

## Methodology used by Oxford Economics [i] to calculate BP's impact in the EU27 in 2022

All economic impacts are reported on a gross basis. The results, therefore, do not take into account the alternative potential uses of the people and other resources that bp and its suppliers use. This is standard practice due to difficulty determining the second-best use of any resource.

### Estimating bp's direct impact in the EU27 economy

In order to calculate bp's direct impact, Oxford Economics used finance, headcount, and tax data provided by bp. The employment headcount data pertains to 31st December 2022, on the basis of the normal work jurisdiction of the employee and does not include third-party contractors. bp's tax data is for calendar year of 2022.

Gross value added is the sum of earnings before interest, tax, depreciation, and amortisation (EBITDA), compensation of employees (including wages and salaries paid to employees including benefits in kind, as well the employer's pension contributions and social insurance contributions), and business property rates.

### Estimating bp's supply chain impact in the EU27 economy

Based on the detail global procurement data provided by bp, Oxford Economics estimated bp's supply chain impact (or indirect impact) supported because bp spent money with suppliers in the EU27. The spend amount in the EU27 was calculated using the supplier's registered address from bp's procurement data.

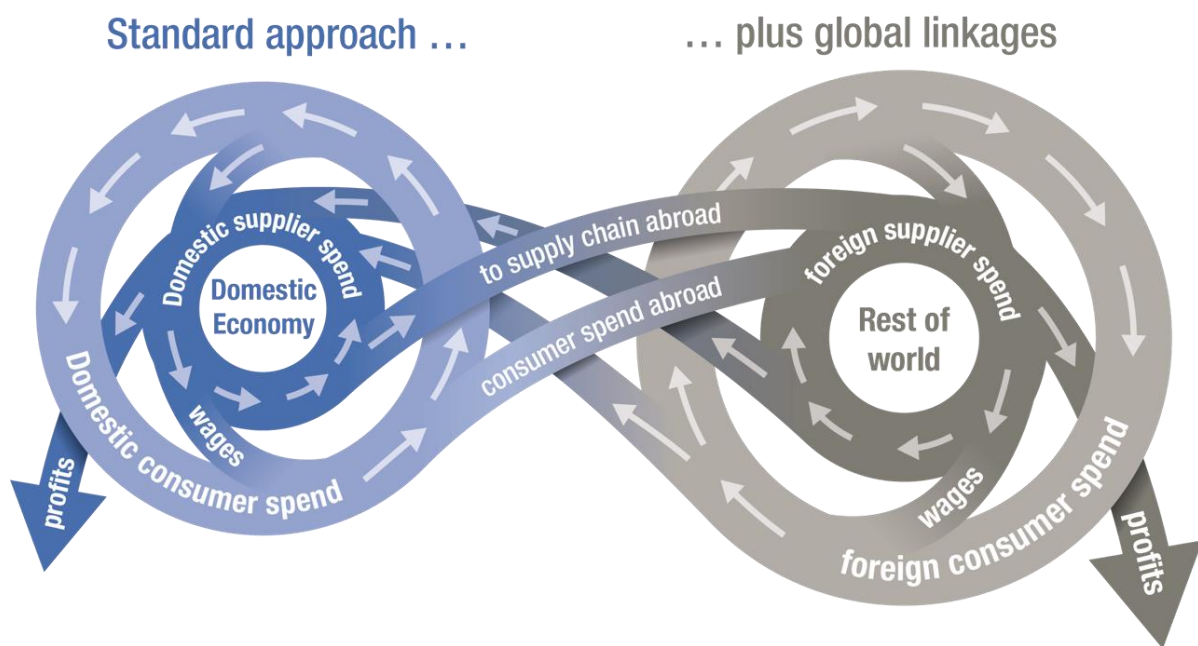
To do so, Oxford Economics aligned bp's procurement spending, including both operational and capital expenditure, to the countries and industries in Oxford Economics' Global Sustainability Model. The Global Sustainability Model is a bespoke input-output model that covers 96 countries that, together, account for 97% of global GDP. In the model, each country's economy is split into 36 industries that are defined by the ISIC Revision 4 classification—from agriculture to manufacturing, and from utilities to professional services. This allows Oxford Economics to trace supply chain spending within countries and across their borders and estimate bp's impact on the EU27 economy associated with the company's supply chain spending.

Furthermore, Oxford Economics quantified the boost to EU27 economic activity that likely occurred because of bp's spending outside of the EU27, based on supplier's registered address in bp's procurement database. bp has a global presence with operational sites across the world and, given how inter-connected the modern economy is, a proportion of bp's global spending will return to EU27 economy indirectly. For example, if a bp refinery in the Netherlands purchases equipment from a US manufacturer and the manufacturer buys

some engineering services from Germany, this activity will further stimulate some gross value added, jobs, and tax payments in the EU27.

Taken together, Oxford Economics' modelling of the supply chain impact from bp's spending in the EU27 and bp's spending in the rest of the world means that Oxford Economics have produced a comprehensive picture of the economic activity bp stimulates in the EU27. This global modelling goes beyond traditional, single-country models, in which imports by a country exit the models and do not reappear elsewhere.

### How a global input-output model differs from a domestic input-output model



Oxford Economics' Global Sustainability Model uses a combination of proprietary Input-Output tables, Input-Output forecasting techniques, and data sourced from the OECD. [ii] These tables estimate how the world's major economies and industries interact with each other in a single year and they can be used to estimate the impact on other industrial sectors as a result of bp's spend on inputs of goods and services and fixed assets. The use of IO tables to create Leontief matrices, in conjunction with bp's supply chain spending data, results in bp-specific multiplier effects. [iii]

Under the Leontief system, Oxford Economics generated Type 1 Leontief Inverse matrices. When combined with a final demand spending shock, which is bp's procurement expenditure by sector and country, these matrices provide an estimate of the sum of internal and external production activity — across each of the 96 countries and 36 industries — that is required to satisfy that final demand.

Once Oxford Economics have estimated the output that is associated with a particular spend impetus, Oxford Economics estimate gross value added by multiplying our estimate of output by gross value added to output ratios that are specific to each country and industry.

Finally, Oxford Economics convert the gross value added estimates to employment estimates. To do so, Oxford Economics divide the gross value added estimates by estimates and/or forecasts of the ratio gross value added to employment in each country and industry.

## Treatment of refuelling stations and joint ventures

bp refuelling stations and joint ventures are included in the economic impact estimates if bp operates them. The financial and employee data provided has been derived from bp's Annual Report, which is based on IFRS accounting standards. The data related to spend with suppliers is on a 100% basis for companies and joint ventures where bp is the operator.

### Inclusion/exclusion of refuelling stations and joint ventures data in the estimates in this report

Items	Employment	Profits	Compensation of employees	Procurement
Refuelling stations and joint ventures:				
Operated by bp	Yes	Yes	Yes	Yes
Operated by third party	No	Yes	No	No
What it affects:	Direct impact	Direct impact	Direct and induced impacts	Indirect impacts

## Margin of error

Throughout the report, Oxford Economics has rounded bp's economic impacts to two significant figures except for bp's direct impact results. The direct impacts comprise data provided by bp's financial, human resources, and tax teams.

Because Oxford Economics' models are by necessity an approximation of reality, all resulting estimates contain an implicit margin of error. The margin of error is not necessarily uniform for every estimate, but as a rule of thumb the margin of error can be reasonably expected to be on the order of +/- 10 to 100 for estimates of the number of jobs bp supports, and +/- €1 million to €10 million for estimates of the amount of gross value added bp supports.

## Exchange rate

An average annual exchange rate for 2022 of 0.9497 Euro per USD was used to convert currency values where necessary. [iv]

## Footnotes

[i] Oxford Economics was founded in 1981 as a commercial venture with Oxford University's business college to provide economic forecasting and modelling to UK companies and financial institutions expanding abroad. Since then, we have become one of the world's

foremost independent global advisory firms, providing reports, forecasts and analytical tools on more than 200 countries, 100 industries, and 8,000 cities and regions. Our best-in-class global economic and industry models and analytical tools give us an unparalleled ability to forecast external market trends and assess their economic, social and business impact.

[ii] OECD, Input-Output, Analytical Tables pertaining to 2015, published in 2021. Input-output tables give a snapshot of an economy at a particular time, showing the major spending flows from 'final demand' (i.e. consumer spending, government spending, and exports to the rest of the world); intermediate spending patterns (i.e., what each sector buys from every other sector – the supply chain); how much of that spending stays within the economy; and the distribution of income between employment income and other income (mainly profits).

[iii] Leontief (1986), *Input and output economics, second edition Oxford University Press*.

[iv] ECB, (2023), "[Euro foreign exchange reference rate](#)", data accessed June 2023. Average spot rate from 01/01/2022 to 31/12/2022

1. GDP of EU27 and its members
  - a. Eurostat, (2023), "[GDP and main components \(output, expenditure and income\)](#)", data accessed June 2023.
2. Employment of EU27 and its members
  - a. Eurostat, (2023), "[Employment and activity by sex and age - annual data](#)", data accessed June 2023.
3. Total general government revenue of EU27 and its members
  - a. Eurostat, (2023), "[Government revenue, expenditure and main aggregates](#)", data accessed June 2023.