

VII Seminario Estratégico:
“Evaluación de las Perspectivas Energéticas de la Argentina”

Mesa III: Recursos y Reservas

Lic. Daniel Alberto Kokogian

Buenos Aires, Junio 2015



Habia una vez un informe.....

Potencial del SHALE GAS en ARGENTINA

Recursos Totales Estimados de Shale Gas en Argentina

(Fuente EIA-ARI, Reportes 2011 & 2013)

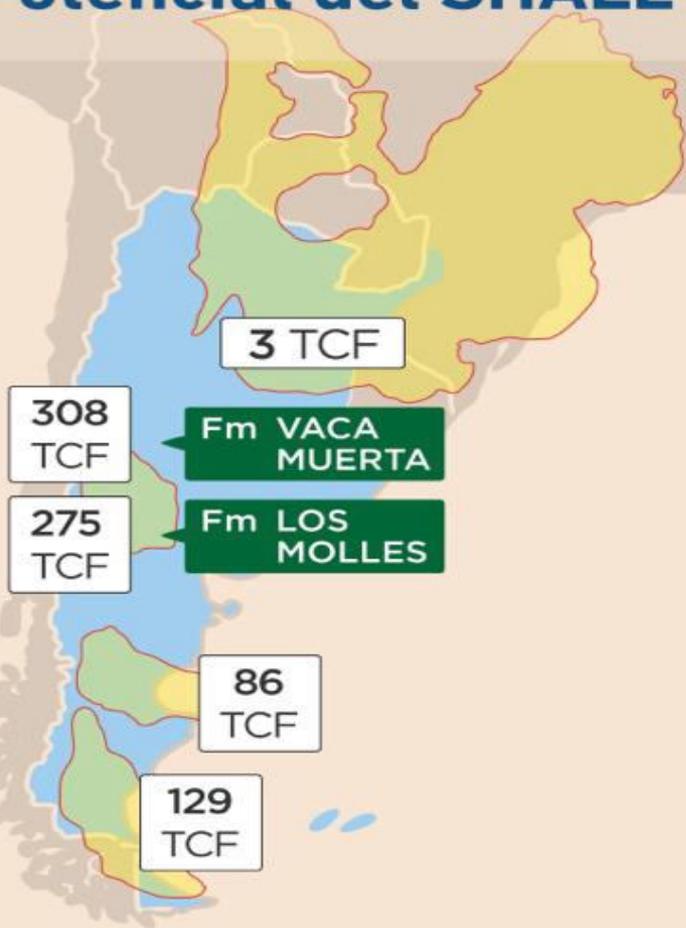
ARGENTINA	2011	2013
RECURSOS TOTALES	774	802 TCF

CUENCA NEUQUINA ETAPA PILOTO

Fm. Los Molles	168	275 TCF
Fm, Vaca Muerta	240	308 TCF

OTRAS CUENCAS ETAPA CONCEPTUAL

Chaco-Paranaense	164	3 TCF
Golfo San Jorge	95	86 TCF
Austral-Magallanes	108	129 TCF





83°



U.S. officials cut estimate of recoverable Monterey Shale oil by 96%

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BY LOUIS SAHAGUN

May 21, 2014, 1:00 a.m.

Federal energy authorities have slashed by 96% the estimated amount of recoverable oil buried in California's vast Monterey Shale deposits, deflating its potential as a national "black gold mine" of petroleum.

Just 600 million barrels of oil can be extracted with existing technology, far below the 13.7 billion barrels once thought recoverable from the jumbled layers of subterranean rock spread across much of Central California, the U.S. Energy Information Administration said.

FOR THE RECORD:

Monterey Shale: In the May 21 Section A, an article about federal energy authorities slashing by 96% the estimated amount of recoverable oil in California's Monterey Shale



Una nueva OPEP está naciendo: Estados Unidos

Comoción en Viena Revolución del shale Poder sobre el precio Despidos petroleros El sueño de Nixon Los costos de perforación bajan

El eje del mundo petrolero se ha corrido desde las arenas sauditas a los campos de shale de Texas y Dakota del Norte, a los que algunos ya han bautizado "Cowboystán"



Una nueva OPEP está naciendo: Estados Unidos

TAGS Edición Impresa

19 opiná

46 shares

25

21

+

+

+

Traducción:
Susana Manghi
- THE NEW
YORK TIMES

Durante la mayor parte del siglo pasado, el precio del crudo osciló como un péndulo, vapuleando los destinos de países. En la mayoría de los casos, la oferta del volátil producto era controlada por gobiernos de lugares desérticos cuyo poder se apoyaba, exclusivamente, en el petróleo que bullía bajo sus tronos.

GrupoClarín

en portada

“Si ponen techo a la inflación, se lo pondremos a la paritaria”

El líder de la CGT disidente hizo un balance luego de la puesta en marcha de la medida de fuerza de alcance nacional.



La pesificación
estilo K va en
bicicleta

Sembrar rinde
una quinta parte
que un alquiler



Canje por US\$ 7

ENERGY | OIL AND GAS | UTILITIES | RENEWABLE ENERGY

Saudi oil minister 'not stressed' as OPEC meet looms

Holly Ellyatt | @HollyEllyatt
Tuesday, 2 Jun 2015 | 7:35 AM ET



Saudi Arabia's oil minister has defended his country's refusal to cut production, arguing that demand for oil is set to increase in the second half of the year.

Speaking to reporters in Vienna late Monday, Ali al-Naimi said, "the answer is yes," when asked if Saudi Arabia's strategy of maintaining its production levels in order to retain its global share of the oil market was working.

"Demand is picking up. Good! Supply is slowing, right? That is a fact," he said ahead of a key meeting of the Organization of Petroleum-Exporting Countries (OPEC) on Friday, according to Reuters.

"You can see that I'm not stressed, I'm happy."

His comments appear to pour cold water on any expectations that Saudi Arabia -- the most influential member of OPEC -- is going to call



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Got an Oil or Gas Project?

Get Funded!
\$5M-\$500M+

GILLES A. HERARD JR.
MERCANTILE BANKER

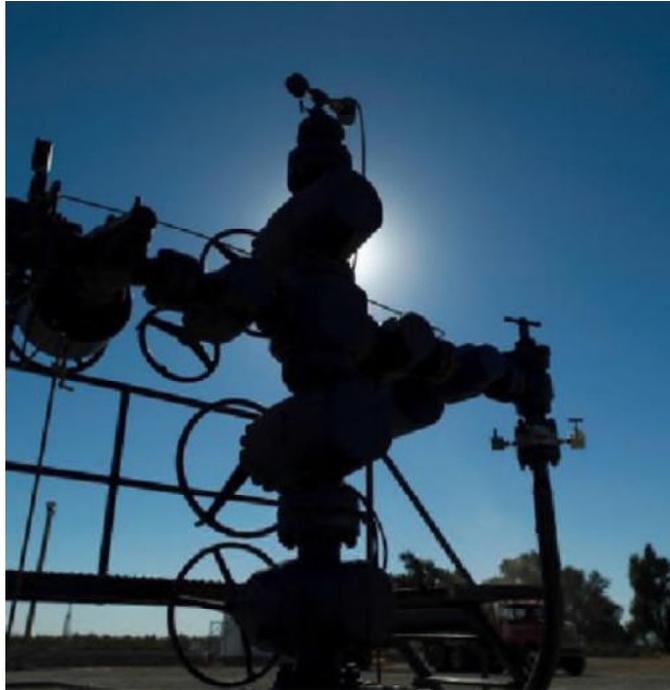
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The Counterfeit Shale Revolution & The Epidemic of Over-Production

**Art Berman
Labyrinth Consulting Services, Inc.**

**Ray Leonard
Hyperdynamics**

**Dallas Geological Society
Dallas, Texas
May 12, 2015**

The Counterfeit Shale Revolution

- The shale revolution is counterfeit. Tight oil and shale gas are imitations of something valuable and shale play promoters intentionally deceive the public about their true value.
- It is counterfeit because the cost of production is more than the global economy can bear.
- Producers and analysts deceive the public with misleading and incorrect break-even prices that exclude important costs or are based on exaggerated reserves.
- There is no revolution: it is a final, desperate effort to squeeze the last remaining petroleum from the worst possible rock.
- Oil and gas from shale is called unconventional, a euphemism for expensive: neither is commercial at current prices.
- Over-production by shale players has ruined every market they have entered: natural gas, natural gas liquids and now, crude oil.
- This has been possible because of a capital bubble and disregard for investor value.

coun·ter·feit

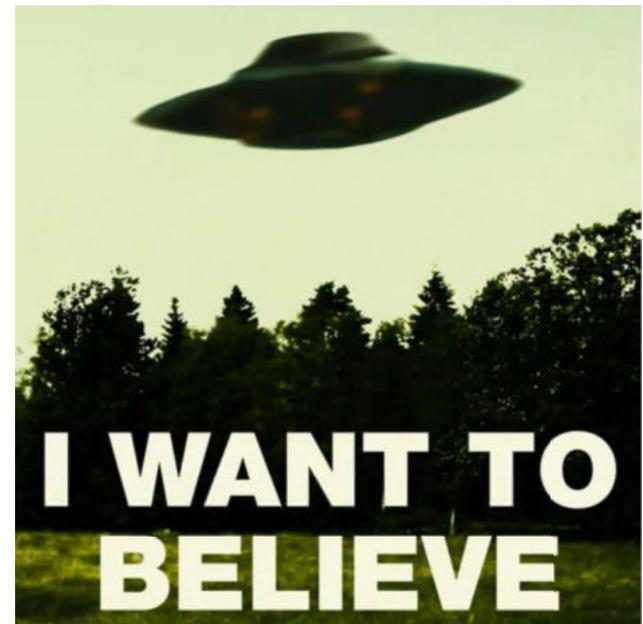
Made in imitation of something else with intent to deceive.

www.merriam-webster.com

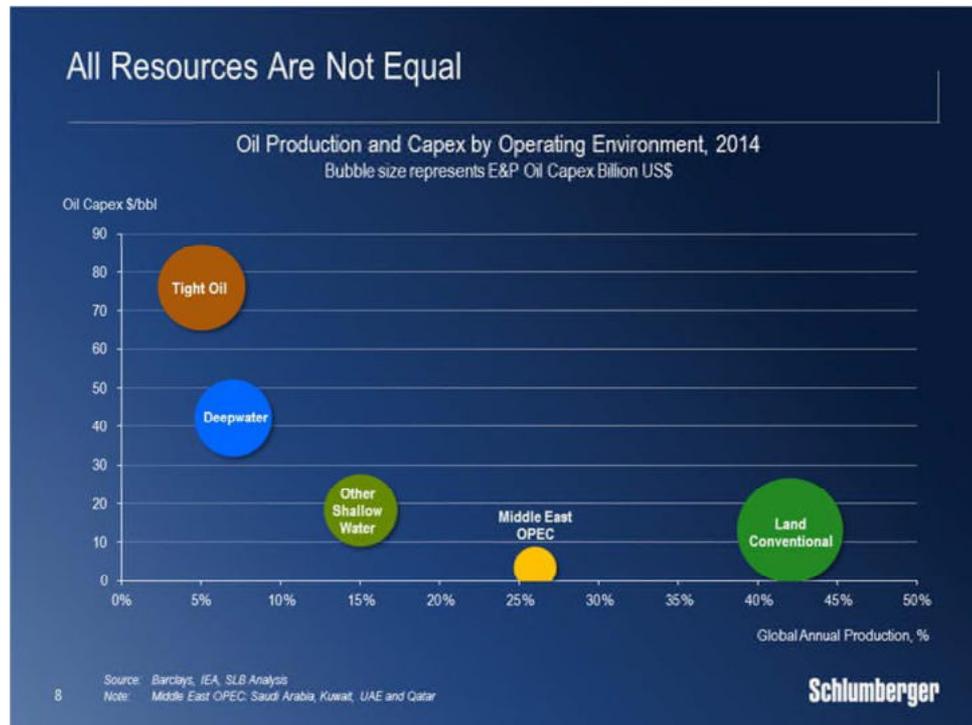


The Beautiful Story

- We imagine that we are in the midst of an energy revolution today with the advent of oil and gas production from shale.
- This new frontier will refill our energy reserve account and the world will experience growth like never before.
- That is what we are told and what we want to believe. But it is not true.
- The problem is that it costs more than the market can bear.
- Oil and gas production from shale is not a revolution—it is a retirement party.

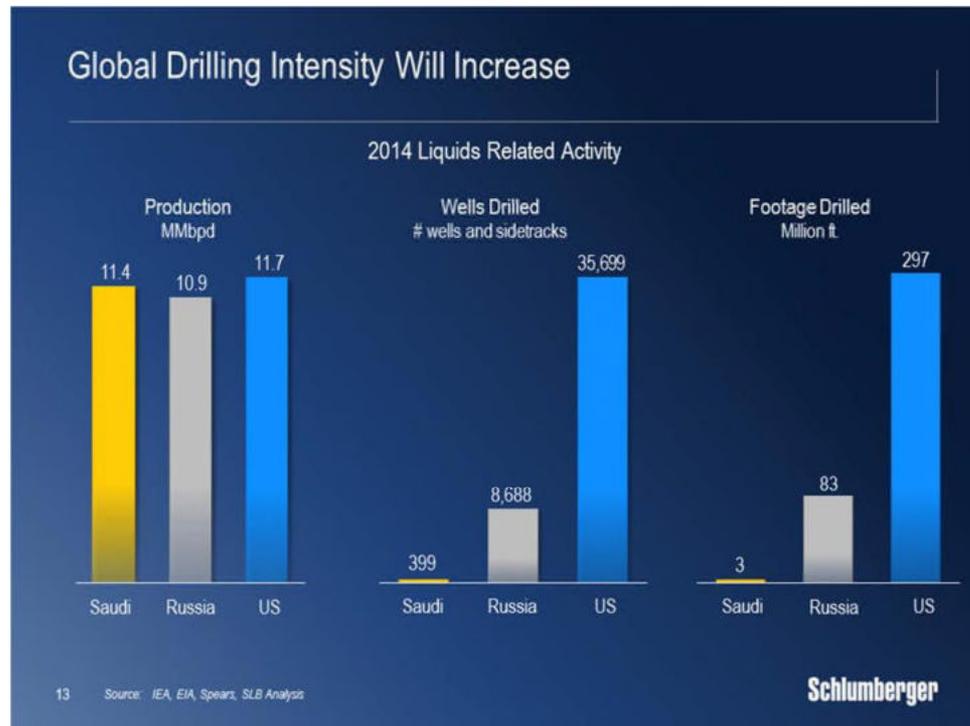


The Cost of Tight Oil According to Schlumberger



- Oil and gas produced from shale reservoirs is much more expensive than conventional oil and gas.
- The marginal cost of tight oil production is about \$75 per barrel.

The Cost of Tight Oil According to Schlumberger



- U.S. tight oil required 100 times more wells to produce approximately the same volume of oil as Saudi Arabia.
- That cost more than 100 times as much.

The Economics of Tight Oil From SEC Filings

Whiting Petroleum Corp

Total BOE	15,000,000		
Realized Price BOE	\$35.22		
Net Per BOE	-\$54.44		
	\$ Thousands	\$/mcf	
Operating Expense	\$166,365	\$11.09	
Production Taxes	\$44,378	\$2.96	
G&A	\$43,980	\$2.93	
Interest Expense	\$74,257	\$4.95	
Total Non-Capital Cost	\$328,980	\$21.93	
Capex	\$1,015,974	\$67.73	
Total Costs	\$1,344,954	\$89.66	
Impairments	\$80,924		

Continental Resources

Total BOE	18,614,667		
Realized Price BOE	\$31.65		
Net Per BOE	-\$40.32		
	\$ Thousands	\$/boe	
Operating Expense	\$109,589	\$5.89	
Production Taxes	\$48,362	\$8.20	
G&A	\$45,380	\$2.46	
Interest Expense	\$75,063	\$4.03	
Total Non-Capital Cost	\$278,394	\$20.58	
Capex	\$956,700	\$51.39	
Total Costs	\$1,235,094	\$71.97	
Impairments	\$147,561		

Carrizo Oil & Gas

Total BOE	3,114,000		
Realized Price BOE	\$32.13		
Net Per BOE	-\$42.44		
	\$ Thousands	\$/boe	
Operating Expense	\$28,708	\$9.22	
Production Taxes	\$7,051	\$2.26	
G&A	\$31,577	\$10.14	
Interest Expense	\$18,196	\$5.84	
Total Non-Capital Cost	\$85,532	\$27.47	
Capex	\$146,678	\$47.10	
Total Costs	\$232,210	\$74.57	
Impairments			

Pioneer Natural Resources

Total BOE	17,444,070		
Realized Price BOE	\$29.63		
Net Per BOE	-\$20.99		
	\$Thousands	\$/boe	
Operating Expense	\$205,000	\$11.75	
Production Taxes	\$39,000	\$2.24	
G&A	\$82,000	\$4.70	
Interest Expense	\$46,000	\$2.64	
Total Non-Capital Cost	\$372,000	\$21.33	
Capex	\$511,000	\$29.29	
Total Costs	\$883,000	\$50.62	
Impairments	\$138,000		

Source: Company 2014 10-Q Filings and Labyrinth Consulting Services, Inc.

- Whiting a pure Bakken player; Continental a Bakken and SCOOP player; Carrizo an Eagle Ford player; Pioneer a Permian and Eagle Ford player.
- Basic costs are \$50-\$90 per barrel for players in key tight oil plays.
- These costs only reflect Q1 2015 and are spread across all production from other periods.
- They do not include sunk costs or write-downs.
- They aren't discounted.
- They represent a minimum break-even price.

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The Cost of Shale Gas According to a Marcellus-Utica Player's 10-Q

Antero Resources

Total MCFE	133,642,000	
Realized Price MCFE	\$4.42	
Net Per MCFE	-\$1.53	
	\$ Thousands	\$/mcf
Operating Expense	\$122,388	\$0.92
Production Taxes	\$21,039	\$0.16
G&A	\$50,985	\$0.38
Interest Expense	\$31,342	\$0.23
Total Non-Capital Cost	\$225,754	\$1.69
Capex	\$569,068	\$4.26
Total Costs	\$794,822	\$5.95
Impairments	\$8,577	
Q1 2015 Production		
Natural Gas mcf	112,000,000	
NGL bbl	3,241,000	
Crude Oil bbl	366,000	
Total MCFE	133,642,000	

Source: Company 2014 10-Q Filings and Labyrinth Consulting Services, Inc.

- The marginal cost of shale gas production is about \$6 per mcf.
- This includes the value uplift of NGLs and condensate.
- 10-K & 10-Q filings represent optimistic estimates of break-even prices because they only reflect current period costs and not the cost of legacy production or write-downs.

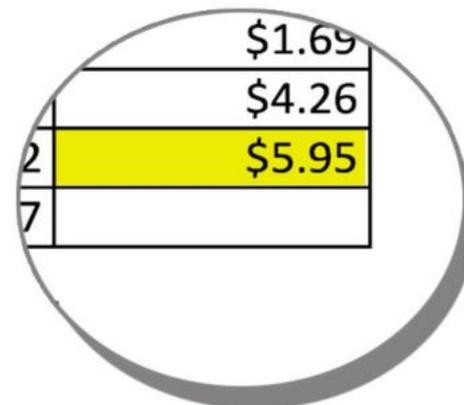
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Tight Oil & Shale Gas Plays Are Not Profitable for Most Companies

Oil-Weighted	2014 FCF	2013 FCF	FCF Change	CF/CE	Debt/Equity	2014 DEBT	2013 DEBT	Debt Change
OXY	\$451	\$3,247	-\$2,796	1.04	0.20	\$6,838	\$6,939	-\$101
EOG	\$402	\$269	\$134	1.05	0.33	\$5,910	\$5,913	-\$3
MRO	\$327	\$504	-\$177	1.03	0.30	\$6,391	\$6,597	-\$206
WTI	-\$46	\$8	-\$54	0.92	2.67	\$1,360	\$1,205	\$155
SFY	-\$80	-\$229	\$149	1.53	1.35	\$1,075	\$1,142	-\$68
COP	-\$350	\$550	-\$900	0.98	0.43	\$22,565	\$21,662	\$903
CRZO	-\$360	-\$421	\$61	0.58	1.22	\$1,351	\$900	\$451
PDCE	-\$392	-\$236	-\$156	0.38	0.58	\$665	\$605	\$60
PVA	-\$491	-\$243	-\$249	0.37	1.64	\$1,110	\$1,281	-\$171
OAS	-\$528	-\$1,756	\$1,228	0.62	1.44	\$2,700	\$2,536	\$164
MUR	-\$570	\$48	-\$618	0.85	0.35	\$3,002	\$2,963	\$39
ROSE	-\$570	-\$1,237	\$667	0.53	1.20	\$2,000	\$1,500	\$500
MHR	-\$581	-\$520	-\$61	0.03	1.78	\$949	\$880	\$69
NFX	-\$741	-\$650	-\$91	0.65	0.74	\$2,892	\$3,694	-\$802
HES	-\$810	-\$970	\$160	0.85	0.27	\$5,987	\$5,798	\$189
WLL	-\$1,153	-\$650	-\$503	0.61	0.99	\$5,629	\$2,654	\$2,975
PXD	-\$1,210	-\$731	-\$479	0.66	0.31	\$2,665	\$2,653	\$12
CLR	-\$1,361	-\$1,176	-\$185	0.71	1.21	\$5,998	\$4,716	\$1,282
APA	-\$2,419	-\$1,385	-\$1,034	0.78	0.43	\$11,245	\$9,725	\$1,520
TOTALS	-\$10,482	-\$5,577	-\$4,904	0.75	0.92	\$90,331	\$83,363	\$6,968

Stock Ticker	2014 FCF	2013 FCF	FCF Change	CF/CE	Debt/Equity	2014 DEBT	2013 DEBT	Debt Change
ECA	\$141	-\$423	\$564	1.06	0.98	\$7,813	\$7,668	\$145
UPL	\$100	\$96	\$4	1.16	-19.73	\$3,378	\$2,470	\$908
PQ	\$3	-\$241	\$243	1.02	3.53	\$425	\$425	\$0
XCO	-\$30	\$30	-\$60	0.92	3.81	\$1,447	\$1,891	-\$444
KWK	-\$116	-\$153	\$37	0.04	-1.85	\$2,038	\$1,989	\$49
GDP	-\$201	-\$180	-\$21	0.38	1.79	\$569	\$486	\$83
CRK	-\$234	-\$262	\$28	0.63	1.03	\$1,070	\$799	\$272
TLM	-\$242	-\$696	\$454	0.89	0.71	\$5,274	\$5,540	-\$266
COG	-\$243	-\$170	-\$73	0.84	0.50	\$1,752	\$1,147	\$605
BBG	-\$323	-\$182	-\$140	0.45	1.15	\$829	\$984	-\$155
RRC	-\$470	-\$554	\$84	0.67	0.94	\$3,073	\$3,141	-\$68
XEC	-\$489	-\$248	-\$241	0.77	0.35	\$1,500	\$924	\$576
SGY	-\$536	-\$76	-\$460	0.43	0.85	\$1,041	\$1,027	\$14
AR	-\$611	-\$521	-\$90	0.62	0.96	\$4,363	\$2,079	\$2,284
CHK	-\$673	-\$1,962	\$1,289	0.87	0.71	\$11,555	\$12,904	-\$1,349
SD	-\$951	-\$645	-\$305	0.40	1.95	\$3,195	\$3,195	\$1
DVN	-\$1,007	-\$1,322	\$315	0.86	0.58	\$11,262	\$12,022	-\$760
APC	-\$1,042	\$1,167	-\$2,209	0.89	0.69	\$15,092	\$13,565	\$1,527
SM	-\$1,063	-\$277	-\$786	0.58	0.92	\$2,366	\$1,600	\$766
QEP	-\$1,184	-\$411	-\$773	0.57	1.18	\$2,273	\$3,107	-\$834
NBL	-\$1,365	-\$1,010	-\$355	0.72	0.55	\$6,241	\$4,887	\$1,354
SWN	-\$5,006	-\$344	-\$4,662	0.32	0.45	\$6,967	\$1,950	\$5,017
TOTALS	-\$15,541	-\$8,383	-\$7,159	0.68	-0.01	\$93,522	\$83,798	\$9,724

Source: Company 2014 10-K Filings and Labyrinth Consulting Services, Inc.

- The counterfeit shale revolution has been funded by debt, public offerings, bond sales and a variety of other sources of capital other than cash from operations.
- Negative free cash flow and growing debt characterized the balance sheets of most companies involved in shale plays before the recent drop in oil prices.
- Companies are chronically cash-flow negative: outspend cash flow by 25% (tight oil) and 32% (shale gas).
- Unmanageable debt that can never be paid from cash flow & must be continually re-financed.
- The E&P business has become financialized—the only measure is production-reserve growth.
- The appeal is the relatively short-term ROCE compared with deep-water, etc.

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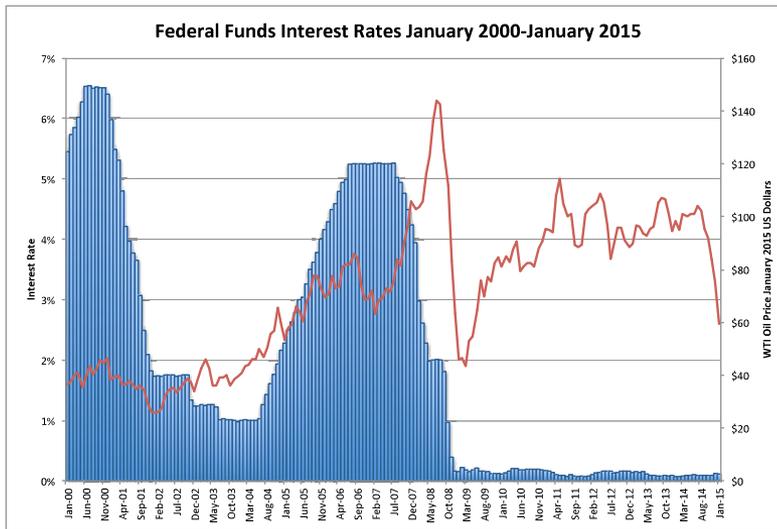
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- Companies are chronically cash-flow negative: outspend cash flow by 25% (tight oil) and 32% (shale gas).
- Unmanageable debt that can never be paid from cash flow & must be continually re-financed.
- The E&P business has become financialized—the only measure is production-reserve growth.
- The appeal is the relatively short-term ROCE compared with deep-water, etc.

The Financialization of the Exploration & Production Business



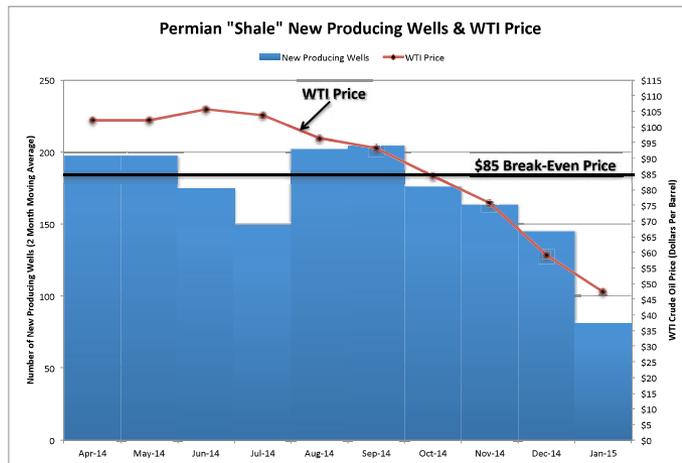
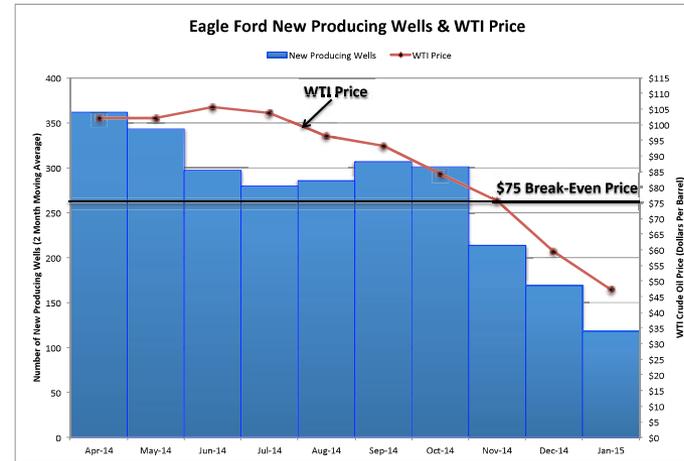
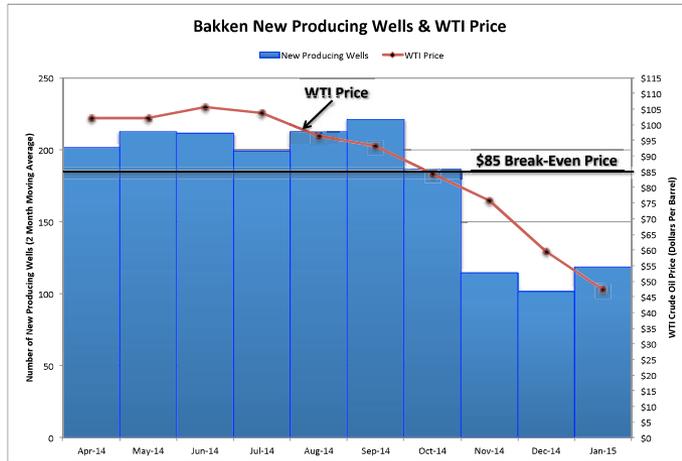
Source: EIA and Federal Reserve Board

“Easy credit feeds our love of immediate gratification, distorts self-regulation, creating a destabilizing positive-feedback loop...that dominates the calculus of risk.”

--Peter Wybrow, *WSJ* May 11, 2015

- In a zero-interest world, where could reasonably secure yields be found?
- Investment banks identified the U.S. E&P business as the solution.
- Yields for corporate junk bonds, preferred stock and other capital instruments in the range of 6-10% interest.
- In the United States and “backed” by a hard asset in the ground.
- E&P companies became the sub-prime derivative of the post-Financial Crisis period.
- Shale gas and later, tight oil companies had access to almost infinite capital with no performance requirement other than to avoid debt covenants.

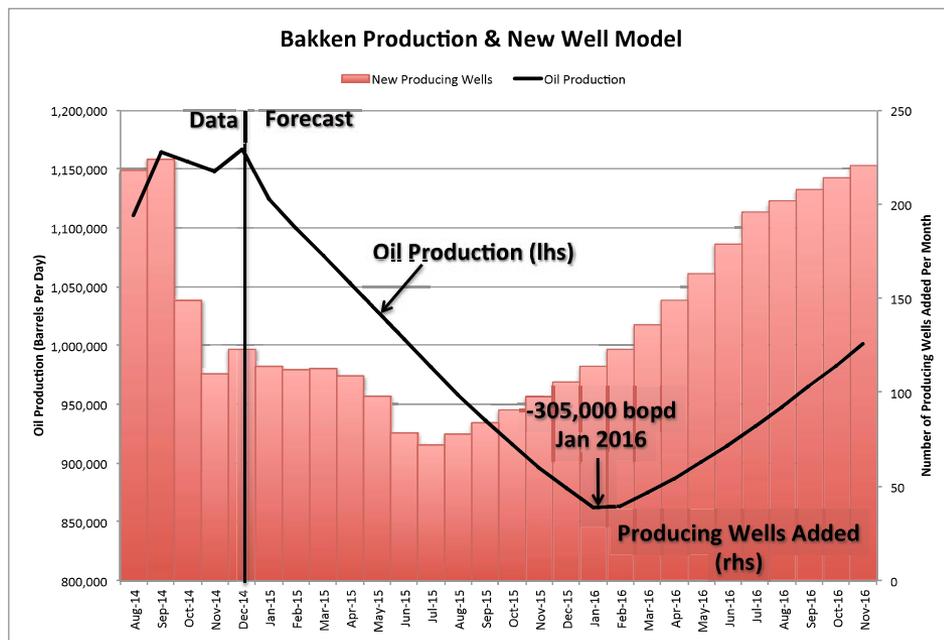
The Economics of Tight Oil From Completion Declines



- Decreased completions suggest \$75-\$85 per barrel break-even price.

Source: Drilling Info and EIA.

The Production Decline Has Begun



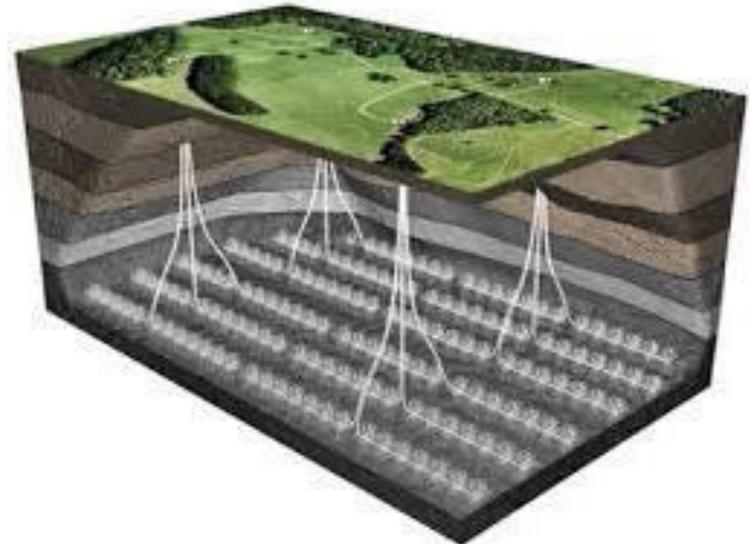
	By July 1	Total	By
EF	-136,000	162,000	Sep-15
BK	-165,000	305,000	Jan-16
PM	-60,000	92,000	Dec-15
TOTAL	-361,000	559,000	

Source: Drilling Info and Labyrinth Consulting Services, Inc.

- January 2015 production in Eagle Ford (EF), Bakken (BK) and Permian basin (PM) decreased 111,000 bopd because of decreased well completions.
- Modeled decreased completions using 2008-2009 rig count decline as a guide.
- Suggests almost 400,000 bopd of production decline in tight oil plays by July 1.
- 600,000 bopd decline possible by year-end 2015.
- Only continued prices below \$60 per barrel through at least year-end 2015 will lead to market balancing.

The Problem With The Counterfeit Shale Revolution

- The story stresses success based on resource estimates but not reserves.
- Production volumes but not the cost of that production.
- The benefits of technology but not its price.
- Claims of profit that exclude important expenses.
- The government and press accept this story because it paints a picture that fulfills so many aspirations of energy independence, U.S. re-emerging political strength, dominance in energy affairs and economic growth.
- Warning signs of potential risk have so far been ignored.

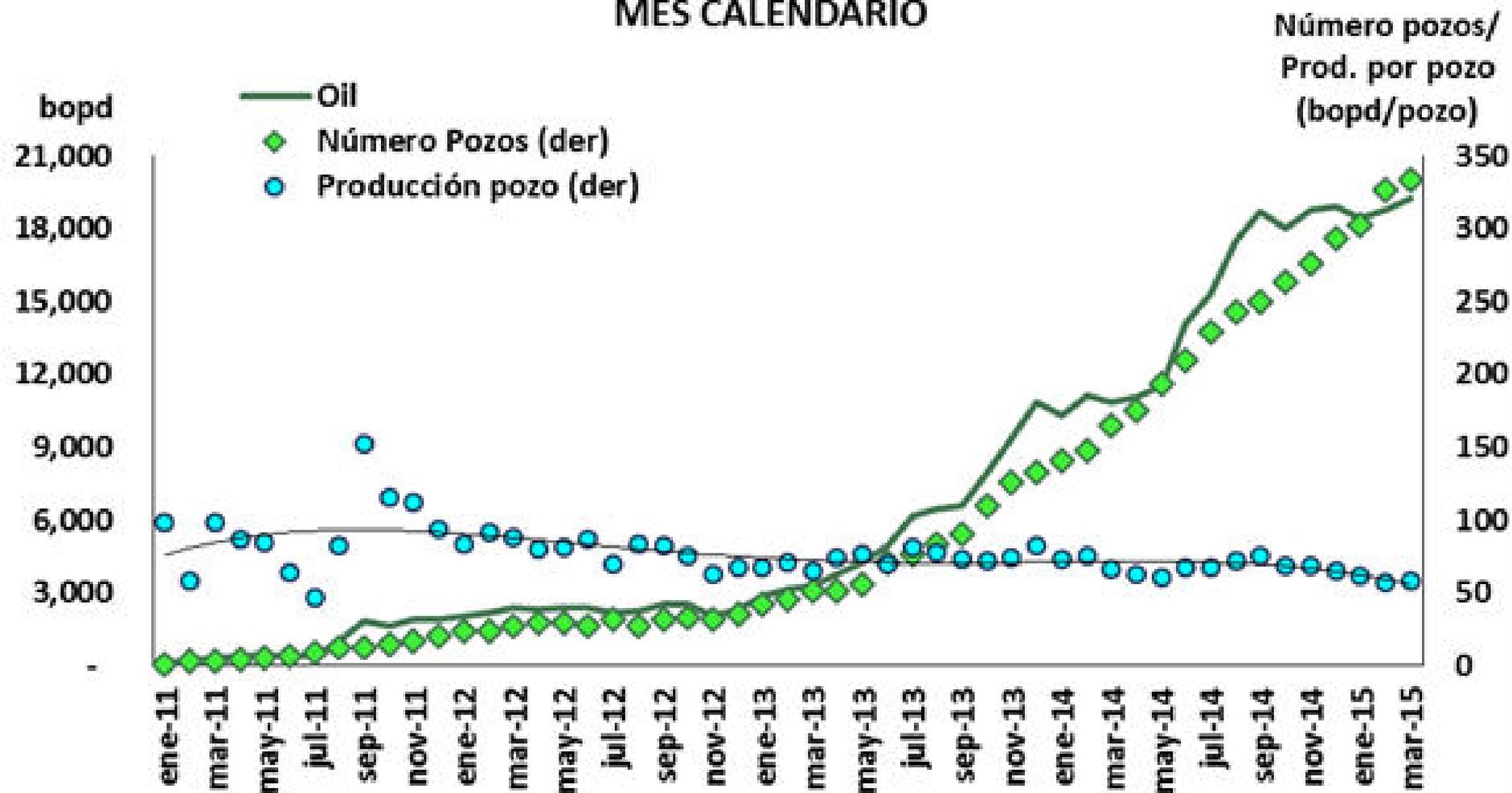


The Counterfeit Shale Revolution Concluding Observations

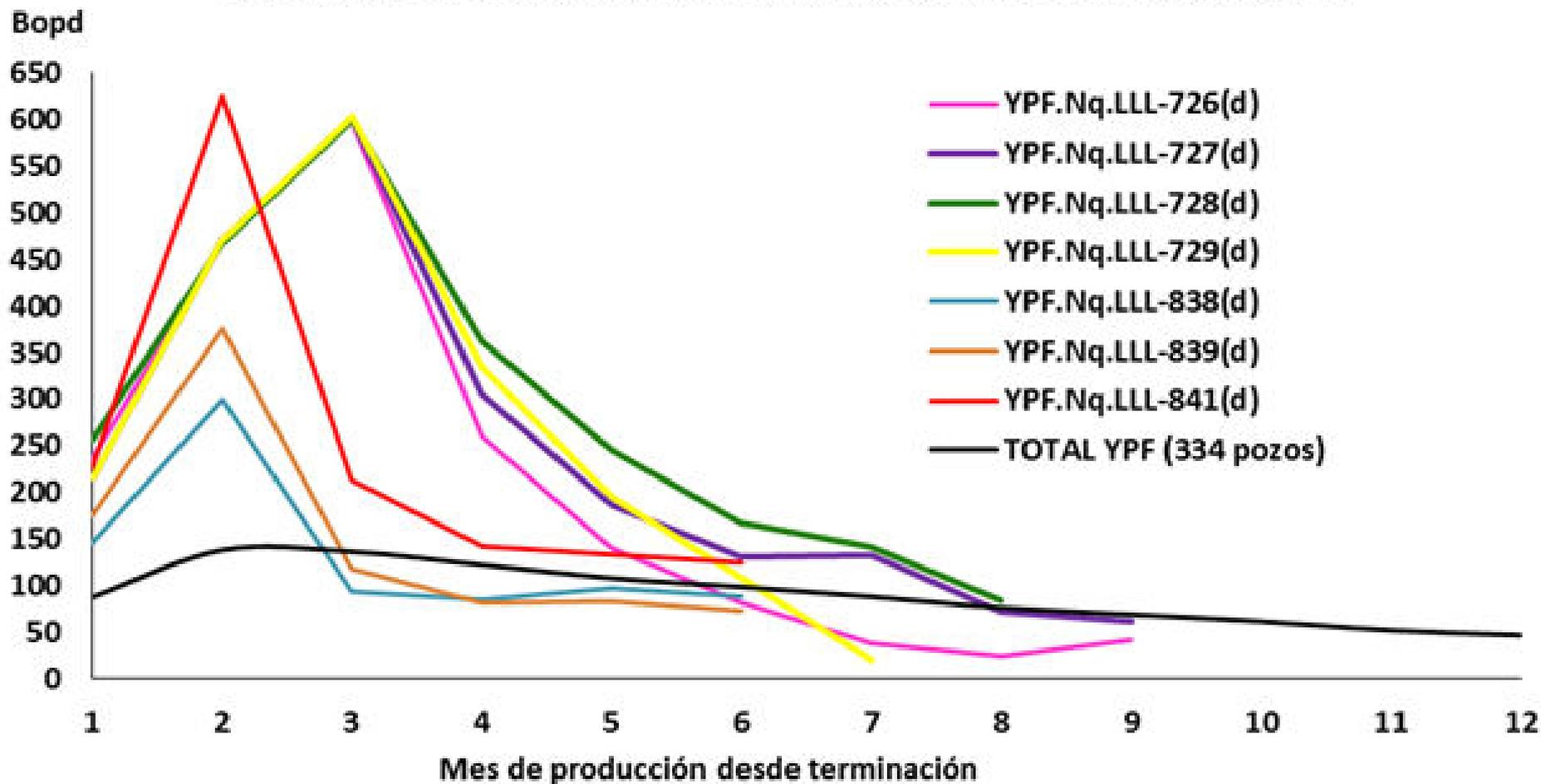
- Shale plays have been mis-represented as providing cheap and abundant oil and natural gas supply.
- The current oil-price collapse is because of expensive unconventional oil and the market's inability to support its cost.
- \$90 per barrel appears to be threshold for demand destruction.
- Only the core of the core areas of the best tight oil plays are profitable at oil prices around \$70 per barrel.
- Shale gas plays have never been commercial since prices collapsed in 2008 but have been propped up by easy money based on zero-interest rates.
- Easy money has also funded zombie tight oil plays and companies.
- The present oil-price collapse is severe because of the accumulated, long-term price fatigue since late 2007 and longer-term economic considerations.
- The key to recovery is demand—low price will cure demand but it may take a long time.
- The effect of reduced E&P spending on the U.S. economy is unclear and could reduce demand by slowing the weak economic recovery.
- Continued non-commercial over-production will subside faster than most imagine especially after 1st Quarter 2015 earnings reports.
- Capital availability for the counterfeit shale plays will be an important factor in how long low oil prices persist.

Y POR CASA COMO ANDAMOS?

PRODUCCIÓN GROSS DE SHALE OIL POZOS OPERADOS POR YPF - MES CALENDARIO

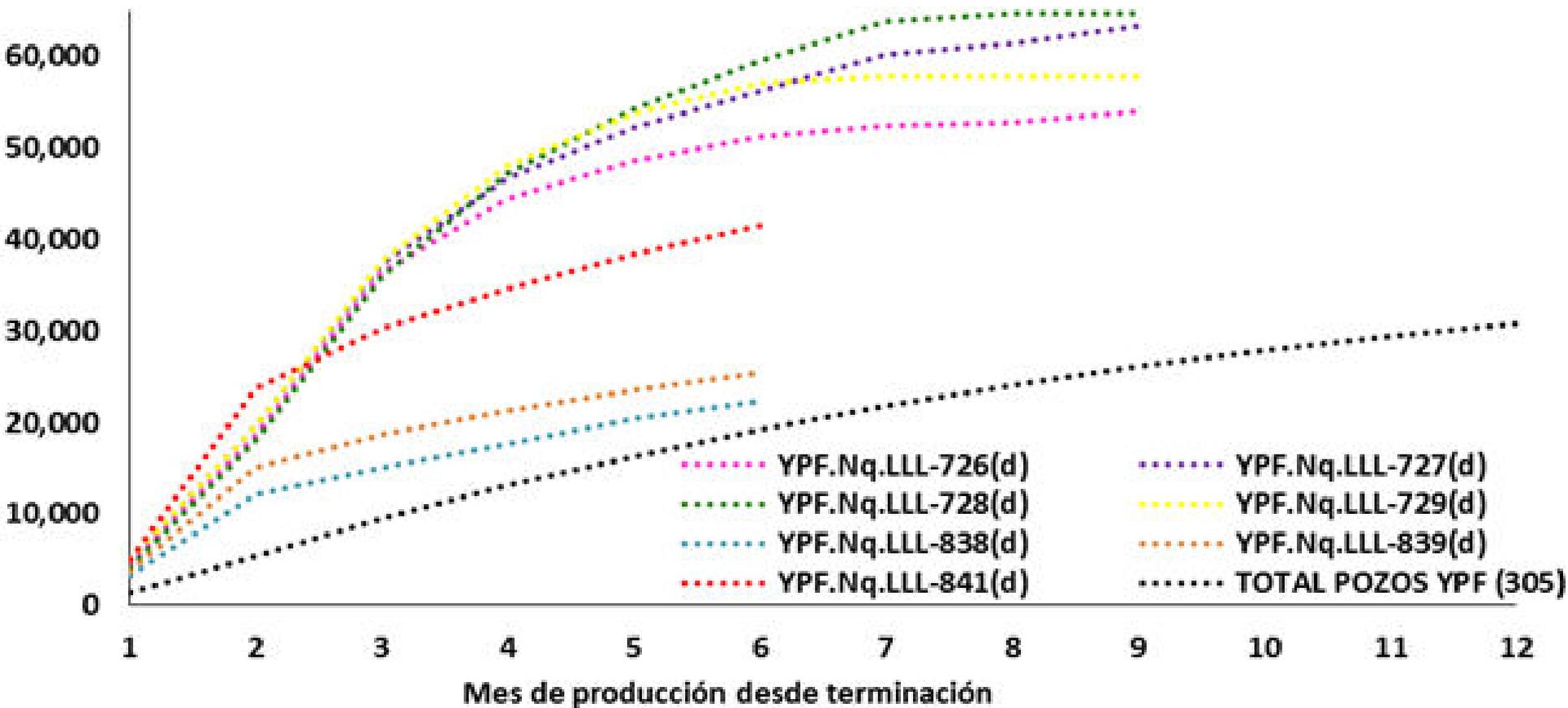


MEJORES POZOS VERTICALES EN VENTANA DE PETRÓLEO VOLÁTIL

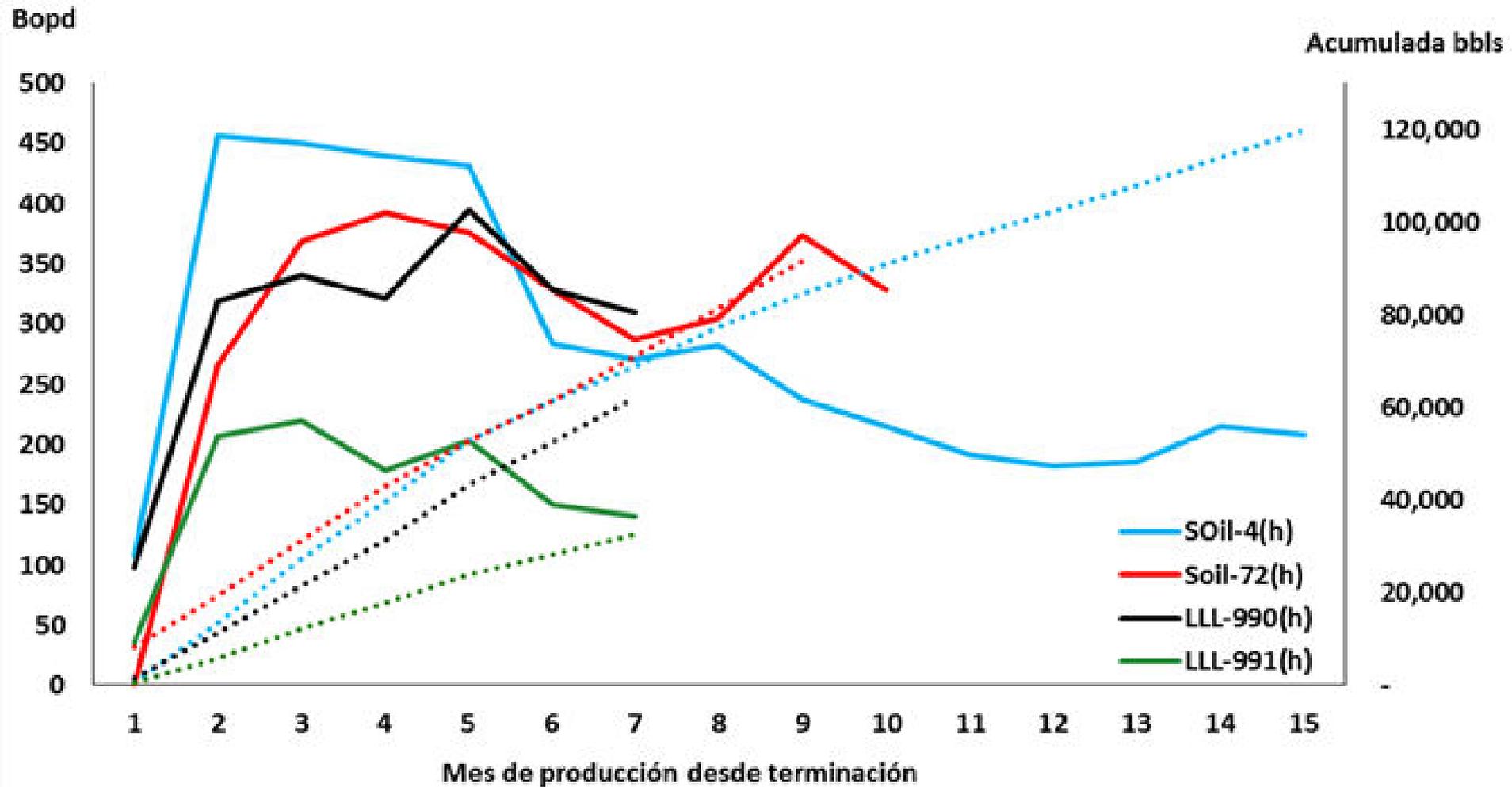


MEJORES POZOS VERTICALES EN VENTANA DE PETRÓLEO VOLÁTIL

Acumulada (bbls)



POZOS HORIZONTALES EN LOMA CAMPANA (Acumuladas en línea punteada)



YPF OPERADO - SHALE OIL POR AÑO DE INGRESO DE POZOS A PRODUCCIÓN

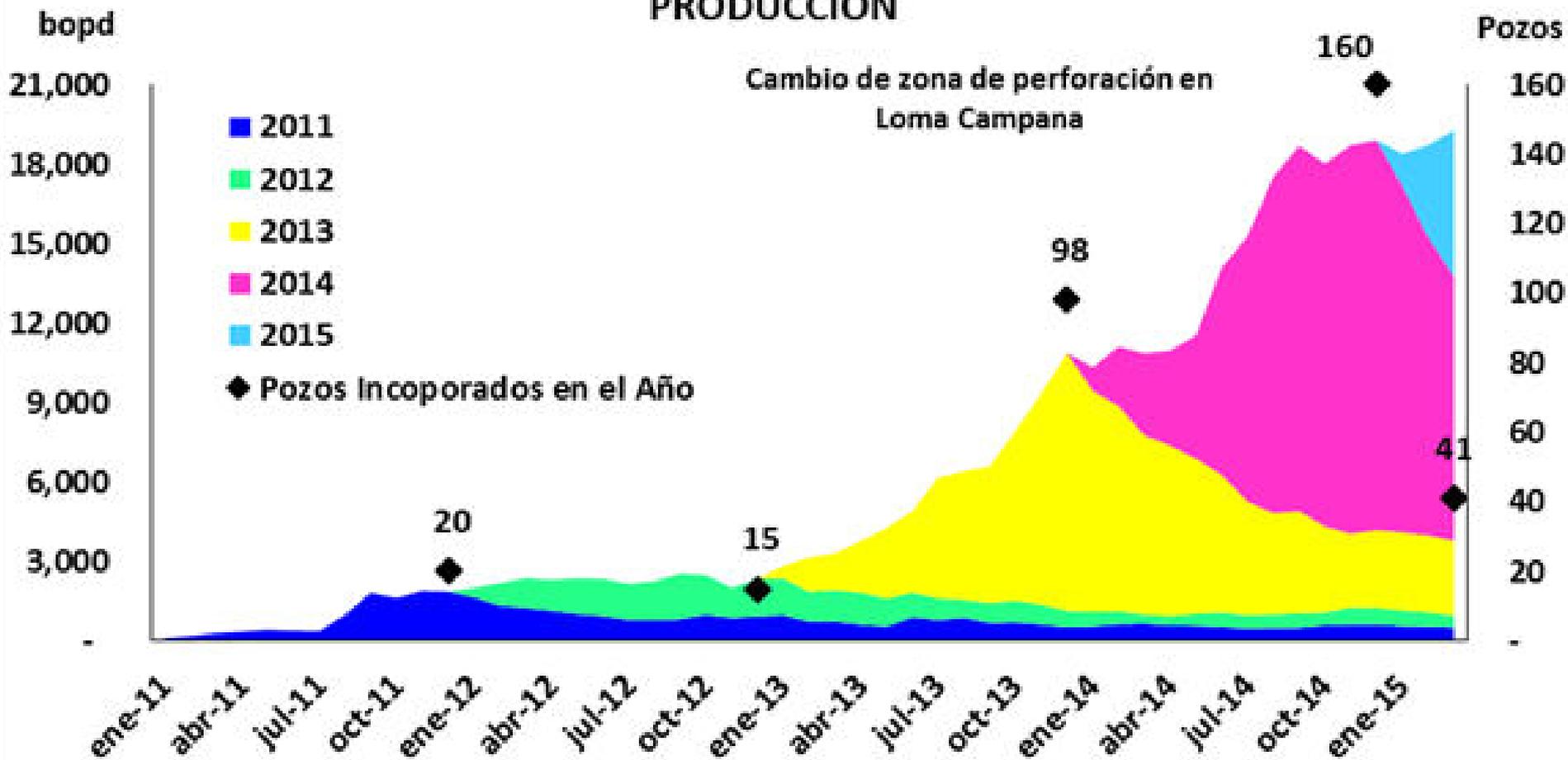


Table 3: E&P cost analysis

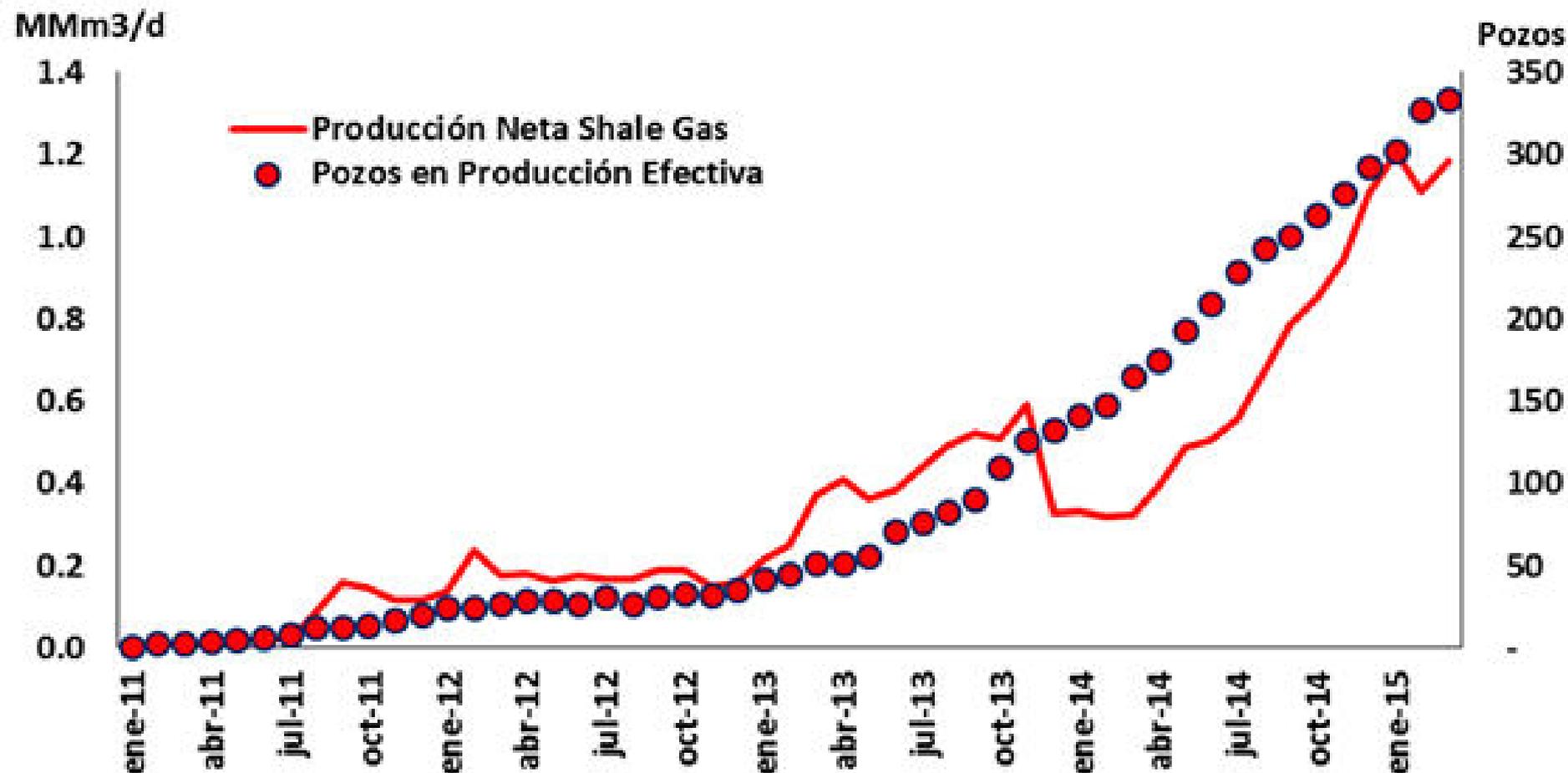
	PETBRA*	PDVSA	ECOPET**	PRECN**	YPF
US\$/bbl	FY2013	FY2013	FY2013	FY2013	FY2013
Crude oil price	\$98	\$98	\$99	\$99	\$72
Lifting cost	\$15	\$15	\$15	\$15	\$16
Transportation/Upgrading		\$26	\$35	\$18	\$4
Other production cost	\$3			\$0	
Operating cost	\$18	\$41	\$50	\$33	\$20
SG&A	\$1	\$3	\$5	\$8	\$6
Operating cash cost	\$18	\$45	\$55	\$41	\$26
<i>Operating cash netback</i>	<i>\$80</i>	<i>\$53</i>	<i>\$44</i>	<i>\$58</i>	<i>\$46</i>
Interest expense	\$6	\$1	\$1	\$4	\$6
Cash cost before Royalties	\$25	\$46	\$56	\$45	\$32
Production taxes/Royalties	\$17	\$44			\$13
Total cash cost	\$41	\$90	\$56	\$45	\$45
Extraordinary items***		\$21			
Total cash cost aft. extraordinary items	\$41	\$112	\$56	\$45	\$45
<i>Total cash netback aft. extraordinary items</i>	<i>\$57</i>	<i>(\$14)</i>	<i>\$43</i>	<i>\$54</i>	<i>\$27</i>
Non-cash costs					
Exploration costs	\$4	\$0	\$3	\$0	\$2
D&A	\$11	\$5	\$8	\$31	\$21
All-in costs	\$56	\$117	\$67	\$77	\$67

* PETBRA Brazil E&P

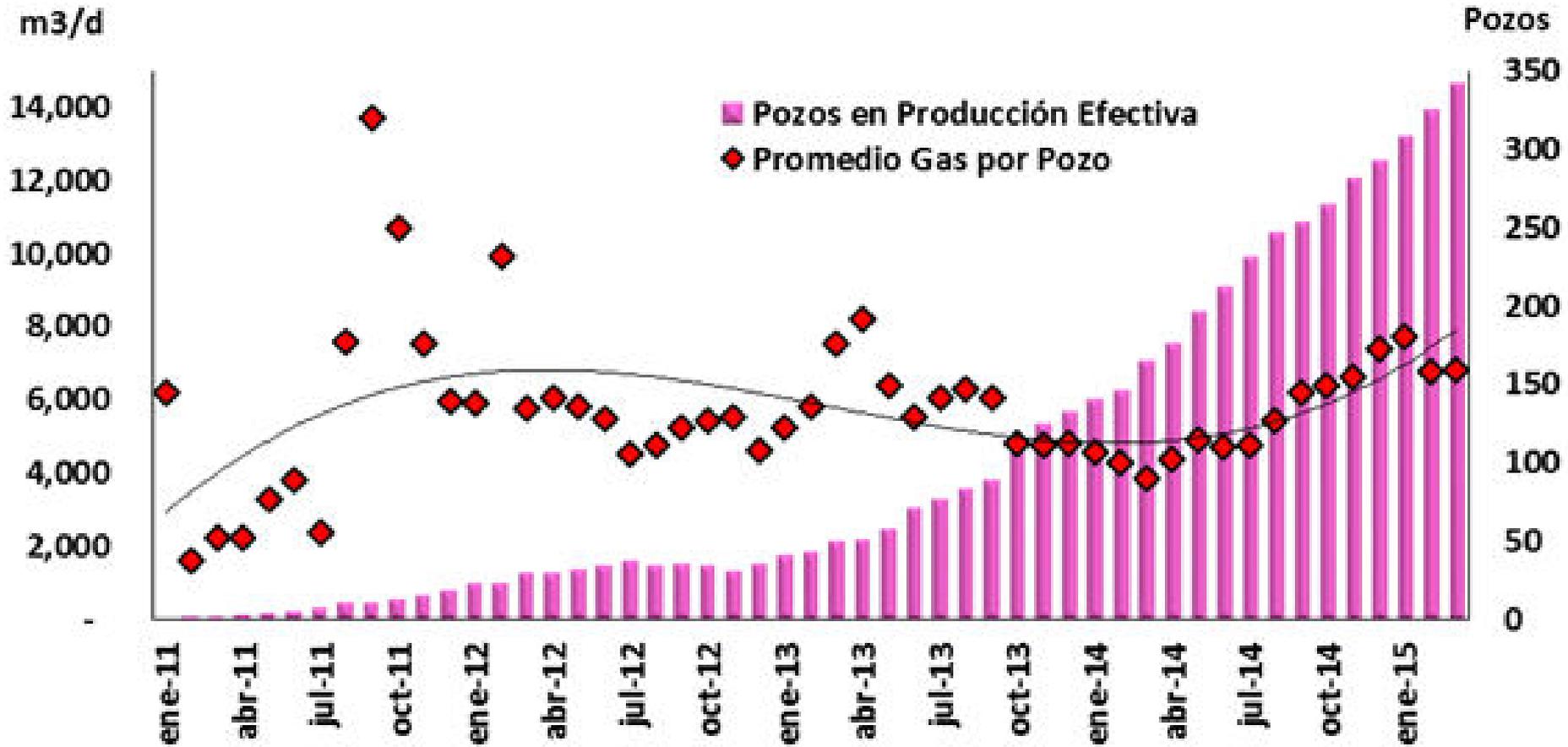
** ECOPET and PRECN figures are presented net of royalties

*** Social programs for PDVSA; Windfall taxes to Fonden included in Production taxes

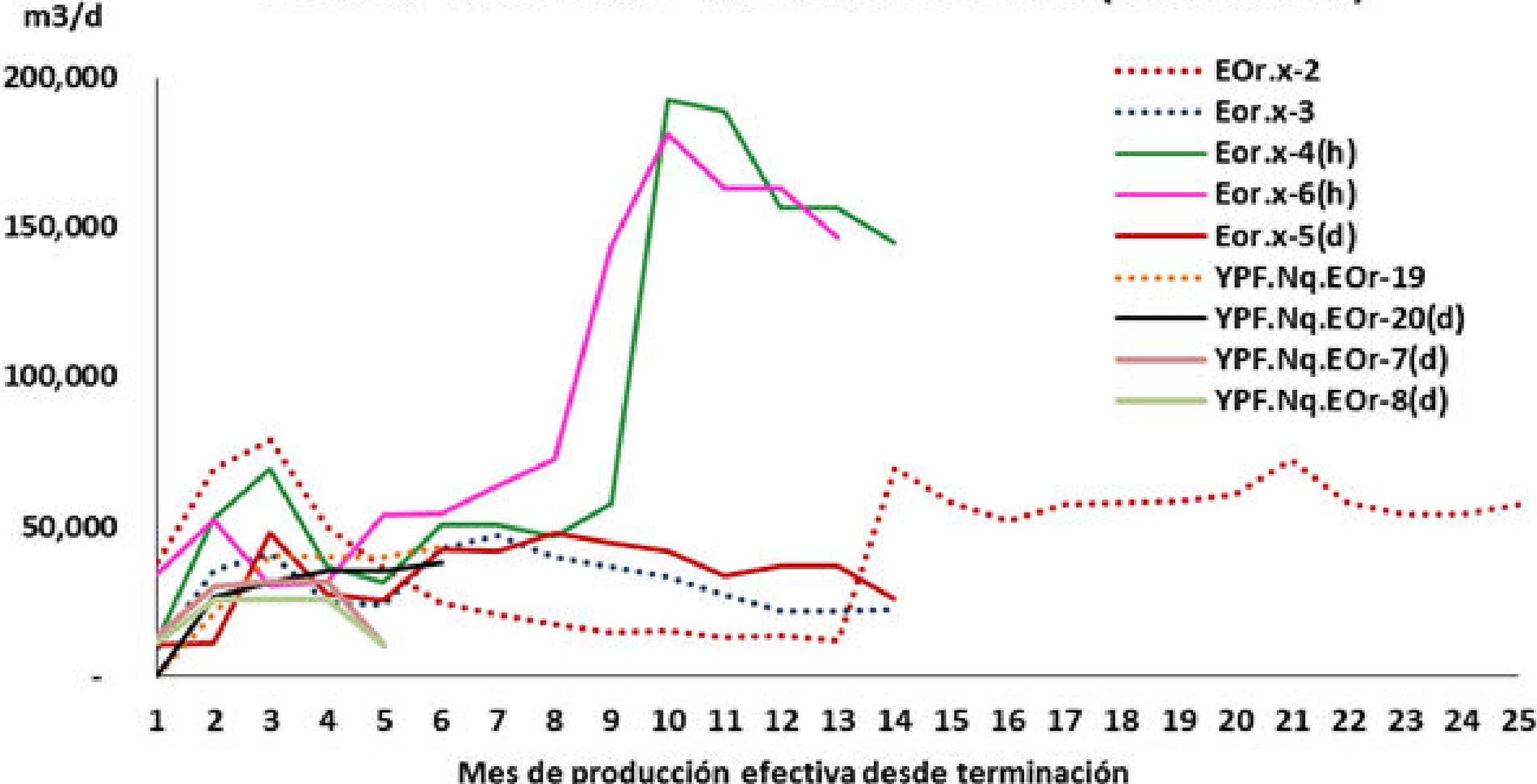
PRODUCCIÓN NETA DE SHALE GAS POZOS OPERADOS POR YPF - MES CALENDARIO



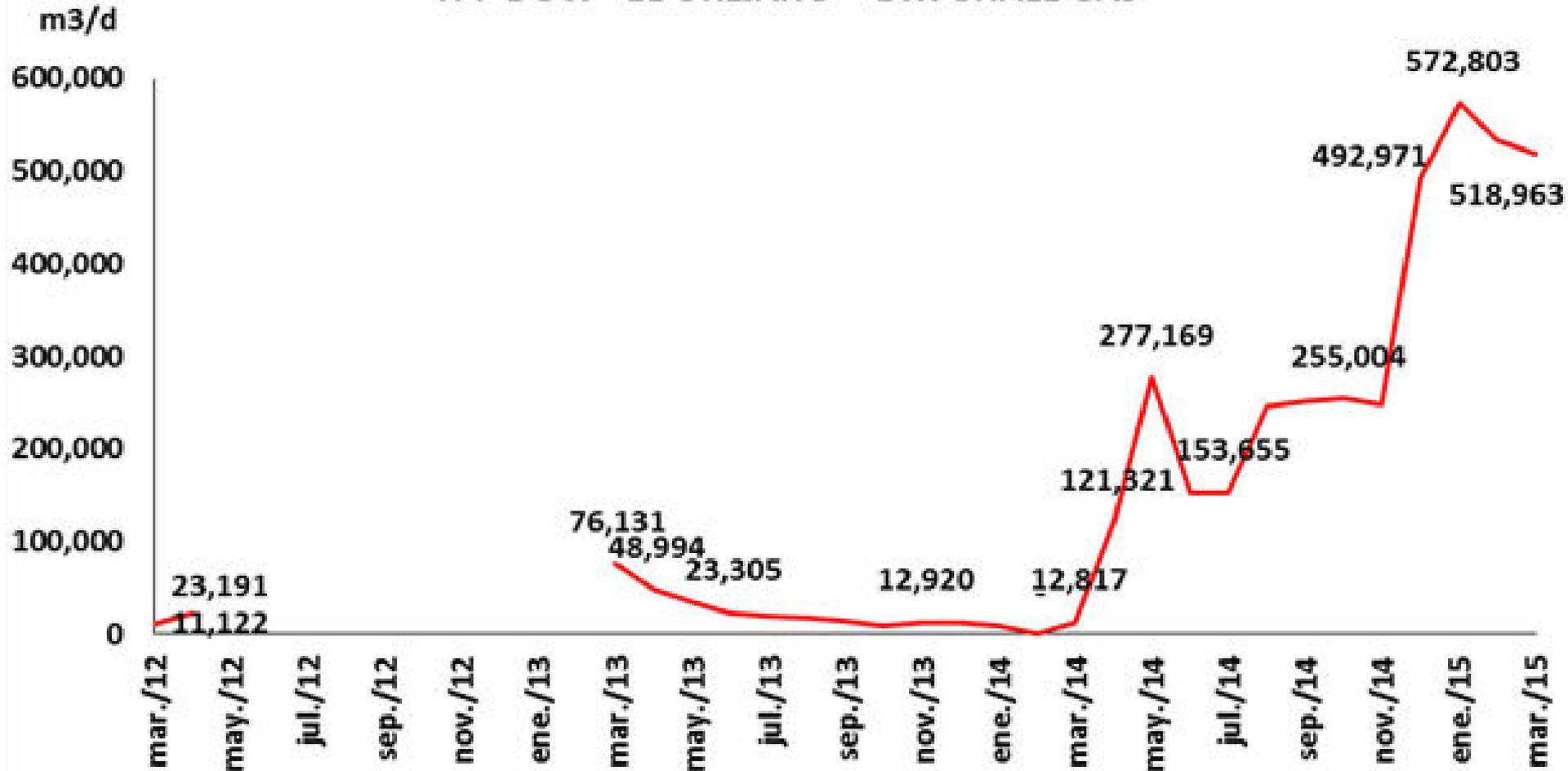
YPF OPERADO - PRODUCCIÓN DE SHALE GAS TODOS LOS POZOS - MES CALENDARIO



YPF-DOW - EL OREJANO - CURVA NORMALIZADA (Días efectivos)



YPF-DOW - EL OREJANO - DRY SHALE GAS



Conclusiones

- Argentina tiene un potencial importante en reservorios no convencionales.
- La magnitud de este potencial dista mucho de ser conocida y es todavía incierta.
- El esfuerzo realizado hasta el momento representa el inicio de una larga tarea cuyo objetivo excluyente será transformar la mayor cantidad de recursos en reservas.
- Difícilmente ese objetivo se logre en el corto o mediano plazo, al menos que ocurra un dramático cambio de paradigma técnico , los costos se reduzcan notablemente o los precios sean sustancialmente mayores.

- Todo indica que la energía proveniente de los no convencionales resultara mas costosa que la producida a partir de los convencionales o incluso los tight.
- No parece ser prudente concentrar todos los esfuerzos para aumentar la producción de gas y petróleo en los no convencionales.
- La explotación de los no convencionales debería ser una mas de las tareas a desarrollar.
- Mientras tanto, parece logico pensar seriamente en modificar la matriz energética tan volcada hacia el gas y el petróleo. Si bien el autoabastecimiento puede ser un objetivo a seguir, la obtención del mismo no debiera darse por sentada, muy especialmente para el gas.

Muchas Gracias...



- *The only criterion* that seems to matter to investors these days is *production guidance*. If production drops, *stock value will fall* even farther than it has already. This will *trigger loan covenants* if asset values fall below thresholds set out in the loan agreements. When that happens, *the loans will be called unless the companies can come up with more cash*. This might result in bankruptcy. *So, the drilling must continue as long as there is capital.*

• *from Art Berman*