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Oil and Gas Supply Security to East Asia Region

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OUTLINE OF PRESENTATION

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I. WORLD CRUDE OIL & LNG IMPORT AND EXPORT OUTLOOK

Crude Oil Import Outlook (2014–2040)

	Thousand b/d			
	2014	2020	2030	2040
China	6,186	8,519	11,040	12,200
Japan	3,237	3,183	2,991	2,620
Taiwan	822	834	836	834
Korea	2,469	2,481	2,483	2,408
ASEAN	1,987	3,920	5,026	6,525
South Asia	3,900	5,880	8,494	8,911
Oceania	566	556	516	360
Asia Pacific total	19,167	25,373	31,386	33,858
US	7,388	6,628	6,422	5,300
Canada	564	161	80	40
Latin America	925	988	1,090	1,106
Americas total	8,877	7,777	7,592	6,446
Europe	10,307	8,228	6,792	6,250
FSU	584	210	106	negligible
Africa	656	701	773	796
Middle East	492	526	580	588
Total	40,083	42,813	47,228	47,938

ASEAN = Association of Southeast Asian Nations; FSU = Former Soviet Union; US = United States.

Source: IEEJ.

- oil demand in Asia will continue to grow, where China has led the demand growth in the region since the mid-2000s, and it will remain so with imports of 12 mb/d in 2040, by far the largest in the world.
- South Asia, importing 9 mb/d and the Association of Southeast Asian Nations (ASEAN), importing 7 mb/d, will also emerge as other demand giants towards 2040.
- Oil production in Asia-Pacific will either decline or maintain at best, the region will continue to be the major oil importer in the world.
- Thus, the share of Asia-Pacific in world crude oil imports will increase from 48 percent in 2014 to 71 percent in 2040.

Crude Oil Export Outlook, by Region (2014–2040)

Thousand b/d

	2014	2020	2030	2040
ASEAN	848	441	230	120
Australia	161	302	420	472
Other Asia Pacific	212	198	175	112
Asia Pacific total	1,221	942	825	704
US	345	209	424	591
Canada	2,266	2,844	3,452	3,707
Latin America	5,001	4,166	3,889	3,509
Americas total	7,612	7,219	7,764	7,807
Europe	1,885	158	negligible	negligible
FSU	6,798	6,876	7,254	7,847
Africa	5,774	5,832	6,390	6,454
Middle East	16,793	21,786	24,995	25,127
Total	40,083	42,813	47,228	47,938

ASEAN = Association of Southeast Asian Nations; FSU = Former Soviet Union; US = United States.

Source: IEEJ.

- The Middle East will clearly remain by far the largest export region in the foreseeable future with 25mb/d export in 2040, sharing 52 percent of the world total.
- Asia-Pacific shares only 2 percent of the world crude oil export in 2014, and the share will further decrease towards 2040 due to decline of production in the region;
- Europe will be even more negative; the export of which will be negligible in 2030 onwards.
- The US and Canada are expected to increase their export due to shale oil and gas revolution.
- FSU and Africa will expand their exports gradually too. North America, FSU, and Africa will contribute to diversify export sources of Asian importers;

LNG Import Outlook (2014-2040)

		Million Tonnes			
Region	Country	2014	2020	2030	2040
Asia Pacific	Japan	89	75	85	86
	Korea	38	36	44	45
	China	19	47	82	99
	Thailand	1	8	19	25
	Singapore	2	8	11	14
	Malaysia	2	5	6	8
	Indonesia	0	5	9	12
	Vietnam	0	1	3	6
	Philippines	0	1	4	5
	India	15	23	50	62
	New Zealand	0	0	1	1
	Taiwan	13	15	21	23
	Pakistan	0	2	2	4
	Sri Lanka	0	0	1	1
	Bangladesh	0	0	2	2
	Sub total	179	227	339	394
Middle East	Persian Gulf	4	7	13	21
	Non Persian Gulf	0.1	3	4	5
	Sub total	4	10	17	26
Europe	Baltic	0.1	4	5	9
	Atlantic	13	31	32	33
	Medditeranean	19	44	46	46
	Sub total	32	78	83	88
Americas	North America	10	10	11	12
	South America	12	12	15	17
	Sub total	23	22	26	29
Africa	North Africa	0	0	2	3
	Sub Sahara Africa	0	1	5	7
	Sub total	0	1	7	10
Total		238	338	472	547

- Japan, the largest LNG importer in the world, will greatly decrease its imports mainly due to the restart of its nuclear power plants, renewable expansion, and energy efficiency.
- Korea is expected to follow a similar path with its expansion of nuclear and coal-fired power generation.
- China will be the largest LNG importing country in the world in 2040.
- India will be the third largest LNG importer in the world in 2040.
- LNG imports in Southeast Asian countries will quickly reach 70 MT in 2040.
- Europe will import significantly more in the future, the import growth potential in Oceania, North America, and South America is limited towards 2040.

LNG Export Outlook (2014-2040)

Million Tonnes

	2014	2020	2030	2040
ASEAN	48	45	43	39
Oceania	27	67	85	98
US	0.3	31	66	95
Canada	0	0	24	32
S&C America	17	14	13	11
Americas total	17	45	103	138
Europe	4	3	2	1
FSU	11	15	31	55
Africa	36	45	56	87
Middle East	96	89	109	129
Total	239	309	429	547

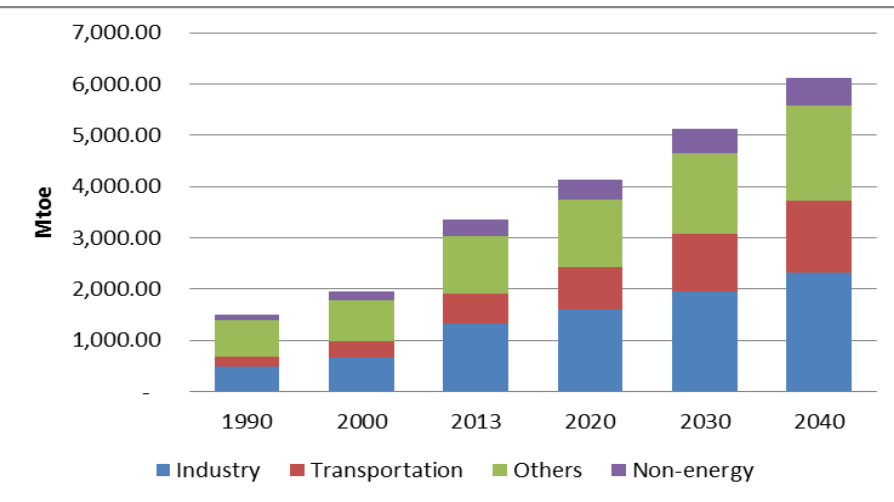
ASEAN = Association of Southeast Asian Nations; FSU = Former Soviet Union; S&C America = South and Central America; US = United States.

Source: IEEJ.

- The biggest change in terms of LNG export towards 2040 is the emergence of North America as a significant export region. This is due to oil and shale gas revolution, the region, especially the US, is rapidly developing export capacity.
- Exporting the first cargo from the Gulf of Mexico in 2016, the US export will reach as much as 95 MT in 2040.
- Oceania, mainly Australia, is expanding capacity too. Together with Papua New Guinea, the region will export as much as the US in 2040.
- The Middle East, on the other hand, will export less in 2020 mainly due to feed gas shortage as well as losing market share. However, the LNG demand growth will call for Middle East supplies in 2030 onwards, and the Middle East will pick up its export quickly.

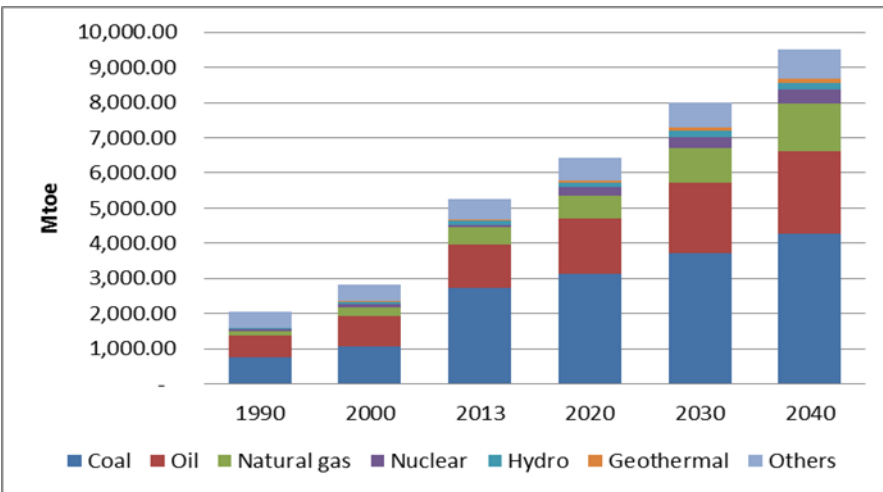
II. ENERGY OUTLOOK IN EAS REGION- BAU CASE

Final Energy Consumption by Sector (1990 to 2040), BAU



- TFEC is projected to increase from 3,347 Mtoe in 2013 to 6,129 Mtoe in 2040, with an average annual growth rate of 2.3 %
- By sector, transport is the most rapidly increasing by 3.3 percent per year, as a result of motorisation driven by disposable income.

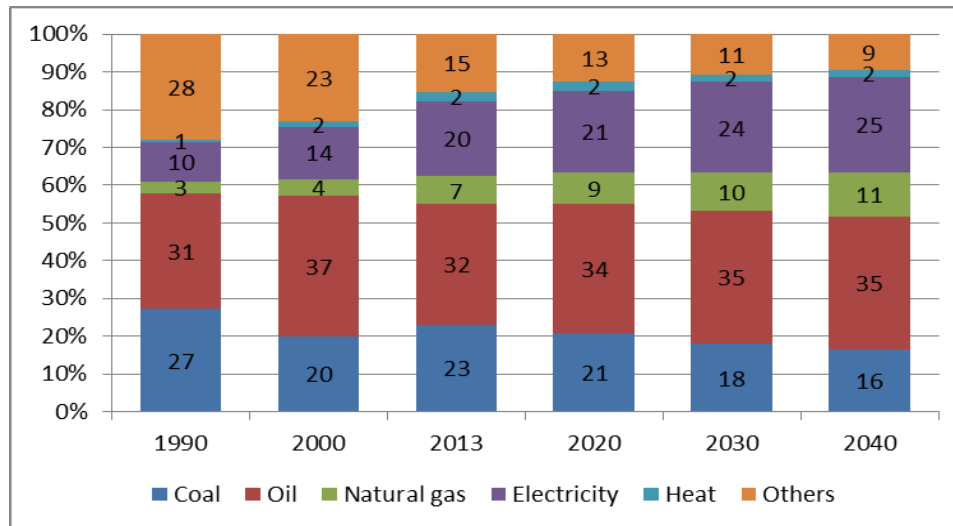
Primary Energy Supply in EAS (1990 to 2040)



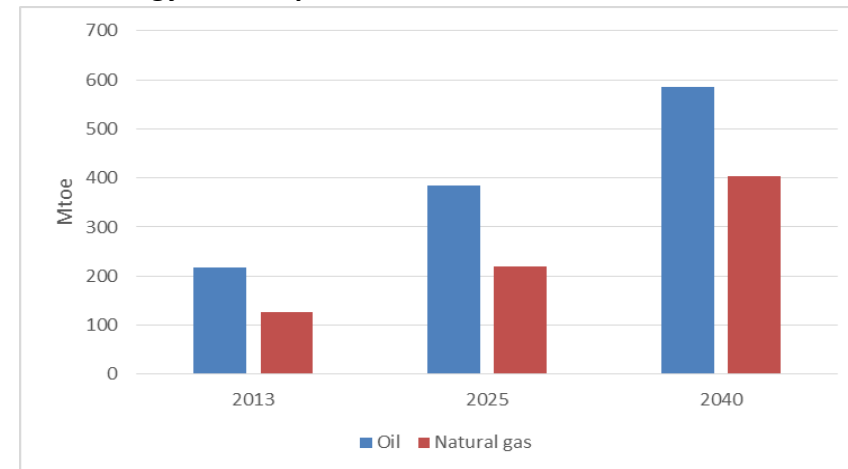
- The Primary energy supply in EAS region is projected to grow at a little slower pace, of 2.2 percent per year, as final energy consumption grows at 2.3 percent per year.
- EAS primary energy supply is projected to increase from 5,257 Mtoe in 2013 to 9,517 Mtoe in 2040.

III. Oil and Gas Demand in EAS Region

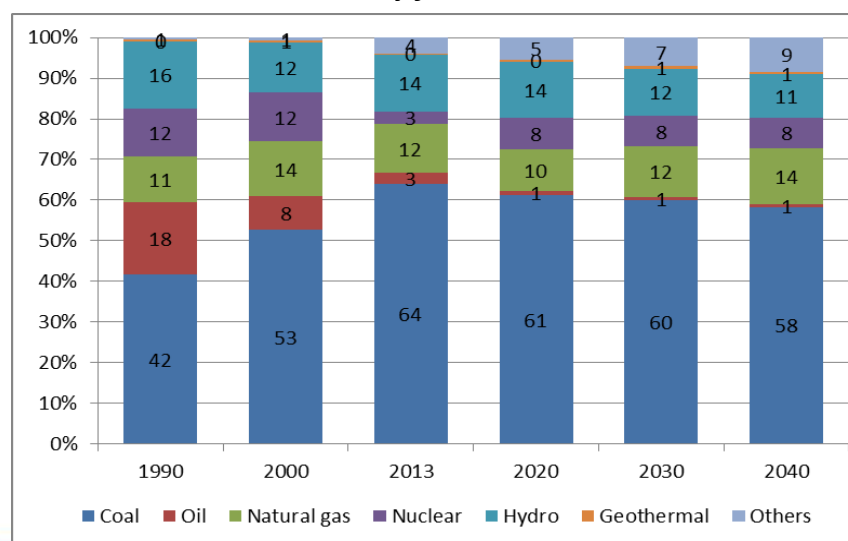
Final Energy Consumption share by Fuel-BAU, 2013 and 2040



Final Energy Consumption- Oil & Natural Gas, 2013 to 2040



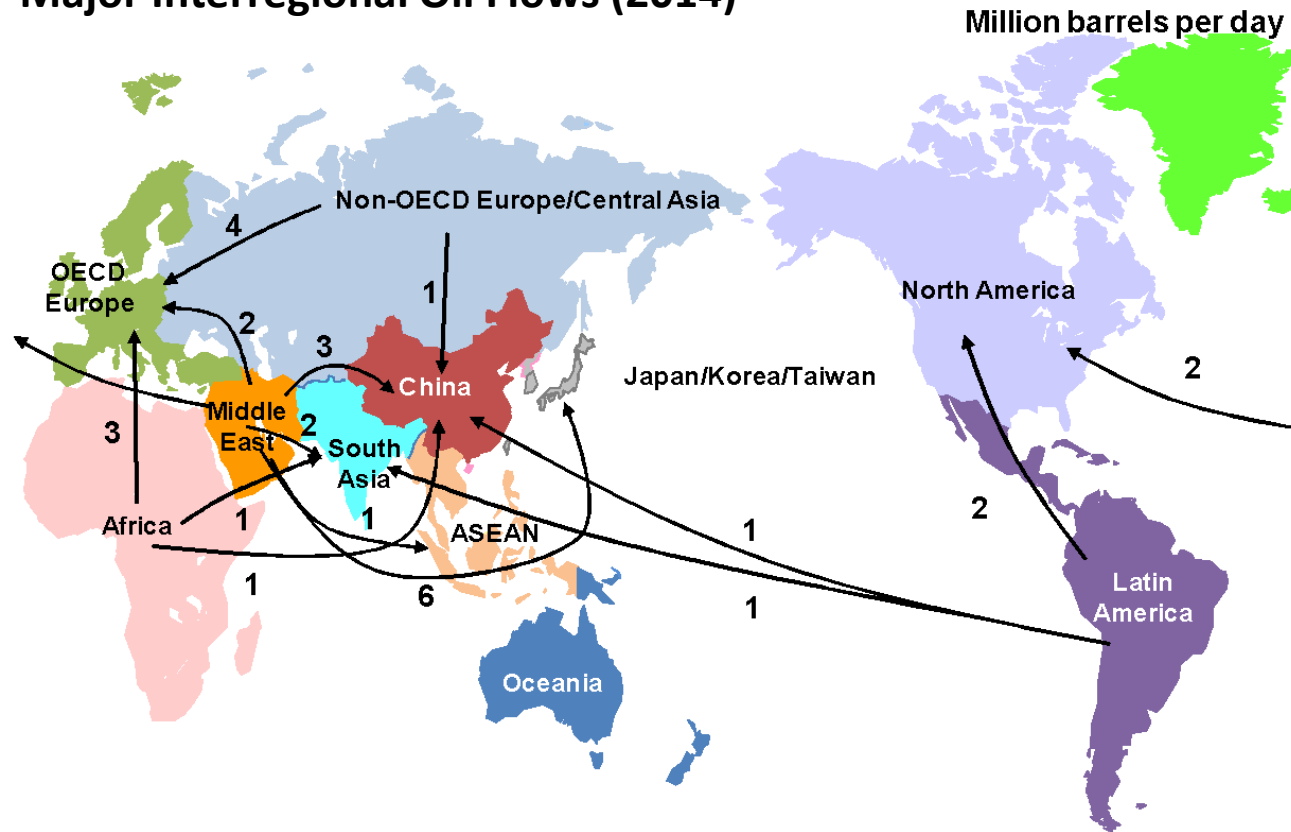
Power Generation share by fuel, 2013 to 2040



- Oil demand will grow more than double from 1,070 Mtoe in 2013 to 2,164 Mtoe in 2040, representing an average growth rate of 2.6% per year; Oil remains the highest share 35.3% of TFEC by 2040 in EAS;
- Natural gas will grow from 243 Mtoe in 2013, to 704 Mtoe in 2040, representing an average growth rate of 4% per year; Gas share will be 11% of TFEC by 2040.
- Natural gas is the 2nd largest share (14%) for power generation, after coal (58%) in EAS region.

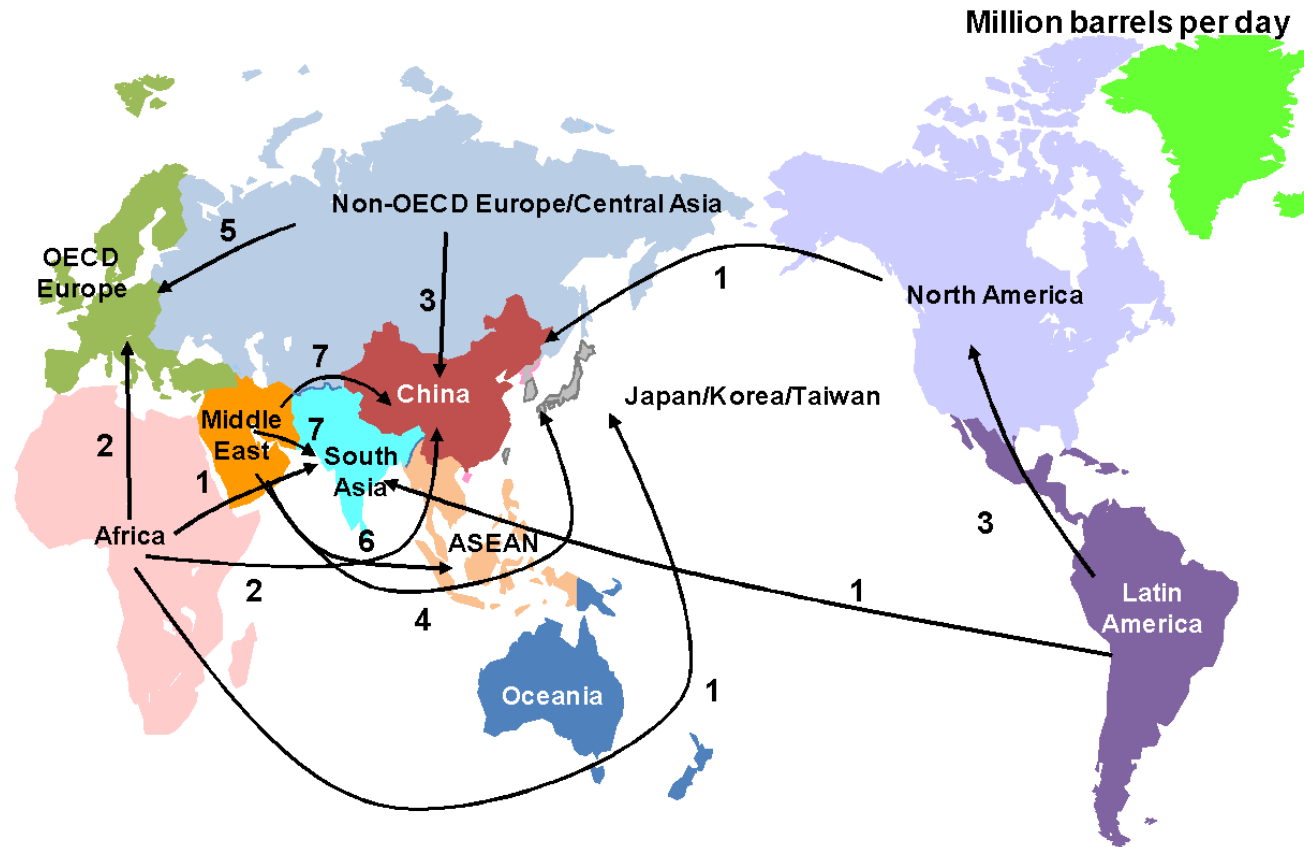
IV. Crude Oil Trade Flow and Sea Lane Supply Security to EAS

Major Interregional Oil Flows (2014)



- The Middle East is currently the origin of the major crude oil flow, exporting 12 mb/d to Asia, 2 mb/d to Europe, and 2 mb/d to North America in 2014. This is followed by the flows from OECD Europe/Central Asia, mostly Russia to Europe (4mb/d), Africa to Europe (3mb/d), and Latin America to North America (2mb/d).

Major Interregional Crude Oil Flows (2040)



- The growing oil demand in Asia will be largely met by the Middle East because of its development cost competitiveness and geographical proximity. This means the dependence on the two important choke points (Hormuz and Malacca/Singapore Straits) will be the two most important passages for oil trade for Asia

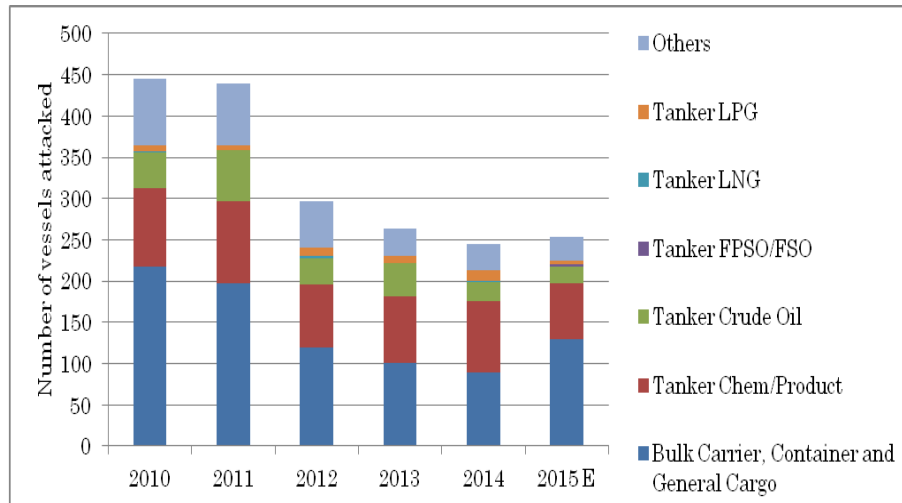
Outlook of Crude Oil Shipping through Major Choke Points for EAS Region

Choke point		2014		2030		2040	
		Thousand b/d	number of tanker passages	Thousand b/d	number of tanker passages	Thousand b/d	number of tanker passages
Hormuz	Asia bound	12,419	7,815	23,414	14,735	23,994	15,100
	Atlantic bound	4,443	2,796	1,573	990	negligible	negligible
	Total	16,862	10,611	24,987	15,725	23,994	15,100
Malacca/Singapore		12,272	7,723	18,456	11,615	19,404	12,211
Panama*		91	133	127	93 (47)	140	103 (51)
Bering		0	0	negligible	negligible	negligible	negligible

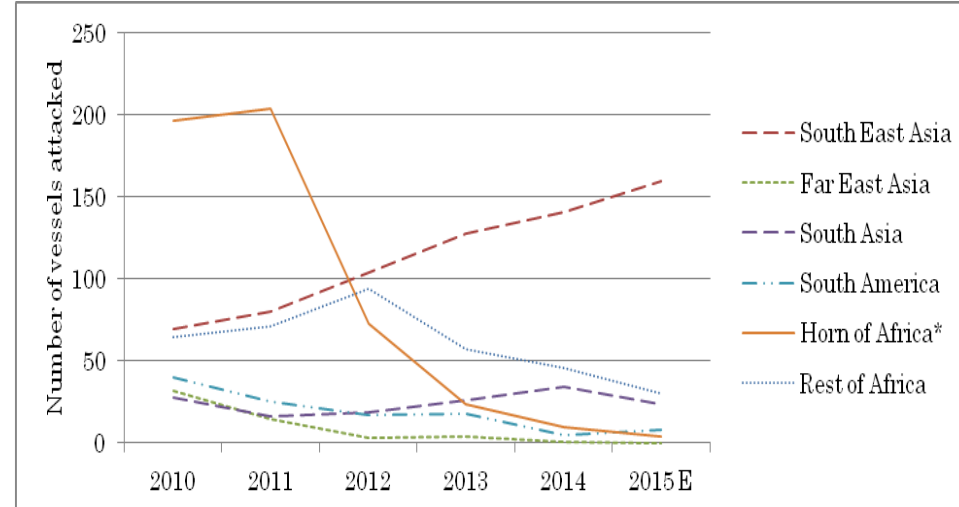
- Physical limitation of shipping passage does not seem to be an issue for the Hormuz Strait that is deep and wide enough, also for the Panama Canal and Bering Strait that a limited number of oil tankers are expected to go through.
- For the Malacca/Singapore Straits, the physical limitation might be the case in the future, as to whether Malacca/Singapore will overflow with vessels, considering the possibility of accidents and oil spills, it is sensible to develop alternative routes such as Sunda and Lombok in Indonesia.

Sea Lane Security of Oil and LNG

Number of Vessels Attacked, by Vessel Type



Number of Vessels Attacked, by Region



Source: IMB, 2015

FPSO = floating production storage and offloading

- The piracy and armed robbery has played a role in disrupting the free movement of vessels, causing delays, financial losses, and even loss of life. Data from the International Maritime Bureau (IMB) of the International Chamber of Commerce (ICC) reveals that globally, acts of piracy and robbery at sea have declined over the past 5 years;
- However, the piracy incidents in Southeast Asia and South Asia are either rising or continuing unabated

V. SOME DISCUSSIONS

- The increase of global energy demand will put pressure on energy security of the region;
- Thus, energy supply Security through energy cooperation remain importance,
- Energy infrastructure resiliency could be discussed as it will play important role in the energy security,
- Sea lane supply security and choke points will be a key issue in physical transportation of oil and gas to EAS,
- Policy options for energy security will need to be further developed and reinforced, i.e., APSA.
- Regional energy infrastructure connectedness and electricity market trading play roles for the energy saving and regional energy security.
- Physical oil & LNG stock is the most important part for each country to make response to disruption of oil & gas.

VI. CHALLENGES AND OPPORTUNITIES

- The triple challenges of increasing energy demand, abating climate changes, and securing energy supply at affordable price and reliability will require the APEC economies to strengthen energy cooperation beyond the borders;
- The energy cooperation will bring many economic, social and environmental benefits to the APEC region;
- The cooperation will need to go beyond the APEC region to include ASEAN, EAS, and the others.