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Iran's Evolving Threat

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Working Draft: Revised January 3, 2010

Ten Key Challenges

- **Rising Global Dependence on Gulf Oil Through 2030**
- **Export Vulnerability**
- **Conventional Military Threats**
- **Asymmetric Warfare**
- **Piracy and Somali Instability**
- **Al Qa'ida in the Peninsula**
- **Yemen**
- **Broader Challenge of Terrorism**
- **Missile Warfare;**
- **Nuclear Forces and Weapons of Mass Destruction**

Key Solutions

- **Prepare for all types of threats, and full spectrum of terrorism and asymmetric warfare;**
- **Jointness and inter-ministry cooperation;**
- **Regional and international cooperation**
- **Focus on both active and passive defense;**
- **Broad, non-compartmented situational awareness with real world operational response - critical value of IS&R and C4I;**
- **Intelligence Cooperation**
- **Gaming and "red teaming"**
- **Design civil and commercial facilities and infrastructure for deterrence and defense.**

3

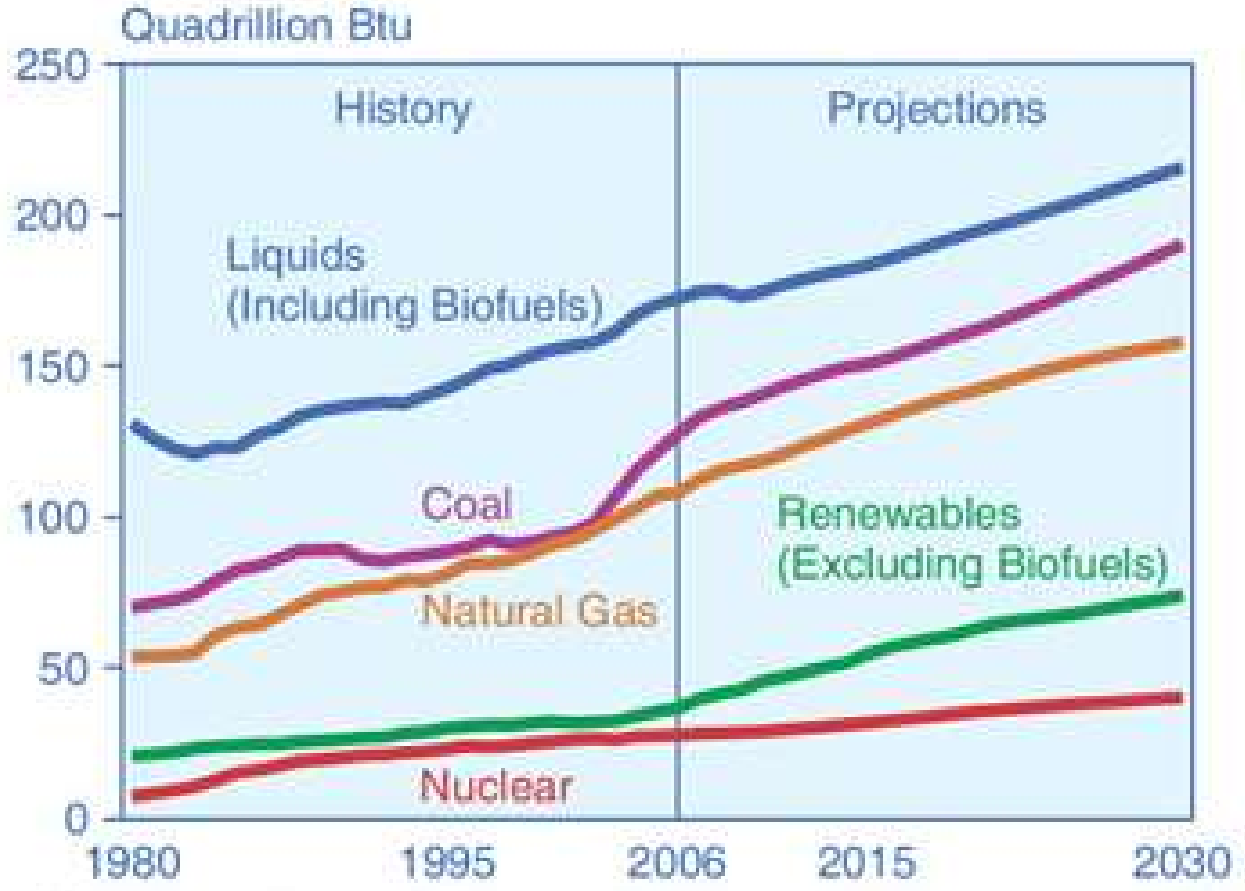
The Challenge of Rising Global Dependence on Gulf Oil Through 2030

Strategic Dependence

- **Neither local powers nor any combination of friendly power can assume US role;**
- **US is dependent on a global economy which is dependent on Gulf energy exports; and US imports indirectly from Gulf through massive imports of manufactured goods.**
- **Both US DOE/EIA and IEA show global and US direct dependence on Gulf petroleum exports through at least 2030**
- **Dependence further increase by vital role of petroleum experts in transportation sector.**
- **Most risks are security driven, but IEA and others raise key questions about investment cost and need for consistent investment and new technology over time.**
- **Only three regional countries: Qatar, Oman, and Saudi Arabia have efficient energy investment and companies. Two key powers: Iran and Iraq have not been stable or made efficient energy investments since 1978-1981.**

5

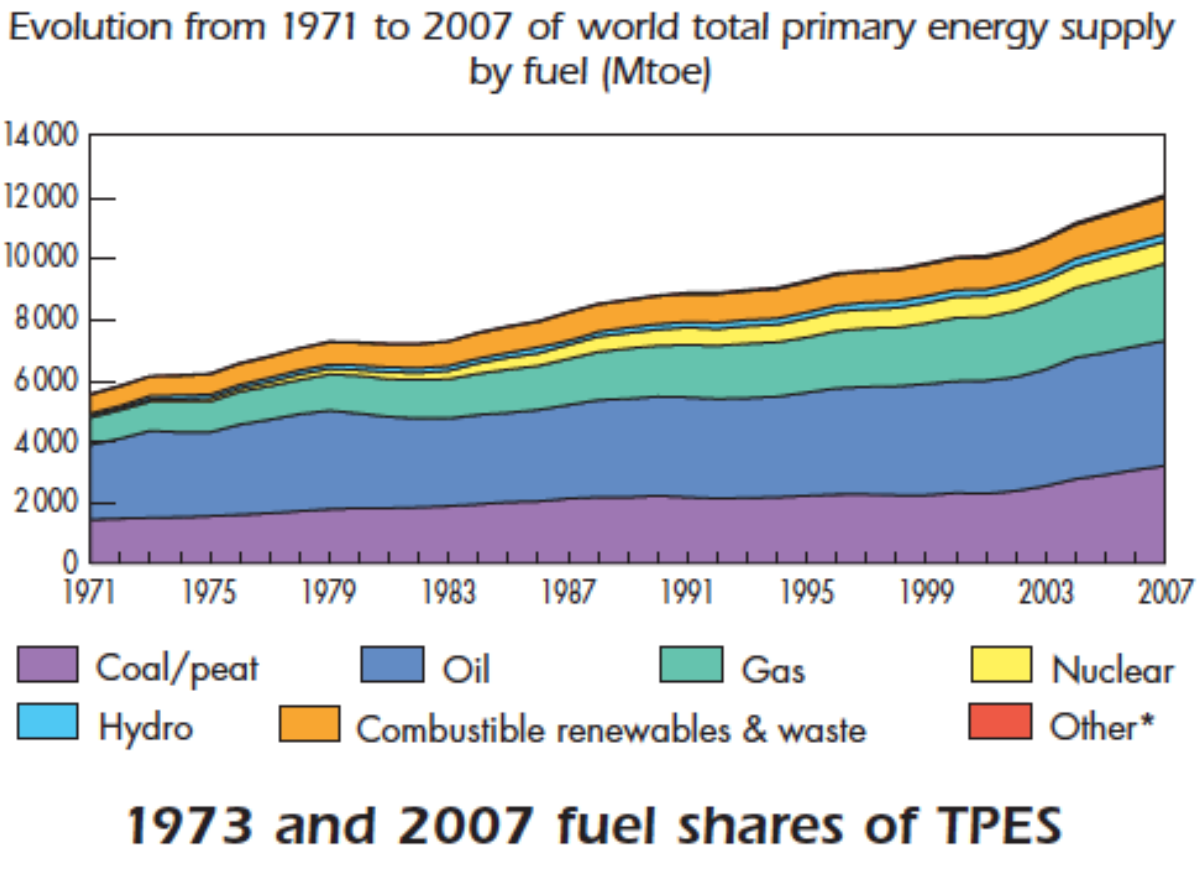
EIA: World Energy Use: 1980-2030



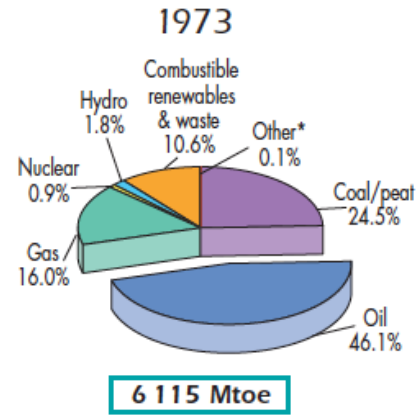
Sources: **History:** Energy Information Administration (EIA), *International Energy Annual 2006* (June-December 2008), web site www.eia.doe.gov/iea. **Projections:** EIA, World Energy Projections Plus (2009).

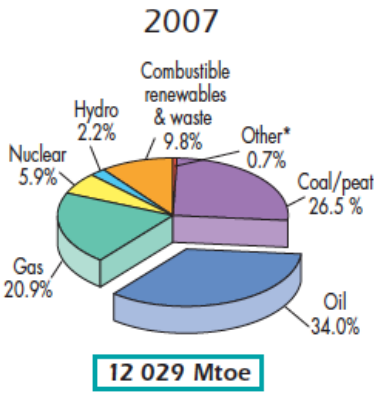
Source: EIA-IEO 2009

IEA: Role of Oil as Percent of World Energy Has Diminished, But Consumption is Steadily Rising: 1973-2007



1973 and 2007 fuel shares

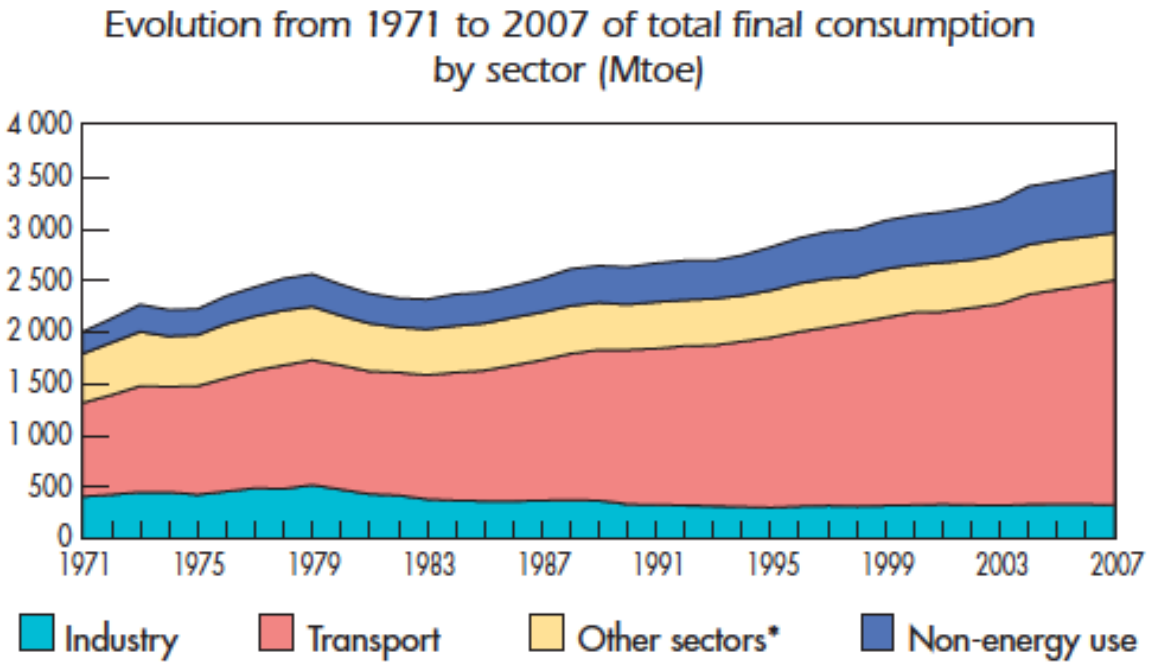




*Other includes geothermal, solar, wind, heat, etc.

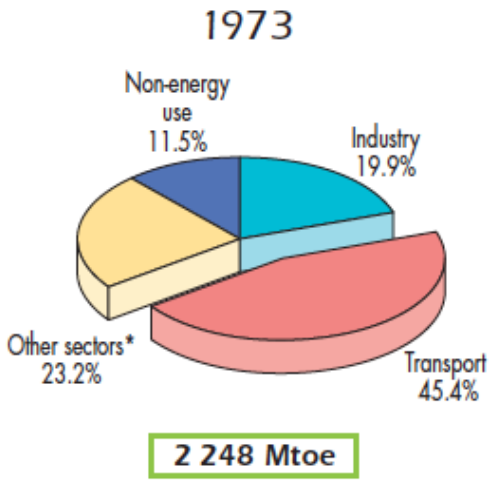
Source: Adapted from IEA, World Energy Statistics, 2009

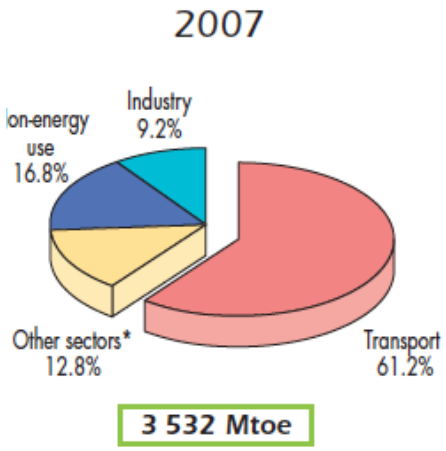
IEA: World Transport Dependence on Oil is Also Steadily Rising: Key Impact on Global Economy



*Includes agriculture, commercial & public services, residential and non-specified other sectors.

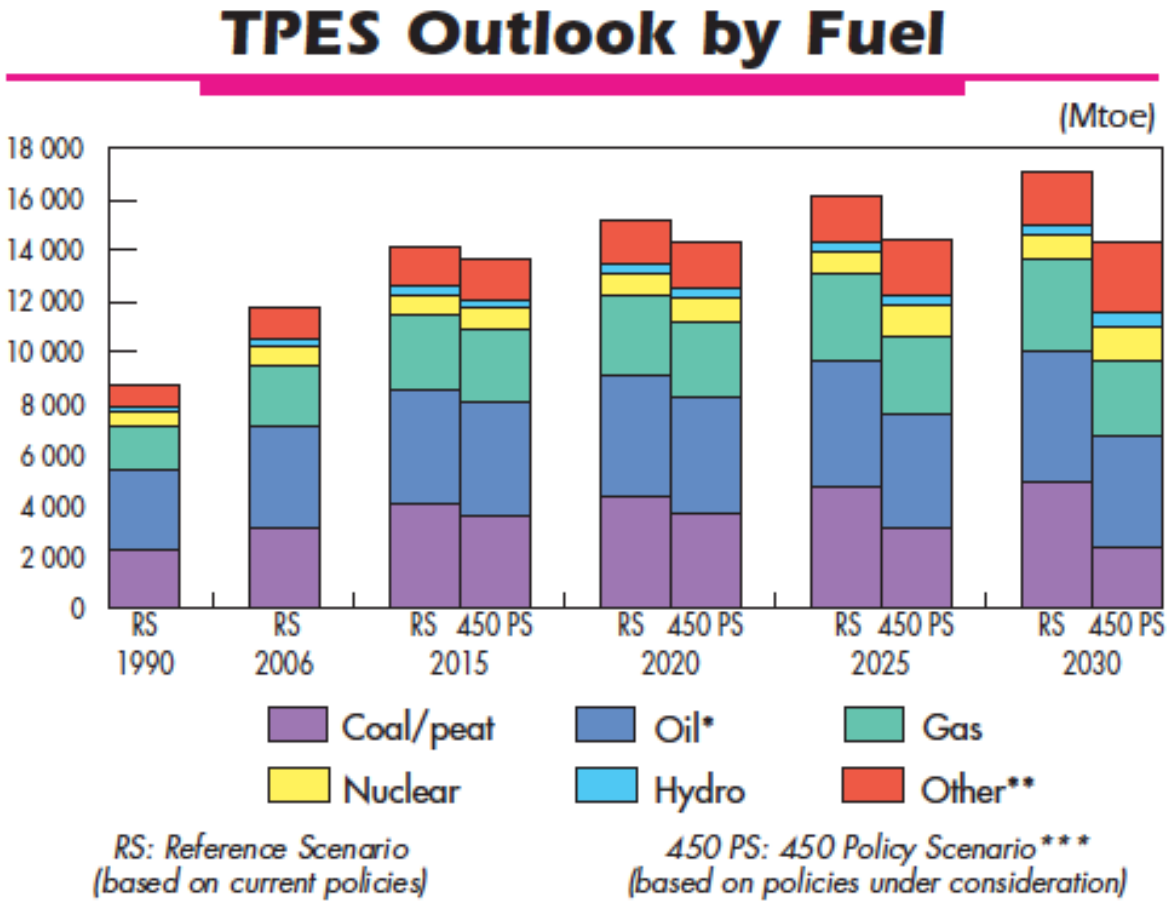
1973 and 2007 shares of world oil consumption





Source: Adapted from IEA, World Energy Statistics, 2009

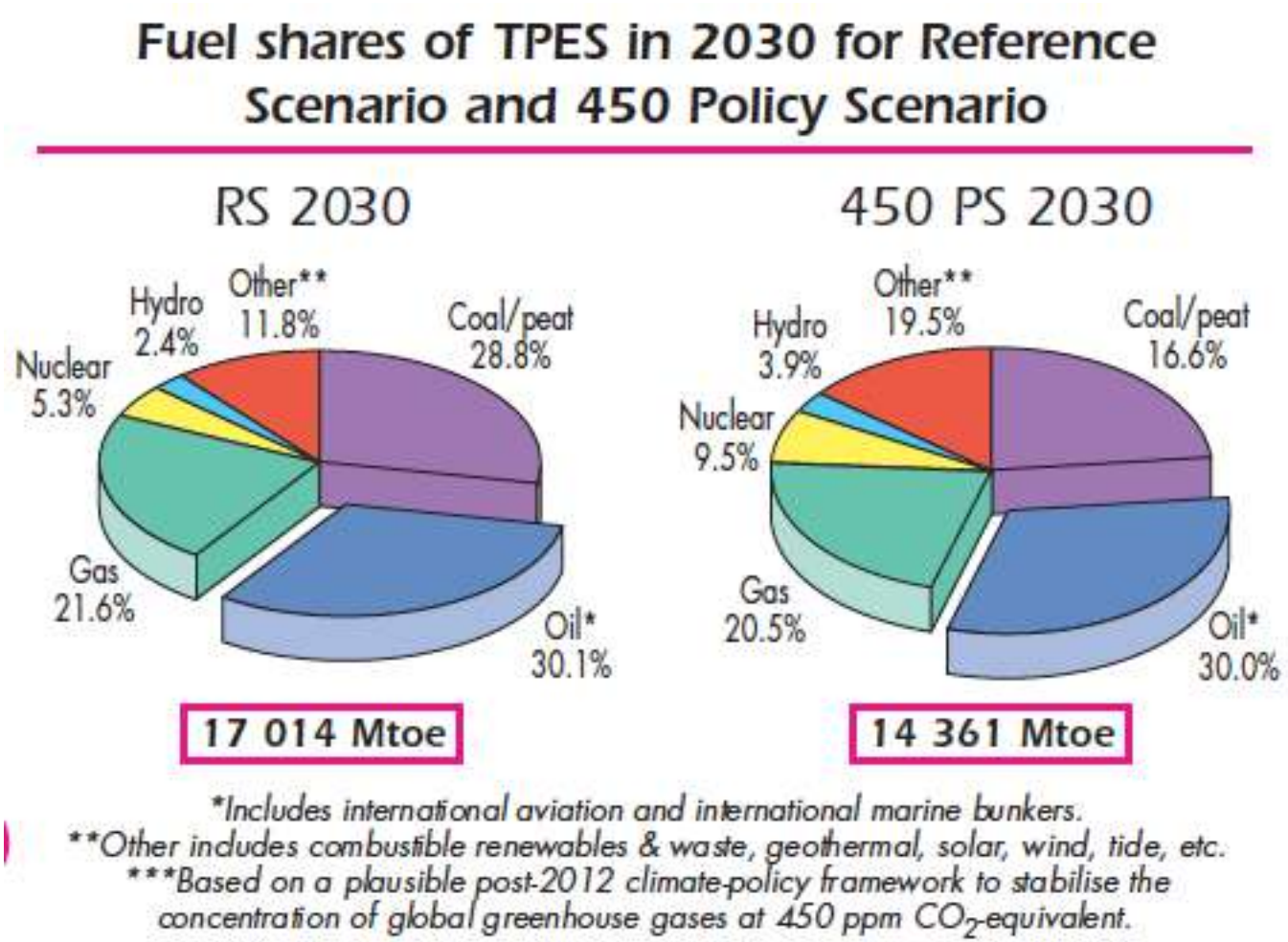
IEA Projects That World Dependence on Conventional Oil Will Remain Critical: Trend 1990-2030



Fuel shares of TPES in 2030 for Reference Scenario and 450 Policy Scenario

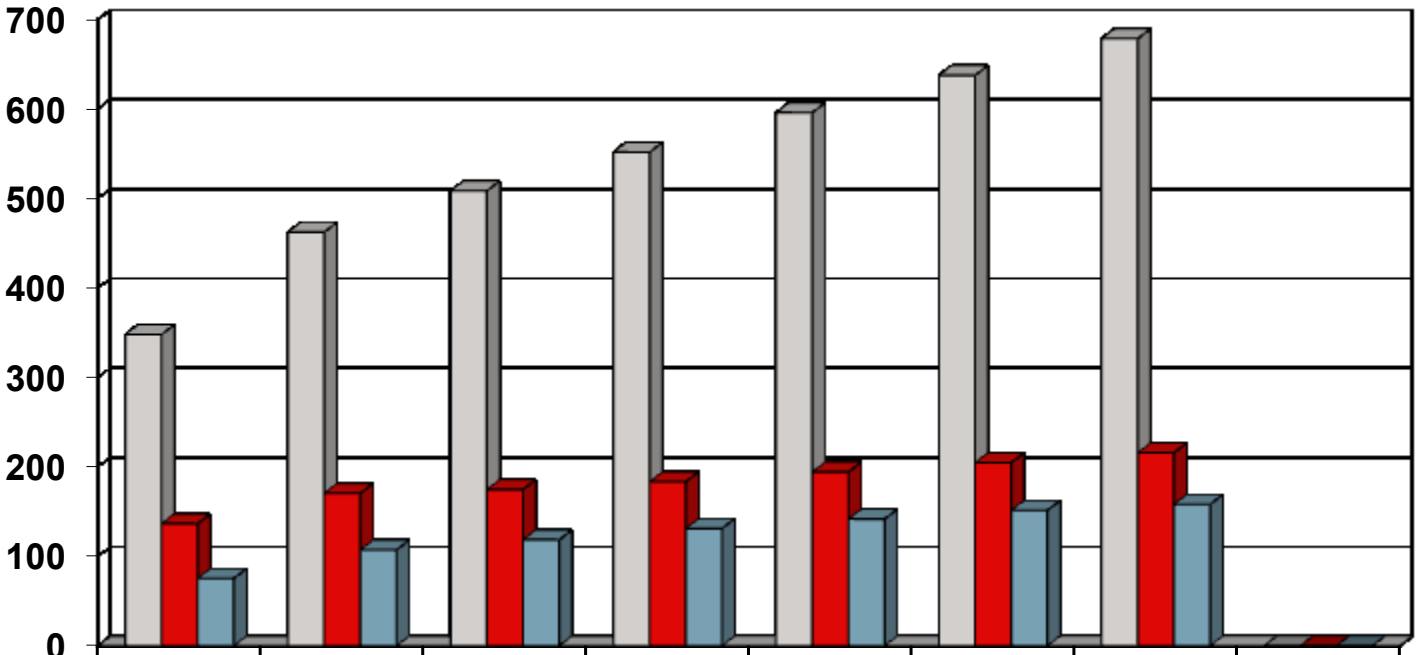
Source: Adapted from IEA, World Energy Statistics, 2009

IEA Projects That World Dependence on Oil Will Average 30% of All Energy Use in 2030



Source: Adapted from IEA, World Energy Statistics, 2009

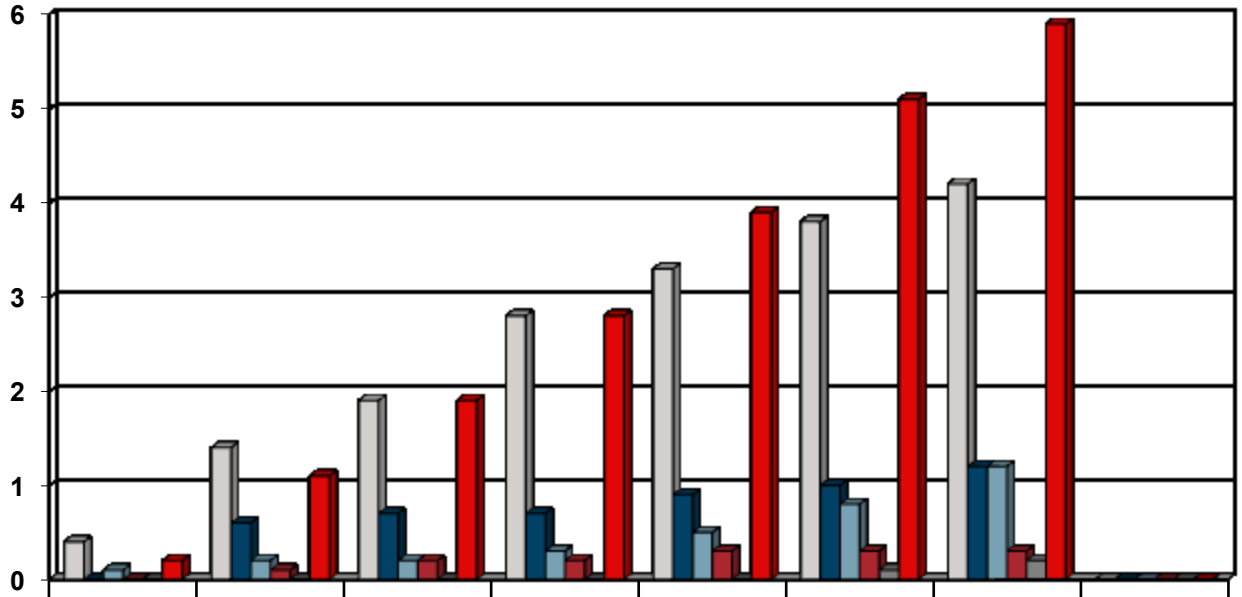
EIA Reference Case Projection of Role of Petroleum in World Energy Supply 1990-2030: In Quads



	1990	2005	2010	2015	2020	2025	2030	% Change
Total	347.7	462.1	508.3	551.5	595.7	637.3	678.3	0
Liquids	136.4	170.4	174.7	183.3	194.2	204.6	215.7	0
Natural Gas	75.3	107.1	118.5	131	141.7	151.3	158	0

Source: Adapted from EIA, *World Energy Outlook*, 2009, p. 122

EIA Reference Case Projection of Role of Unconventional Liquids in World Energy Supply 1990-2030: In MMBD

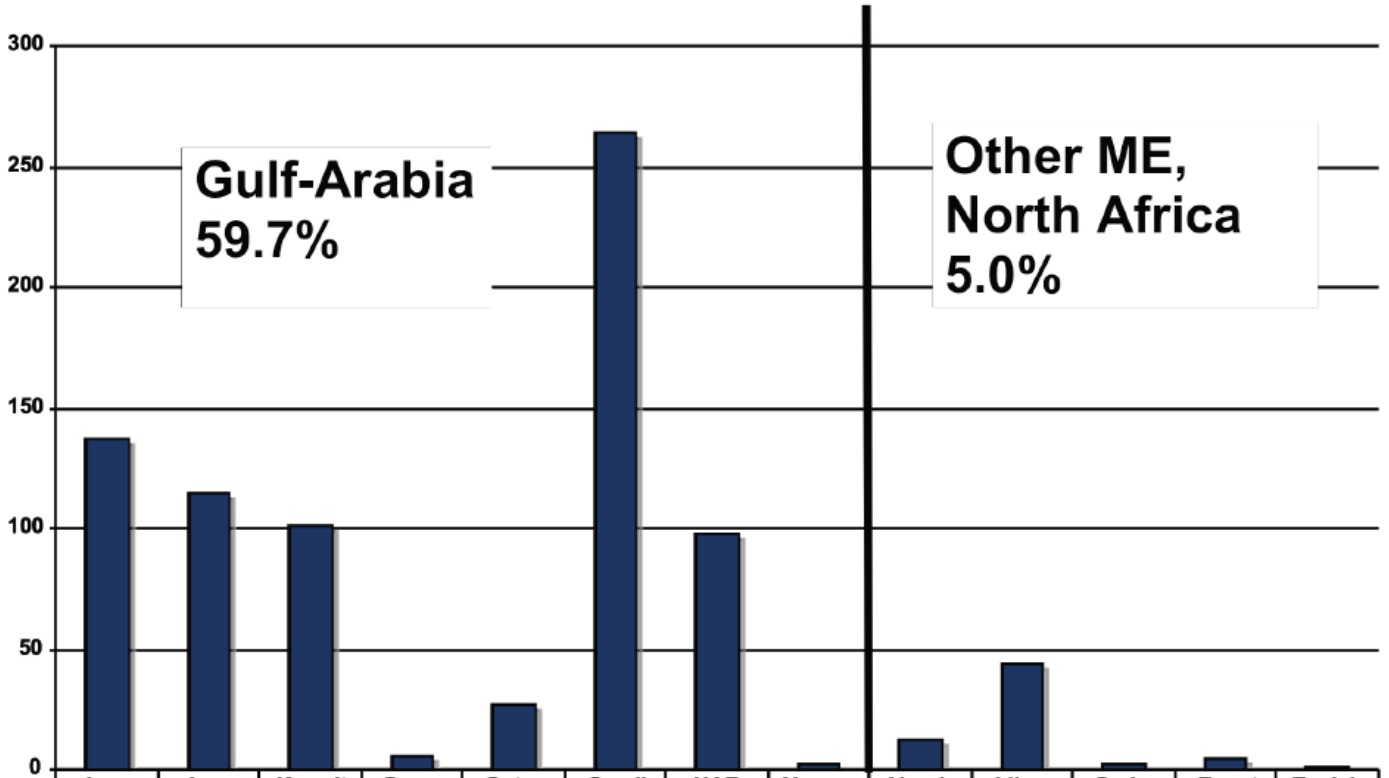


	1990	2008	2010	2015	2020	2025	2030	% Change
Oil Sands/Bitumen (Canada)	0.4	1.4	1.9	2.8	3.3	3.8	4.2	0
Extra Heavy Oil (Mexico)	0	0.6	0.7	0.7	0.9	1	1.2	0
Coal to Liquid	0.1	0.2	0.2	0.3	0.5	0.8	1.2	0
Gas to Liquid	0	0.1	0.2	0.2	0.3	0.3	0.3	0
Shale Oil	0	0	0	0	0	0.1	0.2	0
Biofuels	0.2	1.1	1.9	2.8	3.9	5.1	5.9	0

Source: Adapted from EIA, *World Energy Outlook*, 2009, p. 228

BP Projection of Proven Oil Reserves By Gulf and MENA Country:

In Billions of Barrels Per Day

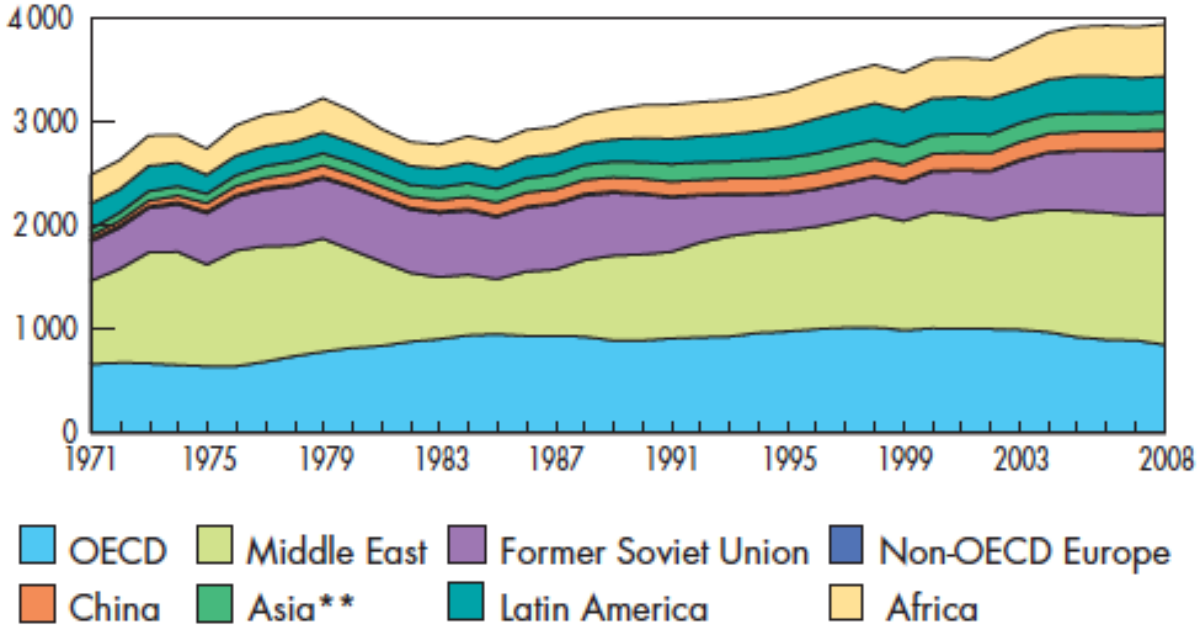


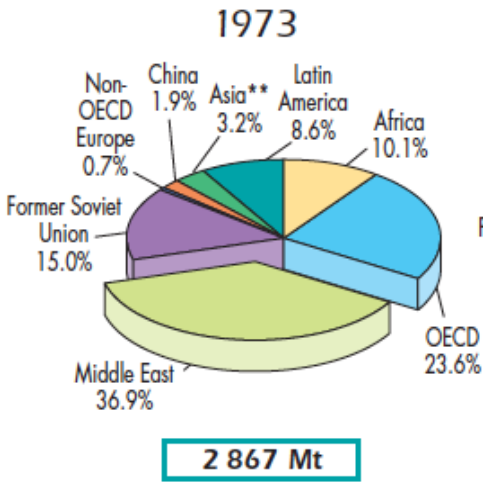
	Iran	Iraq	Kuwait	Oman	Qatar	Saudi	UAE	Yemen	Algeria	Libya	Syria	Egypt	Tunisia
% of World	* 10.9%	* 9.1%	* 8.1%	* 0.4%	* 2.2%	* 21.0%	* 7.8%	* 0.2%	* 1.0%	* 3.5%	* 0.2%	* 0.3%	-
End 2008	137.6	115	101.5	5.6	27.3	264.1	97.8	2.7	12.2	43.7	2.5	4.3	0.6

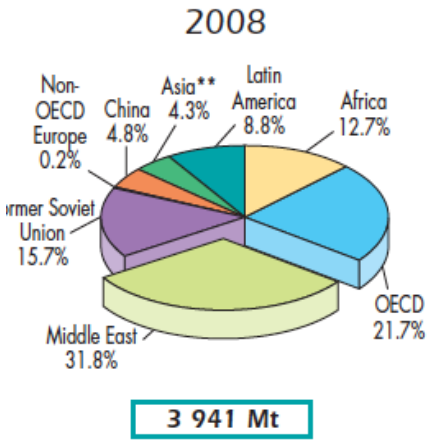
Notes: Proved reserves of oil – Generally taken to be those quantities that geological and engineering information indicates with reasonable certainty can be recovered in the future from known reservoirs under existing economic and operating conditions. Reserves-to-production (R/P) ratio – If the reserves remaining at the end of any year are divided by the production in that year, the result is the length of time that those remaining reserves would last if production were to continue at that rate. Source of data – The estimates in this table have been compiled using a combination of primary official sources, third-party data from the OPEC Secretariat, *World Oil, Oil & Gas Journal* and an independent estimate of Russian reserves based on information in the public domain. **Canadian proved reserves include an official estimate of 22.0 billion barrels for oil sands 'under active development'**. Reserves include gas condensate and natural gas liquids (Nils) as well as crude oil. Annual changes and shares of total are calculated using thousand million barrels figures.

Source: Adapted from BP, *Statistical Review of World Energy*, *2009*, p. 6

Middle East East Remains Critical Oil Producer After 35 Years of Effort to Find Alternatives

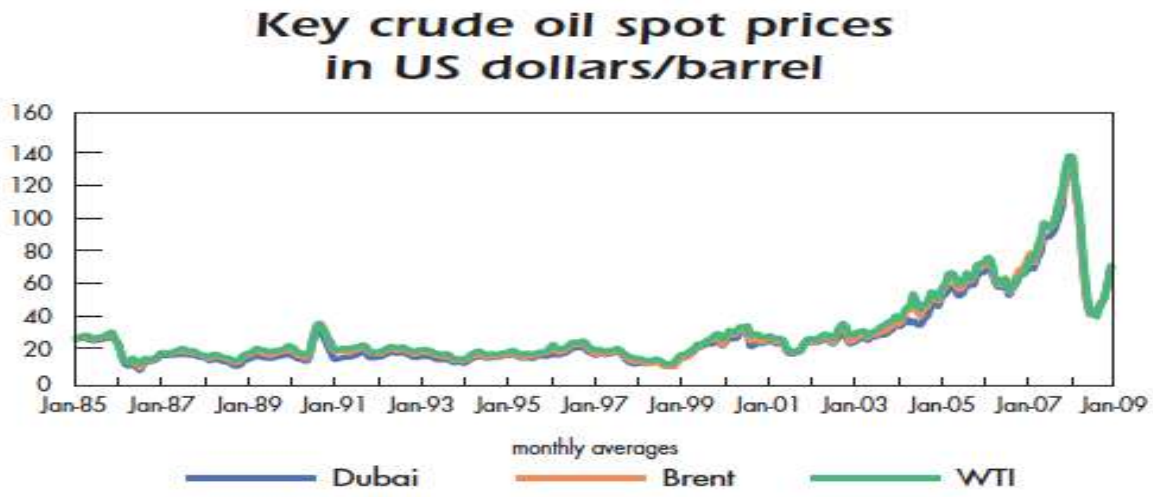




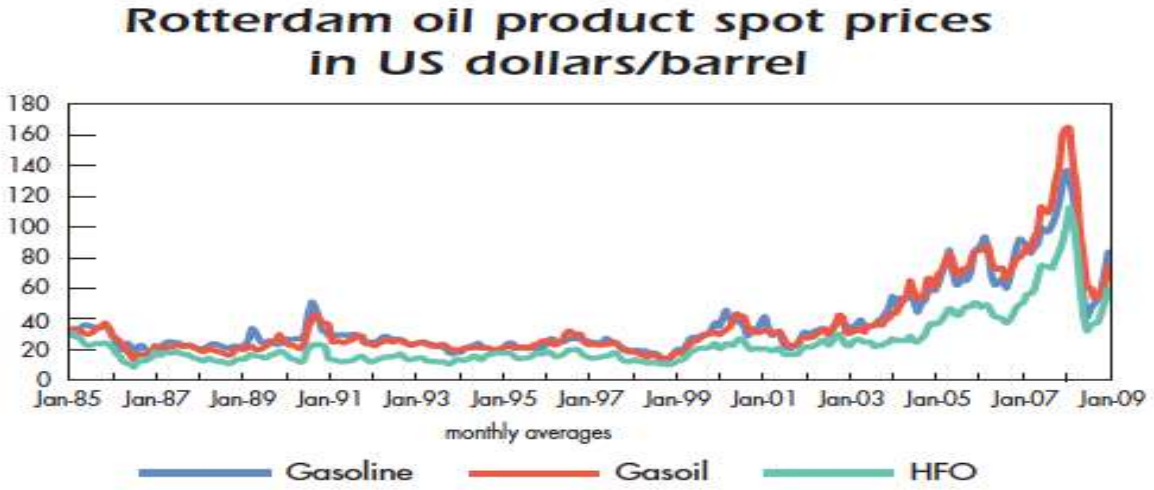


Source: Adapted from IEA, World Energy Statistics, 2009

Trends in Oil Prices: $US Constant/Bbl

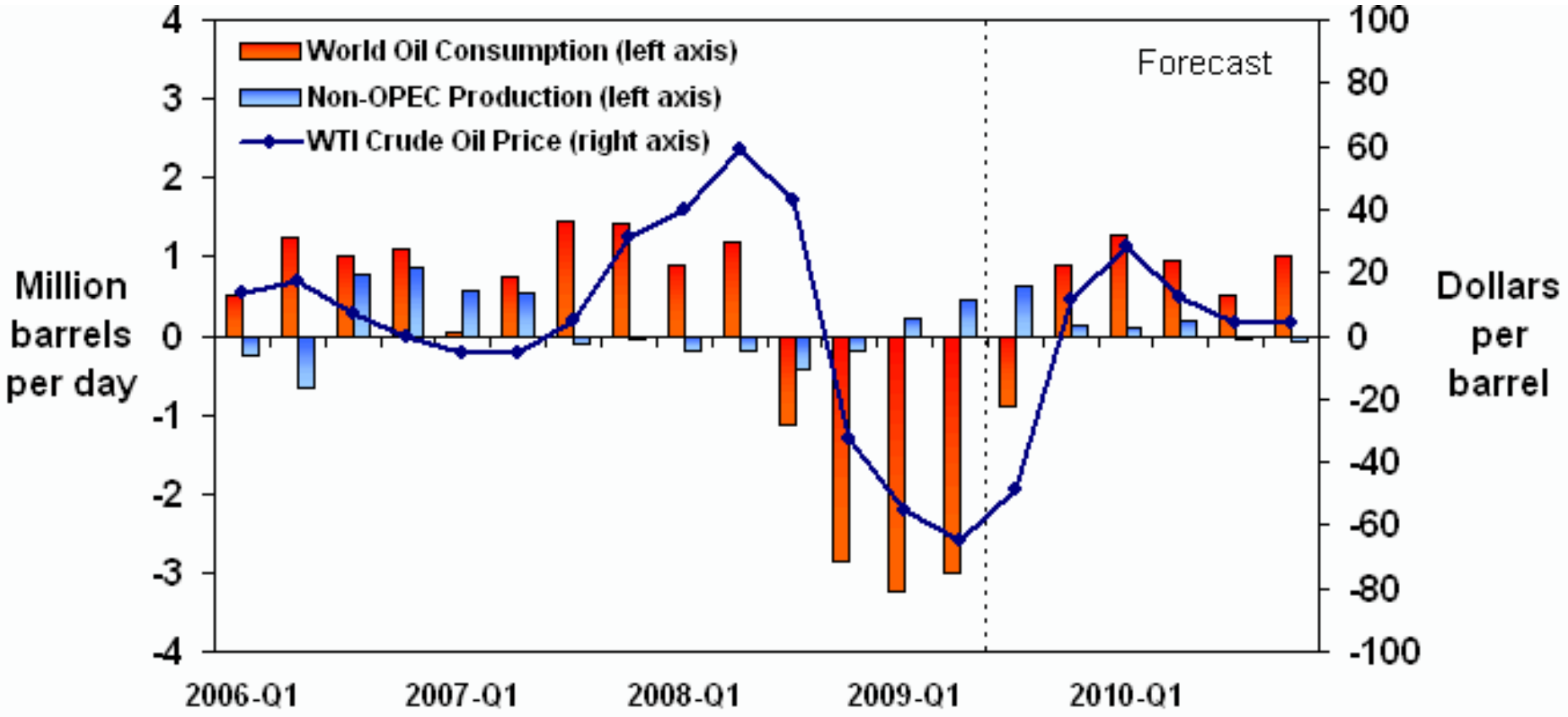


Petroleum Products



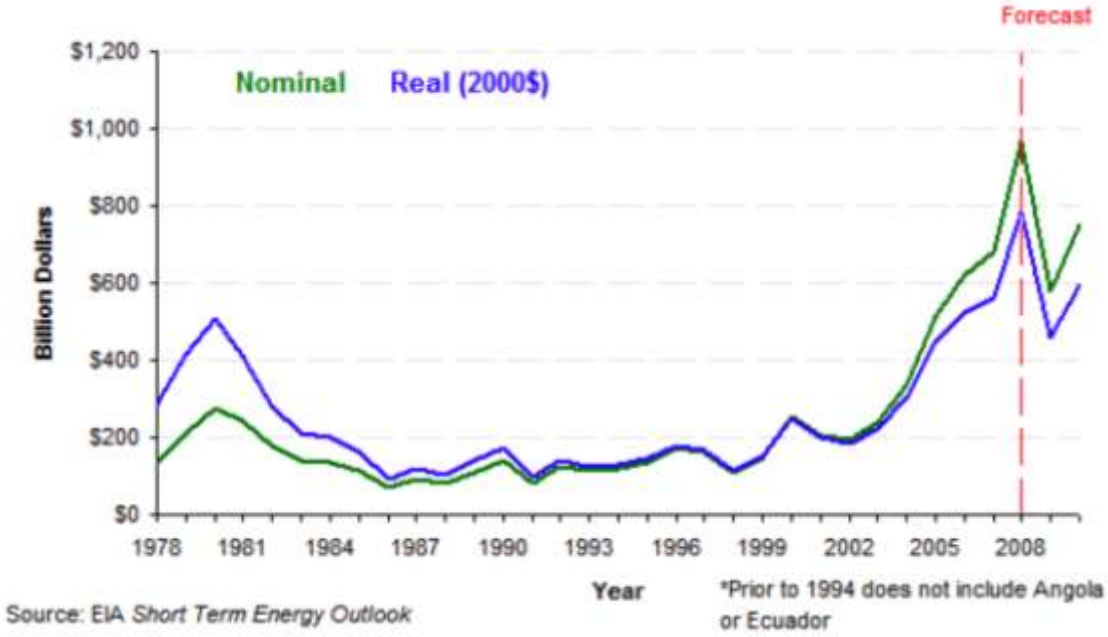
Source: Adapted from IEA, World Energy Statistics, 2009

World Oil Consumption Continues to Outpace Non-OPEC Production Regardless of Prices



EIA, Short-Term Energy Outlook, July 2009, available at: http://www.eia.doe.gov/emeu/steo/pub/contents.html#Global_Crude_Oil_And_Liquid_Fuels

Trends in Gulf Oil Revenues: 1978-2009



Source: EIA *Short Term Energy Outlook*

Country	Nominal ($B)				Real (2000$B)			
	2008	2009	2010	Jan-Oct 2009	2008	2009	2010	Jan-Oct 2009
Algeria	$69	NA	NA	$33	$56	NA	NA	$26
Angola	$68	NA	NA	$33	$55	NA	NA	$26
Ecuador	$10	NA	NA	$5	$8	NA	NA	$4
Iran	$83	NA	NA	$43	$67	NA	NA	$34
Iraq	$61	NA	NA	$31	$49	NA	NA	$25
Kuwait	$79	NA	NA	$38	$64	NA	NA	$30
Libya	$57	NA	NA	$27	$46	NA	NA	$21
Nigeria	$70	NA	NA	$35	$56	NA	NA	$28
Qatar	$38	NA	NA	$19	$31	NA	NA	$15
Saudi Arabia	$285	NA	NA	$122	$231	NA	NA	$98
UAE	$87	NA	NA	$40	$70	NA	NA	$32
Venezuela	$59	NA	NA	$28	$48	NA	NA	$22
OPEC	$966	$576	$750	$452	$782	$461	$593	$362

Source: Adapted from Energy Information Agency (EIA), Department of Energy, *OPEC Revenues Fact Sheet*, November 2009,

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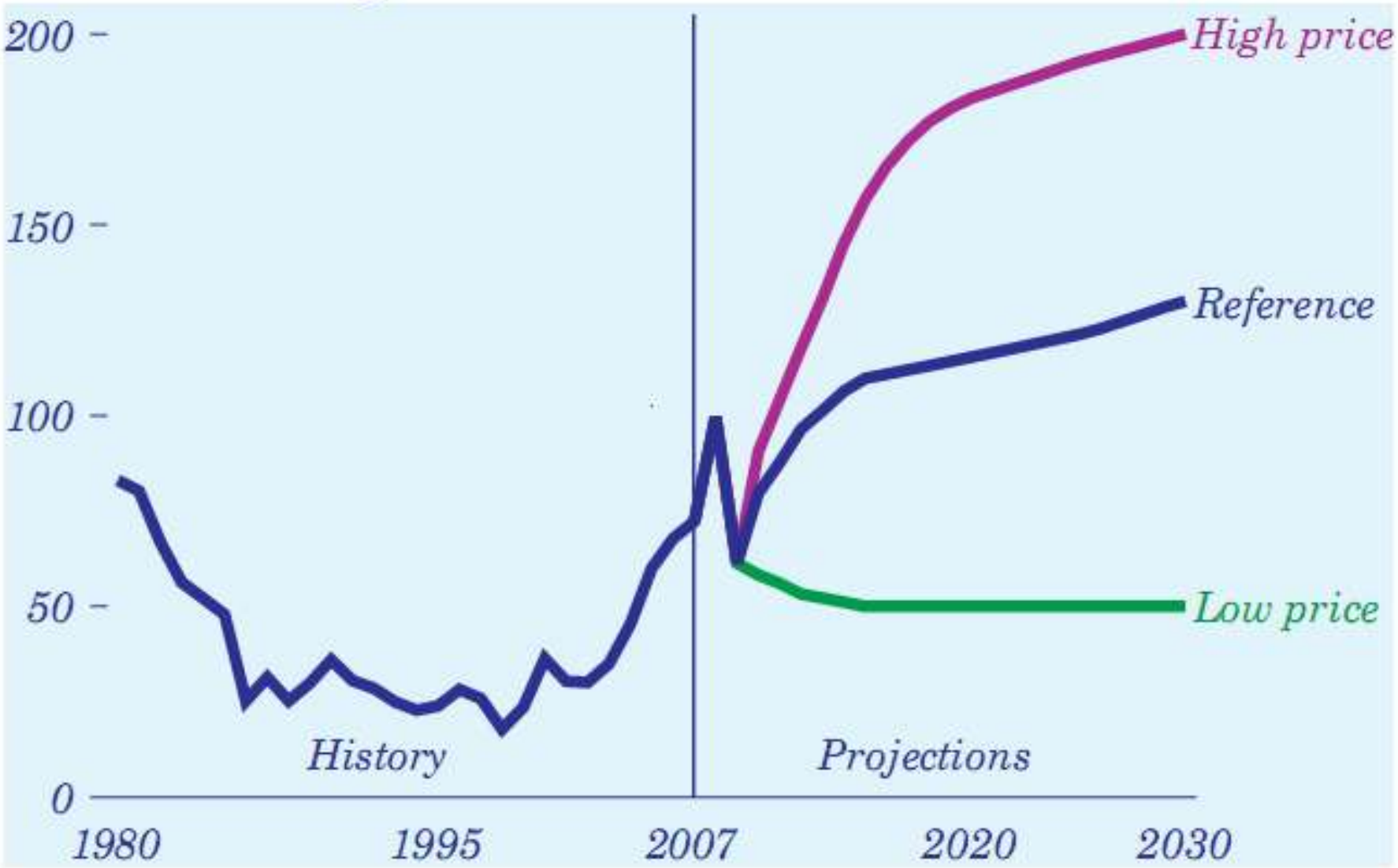
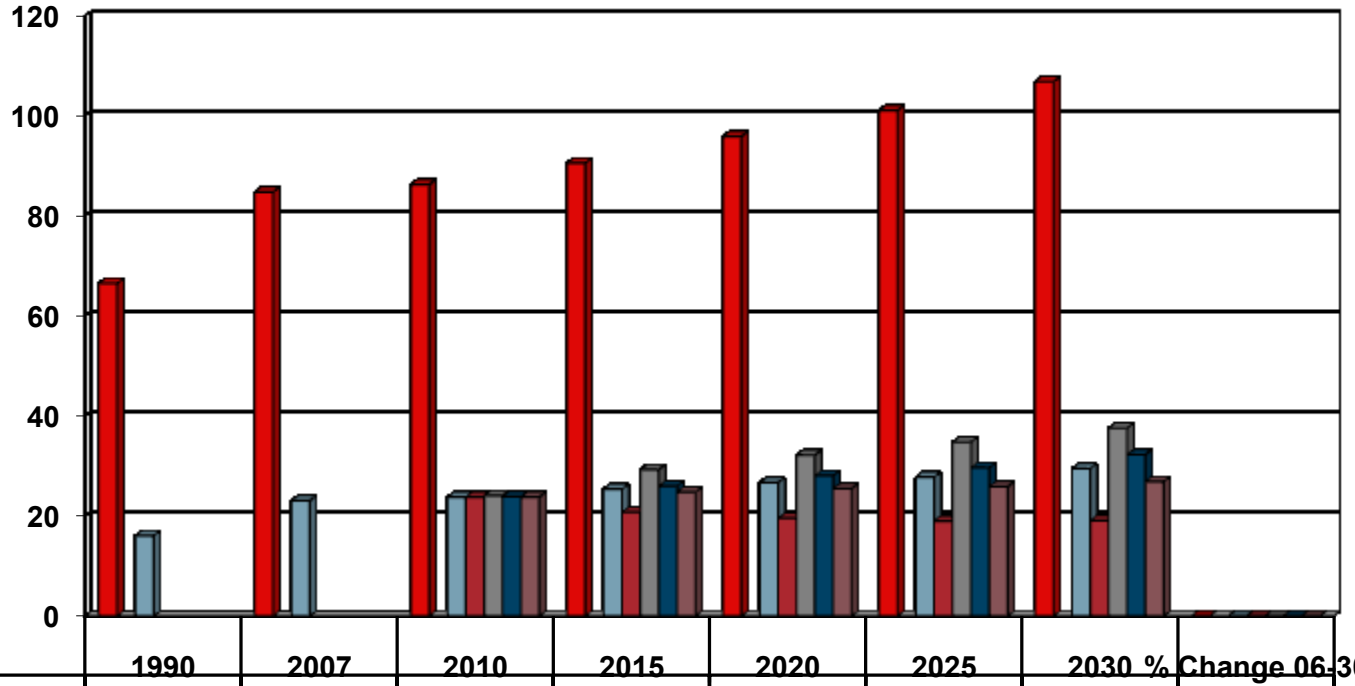
EIA Estimates of Future World Oil Prices



Source: EIA-IEO 2009

EIA Projections of Gulf OPEC Oil Production 1990-2030: In Millions of Barrels Per Day

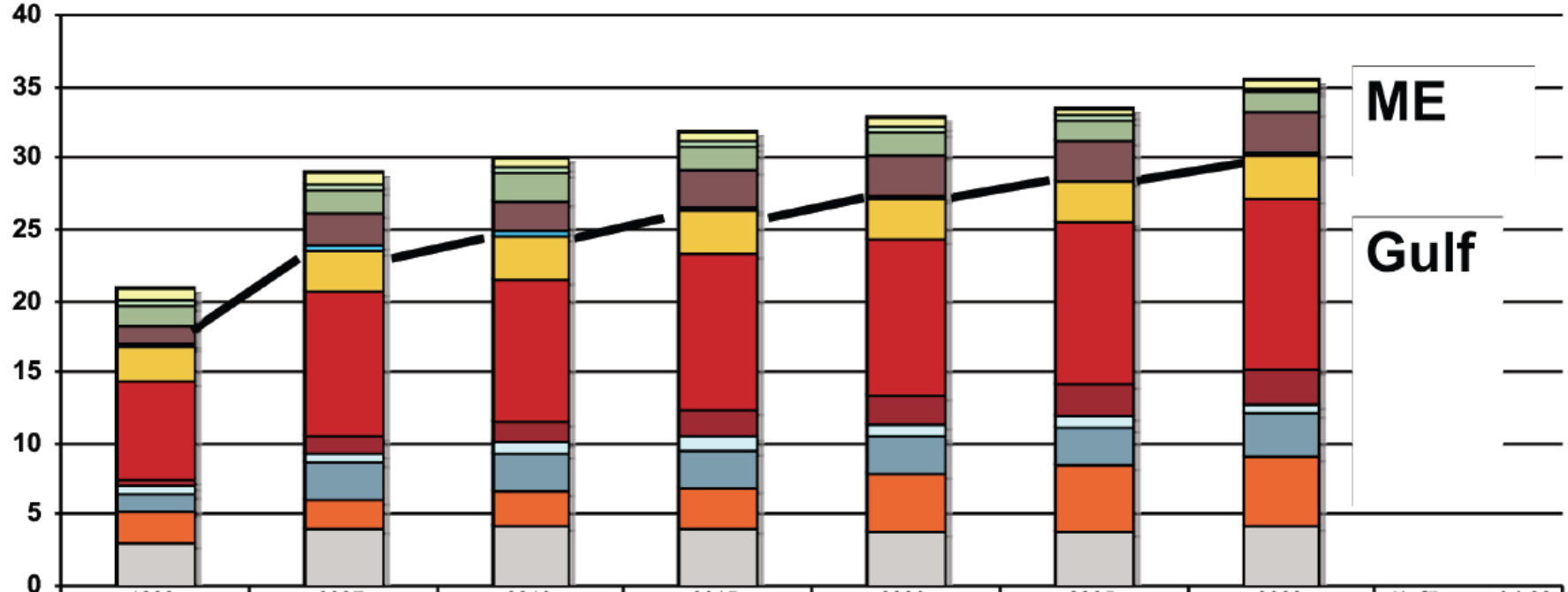


	1990	2007	2010	2015	2020	2025	2030	% Change 06-30
World-Reference	66.5	84.8	86.3	90.6	95.9	101.1	106.9	0
Gulf OPEC								
---Reference	16.1	23.1	23.8	25.4	26.7	27.8	29.5	0
---High Oil Price			23.8	20.8	19.6	19	19.1	0
---Low Oiil Price			24.1	29.3	32.2	34.8	37.6	0
---High Econ Growth			23.9	26	28.1	29.7	32.3	0
---Low Econ Growth			23.8	24.8	25.5	25.9	26.9	0

Source: Adapted from EIA, *World Energy Outlook*, 2009, pp. 225, 229, 233, 241

EIA Projections of Gulf/ME Oil Production By Country 1990-2030:

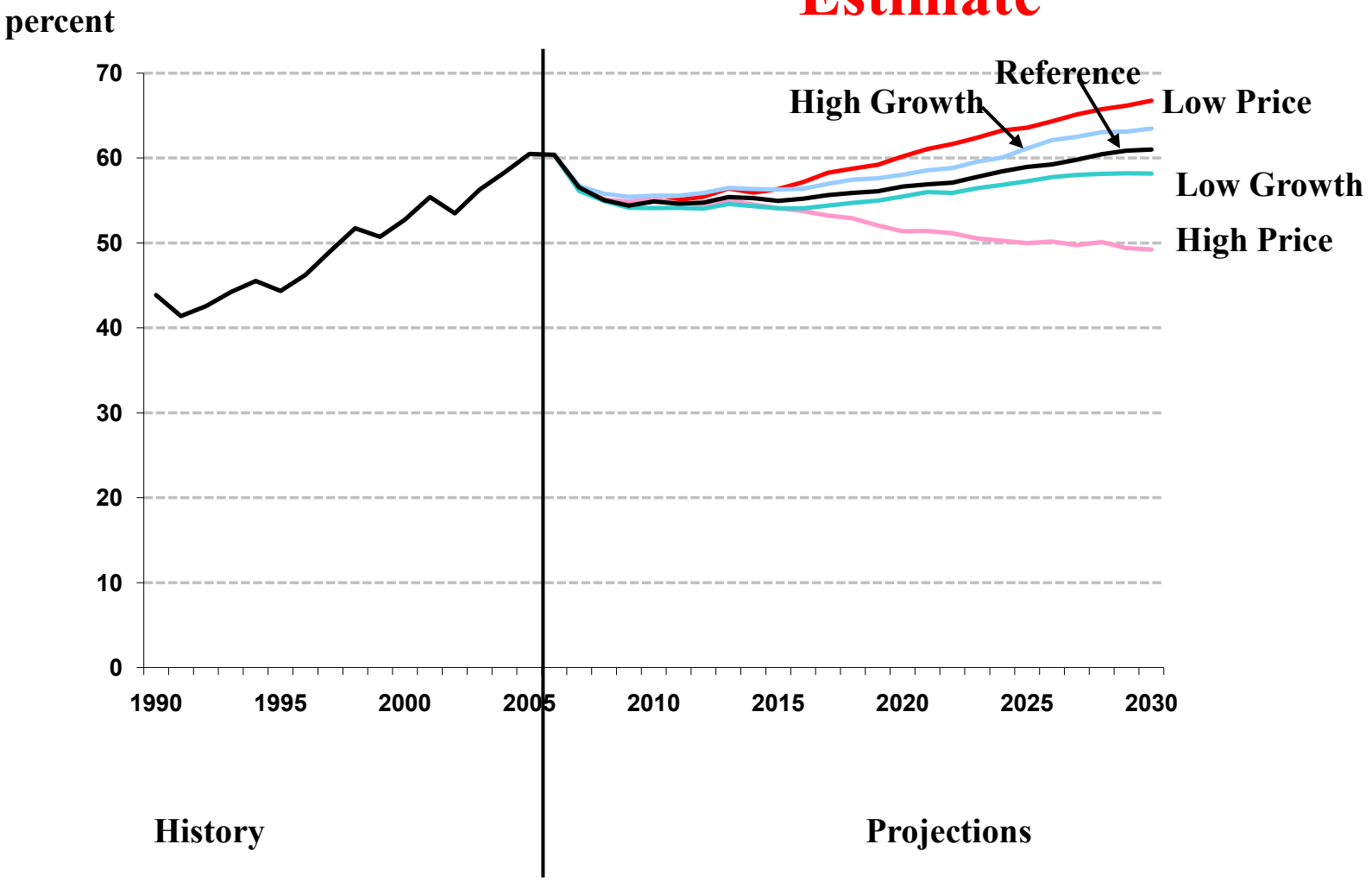
In Millions of Barrels Per Day



	1990	2007	2010	2015	2020	2025	2030	% Change 06-30
Egypt	0.9	0.7	0.5	0.6	0.6	0.6	0.6	* -0.2
Syria	0.4	0.4	0.5	0.4	0.4	0.3	0.3	* -1.5
Libya	1.4	1.8	1.9	1.7	1.5	1.5	1.5	* 0.1
Algeria	1.3	2.2	2.2	2.7	2.8	2.8	2.8	* 3.9
Yemen	0.2	0.3	0.3	0.2	0.2	,2	0.2	* -3.7
UAE	2.3	2.9	3	3	2.9	2.9	2.9	* 0.3
Saudi	7	10.2	10	10.9	11	11.3	12	* 3.3
Qatar	0.4	1.1	1.4	1.9	2.1	2.3	2.5	* 0.5
Oman	0.7	0.7	0.8	0.9	0.7	0.7	0.7	* -0.2
Kuwait	1.2	2.6	2.7	2.7	2.6	2.7	2.9	* -0.1
Iraq	2.1	2.1	2.5	2.9	4.2	4.6	5	* 0.5
Iran	3.1	4	4.2	4	3.8	3.9	4.2	* -0.1

Source: Adapted from EIA, *World Energy Outlook*, 2009, p. 225

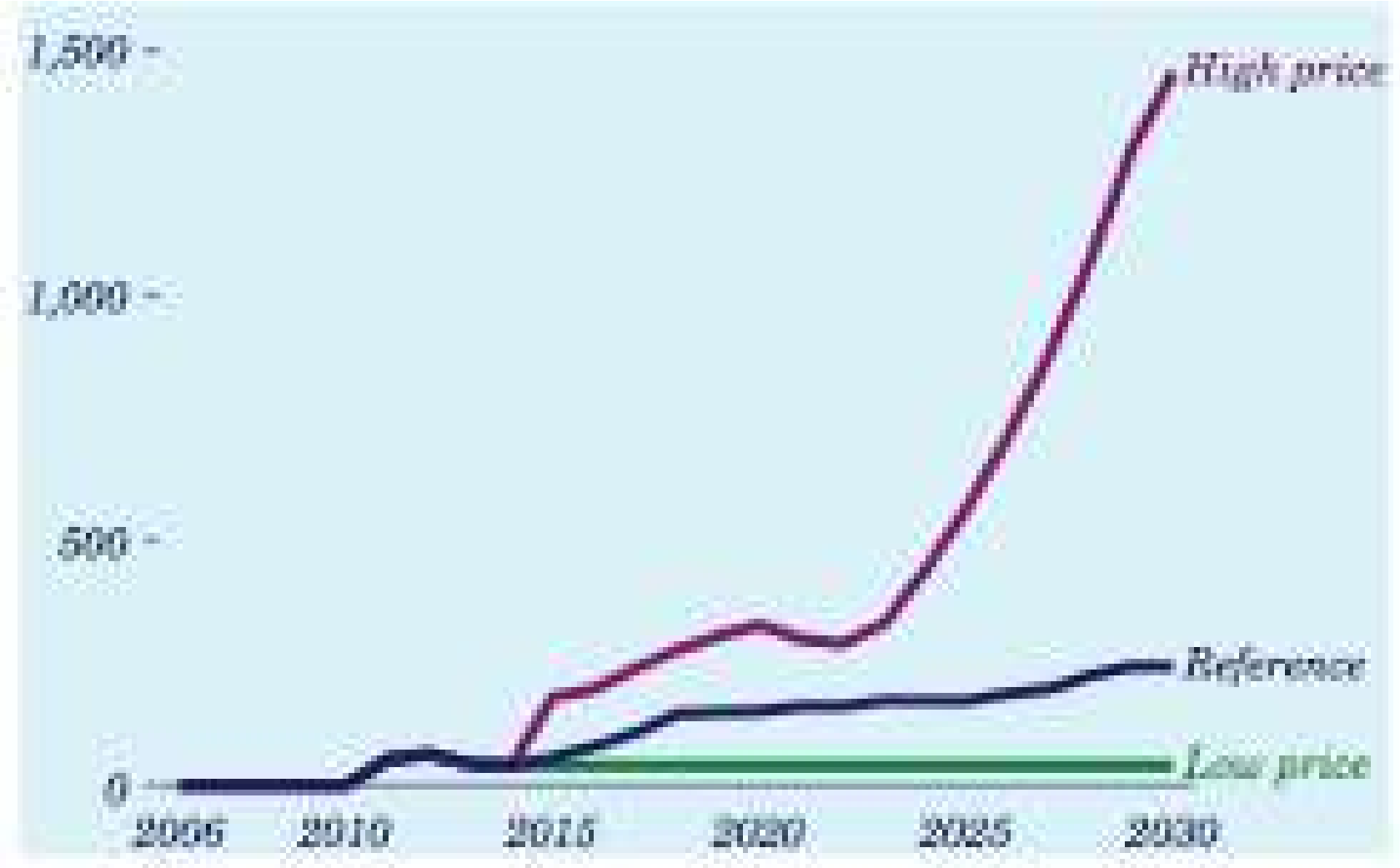
Net Import Share of U.S. Liquid Fuels Consumption,1990-2030 --- 2007 Estimate



Net Import Share of U.S. Liquid Fuels Consumption, 1990-2030 (2008 Estimate)

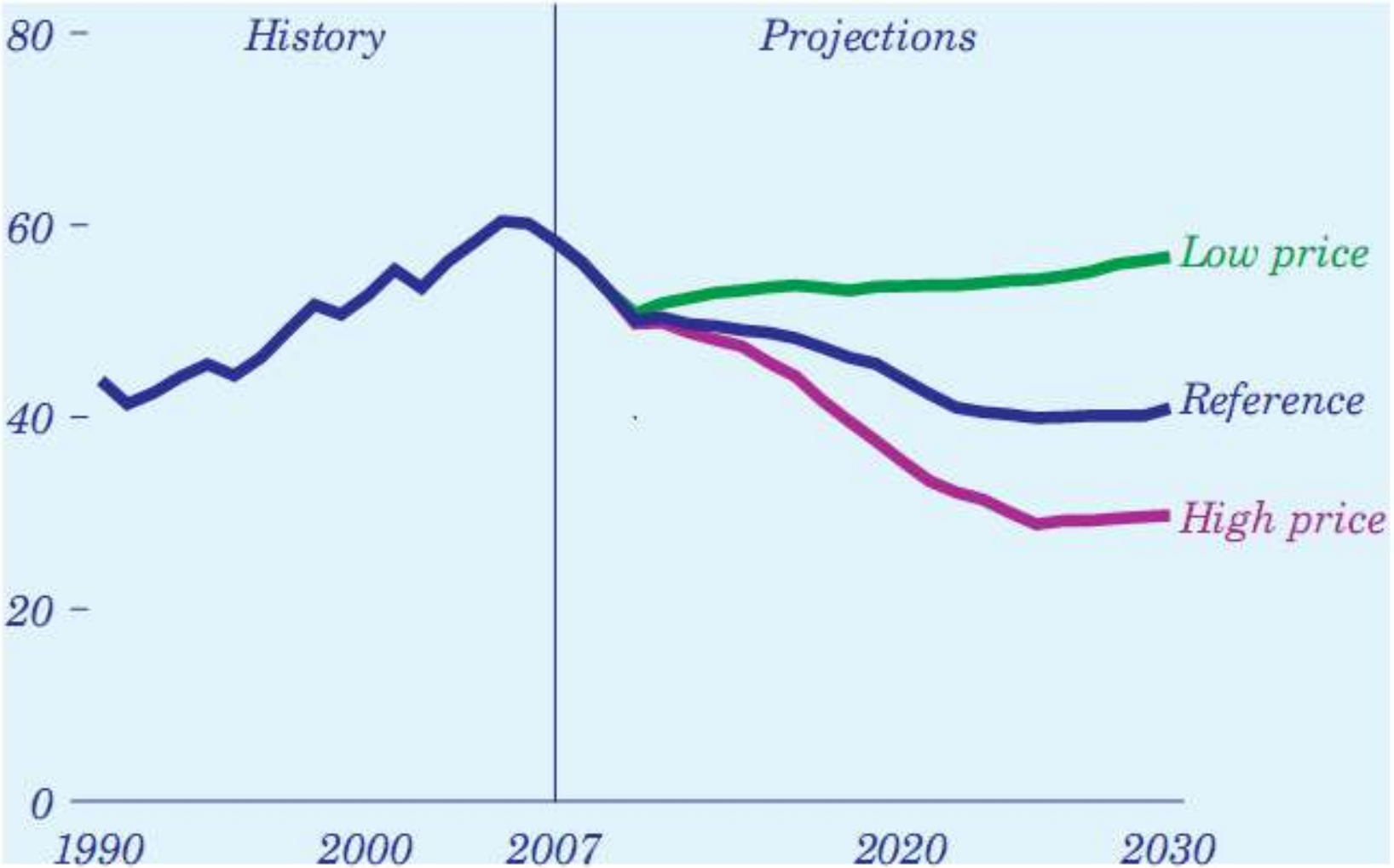
DOE-IEA, Annual Energy Outlook 2008, p. 80

Unconventional Share of U.S. Liquid Fuels 1990-2030 (2008 Estimate)



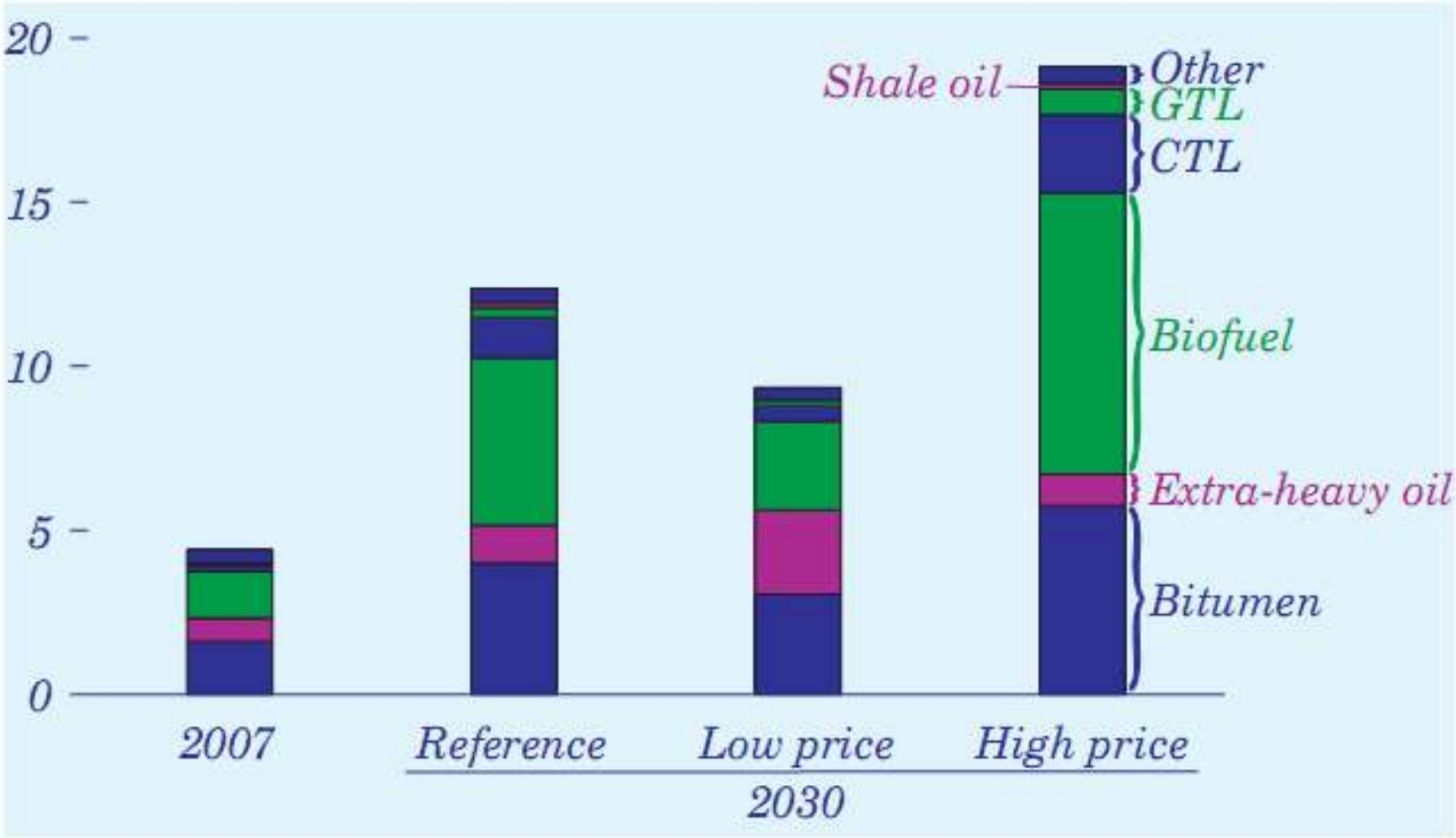
DOE-IEA, Annual Energy Outlook 2008, p. 80

Net Import Share of U.S. Liquid Fuels Consumption, 1990-2030 (2009 Estimate) in Percent



DOE-IEA, Annual Energy Outlook 2009, p. 82

Unconventional Liquid Fuels as Percent of World Production At Given Prices: 1990-2030



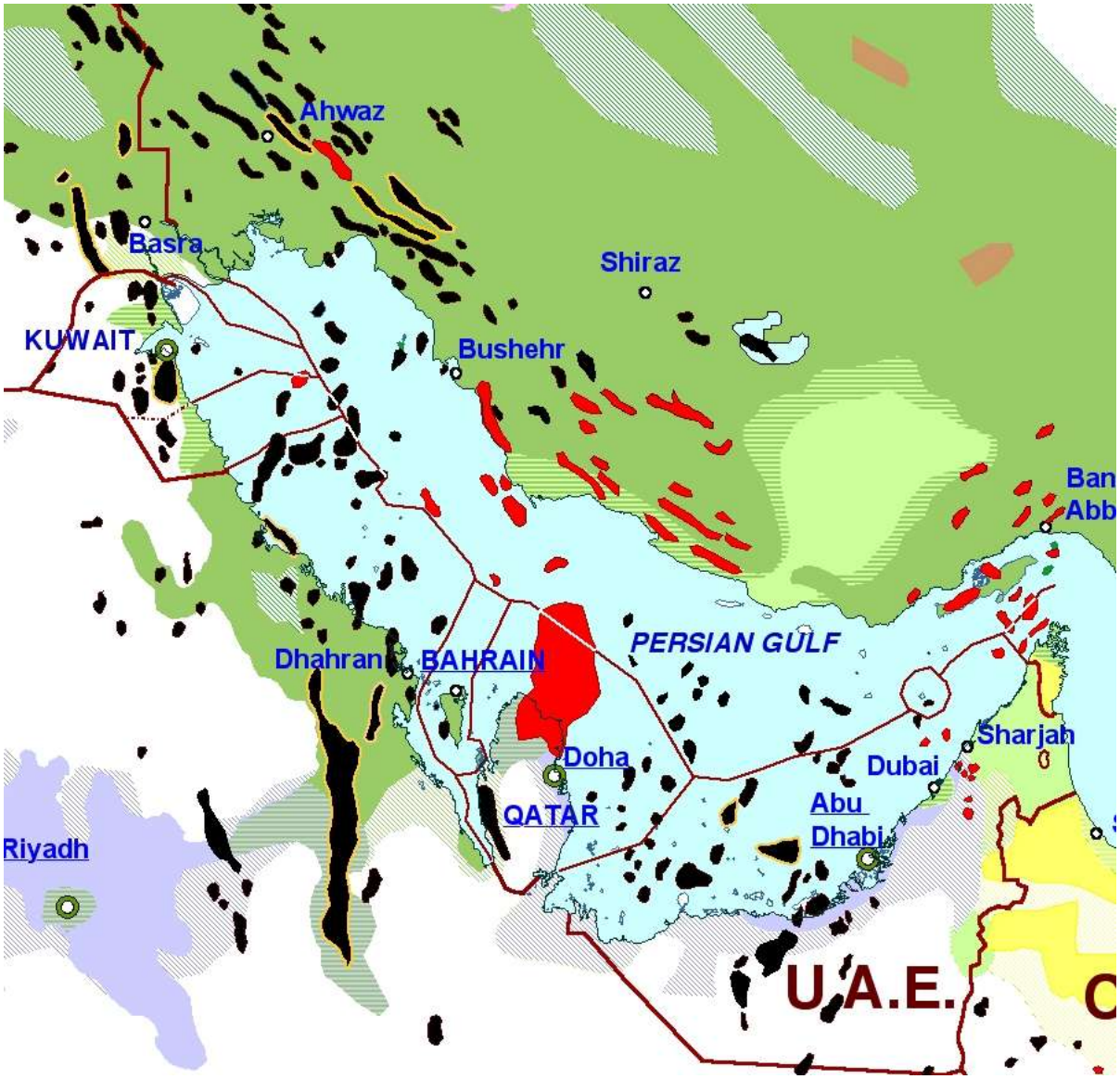
DOE-IEA, Annual Energy Outlook 2009, p. 60

The Challenge of Export Vulnerability: Petroleum Exports, Key Infrastructure, and Key Imports

But, There Are Some Alternative Routes

EIA: http://www.eia.doe.gov/cabs/World_Oil_Transit_Chokepoints/images/Oil%20and%20Gas%20Infrastructue%20Persian%20Gulf%20%28large%29.gif

Vulnerability of Gulf Oil Fields



Primary Oil and Gas Deposits in the Middle East and the Shia Majority Areas.

- A Major Oil field
- A Super-Giant Oil field
- A Major Gas field

Islam:

- Shiism (to include Alevis/Alawis)
- Sunnism (Hanafi, Shafi'i, Maliki)
- Hanabli
- Ibadism
- Christianity
- Judaism
- Other

- Mixed population areas
- Sparsely populated areas
- Uninhabited areas

Source: M. Izady, 2006 http://gulf2000.columbia.edu/maps.shtml

The Entire Gulf: Breaking the Bottle at Any Point

Source: EIA, Country Briefs, World Oil Transit Chokepoints, January 2008

Energy Infrastructure is Critical, *But*

- **Steadily rising global demand for Gulf crude, product, and gas**
- **Rising Asian demand (much exported indirectly to the West)**
- ***Heavy concentrations in facilities designed to economies of scale, not redundancy.***
- ***Poor response planning, and long-lead time replacement for critical key components.***
- ***Day-to-day use often near limits of capacity***
- ***Lack of systems integration and bypass capability at national and GCC level***
- ***Improving lethality and range of precision strike systems.***
- ***Smarter saboteurs and terrorists.***

Key Gulf-Related Chokepoints - I

Important World Oil Transit Chokepoints						
Name	**2006E oil flow (bbl/d)**	**Width at Narrowest Point**	**Oil Source Origin**	**Primary Destination**	**Past Disturbances**	**Alternative Routes**
The Strait of Hormuz	16.5-17 million	21 miles	Persian Gulf Nations including Saudi Arabia, Iran, and UAE	Japan, The United States, Western Europe, other Asian countries	Sea mines were installed during the Iran-Iraq War in the 1980s. Terrorists threats post September 11, 2001.	745-mile long East-West Pipeline through Saudi Arabia to the Red Sea
The Suez Canal/ Sumed Pipeline	4.5 million	1,000 feet	Persian Gulf Nations, especially Saudi Arabia, and Asia	Europe and The United States	Suez Canal was closed for eight years after the Six-Day War in 1967. Two large oil tankers ran aground in 2007 suspending traffic.	Reroute around the southern tip of Africa (the Cape of Good Hope); additional 6,000 miles.

Source: EIA, Country Briefs, World Oil Transit Chokepoints, January 2008

Key Gulf-Related Chokepoints - II

Important World Oil Transit Chokepoints						
Name	**2006E oil flow (bbl/d)**	**Width at Narrowest Point**	**Oil Source Origin**	**Primary Destination**	**Past Disturbances**	**Alternative Routes**
Bab el-Mandab	3.3 million	18 miles	The Persian Gulf	Europe and The United States	USS Cole attack in 2000; French oil tanker in 2002, both attacks off the coast of Aden, Yemen	Northbound traffic can use the East-West oil pipeline through Saudi Arabia; Reroute around the southern tip of Africa (the Cape of Good Hope); additional 6,000 miles.
The Turkish Straits	2.4 million	0.5 mile	Caspian Sea Region	Western and Southern Europe	Numerous past shipping accidents due to the straits sinuous geography. Some terrorist threats were made after September 11, 2001.	No clear alternative; potential pipelines discussed including a 173-mile pipeline between Russia, Bulgaria, and Greece.

Source: EIA, Country Briefs, World Oil Transit Chokepoints, January 2008

Abu Musa, Tumbs, Hormuz: Factoids

- 34 miles (55 KM) wide at narrowest part.
- Channels consist of 2-mile (3.2 km) navigable channels for inbound and outbound traffic, separated by 2-mile wide buffer zone.
- 40% of all globally traded oil supply.
- 75%-plus of Japan's oil/
- 13.4 MMBD of crude through Strait in May 2007
- Additional 2 MMBD of products and over 31 million tons of LNG.
- 90% of all Gulf exports go through Strait.
- EIA predicts exports will double to 30-34 MMBD by 2020
- Gulf will export 40% of world's LNG by 2015.

Source: http://www.lib.utexas.edu/maps/middle_east_and_asia/hormuz_80.jpg, and Brig. General Said Mohammed Al-Sowaidi, Martimer Challenges in the Gulf, March 2008.

Hormuz: Breaking the Bottle at the Neck

- 280 km long, 50 km wide at narrowest point.
- Traffic lane 9.6 km wide, including two 3.2 km wide traffic lanes, one inbound and one outbound, separated by a 3.2 km wide separation median
- Antiship missiles now have ranges up to 150 km.
- Smart mines, guided/smart torpedoes,
- Floating mines, small boat raids, harassment.
- Covert as well as overt sensors.

Source: http://www.lib.utexas.edu/maps/middle_east_and_asia/hormuz_80.jpg

"Closing the Gulf"

- 3 Kilo (Type 877) and unknown number of midget (Qadr-SS-3) submarines; smart torpedoes, (anti-ship missiles?) and smart mine capability.
- Use of 5 minelayers, amphibious ships, small craft, commercial boats.
- Attacks on tankers, shipping, offshore facilities by naval guards.
- Raids with 8 P-3MP/P-3F Orion MPA and combat aircraft with anti-ship missiles:(C-801K (8-42 km), CSS-N-4, and others).
- Free-floating mines, smart and dumb mines, oil spills.
- Land-based, long-range anti-ship missiles based on land, islands (Seersucker HY-2, CSS-C-3), and ships (CSS-N-4, and others).
- IRGC raids on key export facility(ties).
- Iranian built Nasr-2 ship based SSM.

The Bab El Mandab

- **3.3 MMBD per day with 25%+ growth over next decade.**
- **2.1 MMBD flows northbound through Suez Complex.**
- **18 miles wide with two 2 mile channels going each way.**
- **Only major bypass is Saudi East-West pipeline at 4.4 MMBD, but now fully used.**

Source: EIA, Country Briefs, World Oil Transit Chokepoints, January 2008

Suez

Source: EIA, Country Briefs, World Oil Transit Chokepoints, January 2008

- **An estimated 3.9 million bbl/d of oil flows northbound through the Suez Canal to the Mediterranean, while 0.6 million bbl/d travels southbound into the Red Sea.**
- **Over 3,000 oil tankers pass through the Suez Canal annually. With only 1,000 feet at its narrowest point, the Canal is unable to handle large tankers.**
- **Suez Canal Authority (SCA) has discussed widening and deepening to accommodate VLCCs and ULCCs.**
- **200-mile long Sumed Pipeline, or Suez-Mediterranean Pipeline also provides a route by crossing the northern region of Egypt from the Ain Sukhna to the Sidi Kerir Terminal.**
- **The pipeline can transport 3.1 million bbl/d of crude oil., Nearly all of Saudi Arabia's northbound shipments (approximately 2.3 million bbl/d of crude) are transported through the Sumed pipeline.**
- **Closure would divert tankers around the southern tip of Africa, the Cape of Good Hope, adding 6,000 miles to transit time.**

The Challenge of Conventional Military Threats

The GCC Threat to the GCC

- **Vast lead in military spending and arms imports**
- **Support from US, Britain, France**

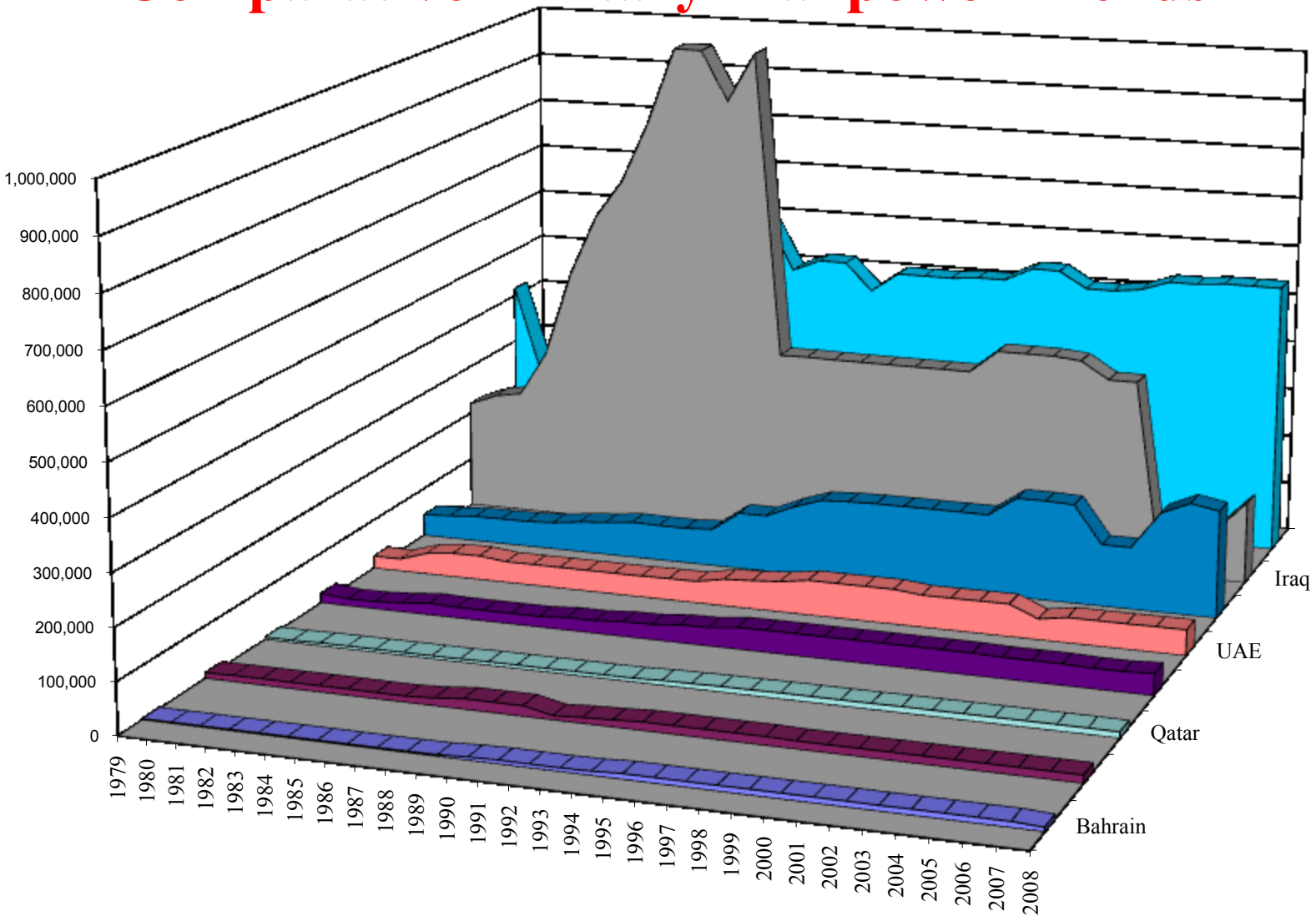
But,

- **Poor Mission Focus with Limited Coordination**
- **Lack of Integration, Standardization**
- **Problems in Large-Scale Exercises and Training; Military Realism**
- **Problems in Jointness – including security services, police, and intelligence – and combined arms.**
- **Lack of Balanced Force Development: Manpower Quality and Sustainability**

Regional Cooperation on Iran?

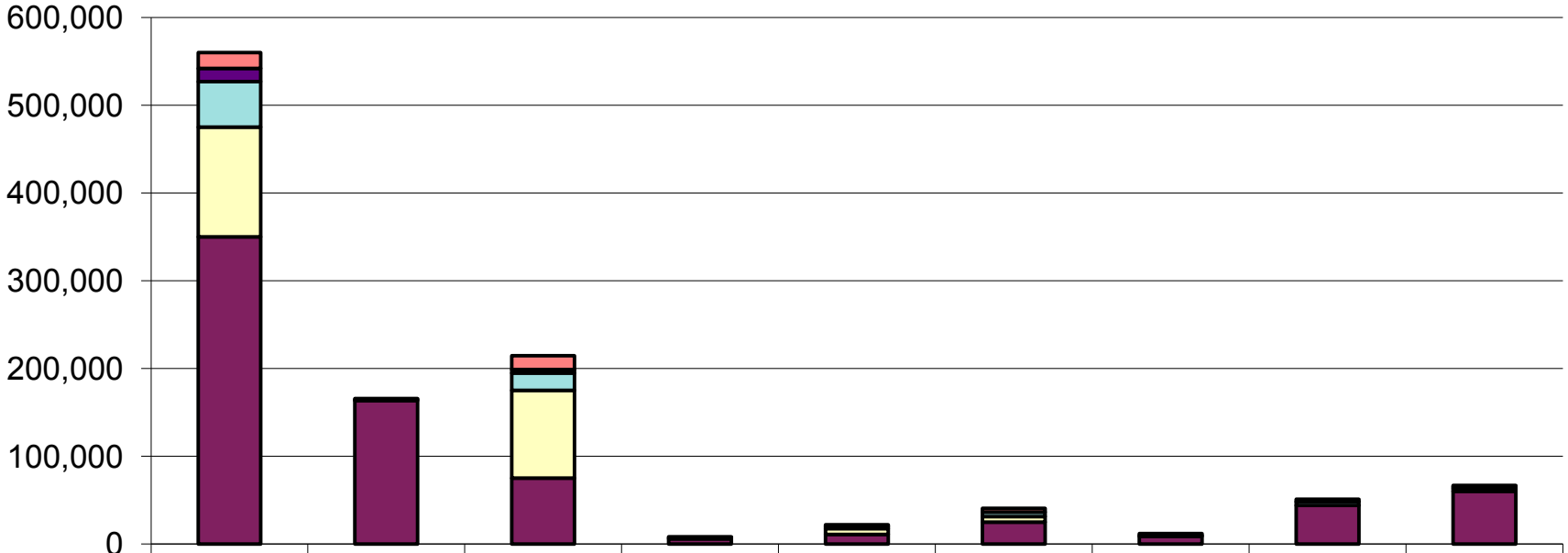
- **Truth is there is limited regional cooperation among the Gulf nations with regards to Iran.**
- **Region-wide drive to bolster naval forces to countering the perceived growing threat from Iran.**
- **Oman, like Syria and Qatar, sees in Iran an important political and economic ally that is too powerful and too potentially dangerous to ignore, let alone antagonize; while defying Egypt, Saudi Arabia and other Arab nations in their efforts to curb Iranian influence and Nuclear ambitions.**
- **United Arab Emirates, which is battling with Iranian leaders over the title to three Persian Gulf islands, has done little to stop billions of dollars in annual trade with Iran.**
- **Sunni-led Arab countries are concerned over Tehran's influence with the Shiite-dominated government in Iraq.**
- **Qatar says it is mediating between Iran and Arab powers such as Egypt and Saudi Arabia, where the ruling family feels threatened by Iranian power.**
- **Continued developments in Saudi and Egyptian outreach to Arab nations to unite against Iranian influence and Nuclear Ambitions as well as outreach efforts to Syria in efforts to break Iranian-Syrian ties.**
- **Continued U.S. engagement and "security umbrella" seems to be key to any resemblance of Regional Cooperation in regards to Iran.**

Comparative Military Manpower Trends



Derived from IISS, Military Balance, 2008

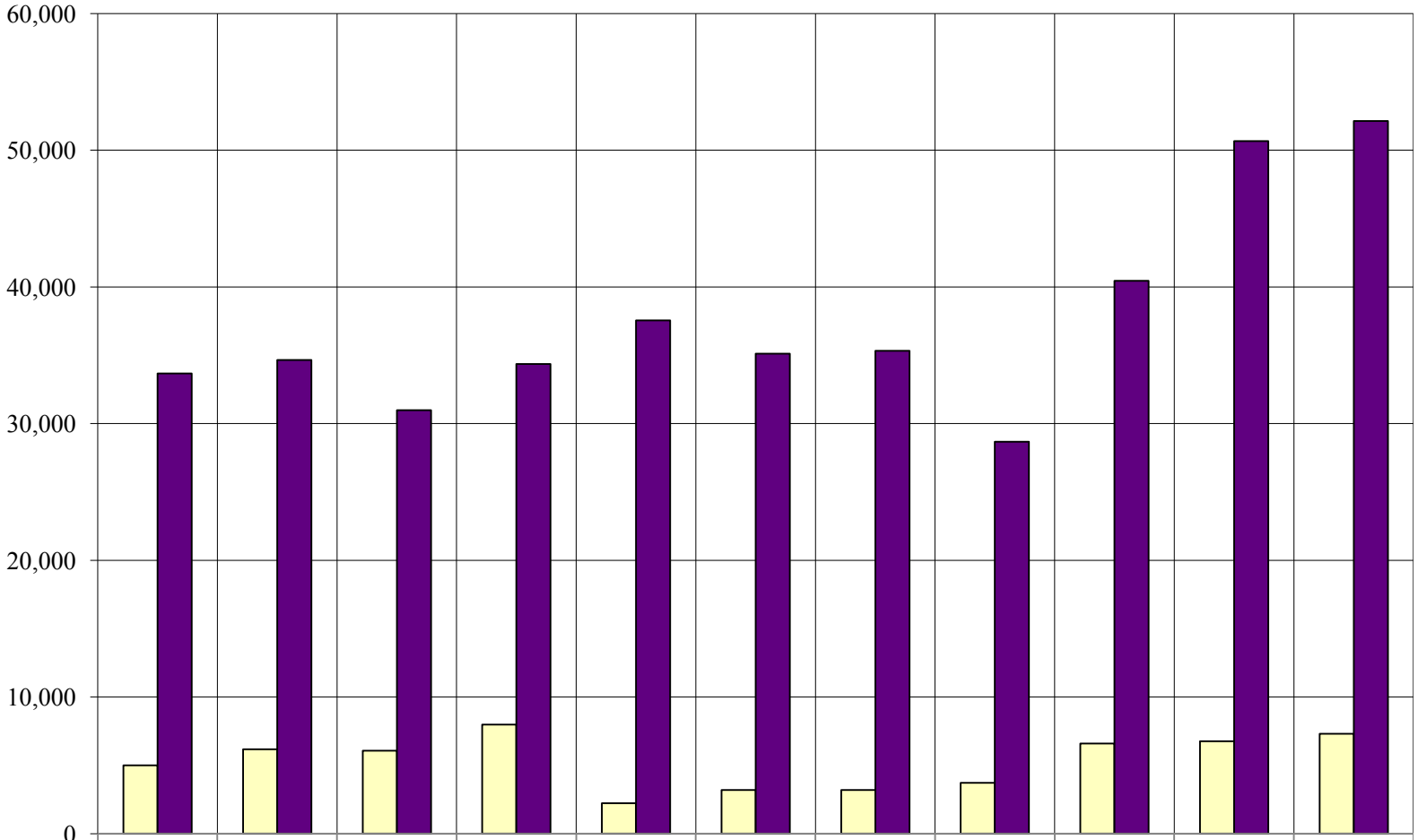
Comparative Military Manpower



	Iran	Iraq	Saudi	Bahrain	Kuwait	Oman	Qatar	UAE	Yemen
Navy	18,000	1,100	15,500	700	2,000	4,200	1,800	2,500	1,700
Air Def	15,000	0	4,000	0	0	0	0	0	2,000
Air	52,000	1,200	20,000	1,500	2,500	5,000	1,500	4,500	3,000
Guard	125,000	0	100,000	0	6,600	6,400	0	0	0
Army	350,000	163,500	75,000	6,000	11,000	25,000	8,500	44,000	60,000

Derived from IISS, Military Balance, 2008

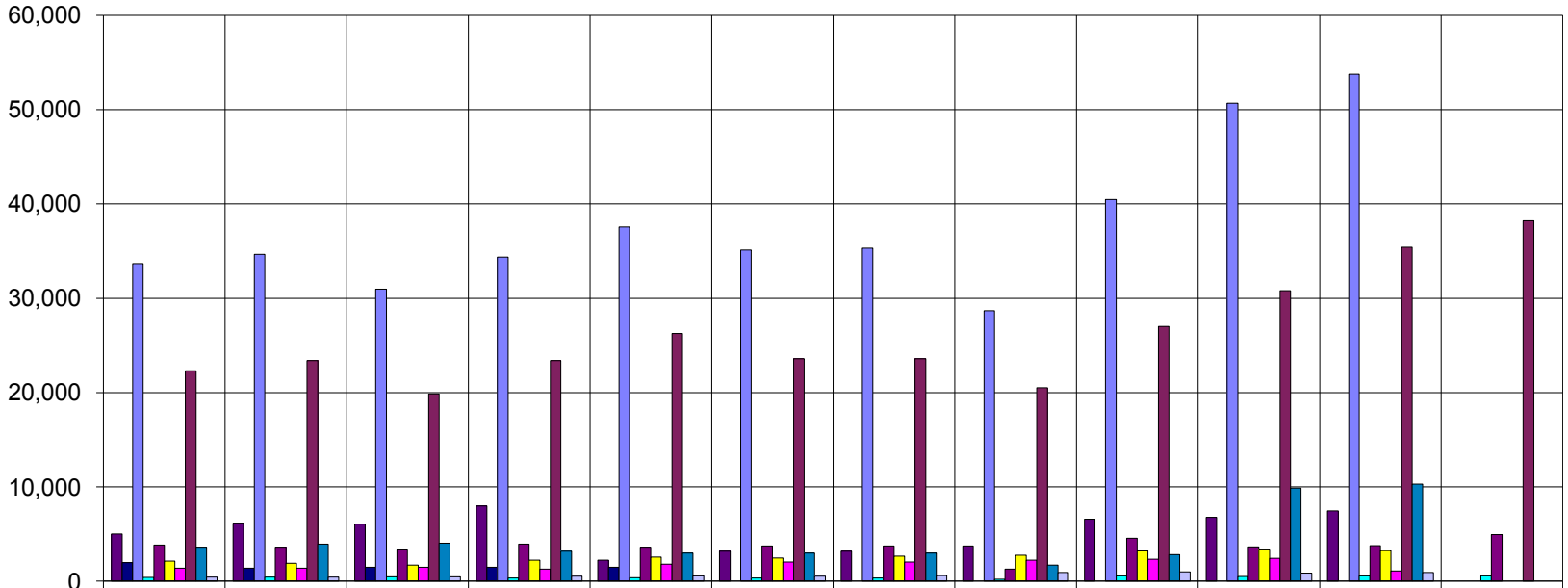
Comparative Iran vs. GCC Military Spending



	1997	1998	1999	2000	2001	2002	2003	2004*	2005	2006	2007
Iran	4,996	6,165	6,060	7,972	2,232	3,189	3,189	3,720	6,590	6,759	7,310
GCC Total	33,659	34,655	30,979	34,357	37,559	35,112	35,322	28,678	40,452	50,676	52,142

Derived from IISS, Military Balance, various editions

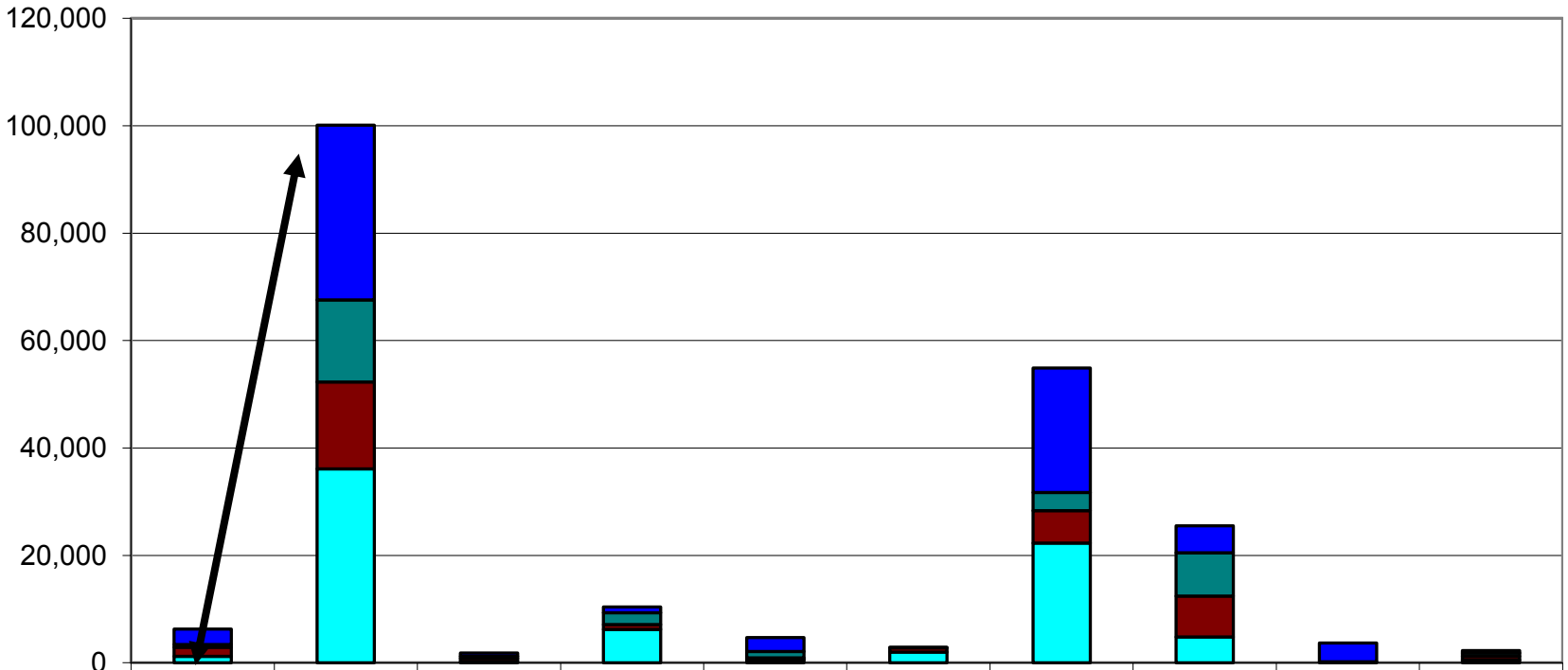
Comparative Military Spending: 1997-2008



	1997	1998	1999	2000	2001	2002	2003	2004*	2005	2006	2007	2008
Iran	4,996	6,165	6,060	7,972	2,232	3,189	3,189	3,720	6,590	6,759	7,450	0
Iraq	1,982	1,382	1,488	1,488	1,488	0	0	0	0	0	0	0
GCC Total	33,659	34,655	30,979	34,357	37,559	35,112	35,322	28,678	40,452	50,676	53,762	0
Bahrain	387	427	472	342	355	352	350	191	559	498	550	552
Kuwait	3,827	3,614	3,401	3,933	3,614	3,720	3,720	1,275	4,539	3,640	3,750	4,930
Oman	2,126	1,913	1,701	2,232	2,551	2,445	2,657	2,764	3,210	3,410	3,230	0
Qatar	1,382	1,382	1,488	1,275	1,807	2,020	2,020	2,232	2,327	2,430	1090	0
Saudi Arabia	22,323	23,386	19,878	23,386	26,256	23,599	23,599	20,515	27,000	30,810	35,400	38,200
UAE	3,614	3,933	4,039	3,189	2,976	2,976	2,976	1,701	2,817	9,888	10,292	0
Yemen	437	421	456	529	570	547	596	940	1,001	858	927	0

Derived from IISS, Military Balance, various editions

Comparative New Arms Orders: 1992-2007



	Iran	GCC	Bahrain	Kuwait	Oman	Qatar	Saudi Arabia	UAE	Iraq	Yemen
04-07	2,900	32,500	600	1,100	2,600	100	23,200	5,000	3,500	500
00-03	500	15,300	400	2,200	1,200	0	3,400	8,100	200	600
96-99	1,700	16,200	600	900	300	800	6,000	7,600	0	700
92-95	1,200	36,100	200	6,200	600	2,000	22,300	4,800	0	500

0 = Data less than $50 million or nil. All data rounded to the nearest $100 million.

Source: Richard F. Grimmett, Conventional Arms Transfers to the Developing Nations, Congressional Research Service, various editions.

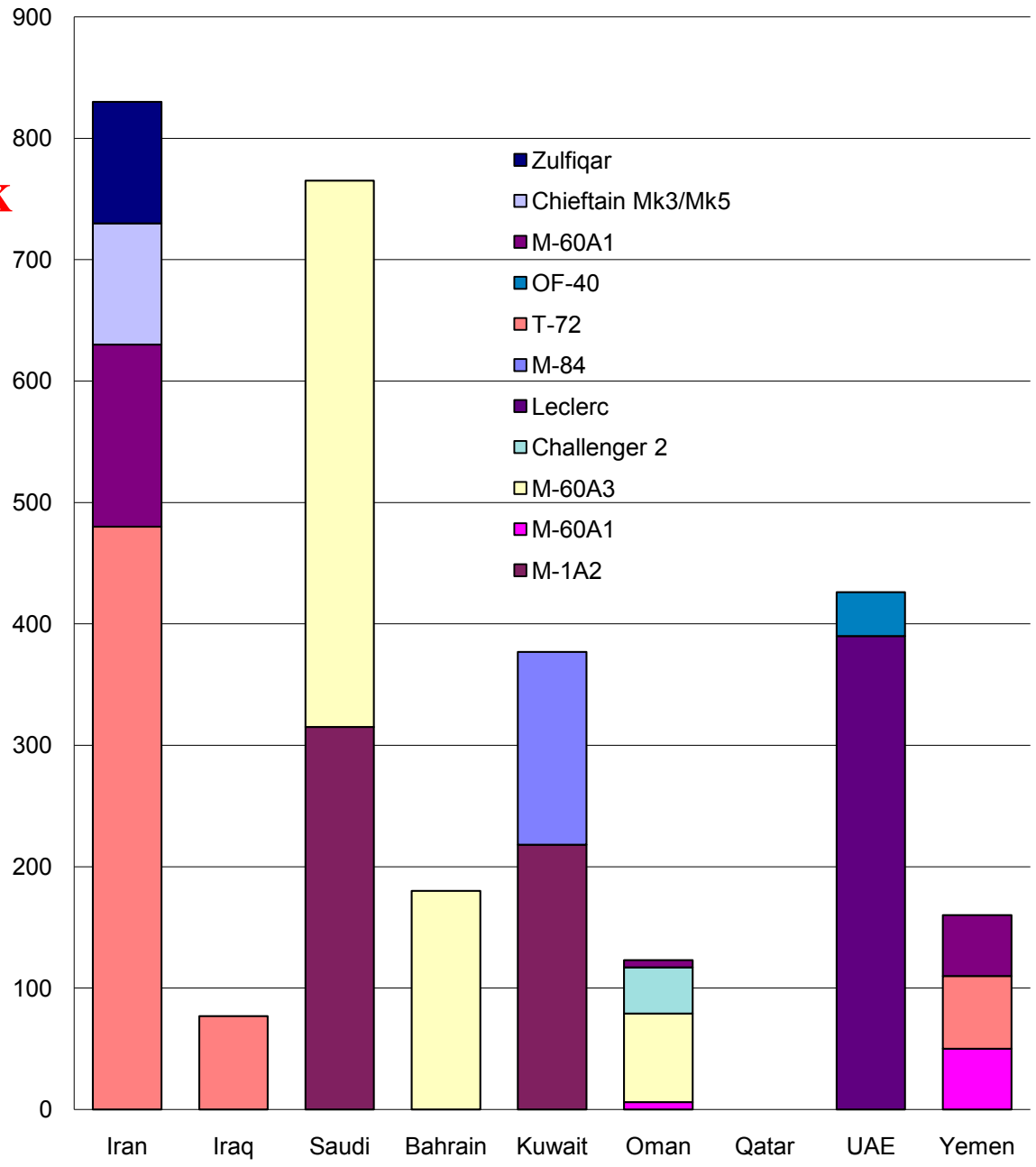
Land Force Threats

- **Iranian Threat to Kuwait and Iraq**
- **Iranian permissive amphibious/ferry operation.**
- **Iranian dominance of Iraq; Invited In to Replace US?**
- **Spillover of Iraqi Sunni-Shi'ite power struggles.**
- **Yemeni incursion into Saudi Arabia or Oman**

But:

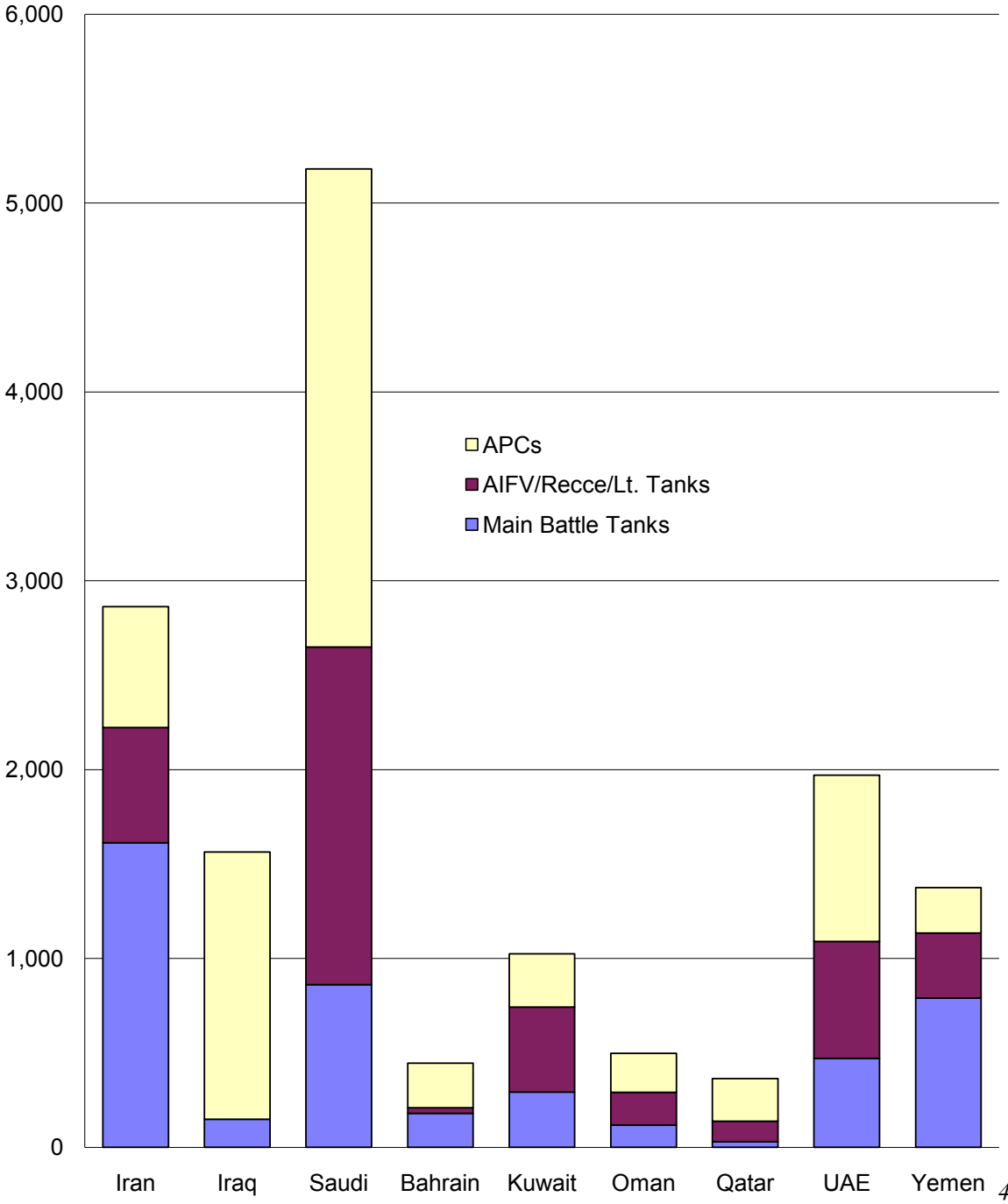
- ***Low near-term probability.***
- ***High risk of US and allied intervention.***
- ***Limited threat power projection and sustainability.***
- ***Unclear strategic goal.***

Comparative Modern Tank Strength, 2009



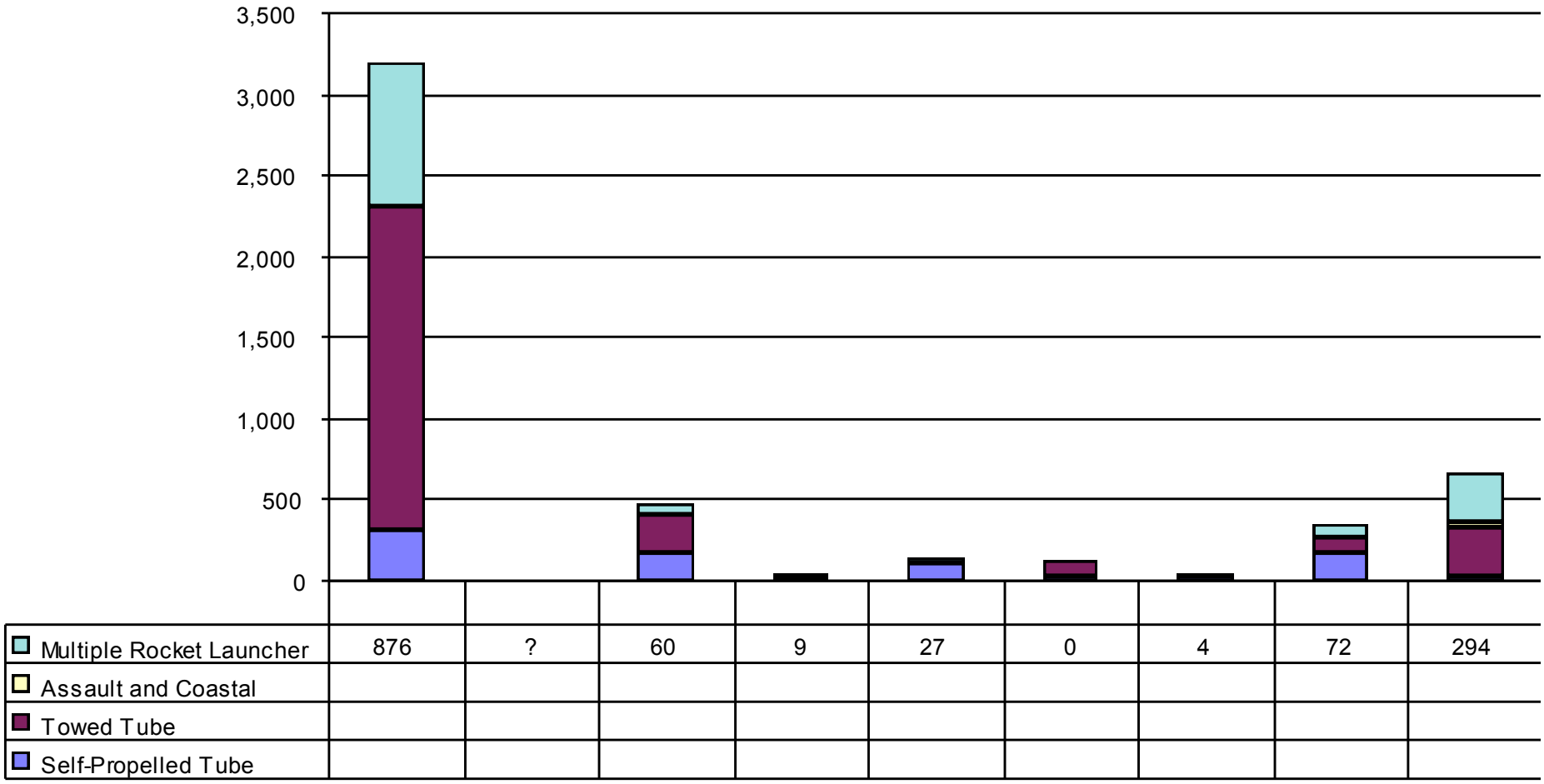
Source: Estimated by Anthony H. Cordesman using data from the IISS, The Military Balance, various editions.

Comparative Armored Vehicle Strength



Source: Estimated by Anthony H. Cordesman using data from various editions of the IISS The Military Balance and Jane's Sentinel.

Comparative Artillery Strength



Derived from IISS, Military Balance, 2008

Keeping a Decisive US Qualitative Edge in US Forces and Arms Transfers to the Gulf ($10.5B in FY087 & FY09)

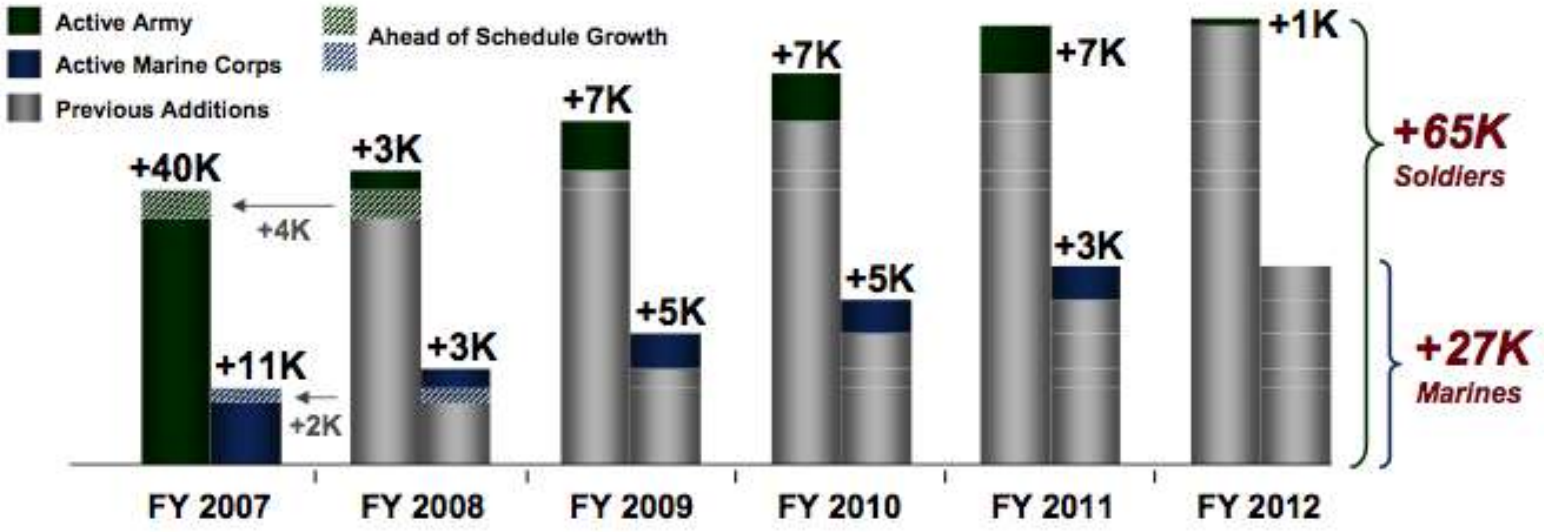
Joint Ground Capabilities	Joint Maritime Capabilities	Joint Air Capabilities	Space-based Capabilities
– Future Combat Systems: • Ground and air systems – 119 Stryker Vehicles – 5,249 High Mobility Multi-purpose Wheeled Vehicles – 1,061 Heavy Tactical Vehicles – 3,187 Medium Tactical Vehicles – 29 M1A1 Abrams Tank Upgrades – Chemical Weapons Demilitarization	– CVN 21 Carrier Replacement – 1 Virginia Class Submarine – 1 DDG-1000 Destroyer – 2 Littoral Combat Ships – 2 T-AKE Auxiliary Dry Cargo Ships – CVN Refueling Complex Overhaul – 2 Joint High Speed Vessels	– 16 F-35 Joint Strike Fighters – 20 F-22A Raptors – 36 V-22 Ospreys – 23 F/A-18 Hornets – 22 E/A-18G Growlers – 16 CH-47 Chinooks – VH-71 Helicopter – KC-X Aerial Refueling Tanker – 59 Predators, Reapers and Warriors	– 2 Space Based Infrared Systems – 4 Expendable Launch Vehicles – GPS Satellite – 1 Mobile User Objective System – Transformational Satellite – Advanced Extremely High Frequency Satellite – Wideband Global SATCOM – Ballistic Missile Defense

Basic Research +$0.3B in FY 2009 (+$1.4B FY09-FY13)

Increase Ground Capabilities

+$8.7B
FY08 - FY09

Army Active	42	Brigade Combat Teams **(482.4K Soldiers)**	→	48	Brigade Combat Teams **(547.4K Soldiers)**
	12/12	Months Home Station / Months Deployed		24/12	Months Home Station / Months Deployed
Marine Corps Active	2.5	Marine Expeditionary Forces **(175K Marines)**	→	3	Marine Expeditionary Forces **(202K Marines)**
	7/7	Months Home Station / Months Deployed		14/7	Months Home Station / Months Deployed



Source: FY 2009 DoD Budget Request; FY 2008 Budget; FY 2007 Supplemental

Numbers may not add due to rounding

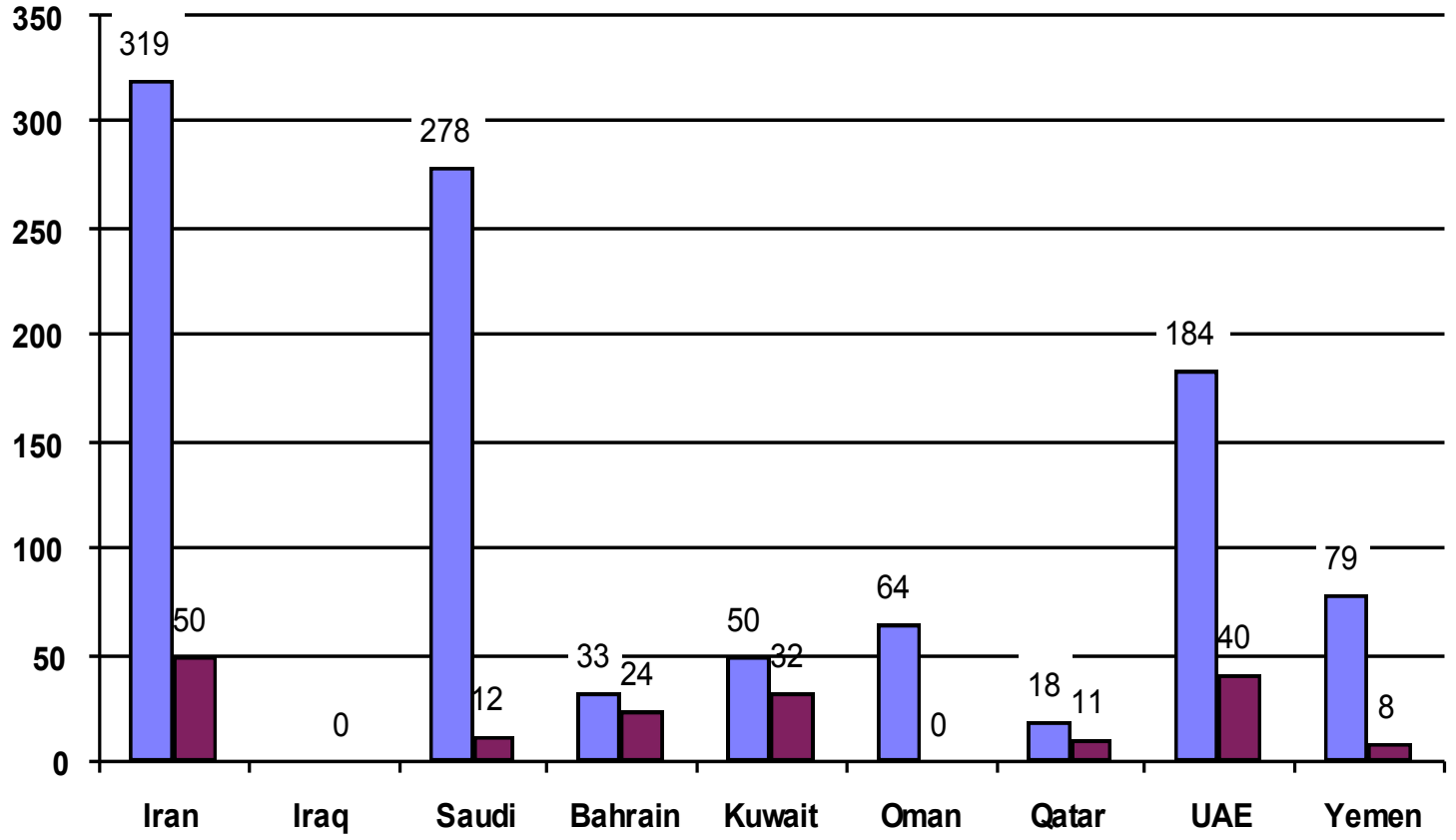
Air/Missile Threats

- **Precision air strikes on critical facilities: Raid or mass attack.**
- **Terror missile strikes on area targets; some chance of smart, more accurate kills.**
- **Variation on 1987-1988 "Tanker War"**
- **Raids on offshore and critical shore facilities.**
- **Strikes again tankers or naval targets.**
- **Attacks on US-allied facilities**
- **Use of UAVs as possible delivery systems (conventional or Unconventional munitions)**

But:

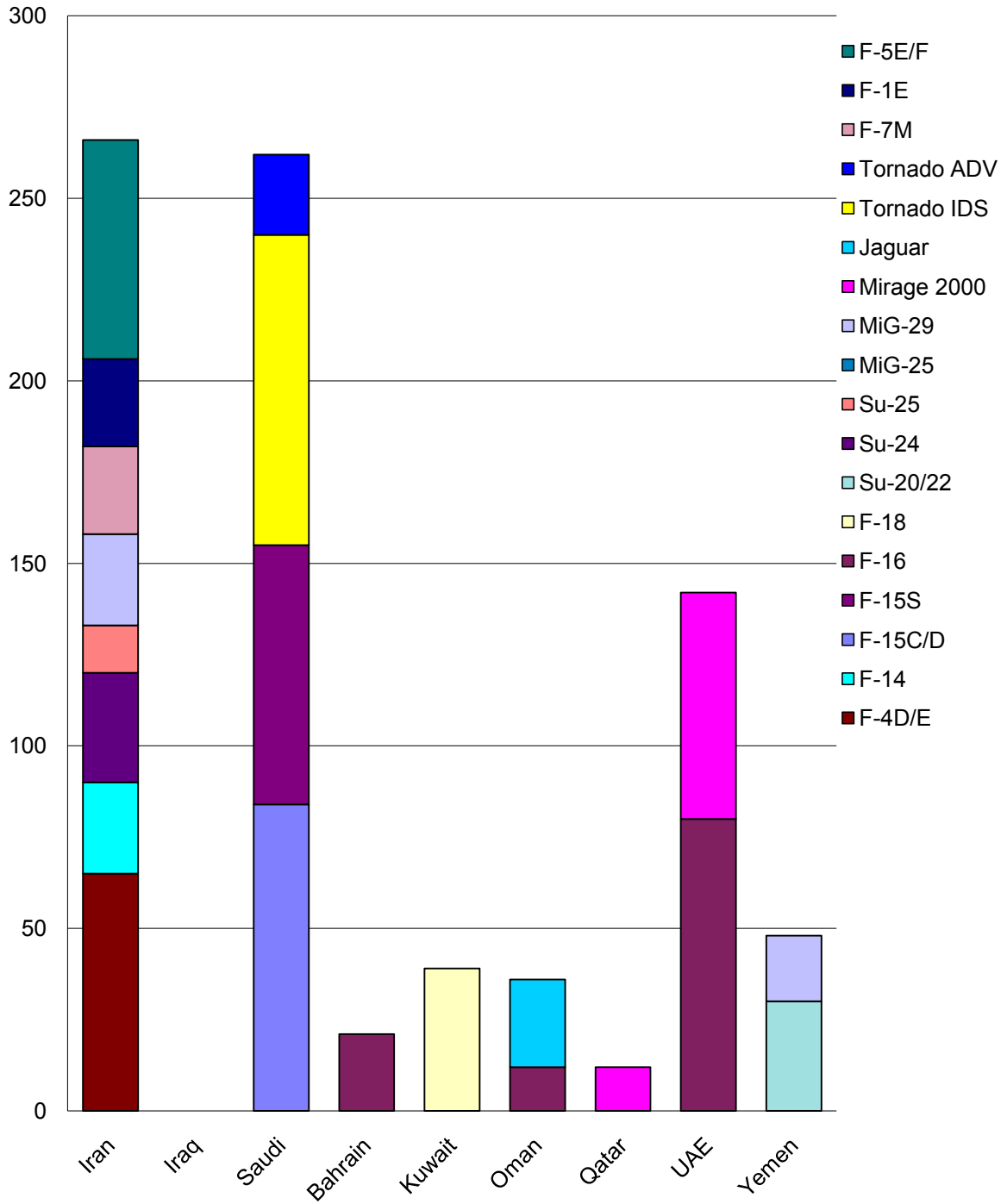
- ***Low near-term probability.***
- ***High risk of US and allied intervention.***
- ***Limited threat power projection and sustainability.***
- ***Unclear strategic goal.***

Comparative Combat Air Strength



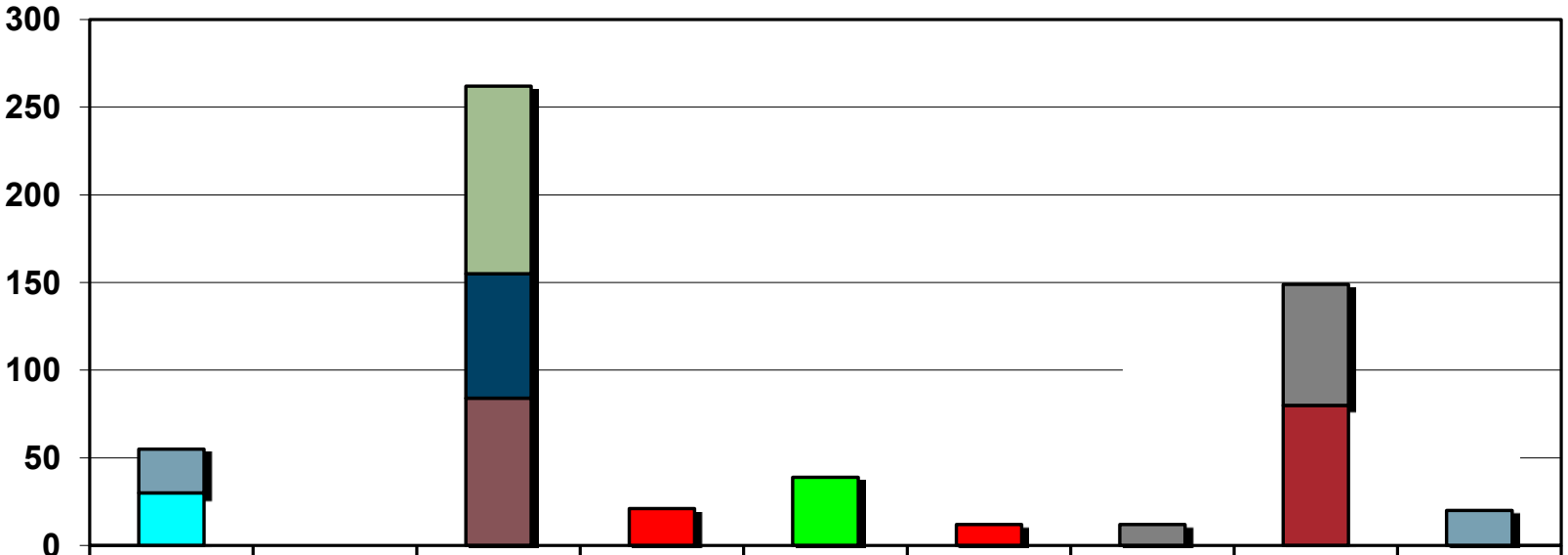
Derived from IISS, Military Balance, 2008

Comparative High Quality Fighter/Attack Aircraft



Source: Adapted by Anthony H. Cordesman from various sources and IISS, The Military Balance, various editions and

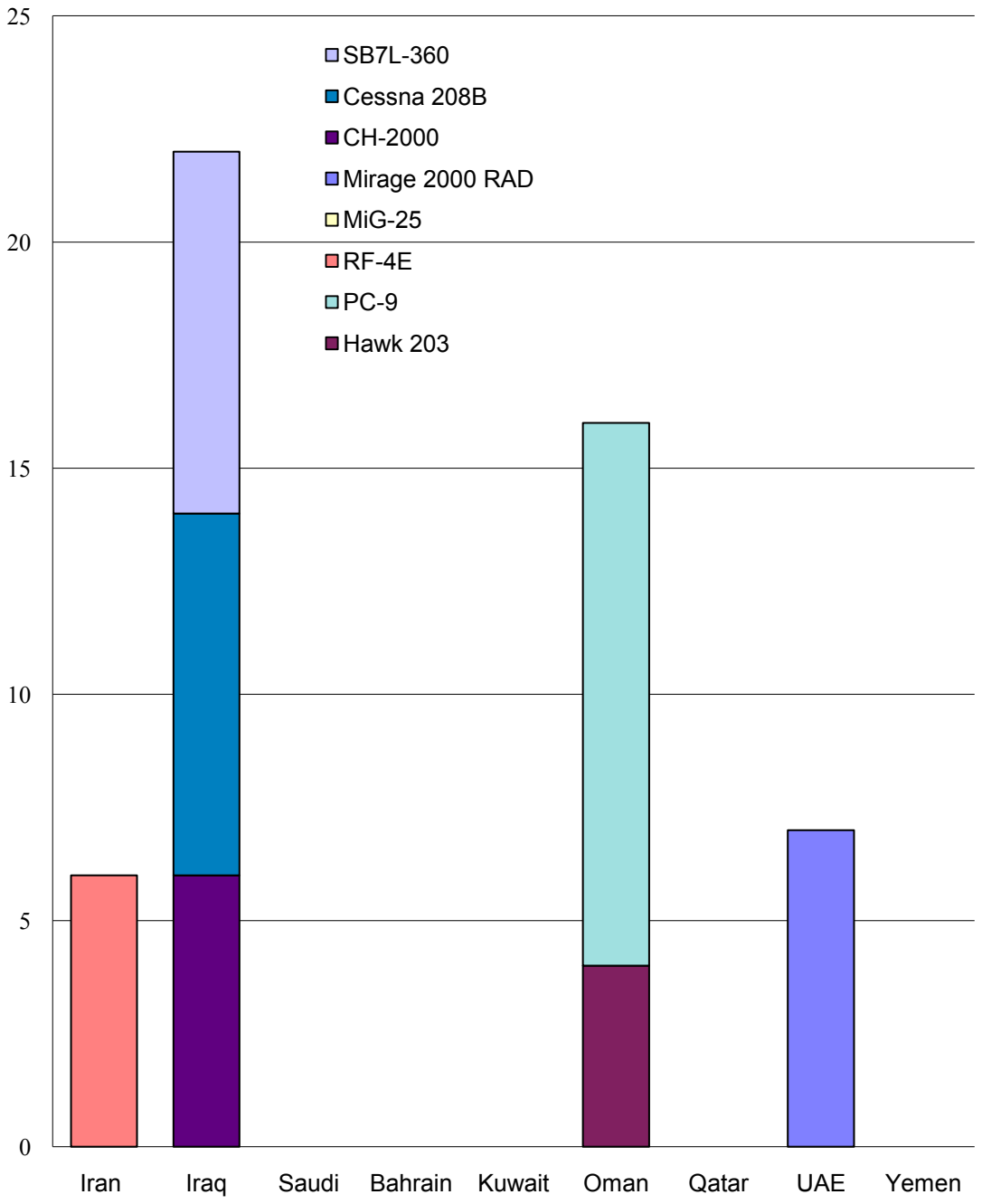
Comparative High Quality Combat Air Strength By Type



	Iran	Iraq	Saudi	Bahrain	Kuwait	Oman	Qatar	UAE	Yemen
Tornado IDS/ADV			107						
Mirage 2000							12	69	
F-18					39				
F16E/F								80	
F-16C/D				21		12			
F-15S			71						
F-15CD			84						
F-14	0								
MiG-29	25								20
Su-25	0								
Su-24	30								

Source: IISS, Military Balance, 2008; Jane's Sentinel series; Saudi experts

Comparative Gulf Reconnaissance Aircraft, 2009



Source: Adapted by Anthony H. Cordesman from IISS, The Military Balance, various editions.

Iranian UAV Projects / Assets 2009

Prime Manufacturer	Designation	Development / Production	Operation	Payload Wt.	Endurance (hr)	Range	Ceiling (ft)	Mission
Unknown	Stealth	Underway / Underway	Deployed			700 km		R/S*
HESA	Ababil (Swallow)	Complete / Underway	Deployed	45 kg	1.5+	150 km	14,000	Multiple variants for R/S* - attack – ISR**
Shahbal Group, Sharif Univ.	Shahbal	Underway		5.5 kg		12 km	4,500	R/S*
Asr-e Talai Factories	Mini-UAV	Underway						Surveillance
FARC	Sobakbal	Underway / Underway	Deployed	0.35 kg	2	2.7 - 13.5 mi	19,686	Surveillance
Qods Aeronautics Industries	Mohajer II/III (Dorna); Mohajer IV (Hodhod); Saeqeh I/II; Tallash I/Endeavor; Tallash II Hadaf 3000	Complete / Underway	Deployed					Multirole aka Lightning Bolt Target drone - aka Target 3000

Source: Adapted by Adam C. Seitz from AIAA Aerospace 2009 Worldwide UAV Roundup; available at: http://www.aiaa.org/Aerospace/images/articleimages/pdf/UAVs_APR2009.pdf.

*R/S: Reconnaissance / Surveillance; **ISR: Intelligence / Surveillance / Reconnaissance

Gulf Air Balance

Air Bases and Air Force Order of Battle (2009)

Three Main Iranian Nuclear Facilities

- Natanz: Uranium Enrichment Facility
- Arak: Heavy Water Nuclear Reactor and Possible Future Plutonium Production Reactor
- Esfahan: Nuclear Research Center. Uranium Conversion Facility (UCF)

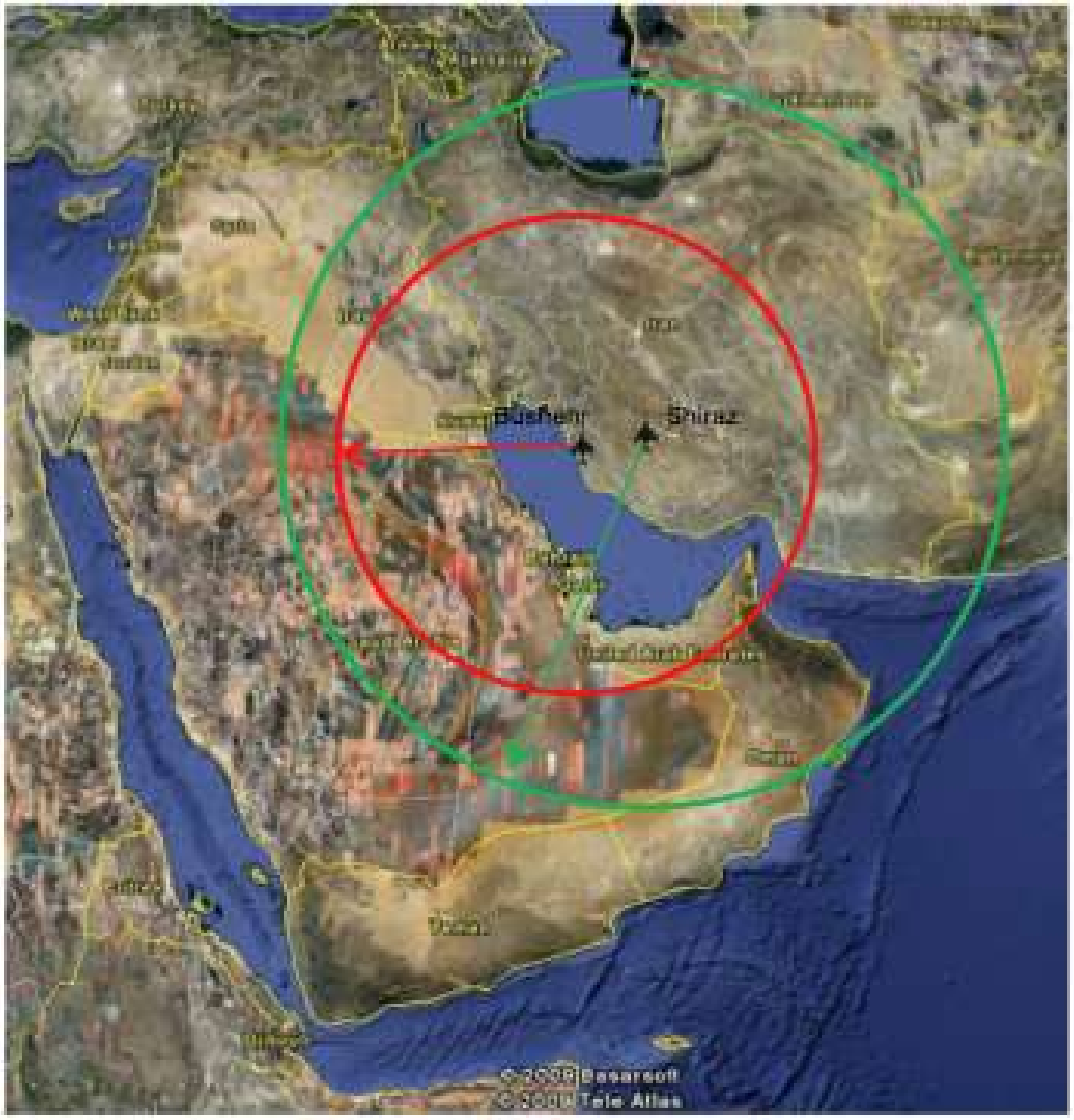
Air Bases Source: Global Security.org
Order of Battle Source: Anthony Cordesman CSIS

	Combat A/C	Attack Helo's
Iran	319	95
Iraq	-	37
Kuwait	50	45
Bahrain	33	16
Qatar	18	25
UAE	164	67
Oman	64	41
Saudi Arabia	278	67
Yemen	179	18

Iran Airbases

Tabriz	F-5E/F, MiG-29
Hamadan	F-4E/D Su-24
Dezful	F-5E/F
Bushehr	F-4E/D F-14
Bandar Abbas	2 Helicopter Wings
Shiraz	Su-25 Su-24
Esfahan	F-5E Su-24
Tehran	MiG-29 Su-24
Zahedan	F-7M
Kermanshah	F-5E/F

Range of Iran's Air Power



Mission Profile:
Hi-Lo-Hi

F-4E (Bushehr):
(4) MK83 1000lb Bombs
(1) 600 Gallon Fuel Tank
10 Minutes loiter time
Range = 400 nmi

SU-24 (Shiraz):
(4) 500 kg/1000 lb Bombs
(1) 400 gallon tank
10 minutes loiter time
Range = 590 nmi

SU-25 (Shiraz):
(4) 500kg/1000lb Bombs
(1) 400 gallon tank
(2) 10 minutes loiter time
Range = 600 nmi

Gulf Land-Based Air Defenses

Country	Major SA	Light SAM	AA Gun
Bahrain	(8) IHAWK	(60) RBS-70 (18) FIM 92A Stinger (7) Crotale	(26) Guns (15) Orlikon 35mm (12) L/70 40mm
Iran	(16/150) IHAWK (3/10) SA-5 (45) SA-2 Guideline	SA-7/14/16 HQ-7 (29) SA-15 Some QW-1 Misaq (29) TOR-M1 Some HN-5 (30) Rapier Some FM-80 (Ch Crotale) 15 Tigercat Some FIM-92A Stinger	(1,700) Guns ZSU-23-4 23mm ZPU-2/4 23mm ZU-23 23mm M-1939 37mm S-60 57mm
Kuwait	(4/24) IHAWK Phase III (5) Patriot PAC-2	(6/12) Aspide (48) Starbust	12 Oerlikon 35mm
Oman	None	Blowpipe (2) Mistral SP (34) SA-7 (6) Blindfire (20) Javelin (40) Rapier S713 Martello	(26) Guns (4) ZU-23-2 23mm (10) GDF-(x)5 Skyguard 35mm (12) L-60 40mm
Qatar	None	(10) Blowpipe (12) FIM-92A Stinger (9) Roland II (24) Mistral (20) SA-7	
Saudi Arabia	(16/128) IHAWK (4-6/16-24) Patriot (17/141) Shahine Mobile (2-4/160) PAC-2 Launchers (17) ANA/FPS-117 Radar (73/68) Crotale Shahine	(40) Crotale (500) Stinger (ARMY) (500) Mistral (ADF) (500) FIM-43 Redeye (ARMY) (500) Redeye (ADF) (73-141) Shahine Static (500) FIM-92A Stinger (ARMY) (400) FIM-92A Avenger (ADF)	(1,220) Guns (92) M-163 Vulcan 20mm (30) N-167 Vulcan 20mm (NG) (850) AMX-30SA 30mm (128) GDF Orlikon 35mm (150) L-70 40mm (store) (130) M-2 90mm (NG)
UAE	(2/31) IHAWK	20+ Blowpipe (20) Mistral Some Rapier/Crotale/ RB-70/Javelin/SA-18	(62) Guns (42) M-3VDA 20mm SP (20) GCF-BM2 30mm

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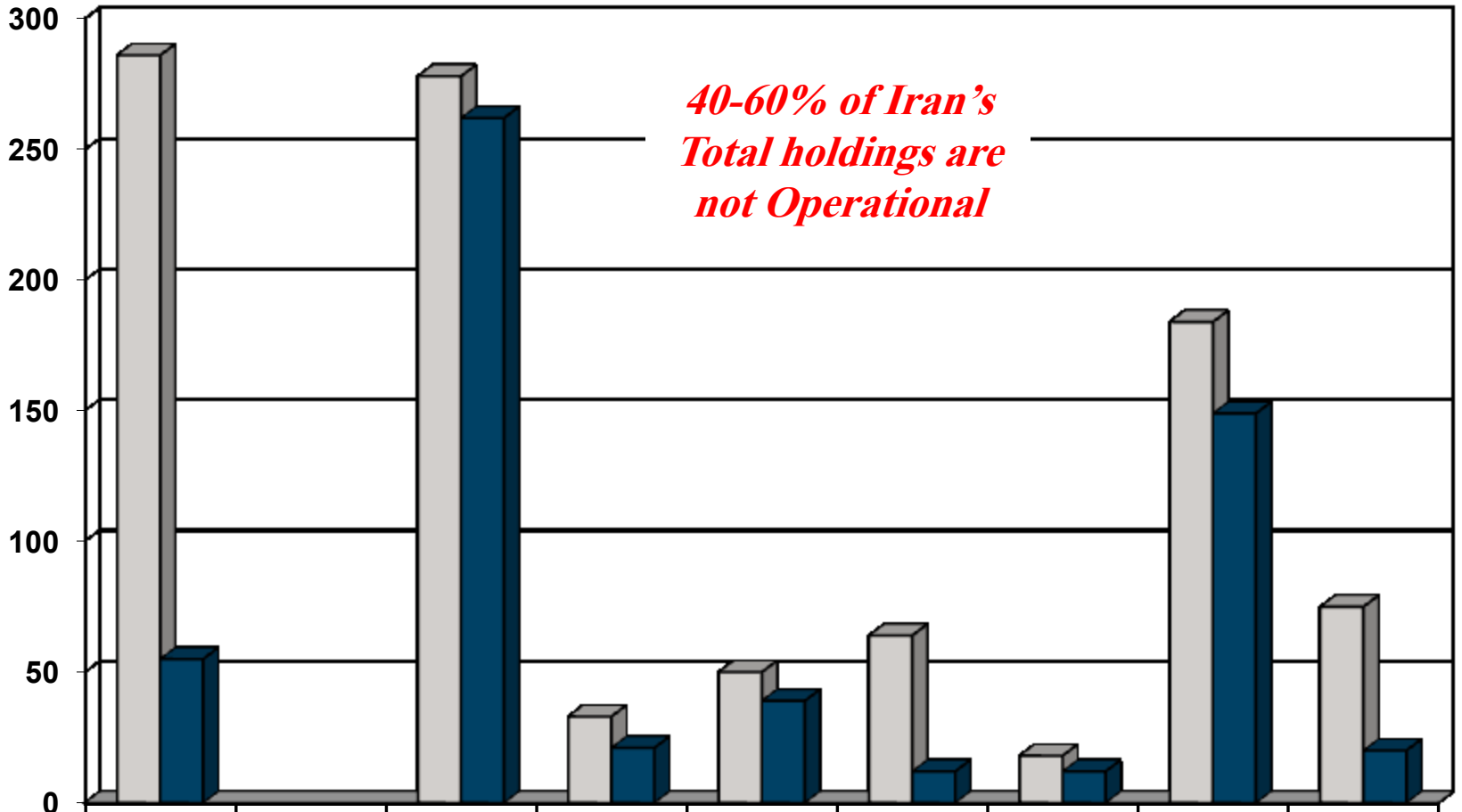
Comparative Gulf Total & High Quality Combat Air Strength By Type



	Iran	Iraq	Saudi	Bahrain	Kuwait	Oman	Qatar	UAE	Yemen
Total	286		278	33	50	64	18	184	75
High Quality	55		262	21	39	12	12	149	20

Source: IISS, Military Balance, 2008; Jane's Sentinel series; Saudi experts

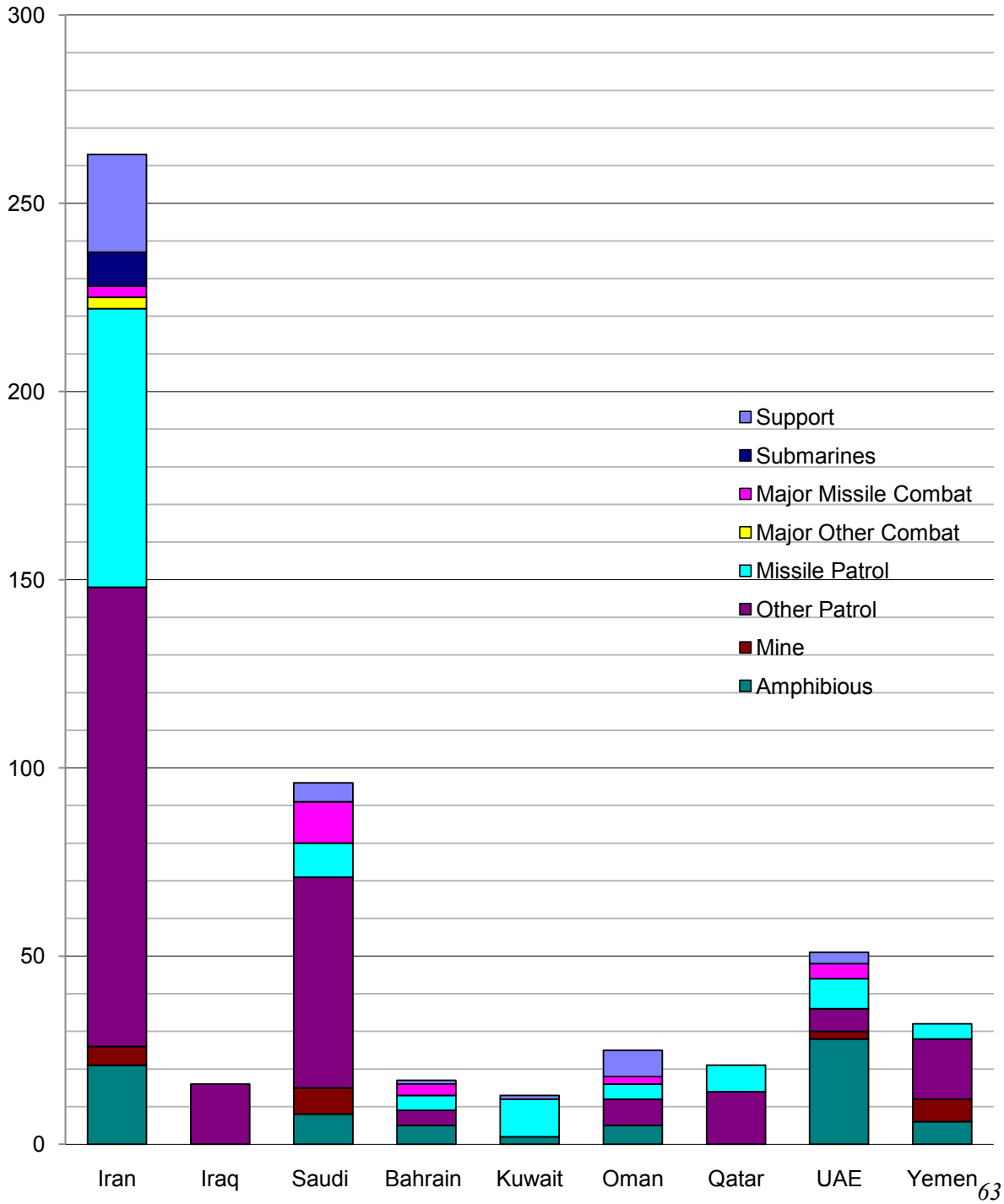
Naval Threats

- **Iranian effort to "close the Gulf."**
- **Iranian permissive amphibious/ferry operation.**
- **Variation on 1987-1988 "Tanker War"**
- **Raids on offshore and critical shore facilities.**
- **"Deep strike" with air or submarines in Gulf of Oman or Indian Ocean.**
- **Attacks on US facilities**

But:

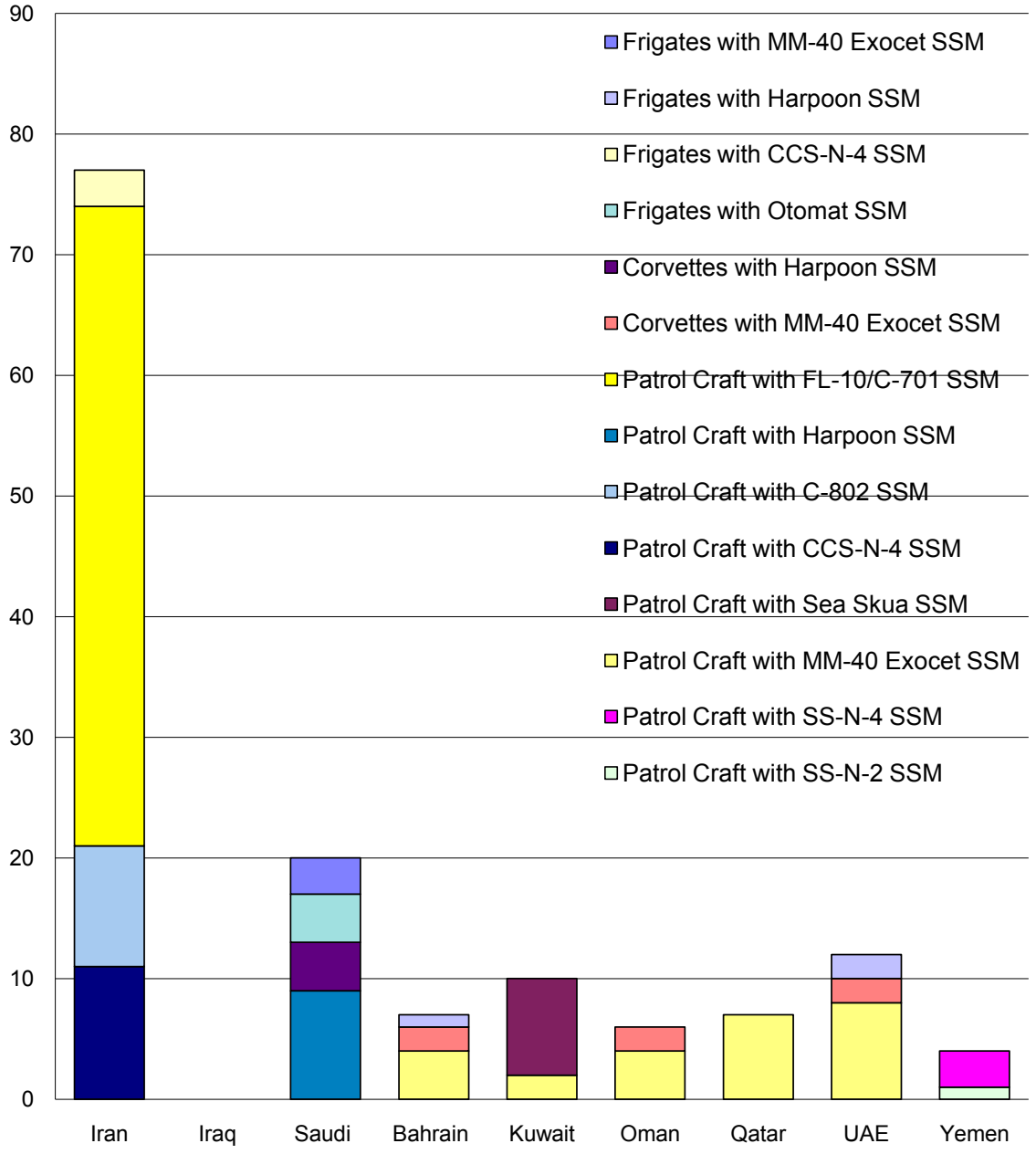
- ***Low near-term probability.***
- ***High risk of US and allied intervention.***
- ***Limited threat power projection and sustainability.***
- ***Unclear strategic goal.***

Comparative Major Naval Combat Ships



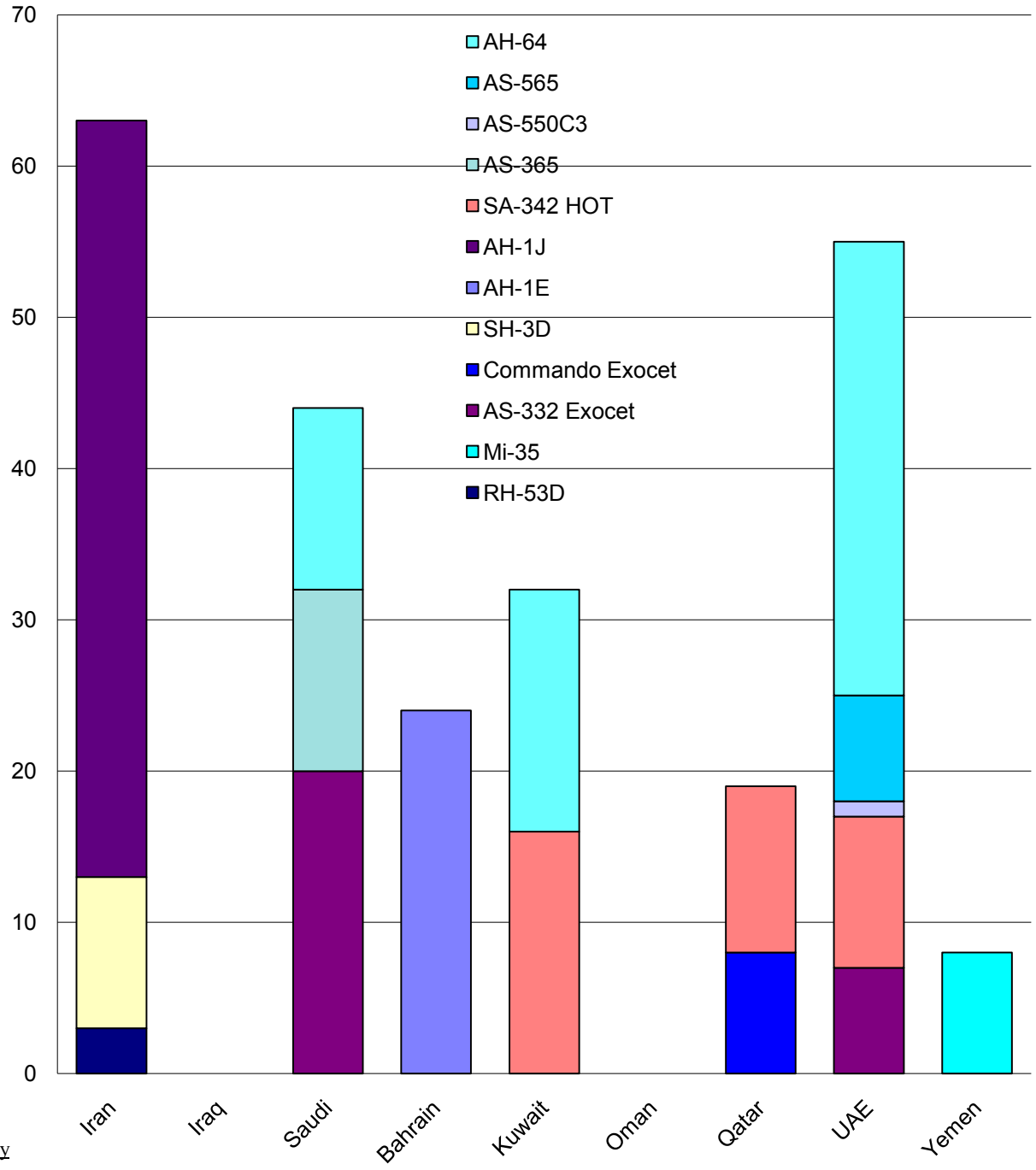
Source: Adapted by Anthony H. Cordesman from IISS, The Military Balance, various editions.

Gulf Warships with Anti-Ship Missiles



Source: Adapted by Anthony H. Cordesman from IISS, The Military Balance, various editions and material provided by US and Saudi experts.

Comparative Gulf Attack, Anti-Ship and ASW Helicopters



Source: Adapted by Anthony H. Cordesman from IISS, The Military Balance, various editions.

The Challenge of Asymmetric Warfare:

Intimidation, Deterrence, and Warfighting

Large Territory: Threatened Periphery

- Iraq and Yemen create major land border issues.
- Coastal defense affects Gulf, Gulf of Oman, Arabian Sea, Gulf of Aden, and Red Sea.
- Nearly 4,000 kilometers of coastline.
- Coast vital to exports, water (desalination & power) and food.
- Air transport and ships also critical.
- Defense in depth difficult given dependence on coasts; population distribution.
- Security of Gulf, Strait of Hormuz, Gulf of Oman, Bab el Mandab, Red Sea critical. Threat of Piracy as well as hostile forces.

Gulf Periphery & Oil Infrastructure

Source: http://www.eia.doe.gov/emeu/cabs/Persian_Gulf/images/pg_map.pdf

Most Likely Foreign Threats Are Not Formal Conflicts

- **Direct and indirect threats of using force. (I.e. Iranian efforts at proliferation)**
- **Use of irregular forces and asymmetric attacks.**
- **Proxy conflicts using terrorist or extremist movements or exploiting internal sectarian, ethnic, tribal, dynastic, regional tensions.**
- **Arms transfers, training in host country, use of covert elements like Quds force.**
- **Harassment and attrition through low level attacks, clashes, incidents.**
- **Limited, demonstrative attacks to increase risk, intimidation.**
- **Strike at critical node or infrastructure.**

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Going Nuclear: Intimidation as a Form of Terror

- **Even the search for nuclear power is enough to have a major effect.**
- **Development of long range missiles add to credibility, and pressure.**
- **Crossing the nuclear threshold in terms of the bomb in the basement option.**
- **Threats to Israel legitimize the capability to tacitly threaten Arab states. Support of Hamas and Hezbollah increase legitimacy in Arab eyes -- at least Arab publics.**
- **Many future options: stockpile low enriched material and disperse centrifuges, plutonium reactor, underground test, actual production, arm missiles, breakout arming of missiles.**
- **Declared forces, undeclared forces, lever Israeli/US/Arab fears.**

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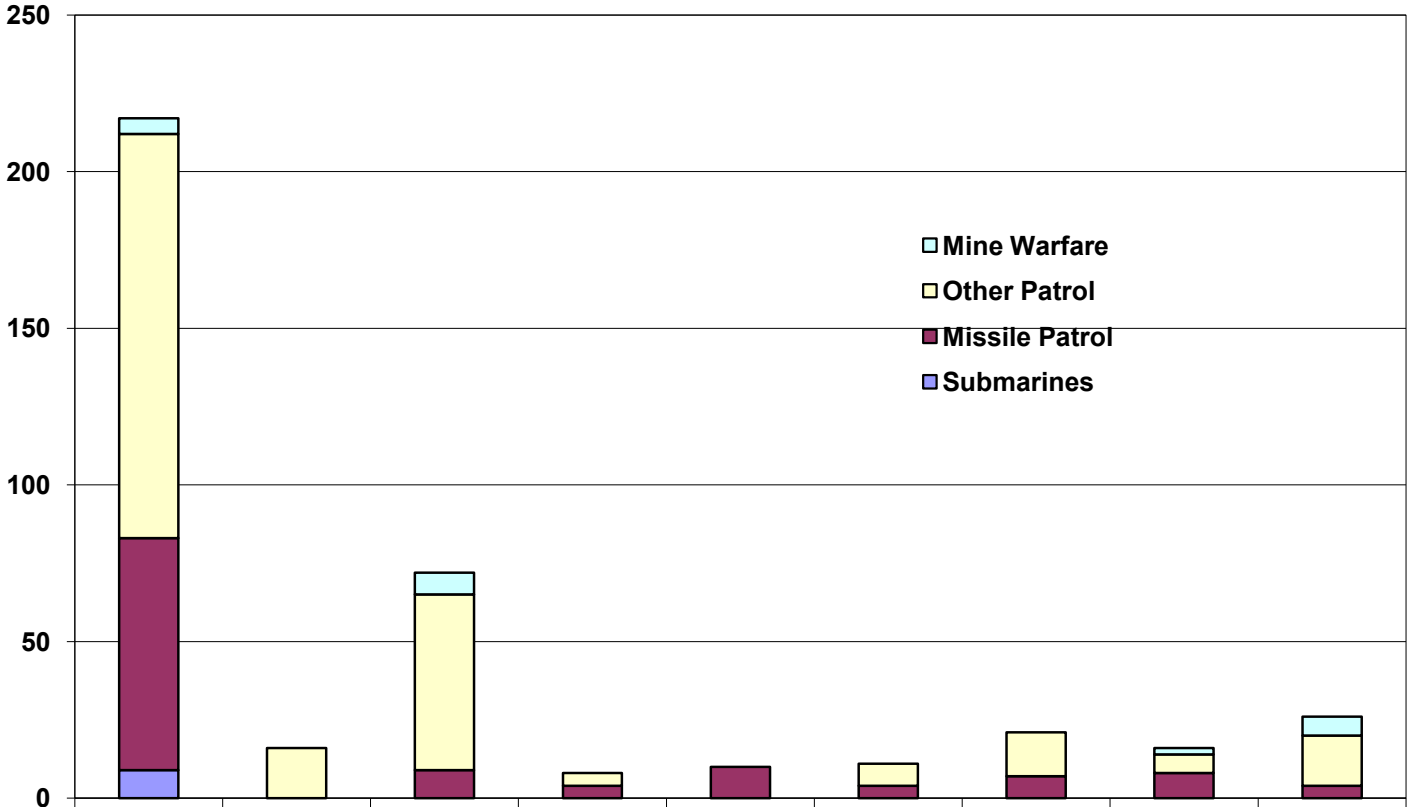
Going Asymmetric: Leveraging Weak Conventional Forces for Intimidation

- **Combined nuclear and asymmetric efforts sharply reduce need for modern conventional forces -- which have less practical value**
- **Linkages to Syria, Lebanon, other states, and anti-state actors like Hamas and Hezbollah add to ability to deter and intimidate/lever.**
- **Can exploit fragility of Gulf, world dependence on oil exports, GCC dependence on income and imports.**
- **Threats to Israel again legitimize the capability to tacitly threaten Arab states.**

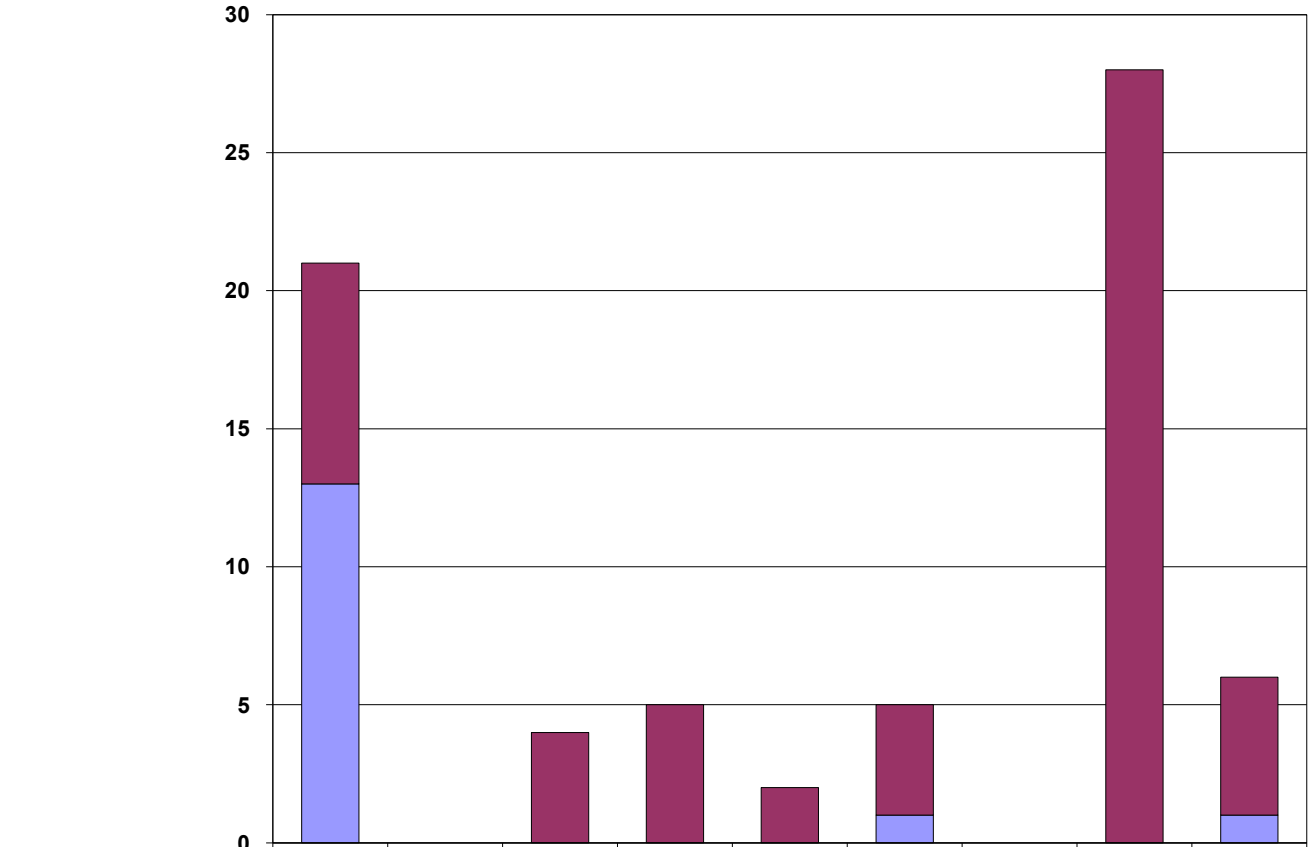
Key Ships for Asymmetric Warfare



	Iran	Iraq	Saudi	Bahrain	Kuwait	Oman	Qatar	UAE	Yemen
Mine Warfare	5		7					2	6
Other Patrol	129	16	56	4		7	14	6	16
Missile Patrol	74		9	4	10	4	7	8	4
Submarines	9								

Source: Adapted by Anthony H. Cordesman from IISS, The Military Balance, various editions; Jane's Sentinel series; Saudi experts

Amphibious Ships & Landing Craft



	Iran	Iraq	Saudi	Bahrain	Kuwait	Oman	Qatar	UAE	Yemen
Landing Craft	8		4	5	2	4		28	5
Amphibious Ships	13		0			1			1

Source: Adapted by Anthony H. Cordesman from IISS, The Military Balance, various editions, Jane's Sentinel series, **and material provided by US and Saudi experts. Estimates differ on Saudi landing craft, because of different ways to count operational status. Some experts put the figure at 6 LCMs and 2 LCUs.**

Planning for Asymmetric Warfare

- **Deterrence and conflict prevention as critical as defense.**
- **Need integrated GCC force planning and war planning efforts.**
- **Must show GCC will act together. Threats cannot divide or exploit weakest link.**
- **Exercise realistic "red-blue" war games to determine common options and requirements.**
- **Follow-up with realistic CPXs and FTXs.**
- **Emphasize joint warfare approaches that tie in paramilitary and security forces.**
- **Demonstrate have exercised a retaliatory capability.**
- **Interoperability with other Gulf states and with US, UK, France.**
- **Defend against strikes at critical nodes and infrastructure.**

The Islamic Revolutionary Guards Corps

- 125,000+, drawing on 1,000,000 Basij.
- Key is 20,000 Naval Guards, including 5,000 marines.
  - Armed with HY-3 CSS-C-3 Seersucker (6-12 launchers, 100 missiles, 95-100 km), and 10 Houdong missile patrol boats with C-802s (120 km), and 40+ Boghammers with ATGMs, recoilless rifles, machine guns.
  - Large-scale mine warfare capability using small craft and commercial boats.
  - Based at Bandar e-Abbas, Khorramshar, Larak, Abu Musa, Al Farsiyah, Halul, Sirri.
- IRGC air branch reported to fly UAVs and UCAVs, and control Iran's strategic missile force.
  - 1 Shahab SRBM Bde (300-500-700 km) with 12-18 launchers, 1 Shahab 3 IRBM Btn (1,200-1,280 km) with 6 launchers and 4 missiles each.

IRGC Key Assets and Capabilities

- **The IRGC has a wide variety of assets at its disposal to threaten shipping lanes in the Gulf, Gulf of Oman, and the Caspian Sea.**
- **3 Kilo (Type 877) and unknown number of midget (Qadr-SS-3) submarines; smart torpedoes, (anti-ship missiles?) and smart mine capability.**
- **Use of 5 minelayers, amphibious ships, small craft, commercial boats.**
- **Attacks on tankers, shipping, offshore facilities by naval guards.**
- **Raids with 8 P-3MP/P-3F Orion MPA and combat aircraft with anti-ship missiles(C-801K (8-42 km), CSS-N-4, and others).**
- **Free-floating mines, smart and dumb mines, oil spills.**
- **Land-based, long-range anti-ship missiles based on land, islands (Seersucker HY-2, CSS-C-3), and ships (CSS-N-4, and others. Sunburn?).**
- **Forces whose exercises demonstrate the capability to raid or attack key export and infrastructure facilities.**

IRGC Naval Branch Modernization

- **Large numbers of anti-ship missiles on various types of launch platforms.**
- **Small fast-attack craft, heavily armed with rockets or anti-ship missiles.**
- **More fast mine-laying platforms.**
- **Enhanced subsurface warfare capability with various types of submarines and sensors.**
- **More small, mobile, hard-to-detect platforms, such as semi-submersibles and unmanned aerial vehicles.**
- **More specialized training.**
- **More customized or purpose-built high-tech equipment.**
- **Better communications and coordination between fighting units.**
- **More timely intelligence and effective counterintelligence/deception.**
- **Enhanced ability to disrupt the enemies command, control, communications, and intelligence capability.**
- **The importance of initiative, and the avoidance of frontal engagements with large U.S. naval surface warfare elements.**
- **Means to mitigate the vulnerability of even small naval units to air and missile attack.**

IRGC Naval Branch

- **The IRGC has a naval branch consists of approximately 20,000 men, including marine units of around 5,000 men.**
- **The IRGC is now reported to operate all mobile land-based anti-ship missile batteries and has an array of missile boats; torpedo boats; catamaran patrol boats with rocket launchers; motor boats with heavy machine guns; mines as well as Yono (Qadir)-class midget submarines; and a number of swimmer delivery vehicles.**
- **The IRGC naval forces have at least 40 light patrol boats, 10 Houdong guided missile patrol boats armed with C-802 anti-ship missiles.**
- **The IRGC controls Iran's coastal defense forces, including naval guns and an HY-2 Seersucker land-based anti-ship missile unit deployed in five to seven sites along the Gulf coast.**
- **The IRGC has numerous staging areas in such places and has organized its Basij militia among the local inhabitants to undertake support operations.**
- **IRGC put in charge of defending Iran's Gulf coast in September 2008 and is operational in the Gulf and the Gulf of Oman, and could potentially operate elsewhere if given suitable sealift or facilities.**
- **Can deliver conventional weapons, bombs, mines, and CBRN weapons into ports and oil and desalination facilities.**
- **Force consists of six elements: surface vessels, midget and unconventional submarines, missiles and rockets, naval mines, aviation, and military industries.**

IRGC Naval Branch Facilities

- The IRGC has numerous staging areas in such places and has organized its Basij militia among the local inhabitants to undertake support operations.

- The naval branch has bases and contingency facilities in the Gulf, many near key shipping channels and some near the Strait of Hormuz.

    - These include facilities at Al-Farsiyah, Halul (an oil platform), Sirri, Abu Musa, Bandaer-e Abbas, Khorramshahr, and Larak.

- Iran recently started constructing new naval bases along the coasts of the Gulf and the Sea of Oman for an "impenetrable line of defense."

- On October 27, 2008, Iran opened a new naval base at Jask, located at the southern mouth of the Strait of Hormuz, a strategic chokepoint for Persian Gulf oil.

Expanding Mission

- **Iran's Deputy Army Commander Brigadier General Abdolrahim Moussavi has announced that Iran is commitment to expanding its strategic reach, arguing that, "In the past, our military had to brace itself for countering regional enemies. This is while today we are faced with extra-regional threats."**

- **Iran upgraded a naval base at Assalouyeh in Iran's southern Bushehr province.**

  - **This base is the fourth in a string of IRGC bases along the waterway that will extend from Bandar Abbas to Pasa Bandar near the Pakistan border.**

  - **Part of, what IRGC's Navy Commander Rear Admiral Morteza Saffari describes as a new mission to establish an impenetrable line of defense at the entrance to the Sea of Oman.**

Expanding Capabilities - I

- **Forces can carry out extensive raids against Gulf shipping, carry out regular amphibious exercises with the land branch of the IRGC against objectives like the islands in the Gulf, and could conduct raids against countries on the southern Gulf coast.**
- **Iran could launch a coordinated attack involving explosives-laden remote-controlled boats, swarming speedboats, semi-submersible torpedo boats, FACs, kamikaze UAVs, midget and attack submarines, and shore-based anti-ship missile and artillery fire.**
- **Could "swarm" a U.S.-escorted convoy or surface action group transiting the Strait of Hormuz, and barrages of rockets with cluster warheads could be used to suppress enemy defensive fire and carrier air operations.**
- **Naval Guards work closely with Iranian intelligence and appear to be represented unofficially in some embassies, Iranian businesses and purchasing offices, and other foreign fronts.**
- **Iran has launched a domestic weapons procurement campaign aimed at improving its defense capabilities and has announced the development of 109 types of advanced military equipment over the past two years.**
  - **In December 2008 Iranian Navy Rear Admiral Habibollah Sayyari confirmed the delivery of two new domestically-built missile boats, Kalat (Fortress) and Derafsh (Flag), as well as a Ghadir-class light submarine to the Iranian navy.**
  - **The deputy commander of the IRGC's navy, Rear Admiral Ali Fadavi, told the Fars News Agency on 11 November 2008 that both unmanned speedboats and UAVs are now mass-produced in the country.**
  - **On December 6, 2008 the Iranian Navy test-fired a new surface-to-surface missile from a warship as part of exercises along a strategic shipping route. "The Nasr-2 was fired from a warship and hit its target at a distance of 30 km (19 miles) and destroyed it," Iranian state run radio reported.**

Expanding Capabilities - II

- Exercises increasingly experiment with different forces of "swarming," and sudden saturation attacks by mixes of systems.
- Have some 30 large fast attack craft – largely north Korean and Chinese -- with top speed in excess of 35 knots, carrying an array of large and small caliber guns, anti-ship missiles and shoulder-launched anti-aircraft missiles.
- Long experience in swarming with mixes of Swedish-made Boghammer lightly armed patrol craft and Chinese-built high-speed (50 knots) catamarans that carry one gun and a battery of eight anti-ship missiles.
- Kilo-class submarines seem to have long-range homing torpedoes.

- Levels of anti-ship mine warfare capabilities are uncertain. Submarines may be able to lay Russian smart mines. Claims have adapted to carry long-range, high speed anti-ship missiles.

- Have long had stocks of Russian M-08 moored or floating mines. More recent reports indicate have improved EM-31 moored/floating mine, MDM-6 seabed mine, EM-11 variant of Chinese shallow water (25-35M) bottom mine, and claims have a bottom mine system with four rocket mines with variable fusing and rapid launch to target speed.

- Some sources indicate can put down clusters of smart mines on bottom that can be set to release at intervals as ship pass and according to sound of different types of ships.

- Have long had mixes of land, ship, and air based anti-ship missiles, some of which can be remotely targeted and/or used on land or offshore facility targets. (C-701, C-801, C802, Silkworm HY-2 (95 km), TL-10

- Claim to have developed and be producing a range of new systems suited for such warfare including a high-speed (195 knots) short-range (7 km) torpedo, and new anti-ship missiles like the RAAD (360 km and variant on HY-)), and short range Kosar. .
- Have 3-4 small "submarines" (3 Ghadir and 1 Nahong North Korean built craft) and several semi-submersible attack craft.
- Reports have Russian "Sunburn" SS-N-22 supersonic anti-ship missiles, with ranges over 200 km, but not confirmed.

Iranian Asymmetric Doctrine

- **Iran sends signals about its use of asymmetric warfare through its military parades and exercises.**

- **The IRGC often claims to conduct very large exercises, sometimes with 100,000 men or more. The exact size of such exercises is unclear, but they are often a small fraction of IRGC claims.**

- **One important aspect of the exercise was the almost total absence of the regular Iranian navy, whose functions are more oriented towards the classical tasks of sea denial and power projection ashore in the Gulf and the Straits of Hormuz.**

- **By displaying both its real and virtual military (e.g. naval) fighting capabilities through electronic, printed and network media, and through endless official statements, Iran tends to achieve the following politico-diplomatic and propaganda ends (4Ds):**
  - **Defiance (to maintain a course of resistance, targeting primarily the Western political will and system).**
  - **Deception (on the real state of Iranian warfighting capabilities, targeting the Western military establishments).**
  - **Deterrence (with the IRI military "might", targeting Western public opinion, delivered through the media).**
  - **Demonstration (of the outreach of its own power, targeting the Iranian people and the Moslem world).**

Source: Jahangir Arasli, "Obsolete Weapons, Unconventional Tactics, and Martyrdom Zeal: How Iran Would Apply its Asymmetric Warfare Doctrine in a Future Conflict," George C. Marshall European Center For Security Studies, Occasional Paper Series No. 10, April 2007.

IRGC Commander and Asymmetric Strategy - I

- **On September 1, 2007, Khamenei promoted Mohammad Ali Jafari, then coordinator of the IRGC Research and Command Center, to the rank of major general and the post of commander in chief of the IRGC.**

- **Throughout his military career Jafari has emphasized asymmetrical warfare and developing Iran's ballistic missile capabilities throughout his military career**

- **In 1992, he was appointed commander of the ground forces. One of the tasks he carried out in this capacity was "to study and assess the strengths and weaknesses of America [as reflected] in its attacks on Afghanistan and Iraq."**

- **Jafari has outlined the strategy he means to promote as IRGC commander, reiterating his commitment to developing Iran's ballistic missile capabilities and the asymmetrical warfare capacities of the IRGC:**

  - **Asymmetrical warfare... is [our] strategy for dealing with the considerable capabilities of the enemy. A prominent example of this kind of warfare was [the tactics employed by Hizbullah during] the Lebanon war in 2006... Since the enemy has considerable technological abilities, and since we are still at a disadvantage in comparison, despite the progress we have made in the area of equipment, [our only] way to confront [the enemy] successfully is to adopt the strategy [of asymmetric warfare] and to employ various methods of this kind."**

Sources multiple media outlets including: Rooz, Sharq, Baztab, Sobh-e Sadeq, Mehr, Aftab, **Fars News Agency,** MEMRI, Reuters, Associated Press, etc.

IRGC Commander and Asymmetric Strategy - II

- **IRGC commander Mohammad Ali Aziz Jafari statements on asymmetric strategy continued:**
  - **Jafari has said in the past that, in the case of a confrontation with the West, Iran will be willing to employ the organizations under its influence. In a January 2005 speech to intelligence commanders from the Basij and IRGC, Jafari - then commander of the ground forces - stated: "In addition to its own capabilities, Iran also has excellent deterrence capabilities outside its [own borders], and if necessary it will utilize them."**
  - **"the Revolutionary Guards [Corps] will invest efforts in strengthening its asymmetrical warfare capabilities, with the aim of successfully confronting the enemies."**
  - **"After September 11, [2001], all [IRGC] forces changed their [mode of] operation, placing emphasis on attaining combat readiness. The first step [towards achieving] this goal was to develop [a strategy] of asymmetrical warfare and to hold maneuvers [in order to practice it]."**

Sources multiple media outlets including: Rooz, Sharq, Baztab, Sobh-e Sadeq, Mehr, Aftab, **Fars News Agency,** MEMRI, Reuters, Associated Press, etc.

Some Tangible Examples

- Iranian tanker war with Iraq
- Oil spills and floating mines in Gulf.
- Libyan "stealth" mining of Red Sea.
- Use of Quds force in Iraq.
- Iranian use of UAVs in Iraq.
- "Incidents" in pilgrimage in Makkah.
- Support of Shi'ite groups in Bahrain.
- Missile and space tests; expanding range of missile programs (future nuclear test?).
- Naval guards seizure of British boat, confrontation with US Navy, exercises in Gulf.
- Development of limited "close the Gulf" capability.
- Flow of illegal's and smuggling across Yemeni border.

Iranian Military Exercises: 2006-2009 - I

January 27, 2006: Iran completes major military exercise that testes Teheran's ability to attack Gulf shipping and Arab oil facilities. Sources said the exercise was designed to test capabilities to strike U.S. and Arab targets throughout the area of the Gulf. According to a diplomatic source, the exercise was meant to show the West that Iran could stop all oil shipments in the Gulf and destroy numerous oil facilities in Gulf Arab countries," and included a range of fighter-jets and helicopters from the Iranian Air Force, with the Iranian navy contributed surface vessels and submarines.

August 19, 2006: Iran launches a series of large-scale military exercises aimed at introducing the country's new defensive doctrine, state-run television reported. The television report said the military exercise would occur in 14 of the country's 30 provinces and could last as long as five weeks. The first stage of the maneuvers began with air strikes in the southeastern province of Sistan va Baluchistan,. The military exercise, is said to involve 12 infantry regiments, and is called "The Blow of Zolfaghar," in reference to a sword that belonged to Imam Ali, one of the most revered figures for Shi'ite Muslims.

November 3, 2006: Iran's Revolutionary Guards began another series exercises on days after a United States-led naval exercise began in the Gulf. Iran began the 10 days of maneuvers in the Gulf by test firing dozens of missiles, including the long-range Shahab-3 (estimated range: 2000 km or 1,240 miles), and the Shahab-2, which Iran says can carry a cluster warhead that can deliver 1,400 bomblets at once. Major General Yahya Rahim Safavi, leader of the Revolutionary Guards, says on television that Iran's military exercises were not meant to threaten neighboring countries. "We want to show our deterrent and defensive power to trans-regional enemies, and we hope they will understand the message of the maneuvers," he said. "The first and main goal is to demonstrate the power and national determination to defend the country against possible threat." General Safavi said the exercises would last 10 days and would take place in the Gulf, the Gulf of Oman and several Iranian provinces.

Sources multiple media outlets including: Iranian State Radio, IRNA, Rooz, Sharq, Baztab, Sobh-e Sadeq, Mehr, Aftab, Fars News Agency, MEMRI, Reuters, Associated Press, etc.

Iranian Military Exercises: 2006-2009- II

March 23-30 2007: Iran's regular Navy launches week-long war-games on its southern shores. The military exercises are being carried out in the Gulf by Iran's regular Navy, the report said, adding that they would continue until March 30.

January 7, 2008: US ships harassed by Iran. Iranian boats approach three U.S. Navy ships in the strategic Strait of Hormuz, threatening to explode the American vessels. U.S. forces are reported to be on the verge of firing on the Iranian boats, when the boats - believed to be from the Iranian Revolutionary Guard's navy - turn and move away. A Pentagon official say. "It is the most serious provocation of this sort that we've seen yet," He says the incident occurs at about 5 a.m. local time Sunday as Navy cruiser USS Port Royal, destroyer USS Hopper and frigate USS Ingraham were on their way into the Gulf and passing through the strait - a major oil shipping route. to take evasive maneuvers. There were no injuries but the official said there could have been, because the Iranian boats turned away "literally at the very moment that U.S. forces were preparing to open fire" in self defense.

July 7, 2008: Iran's elite Islamic Revolutionary Guards Corps launch large-scale, five-day war-games, dubbed "Exercise Stake Net", was carried out in the Straits of Hormuz and the Sea of Oman, where an assortment of new weapons were brought into play. The Iranian military maneuvers take place on the same day the United States announces it too will holding naval exercises in the Gulf.

Iranian state media say that the military maneuvers by the IRGC's Navy and Air Force missiles unit are aimed at improving the force's military abilities. Separately, Brigadier General Mahmoud Chaharbaghi, commander of the IRGC Ground Forces artillery and missiles unit, announces that 50 of his unit's brigades are being armed with smart weapons and cluster bombs. Iran later test-fires nine missiles including what is claims is an upgraded version of Shahab-3 ballistic missile with a one-ton warhead capable of destroying targets within a 2,000-kilometer (1,245-mile) range.

Sources multiple media outlets including: Iranian State Radio, IRNA, Rooz, Sharq, Baztab, Sobh-e Sadeq, Mehr, Aftab, Fars News Agency, MEMRI, Reuters, Associated Press, etc.

Iranian Military Exercises: 2006-2009 - III

September 7, 2008: Iran's armed forces test the country's new weapons systems and defense plans in a three-day military maneuver. Iran's naval forces claim to have made a breakthrough in building various types of "radar evading" submarines to guard its territorial waters. The IRGC says it successfully test-fired advanced shore-to-sea, surface-to-surface and sea-to-air missiles. The Islamic Revolution Guards Corp (IRGC) and the Army take part in drills involving anti-aircraft defense systems. The main purpose of the maneuvers is to maintain and promote the combat readiness of relevant units and to test new weapons and defense plans. Iran's Chief Navy Commander, Rear Admiral Habibollah Sayyari, said Iran is upgrading its naval fleet with a new generation of domestically-built submarines.

September 15, 2008: The Islamic Republic Air Force tests Iran's domestic-made warfare in a joint military exercise with the IRGC, the Defense Ministry says. The joint aerial maneuver is aimed at boosting Iran's defensive capabilities and operational tactics, Iran's Defense Minister Brigadier General Mostafa Mohammad-Najjar said. The military exercise, which involves The Islamic Republic of Iran Air Force (IRIAF) and the Islamic Revolution Guards Corps (IRGC), comes in the wake of escalating US and Israeli threats to strike the country's nuclear facilities.

October 10, 2008: Islamist militiamen affiliated to Iran's Islamic Revolutionary Guards Corps (IRGC) stage military exercises in the suburbs of Tehran on Friday to defend the Iranian capital against "natural disasters" and "enemy assaults". Members of the paramilitary Basij take part in military drills under the command of the Tharallah Garrison in Tehran. Similar war games are held in Karaj, Islamshahr, Shahre Rey, Rabat Karim, and Varamin, said the acting deputy commandant of the IRGC, Brigadier General Mohammad Hejazi, who also commands the Tharallah Garrison. The maneuvers last for 48 hours. Meanwhile another senior Basij leader announces that the paramilitary force is giving specialized training" to its units across Iran." These units are receiving specialized air, sea and ground training to be prepared for defending the country, the ruling establishment, and the revolution", said Brigadier General Ahmad Zolqadr on the sidelines of a military parade in Zanjan, north-west Iran. Zolqadr is the operational commander of the Basij.

Sources multiple media outlets including: Iranian State Radio, IRNA, Rooz, Sharq, Baztab, Sobh-e Sadeq, Mehr, Aftab, Fars News Agency, MEMRI, Reuters, Associated Press, etc.

Iranian Military Exercises: 2006-2009 - IV

November 12, 2008: Iran launches a "new" type of long-range ballistic missile dubbed "Sajjil," but its general layout was indistinguishable from the description of the "Ashura," which was flight-tested about one year ago. A more modern version is tested in late 2009 called the Sajjil 2, and is a solid-fueled system with a 2,000 km nominal range.

December 2-7, 2008: Iran announces recent upgrades to the Naval Base in Asalouyeh and the now online base facilities in the port of Jask. Iranian officers state that long range tactical missile silos and shore based anti-ship missiles have long been key aspects of planning of potential military operations in the event of an open conflict. Top Iranian Army commander Major General Ayatollah Saleh is quoted in *Presstv Nov 30* as saying "the heavy weight of the enemy warships provides the Iranian side with an ideal opportunity for launching successful counter-attacks" Iran announces that it is in the final stages of planning an extensive naval and military exercise 'Unity 87' due to commence in December 2008. Iran says it will seek to accomplish objectives that include defense against a Israeli and US threat, closing the Strait of Hormuz to local and international shipping, and the testing new and improved military equipment and tactics.

Admiral Qasem Rostamabadi tells states radio that "The aim of this maneuver is to increase the level of readiness of Iran's naval forces and also to test and to use domestically-made naval weaponry." He says the naval maneuvers cover an area of 50,000 square miles, including the Sea of Oman off Iran's southern coast. "In this six-day long maneuver there will be more than 60 combat vessel units," Kayhan quotes Admiral Habibollah Sayyari, commander of the navy as saying it will include destroyers, missile-equipped battleships, submarines, special-operations teams, helicopters, and fighter planes. Iran has previously claimed it could close the Strait of Hormuz to shipping, through which about 40 percent of the world's globally traded oil passes. The United States has pledged to protect shipping routes. An Iranian naval commander says a week earlier that the country's navy could strike an enemy well beyond its shores and as far away as Bab al-Mandab, the southern entrance to the Red Sea that leads to the Suez Canal. Iran test-fires a new surface-to-surface missile from a warship in a strategic shipping route, as part of the war games in the Sea of Oman and the Gulf region: State radio reports, "The surface-to-surface Nasr-2 missile was tested in the (Sea of) Oman operational region,". IRNA reports that, "The Nasr-2 was fired from a warship and hit its target at a distance of 30 km (19 miles) and destroyed it," adding it was the first test of the new, medium-range missile.

Sources multiple media outlets including: Iranian State Radio, IRNA, Rooz, Sharq, Baztab, Sobh-e Sadeq, Mehr, Aftab, Fars News Agency, MEMRI, Reuters, Associated Press, etc.

Iranian Military Exercises: 2006-2009 - V

Mach 8, 2009: Iranian officials reported "successfully" testing a new air-to-sea missile with a range of 110 kilometers (68 miles), the Fars news agency reported. It did not say when the test was conducted. "Iranian defense specialists are able to successfully install missiles with a range of 110 kilometers on fighter planes and launch them," the report said, adding that the high-precision weapon weighs about 500 kilos. The report said the latest test showed the Islamic republic's "ability to automatically direct the missile and carry warheads to destroy large targets at sea."

May 20, 2009: Iran test-fired a solid-fuel missile capable of reaching Israel or US bases in the Middle East. Iranian officials claim that the two-stage, solid-fuel Sajjil-2 surface-to-surface missile has a range of approximately 2,000km (1,240 miles). Iranian Defense Minister Mostafa Mohammad Najjar, claimed that in addition to the increase in range, the Sajjil-2 differs from the Sajjil missile launched in November 2008, because it "is equipped with a new navigation system as well as precise and sophisticated sensors," according to Iran's official news agency, and added that the missile landed "precisely on the target.

Reports also indicate that the Sajjil-2's reaction times may be about 50-20 minutes faster than the Shahab series that came before it. Its solid fuel booster may also be is also reliable, particularly in a mobile basing; and haves less need for maintenance. Its mobility launcher might also be harder to detect since the TEL requires fewer support vehicles -- although the Shahab does use storable liquid fuels and the difference is might not be a serious as some sources indicate.

May 26, 2009: Iran sent six warships into international waters including the Gulf of Aden, a local newspaper reported, just days after it test-fired its Sajjil -2 missile. "We have dispatched six warships to international waters and the Gulf of Aden," naval commander Habibollah Sayari was quoted as saying in the Jomhuri Eslami. "This mission shows our increased capability in dealing with any foreign threat," he said. Iranian officials said on May 14 that the Islamic republic had dispatched two warships to the Gulf of Aden but it was unclear whether they were among the six announced by Sayari.

Sources multiple media outlets including: Iranian State Radio, IRNA, Rooz, Sharq, Baztab, Sobh-e Sadeq, Mehr, Aftab, Fars News Agency, MEMRI, Reuters, Associated Press, etc.

Iranian Military Exercises: 2006-2009 - VI

June 1, 2009: The Iranian air force has launched a large military exercise dubbed "Thunder 88" over its regional waters, official media indicated. Iranian TV said the Air Force carried out maneuvers using various types of combat aircraft, a move that coincided with the Defense Ministry's launching of three new Ghadir-class submarines for its naval fleet (bringing the total number of the sonar-evading vessels to seven) and 18 speedboats at the port of Bandar Abbas near the Straits of Hormuz, the Kuwait news agency KUNA reported. Officials said the exercises are meant to enhance the Iranian Air Force's capabilities and to train them to safeguard navy ships. Iran's Mehr news agency said the Bandar Abbas ceremony was attended by Army Commander Ataollah Salehi and Defense Minister Mostafa-Mohammad Najjar, KUNA reported.

The Ghadir class is a smaller vessel with a displacement of around 120 tons. The semiofficial Fars News Agency in 2007 said the Ghadir class was equipped with stealth technology. The news comes amid a flurry of Iranian defense activity. Iran in May inaugurated a production line for a military hovercraft, dubbed the Younes 6. Meanwhile, Iran announced the military production of some 20 other military devices, including laser systems and electronic warfare devices. Production also began on a 40mm anti-cruise cannon dubbed Fath, which is capable of reaching targets as far as 7 miles away with a firing rate of 300 rounds per minute. The Sejjil-2 surface-to-surface solid-fuel missile, meanwhile, was launched in May with a range capable of reaching Israel.

June 6, 2009: Iran has started production of a new ground-to-air missile system, Iranian media, amid persistent speculation that Israel might attack the Islamic Republic's nuclear facilities. "The range of this defense system (missile) is more than 40 km and it is able to pursue and hit the enemy's airplanes and helicopters on a smart basis and at supersonic speed," Defence Minister Mostafa Mohammad Najjar said, without specifying how the missile compared to previous such weapons.

June 22, 2009: Iran began three days of air force exercises on in the Gulf and the Sea of Oman to raise operational and support capability, Iranian media said. "Long-distance flights of around 3,600 km (2,237 miles) along with aerial refueling from tanker to fighter jet and from fighter jet to fighter jet will be part of this exercise," state broadcaster IRIB's website reported. "Low altitude flights over the waters of the ... Gulf and the Sea of Oman by Iranian fighter jets over distances of 700 km will also be tested.," it said. IRIB reported that the exercises were also aimed at raising the force's ability to use intelligence aircraft "to send signals and analyze threats“.

Sources multiple media outlets including: Iranian State Radio, IRNA, Rooz, Sharq, Baztab, Sobh-e Sadeq, Mehr, Aftab, Fars News Agency, MEMRI, Reuters, Associated Press, etc.

The Broader Patterns in Iranian Activity

Iranian Actors	Related States/ Non-State Actors	Target/Operating Country
Revolutionary Guards	Iran	Iraq
Al Qa'ida force	Syria	Israel
Vevak/other intelligence	Hezbollah	Egypt
Arms transfers	Hamas	Kuwait
Military and security advisors	Mahdi Army	Bahrain
Clerics, pilgrims, shrines	Yemeni Shi'ites	Yemen
Commercial training	Bahraini Shi'ites	Lebanon
Finance/investment	Saudi Shi'ites	Afghanistan
Investment/training companies		Venezuela
Education: scholarships, teachers		
Cultural exchanges		
Athletic visits		

The Al Quds Force - I

- Comprised of 5,000 - 15,000 members of the IRGC (Increased size of force in 2007)
- Equivalent of one Special Forces division, plus additional smaller units
- Special priority in terms of training and equipment
- Plays a major role in giving Iran the ability to conduct unconventional warfare overseas using various foreign movements as proxies
- Specialize in unconventional warfare mission
- Control many of Iran's training camps for unconventional warfare, extremists, and terrorists
- Has offices or "sections" in many Iranian embassies throughout the world
- Through its Quds Force, Iran provides aid to Palestinian terrorist groups such as Hamas, Lebanese Hezbollah, Iraq-based militants, and Taliban fighters in Afghanistan.
- Despite its pledge to support the stabilization of Iraq, Iranian authorities continued to provide lethal support, including weapons, training, funding, and guidance through its Quds Force.
- General David H. Petraeus has stressed the growing role of the Quds force and IRGC in statements and testimony to Congress.

Source: various news outlets, CRS reports, Congressional testimony, Intelligence assessments and official statements.

The Al Quds Force - II

- **Quds Force continue to provide Iraqi and Afghani militants with:**
  - **specialized training,**
  - **funding,**
  - **Iranian-produced advanced rockets,**
  - **sniper rifles,**
  - **automatic weapons,**
  - **mortars,**
  - **Improvised Explosive Devices (IEDs)**
  - **and explosively formed projectiles (EFPs) that have a higher lethality rate than other types of IEDs**
- **Since 2006, Iran has arranged a number of shipments of small arms and associated ammunition, rocket propelled grenades, mortar rounds, 107mm rockets, and plastic explosives, possibly including man-portable air defense systems (MANPADs), to the Taliban.**
- **Israeli defense experts continue to state that they believe the IRGC and Quds force not only played a major role in training and equipping Hezbollah, but may have assisted it during the Israeli-Hezbollah War in 2006, and played a major role in the Hezbollah anti-ship missile attack on an Israeli Navy Sa'ar-class missile patrol boat.**

Source: various news outlets, CRS reports, Congressional testimony, Intelligence assessments and official statements.

Iran and Hezbollah - I

- **Hezbollah was originally formed in 1982 by Iranian seminarians.**
- **Iran's aid packages (arms and money) to Hezbollah are said to exceed $100 million per year.**
- **Iran has gone from supplying small arms, short-range missiles and training to providing more sophisticated long-range missiles and other higher-end weaponry**
  - **Iran exported thousands of 122-mm rockets and Fajr-4 and Fajr-5 long-range rockets to Hezbollah in Lebanon, including the Arash with a range of 21–29 kilometers.**
  - **Between 1992 and 2005, Hezbollah received approximately 11,500 missiles and rockets; 400 short- and medium-range pieces of artillery; and Arash, Nuri, and Hadid rockets and transporters/launchers from Iran.**
  - **In 2005, Iran sent Hezbollah a shipment of large Uqab missiles with 333-millimeter warheads and an enormous supply of SA-7 and C-802 missiles, two of which were used in an attack on an Israeli ship.**
- **Iran also supplied Hezbollah with an unknown number of UAV's, the *Mirsad*, that Hezbollah briefly flew over the Israel-Lebanon border on November 7, 2004, and April 11, 2005; at least three were shot down by Israel during the summer 2006 war.**
- **Iran supplied Hezbollah advanced surface-to-air missiles, including Strela-2/2M, Strela-3, Igla-1E, and the Mithaq-1. The same missiles were reported to have been used to target Israeli helicopters.**

Iran and Hezbollah - II

- **During Hezbollah's summer 2006 war with Israel, Iran resupplied the group's depleted weapons stocks.**

- **Hezbollah has recovered from its 2006 confrontation with Israel and has been able to rearm and regroup, and Iran has been an important part of that recovery.**

  - **Various Types of Rockets, reportedly increasing its stockpile to 27,000 rockets, more than double what Hezbollah had at the start of the 2006 war.**

  - **Among the deliveries were 500 Iranian-made "Zelzal" (Earthquake) missiles with a range of 186 miles, enough to reach Tel Aviv from south Lebanon.**

- **Fighting in Lebanon in 2006 seems to have increased Hezbollah's dependence on Iran. Both Hezbollah's loss of weapons and fighters in the conflict with Israel and the resulting damage to its reputation and position within Lebanon made it more reliant upon Iran.**

- **Elements of Hezbollah planned attacks in Egyptian Sinai; operate in Iraq**

Source Multiple news outlets and Congressional reports and Intelligence assessments including: "Israel's Peres Says Iran Arming Hizbollah." Reuters, February 4, 2002; Kenneth Katzman, Iran: U.S. Concerns and Policy Responses, Congressional Research Service Report for Congress RL32048, April 14, 2009, available at: http://www.fas.org/sgp/crs/mideast/RL32048.pdf; Robin Hughes, "Iran Answers Hizbullah Call for SAM Systems," Jane's Defence Weekly, August 7, 2006, available at: www.janes.com/defence/news/jdw/jdw060807_1_n.shtml; Rotella, Sebastian. "In Lebanon, Hezbollah Arms Stockpile Bigger, Deadlier." Los Angeles Times, May 4, 2008; Shadid, Anthony. "Armed With Iran's Millions, Fighters Turn to Rebuilding." Washington Post, August 16, 2006; MEMRI, "Iran and the Recent Escalation on Israel's Borders Reaction in Iran, Lebanon, and Syria," Special Dispatch Series no. 1207, July 17, 2006, available at: www.memri.org/bin/articles.cgi?Page=archives&Area=sd&ID=SP120706; Ali Nouri Zadeh, "130 Officers from the Iranian Revolutionary Guard Corps and Quds Force Aid Hezbollah: 11,500 Missiles and Rocket-Propelled Grenades Sent from Tehran to Hezbollah," Asharq Al-Awsat, July 16, 2006, available at: www.aawsat.com/details.asp?section=4&issue=10092&article=373305&search=C802 &state=true; "New Iranian capability is troublesome," The Washington Times, 19 February 2009;* **The Israel Project, "Hezbollah, Hamas Rearm as Israel Works to Resume Peace Process," press release, February 22, 2007, available at: www.theisraelproject.org/site/apps/nl/content2.asp?c=hsJPK0PIJpH&b=689705&ct=3601455.,** ***etc.

Iran and Hamas

- **Iran openly supported Hamas and spoke out against the lack of support for Hamas by Arab regimes throughout the Middle East during engagements between the IAF and Hamas in late 2008 and early 2009 in Gaza.**
- **Iran provided training, arms and logistical support to Hamas during the fighting in Gaza between Israeli forces and Hamas militants in late December 2008 and early January 2009.**
- **Israeli intelligence sources continued to report Iranian efforts to rearm Hamas after a ceasefire agreement was reached in January 2009.**
- **Arms transfers come through Sudan and Sinai.**
- **Level of Iranian financial support uncertain.**

Source Multiple news outlets and Congressional reports and Intelligence assessments including: Kenneth Katzman, Iran: U.S. Concerns and Policy Responses, Congressional Research Service Report for Congress RL32048, April 14, 2009, available at: http://www.fas.org/sgp/crs/mideast/RL32048.pdf; Alon Ben-David, "Iranian influence looms as fragile Gaza ceasefire holds," Jane's Defence Weekly, 22 January 2009; Mike Shuster, "Iranian Support For Hamas Running High Post-Gaza," NPR, available at: 4 February 2009, available at: http://www.npr.org/templates/rundowns/rundown.php?prgId=3; **The Israel Project, "Hezbollah, Hamas Rearm as Israel Works to Resume Peace Process," press release, February 22, 2007, available at: www.theisraelproject.org/site/apps/nl/content2.asp?c=hsJPK0PIJpH&b=689705&ct=3601455;** ***etc.***

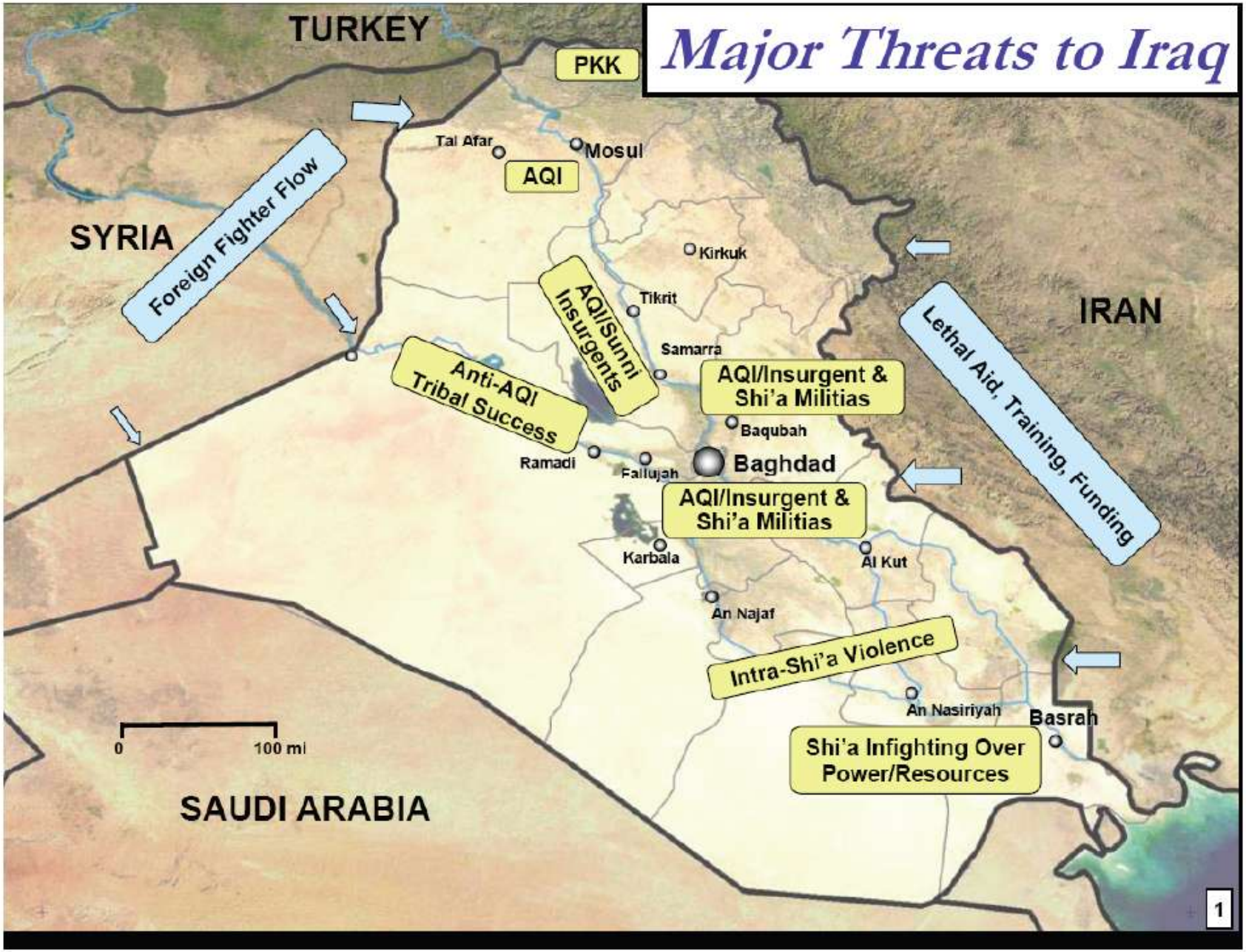
Regional Cooperation on Iran?

- **Truth is there is limited regional cooperation among the Gulf nations with regards to Iran.**
- **Region-wide drive to bolster naval forces to countering the perceived growing threat from Iran.**
- **Oman, like Syria and Qatar, sees in Iran an important political and economic ally that is too powerful and too potentially dangerous to ignore, let alone antagonize; while defying Egypt, Saudi Arabia and other Arab nations in their efforts to curb Iranian influence and Nuclear ambitions.**
- **United Arab Emirates, which is battling with Iranian leaders over the title to three Persian Gulf islands, has done little to stop billions of dollars in annual trade with Iran.**
- **Sunni-led Arab countries are concerned over Tehran's influence with the Shiite-dominated government in Iraq.**
- **Qatar says it is mediating between Iran and Arab powers such as Egypt and Saudi Arabia, where the ruling family feels threatened by Iranian power.**
- **Continued developments in Saudi and Egyptian outreach to Arab nations to unite against Iranian influence and Nuclear Ambitions as well as outreach efforts to Syria in efforts to break Iranian-Syrian ties.**
- **Continued U.S. engagement and "security umbrella" seems to be key to any resemblance of Regional Cooperation in regards to Iran.**

The Challenge of Iraqi Instability

Iraqi Stability vs. Instability

- **Internal divisions:**
  - **Sunni vs. Arab: Baghdad and Diyala**
  - **Arab vs. Kurd vs. Turcoman vs. Minority: Ninewa, Kirkuk, Salah al Din, Diyala: Kurdish "federalism"**
  - **Sunni on Sunni: Tribal vs. parties vs. national.**
  - **Shi'ite on Shiite: Dawa vs. ISCI vs. Fadhila vs. Sadr vs. local: Three and Nine Province "federalism."**
  - **Secular vs. religion**
- **2009 Elections and referendums**
- **Problems in governance and corruption**
- **Al Qa'ida in Iraq: Baghdad, Diyala, Ninewa**
- **Outside pressure: Iran and Turkey**
- **Budget and economic crisis; slow pace of petroleum development, industrial & agricultural failures.**
- **ISF development vs. pace of US withdrawals.**


Major Threats to Iraq
TURKEY
PKK
Tal Afar
Mosul
AQI
SYRIA
Foreign Fighter Flow
Kirkuk
AQI/Sunni Insurgents
Tikrit
IRAN
Lethal Aid, Training, Funding
Samarra
Anti-AQI Tribal Success
AQI/Insurgent & Shi'a Militias
Baqubah
Ramadi
Fallujah
Baghdad
AQI/Insurgent & Shi'a Militias
Karbala
Al Kut
An Najaf
Intra-Shi'a Violence
An Nasiriyah
Basrah
Shi'a Infighting Over Power/Resources
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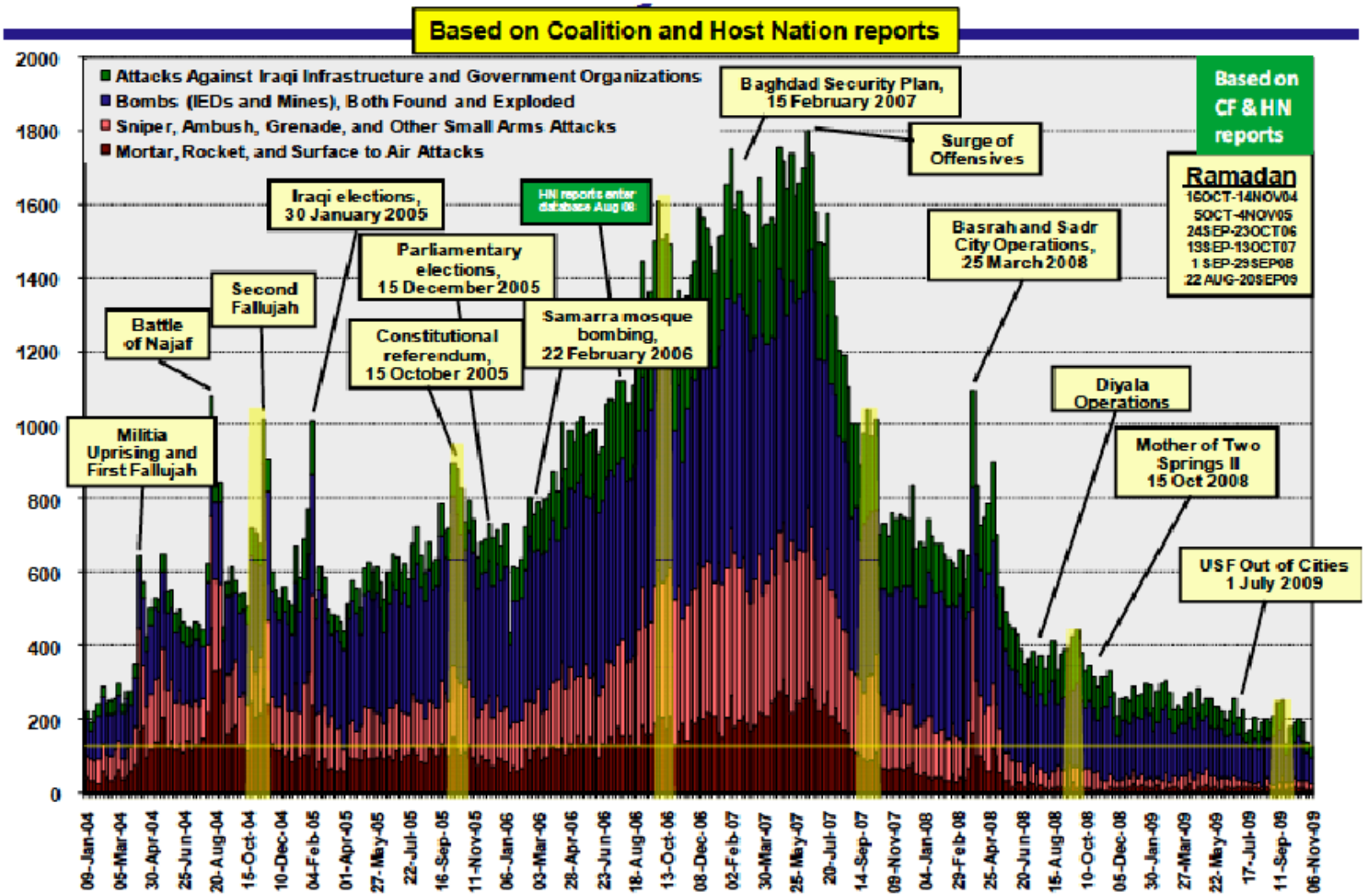
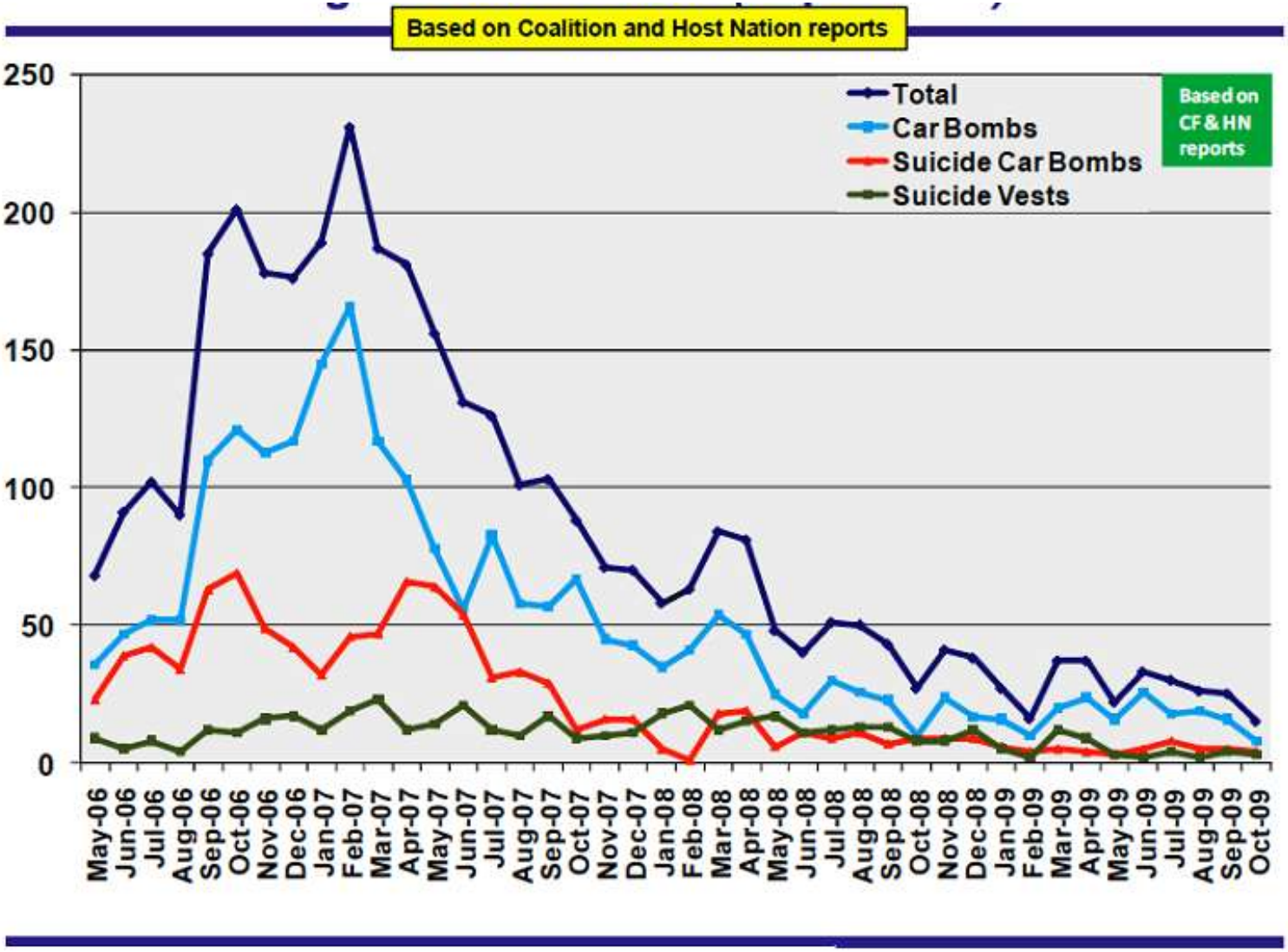
Iraq: Security Incidents: Jan 2004-Nov 2009



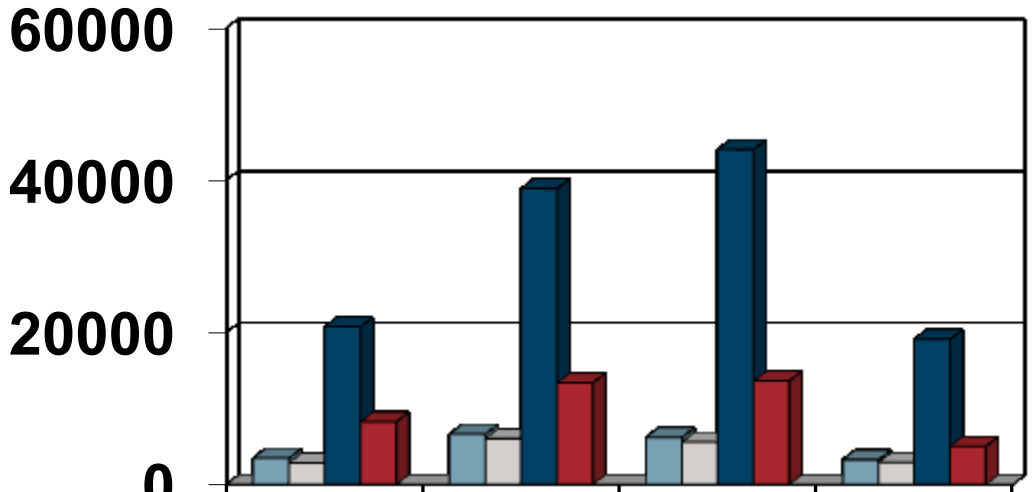
Source: Adapted from material provided by SIGACTS (CF & HN reports) as of 07-Nov-09

Iraq: High Profile Attacks: May 2006 - Oct 2009



Source: Adapted from material provided by SIGACTS (CF & HN reports) as of 07-Nov-09

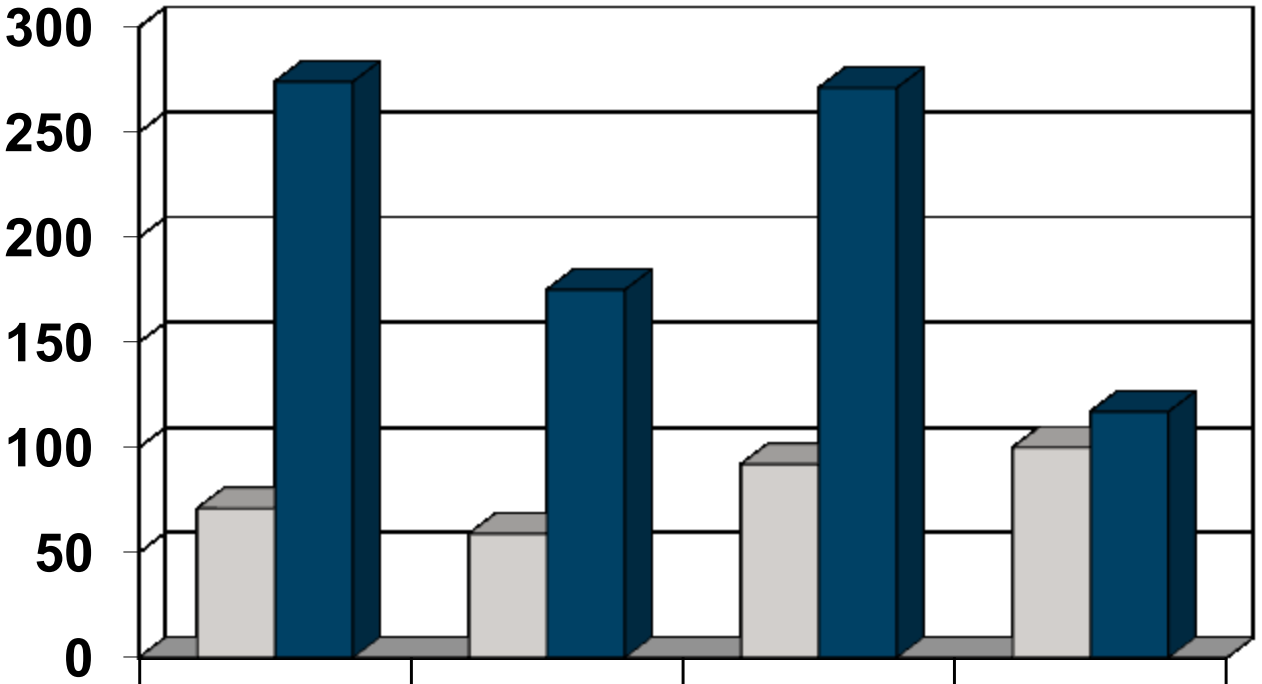
Terrorist Incidents and Casualties in Iraq: 2005-2008



	2005	2006	2007	2008
Total Attacks	3467	6631	6210	3258
Attacks resulting in at least one death, injury, opr kidnapping	2837	6028	5573	2902
People killed, injured, or kidnapped	20722	38878	44012	19083
Deaths	8242	13345	13606	5016

National Counterterrorism Center, *2008 Report on Terrorism*, 30 April 2009,http://www.nctc.gov/, pp. 34 & State Department, Country Reports on Terrorism, 2008, April 2009, p. 348.

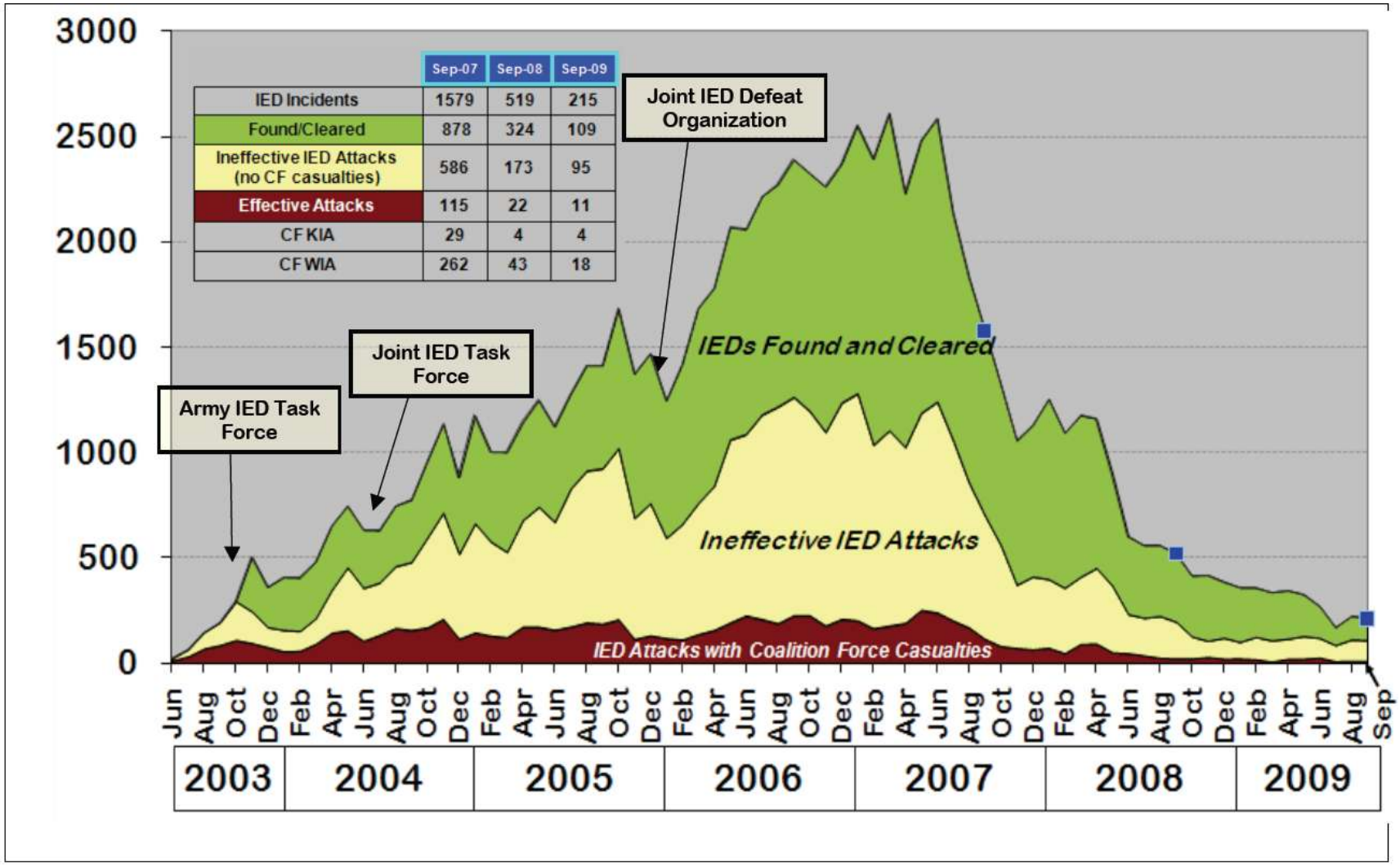
Trends in Improvised Explosive Devices (PBIED) vs. Suicide Vehicle-borne Improvised Explosive Device (SVBIED) Attacks in Iraq: 2005-2008



	2005	2006	2007	2008
Person Borne	71	59	92	100
Suicide Vehicle	274	175	271	117

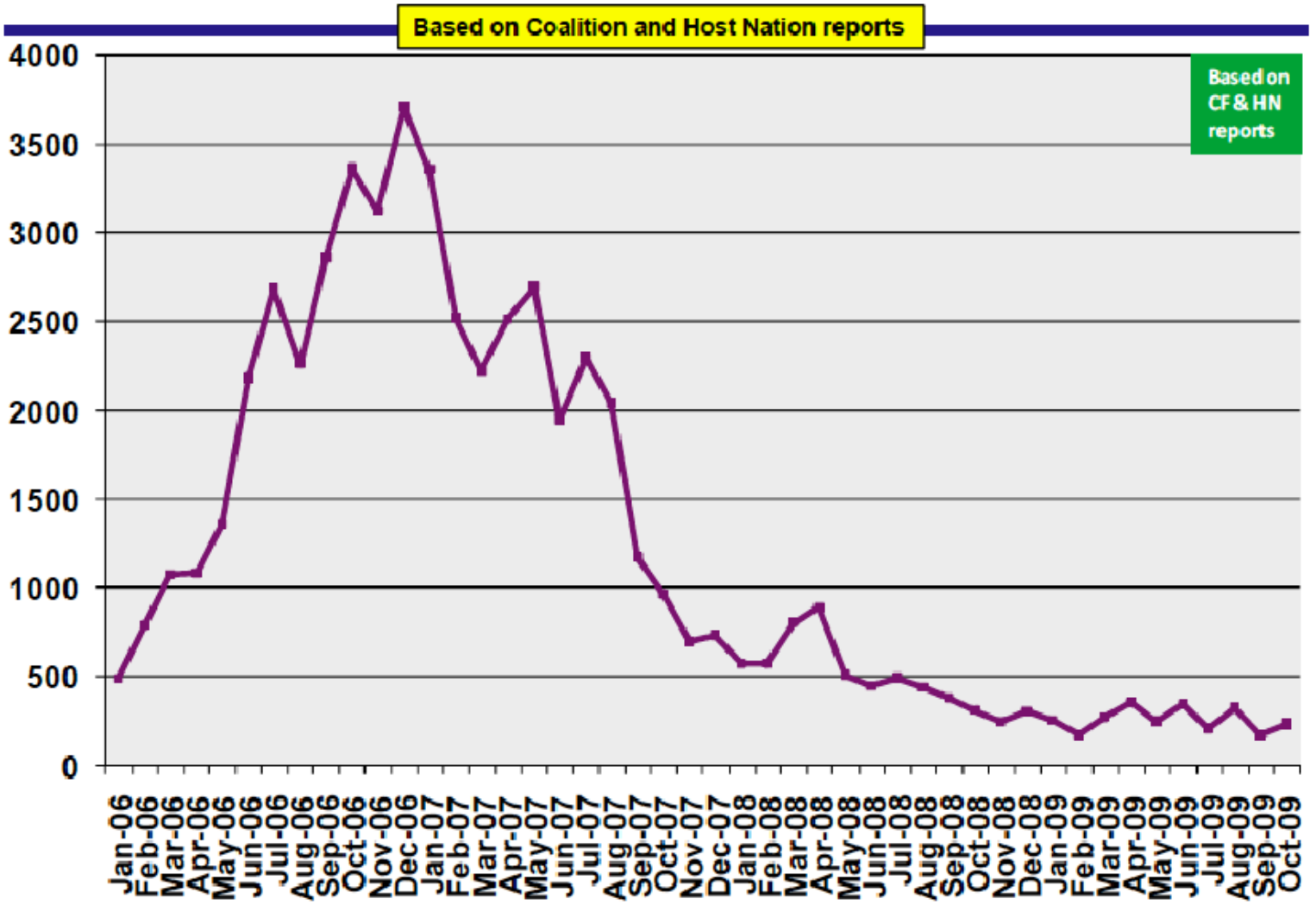
National Counterterrorism Center, *2008 Report on Terrorism*, 30 April 2009,http://www.nctc.gov/, pp. 34 & State Department, Country Reports on Terrorism, 2008, April 2009, p. 348.

Iraq: IED Incidents Affecting Coalition Forces: 2003-2009



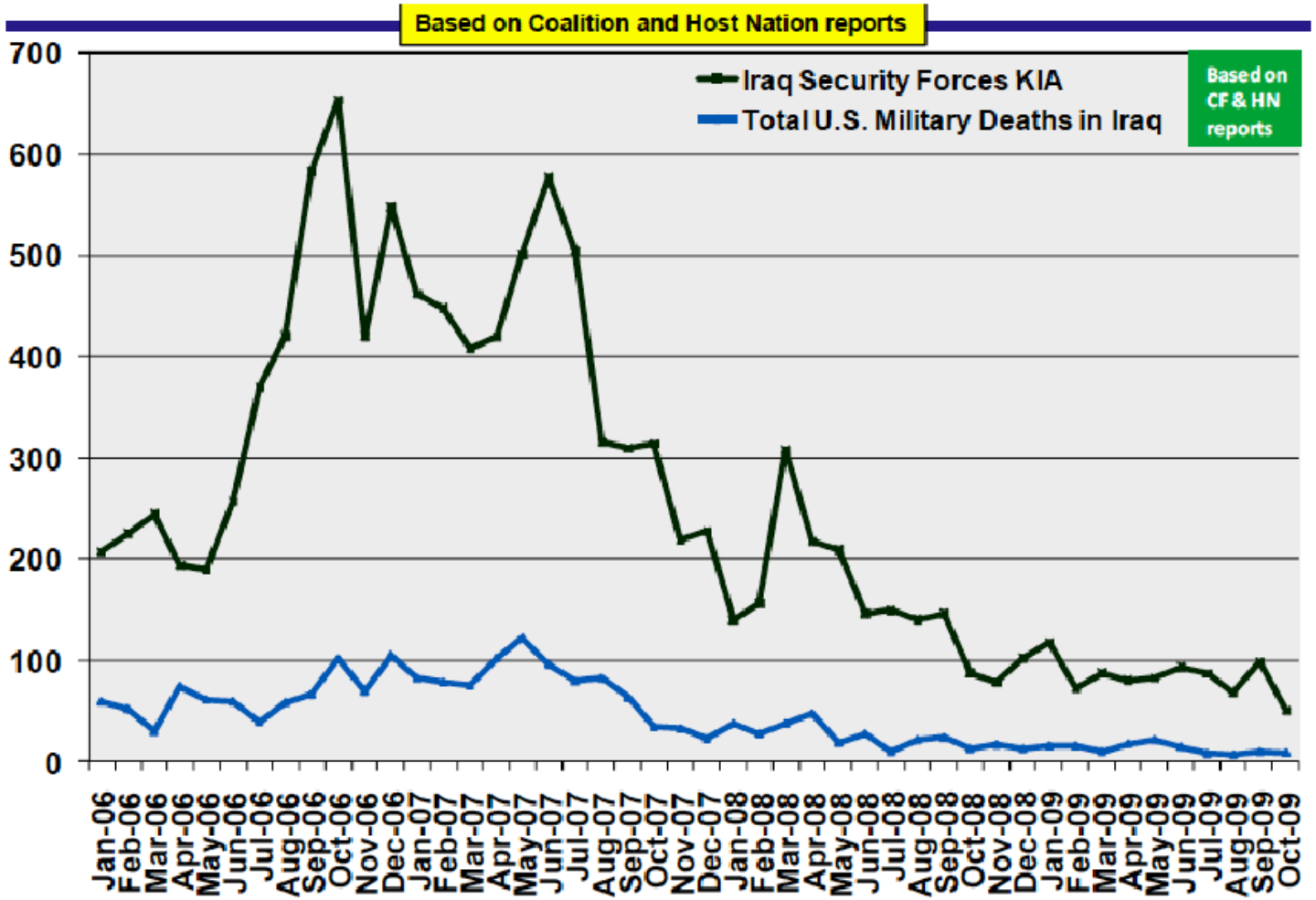
Adapted from **JIEDDO J9 – 7 Oct 09, IDA Scrubbed SigActs (CIDNE)**

Iraq: Civilian Deaths: Jan 2006-Oct 2009



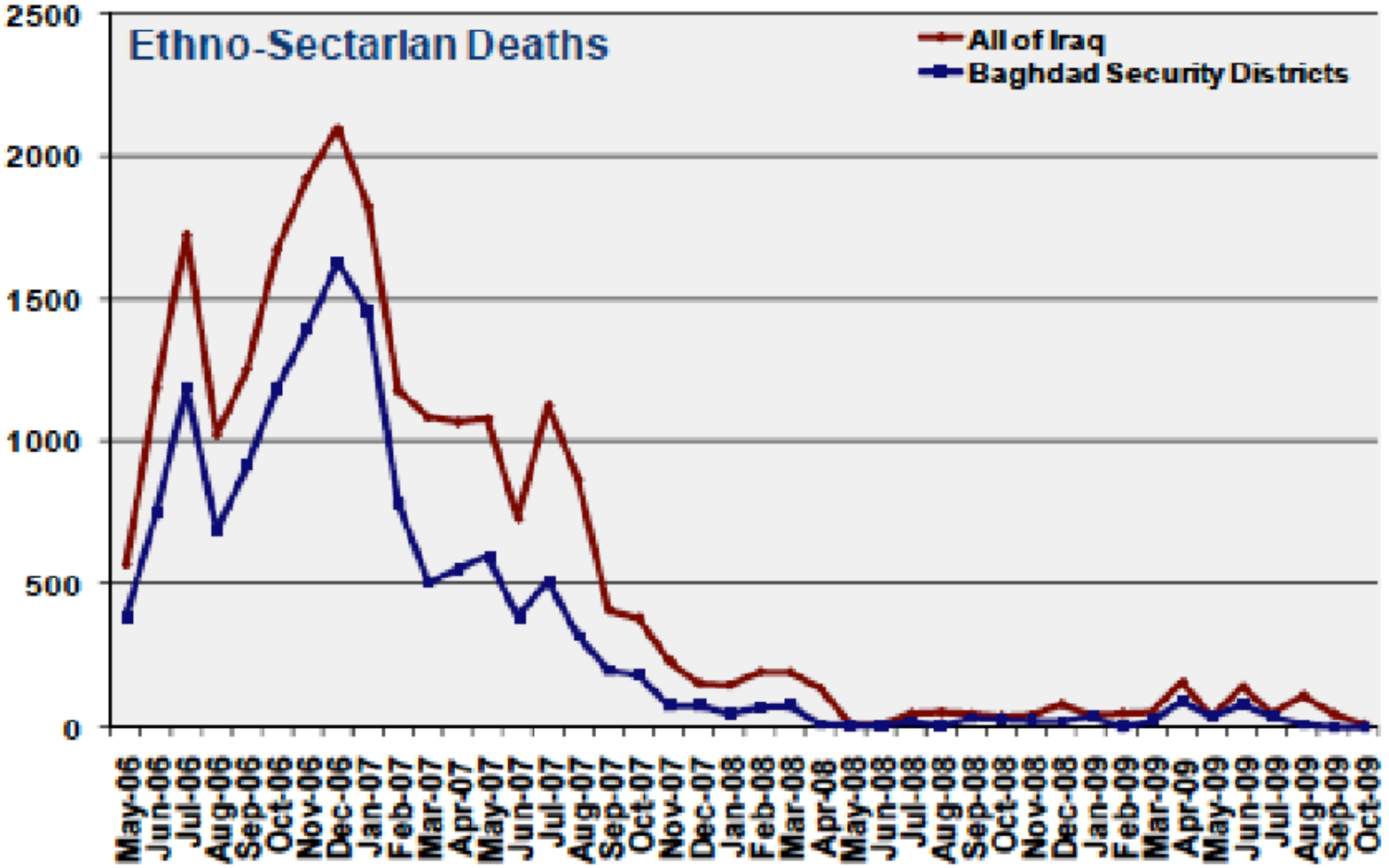
Source: Adapted from material provided by SIGACTS (CF & HN reports) as of 07-Nov-09

Iraq: ISF and Coalition Casualties: May 2006 - Oct 2009



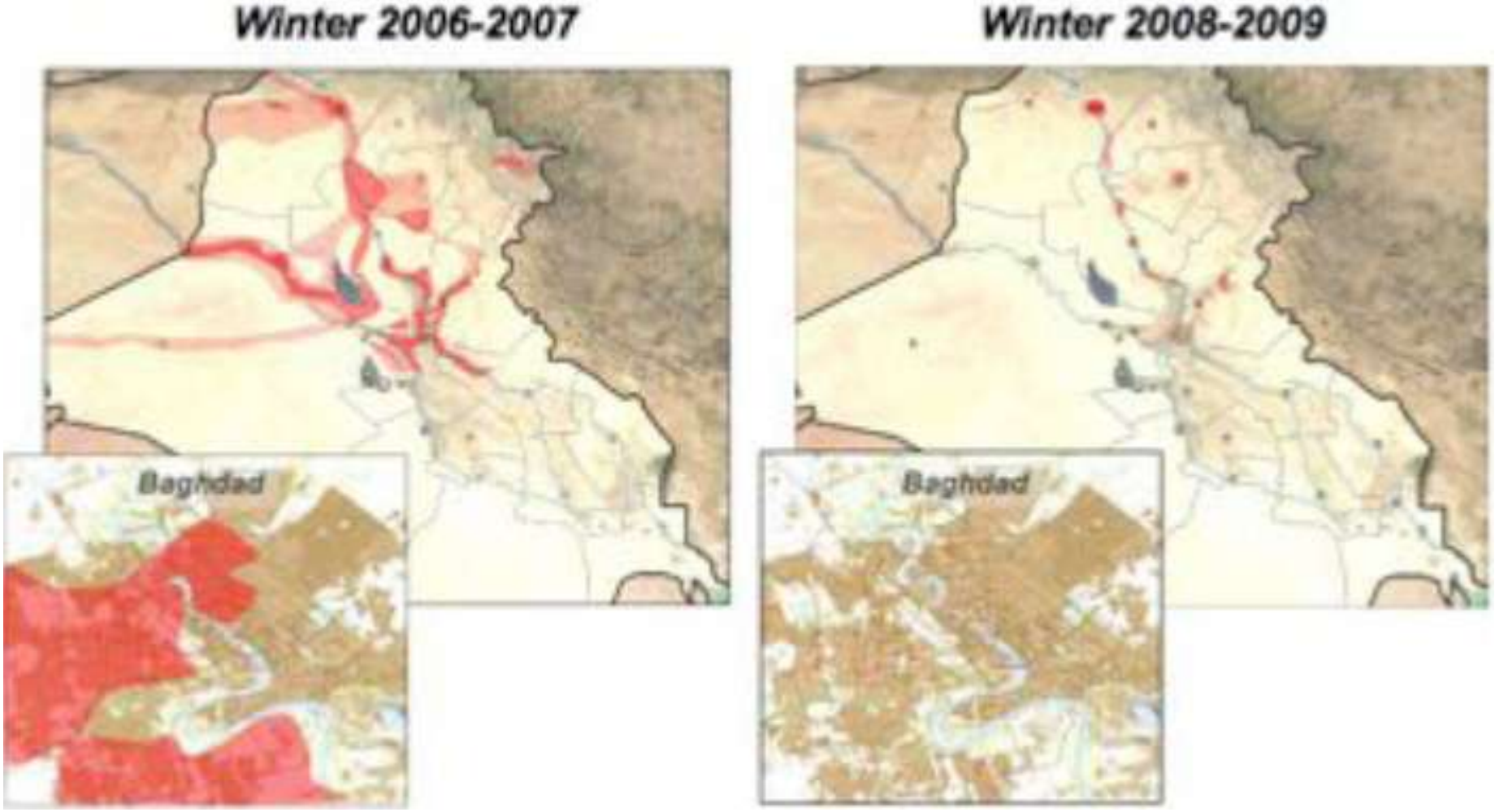
Source: Adapted from material provided by SIGACTS (CF & HN reports) as of 07-Nov-09

Iraq: Ethnosectarian Deaths: May 2006 - Oct 2009



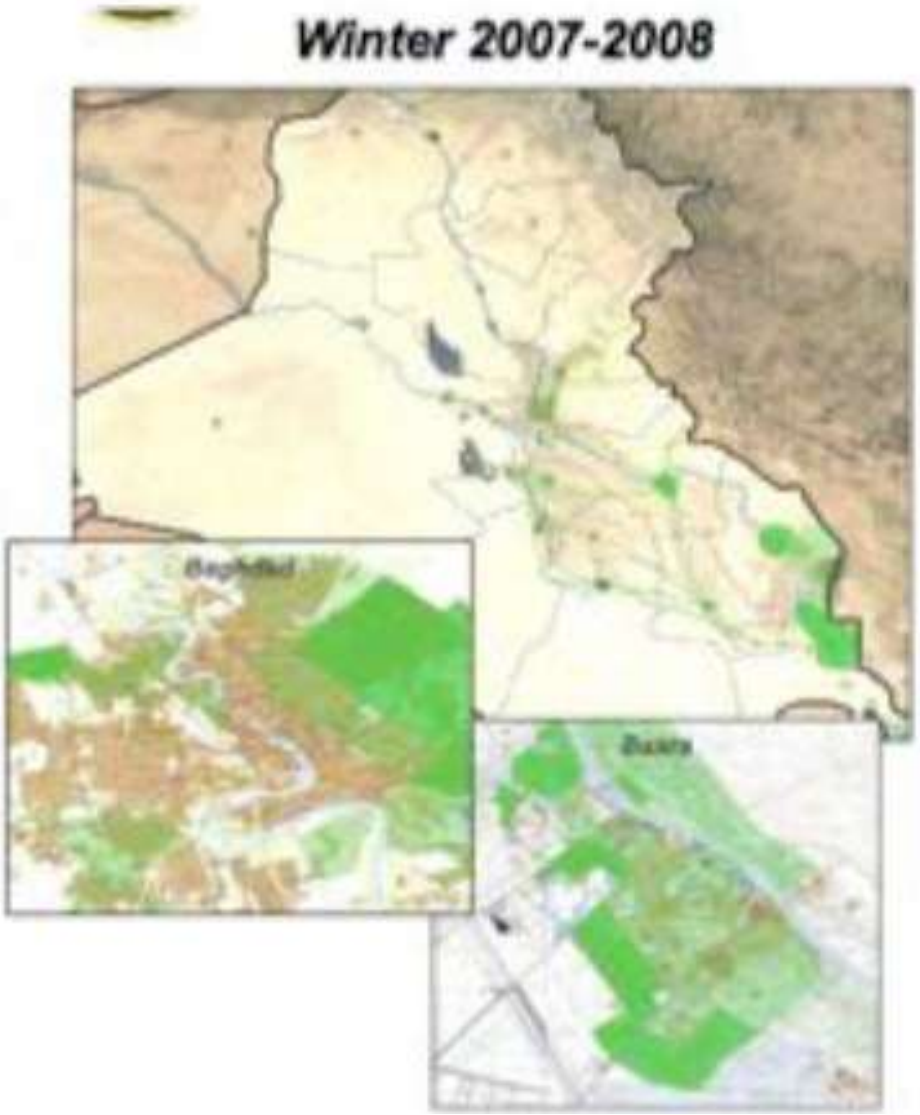
Source: Adapted from material provided by SIGACTS (CF & HN reports) as of 07-Nov-09

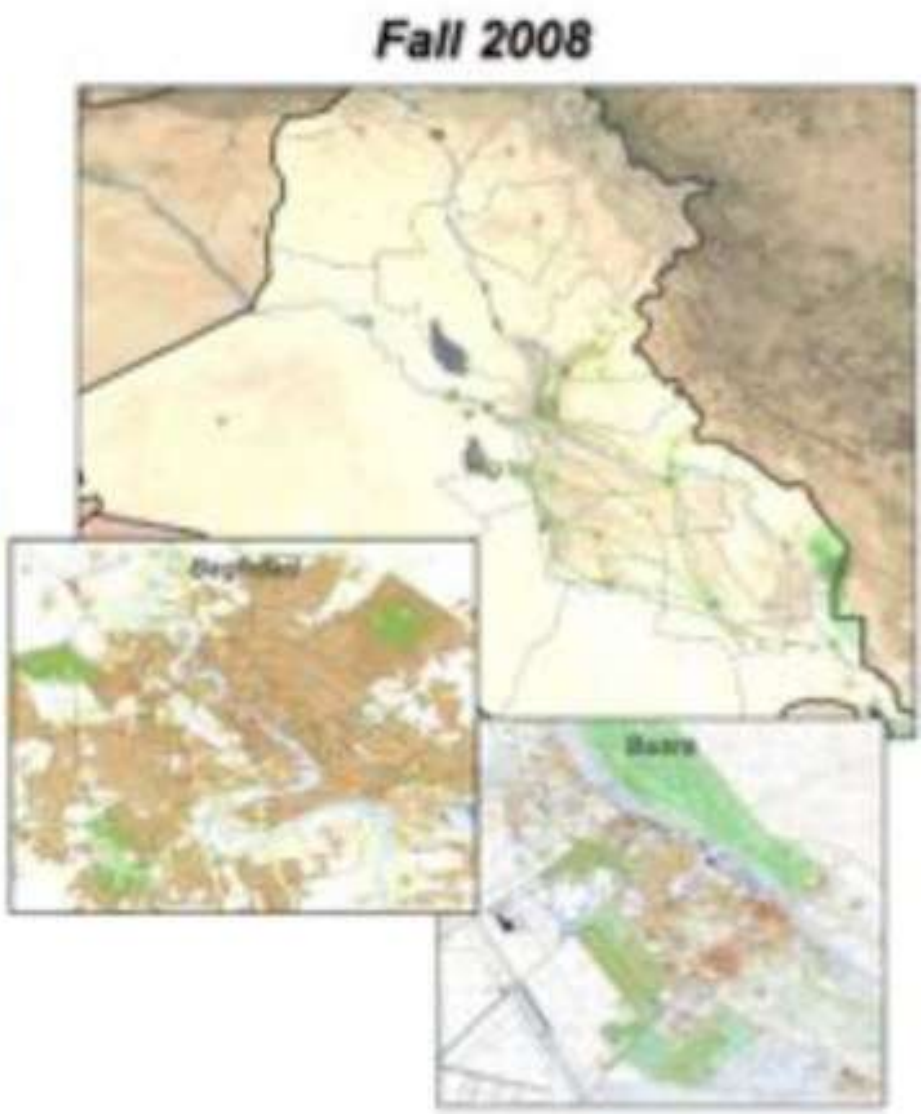
Al Qa'ida in Iraq -- Winter 2006 vs. Winter 2008-2009



Source: MNF-, April 29, 2009

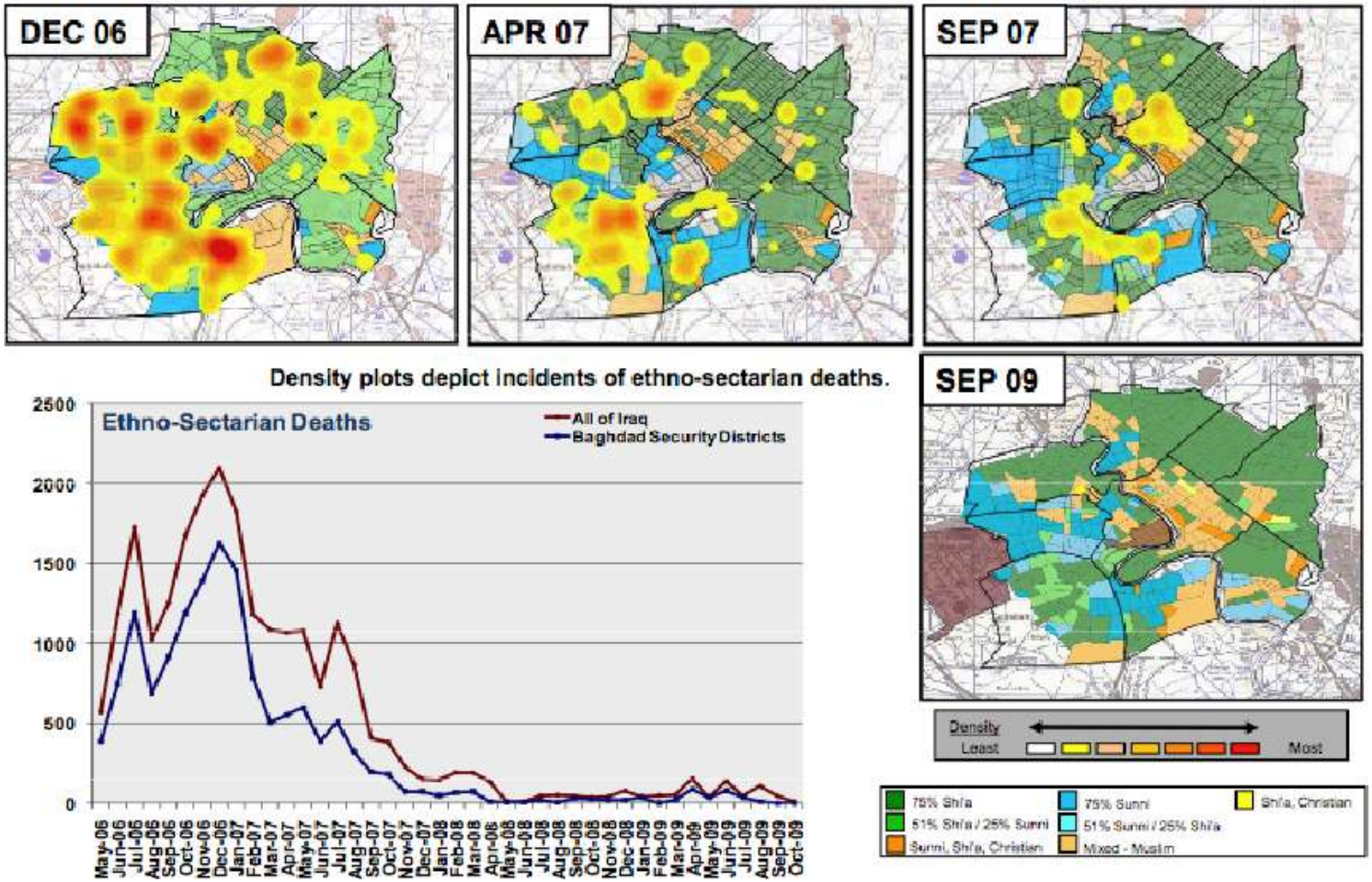
Key Areas of Jaysh Al Mahdi and Shi'ite Extremist Activity: Winter 2007 vs. Fall 2008





Source: MNF-, April 29, 2009

Ethno-Sectarian Violence in Baghdad: May 2006-Oct 2009



Source: Adapted from material providedby SIGACTS(CF & HN reports) asof 07-Nov-09

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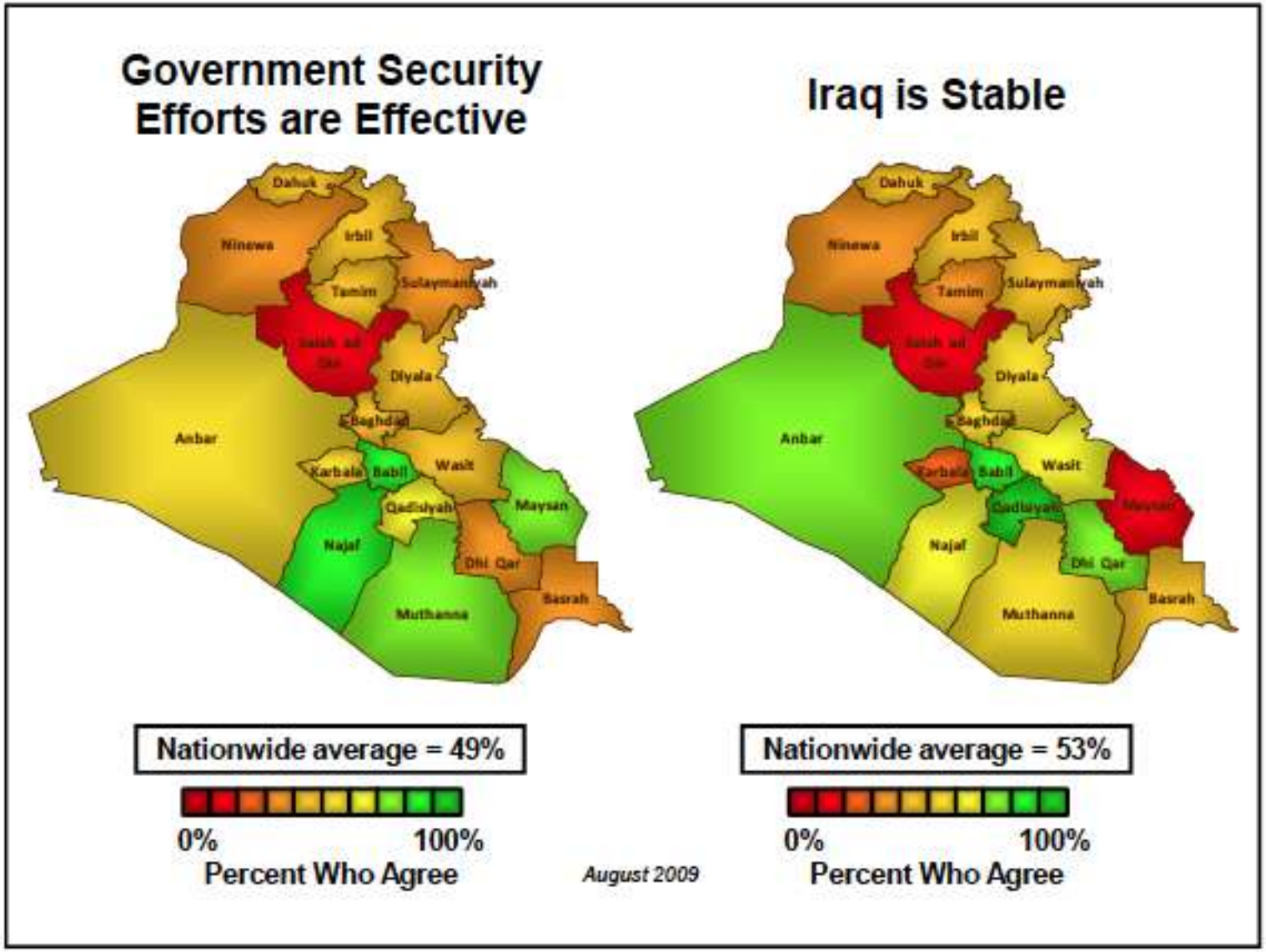
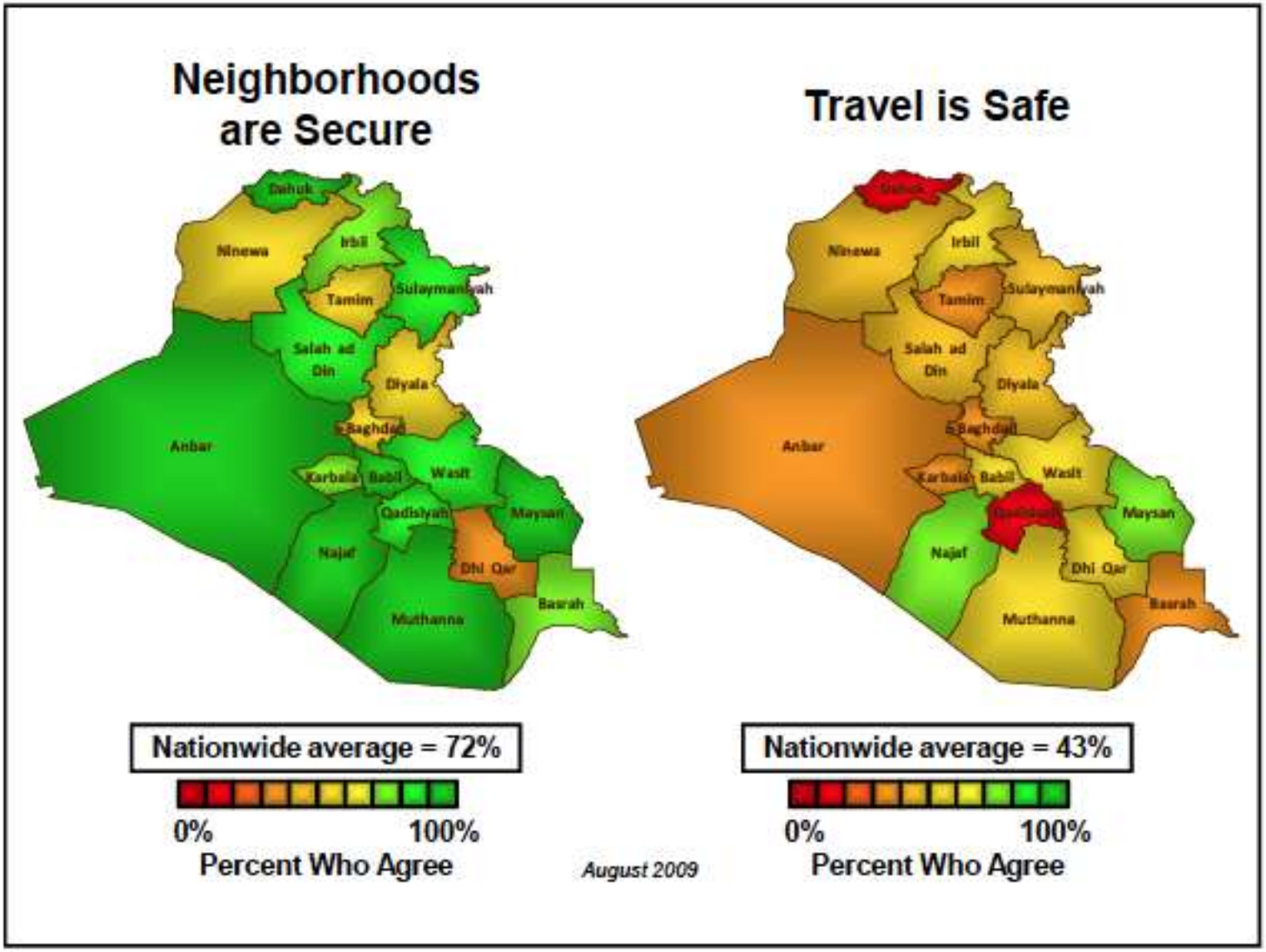
Iraqi Perceptions of Safety: August 2009



Source: Department of Defense. "Measuring Security and Stability in Iraq." September, 2009 Pg. 32

Iraqi Perceptions of Safety: January 2009



Source: Department of Defense. "Measuring Security and Stability in Iraq." September, 2009. Pg. 33

Iraq : The Saudi Case

- 1981 border treaty “resolved” the last uncertainty over the Saudi-Iraqi border and neutral zone issues but was never fully registered with UN.
- Fence would run for approximately 900 kilometers (560 miles), and add to an 7-meter high sand berm that runs along the border, and is in front of which there is a 8 kilometer stretch of no-mans-land that is regularly swept smooth, and patrolled so that infiltrators can be detected and tracked.
- In 2004, the Saudis invited 8 countries to nominate "national champion" companies to compete on the border guard development program. Raytheon undertook a huge border security survey in 2004 and gave the results to MoI.
- In 2006 the MoI hired Bearing Point to draft a comprehensive RFP for the 8 countries to respond to. In 2006 Saudi Arabia issued an RFP for construction of a separation barrier along its border with Iraq – partly because of infiltration, partly because of smuggling, and fear young Saudis were going to Iraq as volunteers for extremist groups.
- The RFP was issued to the 8 in mid 2007 and in early 2008, only 5 companies responded. The USG gave official advocacy to Raytheon.
- Also in 2007 The MoI split the project into two parts, separating out the Northern Border Fence project as an open tender. 14 companies responded, and in September of 2008, the $1.3 billion project was awarded to al-Rashed and EADS. The remainder of the BGDP was rebid in August 2008 with only Thales, EADS and Raytheon being invited to rebid on the $3 billion, 5 year project. The contract would create a sensor fence combining pressure sensors, razor-wire fence, and thermal imaging and radar equipment.
- Interior Minister Prince Naif Bin Abdul Aziz announced on 24 August 2008 that a contract would soon be issued.
- Project part of a wider defense plan to secure the country's 6,500 km (4,000 miles) borders, which could add hundreds of radar facilities, coastal detection centers, telecommunications networks and reconnaissance aircraft/UAVs.

Source: Saudi Gazette, Reuters, Wikepedia, Saudi experts

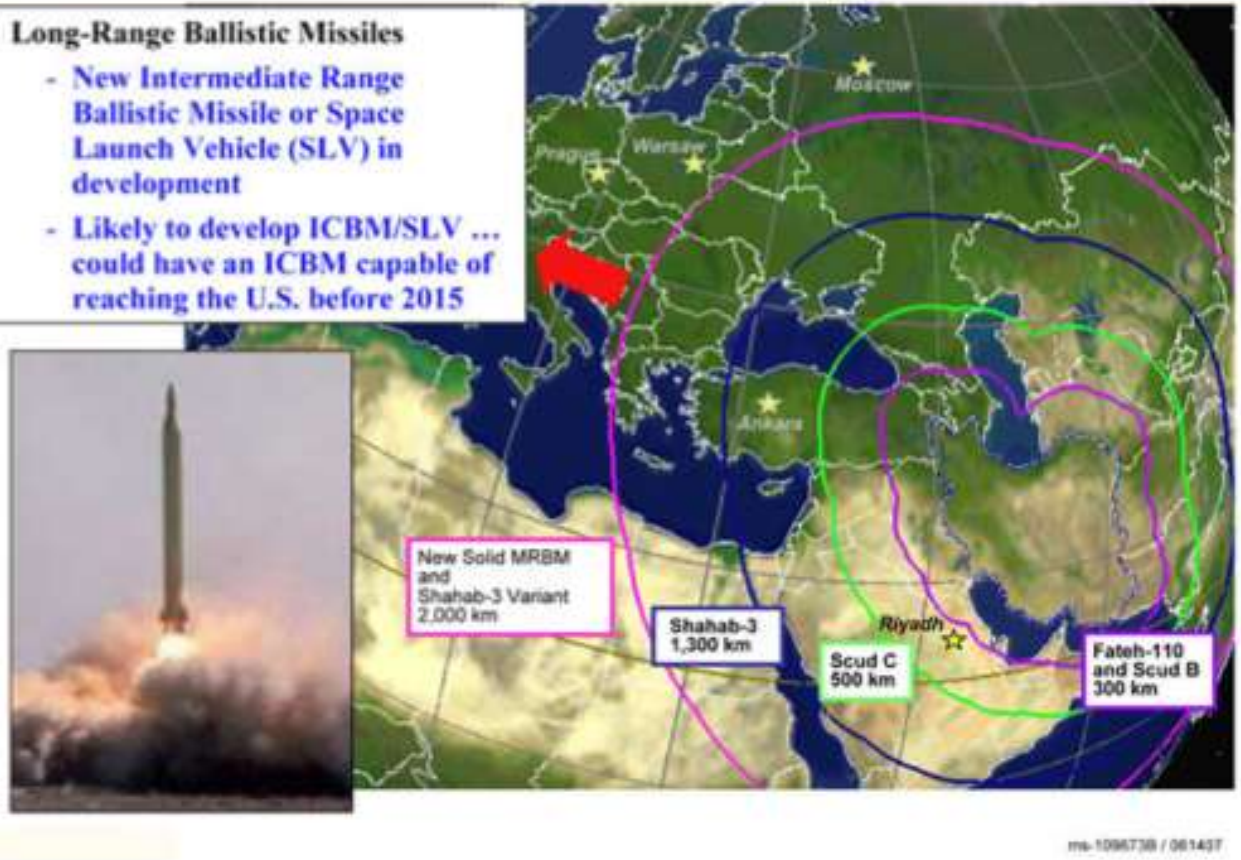
The Challenge of Missile Warfare

What Is The Real Missile Threat?

- Intimidation and Deterrence vs. Warfighting?
- Test, development, rolling future threat?
- Conventional Warhead, Uncertain Reliability, Poor CEP/Accuracy?
- Conventional Warhead, High accuracy, maneuvering capability?
- Chemical Warhead?
- Possible nuclear warhead? Tested Nuclear warhead? Safety/reliability?
- Ballistic + cruise threat?
- Volley or Limited Rate/numbers?
- Accuracy and reliability under real-world operations launch conditions? Accuracy vs. CEP?
- Solid fuel, storable liquid fuel? Reaction times, reliability?
- Near real time vs. preprogrammed targets?
- C4I (command, control, communications, and computer/intelligence systems.
- Sheltered or mobile basing?
- Launch on warning (LOW), Launch under attack (LUA)?

Iranian Shehab Threat

- **Long-Range Ballistic Missiles**
  - **New Intermediate Range Ballistic Missile or Space Launch Vehicle (SLV) in development**
  - **Likely to develop ICBM/SLV … could have an ICBM capable of reaching the U.S. before 2015**



Shehab 3/3A

Range (km)	Payload (kg)
1,350	1,158
1,400	987
1,500	760
1,540	650
1,560	590.27
1,580	557.33
1,600	550
1,780	240
2,000	-

(Source: Missile Defense Program Overview for the European Union, Committee on Foreign Affairs, Subcommittee on Security and Defense. Dr. Patricia Sanders. Executive Director. Missile Defense Agency)

Stages of Development of Iran's Missiles - I

Designation	Stages	Progenitor Missiles	Propellant	Range (Kilometers)	Payload (Kilograms)	IOC (Year)	Inventory
Fateh A-110 (NP-110)	1	Zelzal-2 variant, DF-11, CSS-8	solid	210	500	2003	?
Tondar 69	1	CSS-8	solid	150	150-200	?	200
M-9 variant	1	CSS-6, DF-15	solid	800	320	?	?
M-11 variant	1	CSS-7, DF-11	solid	400	?	?	80
Mushak-120	1	CSS-8, SA-2	solid	130	500	2001	200
Mushak-160 (Fateh 110)	1	CSS-8, SA-2	solid, liquid	160	500	2002	?
Mushak-200 (Zelzal-2)	1	SA-2	solid, liquid	200	500	NA	?
Saegheh	1?	?	solid	75-225	?	?	?

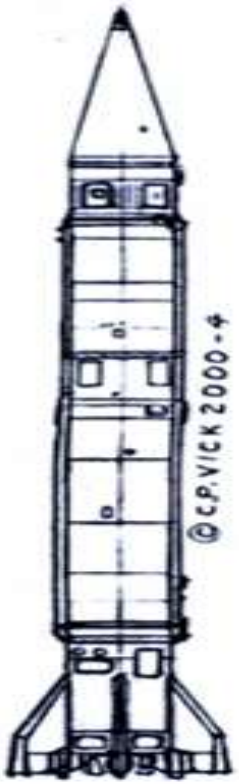
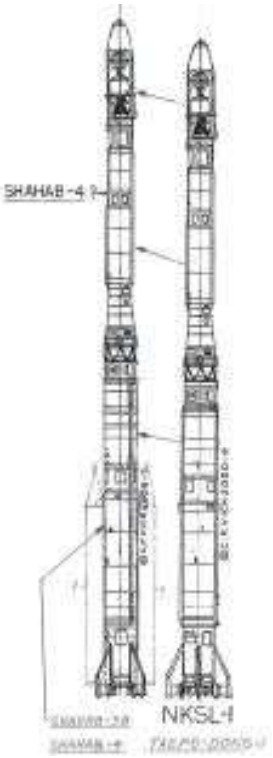
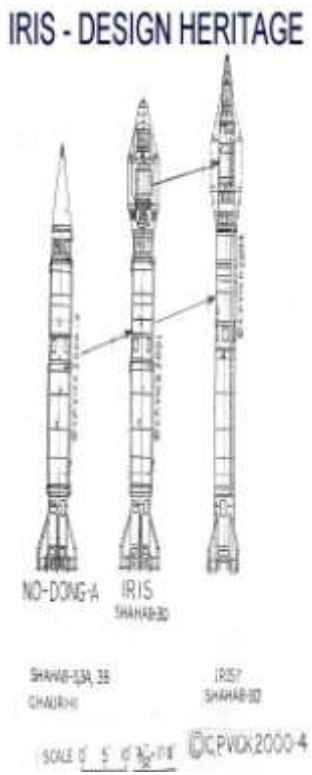
Source: Adapted from GlobalSecurity.org, available at http://www.globalsecurity.org/wmd/world/iran/missile.htm; the Federation of American Scientists, available at http://www.fas.org/nuke/guide/iran/missile; The Claremont Institute: Ballistic Missiles of the World, http://www.missilethreat.com/missiles/index.html. N/A = not available, http://www.iiss.org/publications/strategic-comments/past-issues/volume-15-2009/volume-15-issue-1/irans-missile-development/.

Stages of Development of Iran's Missiles - II

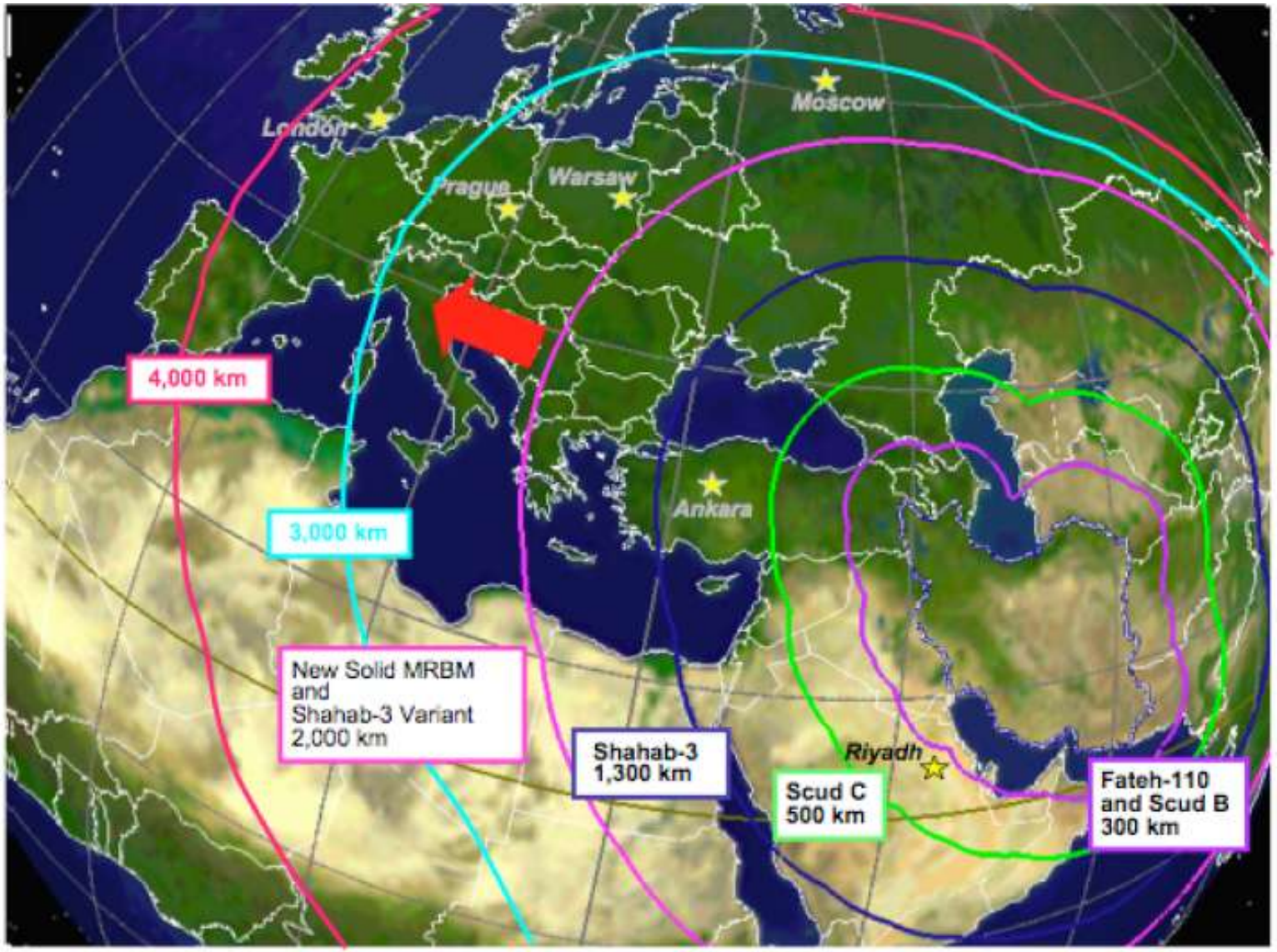
Designation	Stages	Progenitor Missiles	Propellant	Range (Kilometers)	Payload (Kilograms)	IOC (Year)	Inventory
Shahab-1	1	Soviet SSN-4, N Korean SCUD B	liquid	285-330	987–1,000	1995	250–300
Shahab-2	1	Soviet SSN-4, N Korean SCUD C	liquid	500-700	750–989	?	50–450
Shahab-3	1	Nodong-1	liquid	1,280-1600	760–1,158	2002	25–100
Shahab-4	2	Taep'o-dong-1	liquid	2,000-3,000	1,040–1,500	N/A	0
Ghadr 101	multi	Shaheen-1	solid	2,500	N/A	N/A	0
Ghadr 110	multi	Shaheen-2	solid	3,000	N/A	N/A	0
IRIS	1	M-18	solid	3,000	760–1,158	2005	N/A
Kh-55	1	Soviet AS-15 ,	jet engine	2,900–3,000	200 kgt nuclear	2001	12
Shahab-5	3	Taep'o-dong-2	liquid	4,000-5,500	390–1,000	N/A	0
Shahab-6	3	Taep'o-dong-2	liquid	6,000-10,000	270–1,220	N/A	0
Sajjil-2	2	Sajji-1	Solid-two stage	1,500-2,000	?	2008-2009	Test Dec 2009

Source: Adapted from GlobalSecurity.org, available at http://www.globalsecurity.org/wmd/world/iran/missile.htm; the Federation of American Scientists, available at http://www.fas.org/nuke/guide/iran/missile; The Claremont Institute: Ballistic Missiles of the World, http://www.missilethreat.com/missiles/index.html. N/A = not available, http://www.iiss.org/publications/strategic-comments/past-issues/volume-15-2009/volume-15-issue-1/irans-missile-development/.

Iranian Missile Program

	Shahab-3	No Dong	Shahab-4	Variant	IRIS
					
Range	1,300	1,300	2,000	2,000	3,000
Payload	~1,000	700-1000	?	700	~1,000
IOC	2002	?	?	?	2005

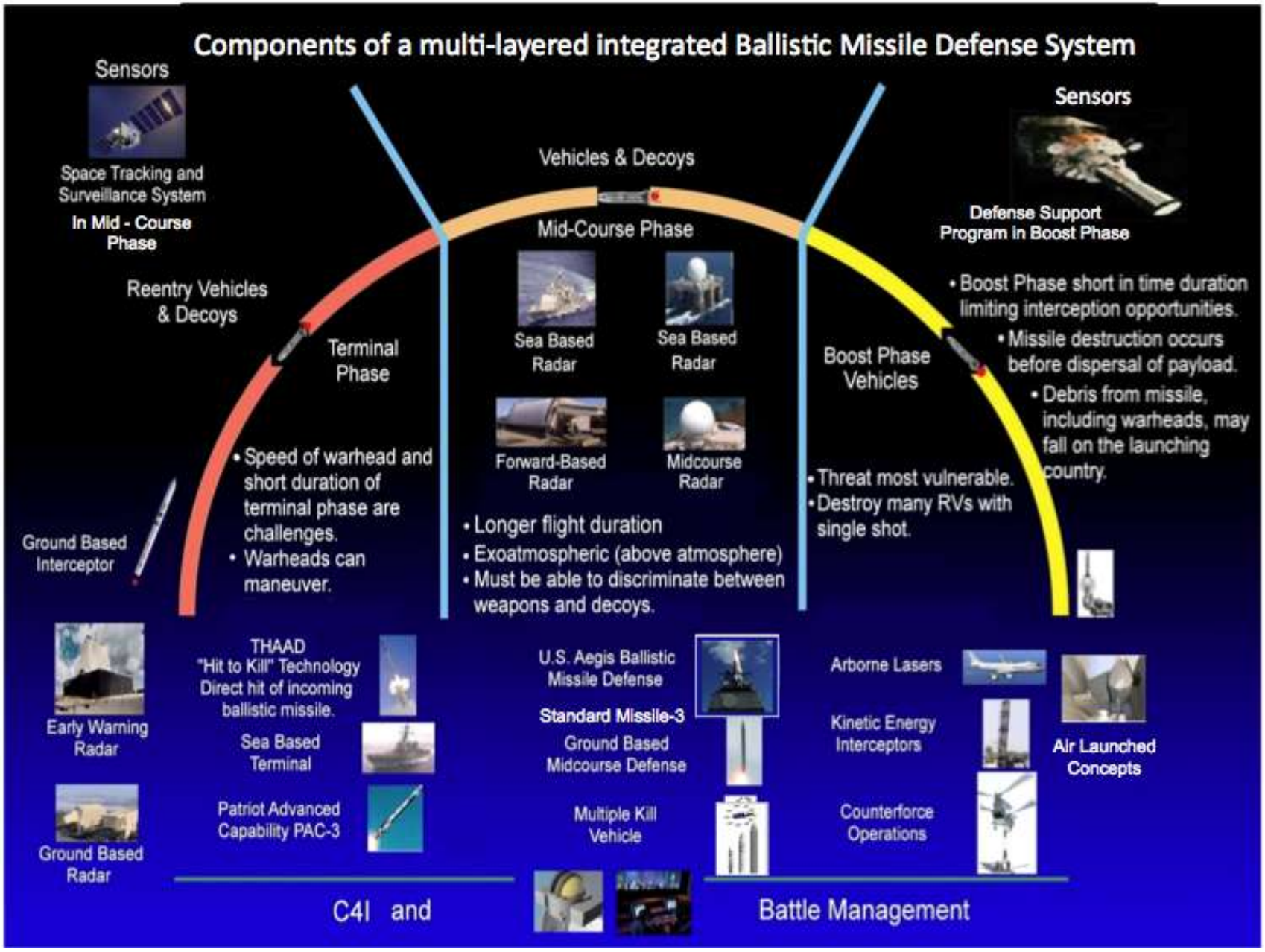
Estimated Iranian Missile Ranges



Source: NASIC, B&CM Threat 2006, Jacoby Testimony March 2005

A Gulf Missile War

Gulf Integrated Missile Defenses



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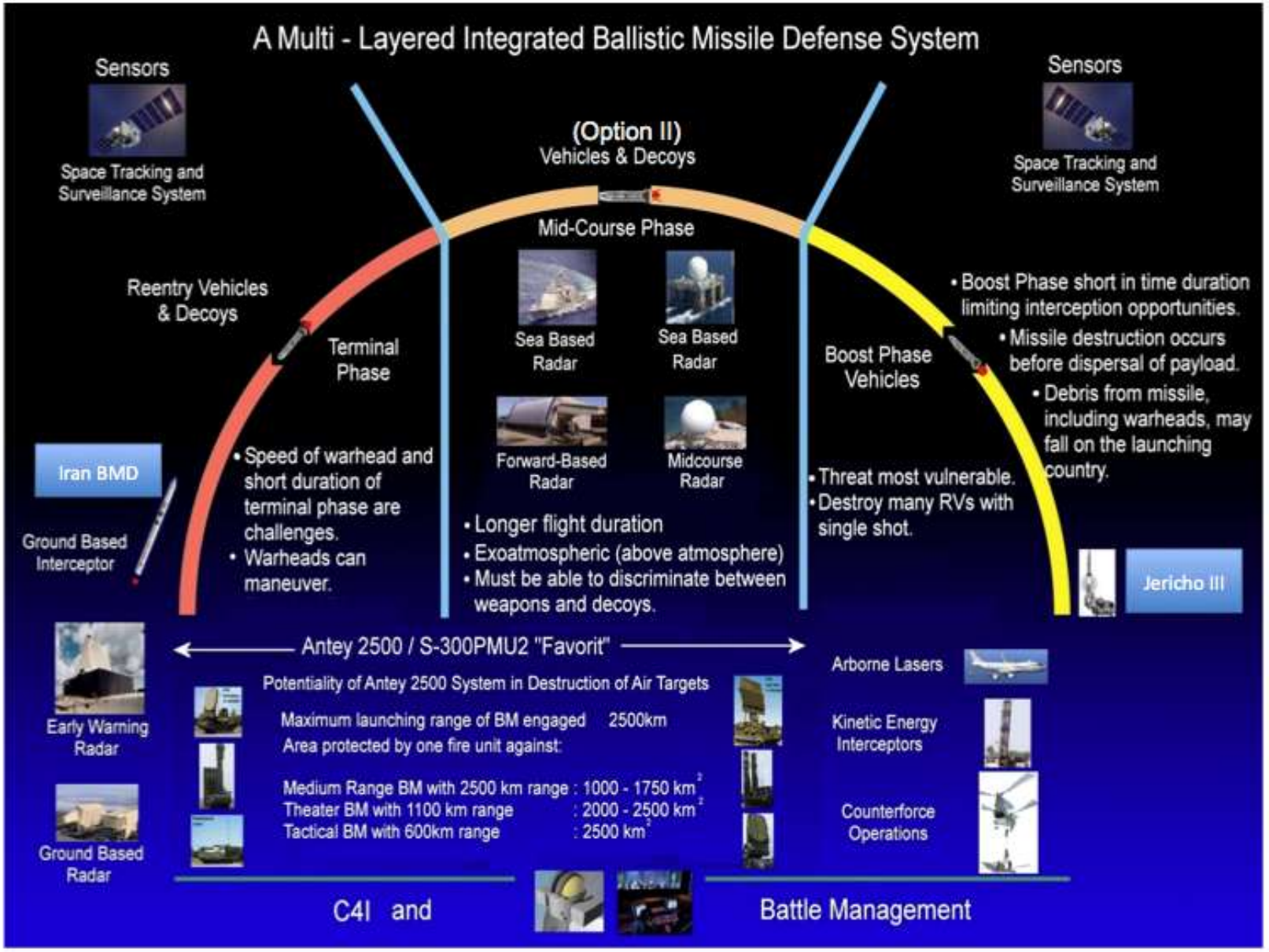
Iranian Integrated Missile Defenses



The Challenge of Nuclear Forces and Weapons of Mass Destruction

Nuclear Uncertainty

- **Must plan to deal with possible Iranian force with unknown weapons characteristics, delivery systems, basing, and timelines.**
  - **Technology base now exists, enrichment to fissile levels is only limiting factor.**
- **Already a key factor in Iranian capability to conduct "wars of intimidation."**
- **Clear Iran proceeding with extensive ballistic missile program regardless of whether it pursues the nuclear option.**
- **Cannot predict timeframe for nuclear threat. Worst case is 2009, but could well be 2015.**
  - **Break out, bomb in basement, tested, deployed, serious numbers, mobile, sheltered, LUA/LOW? Fission, boosted, thermonuclear?**
- **Chemical and biological options as well.**

Current & Potential Nuclear Powers

Iran

SRBM < 1000 km	MRBM 1,000 – 3,000 km	IRBM 3,000 – 5,500 km	ICBM > 5,500 km
Shahab-1	Shahab-3	Shahab-5	Shahab-6
Shahab-2	Shahab-4	-	-
Mushak-120	Ghadr-101	-	-
Mushak-160	Ghadr-110	-	-
Mushak-200	IRIS	-	-
-	Sajil	-	-

Syria

SRBM < 1000 km	MRBM 1,000 – 3,000 km	IRBM 3,000 – 5,500 km	ICBM > 5,500 km
SCUD-B	-	-	-
SCUD-C	-	-	-
SCUD-D	-	-	-
SS-21b	-	-	-

Israel

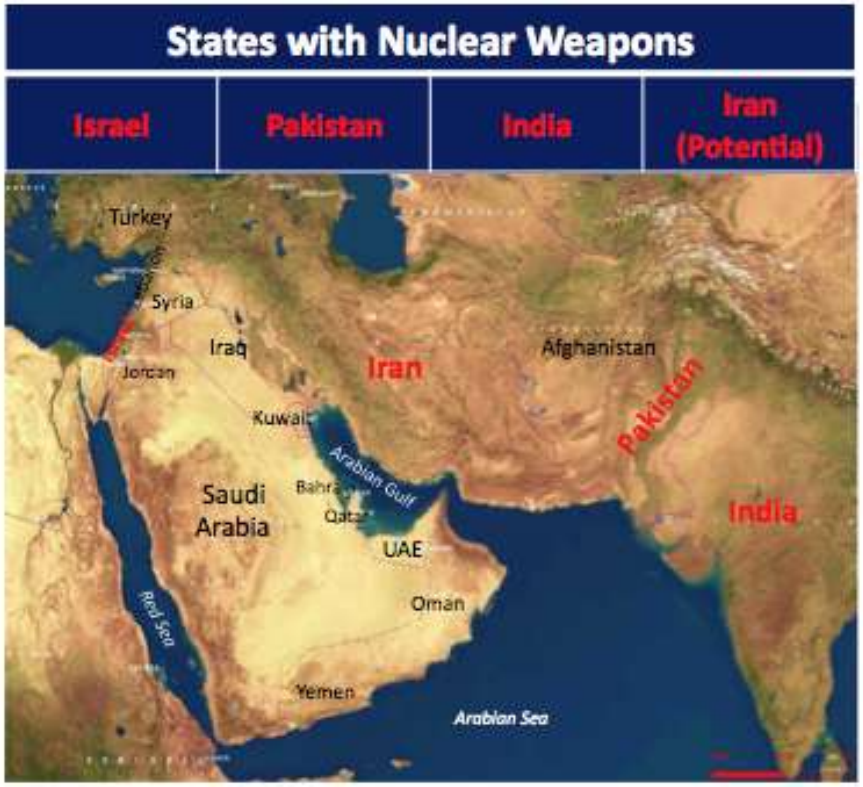
SRBM < 1000 km	MRBM 1,000 – 3,000 km	IRBM 3,000 – 5,500 km	ICBM > 5,500 km
-	Jericho II	-	Jericho II

Pakistan

SRBM < 1000 km	MRBM 1,000 – 3,000 km	IRBM 3,000 – 5,500 km	ICBM > 5,500 km
Shaheen I	Shaheen II	-	-
Hatf I	Ghauri I	-	-
Hatf II	Ghauri II	-	-
Hatf III	Ghauri II	-	-
M-11	-	-	-

India

SRBM < 1000 km	MRBM 1,000 – 3,000 km	IRBM 3,000 – 5,500 km	ICBM > 5,500 km
Agni I	Agni II	Agni III	Surya
Prithvi I			
Prithvi II			



Confusion Over the US NIE

- **Not say Iran was not moving towards nuclear weapon.**
  - **Did say evidence that halted formal efforts at weapons development in 2003. (When US "victories" in Iraq and Afghanistan seemed most threatening to Iran,**
  - **Made it clear that Iran was pursuing enrichment technology that was the sole remaining barrier to Iran acquiring nuclear weapons.**
- **Since NIE was issued, new evidence has surfaced of weapons development efforts beyond initial "laptop" and "Green Salt" disclosures.**
- **Iran has also been discovered to have completed development of a new, far more advanced centrifuge.**
- **Iran has announced two new long-range missiles, and a "space" program that can be adapted to missile development.**

DNI's March 2008 Summary - I

Over the past year we have gained important new insights into **Tehran's** activities related to nuclear weapons and the Community recently published a National Intelligence Estimate on Iranian intent and capabilities in this area. I want to be very clear in addressing the Iranian nuclear capability. First, there are three parts to an effective nuclear weapons capability:

1. **Production of fissile material**
2. **Effective means for weapons delivery**
3. **Design and weaponization of the warhead itself**

We assess in our recent NIE on this subject that warhead design and weaponization were halted, along with covert military uranium conversion- and enrichment-related activities. Declared uranium enrichment efforts, which will enable the production of fissile material, continue. This is the most difficult challenge in nuclear production. Iran's efforts to perfect ballistic missiles that can reach North Africa and Europe also continue.

We remain concerned about Iran's intentions and assess with moderate-to-high confidence that Tehran at a minimum is keeping open the option to develop nuclear weapons. We have high confidence that Iranian military entities were working under government direction to develop nuclear weapons until fall 2003. Also, Iranian entities are continuing to develop a range of technical capabilities that could be applied to producing nuclear weapons. Iran continues its efforts to develop uranium enrichment technology, which can be used both for power reactor fuel and to produce nuclear weapons. And, as noted, Iran continues to deploy ballistic missiles inherently capable of delivering nuclear weapons, and to develop longer-range missiles. We also assess with high confidence that even after fall 2003 Iran has conducted research and development projects with commercial and conventional military applications—some of which would also be of limited use for nuclear weapons.

We judge with high confidence that in fall 2003, Tehran halted its nuclear weapons design and weaponization activities, as well as its covert military uranium conversion and enrichment-related activities, for at least several years. Because of intelligence gaps, DOE and the NIC assess with only moderate confidence that all such activities were halted. We assess with moderate confidence that Tehran had not restarted these activities as of mid-2007, but since they comprised an unannounced secret effort that Iran attempted to hide, we do not know if these activities have been restarted.

We judge with high confidence that the halt was directed primarily in response to increasing international scrutiny and pressure resulting from exposure of Iran's previously undeclared nuclear work. This indicates that Iran may be more susceptible to influence on the issue than we judged previously.

DNI's March 2008 Summary - II

We do not have sufficient intelligence information to judge confidently whether Tehran is willing to maintain the halt of its nuclear weapons design and weaponization activities indefinitely while it weighs its options, or whether it will or already has set specific deadlines or criteria that will prompt it to restart those activities. We assess with high confidence that Iran has the scientific, technical and industrial capacity eventually to produce nuclear weapons. In our judgment, only an Iranian political decision to abandon a nuclear weapons objective would plausibly keep Iran from eventually producing nuclear weapons—and such a decision is inherently reversible. I note again that two activities relevant to a nuclear weapons capability continue: uranium enrichment that will enable the production of fissile material and development of long-range ballistic missile systems.

We assess with moderate confidence that convincing the Iranian leadership to forgo the eventual development of nuclear weapons will be difficult given the linkage many within the leadership see between nuclear weapons development and Iran's key national security and foreign policy objectives, and given Iran's considerable effort from at least the late 1980s to 2003 to develop such weapons.

We continue to assess with moderate-to-high confidence that Iran does not currently have a nuclear weapon. We continue to assess with low confidence that Iran probably has imported at least some weapons-usable fissile material, but still judge with moderate-to-high confidence it has not obtained enough for a nuclear weapon. We cannot rule out that Iran has acquired from abroad—or will acquire in the future—a nuclear weapon or enough fissile material for a weapon. Barring such acquisitions, if Iran wants to have nuclear weapons it would need to produce sufficient amounts of fissile material indigenously—which we judge with high confidence it has not yet done.

Iran resumed its declared centrifuge enrichment activities in January 2006, despite the 2003 halt in its nuclear weapons design and weaponization activities. Iran made significant progress in 2007 installing centrifuges at Natanz, but we judge with moderate confidence it still faces significant technical problems operating them.

•We judge with moderate confidence that the earliest possible date Iran would be technically capable of producing enough highly enriched uranium (HEU) for a weapon is late 2009, but that is very unlikely.

•We judge with moderate confidence Iran probably would be technically capable of producing enough HEU for a weapon sometime during the 2010-2015 time frame. INR judges Iran is unlikely to achieve this capability before 2013 because of foreseeable technical and programmatic problems. All agencies recognize the possibility that this capability may not be attained until *after* 2015.

DNI's March 2008 Summary - III

We know that Tehran had a chemical warfare program prior to 1997, when it declared elements of its program. We assess that Tehran maintains dual-use facilities intended to produce CW agent in times of need and conducts research that may have offensive applications. We assess Iran maintains a capability to weaponize CW agents in a variety of delivery systems.

We assess that Iran has previously conducted offensive BW agent research and development. Iran continues to seek dual- use technologies that could be used for biological warfare.

Extract from J. Michael McConnell, Director of National Intelligence, "Annual Threat Assessment of the Intelligence Community for the Senate Armed Services Committee," 27 February 2008

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ISIS Report: Misconceptions about Iran's Nuclear Program - I

1. **Iran's IAEA safeguards violations were minor breaches and fully in the past**
   - Iran's violation of its obligations under the verification requirements of the Nuclear NPT is one of most significant breaches of this treaty.
   - Iran's safeguards violations have been detailed in numerous IAEA reports starting in 2003
   - November 2003: Iran has failed in a number of instances over an extended period of time to meet its obligations under its Safeguards Agreement with respect to the reporting of nuclear material and its processing and use, as well as the declaration of facilities where such material has been processed and stored…."
   - Iran's development of its enrichment capability took place over 18 years and in secrecy. This places Iran's actions outside the category of "minor."
   - As a consequence of Iran's safeguards violations, the United Nations Security Council has passed five resolutions, four of them containing sanctions, calling on Iran to halt uranium enrichment, accept the Additional Protocol, and comply with IAEA requests to clarify key past activities concerning the military dimensions of its program, including the role of military organizations in the centrifuge program and a set of records, referred to as the "laptop documents" which we discuss further in this document."
   - The November 2004 IAEA report enumerates Iran's safeguards violations and notes that Iran's cooperation up to October 2003 was marked by "extensive concealment, misleading information and delays in access to nuclear material and facilities," include its imports of nuclear material, falsehoods about the origin of centrifuge technology and equipment, and its enrichment activities.

Source: David Albright and Jacqueline Shire, "Misconceptions about Iran's Nuclear Program," ISIS Nuclear Iran, July 8, 2009, available at: http://www.isisnucleariran.org/static/297/

ISIS Report: Misconceptions about Iran's Nuclear Program - II

2. All of Iran's nuclear facilities are under safeguards or monitoring, or alternatively the IAEA has found no evidence that Iran has any secret nuclear facilities

- Many key nuclear activities and facilities are not under any type of IAEA monitoring.
- This lack of Iranian transparency poses one of the most difficult challenges to determining whether Iran has undeclared nuclear activities and materials and is conducting nuclear weapons work.
- The IAEA safeguards system in Iran is currently limited to traditional safeguards under an INFCIRC/153 agreement, which is part of Iran's obligations under the Nuclear NPT.
  - Agreement applies to all of Iran's sources of special fissionable material for the exclusive purpose of verifying that such material is not diverted to nuclear weapons or other nuclear explosive devices.
  - Iran agreed to allow this agreement in 2003, then decided to no longer do so in 2006.
- The IAEA has reported that it is unable to determine if Iran has undeclared nuclear materials or activities.
- In the past, the IAEA has found evidence of secret nuclear sites.
- Now, the IAEA is limited in its ability to look for any such sites because of the weakened inspections and Iran's interpretation of its obligations to the IAEA under INFCIRC/153.
- The IAEA maintains safeguards at the Bushehr nuclear reactor, several facilities at Esfahan (including uranium conversion and fuel fabrication facilities), the Natanz fuel enrichment plants, the Tehran Research Reactor, a facility for radioactive waste storage facility and a laboratory.

Source: David Albright and Jacqueline Shire, "Misconceptions about Iran's Nuclear Program," ISIS Nuclear Iran, July 8, 2009, available at: http://www.isisnucleariran.org/static/297/

CSIS | CENTER FOR STRATEGIC & INTERNATIONAL STUDIES

ISIS Report: Misconceptions about Iran's Nuclear Program - III

3. Iran is fully in compliance with its safeguards obligations

- Iran has refused multiple IAEA requests to verify design information for the Arak heavy water reactor and its associated facilities currently under construction. The IAEA has stated that this refusal is inconsistent with its obligations under INFCIRC/153.
- The IAEA also takes issue with Iran's decision to stop providing information about new nuclear facilities when it makes a decision to construct them.
  - Iran is insisting on adhering to a long outdated version of its safeguards undertakings by agreeing to provide such information only 180 days before the introduction of nuclear material into the facility.
  - Iran initially agreed to provide early notification in 2003, but subsequently reversed its decision. The IAEA states that such a unilateral decision is inconsistent with Iran's obligations under INFCIRC/153.
  - Iran has built secret nuclear sites, including the Natanz gas centrifuge complex, exploiting this outdated arrangement. Iran confirmed its existence in early 2003 only after it was exposed publicly by groups such as ISIS.
  - Gaining assurance that no such sites are under construction now is critical to ensuring that Iran is not trying to exploit this dispute to build nuclear facilities in secret.

Source: David Albright and Jacqueline Shire, "Misconceptions about Iran's Nuclear Program," ISIS Nuclear Iran, July 8, 2009, available at: http://www.isisnucleariran.org/static/297/

ISIS Report: Misconceptions about Iran's Nuclear Program - IV

4. **Producing HEU from LEU is a long and arduous process, and nuclear weapons breakout will take between one and three years**
   - Learning to produce enriched uranium by operating centrifuges in large numbers is the difficult part on the road to developing a viable gas centrifuge capability.
   - Enriching low enriched uranium (LEU) to highly enriched uranium (HEU) is relatively straightforward and can be done quickly, in some cases within months.
     - This process of enriching a stock of LEU to weapon-grade is called a nuclear weapons "break-out" capability.
   - Iran's centrifuge program has advanced considerably in the last year.
     - Iran has succeeded in manufacturing and installing large numbers of centrifuges and ramping up its production of LEU.
     - As of the end of May 2009, Iran had over 7,000 centrifuges enriching uranium or under vacuum and ready to enrich, and had produced over 1,300 kilograms of low enriched uranium hexafluoride.
   - The ISIS concludes in its reporting that Iran has not made the political decision to develop a nuclear weapon, but that should its leadership so decide, Iran would have viable options for producing enough weapon-grade uranium for a nuclear weapon within six months or less.

Source: David Albright and Jacqueline Shire, "Misconceptions about Iran's Nuclear Program," ISIS Nuclear Iran, July 8, 2009, available at: http://www.isisnucleariran.org/static/297/

ISIS Report: Misconceptions about Iran's Nuclear Program - V

5. Iran does not currently have a nuclear weapons capability

- Iran's gas centrifuge program is currently large enough to provide Iran several ways to produce weapons grade uranium.
- The time needed to produce enough weapon-grade uranium for a nuclear weapon is measured in months or a few years at most.
- Iran currently operates enough centrifuges at the Natanz Fuel Enrichment Plant to produce weapons grade uranium directly from natural uranium,
  - If it decided to do so it would need to adjust the cascades or install a relatively small number of new cascades specifically for that purpose.
- As an alternative to modifying the Natanz facility, Iran is capable of building a clandestine plant to make weapon-grade uranium from natural uranium. It has established at Natanz that it can build, install and operate large numbers of cascades. Given the risk of military strikes against Natanz if Iran were making weapon-grade there, it might prefer to build a parallel, secret plant.
- Iran would also need a supply of uranium hexafluoride for such a facility;
  - all of the uranium hexafluoride produced by Esfahan is under safeguards, so it would also likely need to construct a secret parallel facility to make uranium hexafluoride or acquire it illicitly from an overseas supplier.
- Given Iran's refusal to accept any but the weakest safeguards, the IAEA is unable to provide assurances about the absence of any undeclared nuclear materials or facilities. It has no access to centrifuge manufacturing workshops, making it difficult to know how many centrifuges are being produced and where they are stored. Adding in a long history of clandestine nuclear activities, the possibility of Iran building a secret gas centrifuge plant cannot be ruled-out.

Source: David Albright and Jacqueline Shire, "Misconceptions about Iran's Nuclear Program," ISIS Nuclear Iran, July 8, 2009, available at: http://www.isisnucleariran.org/static/297/

ISIS Report: Misconceptions about Iran's Nuclear Program – VI

6. Iran would have to conduct a full-scale nuclear test in order to build a nuclear weapon

- Developing an implosion-type nuclear weapon can be done without needing a full-scale test.
- Most states pursuing a clandestine nuclear weapons program have sought to avoid the need for full-scale testing.
  - If a test is conducted, as it was by Pakistan and North Korea, it served to further refine nuclear weapons skills and more importantly demonstrate dramatically a strategic and political point.
- States have used different options to avoid the need for tests.
  - Pakistan did so after receiving a tested warhead design from China in the early 1980s.
  - To develop confidence in its implosion design, prior to the Gulf War, Iraq was developing a set of tests of components and of the entire device with a surrogate material substituting for HEU.
  - South Africa was likewise planning to pursue this approach for an implosion weapon. Iran would likely follow a path to maximize its flexibility and minimize its requirements for HEU.

Source: David Albright and Jacqueline Shire, "Misconceptions about Iran's Nuclear Program," ISIS Nuclear Iran, July 8, 2009, available at: http://www.isisnucleariran.org/static/297/

ISIS Report: Misconceptions about Iran's Nuclear Program – VII

6. The "laptop documents" are forgeries

- The story of the laptop documents was broken in 2005 and 2006 by Carla Anne Robbins, then at the Wall Street Journal, and Dafna Linzer, at the time writing for the Washington Post.
- The February 27, 2006 IAEA report notes that on December 5, 2005 the IAEA "repeated its request for a meeting to discuss information that had been made available to the Secretariat about alleged studies, including what is known as the Green Salt Project, concerning the conversion of uranium dioxide into uranium tetrafluoride (often referred to as "green salt"), tests related to high explosives, and the design of a missile re-entry vehicle.
  - Iran agreed to the meeting in January and officials met February 26, 2006. Iranian officials responded that the allegations were "based on false and fabricated documents so they were baseless," and that neither such a project nor such studies exist or did exist."
  - Later, Iran said that some of the documents were authentic but had nothing to do with nuclear weapons.
- IAEA analysts who reviewed the documents assessed that the volume of material, level of detail, including names, places and entities, do not support the conclusion that the documents are forgeries.
- The IAEA has continued to pursue the matter with Iran. Its May 2008 report contains an annotated listing of thirteen documents related to the laptop or "alleged studies."
- Iran has repeatedly refused IAEA requests to meet with individuals named in the documents, in particular Dr. Mohsen Fakhrizadeh, who appears to be at the center of the alleged nuclear weaponization-related research and development.

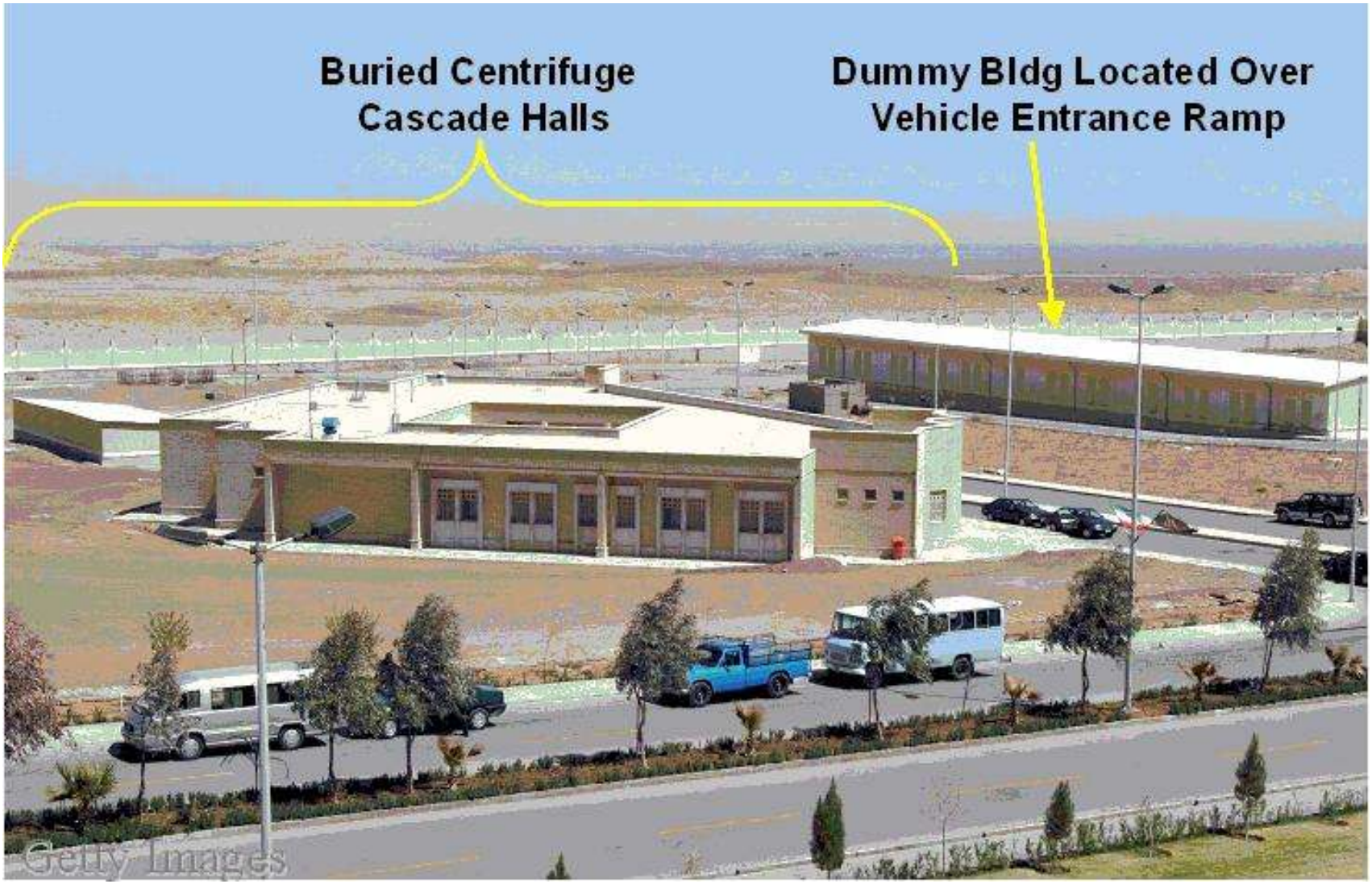
Source: David Albright and Jacqueline Shire, "Misconceptions about Iran's Nuclear Program," ISIS Nuclear Iran, July 8, 2009, available at: http://www.isisnucleariran.org/static/297/


300 miles
500 km
TURKEY
CASPIAN SEA
TURKMENISTAN
Lashkar A'bad
Tehran
Sites circled in red
unknown pre-mid 2002
IRAQ
Arak
Natanz
Isfahan
IRAN
Saghand
Ardekan
AFGHANISTAN
PAKISTAN
KUWAIT
1000 MW
Bushehr
The Gulf
Gachin
BAHRAIN
SAUDI ARABIA
QATAR
Gulf of Oman
MIDDLE EAST
MW Megawatts
Uranium processing facility
Uranium mines
Heavy-water facility
Research reactors / research facilities
Uranium enrichment facility
Light-water reactor (under construction)
Source: IISSmaps
IISSmaps


Vehicle Entrance Ramp
(before burial)
Bunkered underground
production halls
Admin/engineering
office area
DigitalGlobe Quickbird commercial satellite image
20 SEP 02


Vehicle Entrance Ramp
(after burial)
Bunkered underground
Centrifuge cascade halls
Helicopter
pads
New security
wall
Dummy building
concealing tunnel
entrance ramp
Admin/engineering
office area
DigitalGlobe Quickbird commercial satellite image
21 JUL 04

Effective Concealment



Iran's Centrifuge and LEU Status and Time Estimates for Weapons Grade Uranium

UN: November 16, 2009:

•The Agency has verified that, as of 17 November 2008, 9956 kg of UF6 had been fed into the cascades and 839 kg of low
•enriched UF6 had been produced since the beginning of operations in February. The Agency has confirmed, through independently calibrated operator load cell readings, that, between 18 November 2008 and 30 October 2009, 10412 kg of UF6 was fed into the cascades, and a total of 814 kg of low enriched UF6 product and 9080 kg of UF6 tails and dump material was off-loaded into UF6 cylinders. The difference of 518 kg between the input and output figures comprises natural, depleted and low enriched UF6 arising mainly from hold-up in the various cold traps and is not inconsistent with the design information provided by Iran.

•Iran is now testing a ten-machine cascade of IR-4 centrifuges, which might be a longer version of the IR-2 or IR-3. It also is testing a ten-machine cascade of what it calls IR-2m.

ISIS, as of August 28/November 16, 2009

•Already have enough LEU to produce HEU one weapon.

•At Iran's current rate of 2.77 kilograms of LEU hexafluoride per day, Iran would accumulate in total enough LEU to use as feed for the production of sufficient weapon-grade uranium for two nuclear weapons by the end of February 2010.

Wisconsin Project, Iran Watch, as of November 16, 2009:

•Amount of U-235 contained in Iran's stockpile of low-enriched uranium: 41.7 kg. Amount of this U-235 required to fuel a first-generation implosion bomb: 21.6 kg. Date by which Iran probably had stockpiled the above: December 2008. Number of additional months needed to convert this low-enriched uranium to weapon-grade: Two to three. Date by which Iran may have enough U-235 to fuel a second bomb: December 2009 I

•Based on the amount of low-enriched uranium Iran has stockpiled, and the amount it is believed to be producing each month, the Wisconsin Project estimates that by December 2008, Iran had accumulated enough U-235 to fuel one bomb quickly. By the end of this year, the Project estimates that Iran will have enough U-235 to a fuel a second bomb. "Quickly," in this context, means two to three months – about the time it would take Iran to raise the level of U-235 in its uranium stockpile from 3.5 percent to over 90 percent.
•As Iran increases the number of centrifuge machines it is operating, and increases its stockpile of low-enriched uranium, it will consolidate its status as a "virtual" nuclear weapon state.

Iran: New Generation of IR3 and IR4 Centrifuges

•Iran is believed to be operating some IR-2 and extended size IR-2 centrifuges.

•Head of Iran's Atomic Energy Organization (IAEO) Ali Akbar Salehi issues statement that Iran is producing new generations of centrifuges which are expected to be used by March 2011, the semi-official Fars news agency reported on Devember18, 2009.

• "At present we have included the new generations of centrifuges in our (uranium) enrichment activities and these new generations (centrifuges) are passing necessary tests rapidly. Iran is now producing new generations of centrifuges named IR3 and IR4, and we hope that we can use these new generations of centrifuges by the end of the next Iranian year (March 2011) after removing all problems and defects…We have put these new generations of centrifuges into enrichment work and all the necessary tests will be finished soon."

•He added that Iran is not in a hurry to enter the industrial production stage. And that Iranian nuclear scientists expect to incorporate the new centrifuges for full-scale production by early 2011. "That is not a good idea to enter the production stage without passing the required technical and industrial phases.

•He stated that that Iran now had more than 6,000 centrifuges in operation in Iran's nuclear facilities.

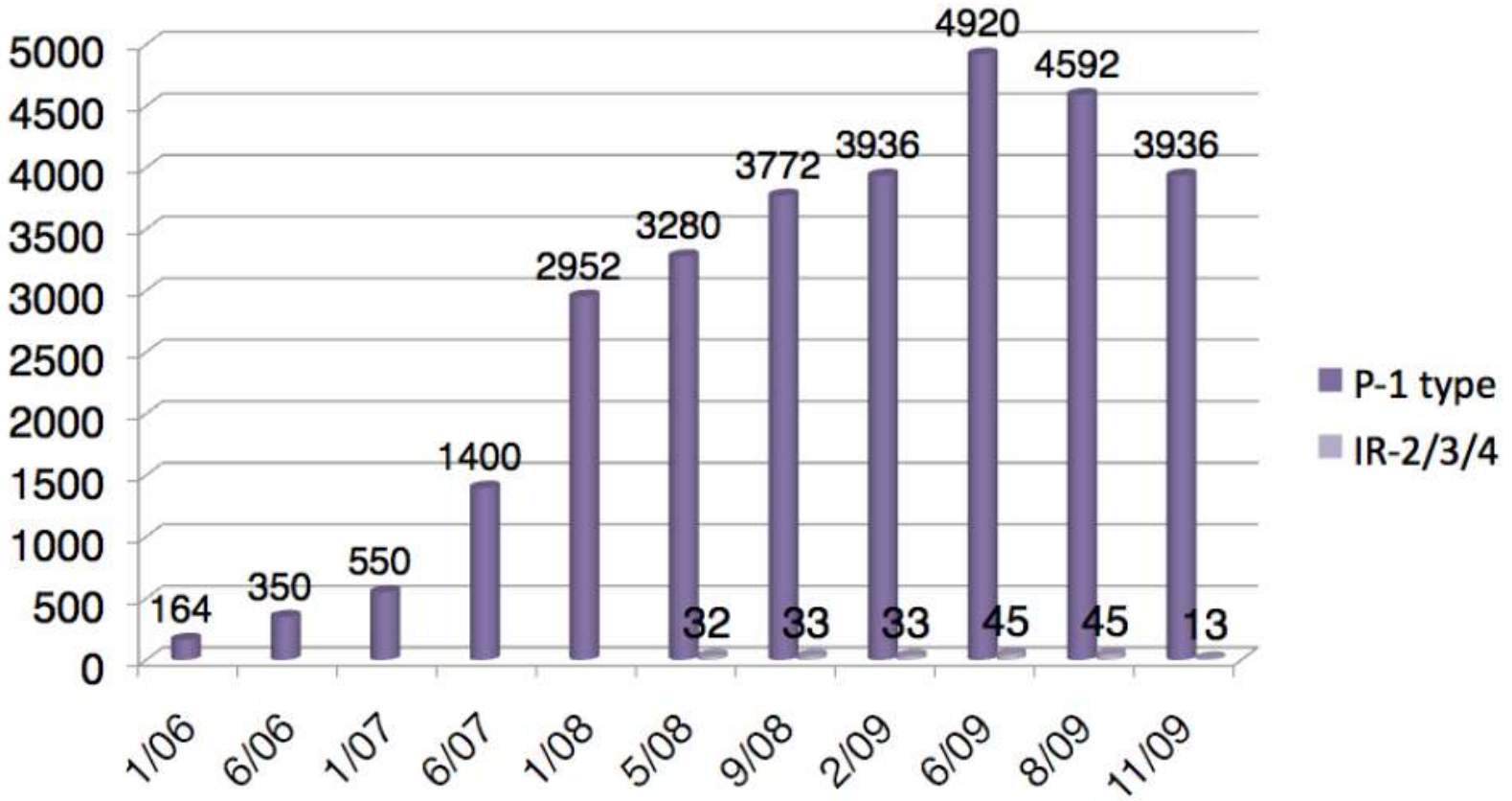
•Salehi had said in September that Iran was testing a new generation of centrifuges.

•Former Head of IAEO Gholamreza Aghazadeh had said early in 2009 that Iran had 7,000 operating centrifuges and would install up to 50,000 centrifuges in the next 5 years.

•Tehran announced at the beginning of December it would move forward with plans to enrich uranium to 20 percent

UPI, December 2, 2009, Xinhua, www.chinaview.cn 2009-12-18 19:54:44

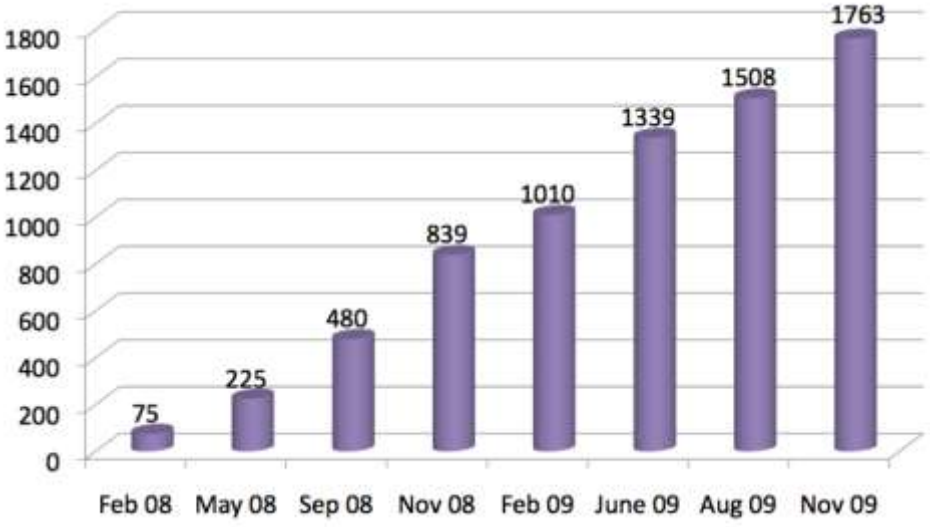
Number of Centrifuges Enriching Uranium at Natanz Fuel Enrichment Plant (FEP)



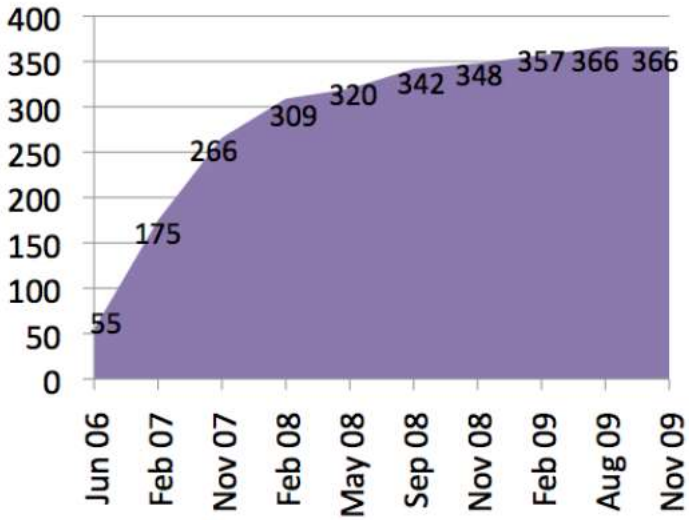
Source: David Albright and Jacqueline Shire, " IAEA Report on Iran: Fordow enrichment plant at "advanced stage of construction;" decline in number P1 centrifuges enriching but P1 centrifuge efficiency increases; discovery of previously unknown stock of heavy water, ISIS, November 16, 2009

Progress in LEU

Low Enriched Uranium Hexafluoride at Natanz FEP
(cumulative, in kg.)



Cumulative UF6 Production at Esfahan
(in metric tons of uranium mass)



Source: Source: David Albright and Jacqueline Shire, " IAEA Report on Iran: Fordow enrichment plant at "advanced stage of construction;" decline in number P1 centrifuges enriching but P1 centrifuge efficiency increases; discovery of previously unknown stock of heavy water, ISIS, November 16, 2009 ; and David Albright, Paul Brannan, and Jacqueline Shire, "IAEA Report on Iran Centrifuges increase; Rate of LEU production steady; progress on inspection requests at Arak and Natanz; no progress on possible military dimensions," August 28, 2009

Heavy Water and Arak Reactor

- **Iran claims reactor at Arak is to produce heavy water for sale; but design is suited for producing weapons grade plutonium.**
- **IAEA reported in November 2009 that it had reviewed the updated DIQ for the Fuel Manufacturing Plant (FMP) at Esfahan provided by Iran on 21 August 2009 (. Contrary to what was requested, the updated DIQ did not contain information on the design features of the IR-40 fuel assembly. The Agency provided comments on the DIQ to Iran on 5 November 2009, reiterating its request that Iran include the fuel assembly information.**
- **The Agency has finalized its assessment of the results of the physical inventory verification (PIV) carried out at FMP in August 2009, and has concluded that the inventory of nuclear material at FMP as declared by Iran is consistent with those results, within the measurement uncertainties normally associated with fabrication plants of similar throughput.**
- **On 24 October 2009, the Agency carried out a DIV at FMP. It confirmed that the status of the facility remained unchanged and that no further assemblies, rods or pellets have been produced. On 7 November 2009, the Agency carried out a DIV at the IR-40 reactor at Arak. The Agency verified that the construction of the facility was ongoing. The Agency has continued using satellite imagery to monitor the status of the Heavy Water Production Plant, which seems not to have been operating since the last report.**
- **IAEA found large amounts of heavy water that does not seem to have come from Arak, On 25 October 2009, during the DIV at the Uranium Conversion Facility (UCF) at Esfahan, the Agency observed 600 50-litre drums said by Iran to contain heavy water. In a letter dated10 November 2009, the Agency asked Iran to confirm the number of drums and their contents, and to provide information on the origin of the heavy water.**

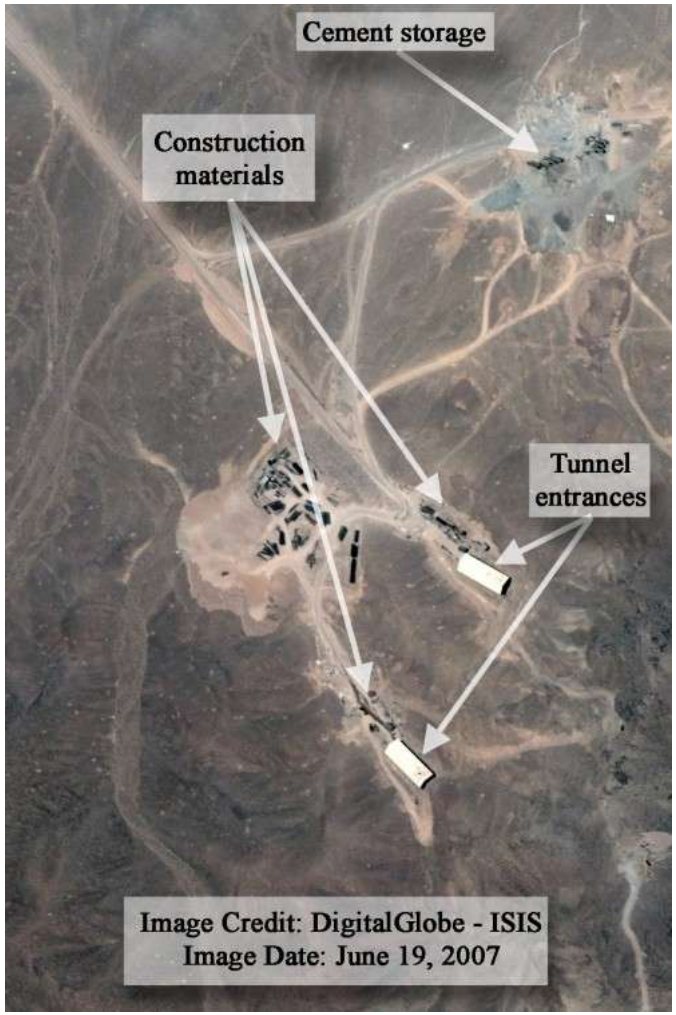
Source: IAEA and ISIS

Pressurized Reactor at Darkhovin

- In December 2007, the IAEA requested preliminary design information for the nuclear power plant. In a letter dated 22 September 2009, Iran provided the Agency with preliminary design information for the plant, citing, as it had in its letter of21 September 2009 concerning FFEP, its desire to cooperate rather than a legal obligation.
- In the preliminary design information, the Darkhovin plant is described as a 360 MWe pressurized water reactor, the construction of which is scheduled to start in 2011, with commissioning to take place in 2015.
- The Agency has examined the design information and has requested Iran to provide additional clarifications regarding, inter alia, the design of the fuel assemblies and the facility layout
- Despite repeated requests from the IAEA, Iran has not submitted an updated and more detailed DIQ.
- In an August 28 report, the IAEA has asked that the DIQ focus in particular on the "nuclear fuel characteristics, fuel handling and transfer equipment and the nuclear material accountancy and control system."
- In regard to Darkhovin, the IAEA reports that Iran is the only country with "significant nuclear activities" not implementing safeguards provisions that provide the IAEA with access to design information prior to construction.

Source: IAEA and ISIS

September 2009: US Intelligence Discloses New Underground Centrifuge Facility at Fordow, 20 KM from Qom



Never disclosed to IAEA before "outed" by US intelligence.

Can hold 3,000 centrifuges.

Iran implies begun in 2007.

Satellites show started in 2002.

IAEA finds in advanced stages of construction.

Iran does not provide full disclosure.

Source: Satellite photo from ISIS, See Paul Brannan, ISIS Reports New Satellite Image Further Narrows Fordow Construction Start Date, ISIS, November 18, 2009

IAEA Report on New Underground Facility

On 26 and 27 October 2009, the IAEA carried out design information verification (DIV) at FFEP The Agency verified that FFEP was being built to contain sixteen cascades with a total of approximately 3000 centrifuges. Iran indicated that it currently planned to install only IR-1 centrifuges at FFEP, but that the facility could be reconfigured to contain centrifuges of more advanced types should Iran take a decision to use such centrifuges in the future. Iran stated that some of the equipment located at FFEP had come from the Natanz site, and that the Natanz site would provide functional support to FFEP, such as centrifuge assembly and decontamination of equipment. Iran also stated that no nuclear material had been introduced into FFEP.

….The Agency confirmed that the plant corresponded with the design information provided by Iran and that the facility was at an advanced stage of construction, although no centrifuges had been introduced into the facility. Centrifuge mounting pads, header and sub-header pipes, water piping, electrical cables and cabinets had been put in place but were not yet connected; the passivation tanks, chemical traps, cold traps and cool boxes were also in place but had not been connected. In addition, a utilities building containing electricity transformers and water chillers had also been erected.

…Iran stated that: *"As a result of the augmentation of the threats of military attacks against Iran, the Islamic Republic of Iran decided to establish contingency centers for various organizations and activities …The Natanz Enrichment Plant was among the targets threatened with military attacks. Therefore, the Atomic Energy Organization requested the Passive Defence Organization to allocate one of those aforementioned centers for the purpose of [a] contingency enrichment plant, so that the enrichment activities shall not be suspended in the case of any military attack. In this respect, the Fordow site, being one of those constructed and prepared centers, [was] allocated to the Atomic Energy Organization of Iran (AEOI) in the second half of 2007. The construction of the Fordow Fuel Enrichment Plant then started. The construction is still ongoing. Thus the plant is not yet ready for operation and it is planned to be operational in 2011."*

…During the meetings, the Agency informed Iran that it had acquired commercially available satellite imagery of the site indicating that there had been construction at the site between 2002 and 2004, and that construction activities were resumed in 2006 and had continued to date. The Agency further indicated that it still had questions about the purpose for which the facility had been intended and how it fit into Iran's nuclear program. The Agency also indicated that Iran's declaration of the new facility reduces the level of confidence in the absence of other nuclear facilities under construction and gives rise to questions about whether there were any other nuclear facilities in Iran which had not been declared to the Agency.

...Iran stated that it did not have any other nuclear facilities that were currently under construction or in operation that had not yet been declared to the Agency. Iran also stated that any such future facilities would "be reported to the Agency according to Iran's obligations to the Agency". In a letter dated 6 November 2009, the Agency asked Iran to confirm that it had not taken a decision to construct, or to authorize construction of, any other nuclear facility which had not been declared to the Agency.

Source: Report by the Director General, "Implementation of the NPT Safeguards Agreement and relevant provisions of Security Council resolutions 1737 (2006), 1747 (2007), 1803 (2008) and 1835 (2008) in the Islamic Republic of Iran," Board of Governors GOV/2009/74, 16 November 2009

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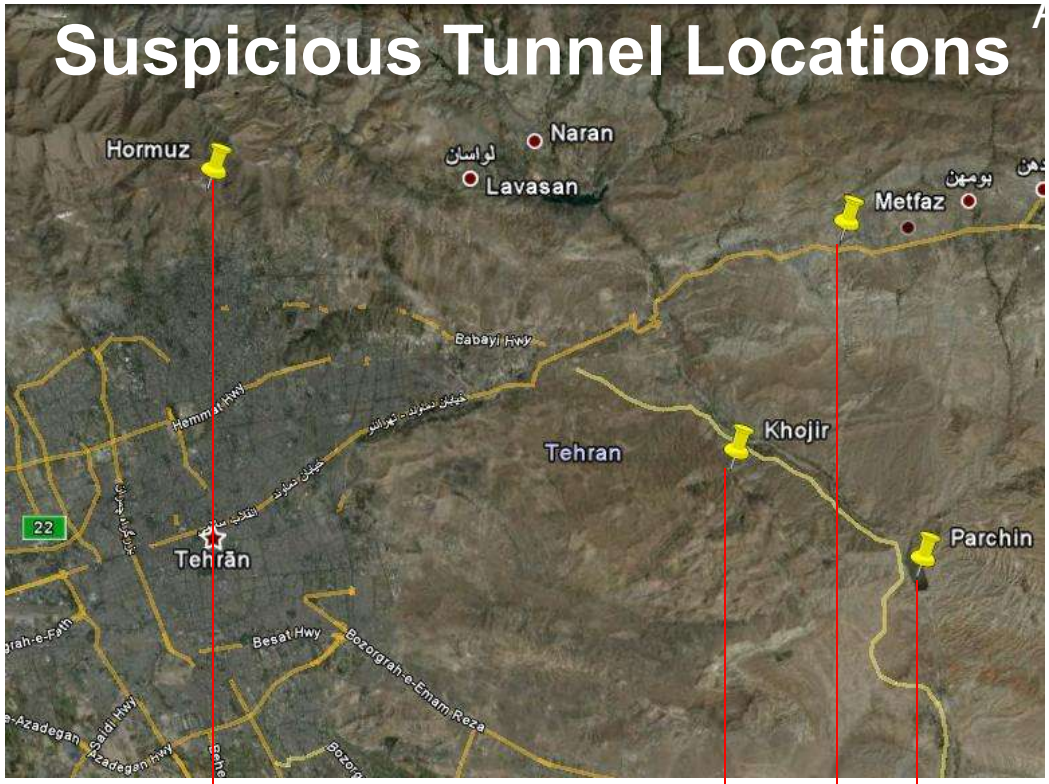
Suspicious Tunnel Locations



Hormuz: Site of suspected research tunnels along ridgeline

Parchin: Site of numerous tunnels, some suspected of use for research

Metfaz: Site of suspected tunnels used for parts construction along ridgeline

Khojir: Site of numerous tunnels, some suspected of use for arms assembly

Qum: Two tunnel entrances to an underground plant

Natanz: Three tunnel entrances near main plant

Isfahan: six tunnel entrances near main plant

Source: New York Times, *"Iran is Shielding Much of its Nuclear Program in a Network of Tunnels"*, January 6, 2010.

How Much is Enough?

Amount of Fissile Material Need to Build a Basic Fission (Non-Boosted) Weapon

Highly Enriched Uranium
HEU (90% U-235)

Simple gun-type weapon	**90-110 lbs/40-50 kg**
Simple implosion weapon	**33lbs/15 kg**
Sophisticated implosion weapon	**20-26lbs/9-12kg**

Weapons Grade Plutonium

Simple implosion weapon	**14lbs/6 kg**
Sophisticated implosion weapon	**4.5-9lbs/2-4 kg**

Extract from the unclassified estimates in Union of Concerned Scientists, "Preventing Nuclear Terrorism Fact Sheet," April 2004, and work by Abdullah Toucan

December 1, 2009: Times of London Discloses Iran Working on Neutron Initiator

Times publishes Iranian document called "Outlook for special neutron-related activities over the next 4 years" showing Iran developing a neutron initiator similar to, of used by AQ Khan, in Pakistani weapons design taken from China, dated in the 1980s, and also given to Libya.

ISIS analysis shows that, "report appears to be describing a plan to further develop and test a critical component of a nuclear weapon, specifically a neutron initiator made out of uranium deuteride (UD3), which when finished (and subsequently manufactured) would most likely be placed at the center of a fission bomb made from weapon-grade uranium.

…This type of initiator works by the high explosives compressing the nuclear core and the initiator, producing a spurt of neutrons as a result of fusion in D-D reactions. The neutrons flood the core of weapon-grade uranium and initiate the chain reaction. It does not boost the yield."

Could be used in a simulation or "cold test" or a nuclear weapon, although passive testing would be difficult and involve risks.

Source: ISIS REPORT, New Document Reopens Question on Whether Iran's Nuclear Weaponization Work Continued Past 2003, December 14, 2009

•

Iran's Hypothetical Forces

- Less than 50 nuclear weapons, most fission, possibly some boosted. 30 Nuclear warheads, 20 bombs.
  - Most 20-30 Kt, some 100 KT
- 100 Shahab 3 and 3 ER on mobile TELs. 60 TELs.
- Su-24, F-14 convert, and Su-37 strike aircraft.
- Reverse engineered KH-55 cruise missiles.
- Mustard and persistent nerve gas, stable bombs, bombs and warheads with cluster munitions.
- Limited satellite targeting and damage assessment capability.
- Limited ballistic missile point defense capability with SA-300/SA-400
- Meaningful civil defense? No.

Israel's Hypothetical Forces

- 200+ boosted and fusion weapons.
  - Most 20-100 Kt variable yield, some 1 Megaton.
- 100 Jericho 1 and 2.
- 30 Jericho ER.
- JSF, F15I, F-16I with nuclear-armed cruise missiles, advanced conventional precision strike capability.
- 3 Dolphin submarines with nuclear armed SLCMs.
- High resolution satellite targeting and damage assessment capability.
- Moderate ballistic missile point and area defense capability with Arrow IV/V and Patriot PAC-3 TMD.
- CW? Assume Yes. BW? Assume No.
- Meaningful civil defense? CW only.

Strike on Iran?

- Timelines: Acquisition? Deployment? Modernization?
- Targeting intelligence?
- Dispersal, hardening, concealment?
- Hardening vs. Attack Lethality
- SEAD: Penetration? Suppression? Kill?
- Range-payload, refuel, recovery
- Restrike? Penetration corridor enforcement?
- LOW? LUA? Covert?

Post-Strike on Iran/ Parallel Iranian Options

- IR-2, IR-3, IR-3 "cooled," IR-4
- Folded centrifuge
- Concealed heavy water reactor
- LWR cannibalization
- LWR download
- Dirty weapons
- Basic biological
- Genetic engineered weapons

Key Force Posture Decisions

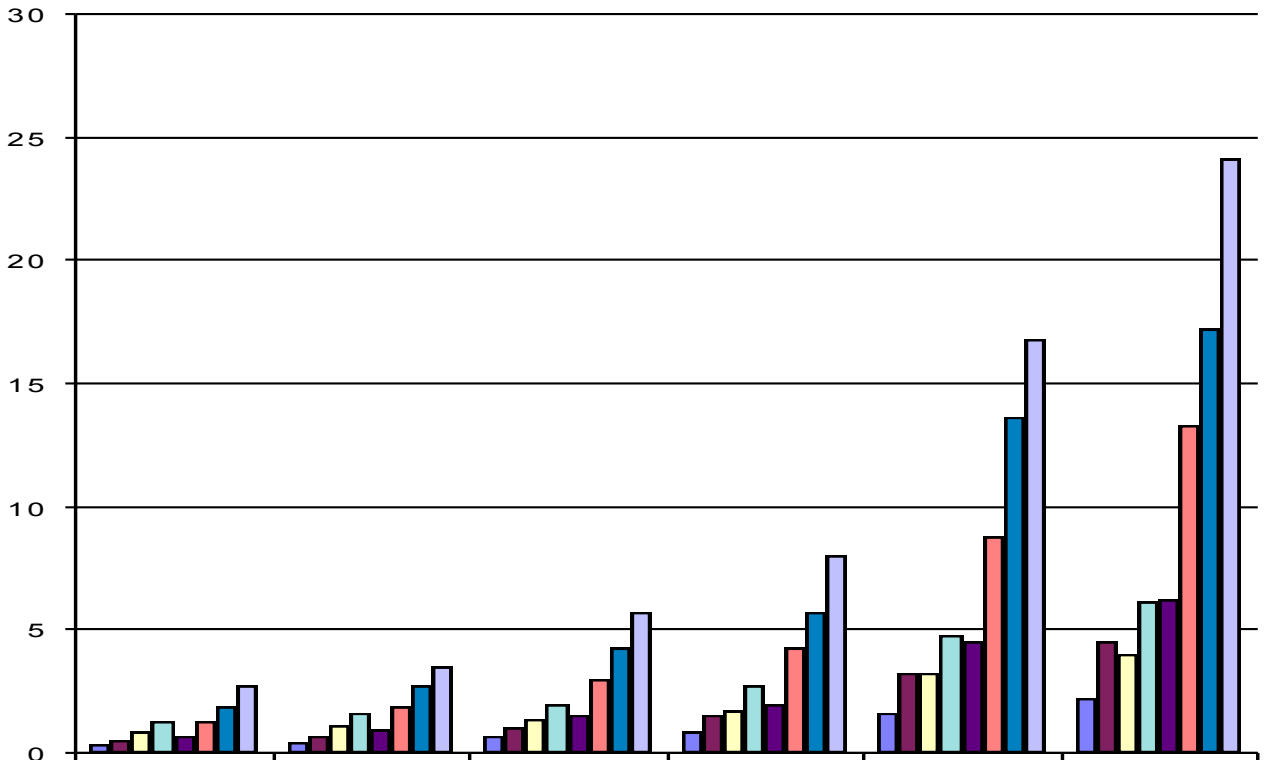
- **US and/or Israel**
  - **Prevent, preempt, contain, deter, retaliate, mutual assured destruction.**
- **Iran and Israel:**
  - **In reserve (secure storage), launch on warning (LOW), launch under attack (LOA), ride out and retaliate**
  - **Continuous alert, dispersal**
  - **Point, wide area defense goals**
- **Israel:**
  - **Basing mode: sea basing, sheltered missiles.**
  - **Limited strike, existential national, multinational survivable.**
- **US:**
  - **Level of defensive aid.**
  - **Ambiguous response**
  - **Clear deployment of nuclear response capability.**
  - **Extended deterrence. Assured retaliation.**
- **Gulf:**
  - **Passive (wait out), defensive, or go nuclear.**
  - **Ballistic, cruise missile, air defense.**
  - **Seek extended deterrence from US**

Key Force Posture Decisions - II

- **Syria:**
  - **Link or decouple from Iran.**
  - **Passive (tacit threat) or active (clear, combat ready deployment).**
- **Non-State Actor:**
  - **Tacit or covert capability.**
  - **Proven capability.**
  - **Deployment mode: Hidden, dispersed, pre-emplaced**

Why Yield Matters

(Seriousness of Effect in Kilometers as a Function of Yield)

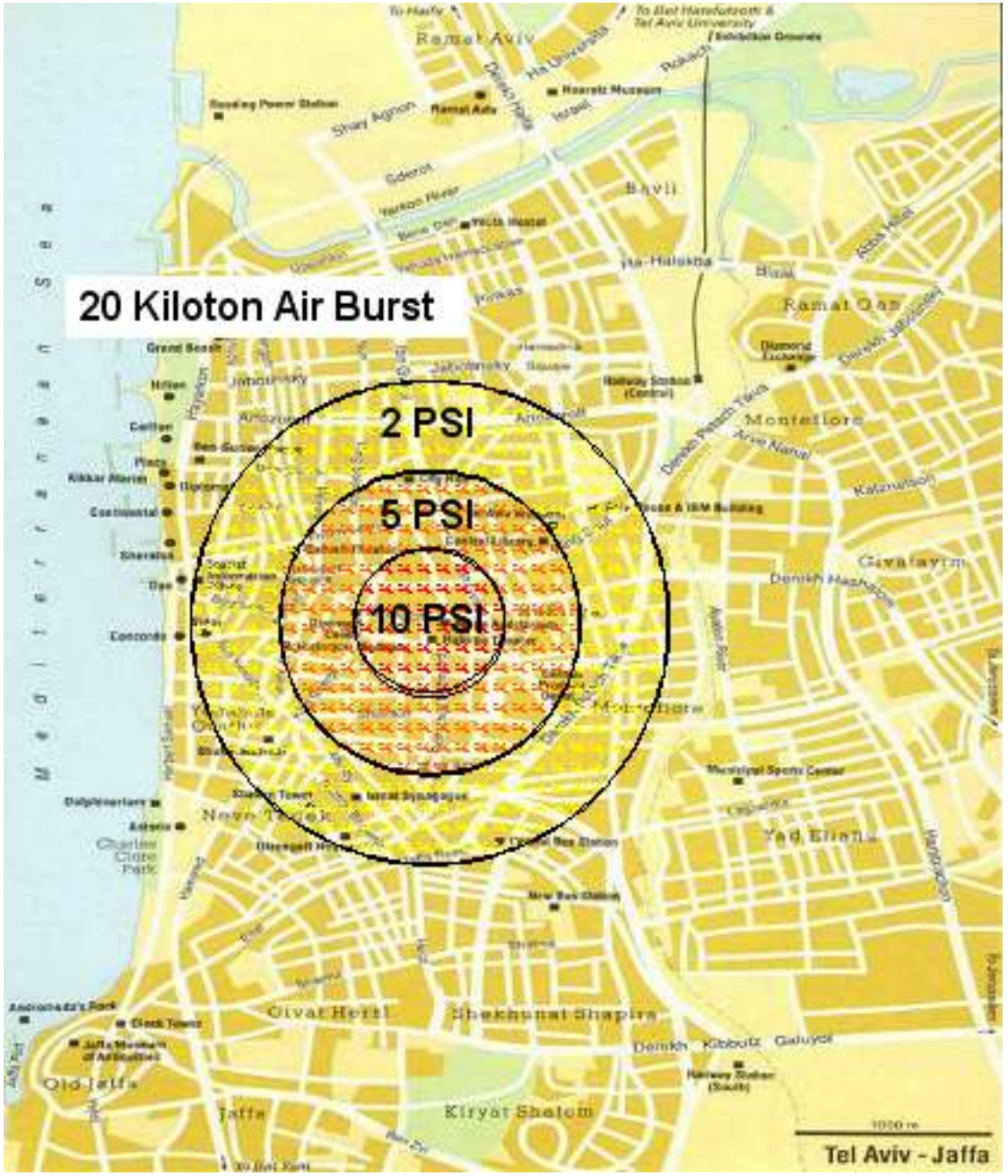


	10KT	20 KT	50 KT	100 KT	500 KT	1 MT
Fireball	0.352	0.464	0.67	0.884	1.6	2.2
Metals Vaporize	0.477	0.675	1	1.5	3.2	4.5
10-Psi	0.875	1.1	1.4	1.7	3.2	4
5-Psi	1.3	1.6	2	2.7	4.8	6.1
Metals Melt	0.675	0.954	1.5	2	4.5	6.2
Plastics Melt/Ignite	1.3	1.9	3	4.3	8.8	13.3
Wood chars/Burns	1.9	2.7	4.3	5.7	13.6	17.2
3rd Degree Burns	2.7	3.5	5.7	8	16.8	24.1

Source: Adapted by Anthony H. Cordesman from the Royal United Services Institute, Nuclear Attack: Civil Defense, London, RUSI/Brassey's, 1982, pp. 30-36

Israel:

Blast coverage of 20KT Iranian Nuclear Weapon

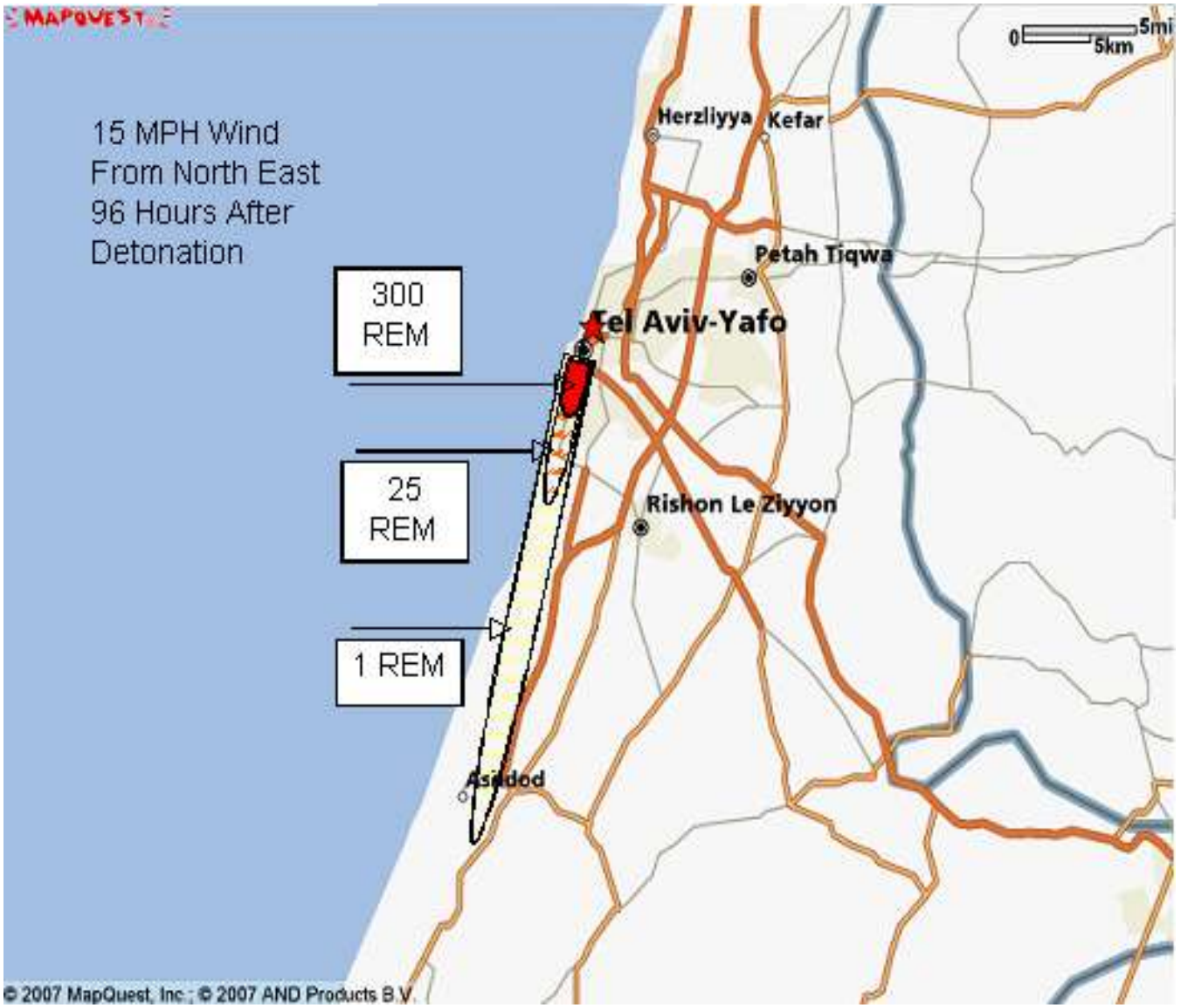


Fall Out

- The closer to ground a bomb is detonated, the more dust and debris is thrown into the air, and the more local fallout.
- Impact with the ground severely limits the blast and radiation from a bomb. Ground bursts are not usually considered tactically advantageous, with the exception of hardened underground targets such as missile silos or command centers.
- Population kills can be different. For a 1 MT explosion, lethal ellipses can reach 40-80 miles against unsheltered populations after 18 hours
- For a 1 MT explosion, lethal ellipses will reach 40-80 miles against unsheltered populations after 18 hours. Area of extreme lethality (3000 rads) can easily reach 20+ miles.
- A dose of 5.3 Gy (Grays) to 8.3 Gy is considered lethal but not immediately incapacitating. Personnel will have their performance degraded within 2 to 3 hours, and will remain in this disabled state at least 2 days. However, at that point they will experience a recovery period and be effective at performing non-demanding tasks for about 6 days, after which they will relapse for about 4 weeks. At this time they will begin exhibiting symptoms of radiation poisoning of sufficient severity to render them totally ineffective. Death follows at approximately 6 weeks after exposure.
- Delayed effects may appear months to years following exposure. Most effects involve tissues or organs. Include life shortening, carcinogenesis, cataract formation, chronic radiodermatitis, decreased fertility, and genetic mutations.

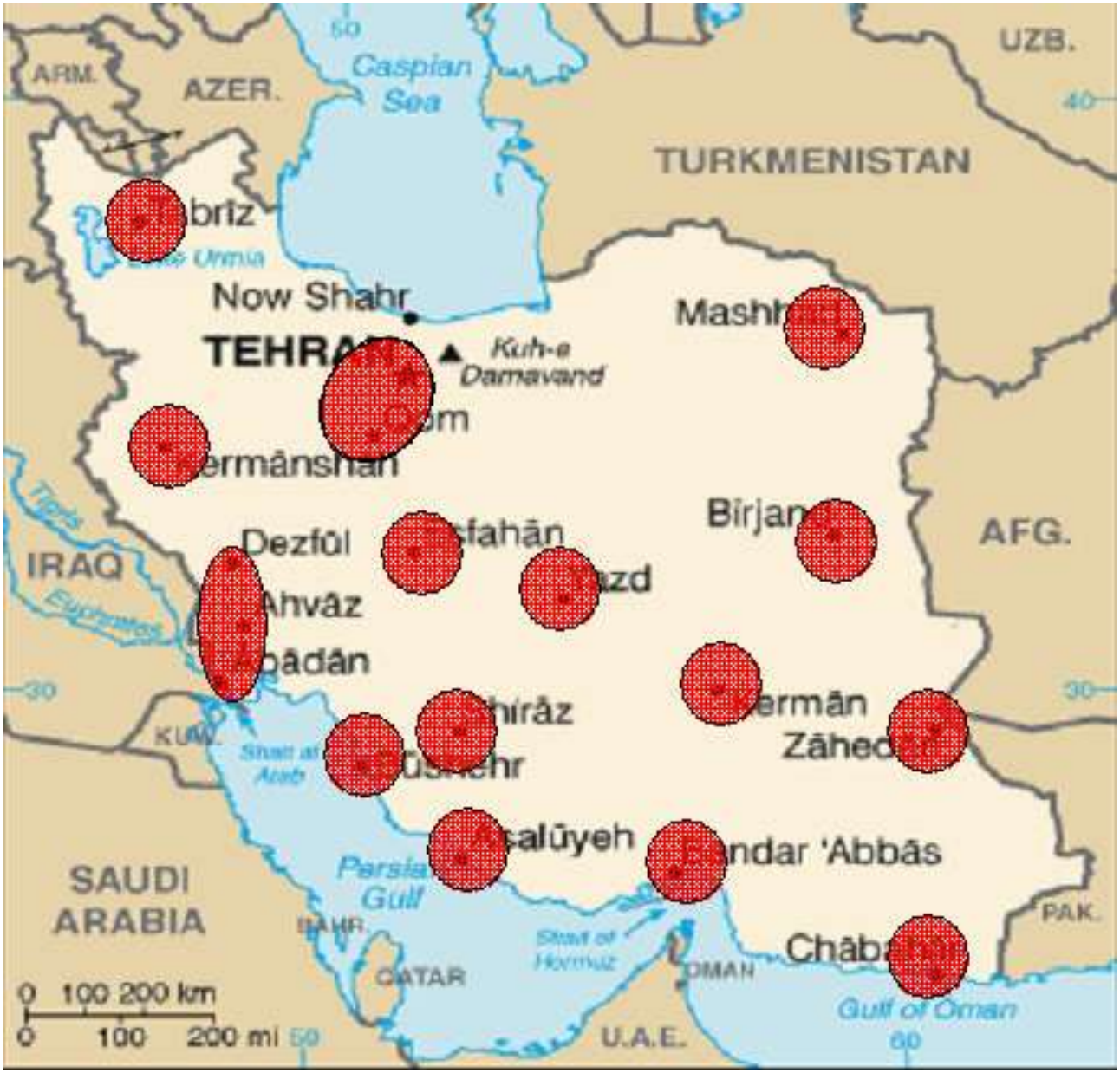
Israel:

Nominal Worst Case 20KT Fall Out Coverage



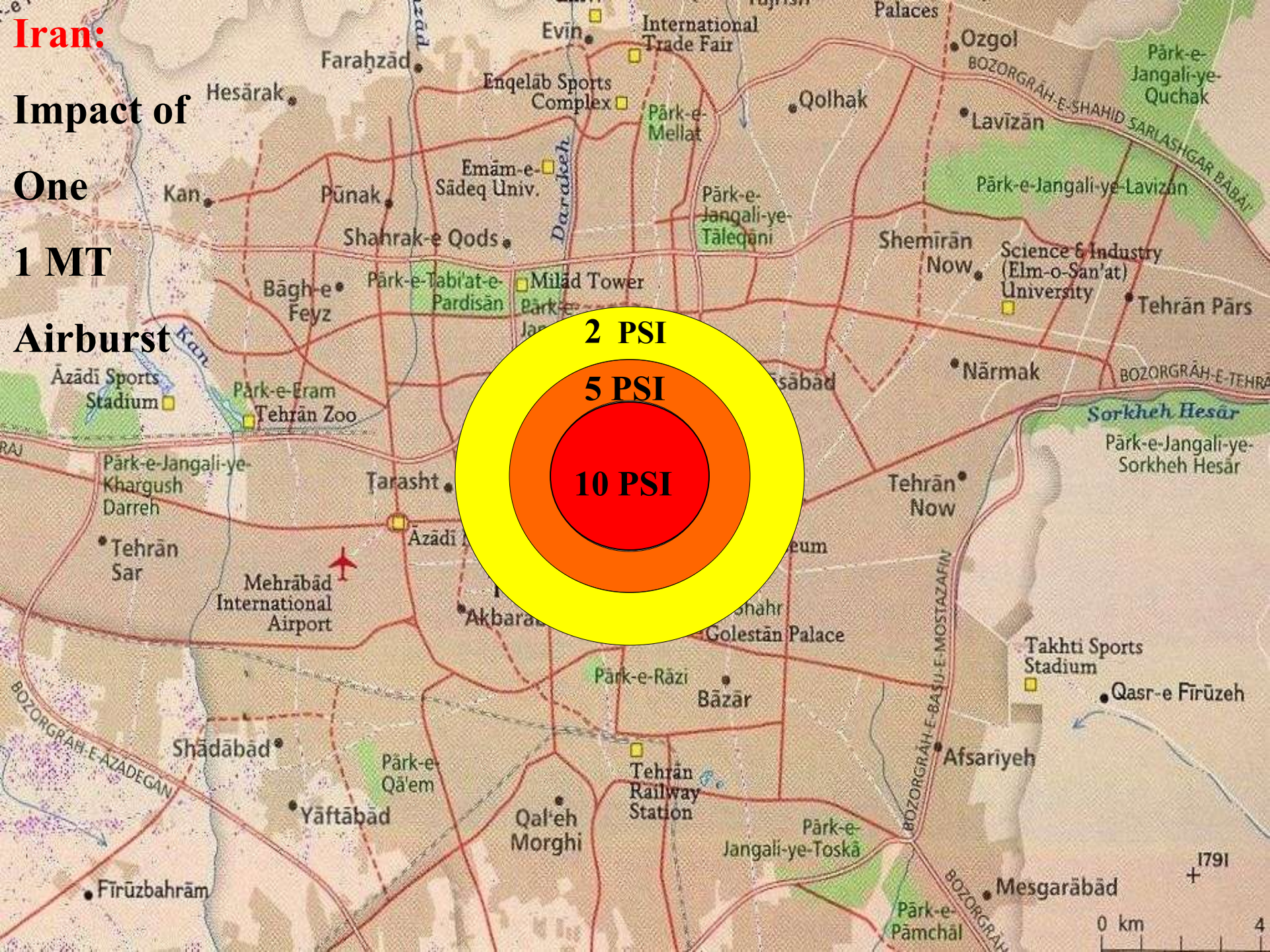
Iran:

High Value Population Centers



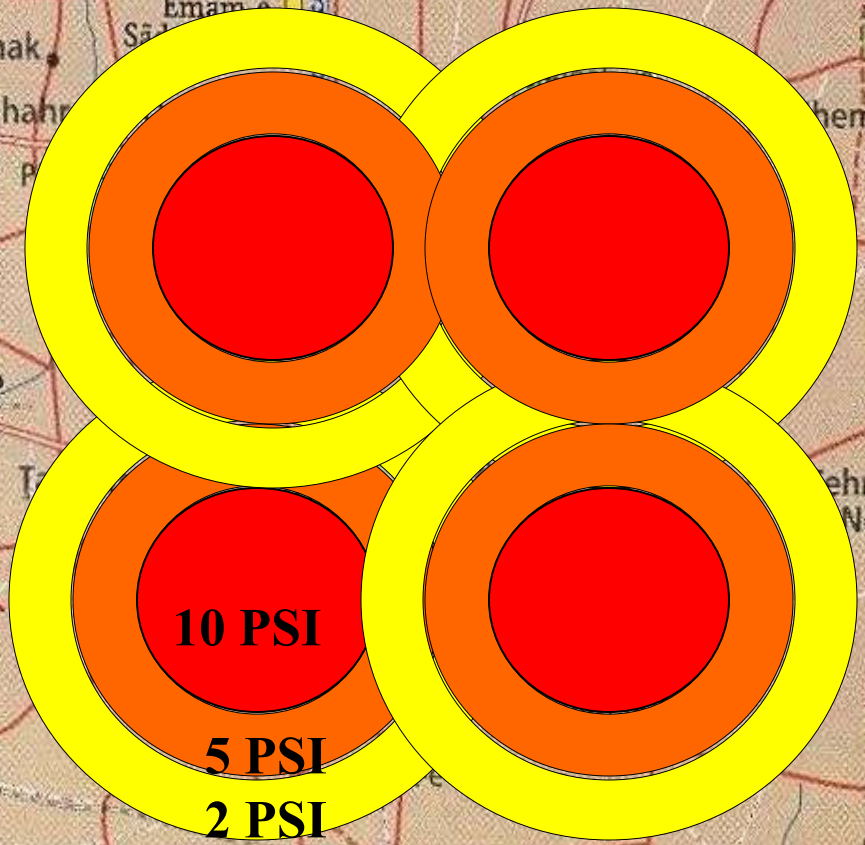
Tehran

- **Iran: Total of 68.7 million.**
  - **Ethnicity: Persian 51%, Azeri 24%, Gilaki and Mazandarani 8%, Kurd 7%, Arab 3%, Lur 2%, Baloch 2%, Turkmen 2%, other 1%**
  - **Religions: Muslim 98% (Shi'a 89%, Sunni 9%), other (includes Zoroastrian, Jewish, Christian, and Baha'i) 2%**
- **Tehran: Topographic basin with mountain reflector. Nearly ideal nuclear killing ground.**
- **Land area of 658 square kilometers (254 sq mi)**
- **Approximately 7.6 million people in city.**
- **12.6 million in municipal area and greater metropolitan area, and 15 million in municipal area. Some 20% of Iran's population.**
- **Tehran is a sprawling city at the foot of the Alborz mountain range with an immense network of highways unparalleled in western Asia.**
- **Hub of the country's railway network. The city has numerous cultural centers**
- **About 30% of Iran's public-sector workforce and 45% of large industrial firms are located in Tehran. More than half of Iran's industry is based in Tehran..**
- **Tehran is the biggest and most important educational center of Iran. Nearly 50 major colleges and universities in Greater Tehran.**
- **Majority of residents are Persians who speak many different dialects of Persian corresponding to their hometown. (including Esfahani, Shirazi, Yazdi, Khuzestani, Semnani, Taleghani, Dari,Judeo-Persian, etc) The second largest linguistic group is that of the Azari.**

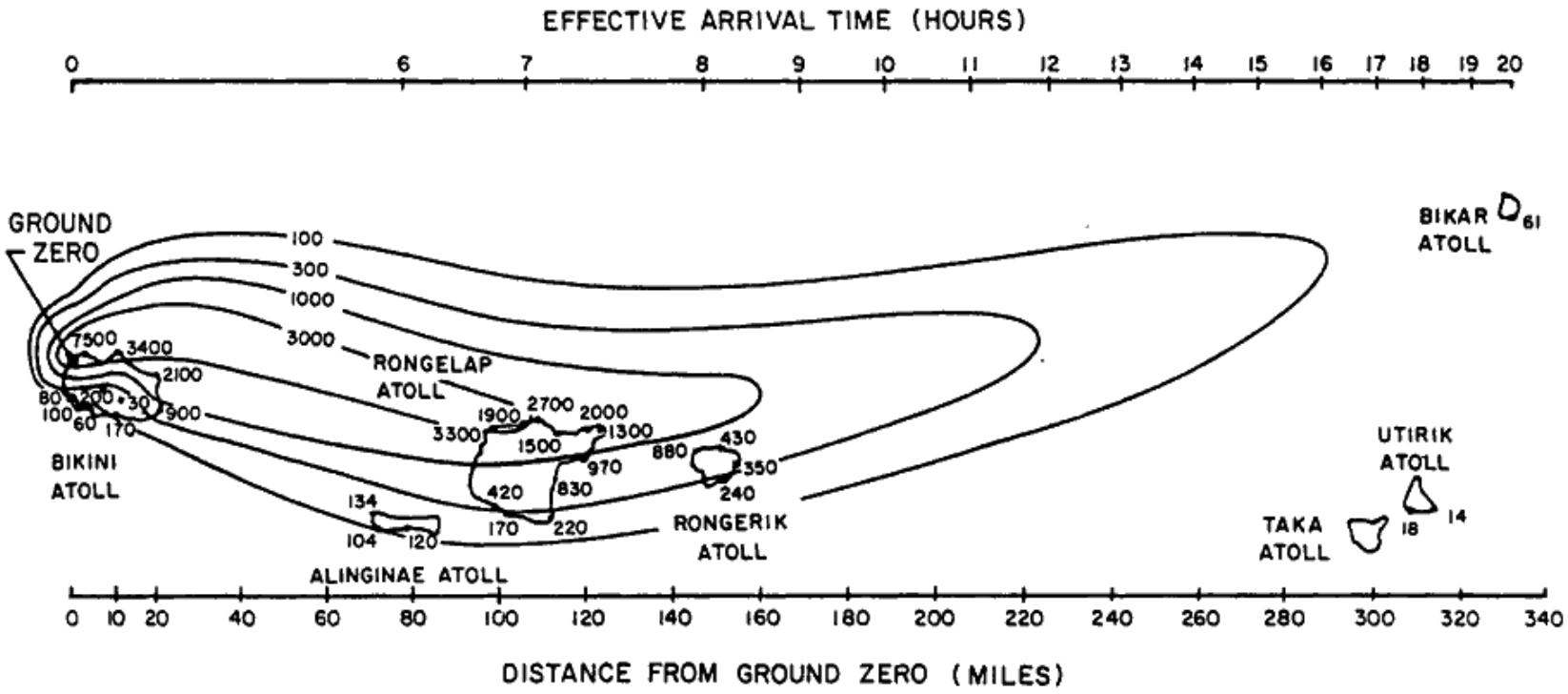

Iran:
Impact of
One
1 MT
Airburst
2 PSI
5 PSI
10 PSI
Evīn
International Trade Fair
Palaces
Ozgol
Faraḥzād
Hesārak
Enqelāb Sports Complex
Pārk-e-Mellat
Qolhak
Lavīzān
Pārk-e-Jangali-ye-Quchak
BOZORGRĀH-E-SHAHID SARLASHGAR BABAI
Kan
Pūnak
Emām-e-Sādeq Univ.
Darakeh
Pārk-e-Jangali-ye-Lavizan
Shahrak-e Qods
Pārk-e-Jangali-ye-Tāleqāni
Shemīrān Now
Science & Industry (Elm-o-San'at) University
Tehrān Pārs
Bāgh-e Feyz
Pārk-e-Tabi'at-e-Pardisān
Milād Tower
Nārmak
BOZORGRĀH-E-TEHRĀ
Āzādī Sports Stadium
Pārk-e-Eram
Tehrān Zoo
Sorkheh Hesār
Pārk-e-Jangali-ye-Sorkheh Hesār
Pārk-e-Jangali-ye-Khargush Darreh
Tarasht
Tehrān Now
Tehrān Sar
Mehrābād International Airport
Golestān Palace
Takhti Sports Stadium
Qasr-e Fīrūzeh
Pārk-e-Rāzi
Bāzār
BOZORGRĀH-E-AZADEGAN
BOZORGRĀH-E-BASIJ-E-MOSTAZAFIN
Shādābād
Pārk-e-Qā'em
Afsarīyeh
Tehrān Railway Station
Yāftābād
Qal'eh Morghi
Pārk-e-Jangali-ye-Toskā
1791
Fīrūzbahrām
Mesgarābād
Pārk-e-Pāmchāl
0 km
4

Iran:

Impact of Four 1 MT Airbursts



Tehran: The Fallout Problem



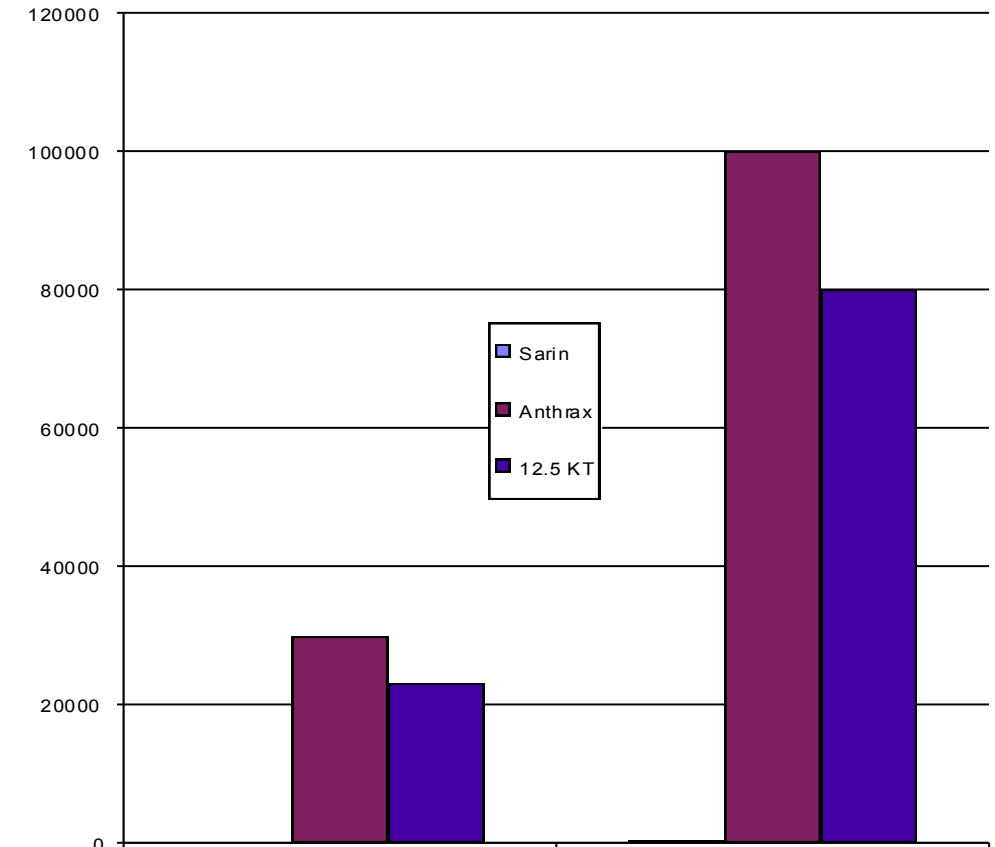
Source: http://en.wikipedia.org/wiki/Nuclear_fallout

Iran Nuclear, US Conventional

- Assume mature, dispersed Iranian force. Preemption limited option for US, but face launch on warning, launch under attack option.
- Iran cannot threaten US. Can threaten US bases in Gulf, Israel, Europe, GCC allies, Egypt, Jordan, oil export capabilities.
- SAD-like environment relying on proxy targets for maximum damage to US.
- Iranian side:
  - Limited strike designed to intimidate or show resolve, force issue without generating massive nuclear retaliation. Might focus on Arab target, rather than US or Israel, to try to limit retaliation.
  - *Reserve strike capability critical.*
  - *Lower fission yields, less accurate force* limit range of targeting, but can cover all US bases and mix of other targets.
  - Target to maximize casualties, clear attention to fall out, lasting effects.
  - Inflict 2,000,000 to 8,000,000 prompt to 21-day dead; long term death rate cannot be calculated.
  - Iranian recovery very possible.
- US side:
  - Some preemptive damage limitation possible.
  - Launch on confirmed warning from US satellites.
  - Massive reserve conventional and nuclear strike capability.
  - Stealth and precision strike capability give weapons of mass effectiveness (WME) capability.
  - Power, refineries, continuity of government, C4I assets.
  - EMP option would be “semi-nuclear” response.

CBRN Prompt (48-hour) Killing Effect in an Urban Environment

The Relative Killing Effect of Chemical vs. Biological vs. Nuclear Weapons



	Low	High
Sarin	60	200
Anthrax	30000	100000
12.5 KT	23000	80000

Source: Adapted by Anthony H. Cordesman from Victor A. Utgoff, The Challenge of Chemical Weapons, New York, St. Martin's, 1991, pp. 238-242 and Office of Technology Assessment, Proliferation of Weapons of Mass Destruction: Assessing the Risks, U.S. Congress OTA-ISC-559, Washington, August, 1993, pp. 56-57.

Q_{50} for Some Types of BW - Open-Air Deployment

- Plague (liquid): 3.5-4.5 liter/sq.km
- Tularemia (dry): 3.0-4.0 kg/sq.km
- Anthrax (dry, old version): 15-20 kg/sq.km
- Anthrax (dry, new version): 4.5-5.0 kg/sq.km
- Anthrax (liquid): 5.0-5.5 liter/sq.km
- Brucellosis (dry): 3.5-4.5 kg/sq.km
- Glanders/Melioidosis (liquid): 4.5-5.5 liter/sq.km
- Smallpox (liquid): 3.5-4.0 liter/sq.km
- Marburg (dry): less than 1.0 kg/sq.km

New Types of Biological Weapons

- ***Binary biological weapons*** **that use two safe to handle elements that can be assembled before use. This could be a virus and helper virus like Hepatitis D or a bacterial virulence plasmid like E. coli, plague, Anthrax, and dysentery.**
- ***Designer genes and life forms,*** **which could include synthetic genes and gene networks, synthetic viruses, and synthetic organisms. These weapons include DNA shuffling, synthetic forms of the flu – which killed more people in 1918 than died in all of World War I and which still kills about 30,000 Americans a year – and synthetic microorganisms.**
- ***"Gene therapy" weapons*** **that use transforming viruses or similar DNA vectors carrying Trojan horse genes (retrovirus, adenovirus, poxvirus, HSV-1). Such weapons can produce single individual (somatic cell) or inheritable (germline) changes. It can also remove immunities and wound healing capabilities.**
- ***Stealth viruses*** **can be transforming or conditionally inducible. They exploit the fact that humans normally carry a substantial viral load, and examples are the herpes virus, cytomegalovirus, Epstein-Barr, and SV40 contamination which are normally dormant or limited in infect but can be transformed into far more lethal diseases. They can be introduced over years and then used to blackmail a population.**
- ***Host-swapping diseases:*** **Viral parasites normally have narrow host ranges and develop an evolutionary equilibrium with their hosts. Disruption of this equilibrium normally produces no results, but it can be extremely lethal. Natural examples include AIDS, Hantavirus, Marburg, and Ebola. Tailoring the disruption for attack purposes can produce weapons that are extremely lethal and for which there is no treatment. A tailored disease like AIDS could combine serious initial lethality with crippling long-term effects lasting decades.**
- ***Designer diseases*** **involve using molecular biology to create the disease first and then constructing a pathogen to produce it. It could eliminate immunity, target normally dormant genes, or instruct cells to commit suicide. Apoptosis is programmed cell death, and specific apoptosis can be used to kill any mix of cells.**

Soviet RBK-type Cluster Bomb for CBR Weapons

Source: Ken Alibeck

Non-State Actor CBR(N?)

- **Independent, Proxy, False Flag, or Trigger Force?**
- **Access likely to be more critical in determining capability than ability to create own weapons, but highly lethal BW and genetic weapons may be becoming "off the shelf" option.**
- **Many of same twists as covert State Actor attacks:**
  - **Bypasses defenses.**
  - **Plausible deniability?**
  - **Exploits special vulnerability of "one bomb" states.**
  - **Psychological and political impacts as important as direct killing effects.**
  - **False flag and proxy options clear.**
  - **Buying time may limit risk of retaliation.**
  - **Allows to exploit "slow kill" nature of biological strikes. Achieve "line source" effects**
  - **Covert forces in place can restrike or escalate.**
- **Unclear Non-State Actors are deterrable by any form of retaliation.**

Source: Ken Alibeck

State Actor Covert Bioterrorism, Suitcase Nuclear

- Bypasses defenses.
- Plausible deniability?
- Exploits special vulnerability of "one bomb" states.
- Psychological and political impacts as important as direct killing effects.
- False flag and proxy options clear.
- Buying time may limit risk of retaliation.
- Allows to exploit "slow kill" nature of biological strikes. Achieve "line source" effects
- Covert forces in place can restrike or escalate.
- Target potentially faces major weakening of conventional capabilities without ability to counter-escalate.

Possible Terrorist/Covert/Irregular Deployment of Biological Weapons

- Use of infected vectors (mosquitoes, fleas, lice, etc.)
- Contamination of food and water supplies
- Contamination of various articles (letters, books, surfaces, etc.)
- Use of different aerosolizing devices and approaches to contaminate inner spaces of various buildings (line and point sources)
- Use of different aerosolizing devices and approaches for open-air dissemination (line and point sources)
- Inner- and outer-space explosive dissemination including suicide bombers
- Terrorist/Sabotage methods of infecting crops and livestock

Source: Ken Alibeck

WME: "Weapons of Mass Effectiveness"

- Theoretical possibility, give precision long-range strike capability.
- Target mix varies with attacker's motives.
- Broad possible target base in MENA area, varying sharply by country.
  - Desalination
  - Major power plants, nuclear power plants.
  - Water purification and distribution.
  - Refinery
  - High value, long-lead time oil, gas, and petrochemical facilities.
  - Ethnic and sectarian high value targets.
  - Leadership elite: Royal family, president, etc.

Dealing with Nuclear Uncertainty

- **Decide proper mix of four basic military options:**
  - **Prevention/preemption,**
  - **Active and passive defense,**
  - **Acquiring own nuclear weapons, and/or**
  - **US extended deterrence.**
- **Can wait for diplomacy for time being, but need to start considering future options.**
  - **Ballistic and cruise missile defenses maybe cost-effective simply to deal with conventional threat.**
  - **A number of systems offer both improved air and missile defense.**
  - **Need quiet talks with US on containment options; extended deterrence.**
  - **Open support for IAEA and diplomatic options key passive approach.**