Spare Capacity :

Is it required under new supply and demand realities?
Who must provide it and at what cost?

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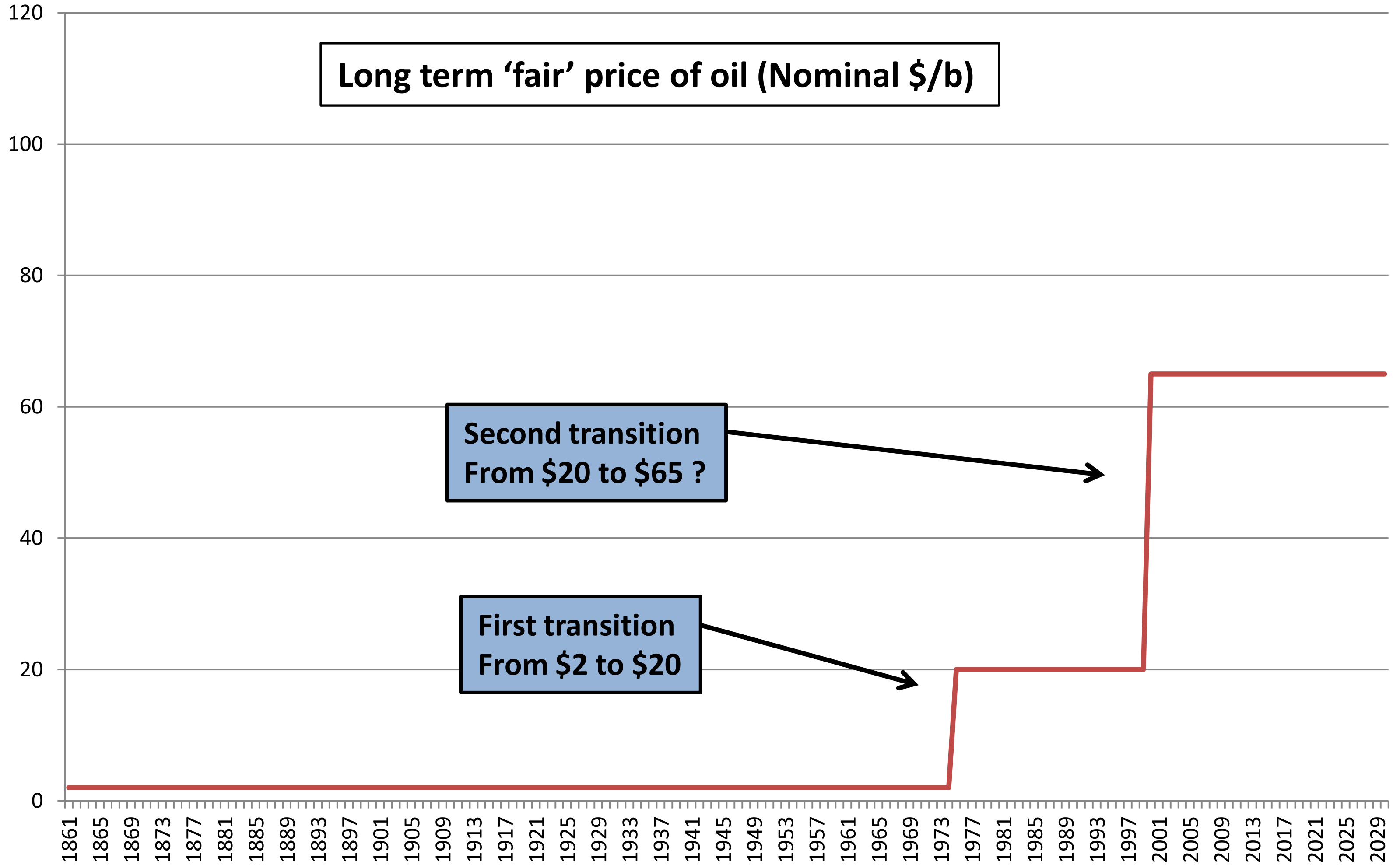
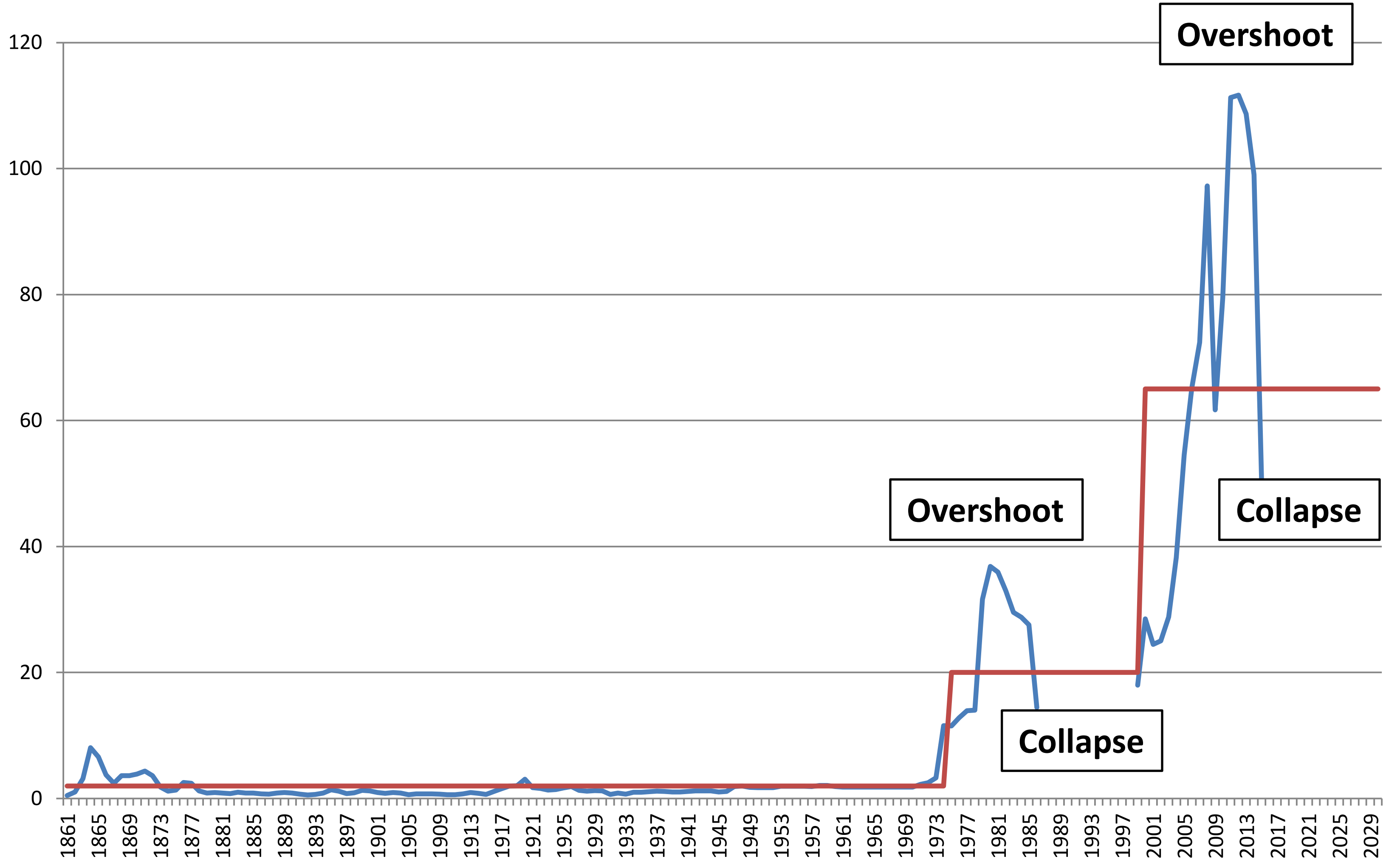
The new supply and demand realities



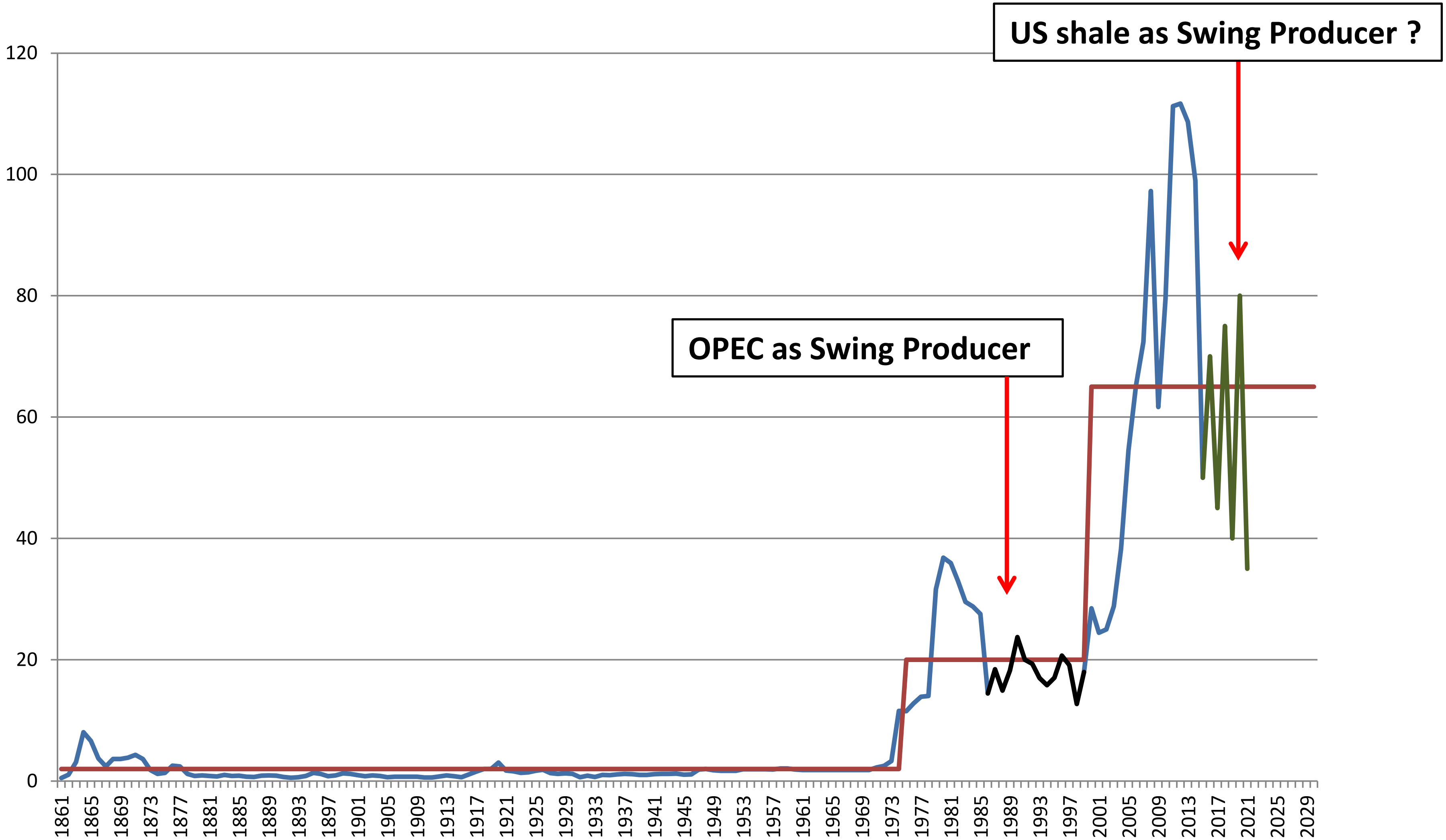
In both cases the market overshot and then collapsed.



1861-1944 US Average. - 1945-1983 Arabian Light posted at Ras Tanura. - 1984-2014 Brent dated.

Source = History is BP Statistical Review of World Energy

Swing producer and recovery to a 'New Normal'



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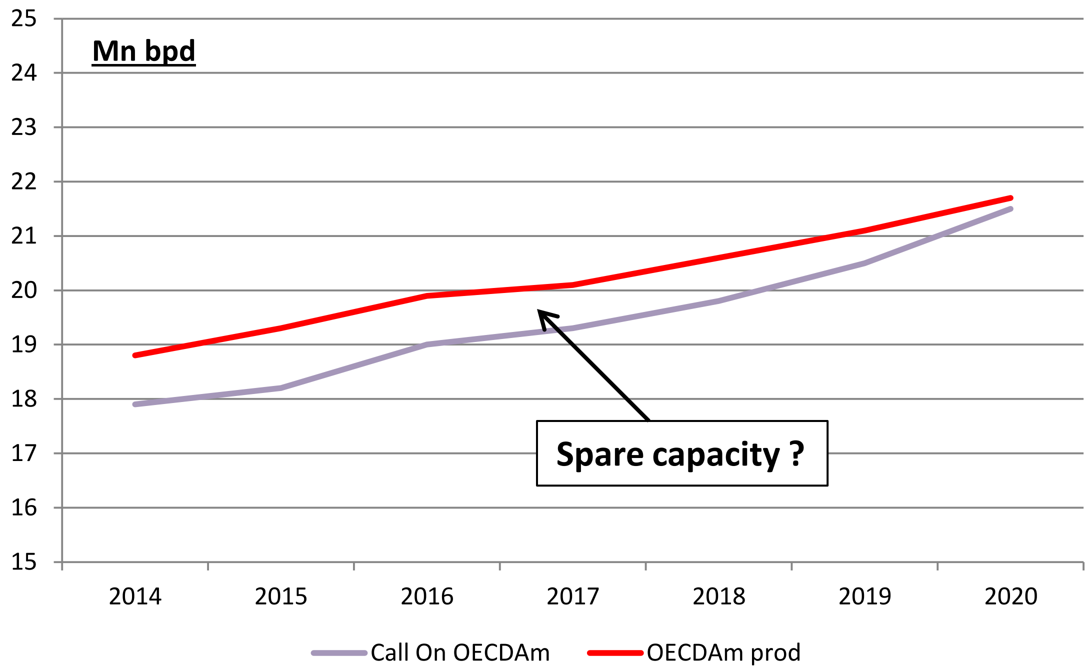
Global Balance should calculate 'Call on OECDAm' , not 'Call on OPEC Crude)



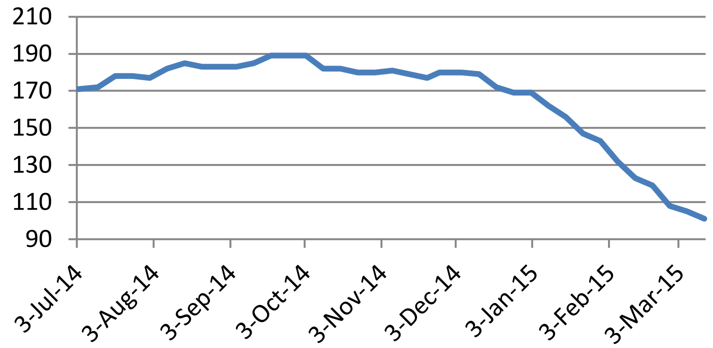
a) Call on US, Canada, Mexico and Chile grows 3 Mn bpd by 2020.
b) But near term, production is 1 Mn bpd over Call.
c) Based on data from IEA MTOMR of Feb 2015.
d) Assume OPEC crude 30.5 Mn bpd in 2015 rising to 32.5 in 2020 (UAE, Libya, Iran, Iraq).

US as Swing Producer – rapid price response to price signals from the market ?

Bakken Rigs - Citi Research

Company	3q14	2015 plan
Abraxas	1	1
ConocoPhillips	10	3
Continental	22	11
Emerald	3	1
EOG	6	3
Halcon	3	2
Hess	17	9.5
Marathon	6	3
Oasis ***	16	7
QEP	7	2.5
Whiting	21	12
Total	**112**	**55**

Baker Hughes ND rig count



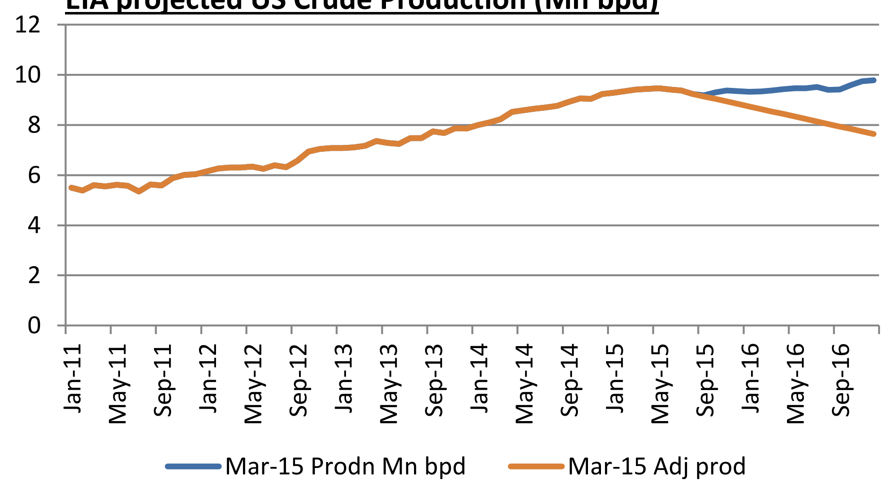
14-Jan-15	Breakevn	Rigs
Billings	$31	1
BOT-REN	$52	0
BOW-SLP	$75	3
Burke	$61	1
Divide	$63	5
Dunn	$28	23
Golden Valley	$49	1
McKenzie	$29	58
McClean	$77	0
Mountrail	$39	28
Stark	$35	1
Williams	$34	32

ND DMR say breakeven costs $28-$77/b but basic operating costs are only $15, or $25 basis WTI.

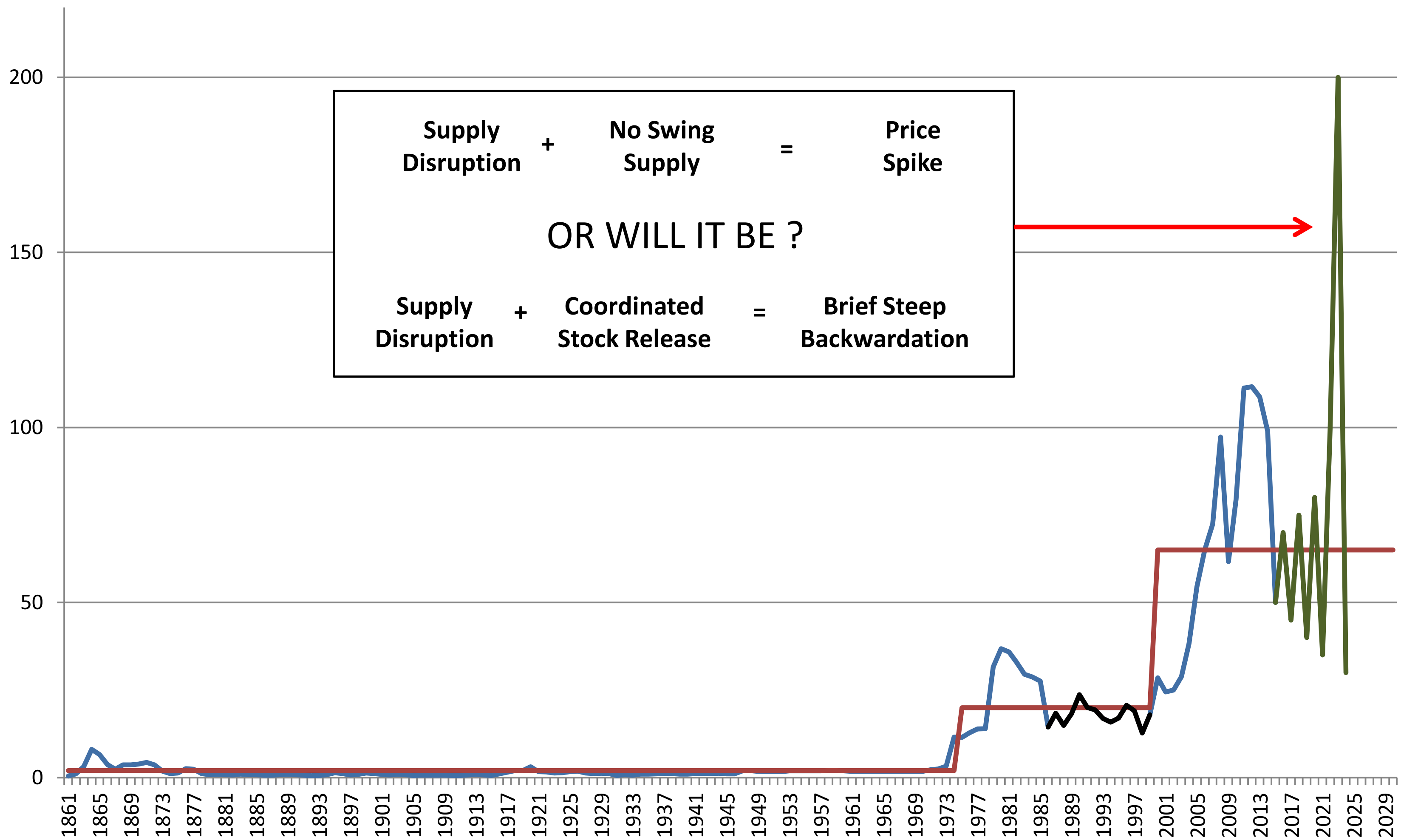
$/BO	Rigs	New wells	1-Jul-15	1-Jul-16	1-Jul-17
25	40	1,100	1,000,000	800,000	700,000
35	90	2,400	1,030,000	875,000	720,000
45	120	3,200	1,100,000	1,050,000	975,000
55	140	3,800	1,200,000	1,200,000	1,150,000
65	155	4,200	1,200,000	1,225,000	1,250,000
75	170	4,600	1,200,000	1,300,000	1,400,000
85	190	5,000	1,250,000	1,400,000	1,550,000

ND DMR say need $55 at wellhead / $65 WTI for 140-150 rig count to drill 3800 wells/yr to maintain ND prodn at 1.2 Mn bpd through 2017.

EIA projected US Crude Production (Mn bpd)



Who pays if there is no Swing Producer, and how much?



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GLOBAL ENERGY

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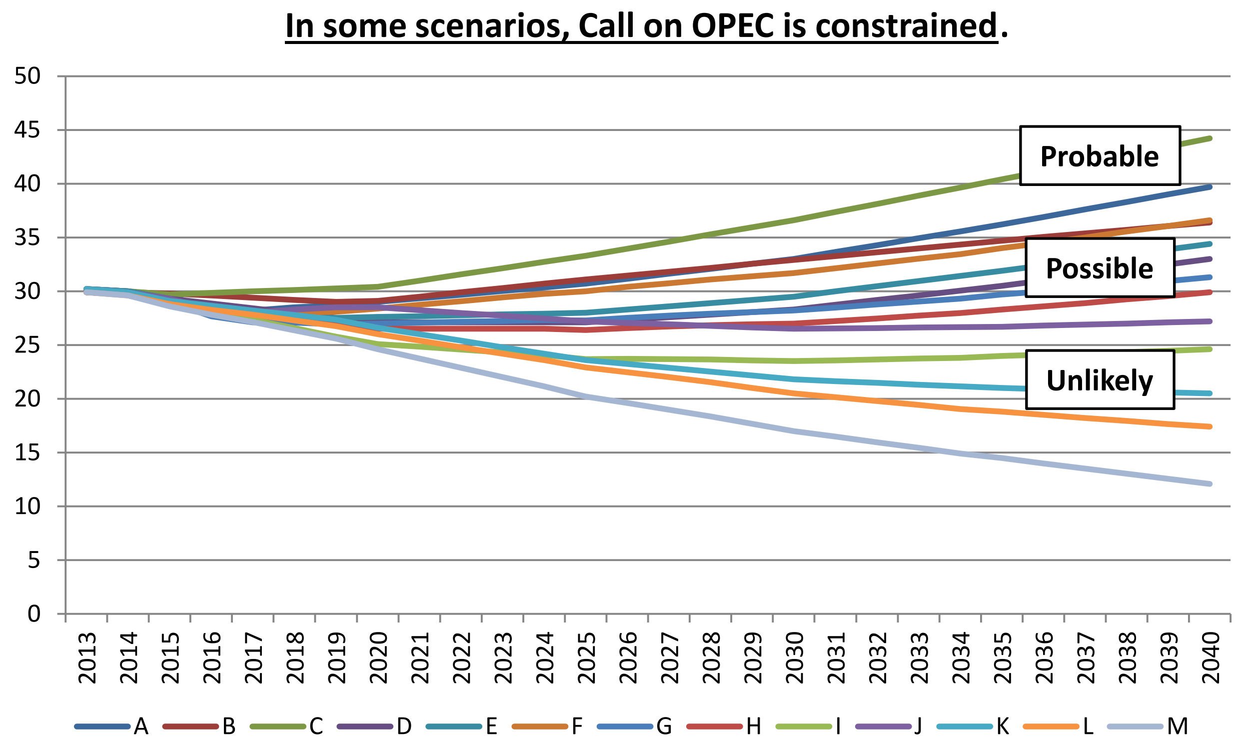
Long term scenarios from WOO/WEO – will stable markets require enhanced cooperation ?



A	OPEC Ref
B	IEA New Policies
C	OPEC high GDP
D	OPEC low GDP
E	OPEC upside supply
F	OPEC + China adj
G	OPEC + China adj and hi supply
H	OPEC low GDP +China adj
I	OPEC low GDP + China adj +hi supply
J	OPEC + 450
K	OPEC low GDP + 450
L	OPEC low GDP + China adj +450
M	OPEC low GDP + China adj + 450 + hi supply

Conclusions :

1) The market is at the tail end of the turbulent transition from the marginal cost of North Sea to the marginal cost of shale.
2) OPEC has given up the role of swing producer.
3) US shale producers are unlikely to deliver on the 3 responsibilities of the swing producer:
   a) The market will decide the price – there will be no ‘fair value’.
   b) Shale producers will not invest in spare capacity.
   c) So there can be no rapid adjustment of supply to manage volatilty.
4) If the market remains volatile at a low level for an extended period there is a risk that other large upstream projects will be delayed too long.
5) This increases the severity of any future supply risk.
6) If there is no spare capacity there is a risk that price will rise to ration demand, and this will kill the economy.
7) Coordinated use of stocks may help replace the role of spare capacity.
8) But to avoid the consequences of a future shock, enhanced dialogue is advisable.