



## Sustainability Research



Mark Lewis, Coordinator Energy Transition & Climate Change Research  
[mlewis@keplercheuvreux.com](mailto:mlewis@keplercheuvreux.com) - (33) 1 70 81 57 60

## Our ESG Research Approach

### Value driven... Not Values driven

**We believe financial indicators alone cannot capture the risk profile or value potential of a specific asset. A truly comprehensive and relevant assessment of an asset risk - reward profile clearly requires taking into account extra-financial indicators and integrating them at the heart of our research model.**

- We do not make any ethical judgement
- Sustainability of Business Models and Value Drivers is our focus
- We look at ESG from a Shareholder Value Creation / Destruction point of view

### Strong Thematic approach :

- Identifying & analysing how the sustainability momentum drives and impact equity performance
- Building expertise in Climate Change, Energy Transition, Business Ethics, Governance, Supply Chain...
- We partner with top experts in all fields we investigate in, including NGOs

### ESG Integration means :

- Assessing ESG materiality in absolute terms rather than in *Best-in-Class* terms
- Analysing the ESG performance of companies within the business context they operate
- Forward looking analysis : alignment of views on the ESG and financial fronts
- Ultimate objective is for all investment recommendations to take into accounts the key ESG factors

# The Three Witches in the Oil Market

## Contents

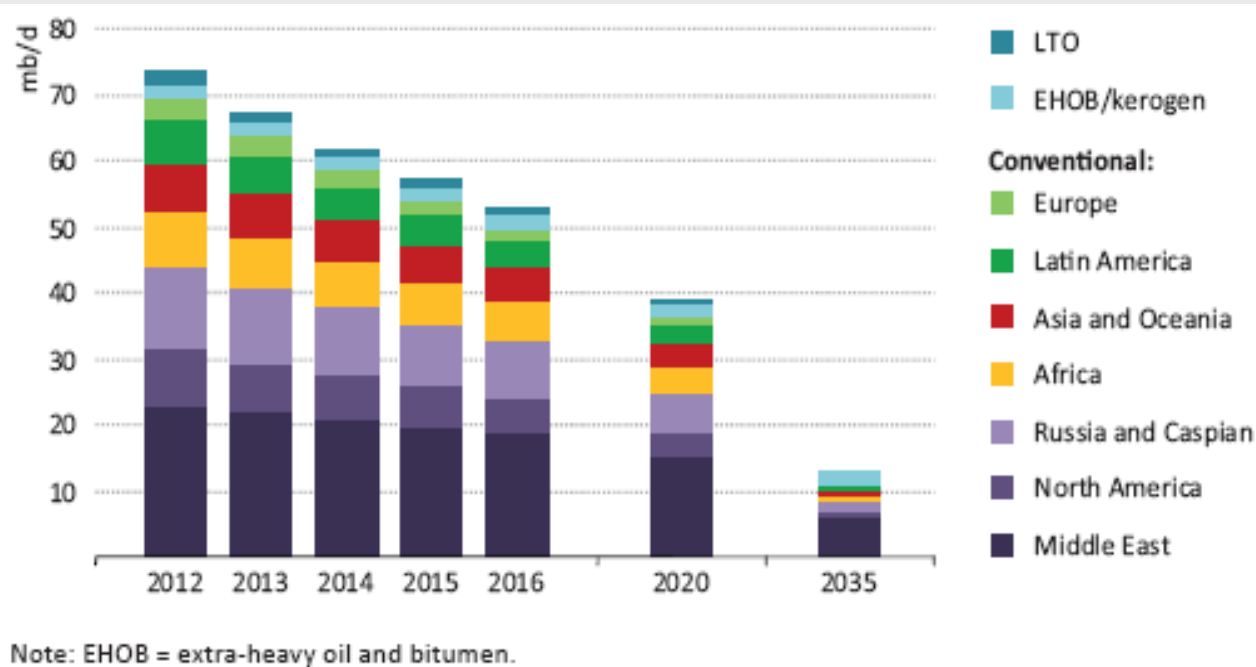
1) Decline Rates



2) The Irresistible Rise of Capex Requirements

3) The Trend in and Outlook for Global Exports of Crude Oil

## IEA estimate of future production from currently producing oil fields if all capex were stopped today

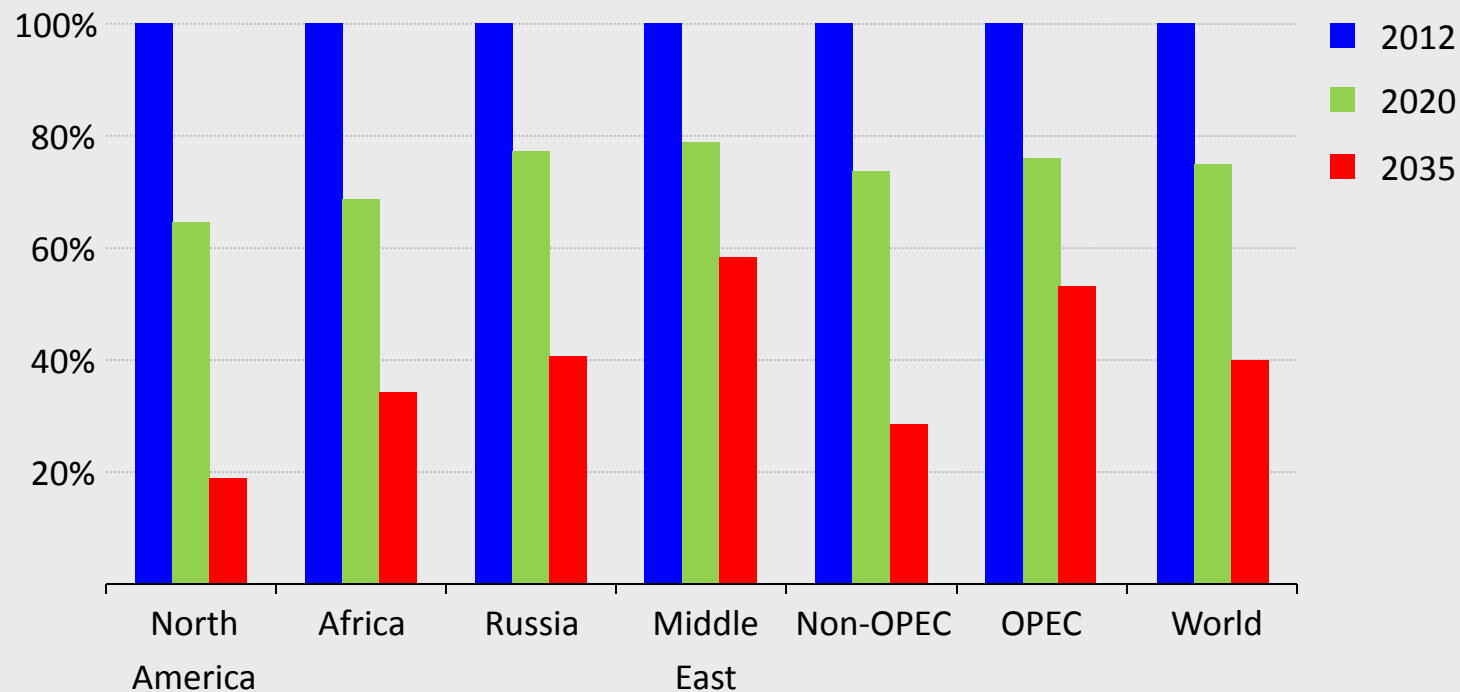


Source: IEA, 2013 World Energy Outlook

### Key points

- IEA estimates that if all upstream-oil capex stopped today, output would fall to 13mbd by 2035 v. 74mbd today
- This implies an average annual natural rate of decline in production of c.2.6mbd, or c.3mbd for all petroleum liquids
- We estimate that this implies just over half of all currently producing fields are past their peak

## Decline in production of conventional crude from currently producing fields according to 2013 WEO

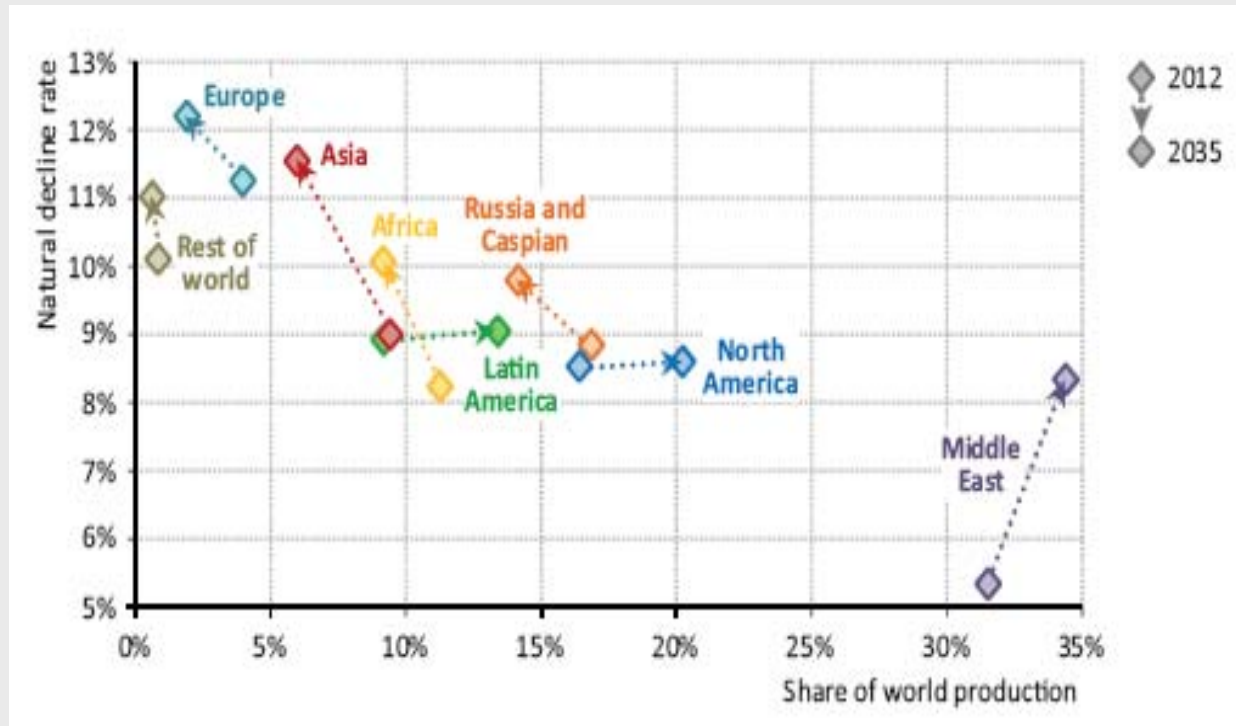


Source: IEA World Energy Outlook 2013

### Key points

- Output from all conventional crude-oil fields producing today falls from 69mbd in 2012 to 28mbd by 2035
- If no further investment in exiting fields took place, the IEA estimates production would fall to 10mbd by 2035
- This is why the 2013 WEO says “the main threat to future oil supply is insufficient investment”.

## IEA expectation of future trend in natural decline rates for crude-oil fields

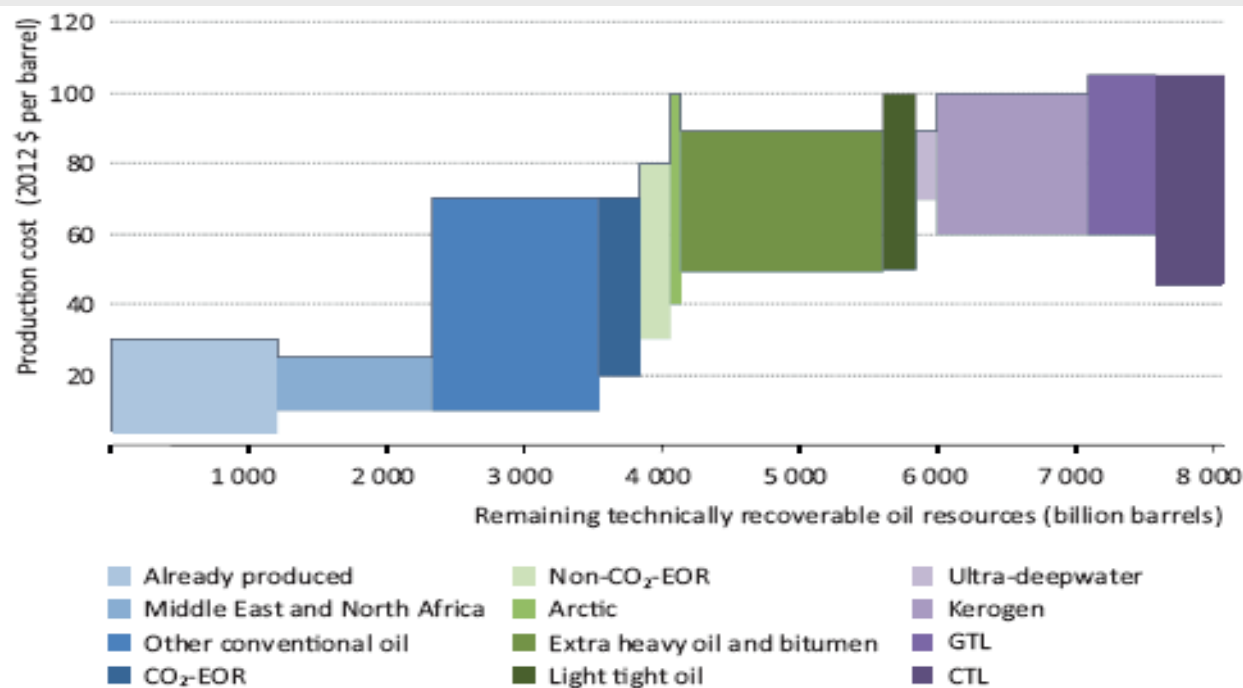


Source: IEA, 2013 World Energy Outlook

### Key points

- Decline rates are measured both on “natural” and “observed” basis, meaning with and without maintenance capex
- IEA estimates the natural decline rate for post-peak fields globally at c.9% , and the observed decline rate at 6.2%
- This varies by region, but IEA sees natural decline rates increasing over 2013-35

## IEA cost curve for global oil supply



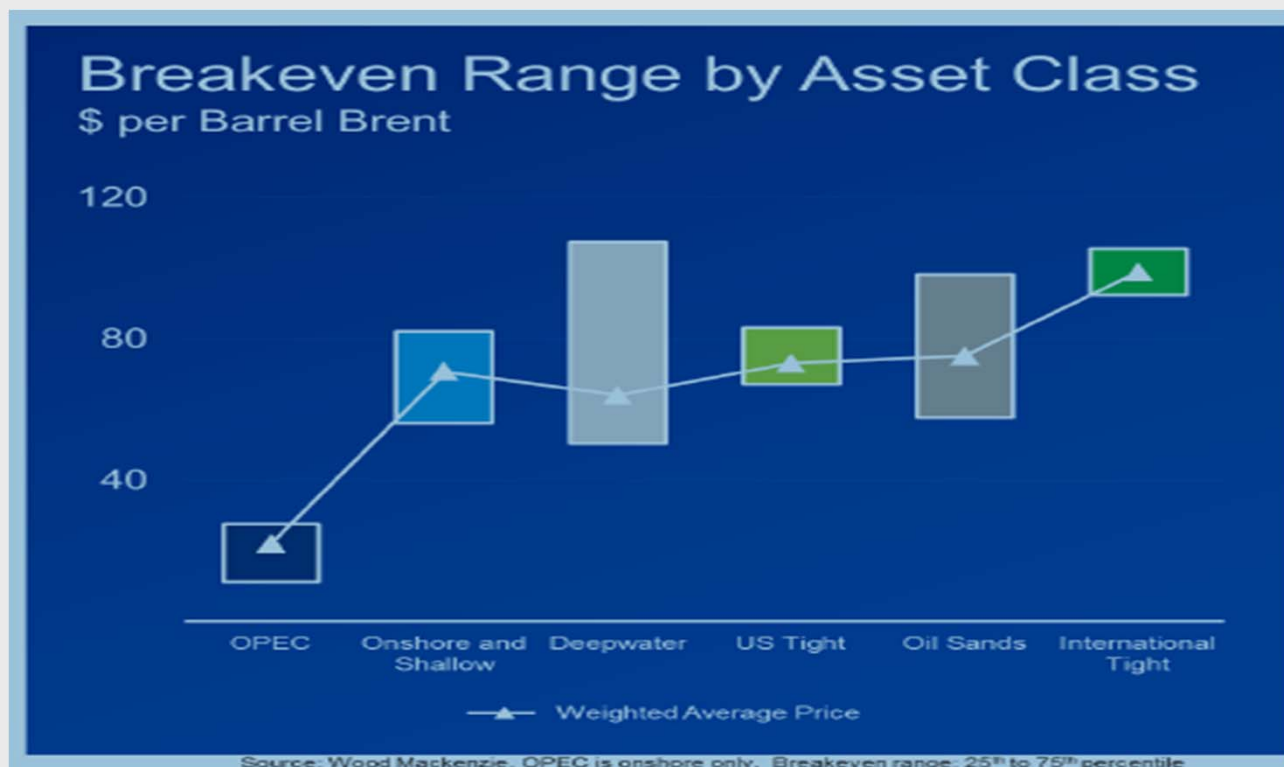
Source: *Resources to Reserves* (IEA, 2013).

Source: IEA, 2013 *World Energy Outlook*

### Key points

- IEA cost curve shows average cost of bringing on oil already consumed was about \$30/bbl in 2012 \$
- New sources of unconventional production – deepwater, shale oil, and oil sands -- much more expensive
- Marginal sources of production today – shale oil, oil sands, and ultra-deepwater – have LRMC of \$85-100/bbl

## Industry estimate of cost curve for global oil supply



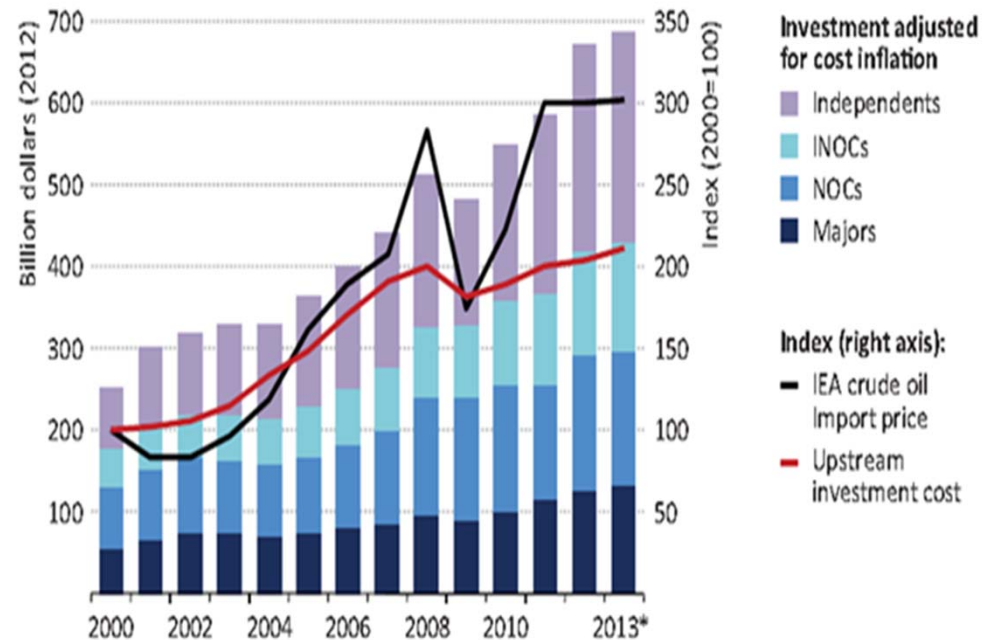
Source: Chevron

### Key points

- Chevron's chart using Wood Mackenzie data very similar to IEA's numbers
- Middle-East OPEC clearly still the cheapest source of global production by far
- The highest cost sources of production are generally also the most CO2-intensive



# Upstream capex, costs, and prices



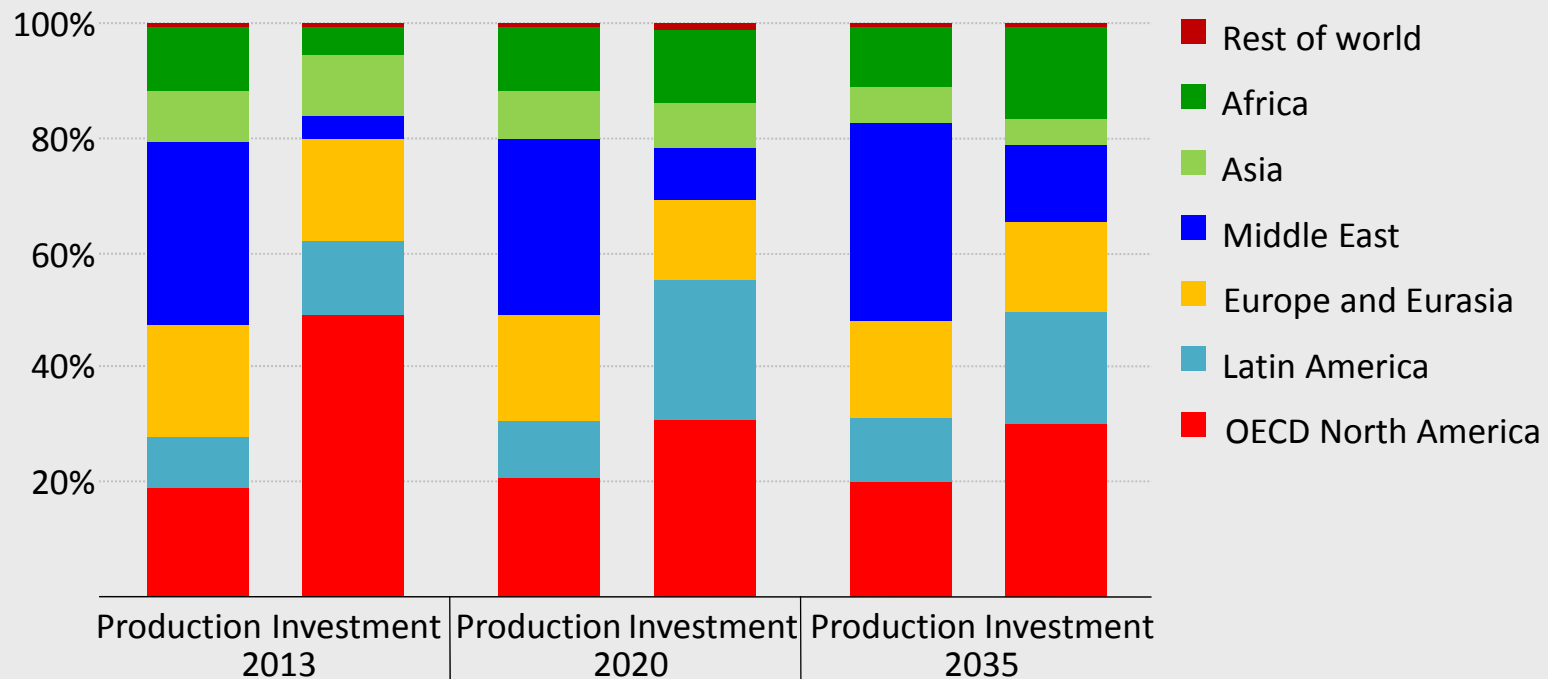
Source: IEA,  
2013 World Energy Outlook

\* Budgeted spending. Notes: The IEA Upstream Investment Cost Index, set at 100 in 2000, measures the change in underlying capital costs for exploration and production. It uses weighted averages to remove the effects of spending on different types and locations of upstream projects

## Key points

- Upstream capex has nearly trebled in real terms since 2000, reaching \$700bn in 2013 versus \$250bn in 2000
- Prices have also increased roughly threefold in real terms over 200-13, but since 2011 prices have been flat
- Over the same period, however, headline production of petroleum liquids has increased by only 14%

## The divergence between oil production and oil investment



Source: IEA World Energy Outlook 2013

### Key points

- Upstream capex has nearly trebled in real terms since 2000, reaching \$700bn in 2013 versus \$250bn in 2000
- 2013, North America accounts for c.20% of production but c.50% of global industry capex
- The IEA expects global upstream capex to remain broadly at current levels (c.\$700bn p.a.) out to 2035

## The trend in OPEC and global oil consumption, 2000-10

### OPEC domestic oil\* consumption, 2000-10 (kbd)

	2000	2005	2010	2010/00	2010/00 (%)
Saudi Arabia	1,537	1,964	2,643	+1,106	71.9
Iran	1,248	1,556	1,845	+597	47.8
Venezuela	500	583	746	+246	49.3
Iraq	462	541	694	+232	50.1
UAE	330	374	545	+215	64.9
Qatar	48	86	166	+118	244.6
Algeria	206	255	312	+106	51.3
Kuwait	264	330	354	+90	33.9
Libya	210	265	289	+79	37.4
Ecuador	131	159	201	+70	54.0
Angola	29	50	74	+45	142.9
Nigeria	246	312	279	+33	13.6
<b>TOTAL OPEC</b>	<b>5,212</b>	<b>6,475</b>	<b>8,148</b>	<b>+2,936</b>	<b>56.3</b>
<b>TOTAL WORLD</b>	<b>76,781</b>	<b>84,064</b>	<b>87,043</b>	<b>+10,262</b>	<b>13.4</b>

Source: EIA; \*All petroleum liquids, unadjusted for their respective energy densities

## The trend in OPEC and world population, 2000-10

### Increase in population of OPEC countries and World, 2000-10

	Total population 2000 (k)	Total population 2010 (k)	Absolute change 2010/2000 (k)	Relative change 2010/00
<b>Qatar</b>	591	1,759	1,168	<b>197.6%</b>
<b>UAE</b>	3,033	7,512	4,479	<b>147.7%</b>
<b>Angola</b>	13,296	19,082	5,786	<b>43.5%</b>
<b>Kuwait</b>	1,941	2,737	796	<b>41.0%</b>
<b>Saudi Arabia</b>	<b>20,045</b>	<b>27,448</b>	<b>7,403</b>	<b>36.9%</b>
<b>Iraq</b>	23,857	31,672	7,815	<b>32.8%</b>
<b>Nigeria</b>	123,689	158,423	34,734	<b>28.1%</b>
<b>Libya</b>	5,231	6,355	1,124	<b>21.5%</b>
<b>Venezuela</b>	24,348	28,980	4,632	<b>19.0%</b>
<b>Algeria</b>	12,345	14,465	2,120	<b>17.2%</b>
<b>Ecuador</b>	30,534	35,468	4,934	<b>16.2%</b>
<b>Iran</b>	65,342	73,974	8,632	<b>13.2%</b>
<b>TOTAL OPEC</b>	<b>324,252</b>	<b>407,874</b>	<b>83,622</b>	<b>25.8%</b>
<b>TOTAL WORLD</b>	<b>6,122,770</b>	<b>6,895,889</b>	<b>773,119</b>	<b>12.6%</b>

Source: United Nations

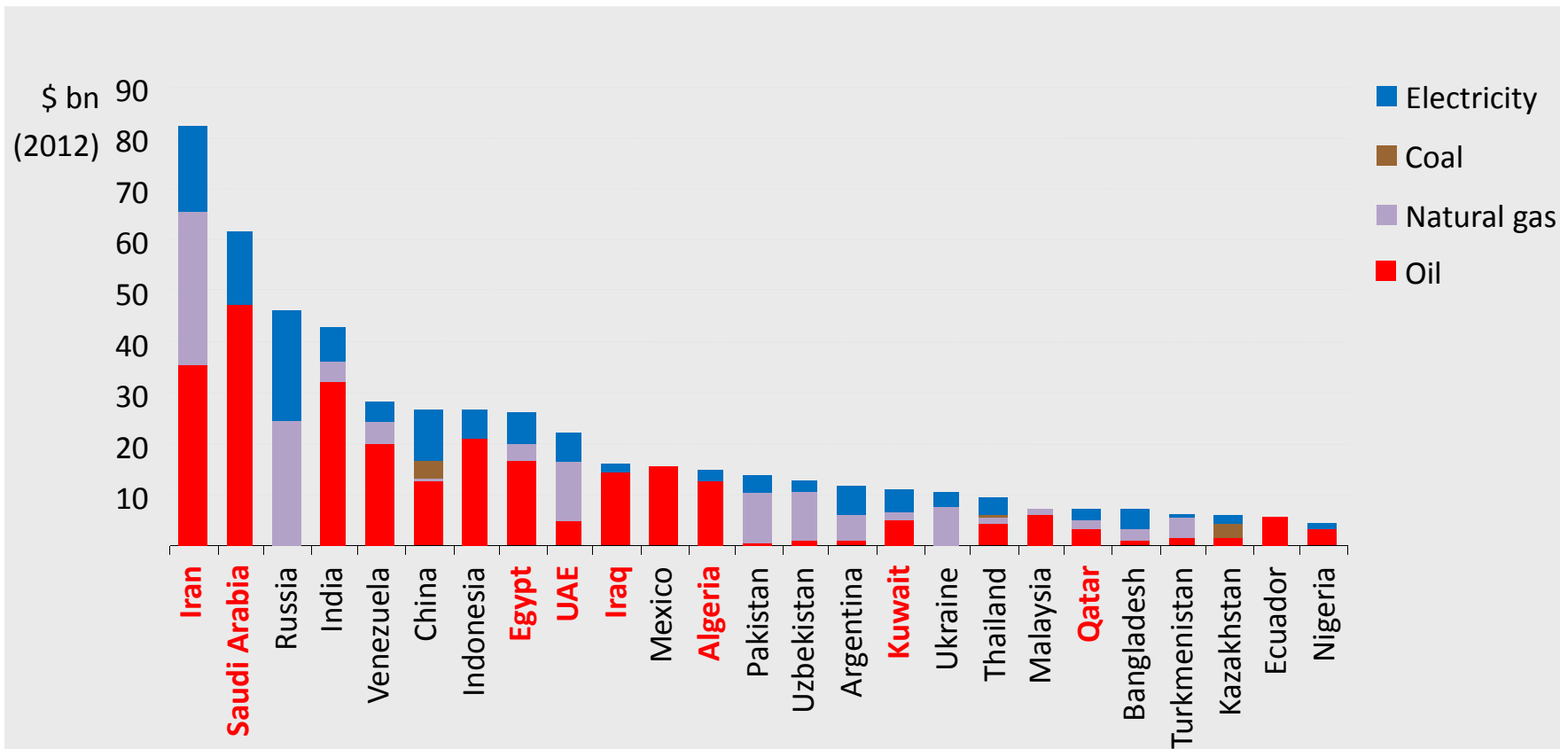
## The trend in OPEC and world population, 2010-20

### Increase in population of OPEC countries and World, 2010-20

	Total population 2010 (k)	Total population 2020 (k)	Absolute change 2020/2010 (k)	Relative change 2010/00
<b>Qatar</b>	1,759	2,204	446	<b>25.3%</b>
<b>UAE</b>	7,512	9,182	1,670	<b>22.2%</b>
<b>Angola</b>	19,082	24,855	5,773	<b>30.3%</b>
<b>Kuwait</b>	2,737	3,411	675	<b>24.6%</b>
<b>Saudi Arabia</b>	27,448	33,685	6,237	<b>22.7%</b>
<b>Iraq</b>	<b>31,672</b>	<b>42,871</b>	<b>11,199</b>	<b>35.4%</b>
<b>Nigeria</b>	158,423	204,747	46,324	<b>29.2%</b>
<b>Libya</b>	6,355	7,149	794	<b>12.5%</b>
<b>Venezuela</b>	28,980	33,780	4,800	<b>16.6%</b>
<b>Algeria</b>	35,468	40,561	5,093	<b>14.4%</b>
<b>Ecuador</b>	14,465	16,639	2,174	<b>15.0%</b>
<b>Iran</b>	73,974	82,039	8,065	<b>10.9%</b>
<b>TOTAL OPEC</b>	<b>407,874</b>	<b>501,123</b>	<b>93,250</b>	<b>22.9%</b>
<b>TOTAL WORLD</b>	<b>6,895,889</b>	<b>7,796,672</b>	<b>903,783</b>	<b>13.1%</b>

Source: United Nations

## Fossil-fuel subsidies by fuel for top 25 countries, 2012



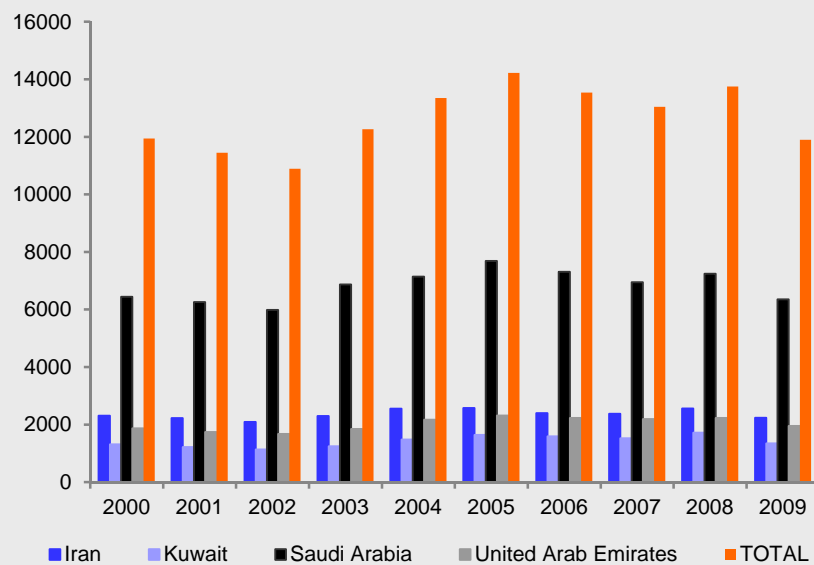
Source: IEA World Energy Outlook 2013

### Comments

- Fossil-fuel subsidies increased to \$544 billion in 2012
- Oil subsidies accounted for c.\$270bn, of which OPEC accounted for c.\$150bn

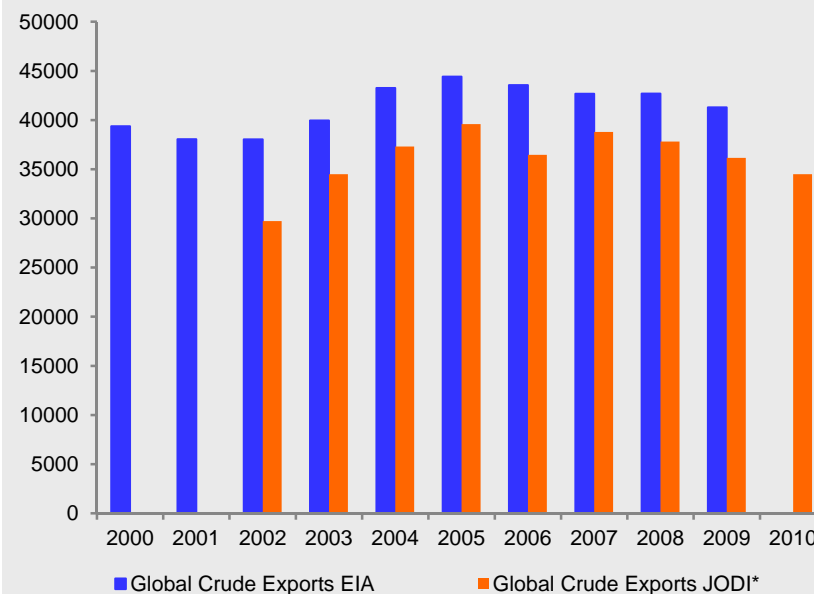
## Global Crude-Oil Exports Have Been Declining Since 2005

Figure 20: Key ME Countries Exports, 2000-10



Source: EIA

Figure 21: Global Exports of Crude Oil, 2000-10

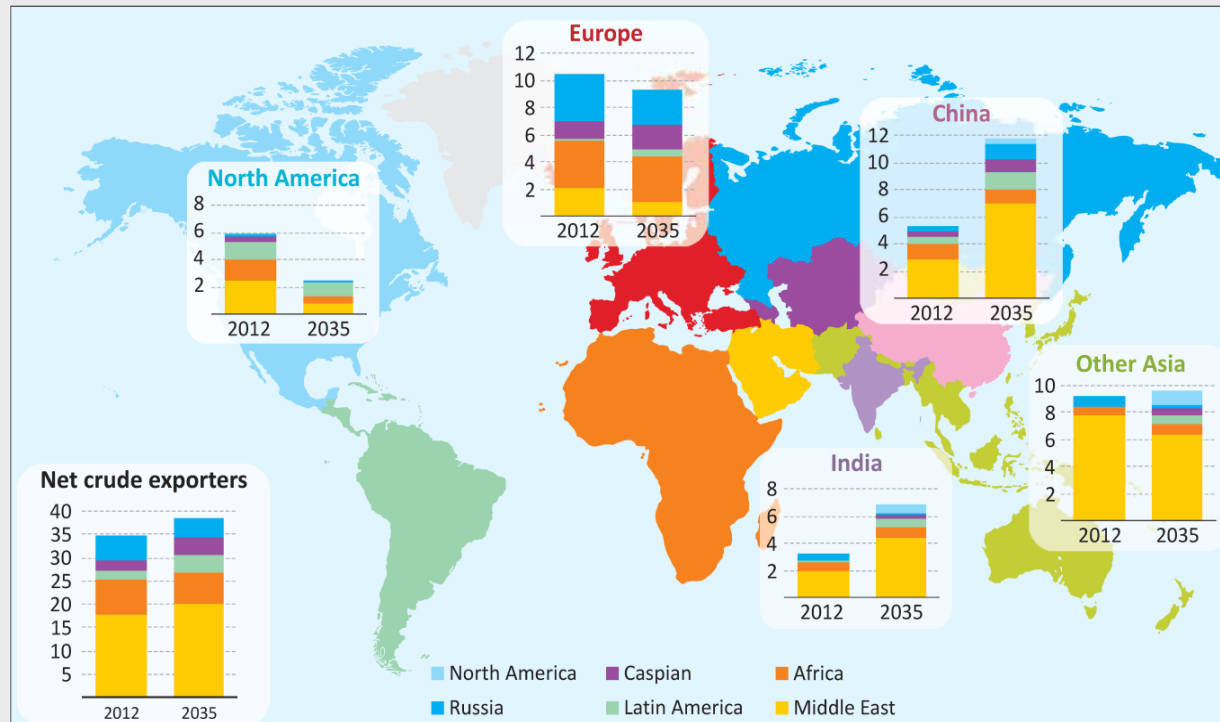


Source: EIA; JODI

### Comments

- The combined exports of Saudi Arabia, Iran, Kuwait, and the UAE peaked in 2005.
- Together, these countries account for c.30% of global oil exports.
- Global exports of crude oil also peaked in 2005.

# IEA estimate of future trend in future crude-oil imports by region and source



This map is without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area.

Source: IEA, 2013 World Energy Outlook

## Key points

- IEA sees crude-oil flows shifting from Atlantic basin to “East of Suez” over 2013-35
- Growth in crude exports by 2035 v. 2012 highly dependent on Iraq (+4.5mbd, but note ME overall only +1.8mbd), Kazakhstan (+1.2mbd), and Brazil (+0.8mbd).
- We think achieving such increases will be extremely challenging



*"Alice laughed: "There's no use trying," she said; "one can't believe impossible things."*

*"I dare say you haven't had much practice," said the Queen. "When I was younger, I always did it for half an hour a day. Why, sometimes I've believed as many as six impossible things before breakfast."*

**Lewis Carroll**

***Through the Looking Glass***

# Disclaimer



## **This product is not for retail clients or private individuals.**

The information contained in this publication was obtained from various publicly available sources believed to be reliable, but has not been independently verified by KEPLER CHEUVREUX. KEPLER CHEUVREUX does not warrant the completeness or accuracy of such information and does not accept any liability with respect to the accuracy or completeness of such information, except to the extent required by applicable law.

This publication is a brief summary and does not purport to contain all available information on the subjects covered. Further information may be available on request. This report may not be reproduced for further publication unless the source is quoted.

This publication is for information purposes only and shall not be construed as an offer or solicitation for the subscription or purchase or sale of any securities, or as an invitation, inducement or intermediation for the sale, subscription or purchase of any securities, or for engaging in any other transaction. This publication is not for private individuals.

Any opinions, projections, forecasts or estimates in this report are those of the author only, who has acted with a high degree of expertise. They reflect only the current views of the author at the date of this report and are subject to change without notice. KEPLER CHEUVREUX has no obligation to update, modify or amend this publication or to otherwise notify a reader or recipient of this publication in the event that any matter, opinion, projection, forecast or estimate contained herein, changes or subsequently becomes inaccurate, or if research on the subject company is withdrawn. The analysis, opinions, projections, forecasts and estimates expressed in this report were in no way affected or influenced by the issuer. The author of this publication benefits financially from the overall success of KEPLER CHEUVREUX.

The investments referred to in this publication may not be suitable for all recipients. Recipients are urged to base their investment decisions upon their own appropriate investigations that they deem necessary. Any loss or other consequence arising from the use of the material contained in this publication shall be the sole and exclusive responsibility of the investor and KEPLER CHEUVREUX accepts no liability for any such loss or consequence. In the event of any doubt about any investment, recipients should contact their own investment, legal and/or tax advisers to seek advice regarding the appropriateness of investing. Some of the investments mentioned in this publication may not be readily liquid investments. Consequently it may be difficult to sell or realise such investments. The past is not necessarily a guide to future performance of an investment. The value of investments and the income derived from them may fall as well as rise and investors may not get back the amount invested. Some investments discussed in this publication may have a high level of volatility. High volatility investments may experience sudden and large falls in their value which may cause losses. International investing includes risks related to political and economic uncertainties of foreign countries, as well as currency risk.

To the extent permitted by applicable law, no liability whatsoever is accepted for any direct or consequential loss, damages, costs or prejudices whatsoever arising from the use of this publication or its contents.

KEPLER CHEUVREUX (and its affiliates) have implemented written procedures designed to identify and manage potential conflicts of interest that arise in connection with its research business, which are available upon request. The KEPLER CHEUVREUX research analysts and other staff involved in issuing and disseminating research reports operate independently of KEPLER CHEUVREUX Investment Banking business. Information barriers and procedures are in place between the research analysts and staff involved in securities trading for the account of KEPLER CHEUVREUX or clients to ensure that price sensitive information is handled according to applicable laws and regulations.

## **Country and region disclosures**

**United Kingdom:** This document is for persons who are Eligible Counterparties or Professional Clients only and is exempt from the general restriction in section 21 of the Financial Services and Markets Act 2000 on the communication of invitations or inducements to engage in investment activity on the grounds that it is being distributed in the United Kingdom only to persons of a kind described in Articles 19(5) (Investment professionals) and 49(2) (High net worth companies, unincorporated associations, etc.) of the Financial Services and Markets Act 2000 (Financial Promotion) Order 2005 (as amended). It is not intended to be distributed or passed on, directly or indirectly, to any other class of persons. Any investment to which this document relates is available only to such persons, and other classes of person should not rely on this document.

**United States:** This communication is only intended for, and will only be distributed to, persons residing in any jurisdictions where such distribution or availability would not be contrary to local law or regulation. This communication must not be acted upon or relied on by persons in any jurisdiction other than in accordance with local law or regulation and where such person is an investment professional with the requisite sophistication to understand an investment in such securities of the type communicated and assume the risks associated therewith.

This communication is confidential and is intended solely for the addressee. It is not to be forwarded to any other person or copied without the permission of the sender. This communication is provided for information only. It is not a personal recommendation or an offer to sell or a solicitation to buy the securities mentioned. Investors should obtain independent professional advice before making an investment.

Notice to U.S. Investors: This material is not for distribution in the United States, except to "major US institutional investors" as defined in SEC Rule 15a-6 ("Rule 15a-6"). Kepler Cheuvreux refers to Kepler Capital Markets, Société anonyme (S.A.) ("Kepler Capital Markets SA") and its affiliates, including CA Cheuvreux, Société Anonyme (S.A.). Kepler Capital Markets SA has entered into arrangements with Crédit Agricole Cheuvreux North America, Inc. ("CA Cheuvreux North America") and Kepler Capital Markets, Inc. ("KCM, Inc.") (collectively "US Broker-Dealers"), which enables this report to be furnished to certain U.S. recipients in reliance on Rule 15a-6 through US Broker-Dealers registered under the U.S. Securities Exchange Act of 1934, as amended.

Each U.S. recipient of this report represents and agrees, by virtue of its acceptance thereof, that it is a "major U.S. institutional investor" (as such term is defined in Rule 15a-6) and that it understands the risks involved in executing transactions in such securities. Any U.S. recipient of this report that wishes to discuss or receive additional information regarding any security or issuer mentioned herein, or engage in any transaction to purchase or sell or solicit or offer the purchase or sale of such securities, should contact a registered representative of the US Broker-Dealer that provided the report. Under no circumstance should you direct orders to CA Cheuvreux North America as payment for products or services provided by KCM, Inc. In turn, under no circumstance should you direct orders to KCM, Inc. as payment for products or services provided by CA Cheuvreux North America.

CA Cheuvreux North America is a broker-dealer registered with the Securities and Exchange Commission ("SEC"), a member of the Financial Industry Regulatory Authority ("FINRA") and the Securities Investor Protection Corporation ("SIPC"). You can reach CA Cheuvreux North America at 1301 Avenue of the Americas, 15th floor, New York, NY 10019, phone (212) 492-8800; Equity trading: (212) 492-8825. Further information is also available at [www.cheuvreux.com](http://www.cheuvreux.com).

KCM, Inc. is a broker-dealer registered with the SEC, a member of FINRA and SIPC. You can reach KCM, Inc. at 600 Lexington Avenue, New York, NY 10022, phone (212) 710-7606; Equity trading: 212-710-7602. Further information is also available at [www.keplercapitalmarkets.com](http://www.keplercapitalmarkets.com).

You may obtain information about SIPC, including the SIPC brochure, by contacting SIPC directly at 202-371-8300; website: <http://www.sipc.org>.

CA Cheuvreux North America is a wholly owned subsidiary of Crédit Agricole Cheuvreux S.A. which is, in turn, owned by Kepler Capital Markets SA. As part of the ownership of Crédit Agricole Cheuvreux S.A., Kepler Capital Markets SA is entitled to distribute certain financial research produced by Crédit Agricole Cheuvreux S.A.

KCM, Inc. is a wholly owned subsidiary of Kepler Capital Markets SA. Kepler Capital Markets SA, registered on the Paris Register of Companies with the number 413 064 841 (1997 B 10253), whose registered office is located at 112 avenue Kléber, 75016 Paris, is authorised and regulated by both Autorité de Contrôle Prudentiel (ACP) and Autorité des Marchés Financiers (AMF).

The US Broker-Dealers are under common ownership, but operate independently in the US. In this regard, US Broker-Dealers are the distributors of this research publication in the United States. Commissions are not shared between US Broker-Dealers (directly or indirectly).

Amsterdam  
Kepler Cheuvreux Benelux  
Johannes Vermeerstraat 9  
1071 DK Amsterdam  
+31 20 573 06 66

Milan  
Kepler Cheuvreux Italia  
Corso Europa 2  
20122 Milano  
+39 02 85507 1

North America

Frankfurt  
Kepler Cheuvreux Germany  
Taunusanlage 19  
60325 Frankfurt  
+49 69 756 960

Paris  
Kepler Cheuvreux France  
112 Avenue Kleber  
75016 Paris  
+33 1 53 65 35 00

Boston  
CA Cheuvreux North America  
99 Summer Street Suite 220  
Boston MA 02110  
+1 617 476 9201

Geneva  
Kepler Cheuvreux SA  
Route de Crassier 11  
1262 - Eysins  
Switzerland  
+41 22 361 5151

Stockholm  
Kepler Cheuvreux Sweden  
Regeringsgatan 38  
10393 Stockholm  
+46 8 723 51 00

New York  
CA Cheuvreux North America  
1391 Avenue of the Americas, Floor  
15  
New York, NY 10019  
+1 212 492 8800

London  
Kepler Cheuvreux UK  
12th Floor, Moorhouse  
120 London Wall  
London EC2Y 5ET  
+44 20 7621 5100

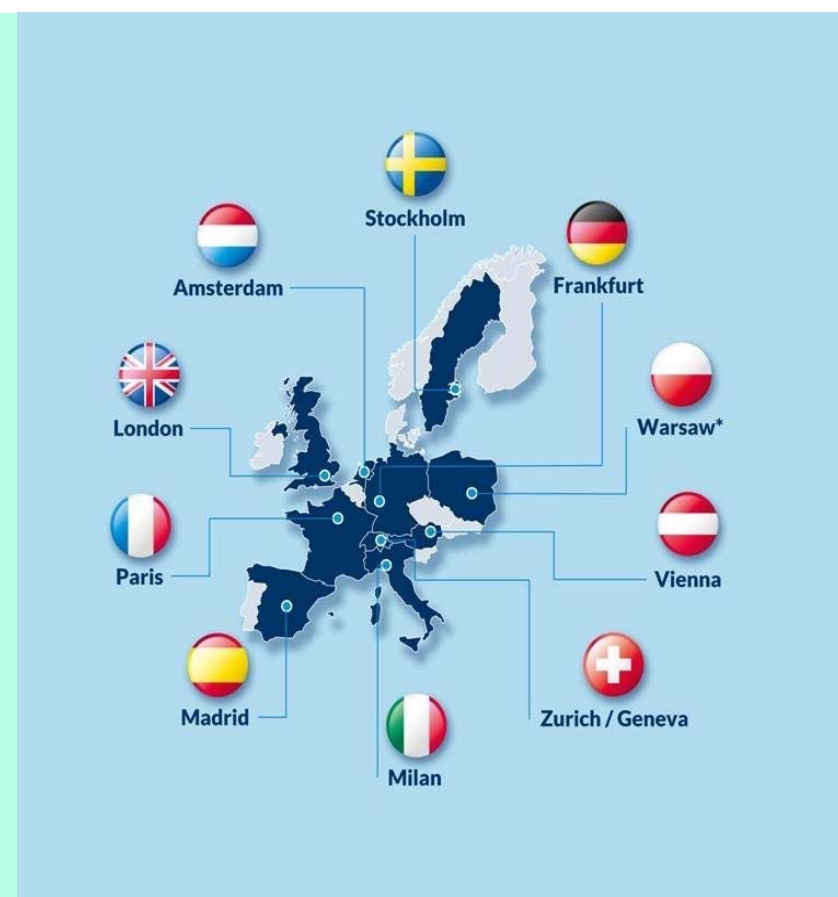
Vienna  
Kepler Cheuvreux Vienna  
Schottenring 16/2  
Vienna 1010  
+43 1 537 124 147

San Francisco  
CA Cheuvreux North America  
50 California Street Suite 860  
San Francisco, CA 94111  
+1 415 255 9802

Madrid  
Kepler Cheuvreux Espana  
Alcala 95  
28009 Madrid  
+34 914365100

Zurich  
Kepler Cheuvreux Switzerland  
Stadelhoferstrasse 22  
Postfach  
8024 Zurich  
+41 43 333 66 66

New York  
Kepler Capital Markets, Inc  
600 Lexington Avenue, Floor 28  
10022 New York, NY USA  
+1 212 710 7600



\* Kepler Cheuvreux has exclusive international distribution rights for UniCredit's CEE product.