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Iran and the Threat to "Close" the Gulf

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Key Energy Data that Shape the Threat

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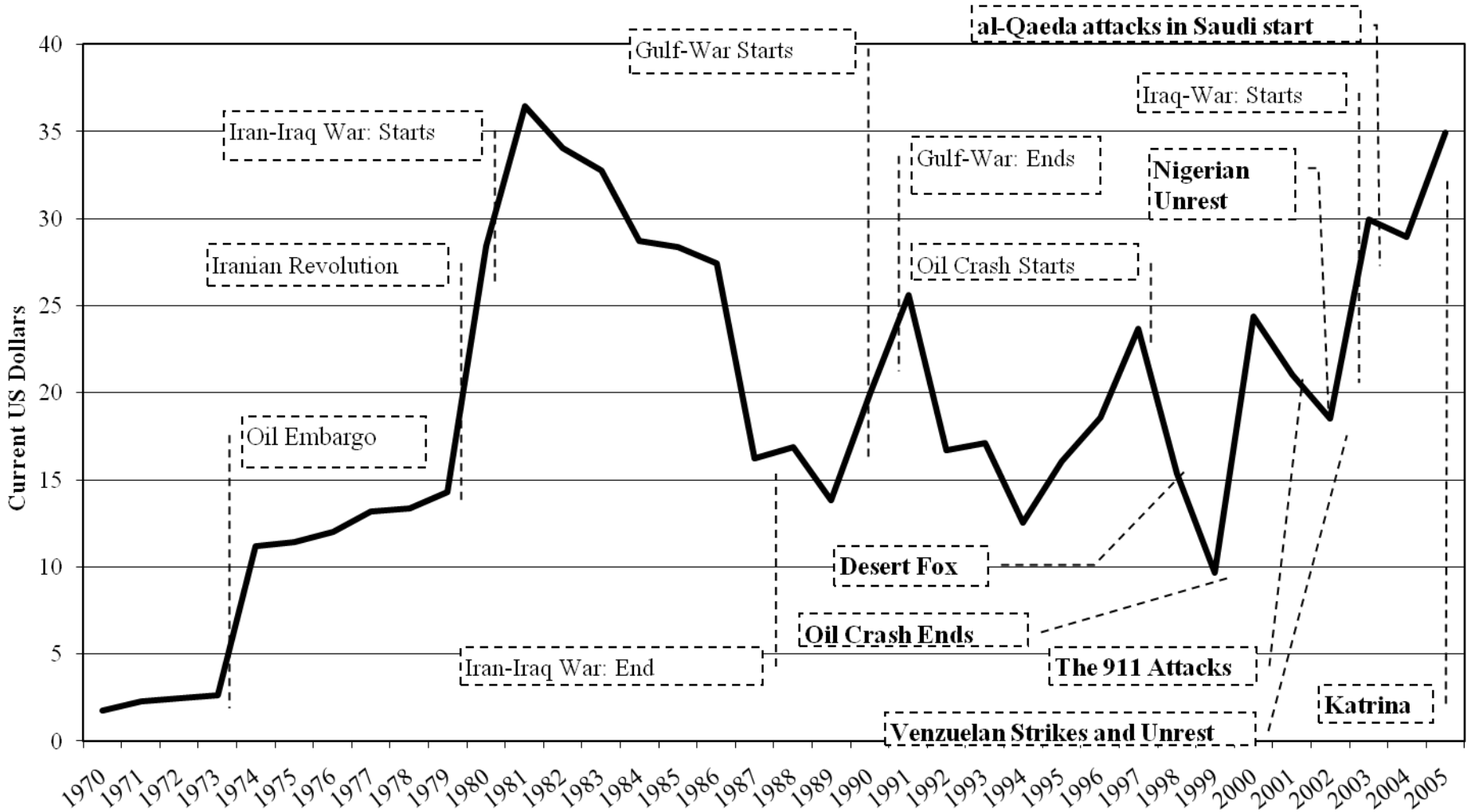
Repeating History: Gulf-Driven Oil Shocks Before $100 Oil

Overtimes: more incidents, more frequent volatility, higher risk of asymmetric attacks, and more geopolitical uncertainties.



Source: EIA, "Crude Prices by Selected Type 1970-2005," http://www.eia.doe.gov/emeu/aer/txt/ptb1107.html.
Note: These prices are averages of several types: Saudi Light, Iranian Light, Libyan Es Sider, Nigerian Bonny Light, Indonesian Minas, Venezuelan Tia Juana light Mexico Maya, and UK Brent blend

Rising Global Dependence on Oil and Liquids

Figure 2. World energy consumption by fuel, 1990-2035 (quadrillion Btu)

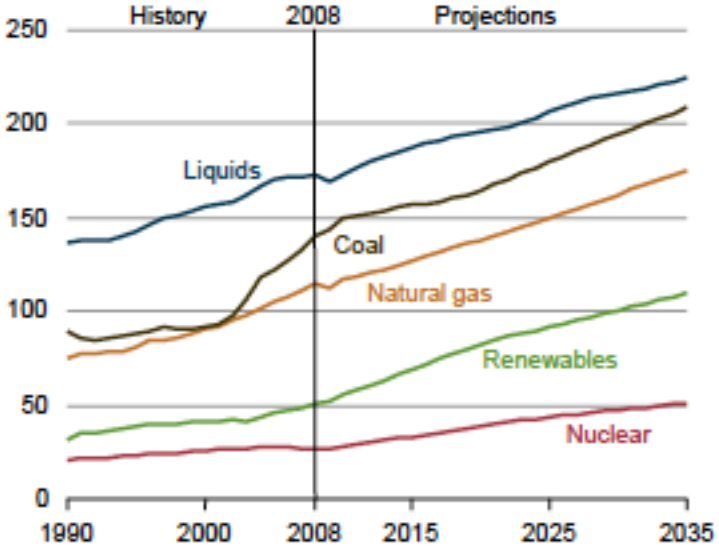
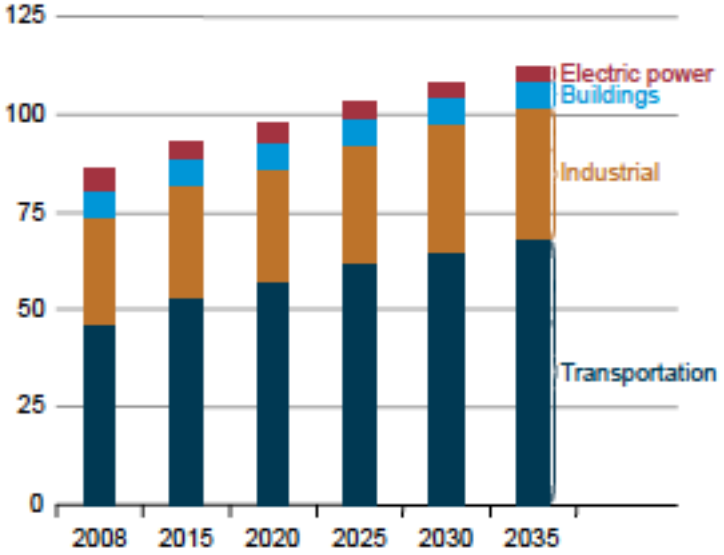


Figure 3. World liquids consumption by sector, 2008-2035 (million barrels per day)



World use of petroleum and other liquids4 grows from 85.7 million barrels per day in 2008 to 97.6 million barrels per day in 2020 and 112.2 million barrels per day in 2035. In the Reference case, most of the growth in liquids use is in the transportation sector, where, in the absence of significant technological advances, liquids continue to provide much of the energy consumed. Liquid fuels remain an important energy source for transportation and industrial sector processes. Despite rising fuel prices, use of liquids for transportation increases by an average of 1.4 percent per year, or 46 percent overall from 2008 to 2035. The transportation sector accounts for 82 percent of the total increase in liquid fuel use from 2008 to 2035, with the remaining portion of the growth attributable to the industrial sector (Figure 3). The use of liquids declines in the other end-use sectors and for electric power generation. To meet the increase in world demand in the Reference case, liquids production (including both conventional and unconventional liquids supplies) increases by a total of 26.6 million barrels per day from 2008 to 2035. The Reference case assumes that OPEC countries will invest in incremental production capacity in order to maintain a share of approximately 40 percent of total world liquids production through 2035, consistent with their share over the past 15 years. Increasing volumes of conventional liquids (crude oil and lease condensate, natural gas plant liquids, and refinery gain) from OPEC producers contribute 10.3 million barrels per day to the total increase in world liquids production, and conventional supplies from non-OPEC countries add another 7.1 million barrels per day.

Unconventional resources (including oil sands, extra-heavy oil, biofuels, coal-to-liquids, gas-to-liquids, and shale oil) from both OPEC and non-OPEC sources grow on average by 4.6 percent per year over the projection period. Sustained high oil prices allow unconventional resources to become economically competitive, particularly when geopolitical or other “above ground” constraints5 limit access to prospective conventional resources. World production of unconventional liquid fuels, which totaled only 3.9 million barrels per day in 2008, increases to 13.1 million barrels per day and accounts for 12 percent of total world liquids supply in 2035. The largest components of future unconventional production are 4.8 million barrels per day of Canadian oil sands, 2.2 and 1.7 million barrels per day of U.S. and Brazilian biofuels, respectively, and 1.4 million barrels per day of Venezuelan extra-heavy oil. Those four contributors to unconventional liquids supply account for almost three-quarters of the increase over the projection period.

Source: EIA, International Energy Outlook, 2011, pp. 2-3

Unconventional Liquids Do Not Substitute for Petroleum, But Act as a Limited Supplement

Figure 32. World liquid fuels production in five cases, 2008 and 2035 (million barrels per day)

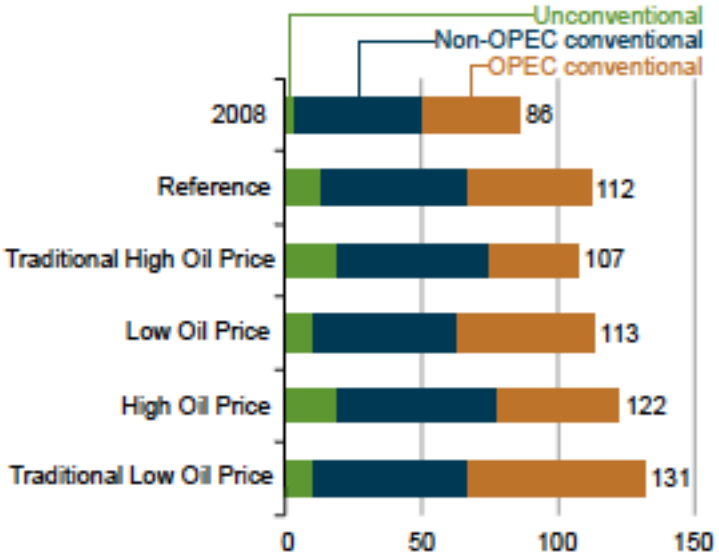
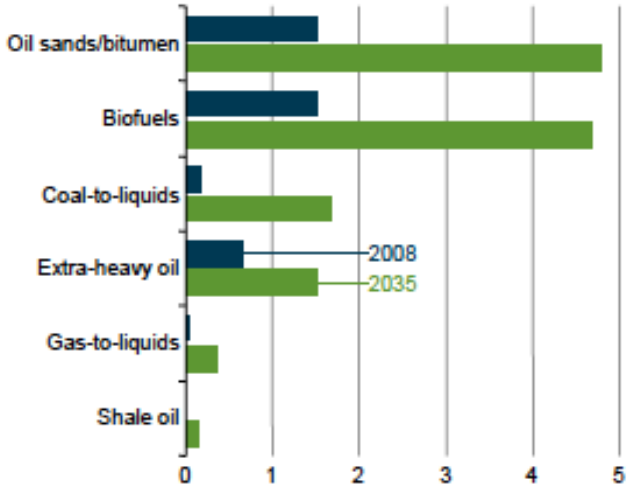


Figure 30. Unconventional liquids production by fuel type, 2008 and 2035 (million barrels per day)



World							
Conventional liquids[a]	81.7	87.2	89.8	93.6	96.5	99.1	0.7
Extra-heavy crude oil	0.7	0.8	1.1	1.2	1.4	1.5	3.1
Oil sands (upgraded)	1.5	2.3	2.9	3.5	4.1	4.8	4.4
Coal-to-liquids	0.2	0.3	0.5	0.8	1.3	1.7	9.0
Gas-to-liquids	0.1	0.3	0.3	0.3	0.3	0.3	7.4
Shale oil	0.0	0.0	0.0	0.0	0.1	0.1	12.1
Biofuels (physical volume)	1.5	2.4	3.0	3.8	4.4	4.7	4.3
World total	**85.7**	**93.3**	**97.6**	**103.2**	**108.0**	**112.2**	**1.0**

[a]Includes conventional crude oil and lease condensate, natural gas plant liquids (NGPL), and refinery gain.
[b]Includes some U.S. petroleum product stock withdrawals, domestic sources of blending components, other hydrocarbons, and ethers.

Source: EIA-IEO 2011, p. 26-28

OPEC and Gulf Share of World Production continue to Increase Through 2035

Figure 27. World liquid fuels consumption by region, 1990-2035 (million barrels per day)

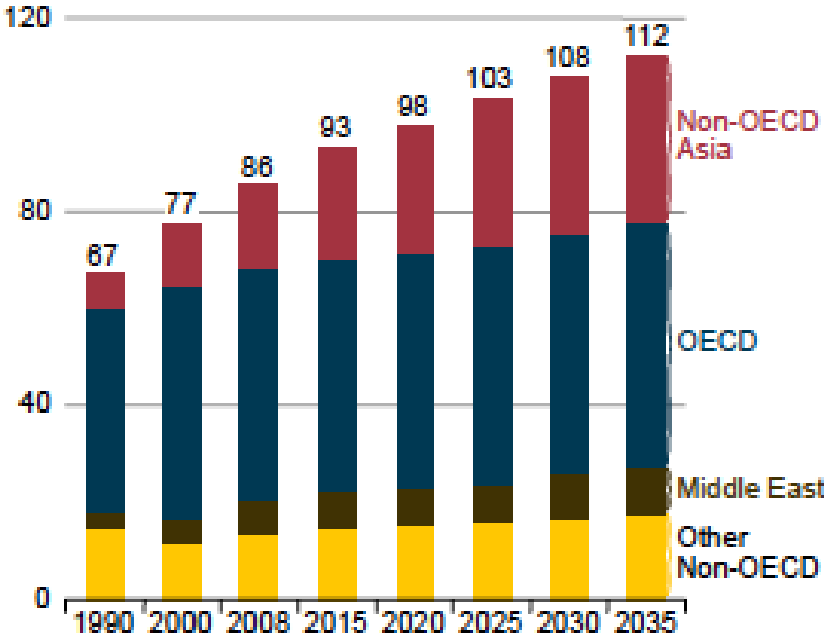
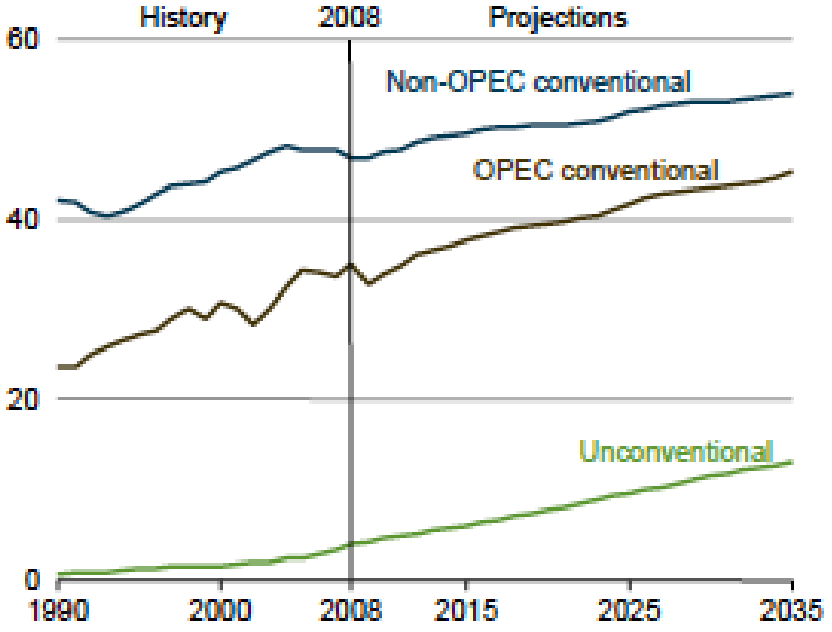


Figure 28. World liquid fuels production, 1990-2035 (quadrillion Btu)



Source: EIA, International Energy Outlook, 2011, pp. 24-25

The Critical Role of Gulf Oil & Other Liquids Production by Gulf Country Through 2035

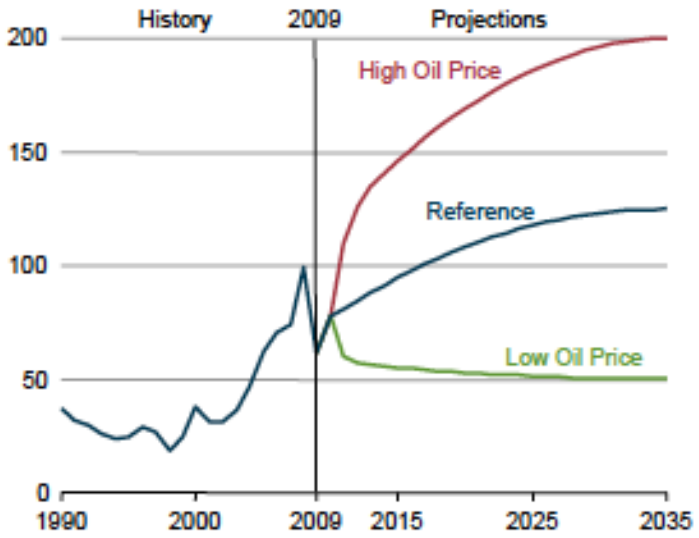
(Million Barrels Per Day)

	History (estimates)			Projections					Average annual percent change,
Region/country	2007	2008	2009	2015	2020	2025	2030	2035	2008-2035
OPEC*	**34.4**	**35.6**	**33.4**	**38.6**	**40.8**	**43.1**	**45.0**	**46.9**	**1.0**
Middle East	**23.1**	**24.2**	**22.5**	**27.0**	**28.9**	**31.2**	**33.3**	**35.2**	**1.4**
Iran	4.0	4.2	4.1	4.0	3.8	3.7	3.8	3.9	-0.3
Iraq	2.1	2.4	2.4	2.9	3.6	4.5	5.5	6.3	3.7
Kuwait	2.6	2.7	2.5	3.0	3.1	3.3	3.7	4.0	1.4
Qatar	1.1	1.2	1.2	1.9	2.1	2.3	2.5	2.5	2.7
Saudi Arabia	10.2	10.7	9.6	11.6	12.8	13.9	14.6	15.4	1.4
United Arab Emirates	2.9	3.0	2.8	3.6	3.5	3.5	3.3	3.2	0.2
North Africa	**4.0**	**4.1**	**3.9**	**3.5**	**3.4**	**3.4**	**3.3**	**3.2**	**-0.9**
Algeria	2.2	2.2	2.1	2.6	2.7	2.6	2.5	2.3	0.3
Libya	1.8	1.9	1.8	0.9	0.7	0.7	0.8	0.8	-3.0
Middle East (Non-OPEC)	**1.5**	**1.5**	**1.5**	**1.6**	**1.4**	**1.3**	**1.1**	**1.1**	**-1.3**
Oman	0.7	0.8	0.8	1.0	0.8	0.7	0.6	0.6	-1.1
Syria	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.2	-1.9
Yemen	0.3	0.3	0.3	0.2	0.2	0.1	0.1	0.1	-3.3
Other	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	3.6
Gas-to-liquids									
Qatar	0.0	0.0	0.0	0.2	0.2	0.2	0.2	0.2	15.5
Total world	**84.9**	**85.7**	**83.9**	**93.3**	**97.6**	**103.2**	**108.0**	**112.2**	**1.0**
OPEC share of world production	40%	42%	40%	41%	42%	42%	42%	42%	
Persian Gulf share of world production	27%	28%	27%	29%	30%	30%	31%	31%	

*OPEC=Organization of the Petroleum Exporting Countries (OPEC-13).
Note: Conventional liquids include crude oil and lease condensates, natural gas plant liquids, and refinery gains.
Sources: History: U.S. Energy Information Administration (EIA), Office of Energy Markets and End Use. Projections: EIA, Generate World Oil Balance

Source: EIA, "Reference Case," International Energy Outlook, 2011, pp. 229, 231

EIA Estimates of Future World Oil Prices 2009–2035 ($US 2009) in Different Scenarios Remain High

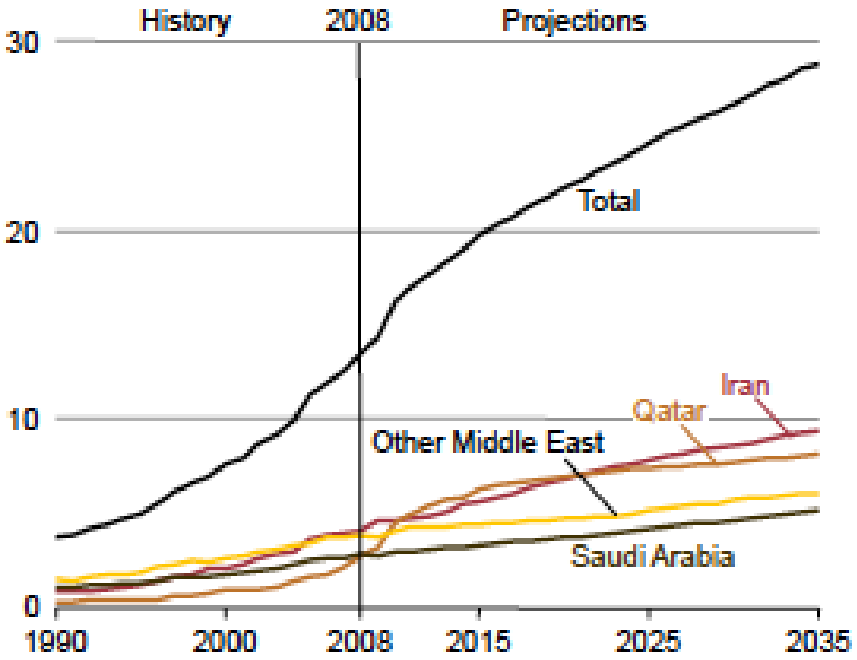


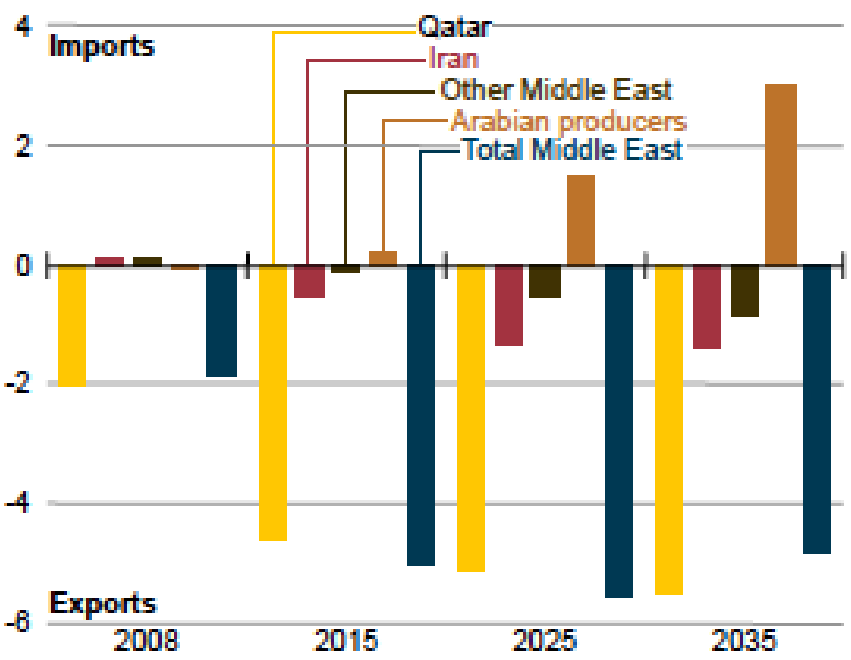
	IEO2011			
Year	Reference	Low Oil Price	High Oil Price	IEO2010 Reference case
2009	62	62	62	100
2015	95	55	146	95
2020	108	53	169	109
2025	118	51	186	116
2030	123	50	196	125
2035	125	50	200	134

In the Reference case, world oil prices are $95 per barrel in 2015 (real 2009 dollars), increasing slowly to $125 per barrel in 2035 ($200 per day in nominal terms). The Reference case represents EIA's current best judgment regarding exploration and development costs and accessibility of oil resources outside the United States. It also assumes that OPEC producers will choose to maintain their share of the market and will schedule investments in incremental production capacity so that OPEC's conventional oil production represents about 42 percent of the world's total liquids production. To retain that share, OPEC would have to increase production by 11.3 million barrels per day from 2008 to 2035, or 43 percent of the projected total increase in world liquids supply). Non-OPEC conventional supplies—including production from high-cost projects and from countries with unattractive fiscal or political regimes—account for an increase of 7.1 million barrels per day over the projection, and non-OPEC production of unconventional liquid fuels provides the remaining 8.2 million barrels per day of the increase.

Source: EIA-IEO 2011, p. 27-28

Gulf Gas Production Is Steadily Increasing as a Source of World Energy Exports (Tcf)



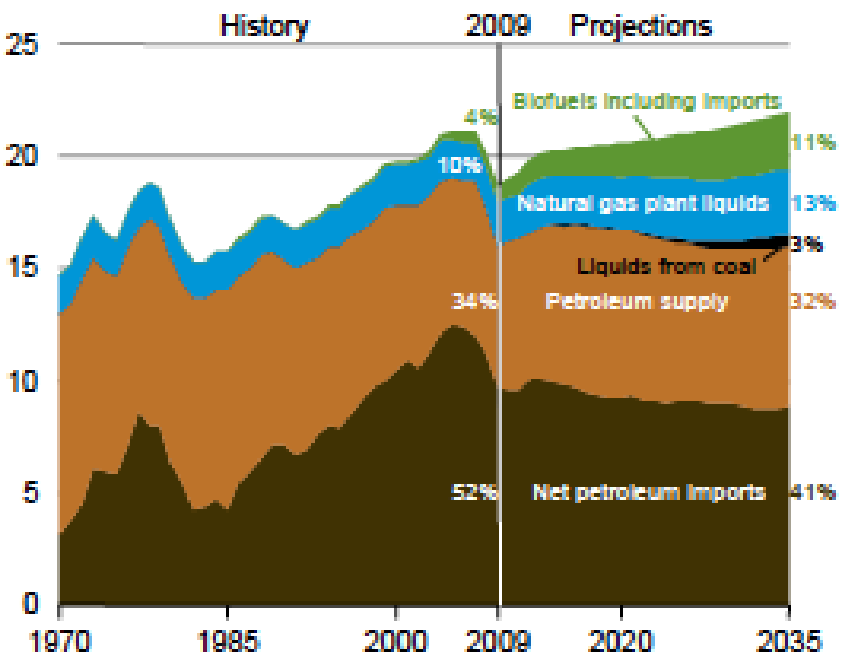


Net exports of natural gas from the Middle East grow at an annual rate of 3.6 percent, as flows from the region increase from 1.8 trillion cubic feet in 2008 to 4.8 trillion cubic feet in 2035 (Figure 59). An important factor in the increase, particularly in regard to brisk growth in volumes in the near term, is the rise of LNG supplies from Qatar, which went from exporting its first LNG in 1999 to being the largest LNG exporter in the world in 2009. Qatar's LNG exports continue to increase through 2035. Its total LNG export capacity reached 77 million tons (3.6 trillion cubic feet) per year in early 2011 with the completion of the last in a line of six megasized liquefaction trains under construction since 2008. Each train has the capacity to produce the equivalent of 0.36 trillion cubic feet of natural gas per year for export

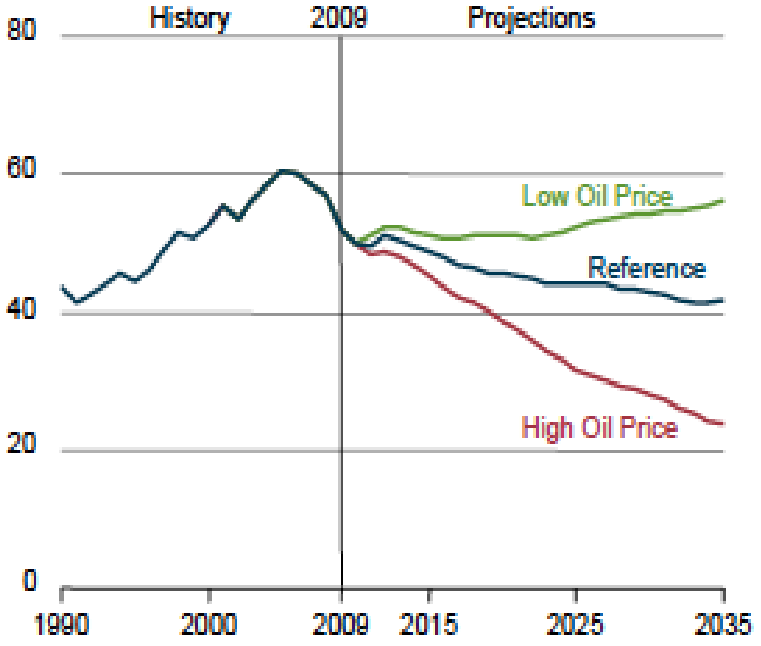
Source: EIA, International Energy Outlook, 2011, pp. 54, 61

Real World US Strategic Dependence on Oil Imports Through 2035

US Total Consumption of All Types of Liquids and Share of *DIRECT* Imports in Million Barrels Per Day)



Net Share of Direct Imports as Percent of US Liquids Fuel Consumption in Different Scenarios: 1990-2035



Direct imports ***sharply understate US strategic dependence*** in two major ways:

- The US has massive *indirect* imports in the form of manufactured goods from Asia and other areas.
- The US pays global oil prices even for domestic production and any crisis immediately effects the US economy.
- The US economy, and every job in America, is dependent on a global economy even more dependent on gulf and other exports than the US.

Source: EIA, Annual Energy Outlook, 2011, pp. 2, 82-83

Scenarios that Shape the Threat

Scenario 1: Sanctions but No Attack

Iran ignores new UN sanctions, and the US discovers new tunnels and centrifuges facilities that it associated with Iran's nuclear program. Iran refuses any IAEA access, and tests a series of long-range solid fuel and liquid fuel missiles. The Obama Administration comes under intense pressure from the Congress, Israel, and other allies to act. It announces US sanctions against any financial institution deal with Iran and a naval embargo against any shipments of gasoline and product to Iran.

Iran responds by halting all oil exports, and threatens to close the Gulf. IRGC naval branch vessels fire on a tanker and Iranian Navy ships and P-3s come close to the US ships enforcing the embargo. This triggers a major rise in insurance premiums and shipping costs for all traffic into the Gulf, as well as leads the US and GCC states to put there forces in the region on full alert. Tensions rise as Israel again threatens to strike.

The result is Iran's exports through the Gulf are halted for several (two?) weeks, and there is considerable panic in the oil market. There is no violence, however, other than small clashes and incidents. No clear resolution takes place. Iran agrees to IAEA action but stalls and limits access. The US is not willing to sustain the crisis, The basic problems with proliferation continue.

Scenario 2: US Naval Blockade and Panic in the Oil Markets

Iran responds to new UN and US sanctions by starting a series of low level IRGC naval branch attacks on Gulf shipping, and uses its Al Quds force and Vevak's ties to extremists in Iraq and Lebanon to conduct terrorist attacks on US targets. The US responds with a naval embargo of Iran and by creating a no fly zone for Iranian aircraft in the Gulf.

Iran places limited numbers of smart mines near the Strait and in the Gulf of Oman. IRGC naval branch vessels sporadically attack tankers in quick, disperse raises throughout the Gulf. Iran places smart mines and free floating mines in the Gulf area, and release oil into the Gulf.

These actions do not close the Gulf, but create a near panic in terms of world oil markets and shipping into the region. Tension and panic is raised to a brief peak when Iran fires a land-based anti-ship missile at a British destroyer passing through the Gulf to aid the USN.

Turkey mediates a cease fire after about 10 days. It does not change the basic military situation, or bring a halt to Iranian proliferation or missile developments.

Scenario 3a: War With Coordinated Release of Oil From SPRs/ 3b War without Release or with Limited release of Oil from SPRs

Iran is found to have concealed higher levels of uranium enrichment and to have obtained some highly enriched material from a source in the FSU. Intelligence sources disclose it is actively working on nuclear weapons and suitable bomb and missile warhead designs. Moreover, evidence surfaces that Iran is conducting simulated nuclear weapons design tests using non-fissile material, and has mastered the technology for high explosive lenses and nuclear initiators.

US and UN sanctions and inspection efforts have failed, and Iran now seems likely to have its first nuclear weapon within a year and not 3-5 years. Iran, the US, and GCC states go on high alert and posture for conflict. Israel quietly prepares a major strike and executes it without warning against key Iranian facilities like Natanz. Israel minimizes flights through friendly Arab air space and penetrates through Syria, but this forces the other Arab states to condemn the strikes politically, and creates tensions between them and the US.

Iran threatens to destroy Israel and the US presence in the region. It responses with limited ballistic missile strikes on Israeli cities and on US bases in the Gulf – concentrating on Bahrain, but with a token strike at bases in Kuwait and Qatar. It also announces that it will attack the US and supporters of Israel by cutting of the flow of oil and gas through the Gulf.

Iran is able to use its submarines to place smart mines near the Strait and in the Gulf of Oman. It uses one of its sub to fire a homing torpedo at a tanker exiting into the Gulf of Oman. IRGC naval branch vessels sporadically attack tankers in quick, disperse raises throughout the Gulf. Iran places smart mines and free floating mines in the Gulf area, and release oil into the Gulf.

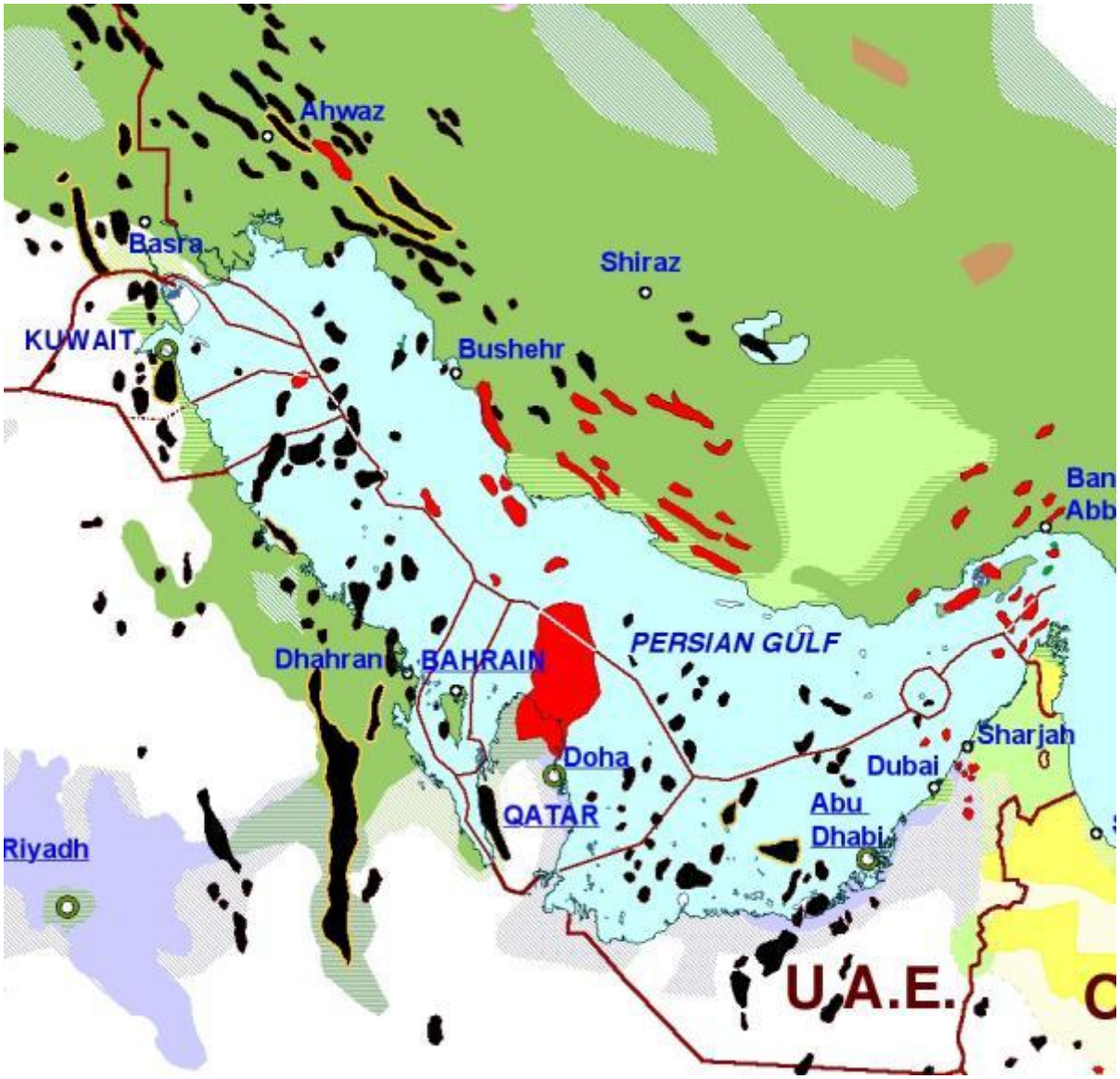
This triggers a limited naval and air war by the US to destroy the Iranian threat inside and near the Gulf. Shipping halts for 5-7 days until the peak fighting is s over, but risk premiums and tanker costs continue for 2-3 more weeks to average roughly 100% above normal. A series of panic attacks ensure during more intense clashes, and as Iran threatens unlimited war on the US and nations giving it bases. The Hezbollah begins a series of rocket strikes on Israel with Iranian and Syrian support, and Iran triggers significant increases in terrorist violence against US targets in Iraq and Afghanistan.

The conflict winds down slowly over time. There is no formal ceasefire. Iran declares that it has ceased to strike at Gulf targets and will concentrate on Israel and the lesser Satan. The US limits its actions to direct defense of Gulf shipping and the Gulf. Iran is allowed to resume exports and the GCC states and Iraq slowly resume their volume of shipping. Once again, the basic problem of Iranian proliferation is not solved. Iran is at most delayed by 1-2 years, and declares it has now been forced to build nuclear weapons because of the threat posed by a nuclear Israel and the US.

The Conditions that Shape the Scenarios:

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

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

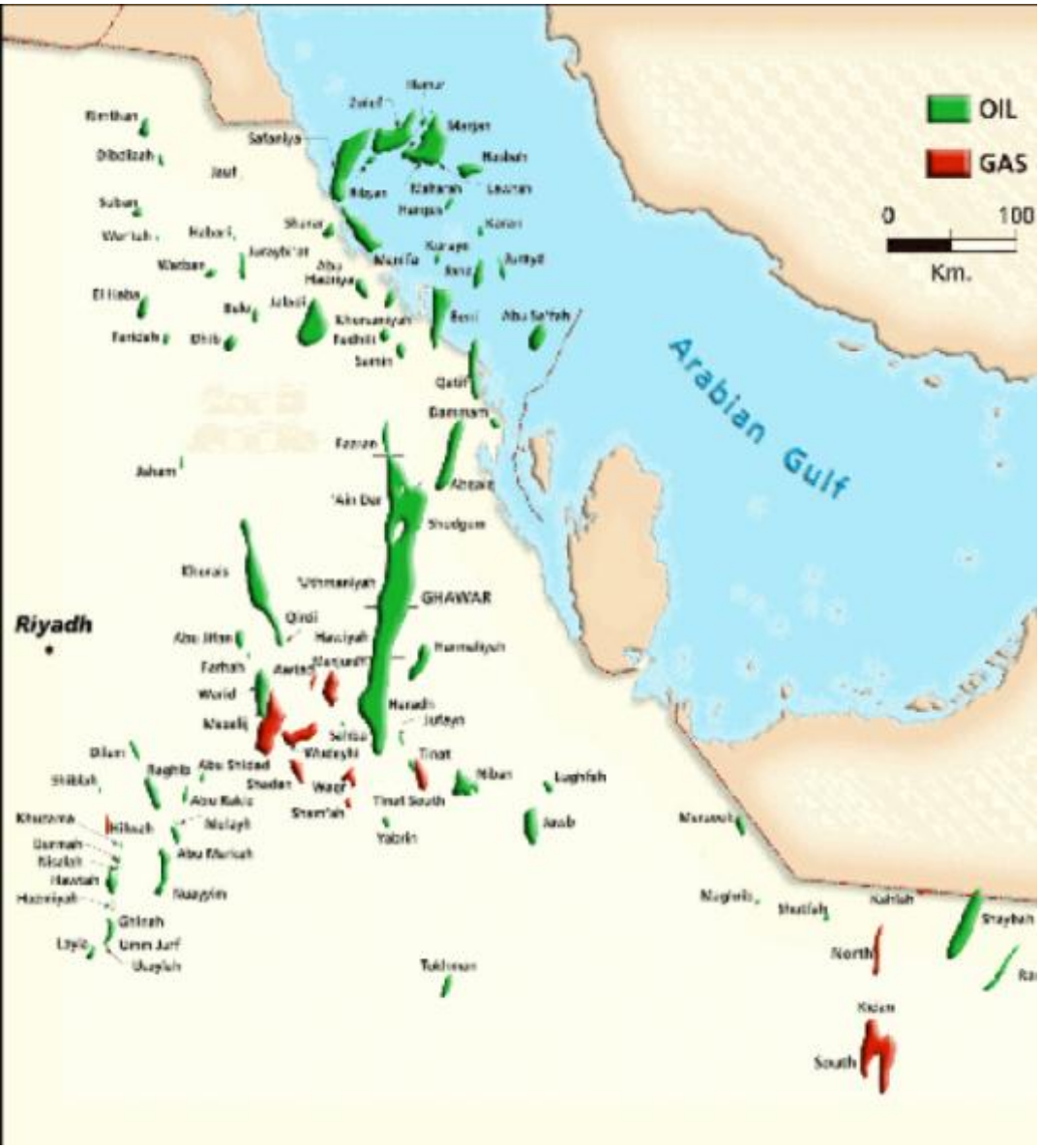
Islam:

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

- Mixed population areas
- Sparsely populated areas
- Uninhabited areas

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

Saudi Arabian Oil Exports



260 billion barrels of proven oil reserves (plus 2.5 billion barrels in the Saudi-Kuwaiti shared "Neutral" Zone), amounting to around one-fifth of proven, conventional world oil reserves.

•Although Saudi Arabia has around 100 major oil and gas fields (and more than 1,500 wells), over half of its oil reserves are contained in only eight fields, including the giant 1,260-square mile Ghawar field (the world's largest oil field, with estimated remaining reserves of 70 billion barrels). The Ghawar field alone has more proven oil reserves than all but six other countries.

Saudi Arabia maintains the world's largest crude oil production capacity, estimated by U.S. Energy Information Administration (EIA) at over 12 million bbl/d at end-2010. Over 2 million bbl/d of capacity was added in 2009 with the addition of increments at Khurais, AFK (Abu Hadriya, Fadhili and Khursaniyah), Shaybah, and Nu'ayyim. For 2010, the EIA estimates that Saudi Arabia produced on average 10.2 million bbl/d of total oil

Saudi Arabia exported an estimated 7.3 million bbl/d of petroleum liquids in 2009 (7.5 million bbl/d in 2010), the majority of which was crude oil. Asia now receives an estimated 55 percent of Saudi Arabia's crude oil exports, as well as the majority of its refined petroleum product and natural gas liquids (NGL) exports.

In 2009, Saudi Arabia exported an average of 1 million bbl/d of petroleum liquids to the United States, (down from (1.5 million bbl/d in 2008) accounting for 9 percent of total U.S. petroleum imports. For this time period, Saudi Arabia ranked fourth after Canada, Mexico, and Venezuela as a petroleum exporter to the United States. Other major Saudi customers in 2009 included Japan (1.2 million bbl/d), South Korea (850,000 bbl/d), and China (839,000 bbl/d).

Saudi Arabia has three primary oil export terminals:

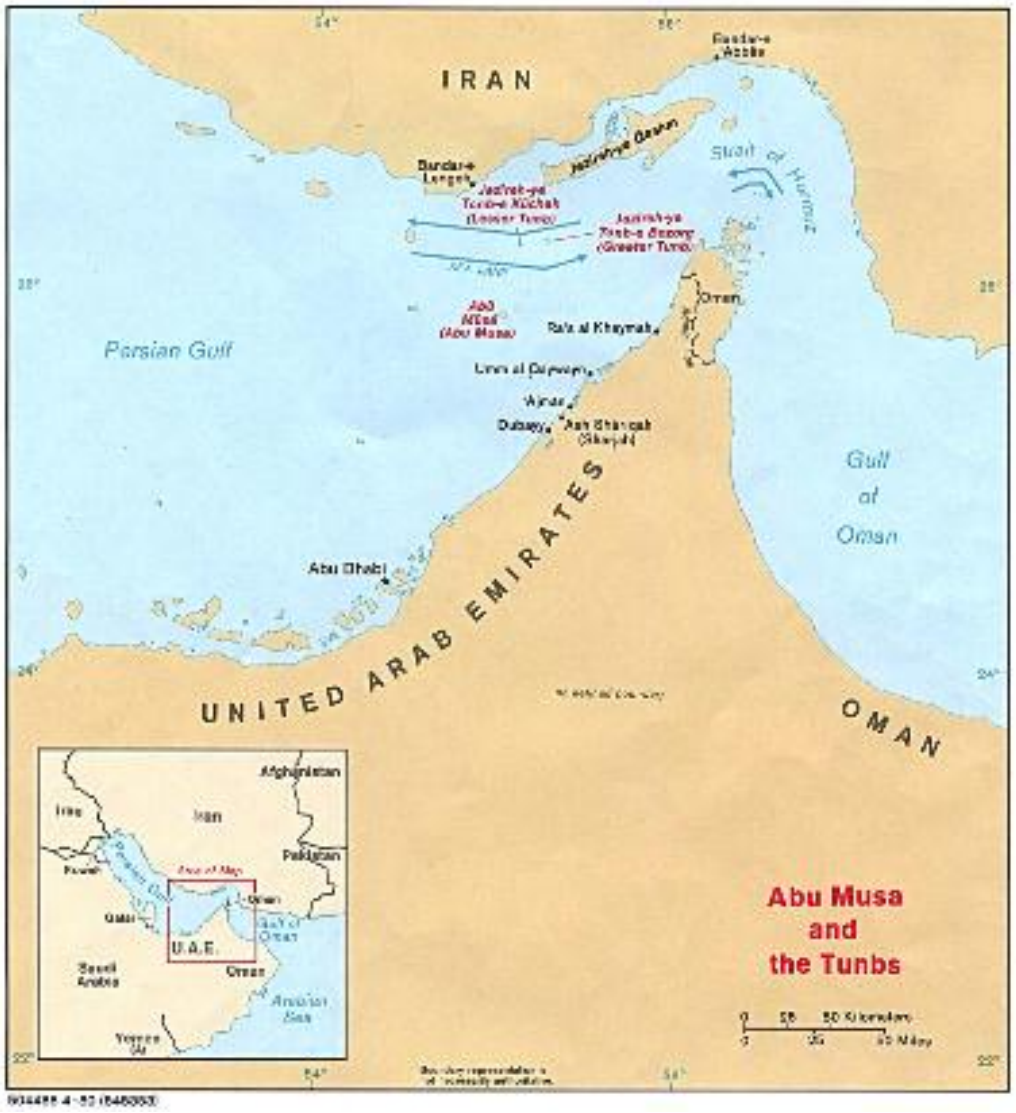
• The Ras Tanura complex has approximately 6 million bbl/d capacity, and the world's largest offshore oil loading facility. It includes the 2.5-million bbl/d port at Ras Tanura. More than 75 percent of exports are loaded at the Ras Tanura Facility.
• The 3 to 3.6-million bbl/d Ras al-Ju'aymah facility on the Persian Gulf.
• The Yanbu'terminal on the Red Sea, from which most of the remaining 25 percent is exported, has loading capacity of approximately 4.5 million bbl/d crude and 2 million bbl/d for NGL and products. The facility is reportedly not used to full capacity.
These and a dozen other smaller terminals throughout the country, appear capable of exporting up to 14-15 million bbl/d of crude and refined products, 3-4 million bbl/d higher than Saudi Arabia's current crude oil production capacity.

EIA, Country Briefs, "Saudi Arabia," 1/2011

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.*

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; DOE/EIA, World Oil Transit Chokepoints, February 2011,

Hormuz: DOE/EIA Strategic Chokepoint Analysis: 12.2011

- **Located between Oman and Iran, the Strait of Hormuz connects the Persian Gulf with the Gulf of Oman and the Arabian Sea. Hormuz is the world's most important oil chokepoint due to its daily oil flow of almost 17 million barrels in 2011, up from between 15.5-16.0 million bbl/d in 2009-2010. Flows through the Strait in 2011 were roughly 35percent of all seaborne traded oil, or almost 20percent of oil traded worldwide.**

- **On average, 14 crude oil tankers per day passed through the Strait in 2011, with a corresponding amount of empty tankers entering to pick up new cargos. More than 85 percent of these crude oil exports went to Asian markets, with Japan, India, South Korea, and China representing the largest destinations.**

- **At its narrowest point, the Strait is 21 miles wide, but the width of the shipping lane in either direction is only two miles, separated by a two-mile buffer zone. The Strait is deep and wide enough to handle the world's largest crude oil tankers, with about two-thirds of oil shipments carried by tankers in excess of 150,000 deadweight tons.**

- **Closure of the Strait of Hormuz would require the use of longer alternate routes at increased transportation costs. Alternate routes include the 745 mile long Petroline, also known as the East- West Pipeline, across Saudi Arabia from Abqaiq to the Red Sea. The East-West Pipeline has a nameplate capacity of about 5 million bbl/d. The Abqaiq-Yanbu natural gas liquids pipeline, which runs parallel to the Petroline to the Red Sea, has a 290,000-bbl/d capacity. Additional oil could also be pumped north via the Iraq-Turkey pipeline to the port of Ceyhan on the Mediterranean Sea, but volumes have been limited by the closure of the Strategic pipeline linking north and**
- **south Iraq.**

- **The United Arab Emirates is also completing the 1.5 million bbl/d Abu Dhabi Crude Oil Pipeline pipeline that will cross the emirate of Abu Dhabi and end at the port of Fujairah just south of the Strait. Other alternate routes could include the deactivated 1.65-million bbl/d Iraqi Pipeline across Saudi Arabia (IPSA), and the deactivated 0.5 million-bbl/d Tapline to Lebanon.**

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Source: DOE/EIA, World Oil Transit Chokepoints, December 2011,

Key Iranian Assets for "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, and host of amphibious ships, small craft, commercial boats.
- Release free floating mines and/or oil slicks along Southern Gulf Coast
- Place smart mines near Strait, ports, key shipping channels
- Limited to high intensity 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).
- 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.
- UAV/UCAV attacks/raids.
- Covert or proxy attacks/sabotage on key facilities/tankers, etc.

The Entire Gulf: Breaking the Bottle at Any Point

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

Most Alternative Routes Have Little or No Surplus Capacity or Are Not Operating

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

Other Chokepoints: The Bab El Mandab

The Strait of Bab el-Mandab is a chokepoint between the horn of Africa and the Middle East, and a strategic link between the Mediterranean Sea and Indian Ocean. It is located between Yemen, Djibouti, and Eritrea, and connects the Red Sea with the Gulf of Aden and the Arabian Sea. Most exports from the Persian Gulf that transit the Suez Canal and SUMED pipeline also pass through the Bab el-Mandab.

Closure of the Bab el-Mandab could keep tankers from the Persian Gulf from reaching the Suez Canal/Sumed pipeline complex, diverting them around the southern tip of Africa. This would effectively engage spare tanker capacity, and add to transit time and cost.

An estimated 3.2 million bbl/d flowed through this waterway in 2009 (vs. 4 million bbl/d in 2008)
toward Europe, the United States, and Asia. The majority of traffic, about 1.8 million bbl/d, moved
northbound through the Bab el-Mandab en route to the Suez/SUMED complex.

The Bab el-Mandab is 18 miles wide at its narrowest point, making tanker traffic difficult and
limited to two 2-mile-wide channels for inbound and outbound shipments. The Strait of Bab el-Mandab could be bypassed via the East-West oil pipeline, which crosses Saudi Arabia with a nameplate capacity of 4.8 million bbl/d. However, southbound oil traffic would still be blocked. In addition, closure of the Bab el-Mandab would block non-oil shipping from using the Suez Canal, except for limited trade within the Red Sea region.

Security became a concern of foreign firms doing business in the region, after a French tanker was attacked off the coast of Yemen by terrorists in October 2002. In recent years, this region has also seen rising piracy, and Somali pirates continue to attack vessels off the northern Somali coast in the Gulf of Aden and southern Red Sea including the Bab el-Mandab.

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Source: EIA, Country Briefs, World Oil Transit Chokepoints, December, 2011

Other Chokepoints: Sumed Pipeline

The 200-mile long SUMED Pipeline, or Suez-Mediterranean Pipeline provides an alternative to the Suez Canal for those cargos too large to transit the Canal (laden VLCCs and larger). The pipeline has a capacity of 2.3 million bbl/d and flows north from Ain Sukhna, on the Red Sea coast to Sidi Kerir on the Mediterranean. The SUMED is owned by Arab Petroleum Pipeline Co., a joint venture between the Egyptian General Petroleum Corporation (EGPC), Saudi Aramco, Abu Dhabis National Oil Company (ADNOC), and Kuwaiti companies.

The majority of crude oil flows transiting the Canal travel northbound, towards markets in the Mediterranean and North America. Northbound canal flows averaged approximately 428,000 bbl/d in 2010. The SUMED pipeline accounted for 1.15 million bbl/d of crude oil flows along the route over the same period. Combined, these two transit points were responsible for over 1.5 million bbl/d of crude oil flows into the Mediterranean, with an additional 307,000 bbl/d travelling southbound through the Canal. Northbound crude transit represented a decline from 2008 when 940,000 bbl/d of oil transited northbound through the Canal and an additional 2.1 million travelled through the SUMED to the Mediterranean.

Source: EIA, Country Briefs, World Oil Transit Chokepoints, February 2011

Other Chokepoints: Suez Canal

The Suez Canal is located in Egypt, and connects the Red Sea and Gulf of Suez with the Mediterranean Sea, spanning 120 miles. Year-to-date through November of 2010, petroleum (both crude oil and refined products) as well as liquefied natural gas (LNG) accounted for 13 and 11 percent of Suez cargos, measured by cargo tonnage, respectively. Total petroleum transit volume was close to 2 million bbl/d, or just below five percent of seaborne oil trade in 2010.

Almost 16,500 ships transited the Suez Canal from January through November of 2010, of which about 20 percent were petroleum tankers and 5 percent were LNG tankers. With only 1,000 feet at its narrowest point, the Canal is unable to handle the VLCC (Very Large Crude Carriers) and ULCC (Ultra Large Crude Carriers) class crude oil tankers. The Suez Canal Authority is continuing enhancement and enlargement projects on the canal, and extended the depth to 66 ft. in 2010 to allow over 60 percent of all tankers to use the Canal.

Closure of the Suez Canal and the SUMED Pipeline would divert oil tankers around the southern tip of Africa, the Cape of Good Hope, adding approximately 6,000 miles to transit, increasing both costs and shipping time. According to a report released by the International Energy Agency (IEA), shipping around Africa would add 15 days of transit to Europe and 8-10 days to the United States.

Total oil flows from the Suez Canal declined from 2008 levels of over 2.4 million bbl/d in 2008 to just under 2 million bbl/d on average in 2010. Flows through the SUMED experienced a much steeper drop from approximately 2.1 million bbl/d to 1.1 million bbl/d over the same period. The year-on-year difference reflects the collapse in world oil market demand that began in the fourth quarter of 2008 which was then followed by OPEC production cuts (primarily from the Persian Gulf) causing a sharp fall in regional oil trade starting in January 2009. Drops in transit also illustrate the changing dynamics of international oil markets where Asian demand is increasing at a higher rate than European and American markets, while West African crude production is meeting a greater share of the latters demand. At the same time, piracy and security concerns around the Horn of Africa have led some exporters to travel the extra distance around South Africa to reach western markets.

Unlike oil, LNG transit through the Suez Canal has been on the rise since 2008, with the number of tankers increasing from approximately 430 to 760, and volumes of LNG traveling northbound (laden tankers) increasing more than four-fold. Southbound LNG transit originates in Algeria and Egypt, destined for Asian markets while northbound transit is mostly from Qatar and Oman, destined for European and North American markets. The rapid growth in LNG flows over the period represents the startup of five LNG trains in Qatar in 2009-2010. The only alternate route for LNG tankers would be around Africa as there is no pipeline infrastructure to offset any Suez Canal disruptions. Countries such as the United Kingdom and Italy received more than half of their total LNG imports via the Suez Canal in 2009 while over 90 percent of Belgium's LNG imports transited through the canal.

Source: EIA, Country Briefs, World Oil Transit Chokepoints, December 2011

Suez Canal: Tanker Traffic 2008-2010

Suez Canal Hydrocarbon Traffic (2008 - November 2010)	2008	2009	2010*
NORTHBOUND			
Crude Oil (bbl/d)	940	314	428
Gasoline	429	379	413
Middle Distillate	150	261	250
Fuel Oil	6	19	6
Naptha	45	1	13
LPG	49	14	24
Other	2	7	20
Total Oil (bbl/d)	**1,621**	**994**	**1,153**
LNG (Bcf)	**316**	**803**	**1,320**
Number of ships			
Tankers	2,089	1,867	1,768
LNG	229	283	393
SOUTHBOUND			
Crude Oil (bbl/d)	211	271	307
Gasoline	165	173	108
Middle Distillate	22	50	27
Fuel Oil	291	188	250
Naptha	63	103	78
LPG	27	38	24
Other	39	27	19
Total Oil (bbl/d)	**818**	**850**	**813**
LNG (Bcf)	**281**	**48**	**97**
Number of ships			
Tankers	1,706	1,612	1,451
LNG	200	242	370
TOTAL			
TOTAL OIL (bbl/d)	**2,440**	**1,843**	**1,966**
Crude	**1,151**	**585**	**735**
Product	**1,288**	**1,258**	**1,232**
LNG (Bcf)	**596**	**852**	**1,416**
TOTAL SHIPS			
Tankers	**3,795**	**3,479**	**3,219**
LNG	**429**	**525**	**763**
SUMED flows (bbl/d)	**2,100**	**1,100**	**1,150**

**2010 information is year-to-date January-November*

Source: EIA, Country Briefs, World Oil Transit Chokepoints, December 2011. *Suez Canal Authority, converted with EIA conversion factors. SUMED pipeline flows are EIA estimates based on APEX (Lloyd's MIU) Tanker Data.*

The Challenge of Asymmetric Warfare:

Intimidation, Deterrence, and Warfighting

Most Likely Iranian 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.

Iran: Threat or "Competitor"

Non-Military Competition

- *Ideology, religion, and political systems*
- *"Terrorism" and violent extremism vs. "counterterrorism"*
- *Energy, sanctions, and global economic impacts*
- *Arms control, arms exports, and arms imports*
- *International diplomacy*

Military Competition

- *Weapons of mass destruction*
- *Conventional forces*
- *Asymmetric and irregular warfare*
- *Proxy use of state and non-state actors*
- *Threat and intimidation*

Nations and Sub-Regions of Competition

- *Gulf Cooperation Council countries*
- *Yemen*
- *Iraq*
- *Jordan*
- *Syria*
- *Lebanon*
- *Israel*
- *Gaza and West Bank*
- *Pakistan*
- *Turkey*
- *Afghanistan*
- *Central Asia*
- *Europe*
- *Russia*
- *China*
- *Japan and Asia*
- *Venezuela, Cuba, Brazil*

The Broader Patterns in Iranian Activity

Iranian Actors	Related States/ Non-State Actors	Target/Operating Country
Revolutionary Guards	Iran	Iraq
Al Qaeda 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		

"Going Nuclear:" Intimidation as a Form of Terrorism and Asymmetric Warfare

- 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.

"Going Asymmetric:" Substituting Asymmetric Forces for Weak Conventional Forces

- 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.

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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 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 claiming 100,000 men or more. The exact size of such exercises is unclear, but they are often a fraction of IRGC claims.

- By displaying both its real and virtual military (e.g. naval) fighting capabilities through electronic, printed and network media, and through official statements, Iran seek 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.

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 and Navy Asymmetric 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.
  - 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.
  - IRGC air branch reported to fly UAVs and UCAVs, and control Iran's strategic missile force.
  - 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?).
  - Based at Bandar e-Abbas, Khorramshar, Larak, Abu Musa, Al Farsiyah, Halul, Sirri.
  - Attacks on tankers, shipping, offshore facilities by naval guards.
- Iranian Navy and Air Force also have key assets:
  - Large-scale mine warfare capability using small craft and commercial boats.
  - Free-floating mines, smart and dumb mines, oil spills
  - 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.
  - 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).

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.

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- 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.

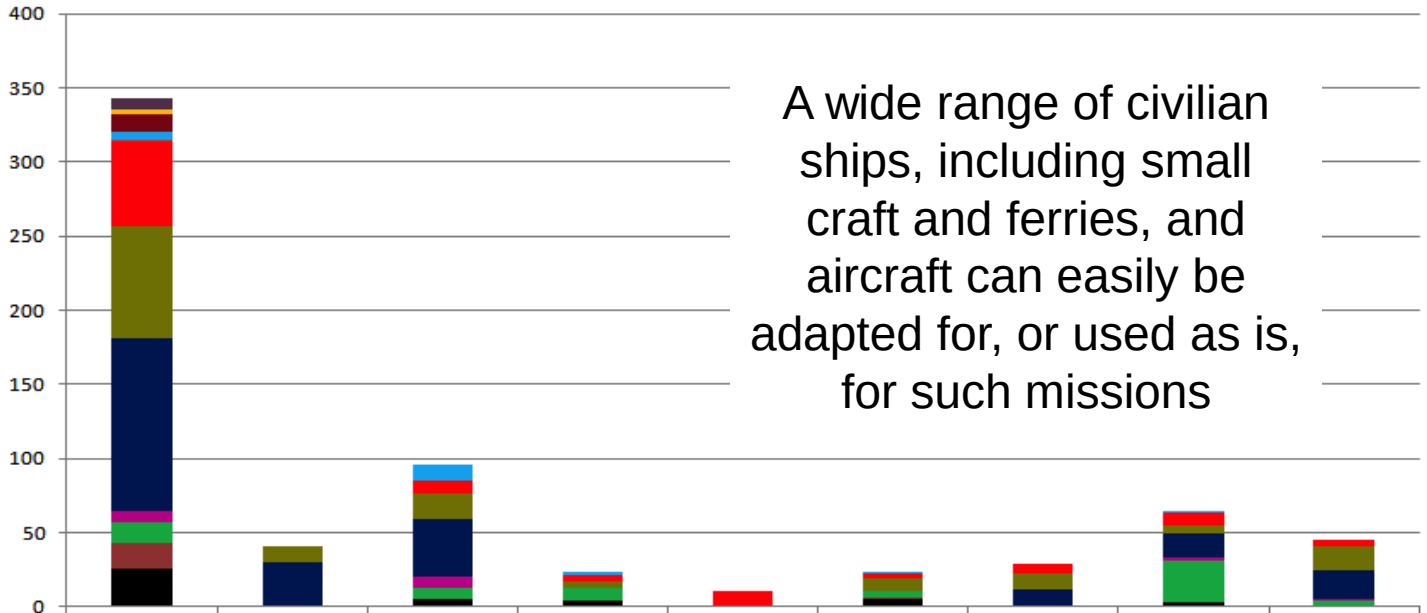
- The naval branch has bases and contingency facilities in the Gulf, many near key shipping channels and some near the Strait of Hormuz.

    - 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.

Key Iranian and Gulf Ships for Asymmetric Warfare

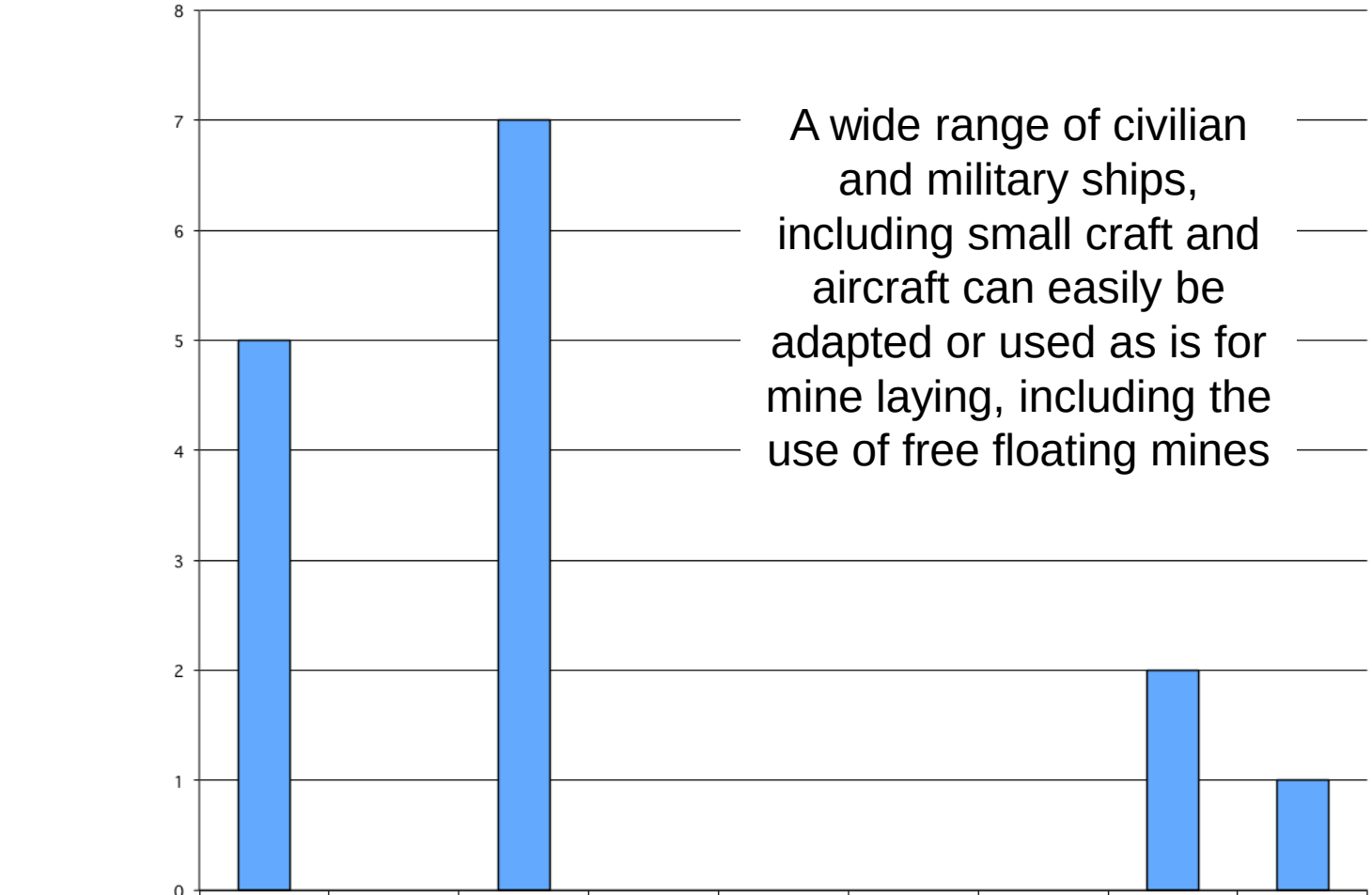


A wide range of civilian ships, including small craft and ferries, and aircraft can easily be adapted for, or used as is, for such missions

	Iran	Iraq	Saudi	Bahrain	Kuwait	Oman	Qatar	UAE	Yemen
SDVs	8								
Submarines	3								
Midget Submarines	12								
Major Missile Combat	5		11	3		2		2	
Major Other Combat	1								
Missile Patrol	57		9	4	10	3	7	8	4
Other Patrol	76	11	17	4		8	10	6	16
Armed Boats	117	30	39				11	16	20
Mine	7		7					2	1
Landing Craft	14		8	9		5		28	3
Amphibious Ships	17					1	1		1
Support	26		5	4	1	5		3	

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

Iranian Mine Warfare Ships



	Iran	Iraq	Saudi	Bahrain	Kuwait	Oman	Qatar	UAE	Yemen
Mine Layers	0	0	0	0	0	0	0	0	0
Mine Countermeasure	5	0	7	0	0	0	0	2	1

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

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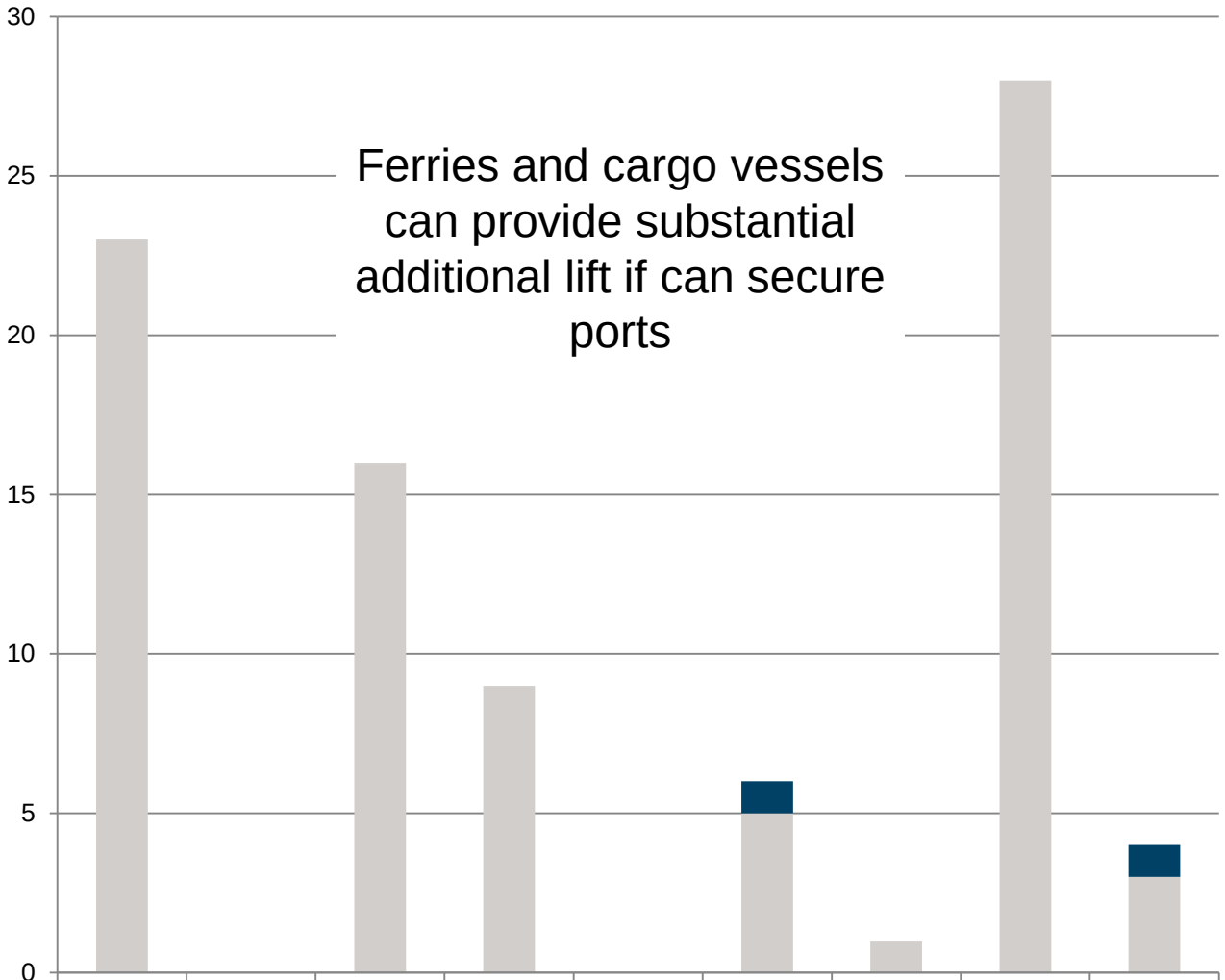
Amphibious Ships & Landing Craft



	Iran	Iraq	Saudi	Bahrain	Kuwait	Oman	Qatar	UAE	Yemen
Amphibious Ships						1			1
Landing Craft	23		16	9		5	1	28	3

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..

The Expanding Roles and Mission of the IRGC

- 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 IRGC Capabilities

- 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.

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.

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.

Military Threats and the Conventional Balance

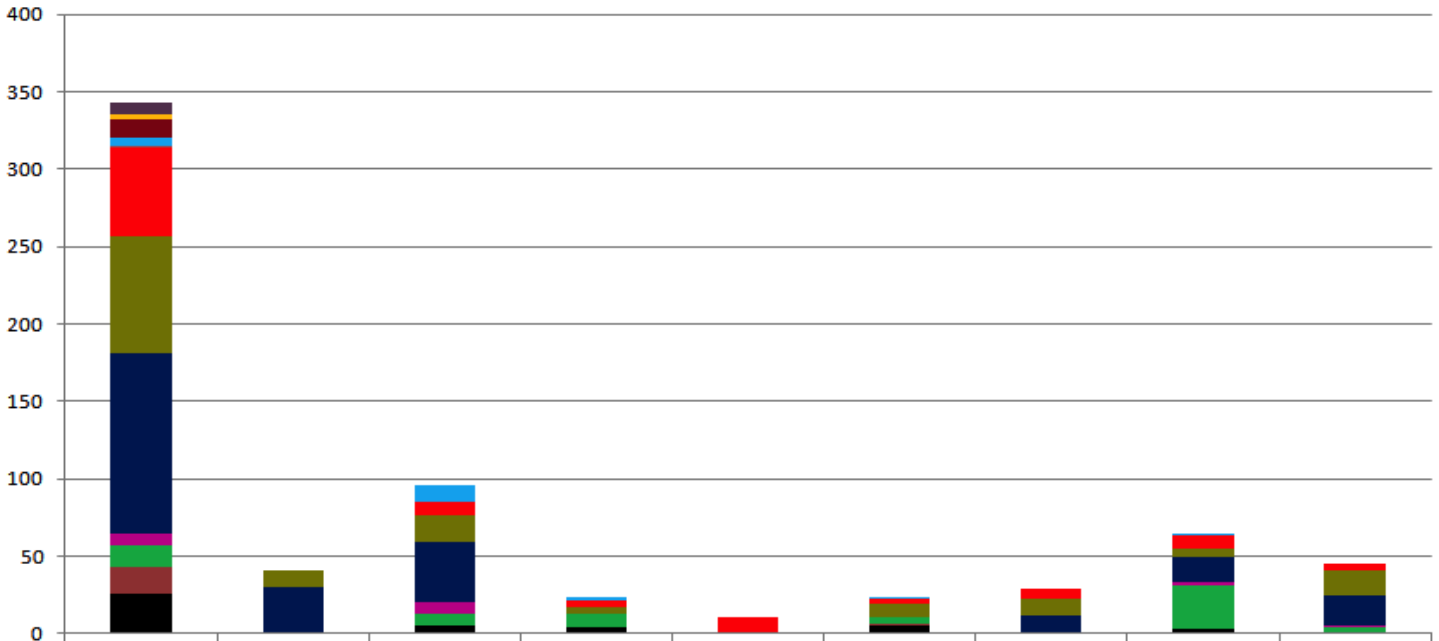
Naval Threats

- 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 Gulf Naval Combat Ships: 2011



	Iran	Iraq	Saudi	Bahrain	Kuwait	Oman	Qatar	UAE	Yemen
SDVs	8								
Submarines	3								
Midget Submarines	12								
Major Missile Combat	5		11	3		2		2	
Major Other Combat	1								
Missile Patrol	57		9	4	10	3	7	8	4
Other Patrol	76	11	17	4		8	10	6	16
Armed Boats	117	30	39				11	16	20
Mine	7		7					2	1
Landing Craft	14		8	9		5		28	3
Amphibious Ships	17					1	1		1
Support	26		5	4	1	5		3	

Source: Adapted from the IISS, **Military Balance, 2011**; and the Jane's Sentinel series.

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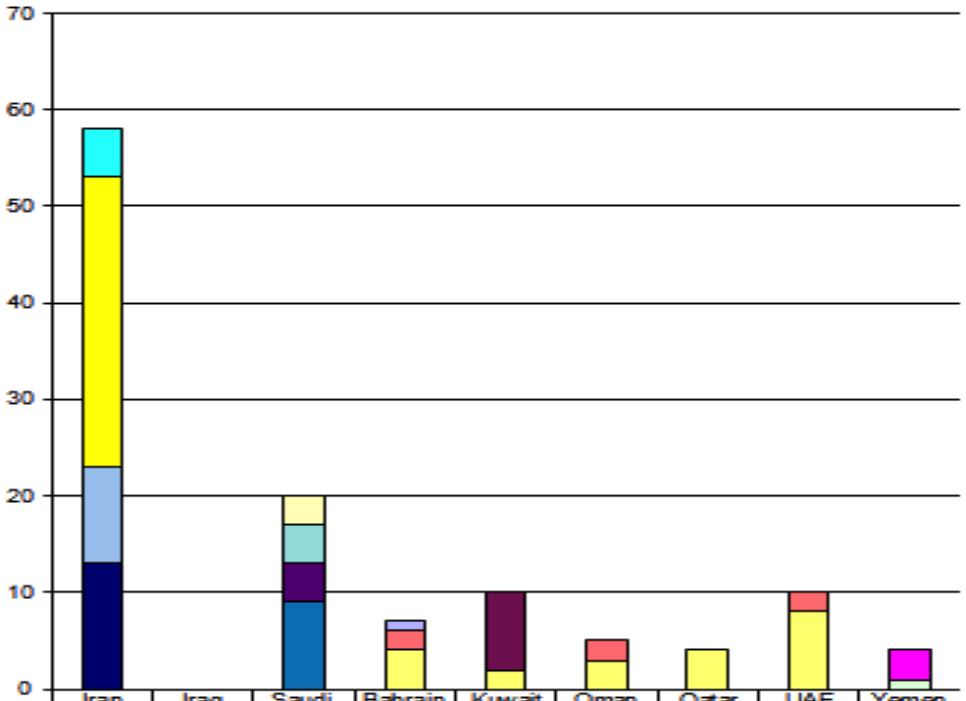
Missile-Armed Combat Warships: 2011



	Iran	Iraq	Saudi	Bahrain	Kuwait	Oman	Qatar	UAE	Yemen
Destroyers with MM-40 Exocet SSM			3						
Frigates with MM-40 Exocet SSM									
Frigates with Harpoon SSM				1					
Frigates with Otomat SSM			4						
Corvettes with CCS-N-4 SSM	5								
Corvettes with Harpoon SSM			4						
Corvettes with MM-40 Exocet SSM				2		2		2	
Patrol Craft with Harpoon SSM			9						
Patrol Craft with C-701 SSM	30								
Patrol Craft with C-802 SSM	10								
Patrol Craft with CSS-N-4 SSM	13								
Patrol Craft with Sea Skua SSM					8				
Patrol Craft with MM-40 Exocet SSM				4	2	3	4	8	0
Patrol Craft with SS-N-4 SSM									3
Patrol Craft with SS-N-2 SSM									1

Source: Adapted from IISS, The Military Balance, Periscope, JCSS, Middle East Military Balance, Jane's Sentinel and Jane's Defense Weekly. Some data adjusted or estimated by the author.

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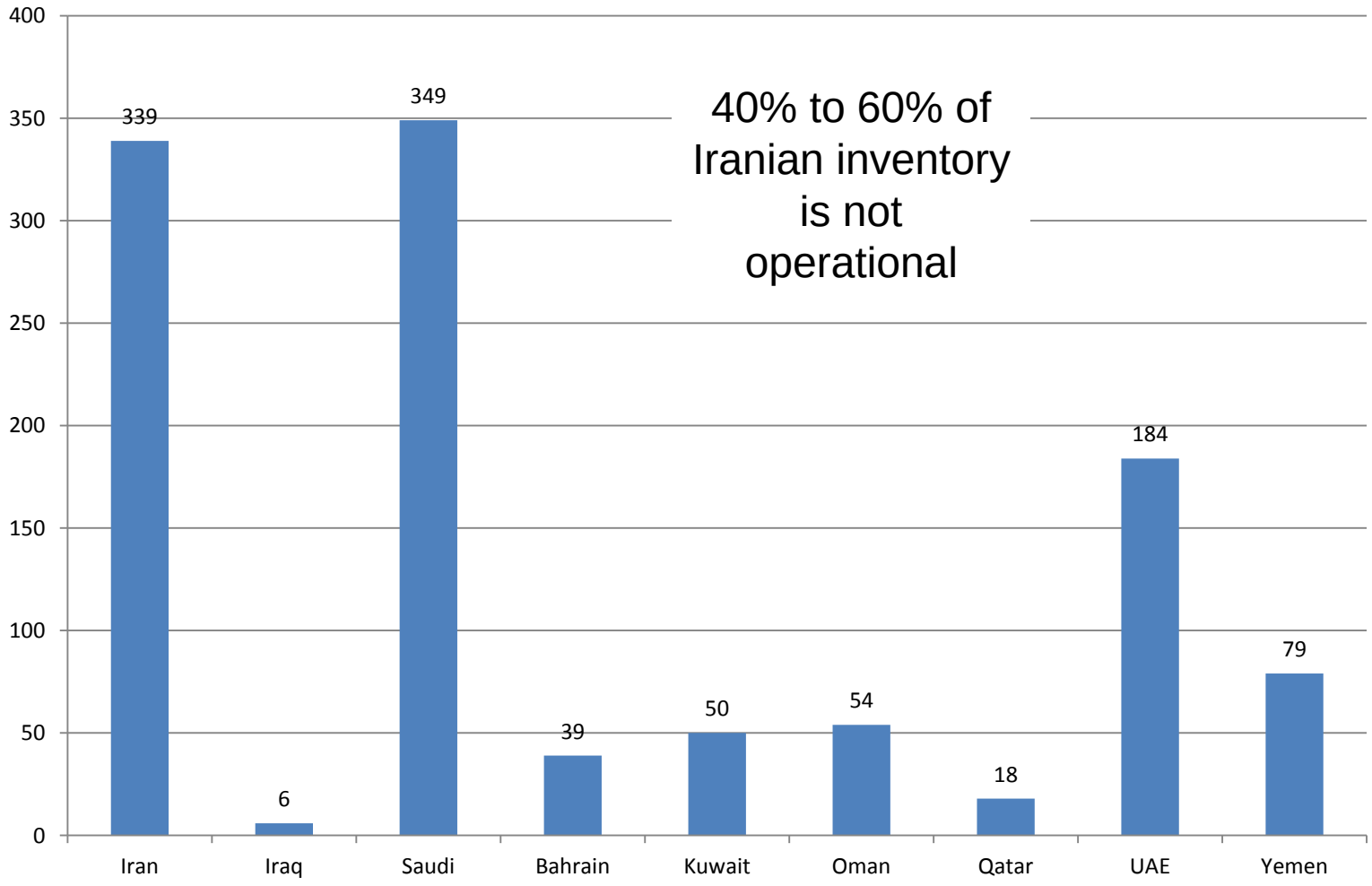
Air/Missile Threats

- 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:

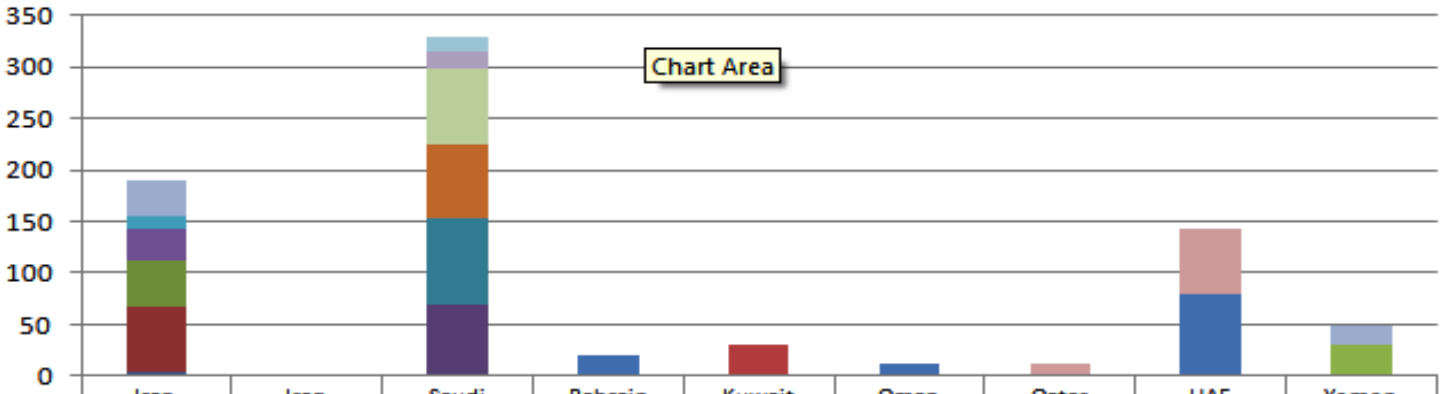
- *Low near-term probability.*
- *High risk of US and allied intervention.*
- *Limited threat power projection and sustainability.*
- *Unclear strategic goal.*

Comparative Gulf Fixed Wing Combat Air Strength in 2010



Note: Only armed or combat-capable aircraft are counted, not trainers, recce or other aircraft. Iraq has 6 Cessna AC-208Bs fulfilling dual recce and attack roles.

Comparative High Quality Fighter/Attack Aircraft in 2011



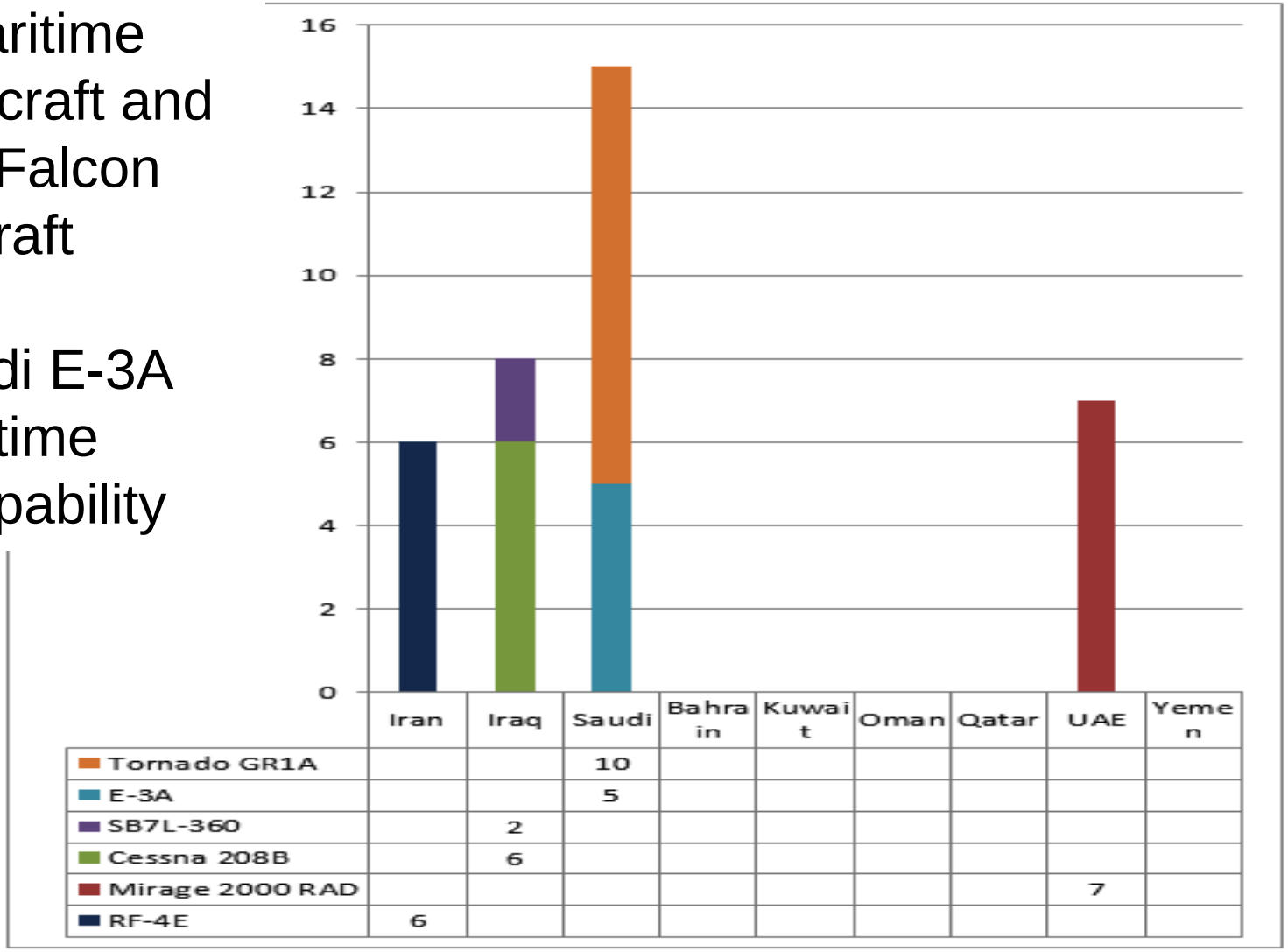
	Iran	Iraq	Saudi	Bahrain	Kuwait	Oman	Qatar	UAE	Yemen
Typhoon-2			16						
Tornado ADV			15						
Tornado IDS			75						
Mirage 2000							12	62	
MiG-29	35								18
MiG-25									
Su-25	13								
Su-24	30								
Su-20/22									30
F-18					31				
F-16				21		12		80	
F-15S			70						
F-15C/D			84						
F-15S			70						
F-14	44								
F-4D/E	65								
Saegheh	3								

Source: Adapted from the IISS, **Military Balance, 2011**; and the Jane's Sentinel series

Gulf Reconnaissance and AWACS Aircraft in 2011

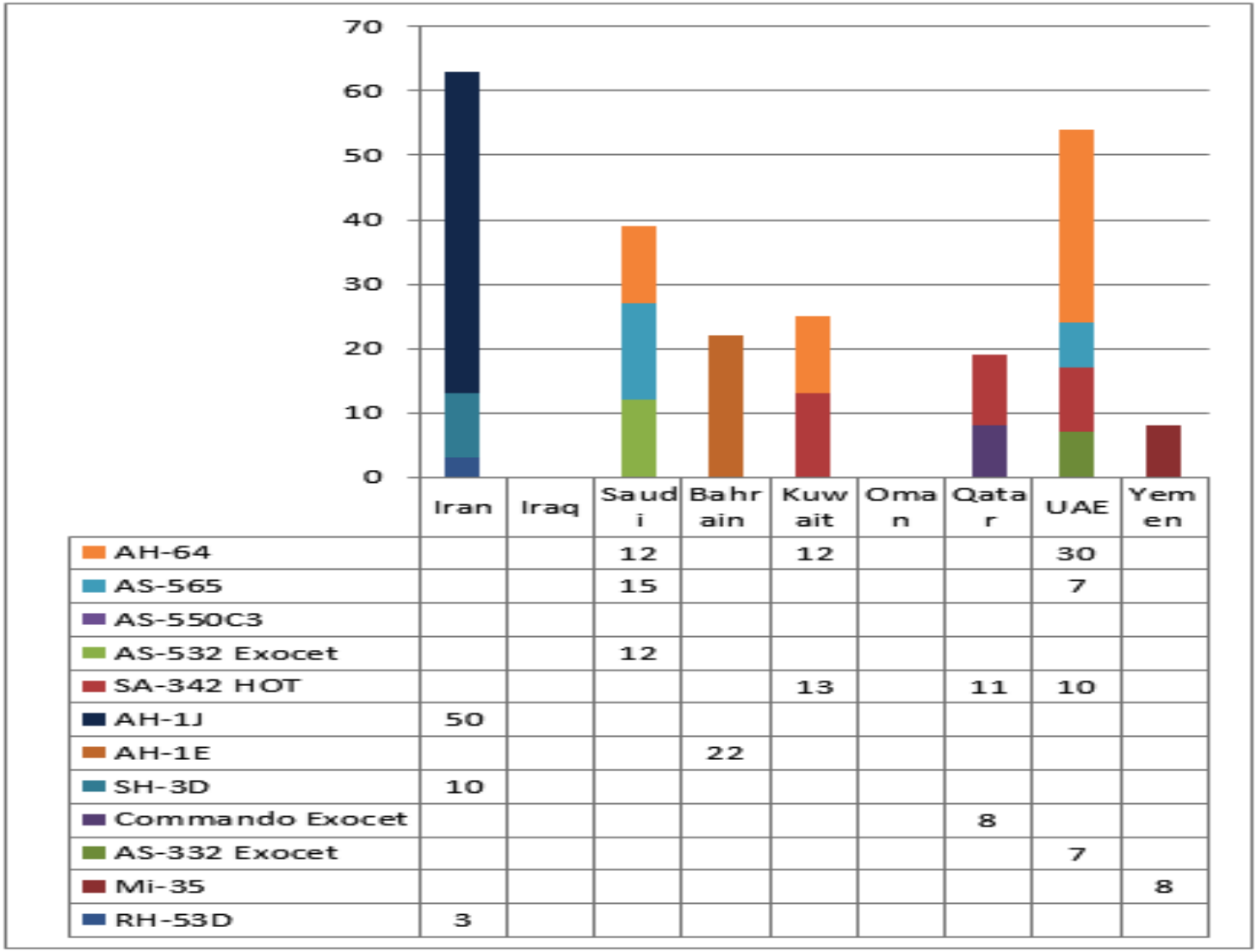
Iran has 3 P-3F Orion maritime patrol aircraft and 3 Da-20 Falcon Elint aircraft

The Saudi E-3A has maritime patrol capability



Source: Adapted from the IISS, **Military Balance, 2011**; and the Jane's Sentinel series

Gulf Attack & Naval Helicopters in 2011



	Iran	Iraq	Saudi	Bahrain	Kuwait	Oman	Qatar	UAE	Yemen
AH-64			12		12			30	
AS-565			15					7	
AS-550C3									
AS-532 Exocet			12						
SA-342 HOT					13		11	10	
AH-1J	50								
AH-1E				22					
SH-3D	10								
Commando Exocet							8		
AS-332 Exocet								7	
Mi-35									8
RH-53D	3								

Source: Adapted from IISS, The Military Balance, Periscope, JCSS, Middle East Military Balance, Jane's Sentinel and Jane's Defense Weekly. Some data adjusted or estimated by the author.

Illustrative Iranian UAV Projects/Assets

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

Iran is developing a range of UCAVs, and has made recent claims to a long-range "stealth" UCAV bomber

Source: Adapted by Adam C. Seitz from AIAA Aerospace 9 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)

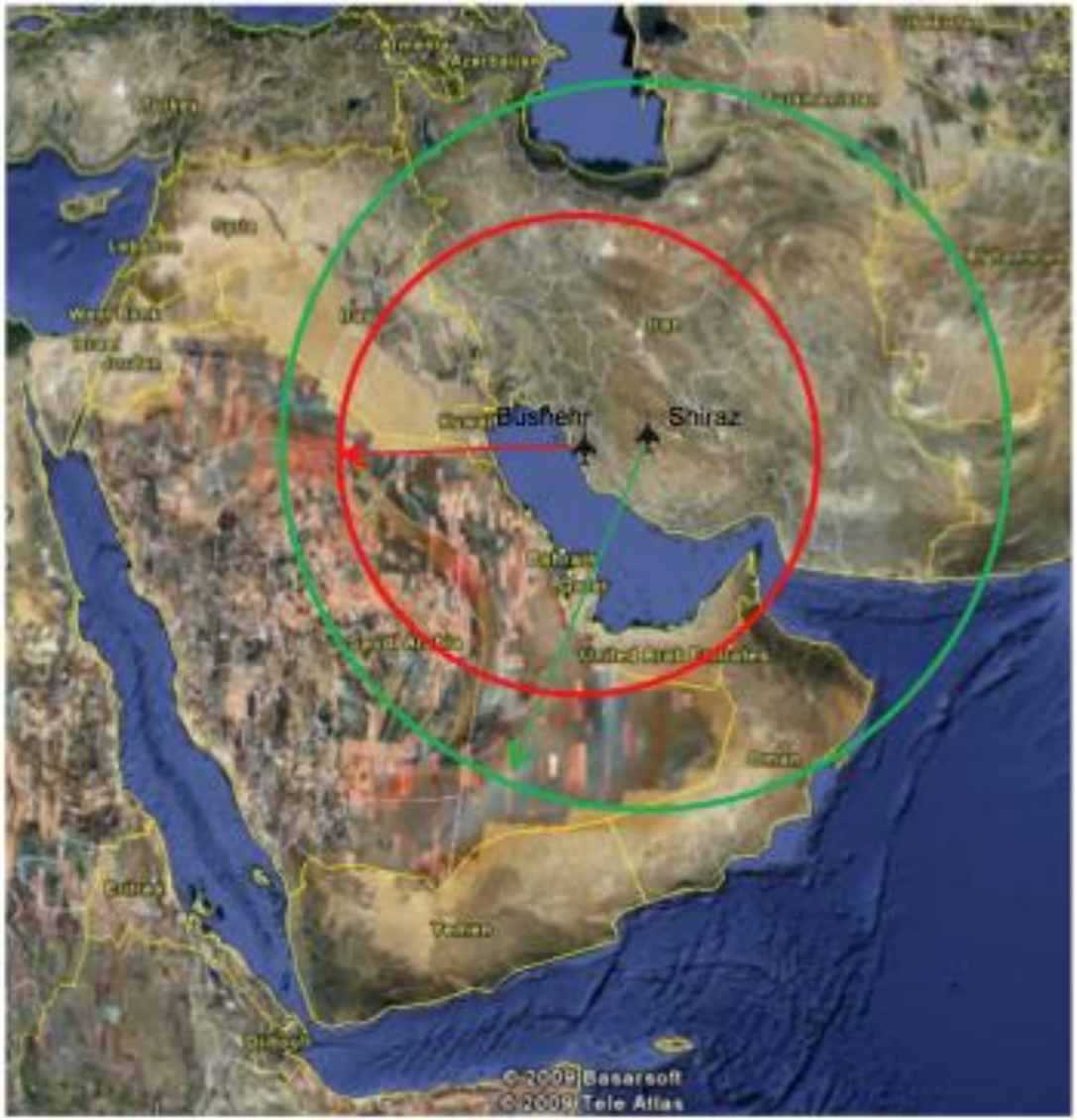
Air Bases Source: Global Security.org
Order of Battle Source: Anthony Cordesman CSIS

	Combat A/C	Attack Helo's
Iran	319	95
Iraq	-	37
Kuwait	50	45
Bahrain	33	16
Qatar	18	25
UAE	184	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 In 2011

Country	Major SAM	Light SAM	AA Guns
Bahrain	8 I Hawk MIM-23B 60	R BS-70 18 FIM-92A Stinger 15 7 Crotale	27 guns Oerlikon 35 mm 12 L/70 40 mm
Iran	16/150 I Hawk 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 5/30 Rapier 10 Pantsyr (SA-22) 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 ZSU-57-2
Iraq			
Kuwait	5 / 24 I Hawk Phase III 12 5/40 Patriot PAC-2 12	Aspide Starburst Aspide Stinger	12 Oerlikon 35mm
Oman	None	Blowpipe 8 Mistral 2 SP 12 Panstsyr S1E	26 guns 4 ZU-23-2 23 mm 10 GDF-005 Skyguard 35 mm
		34 SA-7 6 Blindfire S713 Martello 20 Javelin 40 Rapier	12 L-60 40 mm
Qatar	None	10 Blowpipe 12 FIM-92A Stinger 9 Roland II 24 Mistral 20 SA-7	?
Saudi Arabia (NG)	16/128 I Hawk 4-6/16-24 Patriot 2 17/73 Shahine Mobile 16/96 PAC-2 launchers 17 ANA/FPS-117 radar 73/68 Crotale/Shahine	40 Crotale 500 Stinger (ARMY) 92 500 Mistral (ADF) 500 FIM-43 Redeye 500 Redeye (ADF) 128 73 -141 Shahine static	1,220 guns M-163 Vulcan 20 mm 30 M-167 Vulcan 20 mm 8 50 AMX-30SA 30 mm GDF Oerlikon 35mm 150 L-70 40 mm (in store) 130 M-2 90 mm (NG)
UAE	2/6/36 I Hawk	20+ Blowpipe 20 Mistral Some Rapier Some Crotale Some RB-70 Some Javelin Some SA-18	62 guns 42 M-3VDA 20 mm SP 20 GCF-BM2 30 mm
Yemen	Some SA-2, 3 Some SA-6 SP	Some 800 SA-7 Some SA-9 SP Some SA-13 SP Some SA-14	530 guns 20 M-163 Vulcan SP 20mm 50 ZSU-23-4 SP 23 mm 100 ZSU-23-2 23 mm 150 M-1939 37 mm 50 M-167 20mm 120 S-60 57 mm 40 M-1939 KS-12 85 mm

Source: Adapted by Anthony H. Cordesman from IISS, The Military Balance, Periscope, JCSS, Middle East Military Balance, Jane's Sentinel and Jane's Defense Weekly. Some data adjusted or estimated by the author.