

# New capacity fails to boost 2006 production – delays or depletion?

*This latest update of Petroleum Review's 'megaprojects' database shows large capacity additions each year to 2010 with a marked slowdown after that. The idea that this will provide the world with ample new supplies is undermined by the 2006 experience of large capacity additions and very limited production gains, writes Chris Skrebowski.*

This latest update of the megaprojects database has been expanded to include all projects with peak production of 40,000 b/d or over. The data is drawn from a wide variety of public sources, including company press releases, company websites, IEA (International Energy Agency) listings, stockbroker reports, consultant reports, oil magazines and databases, as well as the Opec website ([www.opec.org](http://www.opec.org)).

The database currently identifies 24.8mn b/d of new capacity due to come onstream between January 2007 and December 2012. At the time of writing there are no defined projects starting up post-2012, apart from a late phase of a Canadian tar sands project.

The new capacity in the period to 2012 is made up of 11.6mn b/d of new capacity from Opec producers in 64 projects and 13.2mn b/d of new capacity from non-Opec producers in 78 projects. The breakdown by year is shown in Table 1. In this analysis, Angola has been left in the non-Opec category despite becoming an Opec member on 1 January 2007. In the 2007–2012 period, Angola is expected to expand production capacity by 1.5mn b/d in 11 new projects. Taking this into account would give a new capacity split of 13.1mn b/d in 75 projects for Opec and 11.7mn b/d in 67 projects for non-Opec.

In addition to the 142 projects for which there is fairly comprehensive information, including start-up dates, there are a further 14 Opec and 36 non-Opec 'potential' projects which stand a good chance of becoming full development projects at some date. These are listed at the end of the megaprojects database (see Table 2). Petrobras has just announced that it now regards ten recent discoveries as commercial (see p3)

these have not yet been added to the database. There are also a number of Russian fields, notably some in eastern Siberia, which are potential development candidates, although public data on these is poor and incomplete.

A number of key findings stand out from analysis of the database. As noted earlier there are no defined projects after 2012 apart from Phase 3 of the Kearsar tar sands project in 2015. Project slippage will undoubtedly mean that some 2012 projects will slip into 2013, and possibly even 2014. The concern stems from the fact that the time from discovery to first oil already averages over six years and is increasing, while 2013 is only six years away.

Analysis of 18 projects discovered after 1997 that came onstream in the 2004 to end 2006 period gives an average discovery to first oil time of 6.2 years. A similar sort of analysis by BHP Billiton (published on a wallchart from *Offshore* magazine) showed that for 14 Gulf of Mexico projects that came onstream by end-2004 the average time from discovery to first oil was 55.7 months (4.64 years). It is to be expected that Gulf of Mexico projects would be some of the world's fastest projects because of a supportive financial regime and the region's comprehensive drilling, development and construction infrastructure.

This means that, in an environment increasingly dominated by resource nationalism, equipment and manpower shortages and a lack of construction capacity, project times are virtually certain to lengthen. Analysis of the megaprojects database would appear to confirm this. For the 41 projects coming onstream between 2007 and 2012, and discovered after 1997, the time from discovery to first oil has stretched out to average 7.7 years.

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Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
<b>Total new capacity</b>	<b>2,596</b>	<b>3,219</b>	<b>4,559</b>	<b>4,386</b>	<b>5,053</b>	<b>4,025</b>	<b>3,662</b>	<b>3,117</b>	<b>1,167</b>	<b>645</b>
Opec new capacity	1,250	1,660	1,715	1,955	2,670	2,070	1,877	1,307	155	0
Non-Opec new capacity	1,346	1,559	2,844	2,431	2,383	1,955	1,785	1,810	1,012	645
Global production increase (IEA)	1,480	760								

Petroleum Review database

Table 1: Opec and non-Opec capacity additions 2005–2014; global production increases 2005–2006

Project	Location	Operator	Oil peak flows (kb/d)	Gas peak flows (mn cf/d)	Oil reserves (mn b/d) <sup>a</sup>	Partners and shareholdings
<b>Onstream 2006</b>						
<i>Opec countries</i>						
AOR-E Delta	Nigeria	ExxonMobil	100		530	
Bu Hasa, Sahil project	Abu Dhabi	ADNOC	180			ADCO 100%
Darkhovin Ph2 Mas-i-Suleimn	Iran	Eni/Naftiran	+110			Eni 60% (on behalf of NIOC), Naftiran Intertrade (NICO) 40%
Dolphin, Al Khaliq (cond)	Qatar	QP/Total	100			
EA expansion	Nigeria	Shell	+50			
Elephant/Wafa/El Sharara	Libya onshore	Eni/Eni/Repsol	100			
Erha/ Erha North	Nigeria (OPL 209)	ExxonMobil	200		500	ExxonMobil 56.25%, Shell 43.75%
Ghawar Haradh Ph3 (E3* API)	S Arabia onshore	Saudi Aramco	300			Saudi Aramco 100%
In Amenas (cond)	Algeria	BP/Statoil	50 (2007)			Sonatrach 35%, BP 32.5% (50% in development phase), Statoil 32.5%
Kuwait GC 28	Kuwait onshore	KOC	60			
NEB Ph1 project****	NE Abu Dhabi	ADNOC	+110			ADNOC 100%?
Oryx/Al Seef/ Rasgas 5	Qatar	Sasol/OP/ExxonMobil	130			
Rag e Safid-Bangestan	Iran offshore	Qeshm	150			
South Pars Ph6 and 8 (cond)	Iran offshore	Statoil	120			
South Pars oil layer (Ahwaz)	Iran offshore	NIOC	150			
West Seno Ph2	Off Kalimantan, Indonesia	Chevron	50			
<i>Non-Opec countries</i>						
ACG Ph2 West Azeri	Azerbaijan	BP	+300 (2007)		5,800 (6,000bn cf)	BP 34.14%, Unocal 10.28%, Socar 10%, Inpex 10%, Statoil 8.56%, ExxonMobil 8% TPAO 6.75%, Devon 5.62%, Itochu 3.92%, Delta Hess 2.72%
ACG Ph2 East Azeri	Azerbaijan	BO	-260 (2007/08)		5,800 (6,000bn cf)	TPAO 6.75%, Devon 5.62%, Itochu 3.92%, Delta Hess 2.72%
Albacora Leste (17*API) (P50)	Brazil	Petrobras	180 (2007)	4mn cm/d	534 (258bn cf)	Petrobras 90%, Repsol YPF 10%
Atlantis	Gulf of Mexico	BP	150		675 boe	BP 56%, BHP 44%
Benguela-Belize (BBLT1)	Angola	Chevron	100 (2007)		400	Chevron 31%, Eni 20%, Total 20%, Sonangol 20%, Galp 9%
Constitution	Gulf of Mexico	Anadarko	60			Petrobras 100%
Cachalote	Brazil	Petrobras	EWT		800	Woodside 47.39%, Hardmn Res 19%, SMDH 12%, BG 10.23%, Premier 8.13%, Roc Oil 3.25%
Chinguetti Ph1	Mauritania offshore	Woodside	75		53 (revised)	Total 40%, BP 16.67%, Statoil 13.33%, ExxonMobil 20%
Dalia (21°–23° API)	Angola	Total	240		940	Woodside Petroleum 60%, Mitsui 40%
Dar Blend (Adar Yale fields)	Sudan	Petrodar	+200 (2007)		276	
Enfield (+Laverda)	Australia NW Shelf	Woodside	100		127 (TBD)	
Fram East	Norway	Norsk Hydro	50		61	
Golfinho Module I (28-40*API)	Brazil (Espirito Santo)	Petrobras	100 (2007)	3.5mn cm/d	450	Petrobras 100%
Jubarte 1 Ph1 (P34)(17*API)	Brazil B60 (Santos)	Petrobras	60 (2007)		600	Petrobras 100%?
Lobito-Tonbuco (BBLT2)	Angola	Chevron	+100 (2008)		400+	Chevron 31%, Eni 20%, Total 20%, Sonangol 20%, Galp 9%
Okume	Equatorial Guinea	Hess	60			Hess 85%, Tullow Oil, GEPetrol
Shakh Deniz (Stage 1)	Azerbaijan	BP	42	830		BP 25.5%, Statoil 25.5%, Socar 10%, Lukoil 10%, NICO 10%, Total 10%, TPAO 9%
Syncrude Ph3	Athabasca, Canada	Canadian Oil Sands	350			Canadian Oil Sands 32%, Imperial Oil 25%, Petro-Canada 12%, Nexen ?, others ?%
Tengiz/Kololev expansion*	Kazakhstan	Chevron	+250	100	6,000	
Thar Jath	Sudan	Petronas	85		800	
Upper Salyman, Vadelyp	Khanty-Mansiisk	Shell/Evikhon	60 (2009)		800	Salyman Petroleum Development (SPD): 50% Shell, 50% OAO Evikhon
<b>Onstream 2007</b>						
<i>Opec countries</i>						
Al Jurf	Libya onshore	NOC	40			
Abu Hadriya/Khursaniyah/Fadhili	S Arabia onshore	Saudi Aramco	+500	250	4,500/500/950	Saudi Aramco 100%
Berkline blks 403/404a/405a	Algeria onshore	Anadarko/Burlington	65			
Corocoro Ph1	Venezuela offshore	ConocoPhillips	75		450 (2,000bn cf)	ConocoPhillips 32.5%, PdVSA 35%, Eni 26%, Opic 6.5%
Idd al Shargi N and S Dome	Qatar	Occidental	65			
Khursaniyah NGLs	S Arabia onshore	Saudia Aramco	250			
Kuwait GC 14	Kuwait onshore	KOC	60			
Qatargas T4 (cond)	Qatar	GQP/ExxonMobil	80			
Ras Gas T6 (cond & LPG)	Qatar	ExxonMobil	150			
Sabriya	Kuwait onshore	KOC	50			
Salman, Faroozan, Daroud	Iran onshore	Total, Petro Iran	150			
<i>Non-Opec countries</i>						
Alvheim	Norway	Marathon	85		152 (200bn cf)	Marathon
Atlantis	Gulf of Mexico	BP	150	180	657 boe	BP 56%, BHP 44%
Buzzard	UKCS	Nexem	180 (2007/08)	550		EnCana 43.2%, Petro-Canada 29.9%, BG Group 21.7%, Edinburgh Oil & Gas 5.2%
Ca Ngu Vanf (Golden Tuna)	Vietnam blk 09-03	PetroVietnam	70		222 (11bn cf)	Petrovietnam 50%, Soco International 25%, PTTEP 25%
Espadarte RJS-409	Brazil (Campos)	Petrobras	100 (2007)	88		Petrobras 100%?
Golfinho Module II (28-40*API)	Brazil (Espirito Santo)	Petrobras	100 (2007/08)	450		Petrobras 100%
Greater Plutonio (6 fields)	Angola block 18	BP	240		800	BP 50%, Sonangol 50%
Kikeh	Malaysia offshore Sabah	Murphy Oil	120 (2009)		530	Murphy 80%, Petronas Carigali 20%
Long Lake (tar sands)	Canada, N Alberta	Nexen	70		1,900	Nexen 50%, OPTI Canada 50%
Peng Lai Ph2	China Bohai Bay PL19-3	ConocoPhillips	190 (2009)	800		CNOOC 51%, ConocoPhillips 49%
Polvo (BM-C-8)	Brazil, (Campos)	Devon Energy	50	50mn b+		Devon Energy 60%, SK Corporation 40%
Roncador 1A Ph2 (P52)	Brazil	Petrobras	180 (2008)		2,600 (field)	Petrobras 100%
Roncador Module 2 (P54)	Brazil	Petrobras	180 (2008)		2,600 (field)	Petrobras 100%
Rosa (tie-bk to Girassol)	Angola blk 17	Total	250, net+40		300	Total 40%, Esso 20%, BP 16.67%, Statoil 13.33%, Norsk Hydro 10%
Surmont (heavy oil by SAGD)	Canada, N Alberta	ConocoPhillips	200 (2012)			ConocoPhillips 50%, Total 50%
Tui	New Zealand	AWE	50			
<b>Onstream 2008</b>						
<i>Opec countries</i>						
Abu Dhabi OGD3, AGD3 (cond)	Abu Dhabi	ADNOC	135			
Akpo	Nigeria OML 130	Elf Nigeria (Total)	180		590 (4,000bn cf)	Total 24%, NNPC ?, Petrobras ?, Sapetro ?%
AKG later phases (cond)	Qatar	QP/ExxonMobil	50			
Al Rayyan	Qatar	Occidental	50			

Table 2: Future oil field projects with a peak production capacity of over 40,000 b/d

<sup>a</sup>Gas reserves (bn cf) are in brackets

Project	Location	Operator	Oil peak flows (kb/d)	Gas peak flows (mn cf/d)	Oil reserves (mn b) <sup>a</sup>	Partners and shareholdings
Amal	Libya onshore	NOC	40			
El Merk fids blk 208 (crude/cond)	Algeria	Anadarko	165			Anadarko/Sonatrach on behalf of Maersk, Eni, Burlington, Talisman and Teikoku Oil
Escravos GTL	Nigeria	Chevron/Sasol	95			Chevron 7%, Sasol 7%
Hawiyah NGLs	S Arabia onshore	Saudi Aramco	310			Saudi Aramco 100%
Jeruk	Indonesia, offshore Java	Santos	60	170 boe		Sampang PSC: Santos 45%, Singapore Petroleum Co (SPC) 40%, Cue Energy 15%
Offshore Kalimantan	Indonesia	JV	50			
Ofon	Nigeria	Total	70			
Qatargas T5 (cond)	Qatar	QP/ExxonMobil	80			
Ras Gas T7 (cond)	Qatar	QP/ExxonMobil	40			
Ras Laffan cond refinery	Qatar	QP	140			
Rhourde El Baguel	Algeria	Sonatrach/Am Hess	100			
Sabriya GC 24	Kuwait onshore	KOC	160			
Shaybah Ph1	S Arabia onshore	Saudi Aramco	+250			Saudi Aramco 100%
Skikda cond splitter	Algeria	CNPC	125			
Tomoporo (23° API)	Venezuela	PdVSA	150		1,000	PdVSA but private investors to 49%
<b>Non-Opec countries</b>						
ACG Ph3 (Gunashli)	Azerbaijan	BP	+200 (2009)		5,800 (6,000bn cf)	See under Ph1 in 2006
Golfinho Module III (28-40°API)	Brazil (Espírito Santo)	Petrobras	100 (2008/09)		450	Petrobras 100%
Horizon Ph1 (tar sand)	Canada, N Alberta	CNR	500		3,300	CNR ?
Jackpine Mine Ph1	Canada, N Alberta	Shell?	200 (2010)			
Joslyn Ph1 & 2	Canada, N Alberta	Total	100 (2014)			
Kizomba C (Mondo/Saxi/Batuq)	Angola blk 15	ExxonMobil	200		1,000	ExxonMobil 40%, BP 26.66%, Eni 20%, Statoil 13.33%
Ku Maloop Zaap	Mexico	Pemex	+450			
MA	Krishna-Godovari basin, India	Reliance Oil	60	300		
Marlim Sul Module 2 (P51)	Brazil	Petrobras	180		2,679 boe (tot)	Petrobras 100%
Moho-Bilondo	Congo (Haute Mer permit)	Total	75			Total 53.5%, Chevron 31.5%, Societe Nationale de Petroles du Congo (SNPC) 15%
Neptune	Gulf of Mexico	BHP Billiton	50	50		
Prirazlomnoye	Russia Siberia	Sevmorneftegaz	155 (2012)		610	Gazprom?, Rosneft?
Sakhalin 2	Russain Far East	Shell	+160			Gazprom 50% +1 share, Shell 27.5%, Mitsui 12.5%, Mitsubishi 10%
South Khylichuyuskoye	Russai Timan-Pechora	ConocoPhillips	135			
Sunrise thermal project	Canada, N Alberta	Husky Oil	200 (2014)			
Su Tu Vang (White Lion)15-1	Vietnam Cuu Long Bas	ConocoPhillips	100?	220		Petrovietnam 50%, ConocoPhillips 23.25%, KNOG 14.25%, SK Corp 9%, Geopetrol 3.5%
Stybarrow	Australia offshore	BHP Billiton	80		60-90	BHP Billiton 50%, Woodside Petroleum 50%
Tahiti	Gulf of Mexico	Chevron	125	70	400-500mn boe	Chevron 58%, Statoil 25%, Shell 17%
Thunder Horse (inc North)	Gulf of Mexico	BP	250 (2008)	200	1,000-1,500 boe	BP 75%, ExxonMobil 25%
Uvat (Demainskiy Ph1)	Russia Siberia	TNK-BP	220		450	TNK-BP 100%?
Vankor 2 fields	Russia N Siberia	Rosneft	665 (2015)		2,300-7,200	Rosneft 100%
Vincent (18° API)	Australia NW Shelf	Woodside	100		730?	Woodside Petroleum 60%, Mitsui 40%
<b>Onstream 2009</b>						
<b>Opec countries</b>						
Agbami	Nigeria OPL 216,217	Chevron	230		800	Chevron 68.15%, Petrobras 13%, Statoil 18.85%
Al Shaheen expansion	Qatar offshore	Maersk Oil	+240			Maersk Oil, QPC
Azadegan (southern part)***	Iran onshore	Inspex, NIOC	125		2,500-3,000	Inspex 75%, NIOC 25%
Berkline blk 405b(cond)	Algeria	First Calgary	40			
Bosi Oil	Nigeria	ExxonMobil	110			
Corocoro Ph2	Venezuela offshore	ConocoPhillips	+45		450 (2,000bn cf)	ConocoPhillips 50%, PdVSA 24%, Eni 26%
Gassi Touil (cond)	Algeria onshore	Repsol	40			
Khurais	S Arabia onshore	Saudi Aramco	1,200		3,000	Saudi Aramco 100%
Nuayyim (Arab Super Light 50°)	S Arabia onshore	Saudi Aramco	100		1,000	Saudi Aramco 100%
Qatargas T6	Qatar	QP/ExxonMobil	80			
Pearl GTL (Ph1) (products, NGL)	Qatar	Shell	70	800		Qatar Petroleum 7%, Shell 7%
Rhourde El Baguel	Algeria	Sonatrach	100			
South Pars Ph9 and 10 (cond)	Iran	NIOC, LG	+80			
Upper Zakum redevelopment	Abu Dhabi	ExxonMobil	+200			ExxonMobil 28%, ADNOC 60%, JODCO 12%
<b>Non-Opec countries</b>						
Frade	Brazil (Campos)	Chevron	100 (2010)		300	Chevron Brasil Limitada 51.74%, Petrobras 30%, Frade Japao Petroleo Limitada 18.26%
Karachaganak Ph3 and 4	Kazakhstan	Eni and BG	+200			Eni 32.5%, British Gas 32.5%, Chevron 20%, Lukoil 15%
Kashagan Ph1	Kazakh Caspian	Agip (Eni)	450 (2011)	1,500	13,000 (tot)	Eni/Total/ ExxonMobil/Shell 18.52% each, ConocoPhillips 9.26%, Inspex 8.33%, KMG 8.33%
Mangala fields (4)	India onshore Rajasthan	Cairn Energy	100		600	Cairn Energy 70%, ONGC 30%
Marlim Leste (P53)	Brazil (Campos)	Petrobras	180 (2009)	6mn cm/d	150	Petrobras 100%
Negage	Angola blk 14	Chevron	75			Chevron 31%, Eni 20%, Total 20%, Sonangol 20%, Galp 9%
Shenzi (southern flank)	Gulf of Mexico	BHP Billiton	100	50	350-400mn boe	BHP Billiton 44%, Repsol YPF 28%, Amerada Hess 28%
Tempa Rossa	Italy onshore	Total	50			
Tombua Landana	Angola	Chevron	130 (2010)			Chevron 31%, Eni 20%, Total 20%, Sonangol 20%, Galp 9%
Tyrihans N&S	Norway	Statoil	70		156 (1,150bn cf)	
Valhall redevt	Norway	BP	+150			BP 28.1%
<b>Onstream 2010</b>						
<b>Opec countries</b>						
Bonga SW + Aparo	Nigeria (OML 118)	Shell and Chevron	175		1,000	Shell 55%, ExxonMobil 20%, Total 12.5%, Eni 12.5%
Cepu block (Banyu Urip)	Indonesia Offshore	ExxonMobil (TBC)	180	20	700 in block	ExxonMobil 45%, Pertamina 45%, Indonesian government 10%
Egina	Nigeria	Total	160			
Jeruk (Ph2)	Indonesia, offshore Java	Santos	100		170 boe	Sampang PSC: Santos 45%, Singapore Petroleum Co (SPC) 40%, Cue Energy 15%
Kushk-Hosseineh	Iran onshore	Iran	300		1,500+	
Pearl GTL (Ph2) (products, NGL)	Qatar	Shell	100			
*Project Kuwait* (Northern fields)	Kuwait onshore	KPC/ Oilco group	+450			Fields involved: Raudhatain, Ratqa, Abdali and Sabriyah
Qatargas 17 (cond)	Qatar	Qp/ExxonMobil	40			
Shaybah (Ph2)	S Arabia onshore	Saudi Aramco	+250			Saudi Aramco 100%

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<sup>a</sup>Gas reserves (bn cf) are in brackets



Project	Location	Operator	Oil peak flows (kb/d)	Gas peak flows (mn cf/d)	Oil reserves (mn b) <sup>a</sup>	Partners and shareholdings
South Pars Ph19/20/21/22 (cond)	Iran	NIOC	+160			
Usan/Ukot/Tongo	Nigeria (OPL 222)	Elf Nigeria (Total)	150		500	Elf Nigeria 20%, Chevron 30%, ExxonMobil 30%, Nexen 20%
Umm Shaiff redevt	Abu Dhabi	ADMA-OPCO	300	1,000		
<b>Non-Opec countries</b>						
West-Platina W/Chumbo	Cesio Angola blk 18	BP	100		250-300	BP 50%, Sonangol 50%
Colombia GTL	Colombia onshore	BP	70			
Foster Creek	Canada, N Alberta	EnCana	500 (2015)			EnCana 7%
Jubarte Ph2 (P57)	Brazil B60 (Santos)	Petrobras	180 (2011)		540	Petrobras 100%
Kashagan Ph2	Kazakh Caspian	Agip (Eni)	+450 (2012)	1,500	10,000 (tot)	Eni/Total/ExxonMobil/Shell 18.52% each, ConocoPhillips 9.26%, Inspex 8.33%, KMG 8.33% Imperial Oil 7%, ExxonMobil 7%
Kearl project	Canada, N Alberta	Imperial Oil	300 (2018)		4,400	
Muskeg River Athabasca Ph1 exp	Canada, N Alberta	Shell/AOSP	+100			
Pazflor (Perpetua/Acacia/Zinia/Hort)	Angola blk 17	Total	200			
Perdido (Gt White/Tobago/Silvertip)	Gulf of Mexico	Shell	130			Perdido regional host - Chevron 37.5%, Shell (optr) 35%, BP 27.5%
Plutao/Saturno/Marte/Venus	Angola blk 31 NE	BP	130		500 in blk 31	BP 26.67%, ExxonMobil 25%, Sonangol 20%, Statoil 13.33%, Marathon 10%, Total 5%
Point Thomson unit	US Alaska	BP	90			
Puma/Tubular Bells	Gulf of Mexico	BP	80			
<b>Onstream 2011</b>						
<b>Opec countries</b>						
Manifa (Arab Heavy 28° API) Ph1	S Arabia offshore	Saudi Aramco	900			Saudi Aramco 100%
Neutral Zone expansion Al Khafji	S Arabia on/offshore	Saudi Aramco	+300			
Oryx GTL exp (products, NGL)	Qatar	Sasol	+65			
ExxonMobil GTL (products, NGL)	Qatar	ExxonMobil	154			Qatar Petroleum 7%, Shell 7%
Yadavaran	Iran onshore	NIOC/Sinopec	300		3,000	NIOC 80%, ONGC 20%
<b>Non-Opec countries</b>						
Blk 31 SEMid-Palas/ Astrea/Juno	Urano/Titania, Angola blk 31 BP		130		500 in blk 31	BP 26.67%, ExxonMobil 25%, Sonangol 20%, Statoil 13.33%, Marathon 10%, Total 5%
Blk 32 - Gingebré et al	Angola blk 32	Total	130		4 discoveries	Total 30%, Marathon 30%, Sonangol 20%, ExxonMobil 15%, Petrogal 5%
Goliat	Norway	Eni	150			
Kizomba D	Angola blk 15	ExxonMobil	120			ExxonMobil 40%, BP 26.66%, Eni 20%, Statoil 13.33%
Marib Jawf	Yemen	ExxonMobil	60			
Parque das Conchas (16-24° API)	Brazil BC-10 (Espírito Santo)	Shell	100		400	Petrobras 35%, Shell 50%, ONGC 15%
Roncador Module 3 (22° API) (P55)	Brazil	Petrobras	180			
Skarv and Idun	Norway	BP	85	670	260 (field)??	
Tengiz expansion SGI/SGPIII	Kazakhstan	Chevron	65		6,000	Chevron 50%, ExxonMobil 25%, KazMunaiGaz 20%, LukArco 5%
<b>Onstream 2012</b>						
<b>Opec countries</b>						
Azadegan Ph2 (Northern part)***	onshore Iran	NIOC/Japan	110		2,500-3,000	NIOC, Japanese interests
Nsiko (OPL 249)	Nigeria offshore	Chevron	75			
<b>Non-Opec countries</b>						
Albacora Complementary	Brazil	Petrobras	100			Petrobras 100%
Block 31 SE-Ceres/Hebe/Titania	Angola blk 31	BP	130		500 in blk 31	BP 26.67%, ExxonMobil 25%, Sonangol 20%, Statoil 13.33%, Marathon 10%, Total 5%
Horizon Ph2 (tar sand)	Canada, N Alberta	CNR	+122		3,300	CNR?
Kashagan Ph3	Kazakh Caspian	Agip (Eni)	+300 (2016)	1,500	10,000 (tot)	Agip/Total/ExxonMobil/Shell 20.37%, ConocoPhillips 10.19%, Inspex 8.33%
Kearl project Ph2	Canada, N Alberta	Imperial Oil	+100		4,400	Imperial Oil 7%, ExxonMobil 7%
Marlim Sul III (FPSO P56)	Brazil	Petrobras	100			
Marlim Sul IV (semi tba)	Brazil	Petrobras	100			
Papa Terra (DC-20) (14°-17° API)	Brazil	Petrobras	100?		700-1,000	Petrobras 62.5%, Chevron 37.5%
<b>Potential Projects</b>						
<b>Opec countries</b>						
Azar (Anaran blk)	Iran onshore	Norsk Hydro, Lukoil	100		2,000 (in place)	Norsk Hydro 75%, Lukoil 25% (PSA?)
Arash	Iran in Gulf	IOOC/KOC jointly			683 boe	
Hamrin	Iraq onshore (South)	SOC	60			
Khurmala Dome	Iraq onshore (Kirkuk area)	NOC	100			
Kifl	Iraq onshore	SOC	40			
Majnoon	Iraq onshore	SOC	360		12,100	
Minagish EOR project	Kuwait onshore	KOC	100			
Ramin	Iran near Ahwaz	NIOC			1,500	
Ressalat rehabn	Iran offshore	IOOC	50			
Reshadat rehabn	Iran offshore	IOOC	80			
SAS - Sahil/Asab/Shah fields	UAE	Adco	??			
Sincor II	Venezuela	Total	180			
Subbah-Luhais	Iraq onshore (South)	SOC	80			
West Qurna Ph2	Iraq onshore	SOC	650		11,300	
<b>Non-Opec countries</b>						
BC-2	Brazil (Campos)	Total				
BS-4(14-15° API) (sour) 2 fields	Brazil offshore	Shell			1,500	Shell 60%?, Petrobras 40%
Borealis	Canada, N Alberta		100			
Camamu	Brazil	El Paso				
Christina Lake	Canada, N Alberta		250			
Chinook BM-C-7	Brazil Campos basin	Anadarko			250-450 boe	Kerr-McGee 50% Petrobras 50% (Norsk Hydro awaiting confirmation of 50% acquisition)
CLOV-Cravelo/Lirio/Orquida/Violeta	Angola blk 17	Total	150			
Filanov	Caspian, Russian sector	Lukoil	100+		600 (1,200bn cf)	Lukoil 100%
Fort Hills oil sands	Canada, N Alberta	PetroCanada	100		2,800	Petro-Canada 55%, UTS Energy Corp 30%, Teck Cominco 15%
Jack	Gulf of Mexico	Chevron	100?			
Jackpine Mine Ph2	Canada, N Alberta	Shell				
Kearl project Ph2 and 3	Athabasca, Canada	Imperial Oil	+100		4,400	Imperial Oil 7%, ExxonMobil 7%
Kebabangan	Malaysia blk J off Sabah	ConocoPhillips			200-300	Block J: Petronas Carigali 20%, ConocoPhillips 40%, Shell 40%

Table 2: Future oil field projects with a peak production capacity of over 40,000 b/d

<sup>a</sup>Gas reserves (bn cf) are in brackets

Project	Location	Operator	Oil peak flows (kb/d)	Gas peak flows (mn cf/d)	Oil reserves (mn b) <sup>a</sup>	Partners and shareholdings
Kharampur	Russia	Rosneft			4,900 boe	
Kharyaga	Russia Siberia	Total PSA	70		700-5,200	
Khvalynskoye	Russian Caspian	Lukoil/KazMgaz			17(c)36mn t (o) (11,300bn cf)	
Kizomba D	Angola block 15	ExxonMobil				
Kurmangazy	N Caspian (Russ/Kaz)	Rosneft/KMG	600?		7,000	Rosneft 25%, other Russian 25%, KazMunaiGaz 25%, Total 25% (tbc)
Lungu	China Tarim basin	Petrochina			500	
Marimba Leste (FPS-Semi)	Brazil (Campos)	Petrobras				
Marimba Leste (FSO)	Brazil (Campos)	Petrobras				
Northern Lights oil sands project	Canada, N Alberta	Synenco	100			Synenco 60%, Sinopec 40%
Northern Territories 4flds	Russia, Timan-Pechora	Lukoil, ConocoPhillips			990	
St Malo	Gulf of Mexico	Chevron	100?			
Su Tu Den NE blk 15-1	Vietnam Cuu Long basin	ConocoPhillips				
Su Tu Nau (Brown Lion) blk 15-1	Vietnam Cuu Long basin	ConocoPhillips				Petrovietnam 50%, ConocoPhillips 23.3%, KNOOC 14.2%, SK Corp 9%, Geopetrol 3.5%
Su Tu Trang blk 15-1	Vietnam Cuu Long basin	ConocoPhillips	100			
SUNCOR (tarsands) expansion	Canada	Suncor	140			
Talakan	Russia Siberia	Surgutneftegas			832	
Tiof	Mauretania	Woodside			298	
Tsentralnoye block	Russia/Kazakh Caspian	Lukoil/Kazakhoil			3,800 (3,240bn cf)	Tsentrkasneftegas JV: Kazakhoil 50%, Lukoil and Gazprom 50%
Urugua	Brazil (Santos)	Petrobras			467mn boe	
Val Gamburgtsev	Russia Siberia	Yukos/Sibneft			600	
Verkhnechonskoye	Eastern Siberia	TNK-BP	130		1,500	
Voyageur	Canada, N Alberta	Suncor	500-550			
Yalamo-Samur	Russia/Azeri Caspian	Lukoil			3,750 boe	
Yuri Korchagin	Russian Caspian	Lukoil			879 boe	
Yuzhno-Shapinskoye	Russia Siberia	SeverTek			500	Lukoil Fortum
Zamyhl	Kazakh Caspian	Kazmunaigas	250?			

\*limited production from 12/2004, Vadelyp 2006; \*\* 250,000 b/d 2007-2009; \*\*\* 5,000mn barrels for field; \*\*\*\* Al Dhabiya, Rumaitha, Shanaget

Table 2: Future oil field projects with a peak production capacity of over 40,000 b/d

<sup>a</sup>Gas reserves (bn cf) are in brackets

...continued from p40

Taken literally, this would mean that any major new discovery would be unlikely to be onstream before late 2014.

However, not all projects involve extended development times. The two fastest projects, at about three years, are Golfinho (Brazil) and Constitution (Gulf of Mexico). At the other end of the scale, West African projects are typically in the seven- to nine-year range. Current constraints in the market in terms of equipment shortages, lack of skilled manpower and construction bottlenecks suggests that extended development times are likely to a feature for several more years.

The other challenge facing the industry is the quite limited number of countries with potential development projects. The listing of 'potential projects' (see end of Table 2) shows this quite clearly. Among the Opec producers

the potential projects are predominantly in Iran and Iraq, both countries where investment is currently difficult for security and political reasons. Among the non-Opec countries, Brazil, Canada (tar sands) and Russia predominate, with these three countries accounting for 26 of the 36 potential projects listed.

In 2004 and 2005 it has been possible to reconcile the volumes of new capacity and the volumes of additional production and to establish volumes being lost to depletion as opposed to capacity temporarily lost to disruptions such as the Gulf of Mexico hurricanes in 2005. For 2006 it is rather harder, as there is considerable conflict between the various data sources, see Table 3.

For the Opec producers 2006 notionally saw 1.66mn b/d of new capacity coming onstream. However, there is little or no public data to confirm Opec

project start-ups and no reliable data on field under performance or depletion. According to the IEA the Opec producers had expanded their spare capacity by 1.5mn b/d by the end of 2006 and expanded their production by 160,000 b/d. Other sources see Opec production declining in 2006. There is little or no public data on Opec project delays, performance or depletion.

For the non-Opec producers 2006 has seen 1.6mn b/d of new capacity brought onstream. The highest figure for production gains is the IEA's 760,000 b/d implying that 840,000 b/d has been lost to depletion, field under-performance or unpublicised delays. Some field under performance has been reported - Enfield, Chinguetti - but the effect is unlikely to be very large. Similarly, unpublicised delays or more likely slower than anticipated production build-ups are real but with relatively small effect. The conclusion would be that non-Opec depletion is running at over 700,000 b/d per year and maybe as high as 1.3mn b/d per year depending which production data source is used.

It is only possible to draw two conclusions from this latest megaprojects analysis. First, data on production, project performance and depletion rates is wholly unsatisfactory, particularly for the Opec producers. Second, the large volumes of new capacity being added between 2007 and 2012 may not translate into the sort of increased production flows the world economy needs to underpin economic growth.

Source	World production growth	Opec	non-Opec
O & G Journal	+125,000 b/d	-110,000 b/d	+235,000 b/d
112%	+140,000 b/d	-123,000 b/d	+263,000 b/d
IEA	+760,000 b/d	+160,000 b/d	+610,000 b/d
EIA	+1,000 b/d	-310,000 b/d	+311,000 b/d

O &amp; G Journal figures are for crude and lease condensates. All liquids are on a global average 112% of the crude and lease condensate figure.

IEA figures are based on data from the latest Oil Market Report (18 January 2007).

EIA are based on 10-month averages from data in the latest International Petroleum Monthly (3 January 2007).

[If any reader can provide a full reconciliation of the various data sources, the Editor would be very pleased to receive it and publish it in a future issue of Petroleum Review.]

Table 3: Variations in new capacity figures depending on source