



APRENDIZAJES, INNOVACIÓN Y TECNOLOGÍA EN EL DESARROLLO DE VACA MUERTA



Semana de la Ingeniería 2021 – CAI

Presidente de Shell Argentina
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This presentation contains certain following forward-looking non-GAAP measures such as cash capital expenditure and divestments. We are unable to provide a reconciliation of these forward-looking Non-GAAP measures to the most comparable GAAP financial measures because certain information needed to reconcile those Non-GAAP measures to the most comparable GAAP financial measures is dependent on future events some of which are outside the control of the company, such as oil and gas prices, interest rates and exchange rates. Moreover, estimating such GAAP measures with the required precision necessary to provide a meaningful reconciliation is extremely difficult and could not be accomplished without unreasonable effort. Non-GAAP measures in respect of future periods which cannot be reconciled to the most comparable GAAP financial measure are calculated in a manner which is consistent with the accounting policies applied in Royal Dutch Shell plc's consolidated financial statements.

Also, in this presentation we may refer to Shell's "Net Carbon Footprint", which includes Shell's carbon emissions from the production of our energy products, our suppliers' carbon emissions in supplying energy for that production and our customers' carbon emissions associated with their use of the energy products we sell. Shell only controls its own emissions. The use of the term Shell's "Net Carbon Footprint" is for convenience only and not intended to suggest these emissions are those of Shell or its subsidiaries.

Shell's operating plan, outlook and budgets are forecasted for a ten-year period and are updated every year. They reflect the current economic environment and what we can reasonably expect to see over the next ten years. Accordingly, Shell's operating plans, outlooks, budgets and pricing assumptions do not reflect our net-zero emissions target. In the future, as society moves towards net-zero emissions, we expect Shell's operating plans, outlooks, budgets and pricing assumptions to reflect this movement.

SHELL EN ARGENTINA

- ❑ 106 AÑOS EN ARGENTINA – DESDE 1914
- ❑ + 2.000 PUESTOS DE TRABAJO DIRECTOS/INDIRECTOS
- ❑ + 1.500 MUSD DE INVERSIÓN EN 2016-2021

❑ SHALES - Vaca Muerta

■ SOV

- Sierras Blancas (+GyP)
- Cruz de Lorena (+GyP)
- Coirón Amargo Sur Oeste (+GyP)
- Bajada de Añelo (+YPF)

■ NOV

- Rincón La Ceniza (Total op.)
- La Escalonada (Total op.)
- Bandurria Sur (YPF op.)

❑ CONVENCIONAL

- ❑ Acambuco (PAE op.)

❑ OFFSHORE – Cuenca Argentina Norte

■ Operados por Shell

- CAN 107 (+QP)
- CAN 109 (+QP)

■ NOV

- CAN 100 (+YPF & Equinor op.)

❑ DOWNSTREAM

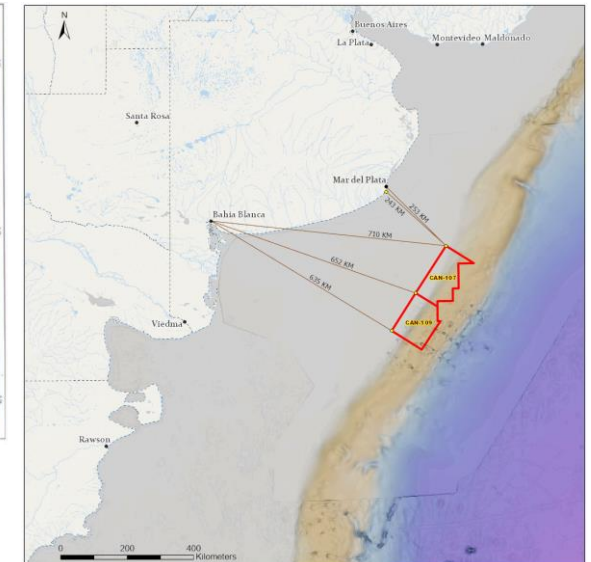
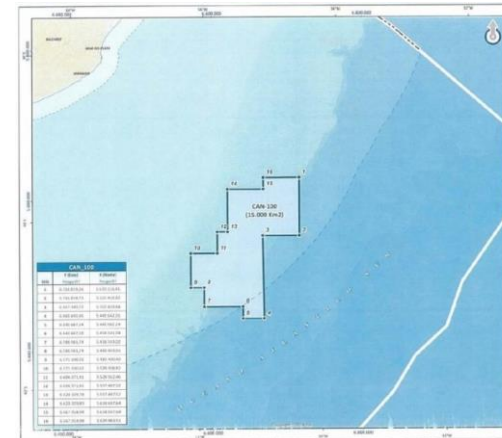
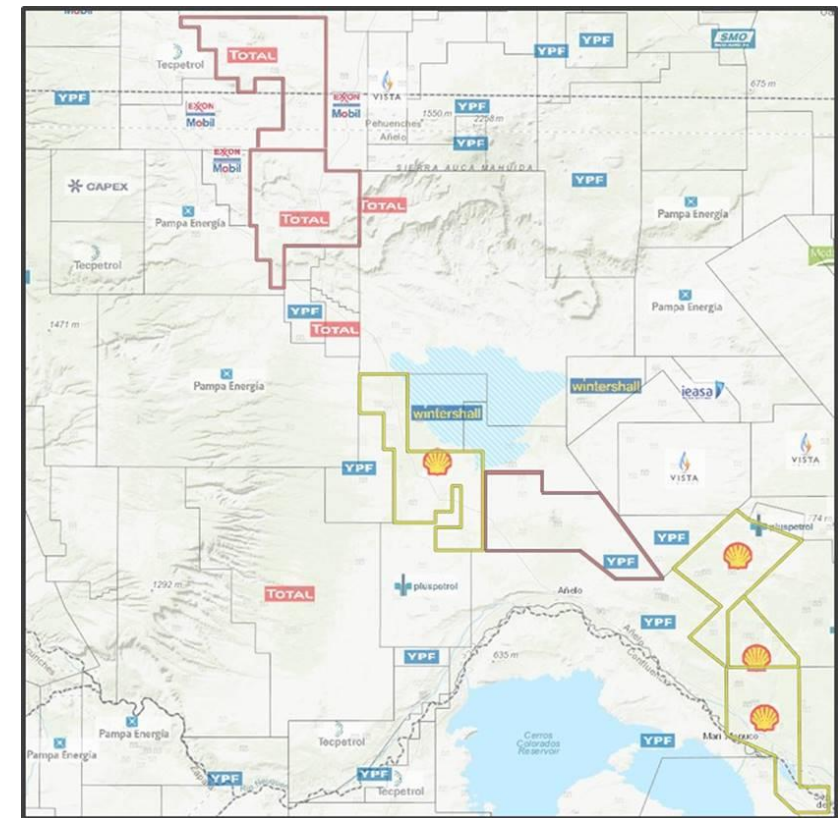
- Accionista de Raízen
- Refinería + 675 estaciones de servicio

❑ TRADING

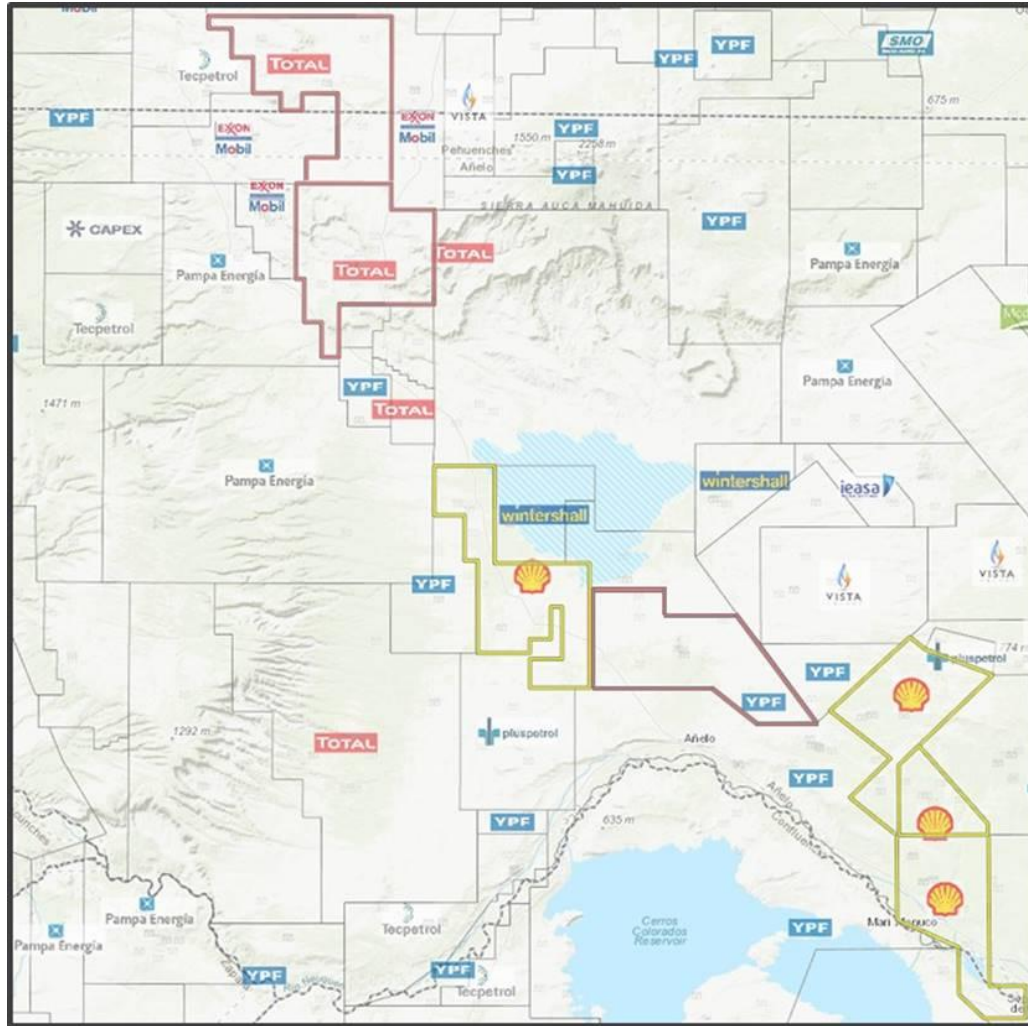
❑ QUÍMICOS

❑ GAS

❑ NUEVOS NEGOCIOS



PRESENCIA E INVERSIÓN EN VACA MUERTA

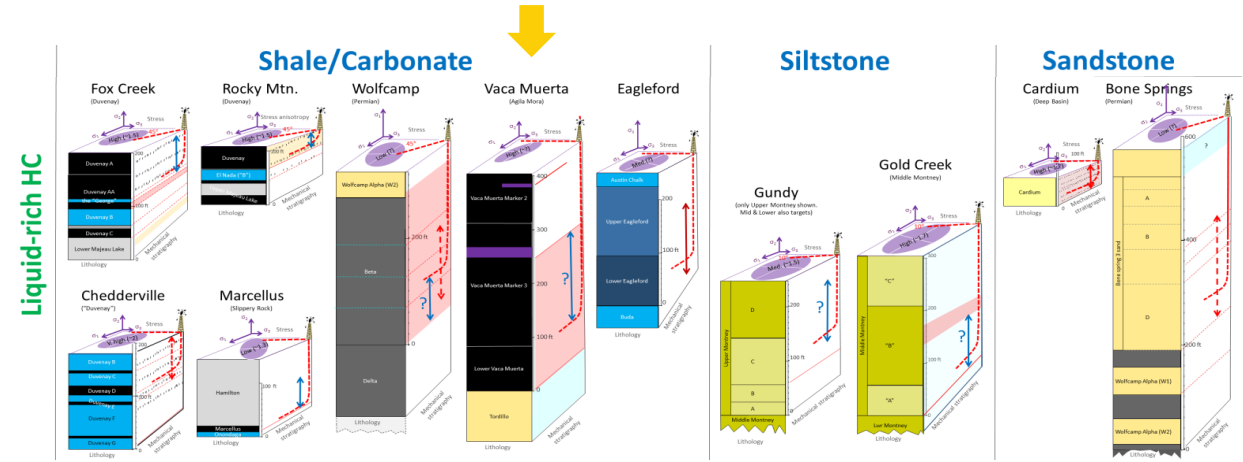


BLOQUES Y RESULTADOS

- 4 bloques operados
 - Sierras Blancas, Cruz de Lorena, Corión Amargo Sur Oeste (GyP)
 - Bajada de Añelo (YPF)
- 3 bloques no operados
 - Bandurria Sur (YPF-Equinor)
 - La Escalonada (Total)
 - Rincón La Ceniza (Total)
- 4 equipos en operación (2 high spec rigs & 2 top-hole rigs)
- 1 frac spread
- +50 pozos operativos (promedio de perforación de ~30 pozos p.a.)
- ~ 9.2 etapas de fractura por día promedio
- EPF (12,000 bpd) + CPF (30,000 bpd) en funcionamiento mas Piloto en Bajada de Añelo (4,500 boe/d)
- Producción (Q1-21): ~ 15,000 bpd (~ 200% vs. Q1-2020)

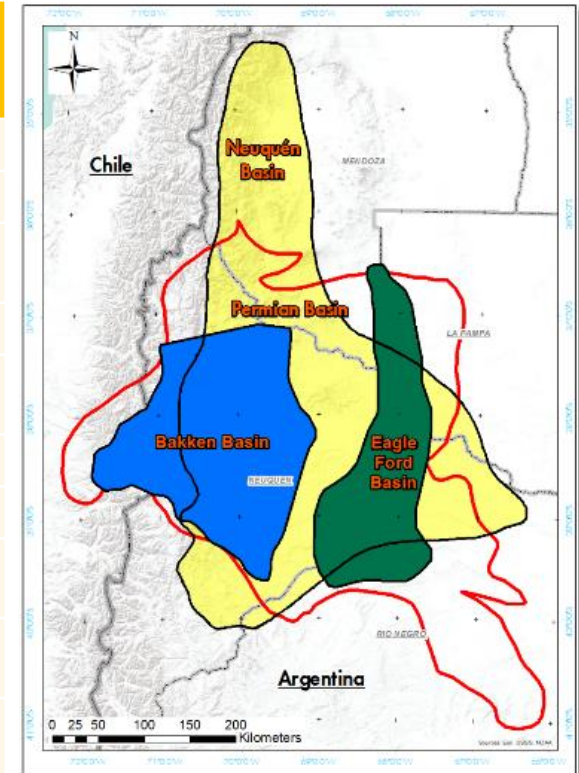
RECURSO DE EXCELENCIA

- Las propiedades técnicas del reservorio lo ubican en el primer cuartil de activos No Convencionales
- La porosidad, el TOC y la presión de la roca son consideradas “best in class”

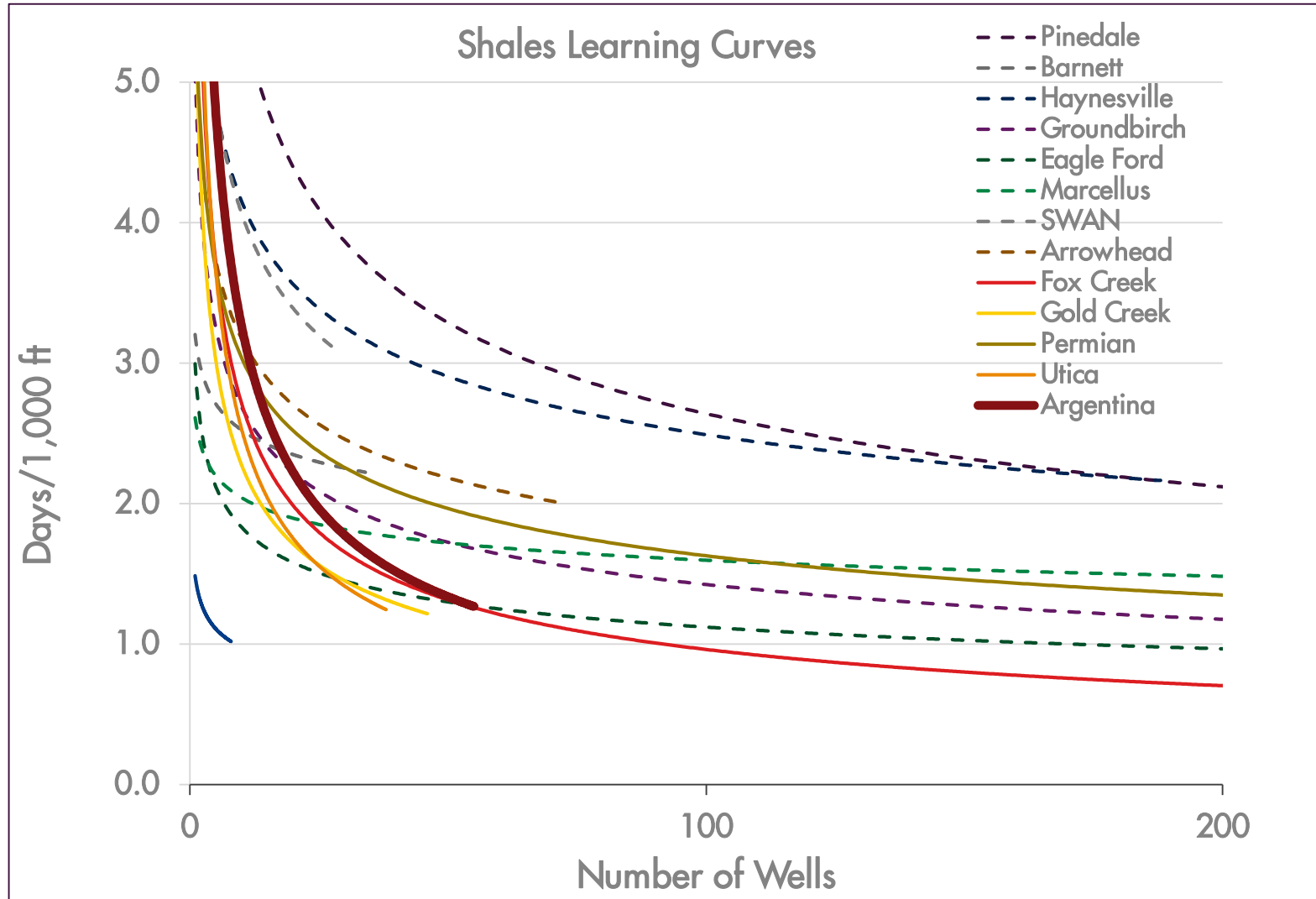


Scale comparison cartoon by Stephenson et al.

	Vaca Muerta Sequence 1AB SOV Harvest	Permian Wolfcamp Beta Harvest	Fox Creek Duvernay Harvest	Groundbirch Montney Harvest	Appalachia Utica/PPLS Harvest
Rango de grosor	35-60m	60-120m	20-40m	120-180m	80-130
Rango N/G	1	1	1	0.97-1	1
Rango de porosidad promedio	9-11 %	6-10%	4.4-5.0%	2.7%/5.4%/7.5%	1.1-8.5%
Rango promedio de Sw	15-30%	40-60%	20-26%	20-30%	18-48%
Rango promedio de permeabilidad de la matriz	100-1000 nD	1000-3000 nD	~10 nD	1-200 nD	4-900 nD
Rango promedio de TOC	2.1-5.7 wt%	1.0-1.75 wt%	1.3-4.0 wt%	1.2-1.9 wt%	1.1-3.0 wt%
Rango de presión	48-69 Mpa	35-66 Mpa	48-57 Mpa	30-50 MPa	55 - 63 Mpa
Rango de gradiente de presión	15-21 kPa/m	11-18 kPa/m	14-20 kPa/m	12-16 kPa/m	18-19 kPa/m
Rango CGR	2500 - 5000 bbl/mmscf	180 - 500 bbl/mmscf	200 - 800 bbl/mmscf	0 - 10 bbl/mmscf	0 bbl/mmscf
Est. Efectividad de altura de fractura	30/45/80 m	30 m	20 - 40 m (=gross thickness)	35 - 80 m	45 - 81 m



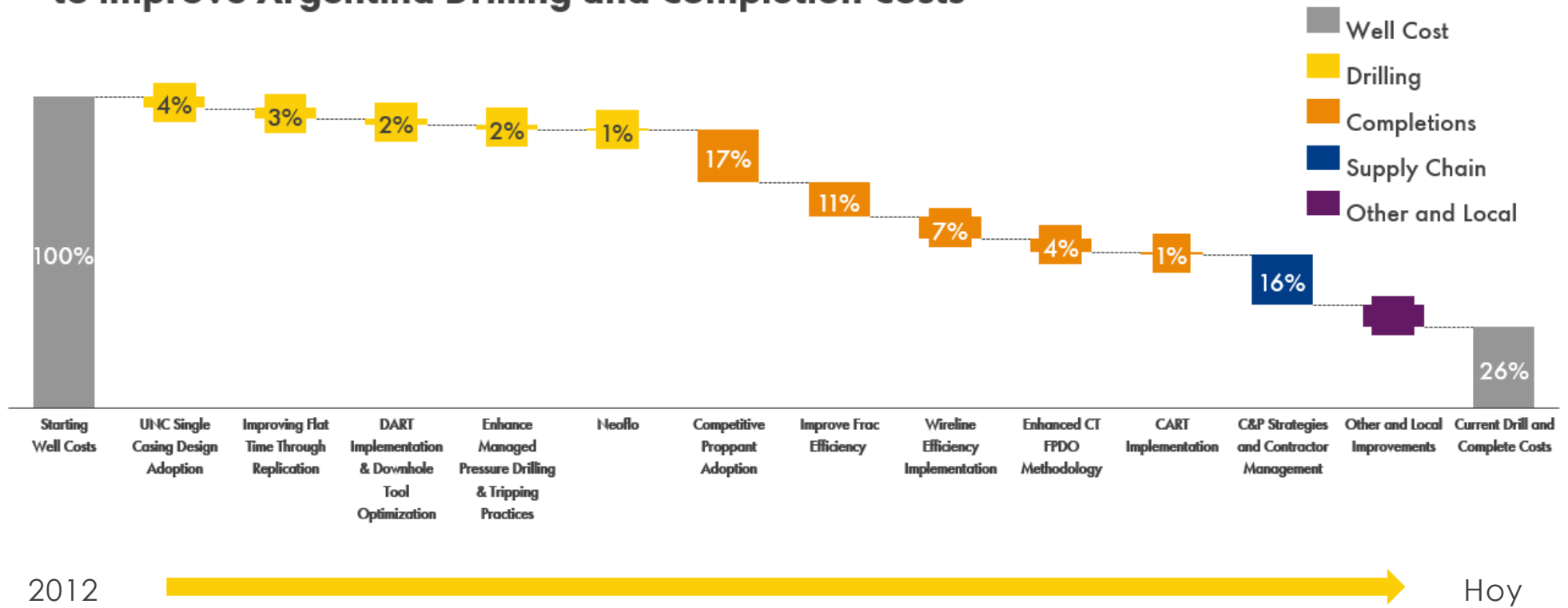
ACELERANDO LA CURVA DE APRENDIZAJE



- Argentina se beneficia de la experiencia Shale en América del Norte
- Perforaciones llegando a los mismos niveles de eficiencia en ~25% de tiempo
- Intercambios de habilidades y conocimientos
- Aplicación rápida de tecnologías de punta externas

REDUCCION DE COSTOS POR INNOVACION

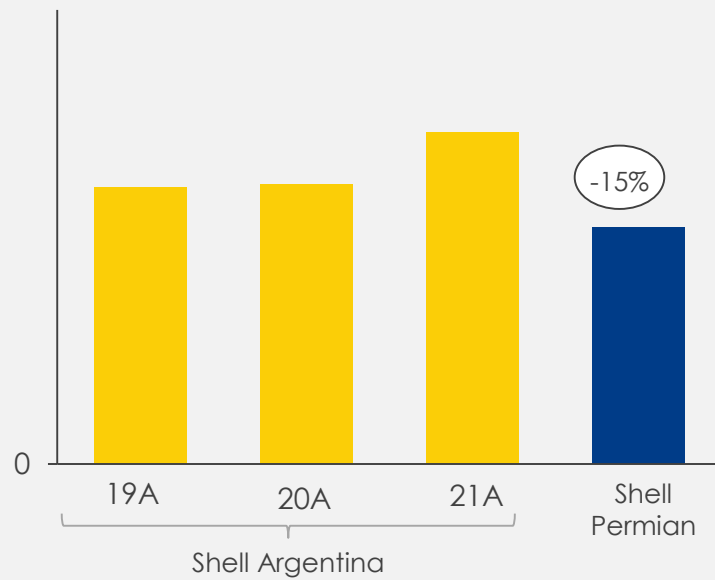
Shell leveraged technical improvements across the Shales portfolio to improve Argentina Drilling and Completion Costs



MARGEN PARA SEGUIR MEJORANDO LA COMPETITIVIDAD CON PERMIAN

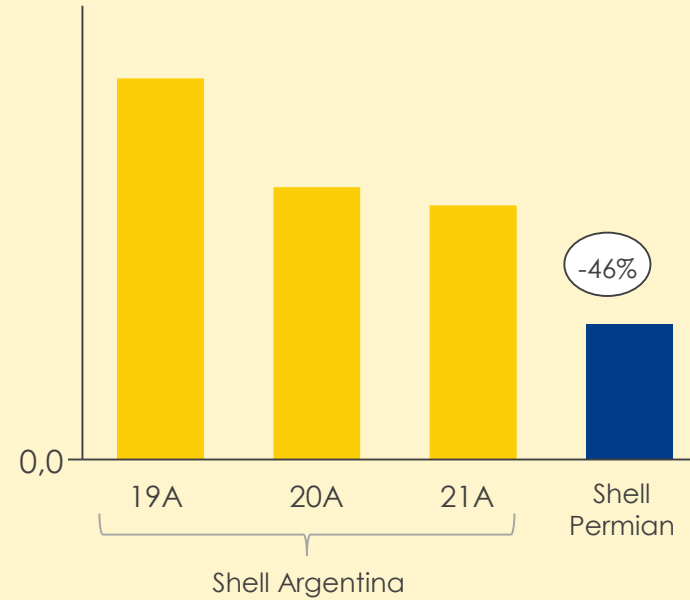
NORMALIZED AVERAGE DRILLING COSTS

\$/ft



NORMALIZED COMPLETIONS COSTS

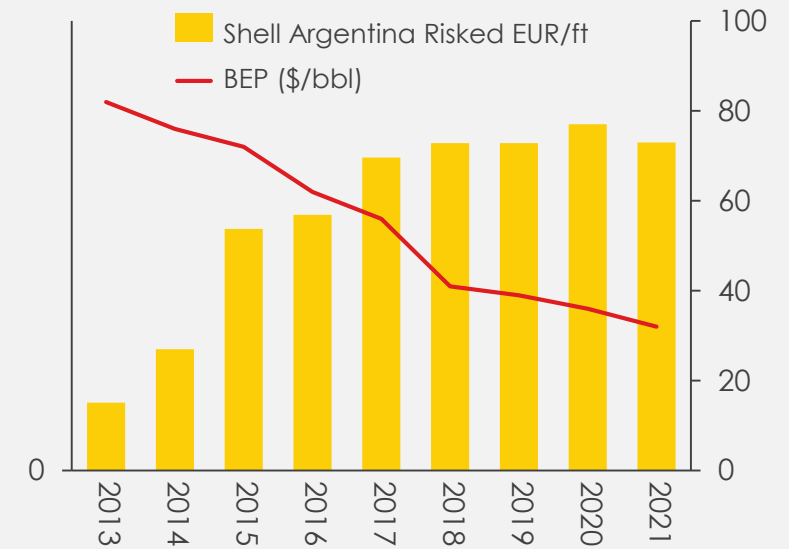
\$/lb



SUBSURFACE EXCELLENCE & TRACK RECORD

Risked EUR (bbl)/ft

BEP (\$/bbl)



Increased EUR/ft by >150% since 2014 and by >30% since 2015 based on design learnings from Permian

SEGUIMOS APRENDIENDO E INOVANDO

■ Aplicaciones de inteligencia artificial

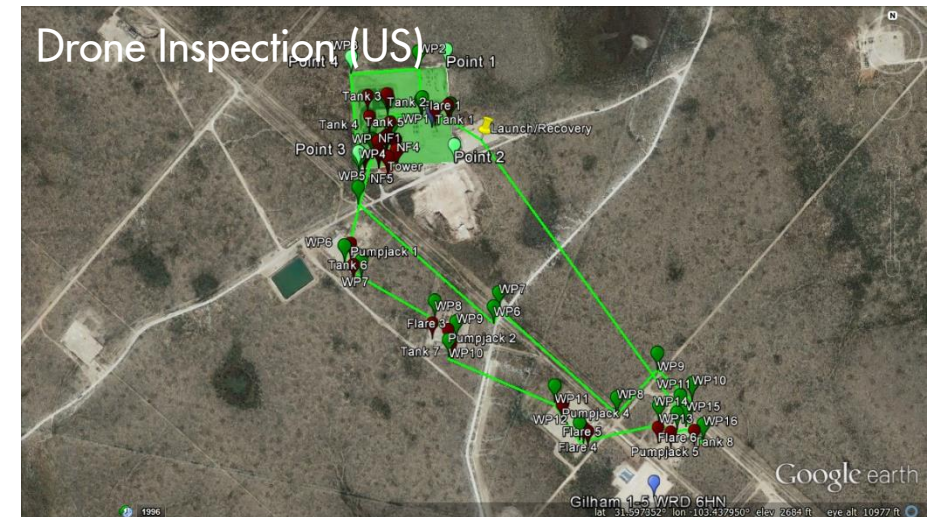
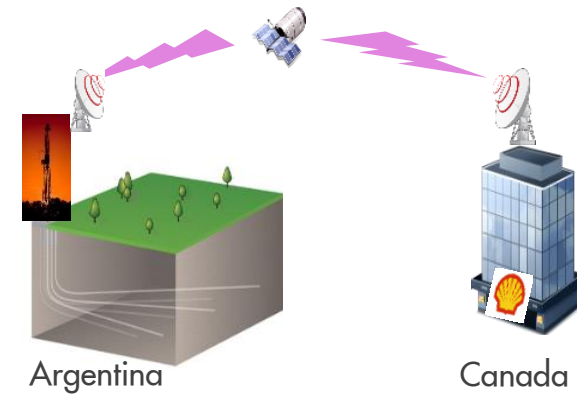
- **Caracterización del reservorio** por analogía con reservorios en EEUU y Canadá
- **Ajustes en tiempo real a parámetros de perforación**
- **Diseño de completaciones** basadas en datos detallados de otros reservorios

■ Innovaciones en perforación

- **Perforación de la curva y horizontal con un único BHA**
- **Sistema MPD** integrado al equipo de perforación
- **Equipos de manejo de tubulares automatizados**
- **DART** – sistema de manejo y monitoreo 24/7 en tiempo real desde Calgary

■ Reduciendo impacto

- **Uso de Neoflo®** (fluido sintético) en la perforación – mejor desempeño, menor impacto ambiental y mejores condiciones de trabajo para operarios
- **Bioremediación de residuos** – pre-tratamiento de secado de recortes de perforación en locación
- **Electrificación** de operaciones con energías renovables
- **Restauración** de flora con vegetación nativa



PRÓXIMOS PASOS HACIA EL DESARROLLO MASIVO



- Abastecimiento pleno de EPF + CPF (42,000 bpd) – perforando 100+ pozos nuevos
- Construcción de un oleoducto Sierras Blancas-Allen (105 km)
- Empezar el desarrollo de Bajada de Añelo con un EPS y 12 pozos mas
- Abastecer el mercado domestico y exportar mas petroleo
- Apoyar a YPF y TOTAL en el desarrollo de Bandurria Sur y Rincon la Ceniza/La Escalonada

TRANSICIÓN ENERGÉTICA

□ Oportunidades:

- Gas como combustible de transición
- Recursos y talentos de excelencia

□ Desafíos:

- Competitividad
- Eficiencia en el uso de recursos y el diseño de proyectos
- Ventana de oportunidad temporal

