



OCP Policy Center Seminar series

An atlantic energy renaissance

Paul Isbell

12 September 2014

The Atlantic Basin and the Global Energy Map

- The 'Atlantic Energy Renaissance'
- Changes in the Global Energy Flow Map
- Strategic Implications

The Atlantic Basin Projection

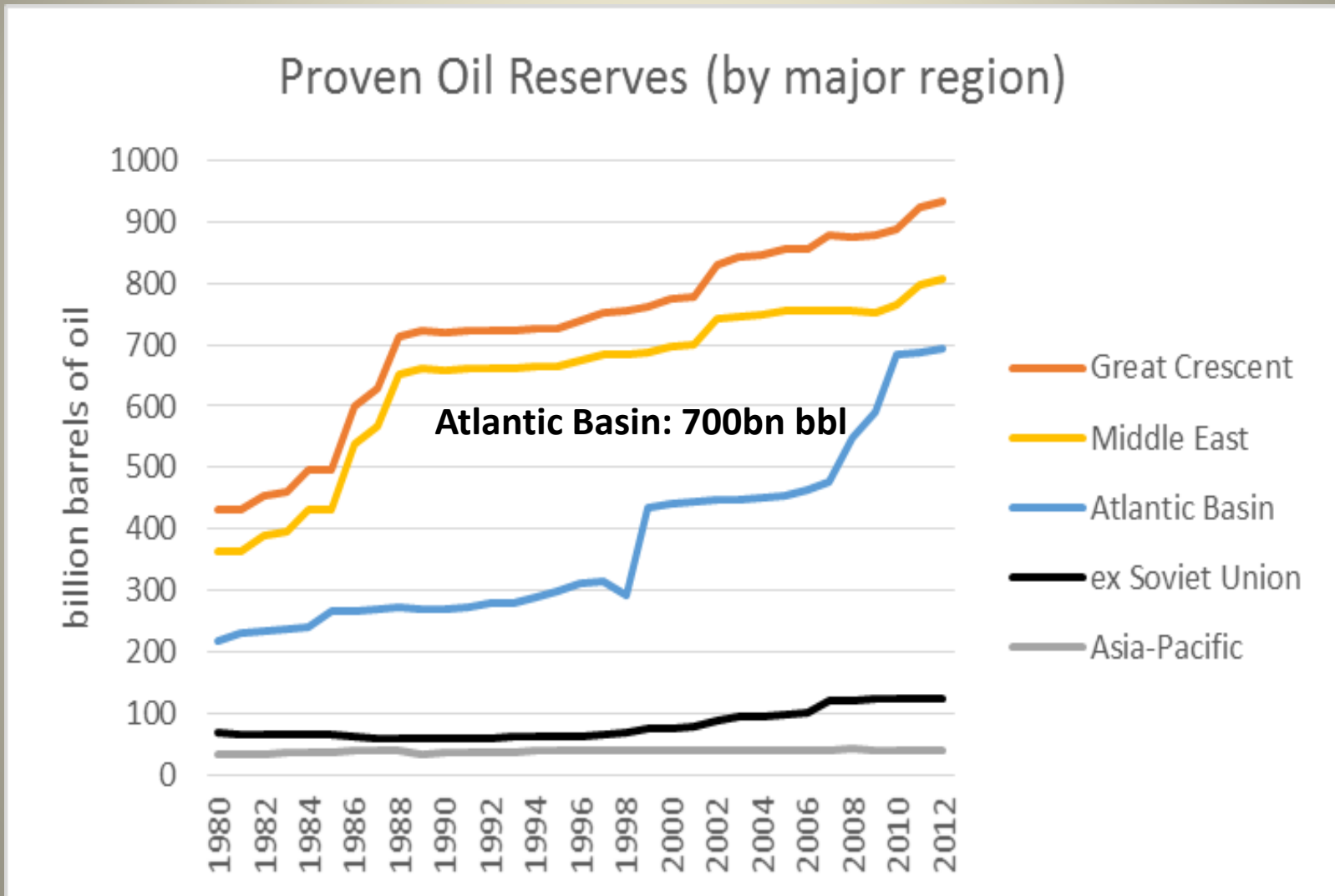
- *Such energy trends, changes in the global energy flow map and the derived strategic implications and opportunities have been revealed by the use of a new ‘projection of the global map’ – the ‘Atlantic Basin projection’*
- **The ‘Atlantic Basin’:** the four surrounding the Atlantic – Africa, LAC, Europe and North America (‘the historical arc of the West’ – a trajectory that can only be revived with critical input, engagement and ‘ownership’ from the Southern Atlantic)
- **The Great Crescent:** the traditional fossil fuel suppliers of the 20th century – the ex Soviet Union (Russia+, Central Asia, and the Middle East). This region also represents a slightly broader version of the old Eurasian ‘heartland’ – the increasingly obsolete fixation of Northern Atlantic foreign policy and grand strategy
- **Asia-Pacific:** the ‘emerging markets’ of the East: Southern Asia, Southeast Asia, East Asia. This is the Asia of the ‘Asian/Pacific century’ so frequently proclaimed.

The Atlantic Energy Renaissance

- The Atlantic Fossil Fuel Revival
 - The ‘shale revolution’ in the Northern Atlantic
 - The ‘offshore revolution’ in the Southern Atlantic
- The ‘low carbon revolution’

Atlantic Fossil Fuel Revival - Oil

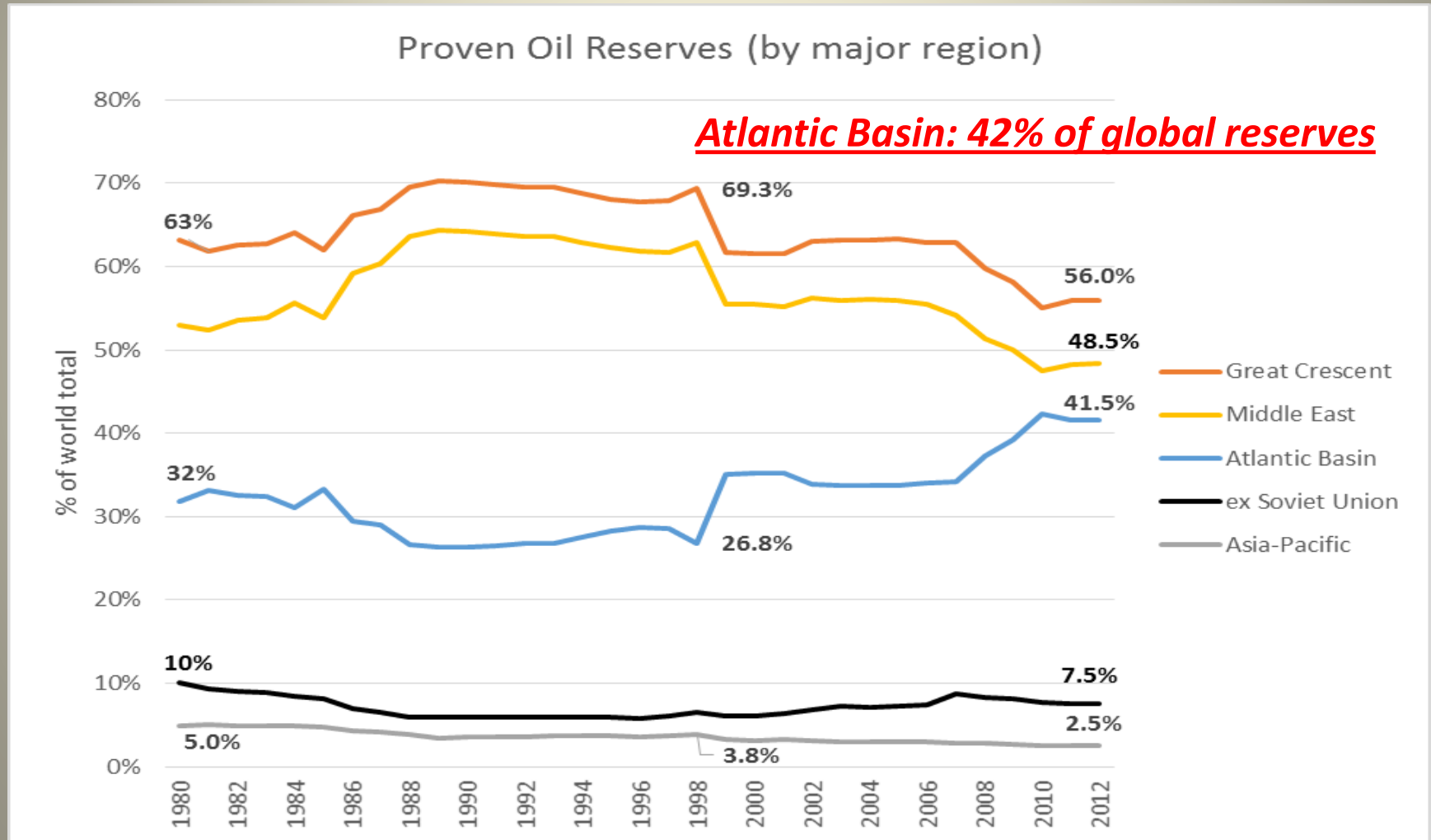
- Proven Oil Reserves, The Atlantic Basin and the World, bn bbl, 1980-2011



Source: BP Statistical Review of World Energy 2013, and author's own elaboration.

Atlantic Fossil Fuel Revival - Oil

- Proven Oil Reserves, The Atlantic Basin and the World, % of world total, 1980-2011

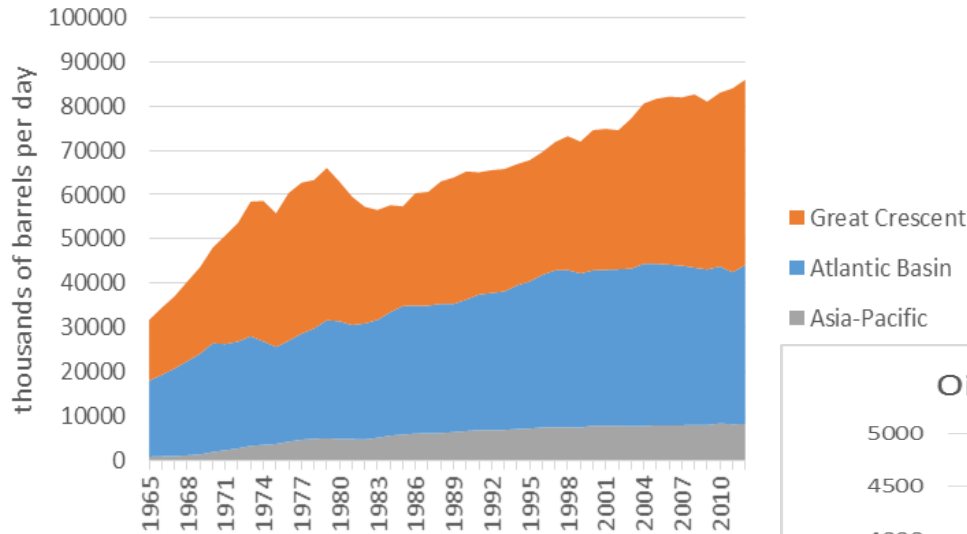


Source: BP Statistical Review of World Energy 2013, and author's own elaboration.

Atlantic Fossil Fuel Revival - Oil

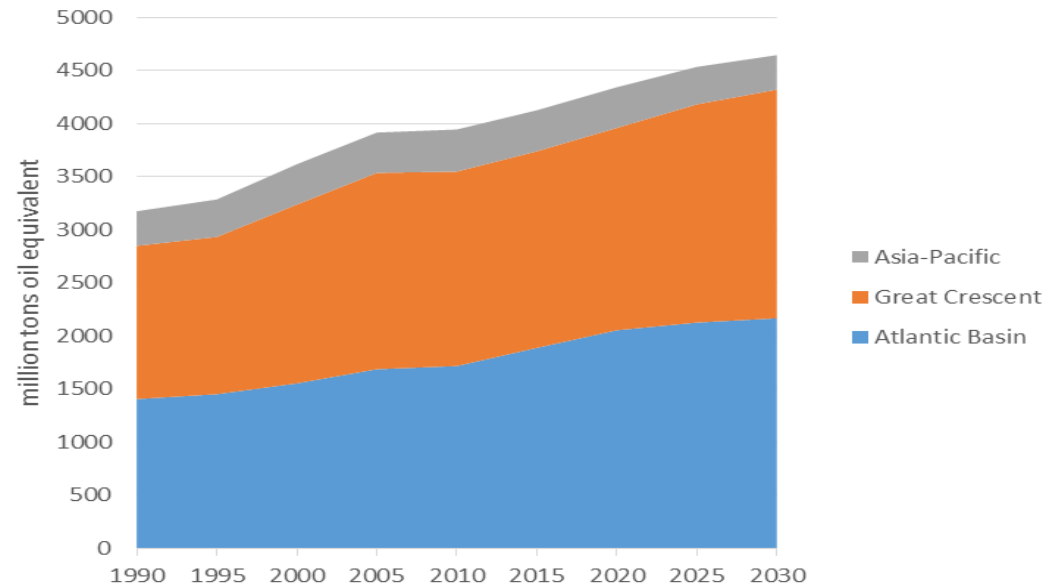
- **Oil Production, The Atlantic Basin and the World, 1965-2012**

Global Oil Production (by major regions)



Atlantic Basin contributes 42% of global oil production

Oil, Past and Future to 2030 (by major region)

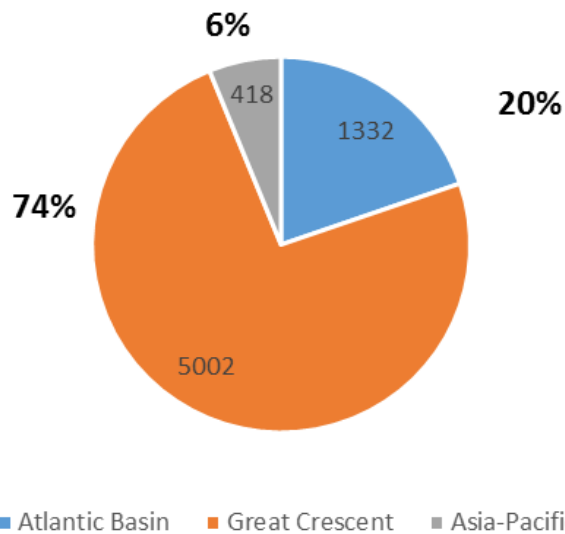


. . . . but the Atlantic Basin will account for nearly two-thirds (64.5%) of all projection growth in oil production to 2030

Atlantic Fossil Fuel Revival - Gas

- Gas Reserves, Conventional (left) and 'Shale' (right), Atlantic Basin and the World, 2012

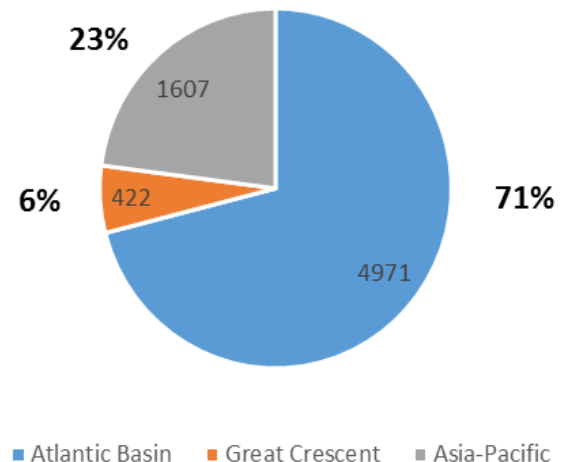
Conventional Proven Gas Reserves (tcf)



The 'Atlantic Basin' accounts for only 20% of conventional proven gas reserves, but . . .

Global 'Shale' Gas, Technically Recoverable Resources (TRR), by Region, 2013

Shale Gas Resources, TRR (tcf)



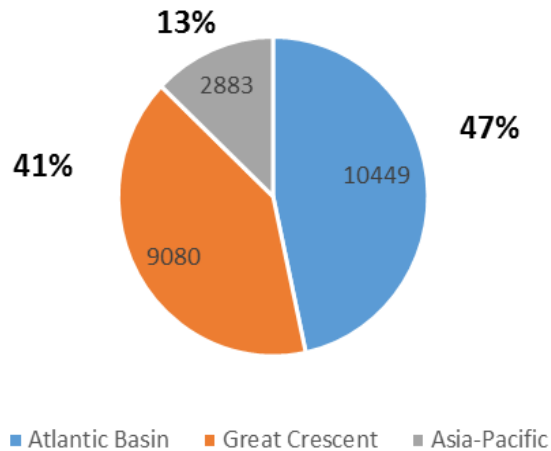
. . . The Atlantic holds 70% of known technically-recoverable shale gas reserves.

Source: EIA 2013, and author's own elaboration.

Atlantic Fossil Fuel Revival - Gas

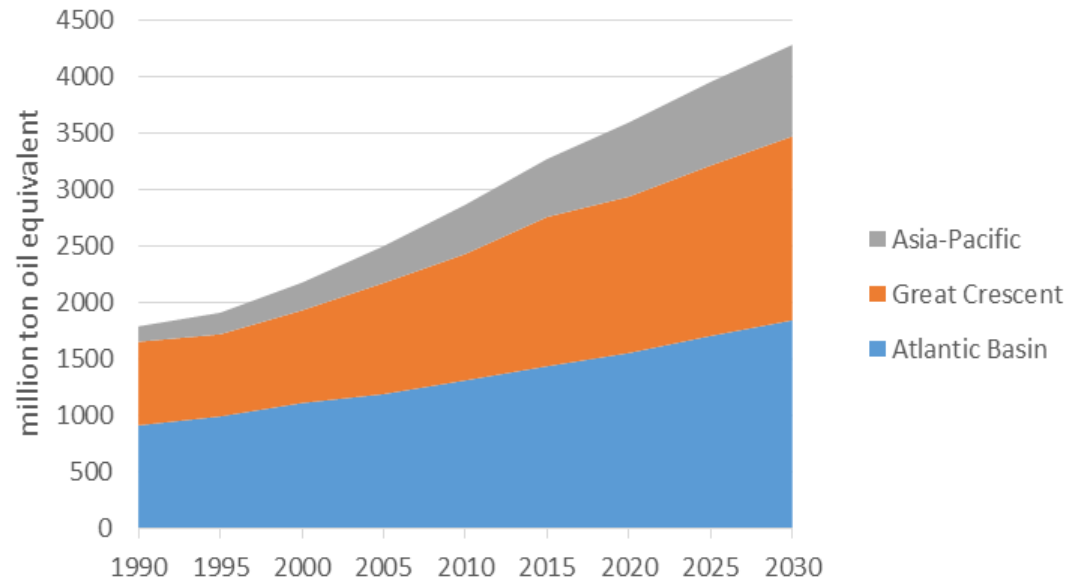
- Total Global Gas Supply, Technically Recoverable Resources (TRR), Atlantic Basin and the World, 2013

Total Technically Recovable Gas Resources, TRR (tcf)



Atlantic Basin accounts for nearly half of the world's technically available gas reserves (conventional + shale)

Gas, Past and Future to 2030 (by major regions)



Source: EIA 2013, and author's own elaboration.

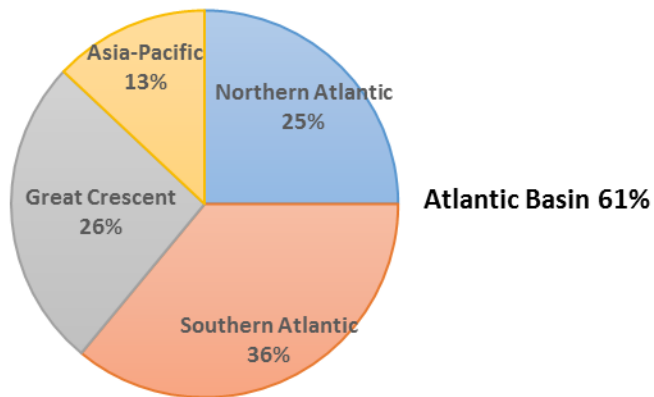
. . . . Atlantic Basin will outpace the Great Crescent in gas production, accounting for 38% of all projected growth in global gas production to 2030 (versus the Great Crescent's 36%)

Source: BP Energy Outlook 2030, January 2013 and own-elaboration.

Atlantic Offshore Revolution - Oil

- One-third (28mbd) of global oil production occurs offshore (8mbd in the 'deep' offshore)
- **Over 60% of global offshore oil and 95% of 'deep offshore' is Atlantic**

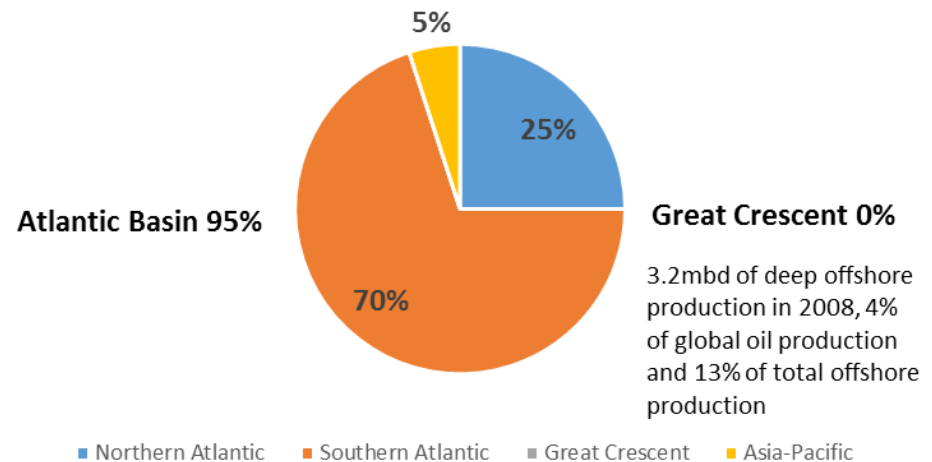
Offshore Oil Production by Major Region, 2012



■ Northern Atlantic ■ Southern Atlantic ■ Great Crescent ■ Asia-Pacific

Global offshore production has more than doubled since 1980 – from less than 15% to nearly one-third today – rising in absolute daily production terms from 8.9mbd to 28mbd in 2010. Since 1980

Deep Offshore Oil Production (>1000m), 2008



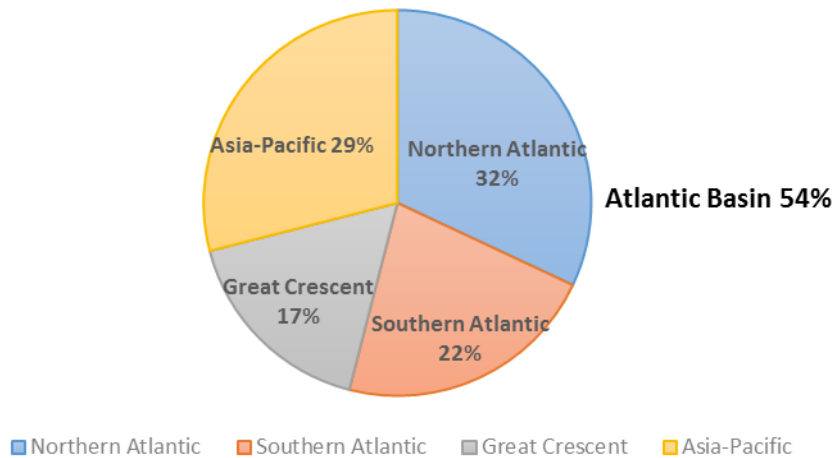
■ Northern Atlantic ■ Southern Atlantic ■ Great Crescent ■ Asia-Pacific

- . . . offshore oil production has accounted for all of the net increase in global oil production, from 66mbd to 86mbd (+20mbd)
- . . . onshore production has fallen from a peak (1970: 60mbd+) and now appears to be in long-term decline worldwide

Atlantic Offshore Revolution - Gas

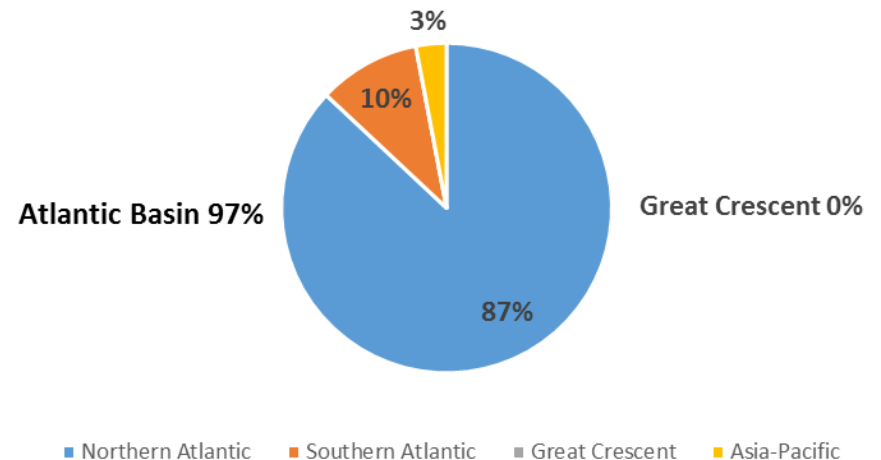
- **Atlantic Basin accounts for 54% of global offshore gas production**

Offshore Gas Production by Major Region, 2012



- Current offshore gas production accounts for some 27% of total global production.
- Over half (54%) of this global offshore gas production occurs in the Atlantic Basin.
- Nearly all (97%) of current deep offshore gas comes from the Atlantic . .

Deep Offshore Gas Production



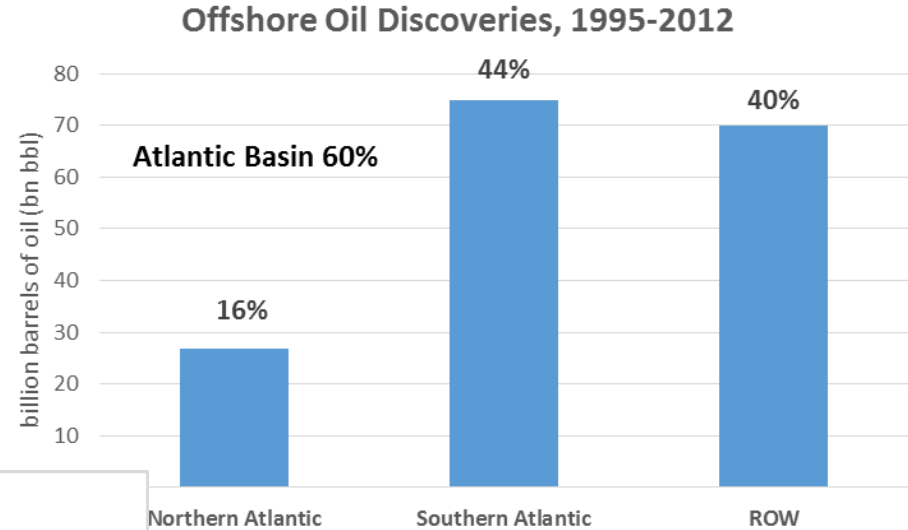
... however, because the AB offshore only accounts for 2% of global gas production and Australia, the world's largest 'deep offshore gas' reserve holder (40%), is likely to increase its production share in the future

Atlantic Offshore Discoveries/Investment

- **Atlantic Basin offshore oil discoveries**

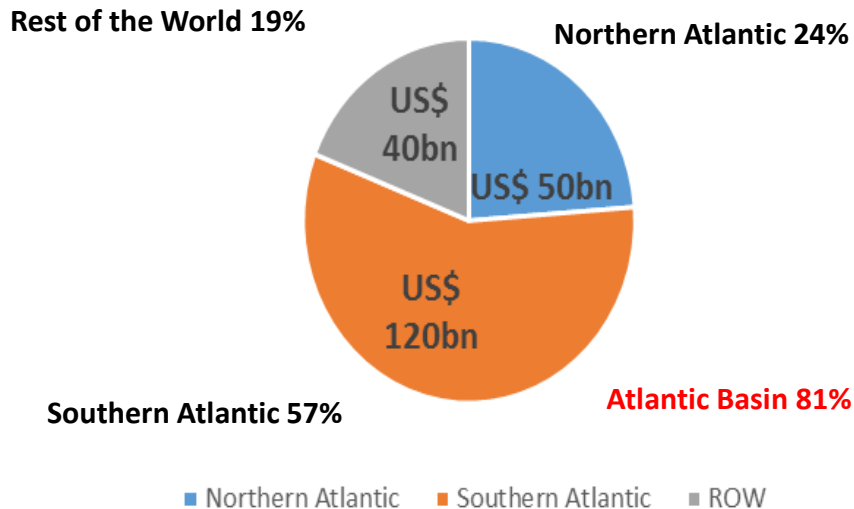
The Atlantic accounts for over 60% of global offshore oil discoveries

More importantly, the Southern Atlantic dominates this 'offshore revolution'



Source: Deutsche Bank and Wood Mackenzie.

Deep Offshore Oil and Gas Investment, US \$ bn, 2011-2015

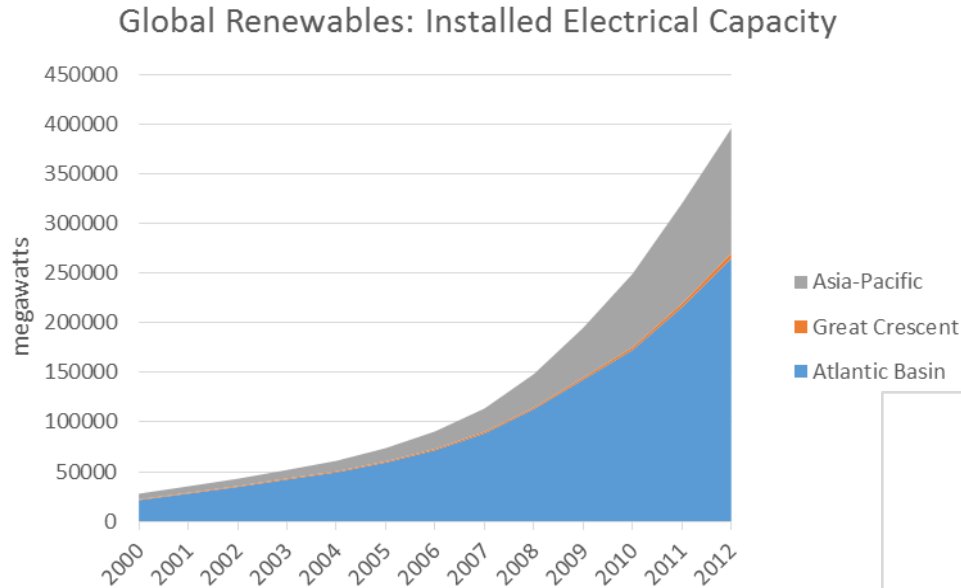


'Deep Offshore' Oil/Gas Investment

- US\$210bn in deep offshore hydrocarbons investment during 2011-15 in subsea pipelines, completions and platforms
- **Atlantic Basin: 81%**
- **Southern Atlantic: nearly 60%**

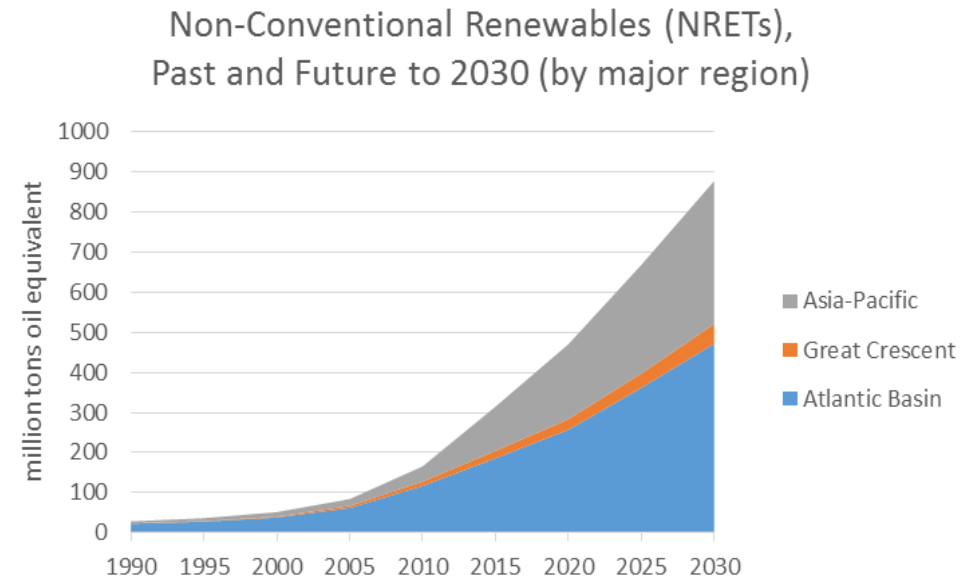
Atlantic 'Low Carbon' Revolution

- **Atlantic Basin: world's leader in 'low carbon' and renewable energy**



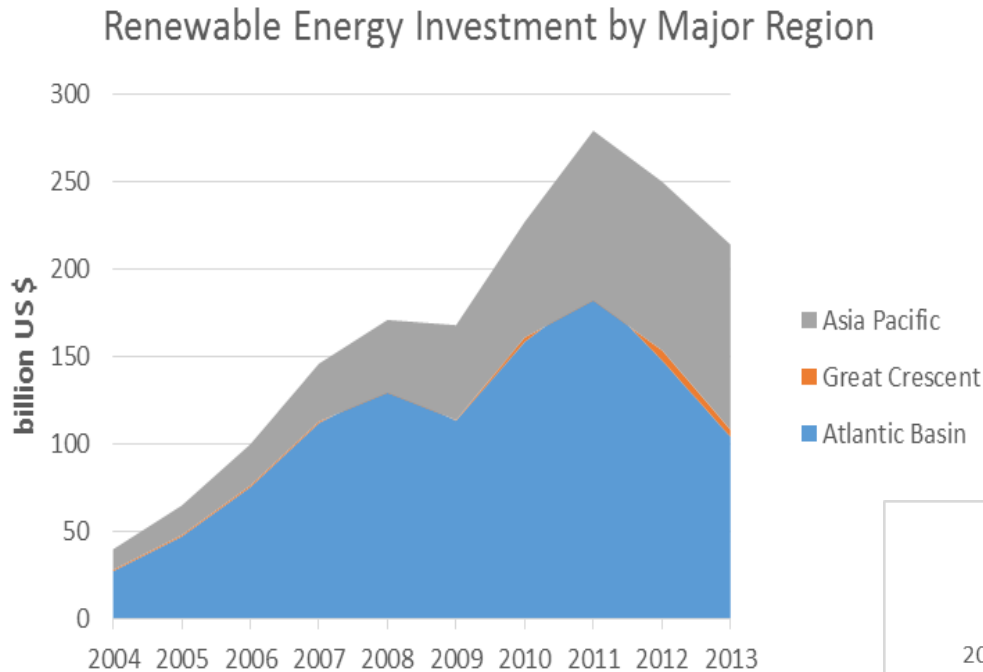
- **AB's collective installed capacities:**
 - solar (77% of the world total)
 - wind (64%)
 - geothermal (59%)
- *Atlantic renewables roughly two-thirds of the world's total installed 'renewable' electricity capacity*

- **... nevertheless,** Asia-Pacific will continue to erode Atlantic Basin predominance in renewable energy
- **by 2030, Asia-Pacific will contribute 41% of all renewable energy production,** cutting the Atlantic Basin's prior lead (54% in 2030, down from 79% in 1990)



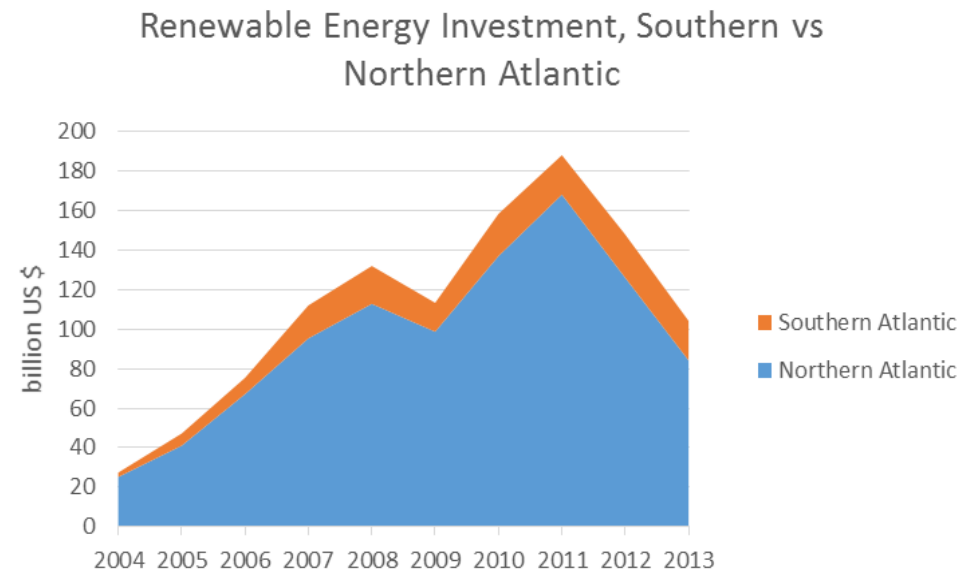
Atlantic 'Low Carbon' Revolution

- **Atlantic Renewables Investment**



- In 2008, the Atlantic registered its peak share (77%) of global investment in renewable energy
- Meanwhile, in 2007, Asia-Pacific experienced its lowest recent share of 23%.
- **Double dip in investment:** a steep double-dip drop-off in which AB accounted for the entire global decline (from US\$279bn to US\$214bn)

- the factors behind the drop in AB RE investment are multiple
- *recent Atlantic investment decline has not affected the Southern Atlantic*
- *continued to registered constant levels around US\$20bn annually*

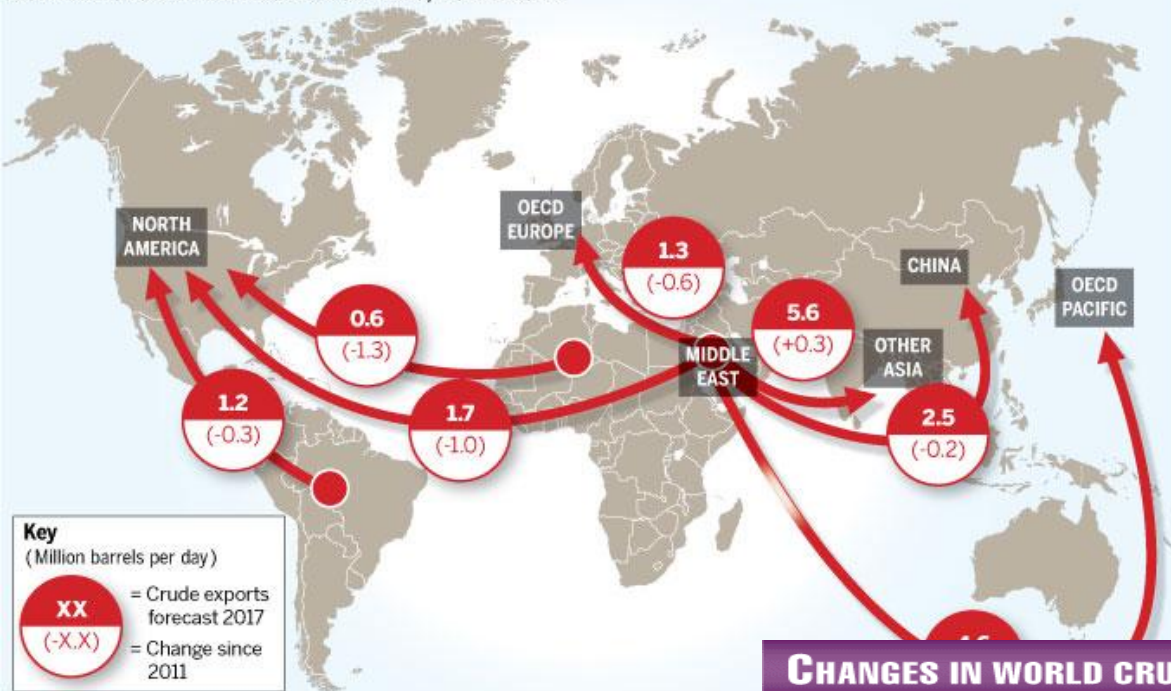


Changes in the Global Energy Flow Map

- Center of gravity for energy supply shifting 'westward'
- Center of gravity for energy demand shifting 'eastward'
- Global energy flows are reversing their traditional 20th century east-to-west orientation to become 'West-to-East' energy flows
- The Atlantic Basin will become, increasingly, the energy supplier, at the margin, to Asia-Pacific

Redrawing the map

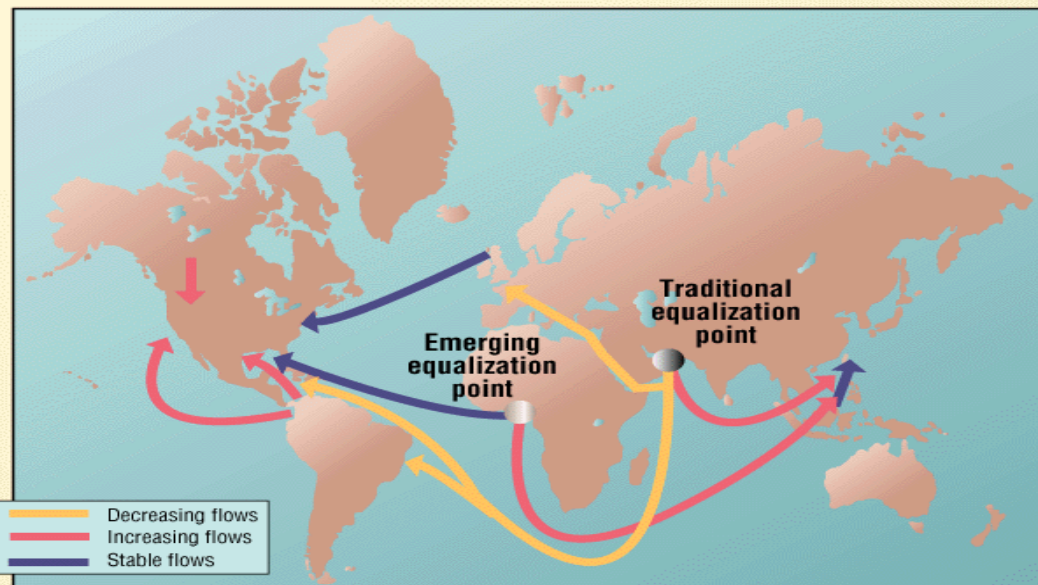
North America and Middle East oil trade, 2011-2017



Between now and the end of the decade, the 4mmbd of oil will reverse flow direction – from East-to-West, to West-to-East

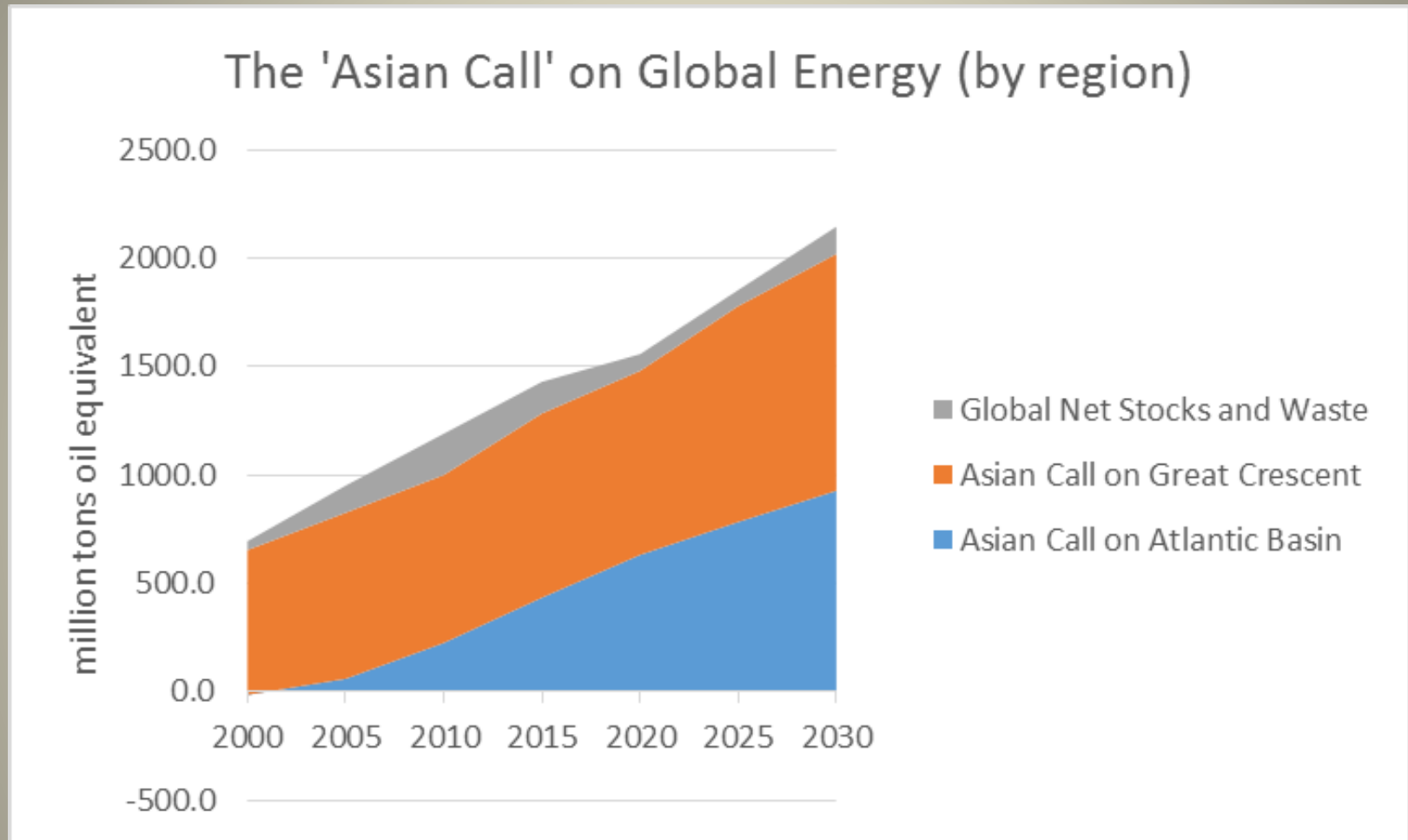
. . . . and by the middle of next decade total global seaborne energy flows will be moving, in net terms, from West-to-East.

CHANGES IN WORLD CRUDE OIL TRADE PATTERNS



Source: Purvin & Gertz Inc.

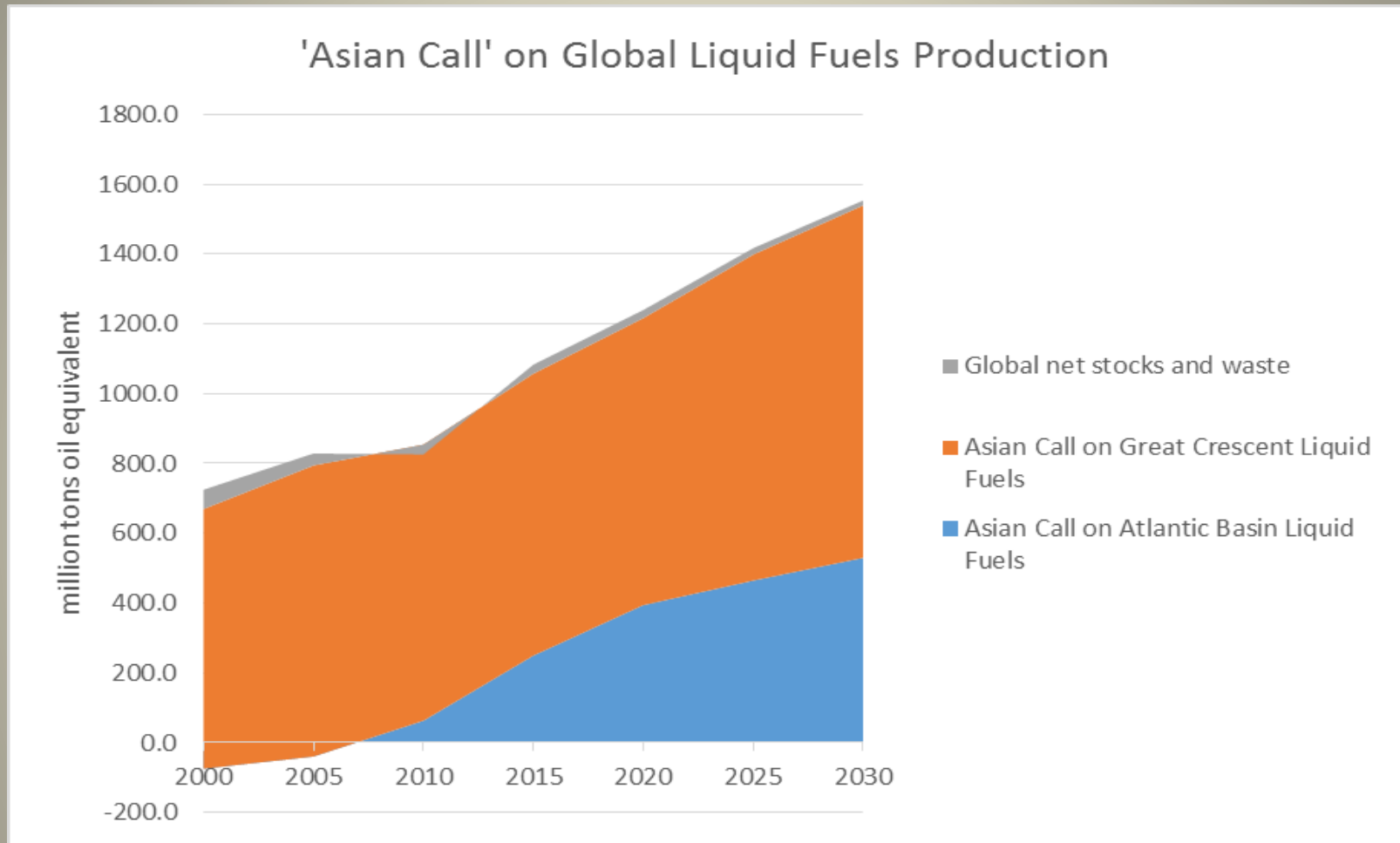
Atlantic and New Global Energy Flow Map



Source: BP Statistical Review of World Energy 2013, and author's own elaboration.

- The Growing 'Asian demand call' on the Atlantic Basin, 2000-2030
- *The growth in the total 'Asian energy demand call' on Atlantic Basin energy is projected to be to twice as intense, at the margin, as the growth in the already heavy call on the 'Great Crescent.'*

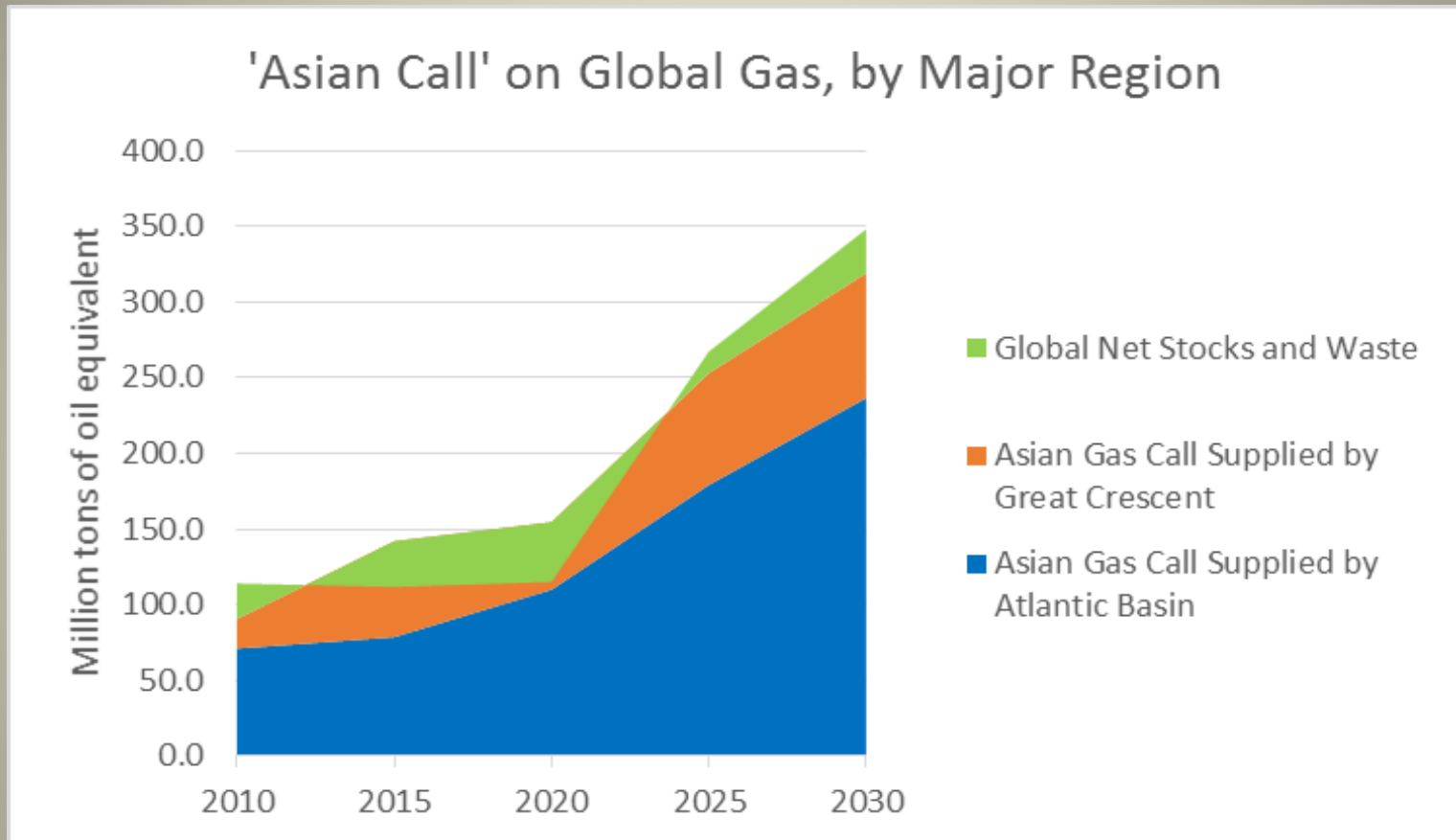
Atlantic and New Global Energy Flow Map



Source: BP Statistical Review of World Energy 2013, and author's own elaboration.

- **The Growing 'Asian liquids call' on the Atlantic Basin, 2000-2030**
- *The growth in the 'Asian liquids demand call' on Atlantic Basin energy is projected to be to three times as intense, at the margin, as the growth in the already heavy call on the 'Great Crescent.'*

Atlantic and New Global Energy Flow Map



Source: BP Statistical Review of World Energy 2013, and author's own elaboration.

- **The Growing 'Asian gas call' on the Atlantic Basin, 2000-2030**
- *The growth in the 'Asian gas call' on the Atlantic Basin is projected to be half again as intense, at the margin, as the growth in the already heavy call on the 'Great Crescent.'*

Strategic Implications

- **‘Potential geopolitical leverage’ shifting westward (problematizes the ‘pivot to Asia’)**
- **‘New equation for regional cooperation, integration, governance’**
 - **The coalescence of an Atlantic Basin energy system and the potential for ‘pan-Atlantic energy cooperation**
 - **The ‘Atlantic Basin Initiative’ and the ‘Atlantic Energy Forum’**
- **Heightened global ‘strategic significance’ of the ‘Southern Atlantic’**
- **Part of a broader global phenomenon: the rise of the ‘seascape’**



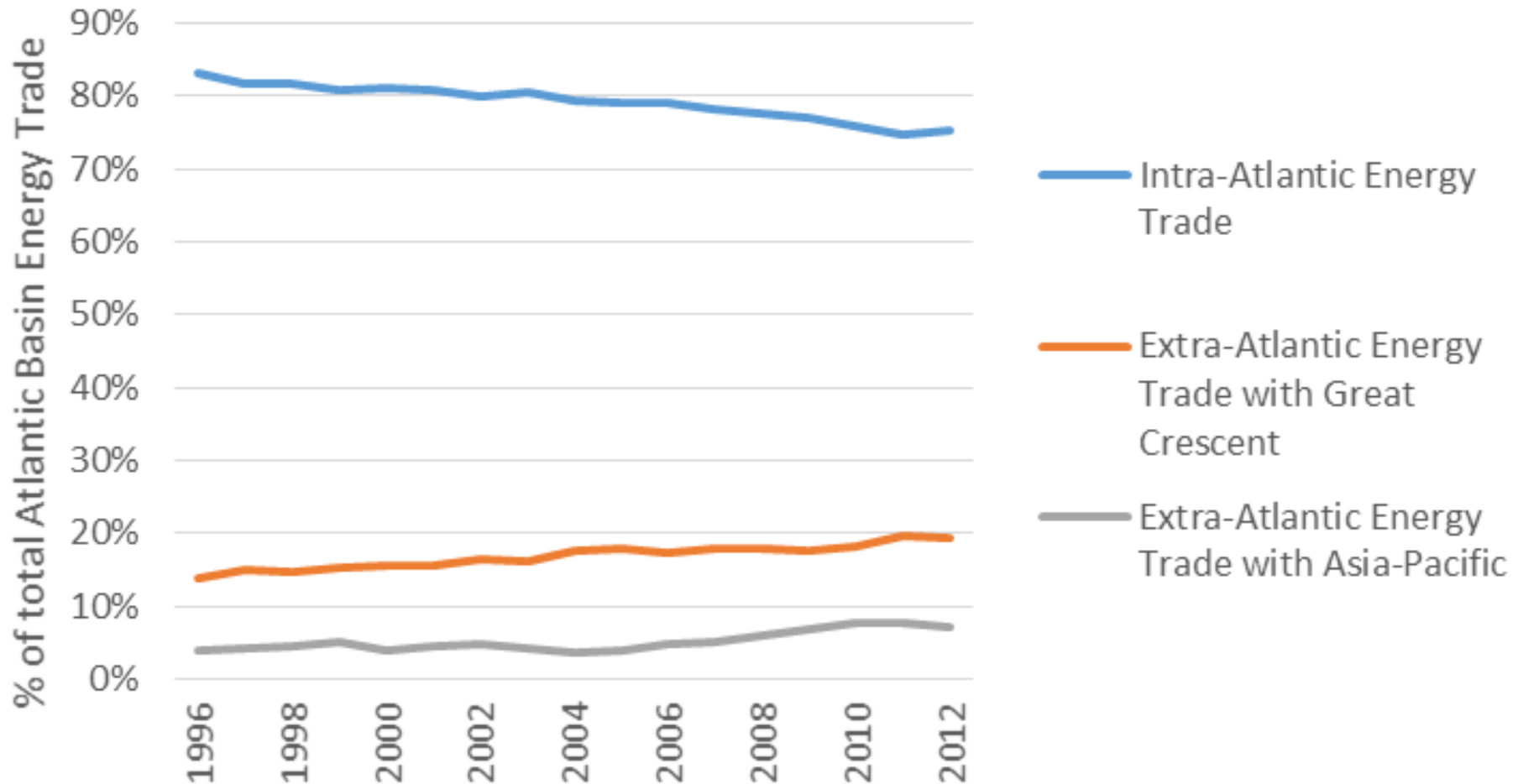
References and Further Reading

- The 'Atlantic Basin Initiative' (ABI): <http://transatlantic.sais-jhu.edu/events/2012/Atlantic%20Basin%20Initiative/Atlantic%20Basin%20Initiative>
- The 'Atlantic Energy Forum' (AEF): Inaugural meeting agenda (November 8-9 in Cancun) and AEF brochure, available upon request
- "Towards a New Atlantic Community" White Paper of the Atlantic Basin Initiative, 2014
- "Atlantic Energy and the Global Energy Flow Map," a paper for the Atlantic Future project of the EC (FP7), 2014
- "Atlantic Energy and the Strategic Horizon," CIDOB, 2013
- *Energy and the Atlantic: the Shifting Energy Landscapes of the Atlantic Basin*, OCP and German Marshall Fund, 2012
- All of the above are available on the CTR JHU SAIS website.

Supplementary Material

An Atlantic Basin Energy System?

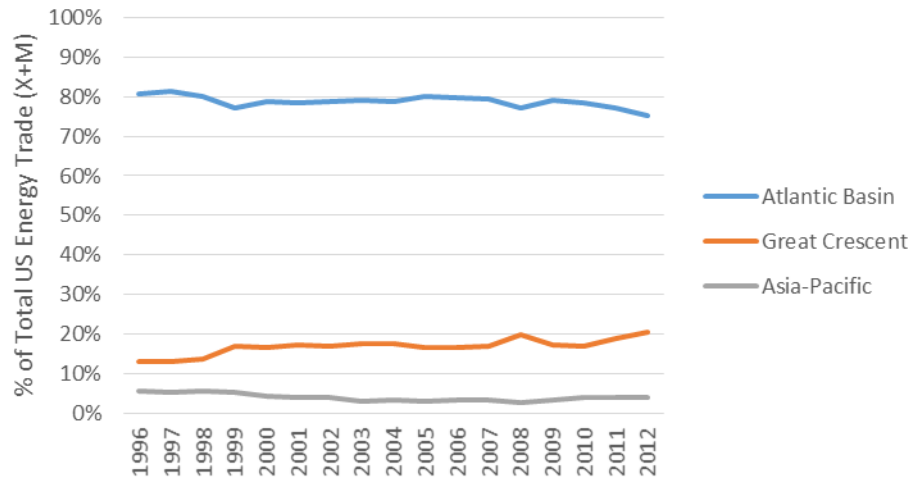
Total Atlantic Basin Energy Trade by Major Region



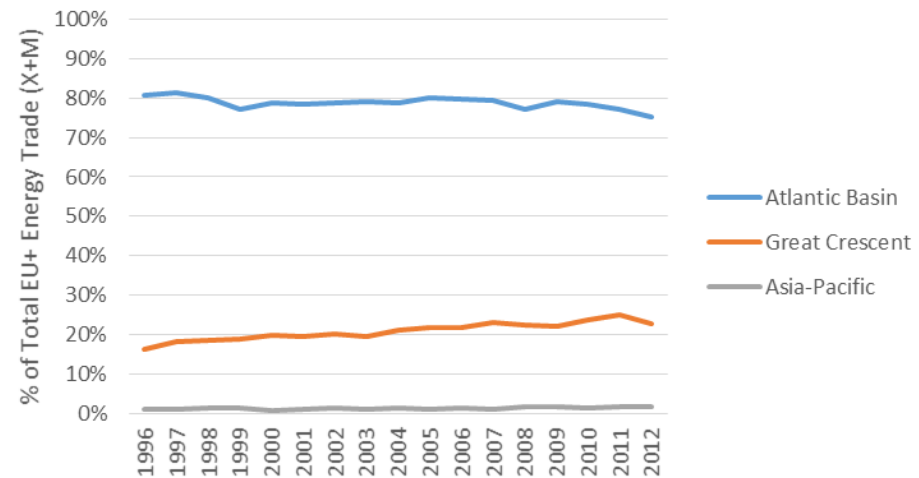
Source: UNCOMTRADE, 2014. Note: Figures include both exports and imports of all types of energy trade in all energy sources, including refined energy products.

An Atlantic Basin Energy System?

Total US Energy Trade (by major region)

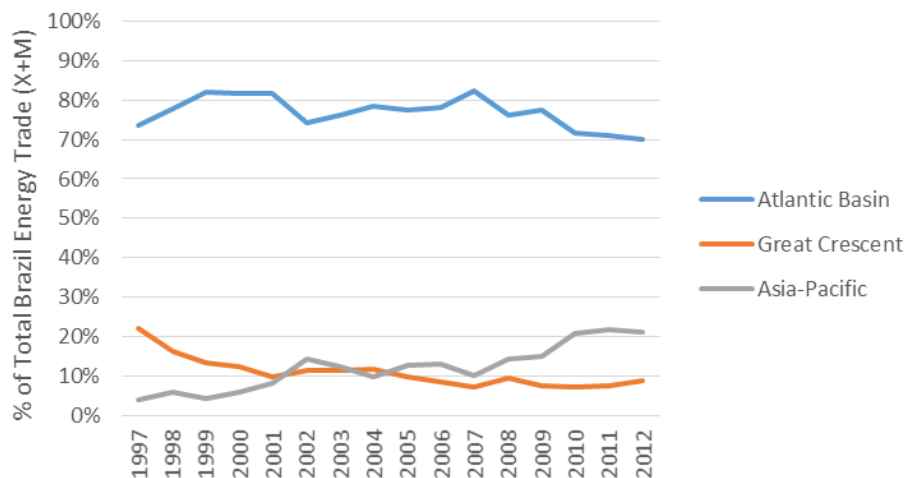


Total EU+ Energy Trade (by major region)

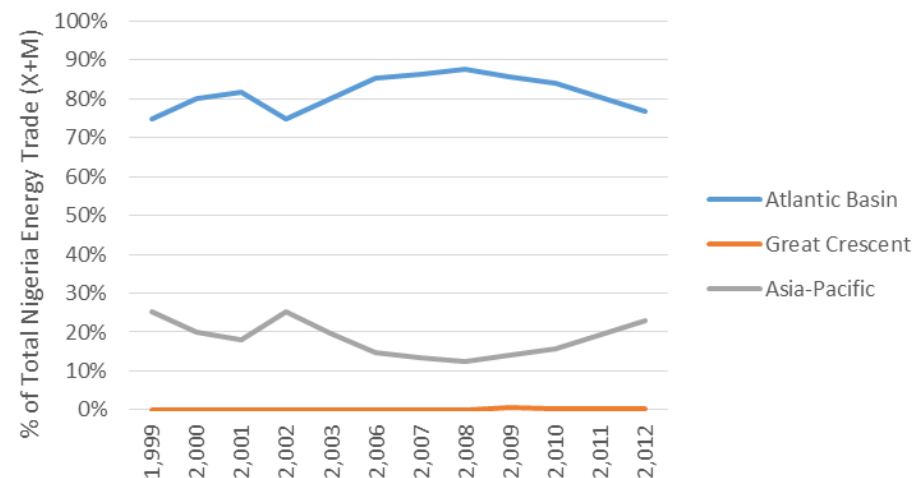


Source: UNCOMTRADE, 2014. Note: Figures include both exports and imports of all types of energy trade in all energy sources, including refined energy products.

Total Brazil Energy Trade (by major region)

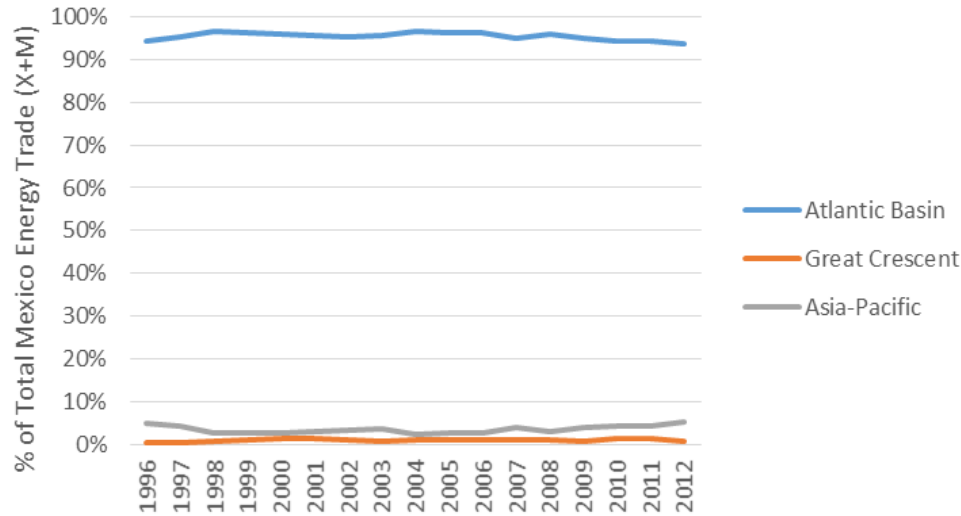


Total Nigeria Energy Trade (by major region)

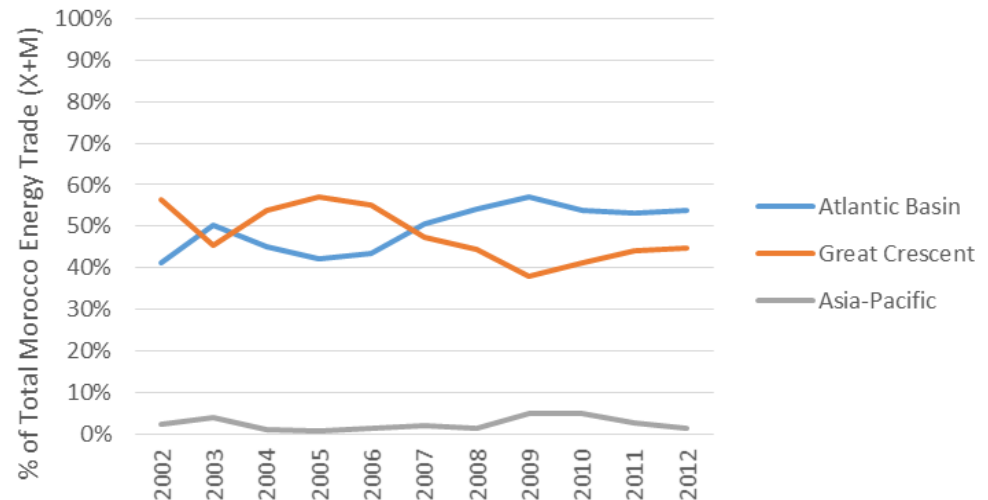


An Atlantic Basin Energy System?

Total Mexico Energy Trade (by major region)

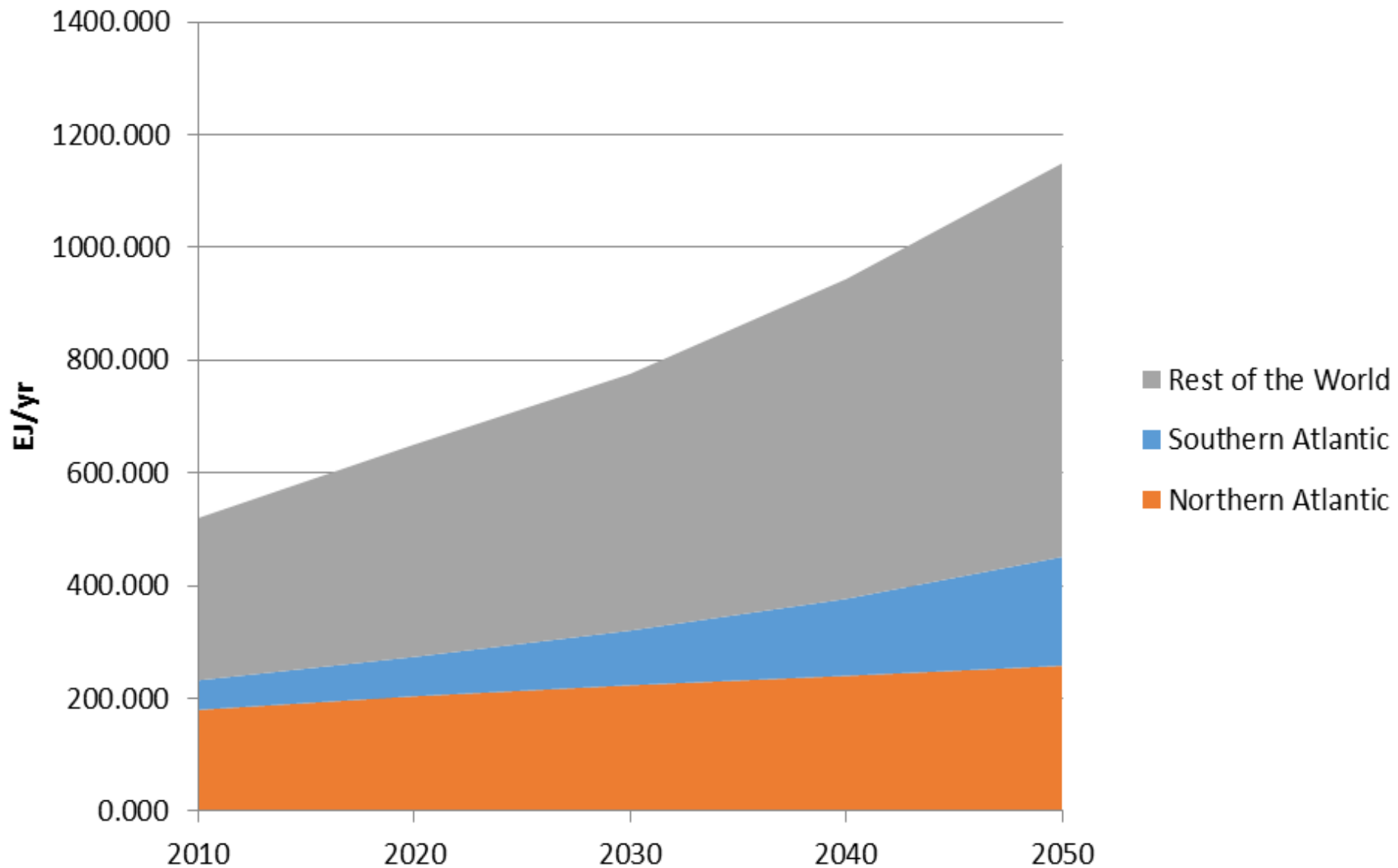


Total Morocco Energy Trade (by major region)



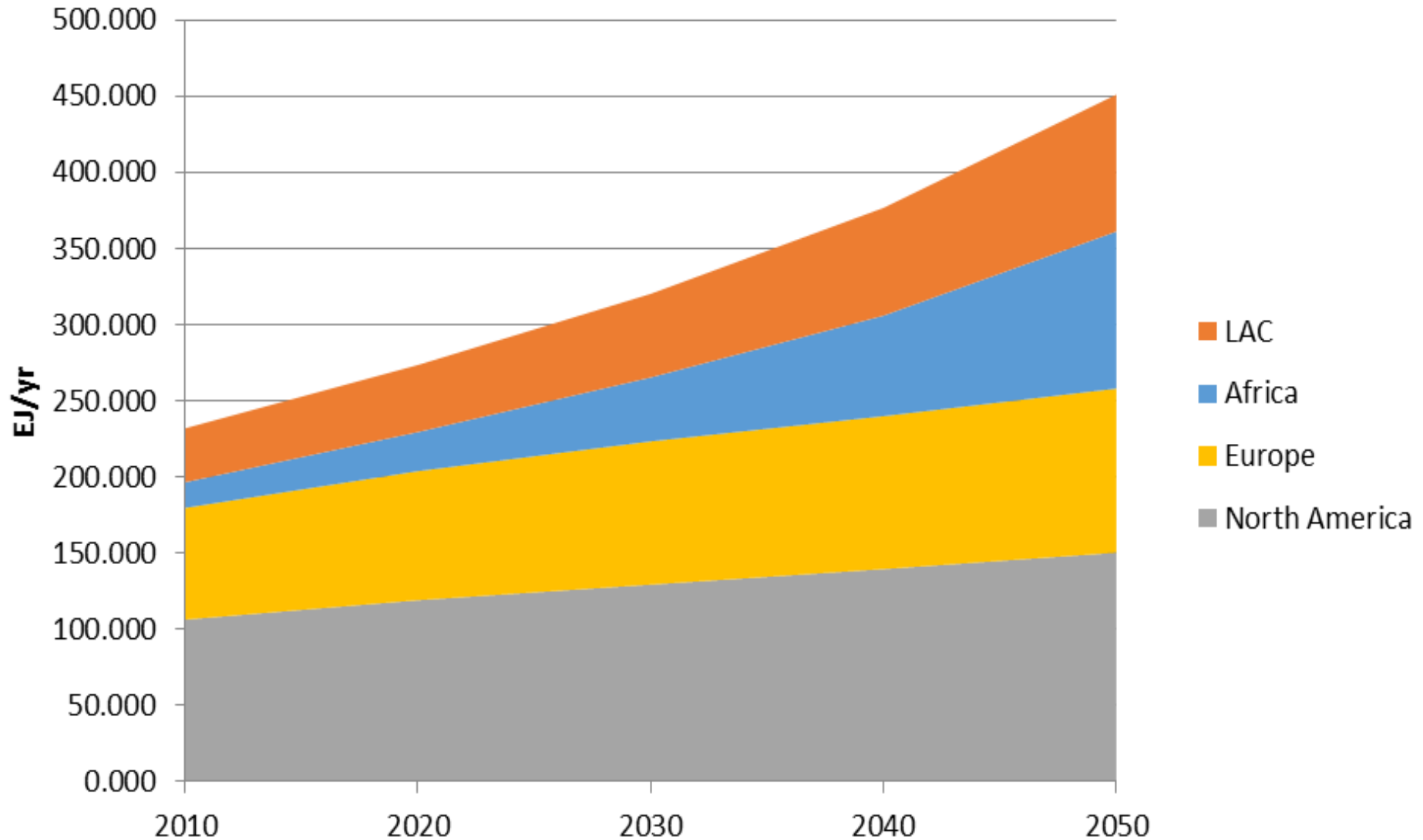
Source: UNCOMTRADE, 2014. Note: Figures include both exports and imports of all types of energy trade in all energy sources, including refined energy products.

Global Energy Demand to 2050



Source: IIASA GEA Model Database 2013 and own-elaboration.

Atlantic Basin Energy Demand to 2050

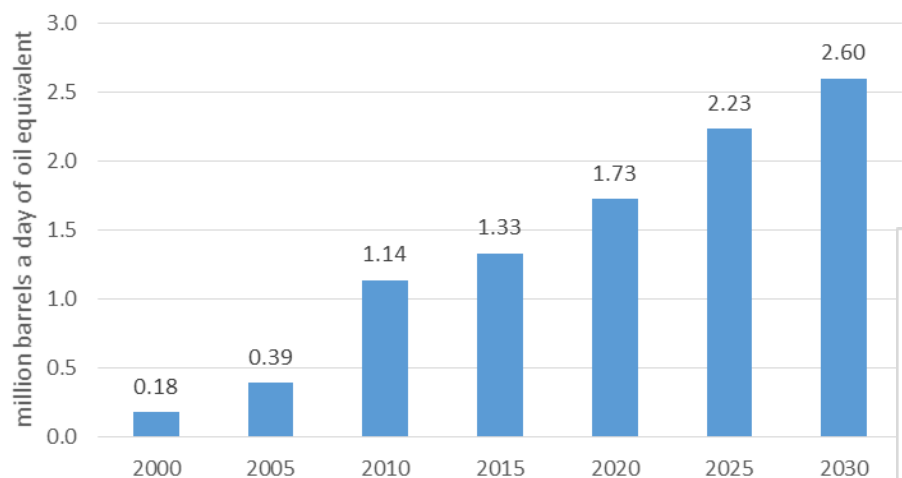


Source: IIASA GEA Model Database 2013 and own-elaboration.

Atlantic Energy 'Renaissance'

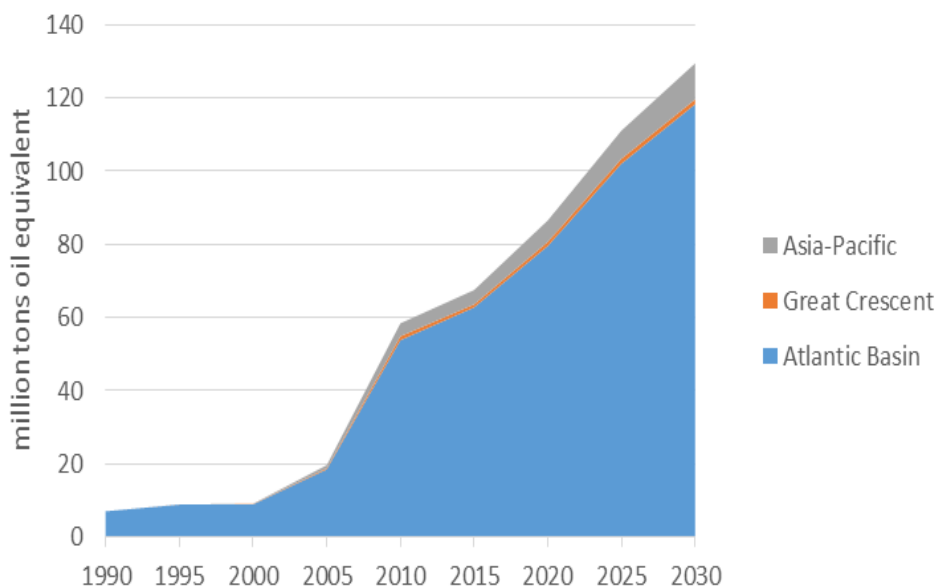
- Biofuels: the Atlantic Basin and the World, 1990-2030
- **Atlantic Basin: produces, consumes and trades 85% to 90% of global biofuels**

Global Biofuels Consumption



Global biofuels currently contribute less than 2mbdoe, or less than 3% of the global 'liquids' energy mix

Biofuels, Past and Future to 2030 (by region)

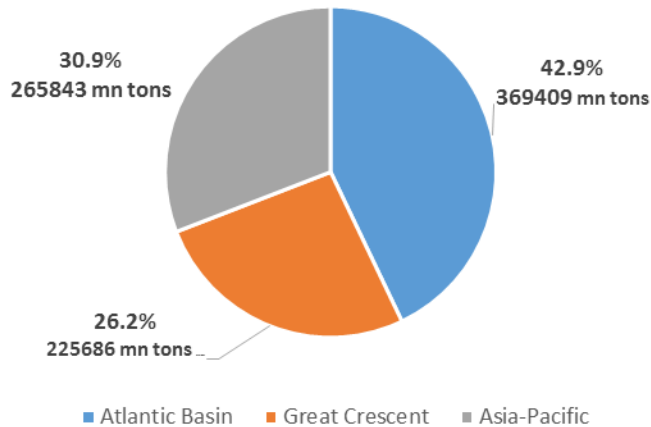


. . . . nevertheless, biofuels still represent a strategic energy vector, given that it is now the only way to replace petroleum liquids in the transport of global material flows (air and sea travel). Biofuels are also a 'strategic branching' fuel between a 'liquids' or an 'electrified' future for transportation

Atlantic Energy 'Renaissance'

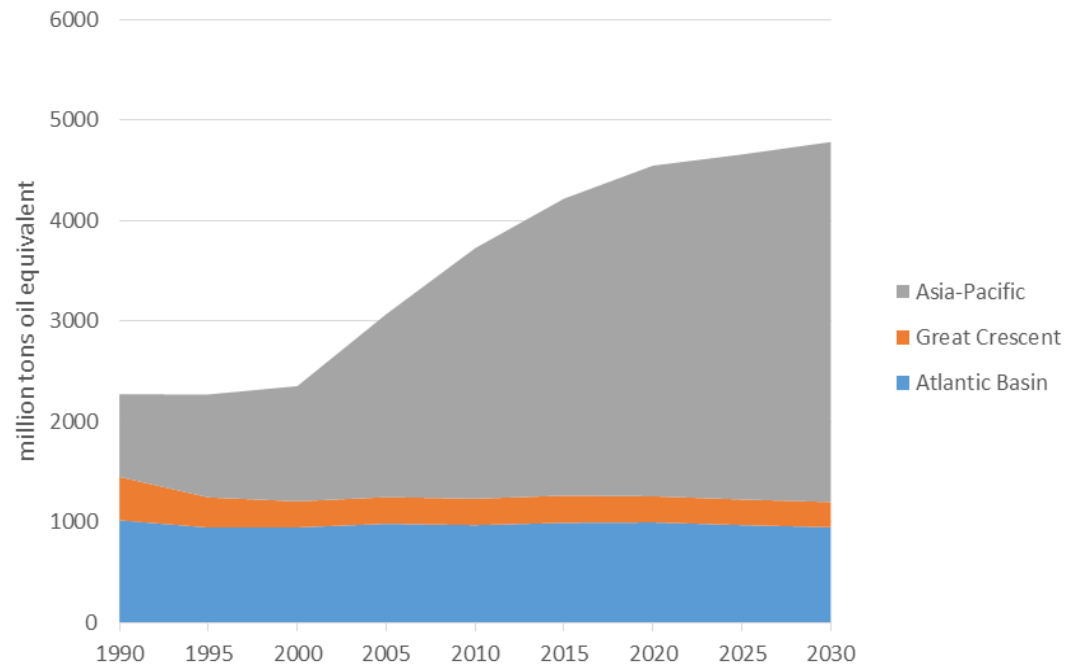
- Global Coal, Atlantic Basin and the World, 1990-2030
- **Atlantic Basin: 43% of global coal reserves**

Global Coal Reserves, 2012 (by major region)



Asia-Pacific: 31% of global coal reserves, but dominates global coal consumption and production

Coal, Past and Future to 2030 (by major regions)

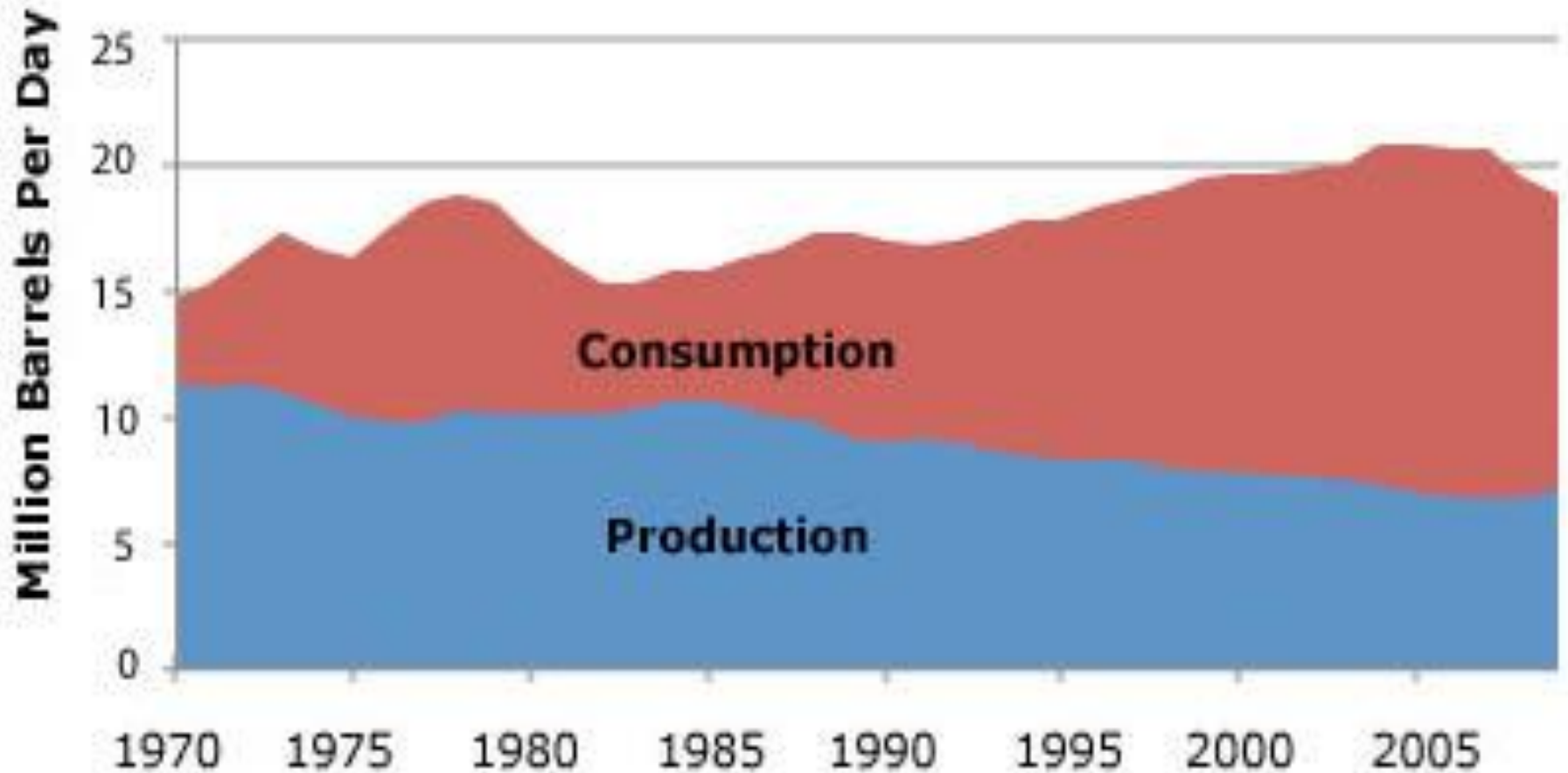


. . . . However, more than half of the projected growth in global coal production has already taken place

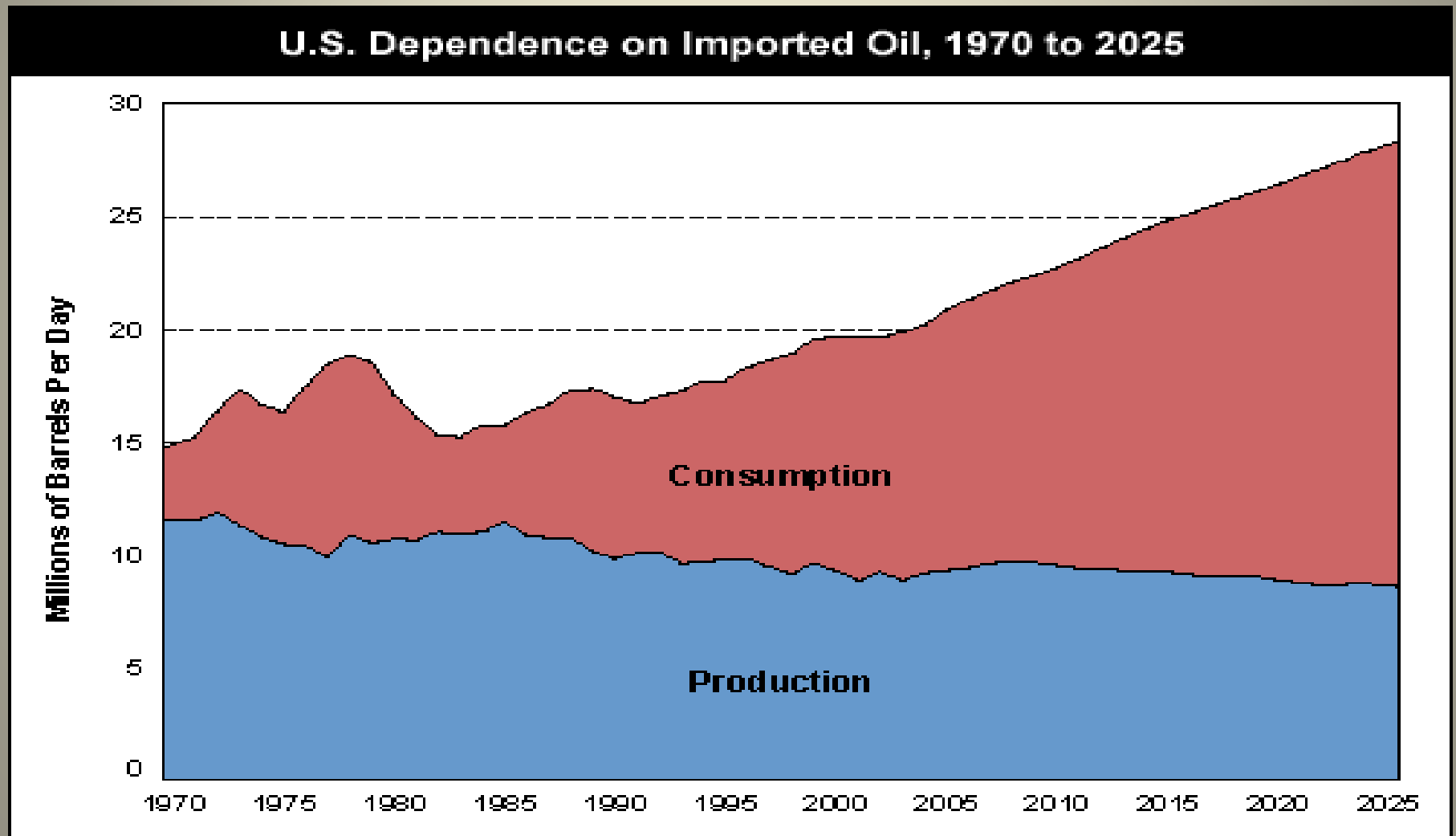
Atlantic Basin will continue to meet Asia-Pacific coal demand at the margin

Previous US story: growing external energy dependence (I)

U.S. Dependence on Foreign Oil, 1970-2009



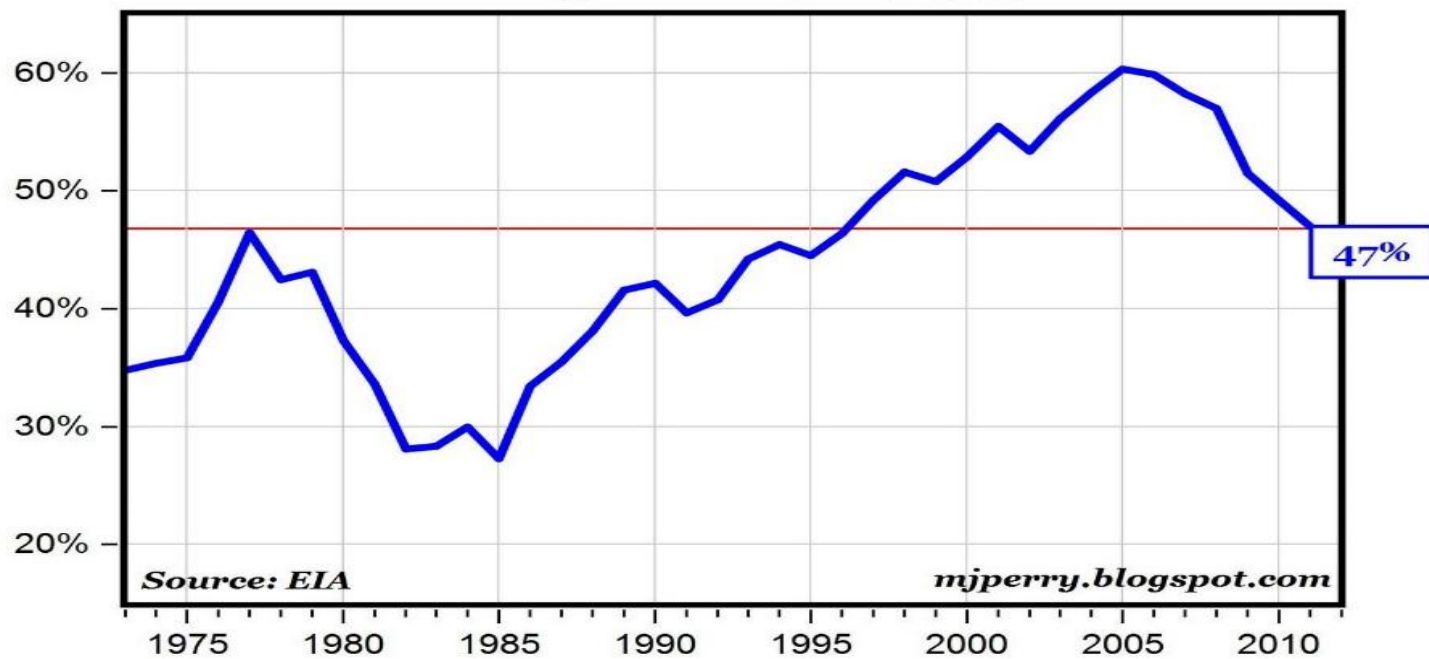
Previous US story: growing external energy dependence (II)



Source: Energy Information Administration, *Annual Energy Outlook 2004*

Previous US story: growing external energy dependence (III)

Oil Imports: Share of U.S. Consumption, 1973-2011



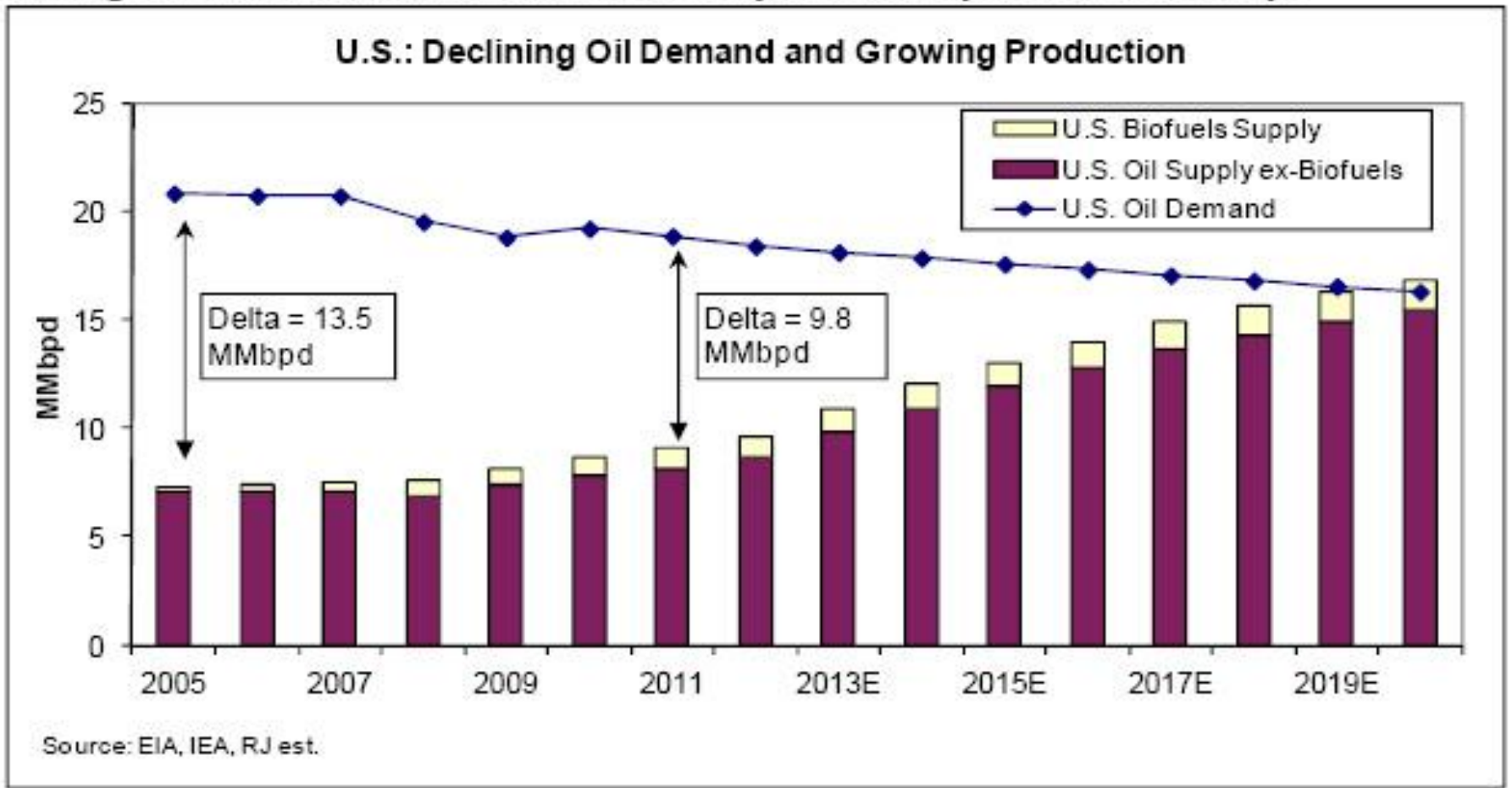
The New US Story: 'Shale Revolution' (I)

- Shale oil production has increased 65% since 2005 (now equal to Iraqi production)
- Shale gas: 35% increase in production (Marcellus shale in PA = to reserves of Qatar (second largest X in 2012))
- Gas imports down by 28% since 2005
- Oil imports have fallen 16% since 2005
- Improvement in competitiveness of energy-intensive sectors, particularly manufacturing

The New US Story: 'Shale Revolution' (II)

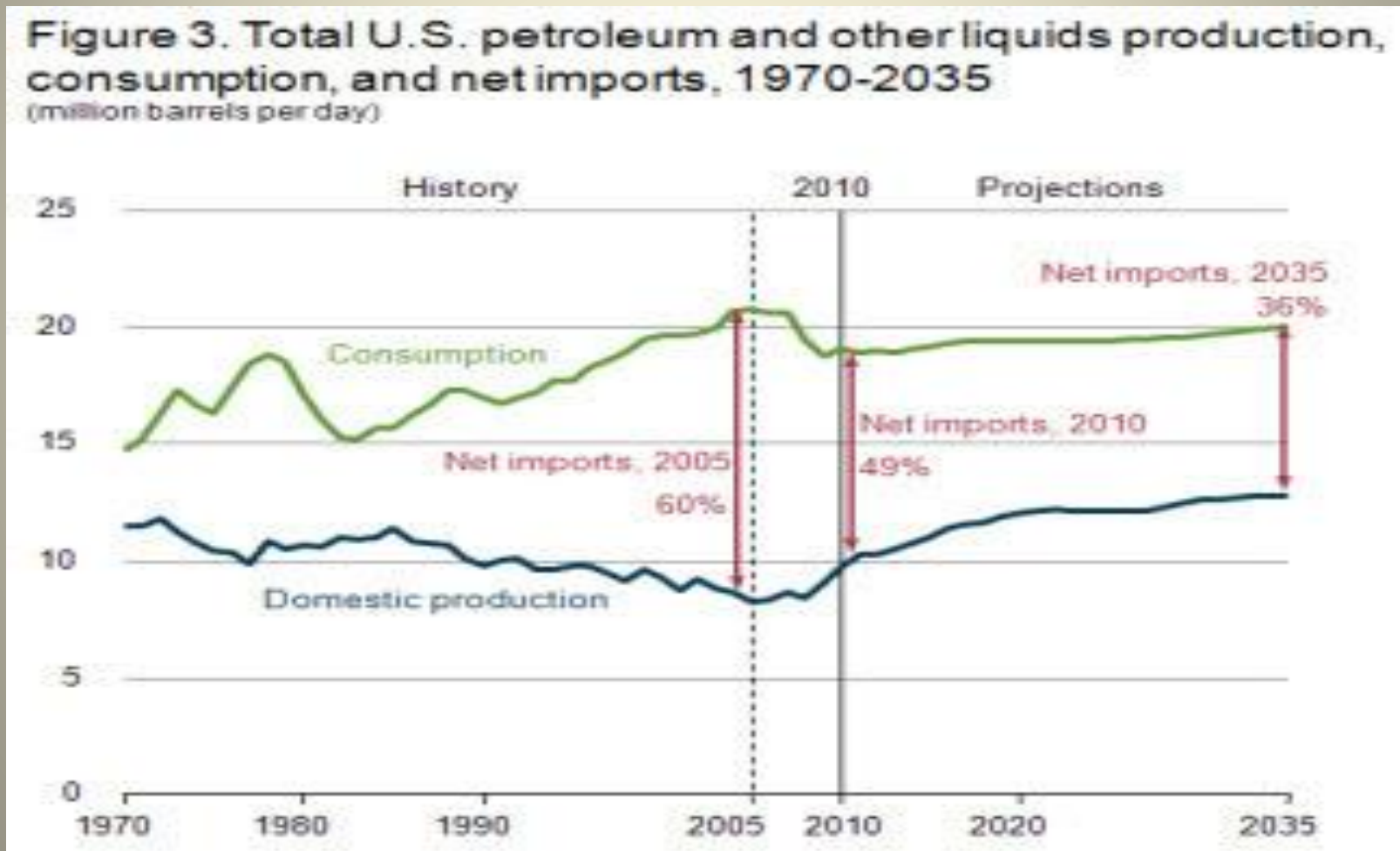
- Optimistic view on 'energy independence' – oil imports eliminated by the end of this decade (based on private sector estimates)

Falling oil demand is a smaller but very relevant part of the story.



The New US Story: 'Shale Revolution' (III)

- More measured, 'official' view – net oil imports falling to 36% by 2030-35 (based on EIA projections)



ATLANTIC OCEAN FLOOR

SCALE 1:100,000 AT THE EQUATOR
1 CENTIMETER ON THIS MAP REPRESENTS 100 KILOMETERS
VERTICAL SCALE IS UNLIMITED



JOHNS HOPKINS UNIVERSITY
The Paul H. Nitze School of Advanced International Studies
1717 Massachusetts Avenue NW
Washington, DC 20036
202.663.5880 / 202.663.5879 fax
<http://transatlantic.sais-jhu.edu>
Center for Transatlantic Relations