



## **Call for tenders - JRC/SVQ/2018/B.5/0025/OC**

### **EUROPEAN UNION TRADE IN VALUE ADDED, JOBS AND GHG EMISSIONS (EU-TIVA)**

#### **Technical Specifications**

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## 1. BACKGROUND AND RATIONALE

### 1.1. The Directorate and the Unit

**The Directorate Growth and Innovation of the Joint Research Centre (JRC) of the European Commission**, based in Seville (Spain), is closely involved in creating a strong and resilient Economic and Monetary Union, ensuring stable financial markets, as well as strengthening and deepening the Single Market including the Digital Single Market. It assists in the development of policies for trade and modern manufacturing as well as in the analysis of how to achieve equitable access to education and training. This includes the examination of the key issues around open, digital science as well as open innovation and the characteristics of innovation ecosystems. It also includes the analysis of the impact of regional funding. The Directorate serves the following policy areas: Economic and Monetary Union, Employment and Social Affairs, Taxation, Competition, Enterprise and Industry, Information Technologies, Regions and Cohesion, Single Market, Trade, Education, Training and Youth, Customs and Audio-Visual Media.

*The B.5 Unit* of the Directorate Growth and Innovation, Circular Economy and Industrial Leadership Unit (CEIL, hereafter B5 Unit), aims to provide the techno-economic support in the fields of industrial emissions, product policy, waste and environmental management. It also develops and applies analytical modelling capabilities, economic analyses and impact assessments; takes care of the techno-economic characterization of selected technologies, products and processes; provides methodological, modelling and analytical support with regard to the socio-economic and environmental implications of external trade, including the interaction between external trade and the functioning of the single market; and provides analyses of global production, trade and value chains.

### 1.2. Policy background

The big success of the book “EU Exports to the World: Effects on Employment and Income” jointly published by DG TRADE and DG JRC in 2015, raised the awareness of EU trade policy makers on the importance of trade and employment in the EU (e.g. State of the Union Presidential Address, September 2016 and September 2017). The JRC is currently updating this book with the new WIOD database release of 2016 ([www.wiod.org](http://www.wiod.org)) and extending the analysis to skill levels, gender and age groups. Besides, a new volume on intra-EU trade using the same approach is being carried out, too. However, both studies are mainly focused on the income and employment effects of the gross exports of countries (consumption and investment of non-residents), disregarding their potential environmental repercussions (i.e. GHG emissions). A follow-up of this work is therefore the analysis of the environmental effects of gross



exports and moreover, the income, environmental and employment effects of all consumption and investment expenditures of the residents in a country.

### 1.3. Research context

The Circular Economy and Industrial Leadership Unit B5 is currently expanding its capacity to conduct studies in the domain of Input-Output analysis (data and modelling) in support of policies focusing on industrial competitiveness, growth and jobs, internal market, and trade and globalisation (e.g. global supply chains).

Furthermore, Input-Output data enable more precise and comprehensive empirical applications on global supply chains, labour productivity and value added decomposition of gross exports by the use of additional socio- economic and environmental layers.

Within this research context, the JRC has developed GAMS<sup>1</sup> scripts linked to a Graphical User Interface (GUI) allowing for disentangling the domestic value added, foreign value added and double counted components of bilateral gross exports across all of the different countries included in the latest release of the WIOD database ([www.wiod.org](http://www.wiod.org)) and across various dimensions (time, country, industry...). The same applies for employment, skill levels, gender and age groups using the EUKLEMS database ([www.euklems.net](http://www.euklems.net)).

The GAMS scripts are used as main computing platform and the GUI is programmed in JavaScript (using Electron and D3.js). This tool combines a dashboard<sup>2</sup> of employment and GVC indicators; pre-defined calculations and their associated databases for frequently asked queries; and, in a separate module, ad-hoc calculations in real-time for specific queries. The definition of the sets and subsets of regions, countries, industries, factors and years are done in MS Excel spreadsheets that GAMS automatically reads in order to be flexible to changes of input data. The minimum requirements in terms of hardware (300 GB of hard disk, 16-32 GB of RAM, 2 processors 3.0 Ghz) and software (a standard licence of GAMS and a licence of MS Office running in Windows 64-bit) must be guaranteed by the contractor. The contractor shall be granted by the JRC with full access to the GAMS scripts and GUI files as well as the corresponding supporting documentation. The tool mainly uses the WIOD database (release 2016) and the EUKLEMS database (release 2018) as input data, among other official statistics.

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<sup>1</sup> General Algebraic Modelling System (GAMS) software.

<sup>2</sup> The list of indicators currently available in the dashboard is: decomposition of gross exports into domestic value added, foreign value added and double counted components; trade balance in gross and value added terms; openness ratio in gross and value added terms; decomposition between direct and indirect effects in gross and value added terms; revealed comparative advantage in gross and value added terms; GVC participation index; employment and labour compensation embodied in EU exports to the world.



The methodology to produce these results is crucial and the one implemented by the JRC is largely based on the various existing contributions to the academic literature (Daudin et al, 2011; Johnson and Noguera, 2012; Wang, Wei and Zhu, 2013; Foster-McGregor and Stehrer, 2013; Koopmans, Wang and Wei, 2014; Nagengast and Stehrer, 2014; Arto et al, 2015 and Los, Timmer and de Vries, 2016, among others).

## 2. OBJECTIVES OF THIS CONTRACT

The objective of this contract is twofold:

1. Modify the GAMS scripts and the GUI
2. Produce one pocketbook with three small volumes titled: “EU Trade in Value Added, Employment and GHG Emissions”

## 3. TASKS

The Contractor must perform the following tasks during the implementation of the contract.

**Task 1.** Produce a modified version of the existing JRC tool package (GAMS scripts and GUI) for the analysis of income, GHG emissions and employment effects of consumption, investment and gross exports of countries as stated in the first objective of the contract. In detail:

- a. Compute indicators such as income (TiVA) and employment effects of all consumption and investment expenditures of the residents in a country, while keeping the same existing functionalities in terms of granularity (industry, time, countries, skill levels, etc.).
- b. Add greenhouse gas (GHG) emissions to the modified tool package, keeping the same existing and new potential functionalities derived from point a. in terms of granularity (industry, time, countries, etc.).
- c. Add the following new datasets of inter-country supply, use and/or input-output tables to the tool implementing the same existing functionalities in terms of granularity (industry, time, countries, skill levels, etc.): OECD<sup>3</sup> Inter-country global input-output tables, the Eurostat's EU Inter-country Supply, Use and Input-Output Tables - FIGARO<sup>4</sup> Project and the EXIOBASE3<sup>5</sup> database (all accessible on the internet). The tool must eventually be able to calculate at least income and

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<sup>3</sup> <http://www.oecd.org/sti/ind/inter-country-input-output-tables.htm>

<sup>4</sup> <http://ec.europa.eu/eurostat/web/experimental-statistics/figaro>

<sup>5</sup> <http://www.exiobase.eu/>



employment effects of consumption, investment and gross exports using WIOD, OECD, FIGARO and EXIOBASE3 datasets.

- d. Extend the dashboard with selected TiVA indicators, carbon footprint measures and employment effects.

**Task 2.** Produce a PDF version of one pocketbook titled: “EU Trade in Value Added, Employment and GHG Emissions” with three volumes:

- a) the first volume must be dedicated to the Value Added embodied in a country's final consumption and investment (domestic use of final products), with various types of granularity: industries, countries, trading partners, as examples.
- b) the second volume to the Employment embodied in a country's final consumption and investment (domestic use of final products), with various types of granularity: industries, countries, trading partners, as examples.
- c) the third volume to the GHG emissions embodied in a country's final consumption and investment (domestic use of final products), with various types of granularity: industries, countries, trading partners, as examples.

The proposed list of indicators in all three volumes will be discussed and agreed with the JRC team.

The publication “[EU Exports to the World: Effects on Employment and Income](#)” must be taken as a reference in terms of shape and format of the volumes.

**Task 3.** Training on the use of the modified tool package

A one day training must be organised by the Contractor at JRC premises in Seville (Spain) immediately after the final meeting (as described in section 5).

A full running version of the GUI must be provided 2 weeks in advance from the date of the training session to help the Commission IT team to implement the necessary IT environment in the JRC premises with the assistance of the contractors. Other training material prepared by the contractors (documentation, slides, etc.) must be provided 1 week in advance.

The training will serve to explain the new functionalities and usage of the GUI tool to the JRC team. The Contractor must present them with real examples.

## 4. DELIVERABLES

The Contractor must provide the following deliverables:

- **Deliverable 1:** Interim report, covering tasks as described in points a and b of Task 1
- This interim report must reflect the modifications made to the GAMS scripts and GUI.



A draft version must be submitted two weeks before the interim meeting and the final version two weeks afterwards, including the results of the discussion.

➤ **Deliverable 2:** Interim report covering tasks as described in points c and d of Task 1  
This interim report must reflect the modifications made to the GAMS scripts and GUI. Regarding the new indicators introduced in the dashboard, a justification of the selection must be provided.

A draft version must be submitted two weeks before the final meeting and the final version two weeks afterwards, including the results of the discussion.

➤ **Deliverable 3 (Final Report):** as described in Task 2

The final report is the Pocketbook "EU Trade in Value Added, Employment and GHG Emissions", which must include the three volumes as indicated in Task 2.

A draft version must be submitted two weeks before the interim meeting and the final version two weeks afterwards, including the results of the discussion.

JRC-Seville-B5 Unit will have 20 working days to review the deliverables and send its comments to the Contractor.

The Contractor will then have 20 working days for providing the final version of the deliverables.

## 5. COORDINATION AND MEETINGS

The Contractor must carry out the service in close co-ordination with the relevant Commission staff (JRC-Seville-B.5 Unit), including regular feedback to and consultation with the responsible desk officer in charge at JRC.

Intermediate follow-up phone calls will take place (e.g. on a bi-weekly basis) to solve questions and discuss the progress and options.

Three meetings will be organised in the frame of this contract, including:

### 1. Kick-off meeting

The contractor must present the detailed work plan, significantly further developed from the technical offer in a one-day meeting at the JRC premises in Seville (Spain).

The meeting will aim at refining the scope of the work, agreeing on the remaining questions and discussing the overall approach and work plan. The meeting shall take place within four weeks from the official start date of the contract (T0).



Any variations in the methodology agreed during the kick-off meeting will require prior approval from JRC.

The Contractor must submit the Kick-off meeting minutes 2 weeks after the meeting.

## **2. Interim meeting**

The contractor must participate in one-day meeting at the JRC premises in Seville (Spain) with the Commission staff to discuss the progress of the project and present the draft Interim Report (D1). As a rule this meeting will be organised to discuss results/progress on the different tasks. This meeting will be scheduled in the kick-off meeting.

The Contractor must submit the Interim meeting minutes 2 weeks after the meeting.

## **3. Final meeting**

The contractor will participate in one-day final meeting at the JRC premises in Seville (Spain) with the Commission staff to present the draft final Report (D3) and will train on a second consecutive day to the Commission staff on the new GUI, as described in Task 3. This meeting will be scheduled in the interim meeting.

The contractor must provide minutes of the key discussions and agreements within 2 weeks of the meeting.

The working language at all of these meetings will be English and the cost for attending meetings is deemed to be included in the final price indicated in the contract.

## **6. CALENDAR OF DELIVERABLES AND MEETINGS**

The following summary table reports the tentative time schedule for the different activities and deliverables.

Deliverable	Title	Months
M1	Kick-off meeting (Seville) ➤ Minutes to be submitted 2 weeks after the meeting	T0 + 4 weeks
M2	Interim meeting (Seville) to discuss draft D1 ➤ Draft D1 to be submitted 2 weeks prior to the meeting ➤ Minutes to be submitted 2 weeks after the meeting	T0 + 6.5
D1	Interim Report on the modifications made to the GAMS scripts and GUI (Tasks 1.a and 1.b)	T0 + 7
D2	Final Report on the modifications made to the GAMS	T0 + 11



	scripts and GUI (Tasks 1.c and 1.d)	
M3	Final meeting (Seville) to present the GUI and draft D3 ➤ Draft D3 to be submitted 2 weeks prior to the meeting ➤ Minutes to be submitted 2 weeks after the meeting	T0 + 13.5
T1	Training ➤ Material/slides to be submitted 1 week prior to the training	T0 + 13.5
D3	Pocketbook “EU Trade in Value Added, Employment and GHG Emissions”	T0 + 14

T0 corresponds to the date on which the last party signs the contract.

## 7. QUALITY ASSURANCE

The work delivered by the contractor must be of such quality that it can be used to support policy making and that it is directly publishable by the European Commission as a part of its official publications. Thus, the contractor should establish robust means of ensuring the reliability, validity and comparability of information collected and the quality of its analysis and reporting, including a full and standard referencing of the sources used.

In particular, the Senior Researcher nominated by the Contractor in his offer will be in charge of the scientific quality assurance tasks.

Before final acceptance, all reports will be completed, adapted and corrected by the Contractor who will fully take into account the comments, suggestions and additional written comments provided by the JRC-Seville.

## 8. DURATION

The performance of the tasks cannot start before the date on which the last party signs the contract, and should be finalised in a maximum of 14 months, including the time for the JRC-Seville to comment the interim deliverables and the Contractor to implement the suggested amendments.

The time needed for possible comments and amendments to the Final Deliverable (D3) would be added to the total duration of the contract.





## 9. LANGUAGE

The language of all deliverables meetings, presentations, and exchanges will be English. The user interface of all software should be English, and this is the language in which all documentation, including that inserted in source code, will be written.

It is expected that the written text in the deliverables is of high standard scientific language, ideas are expressed in a clear and logically structured way. The text of all deliverables will be strictly assessed according to these criteria in the review process.

## 10. REFERENCES

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