**29/09/2022**

# Indicator: Oil import dependency by country of origin

## LEGEND

$UOIO_{C,P}$ is the indicator for dependency by origin of imports of oil for country C from origin country P. It is expressed as a percentage of total net imports and indigenous production of oil for C

**C** is the country of interest (i.g. EU Member States).

**allRC** refers to all reporting countries, which is all 27 EU Member States plus Norway, Iceland, EU candidate countries, EU potential candidates and Energy Community Contracting Parties

**P** are Russia, United States, Norway, Saudi Arabia, United Kingdom, Kazakhstan, Nigeria, Iraq, Azerbaijan, Algeria, Libya that are the top 11 non-EU origins of oil (This calculation excludes the category "Not specified" which in 2020 was only around 1% of the total)

$I_{P,C}$ is the imports of oil from country P to country C. In other words, imports declared by country C as originating from country P

$I_{P,j}$ is the imports of oil from country P to country j. In other words, imports declared by country j as originating from country P

$I_{j,C}$ is the imports of oil from country j to country C. In other words, imports declared by country C from trade partner j

$E_{Tot,C}$ is the total exports of oil of country C

$I_{Tot,C}$ is the total imports of oil of country C

$I_{Tot,j}$ is the total imports of oil of country j

$$SIGMA = \sum_{j \in allRC} I_{j,C} \times \frac{I_{P,j}}{PROD_j + I_{Tot,j}}$$

$PROD_j$ is domestic (indigenous) production of oil in country j

$PROD_C$ is domestic (indigenous) production of oil in country C

*net*$I_{Tot,C}$ is the total net imports (total imports – total exports) for country C

**:M** represents Eurostat's database convention for dissemination of "missing value – data cannot exist"

# FORMULA

If $I_{Tot,C} \leq E_{Tot,C}$ then we define $UOIO_{C,P} =$ :M (indicator is not calculated for net exporters)

If $I_{Tot,C} > E_{Tot,C}$ then

$$UOIO_{P,C} = \left( I_{P,C} + \left( \sum_{j \in allRC} I_{j,C} \times \frac{I_{P,j}}{PROD_j + I_{Tot,j}} \right) - \left( E_{Tot,C} \times \frac{I_{P,C} + SIGMAc}{PROD_C + I_{Tot,C}} \right) \right) / (PROD_C + netI_{Tot,C})$$

**Exception**: United Kingdom for 2015 to 2019 and Norway: these are origins which report or reported data to Eurostat and therefore for which we can further adjust the formula correcting for the declared imports and indigenous production:

$$UOIO_{P,C} = \left( I_{P,C} \times \frac{PROD_P}{PROD_P + I_{Tot,P}} + \left( \sum_{j \in allRC} I_{j,C} \times \frac{I_{P,j}}{PROD_j + I_{Tot,j}} \right) - \left( E_{Tot,C} \times \frac{\left( I_{P,C} \times \frac{PROD_P}{PROD_P + I_{Tot,P}} \right) + SIGMAc}{PROD_C + I_{Tot,C}} \right) \right) / (PROD_C + netI_{Tot,C})$$

# EXAMPLE

$$UOIO_{P,C} = \left( I_{P,C} + \left( \sum_{j \in allRC} I_{j,C} \times \frac{I_{P,j}}{PROD_j + I_{Tot,j}} \right) - \left( E_{Tot,C} \times \frac{I_{P,C} + SIGMAc}{PROD_C + I_{Tot,C}} \right) \right) / (PROD_C + netI_{Tot,C})$$

The import dependency from Russia for Country C is calculated as:

The direct imports of crude oil and petroleum products of Country C from Russia

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The secondary dependency: The indirect imports assumed coming proportionally from Russia via other reporting countries (Petroleum products produced in other reporting countries using Russian crude oil and/or petroleum products produced in Russia but imported and re-exported by other reporting countries)

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Country C's exports corrected for the proportion of crude oil and petroleum products re-exported but assumed to be originating from Russia

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Total net imports and indigenous production of oil for country C (to express the indicator as a percentage)

# NOTES

**1. The indicator tracks the dependency linked to the imports of finished products made from crude of a specific origin.** This is to trace the dependency by origin connected to the purchase of primary commodities by other countries. The assumption that must be accepted as a necessary simplification is that the exports of a country which produces finished products, are made from indigenous crude and from imported crude proportionally (the same for domestic consumption of such finished products).
In other words, the imported finished products to country C from country J (which produce them in its refineries) are assumed to be in proportion to the imported crude and the indigenous crude of country J.

**2. The formula corrects for the different methodology in reporting trade of crude vs trade of products.** In other words, the imported finished products from country J to country C are also assumed to be in proportion to imported oil to country J from other countries. This corrects for the methodology which asks countries to report finished products by last consignment rather than ultimate origin.

**3. The indicator measures only the first layer of secondary dependency.** It is possible for example, that Crude extracted in P is imported by the reporting country D, then refined into finished products, which are exported to reporting country E, which are then re-exported to reporting country C (country of interest); the second level of secondary dependency related to these amounts would not be picked up by the indicator. This was a conscious choice because adding further complexity to the formula to track additional levels of secondary dependency was deemed unjustified as the subsequent corrections would have been much smaller than the first level correction.

**4. The indicator captures the secondary dependency only if the countries involved report to Eurostat.** It is possible that crude from P for example is imported to the non-reporting country X and refined into finished products, which are then exported to EU country C (country of interest); the ultimate origin in this case would not be picked up in the calculation.

**5. The indicator tracks the combined dependency by origin of both crude oil and refined products imports.** This is to accomplish the calculations explained in point 1 and 2. It also avoids being misleading, as separating the indicator into two, one for crude oil and one for refined products, could lead to misunderstandings as the components can have very different absolute amounts and therefore relative weights. For example, a 90% dependency for crude and 10% dependency for products might sound as a relevant dependency overall if it is not noticed for example that crude oil is only a minor fraction of the total.

**6. The indicator refers to the supply side of the market.** It shows the dependency of a countries with regards to the origin of the imports and indigenous production. The aim is not showing the dependency related to the demand side or to the domestic energy consumption. For example, the use of oil products in international maritime bunkers or international aviation or for non-energy purposes is not deducted. One should be careful to consider these amounts in the evaluation of the complete picture of energy dependency of a country.

**7. The data exclude the blended bio components**
**9. Data source: Eurostat series nrg_ti_oil, nrg_te_oil, nrg_cb_oil**