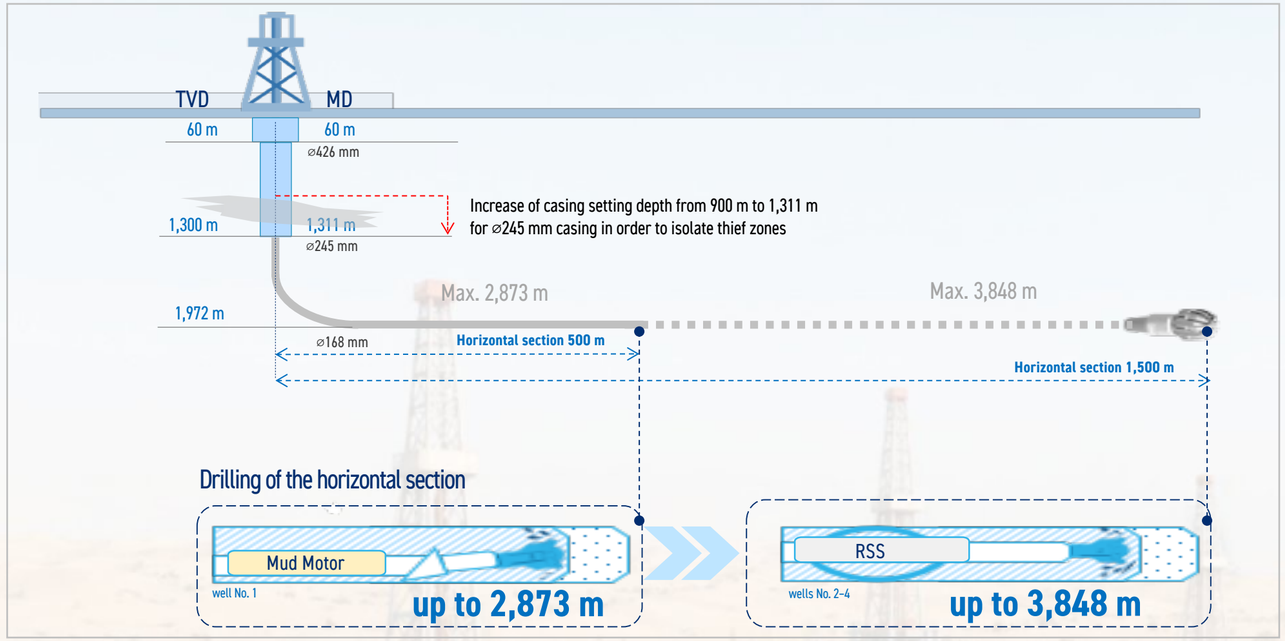
## KEY RESULTS

- ✓ Optimal technical solutions were selected based on the probability of implementation of multiple scenarios
- ✓ A pilot design was prepared and scaled up for replication
- ✓ Optimal technological solutions were incorporated into the Field Development Scheme under preparation (see next slide)
- ✓ A drilling program, project execution plan, and drilling rig mobilization plan were developed
- ✓ Contractual framework was established

## CUSTOMER VALUE

- Project delivered within the mandated deadlines
- Field start-up was accelerated by **2 years**

# CASE 4. FIELD X: TECHNOLOGY SELECTION FOR THE OPTIMAL DEVELOPMENT PLAN




## OBJECTIVE

Reduce drilling risks and identify solutions to increase production potential

## PROJECT FEATURES

- Complex host formation (salt tectonics)
- No final development project

## KEY RESULTS

- ✓ Analysis of appraisal well drilling
- ✓ Adaptation of an analogue field development design
- ✓ Improvement of the adapted design solutions
- ✓ Optimization of geological and geotechnical data
- ✓ Development of a step-by-step plan to transition to extended-reach horizontal wells (increase in production)

## CUSTOMER VALUE

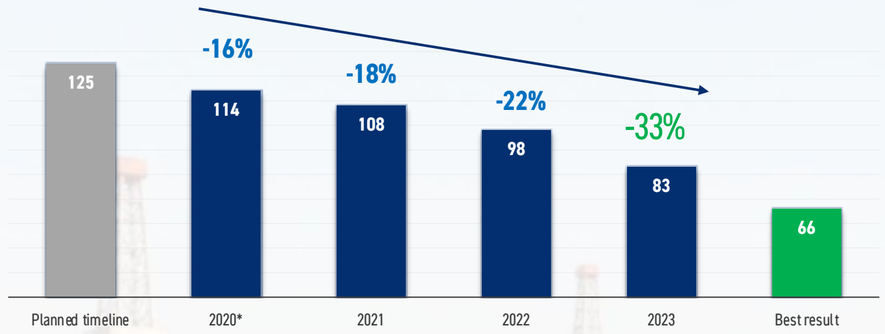
- Optimal development plan implemented (fewer well pads, same production)
- Lower risks when drilling through overlying formations

| SOLUTION | STATUS |
|---|---|
| **Design-related** | |
| Deepening of the ⌀245 mm section down to 1,300 m to isolate the interval of severe losses | ✓ |
| Drilling of horizontal sections up to 1,500 m using rotary steerable systems, and up to 500 m using mud motors | ✓ |
| ⌀324 mm casing is run in case of catastrophic losses | ✓ |
| **Modification of design solutions** | |
| Elimination of downhole equipment assemblies | ✓ |
| Additional stage cementing collar MC5-168 | ✓ |
| Turbo reaming shoe BKSP168 Lite instead of casing shoe USPGTs2.168/245.060 | ✓ |
| Auto-fill and circulation system when running ⌀168 mm casing | ✓ |
| **Additional measures** | |
| Oscillation tool when drilling with a mud motor | ✗ |
| High-performance lubricants in the drilling fluid | ✓ |
| Casing rotation when running ⌀168 mm casing (CRTi) | ✗ |
| Flotation collar when running ⌀168 mm casing | ✗ |
| Low-friction centralizers on ⌀168 mm casing | ✗ |

✓ Approved by the customer
✓ Accepted for execution
Technological risks during implementation
✗ Rejected after analysis

# CASE 5. FIELD Z: REDUCING WELL CONSTRUCTION TIME

## AVERAGE WELL CONSTRUCTION TIME, DAYS




## EFFECT FROM THE 2023 INITIATIVES

**OPTIMIZATION OF DESIGN SOLUTIONS**
elimination of operations, shorter waiting-on-cement (WOC) time

**4.3 days per well**

**NEW TECHNOLOGIES**
RSS, down-the-hole hammer drilling, electromagnetic tools

**5.8 days per well**

**ORGANIZATIONAL MEASURES**
drilling practice guidelines, well pad optimization, drilling parameters, reduction of well logging scope

**4.9 days per well**

**TOTAL PER WELL**
relative to 2022 benchmarks

**15 days per well**

## OBJECTIVE

- Identify solutions to accelerate well construction

## PROJECT FEATURES

- Complex geological section (salt tectonics)
- High lateral heterogeneity
- Zones of catastrophic losses

## KEY RESULTS

- ✓ A unified communication environment has been established
- ✓ Best practices have been replicated (well testing optimization)
- ✓ Well design risk assessment has been performed
- ✓ Development and implementation of measures to reduce non-productive time (NPT)
- ✓ Technological solutions have been developed and proposed (including new technologies)
- ✓ Pilot testing programs have been developed

## CUSTOMER VALUE

- Construction time reduced by 35%
- Cost reduced by 15%