Commission modelling inventory and knowledge management system (MIDAS)
Report generation date 29/09/2021

MIDAS includes the descriptions of models in use by the Commission in support to the policy cycle. MIDAS is developed and managed by the **Competence Centre on Modelling** of the European Commission.

Find out more at https://ec.europa.eu/knowledge4policy/modelling_en
Contact: EU-MIDAS@ec.europa.eu

Factsheet

SWD/2021/245 final

COMMISSION STAFF WORKING DOCUMENT IMPACT ASSESSMENT REPORT Accompanying the document Proposal for a Directive of the European Parliament and of the Council amending Directive 2014/53/EU on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment

Supporting model(s)

TRI-STOCK-CHARGER

Commission modelling inventory and knowledge management system (MIDAS)
Report generation date 29/09/2021

Impact assessment
SWD/2021/245 final

Fact sheet on model contributions

Source: Commission modelling inventory and knowledge management system (MIDAS)

Date of Report Generation: 29/09/2021

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Overview

Title
COMMISSION STAFF WORKING DOCUMENT IMPACT ASSESSMENT REPORT Accompanying the document Proposal for a Directive of the European Parliament and of the Council amending Directive 2014/53/EU on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment

Document ID
SWD/2021/245 final

Year of publication
2021

Led by
GROW

Model(s) used
TRI-STOCK-CHARGER

Additional information on model use for this Impact assessment

-

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TRI-STOCK-CHARGER

Full title

Trinomics stock model for chargers of mobile phones and other small devices

Run for this impact assessment by

Trinomics

Contributed to

Baseline and assessment of policy options

Helped to assess the following impacts

Impact area	Impact category	Impact subcategory
Economic impacts	Consumers and households	Prices, quality, availability or choice of consumer goods and services
Economic impacts	Macroeconomic environment	Economic growth and employment
Social	Employment	Impact on jobs
Environmental	Climate	Emission of greenhouse gases
Environmental	Waste production / generation / recycling	Waste production, treatment, disposal or recycling
Environmental	Efficient use of resources (renewable & non-renewable)	Use of non-renewable resources

Documented in: **Impact assessment study to assess unbundling of chargers: final report.**

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TRI-STOCK-CHARGER

Trinomics stock model for chargers of mobile phones and other small devices

Fact sheet

Source: Commission modelling inventory and knowledge management system (MIDAS)

Date of Report Generation: 29/09/2021

Dissemination: Public

Overview

Acronym TRI-STOCK-CHARGER
Full title Trinomics stock model for chargers of mobile phones and other small devices

Main purpose
To model the stock of chargers in the EU to support the impact assessment of policy options to achieve unbundling of chargers from mobile phones.

Summary
The model was designed by Trinomics in order to simulate the stock of chargers for mobile phones and other small devices for the purpose of assessing the impact of policy measures which affect these chargers. The model addresses the two main charger components, the External Power Supply (EPS) and the (detachable) cable, and differentiates multiple versions of these based on the different power, receptacle and connector types. It covers the EU in aggregate for the period 2010-2030.

The model is a stock-flow model, which models inflows to the model based on chargers provided with sales of mobile phones and other devices, and chargers purchased separately. It also models outflows (disposals) of chargers based on assumptions of disposal rates, and also the method of disposal. These quantified flows are used to calculate the main outputs, of consumer cost, producer revenues and environmental impacts.

The model can be useful across the policy cycle, ex-ante, interim and ex-post to assess developments in the market, their impact, and the impact of potential policy options.

Keywords
emissions , smartphones , chargers , cables , external power supply , ESP , USB , lightning , stock

Model category (thematic)
Other

Model home page
No information provided

Ownership & license

Ownership

Sole ownership [European Union]

Ownership details

No information provided

Licence type

Non-Free Software licence. The license has one or more of the following restrictions: it prohibits creation of derivative works; it prohibits commercial use; it obliges to share the licensed or derivative works on the same conditions.

Details

TRI-STOCK-CHARGER structure and approach

The model is a stock-flow model, which models inflows to the model based on chargers provided with sales of mobile phones and other devices, and chargers purchased separately. It also models outflows (disposals) of chargers based on assumptions of disposal rates, and also the method of disposal. These quantified flows are used to calculate the main outputs, of consumer cost, producer revenues and environmental impacts.

The model provides:

- A comparison sheet – which compiles the main results per policy option to generate tables and figures that can be used for the Impact Assessment report
- Sheets per device type (Smartphones, Standalone, Other_devices) where calculations and assumptions for the charger inflows associated with these devices are included for the baseline and all policy options
- Charger_adds – an interim calculation sheet which compiles per policy option the charger additions from all selected devices, the percentages for which are used in the disposal calculations
- Summary_Figs – various supporting graphical outputs
- Charger profiles – sheet where assumptions on prices, emissions and materials, per charger type, and over time are kept
- Disposals – sheet which includes the main assumptions for the modelling of disposals
- Stock sheets – one per policy option, brings the inflows, removes the outflows, calculates the stock
- Impact sheets – one per policy option, these sheets multiply the flows from the stock sheet with information from the charger profiles to calculate impacts
- Country estimates – supporting data on population
- SBSdata – data from SBS to support Economic impact calculations
- BoM Chargers – Bill of Materials data for chargers

Input and parametrization

- Smartphone sales data (from commercial sources)
- Charger sales data (from PRODCOM)
- Charger profiles (cost, prices, weight, composition, emissions – data from various sources)

Main output

- GHG emissions
- Material use
- E-waste
- E-waste treatment
- E-waste recycling
- Cost to consumers
- Benefit (revenue) for manufacturers and wholesalers
- Benefit for EU Manufacturers
- Manufacturing jobs in EU
- Benefit for distributors and retailers
- Wholesaler/retailer jobs in EU
- Chargers sales / disposals – per type

Additional outputs could be added if associated impacts per charger type are defined, e.g. other environmental impacts.

Spatial - temporal extent

The output has the following spatial-temporal resolution and extent:

Parameter	Description
Spatial Extent / Country Coverage	EU Member states 27
(Spatial) resolution	World-regions (supranational)
Temporal extent	Medium-term (5 to 15 years), Long-term (more than 15 years)
Temporal resolution	Years

Quality & transparency

Quality

Question	Answer	Details
Models are by definition affected by uncertainties (in input data, input parameters, scenario definitions, etc.). Have the model uncertainties been quantified? Are uncertainties accounted for in your simulations?	no	Key variables are the main source of uncertainty. These have been sensitivity tested (see below). Scenario definition for charger disposal (10% of stock per year) is a further key assumption. The model outputs based on these assumptions are validated by consumer survey responses.
Sensitivity analysis helps identifying the uncertain inputs mostly responsible for the uncertainty in the model responses. Has the model undergone sensitivity analysis?	yes	Key variables (e.g. charger profiles, sales) have been sensitivity checked.
Has the model undergone external peer review by a panel of experts, or have results been published in peer-reviewed journals?	no	The model is not peer reviewed. Internal quality assurance is in place.
Has model validation been done? Have model predictions been confronted with observed data (ex-post)?	no	Current stock size is validated with consumer survey data. For the other outputs this is not possible, as not enough time has elapsed.

References related to external peer-review and publication in scientific journals:

- No references provided in MIDAS

Transparency

Question	Answer	Details
Is the model underlying database (i.e. the database the model runs are based on) publicly available?	yes	Processed data is public, but some key input data on mobile phone sales and their split by manufacturer/model type is confidential commercial data purchased for the purpose of the analysis. This is included only in aggregate form in the model.
Can model outputs be made publicly available?	yes	Model outputs are made publicly available in IA reports. Outputs can be made available in agreement with DG GROW.
Is the model transparently documented (including underlying data, assumptions and equations, architecture, results) and are these documents available to the general public?	no	No public documentation of the model is available. However, its elements are explained within the model and in the Annexes to the IA report.
Is the model source code publicly accessible or open for inspection?	yes	The model spreadsheets can be accessed in agreement with DG GROW.

References related to documentation:

No references provided in MIDAS

The model's policy relevance and intended role in the policy cycle

The model is designed to contribute to the following policy areas

- Climate action
- Energy
- Environment
- Consumers
- Business and industry

The model is designed to contribute to the following phases of the policy cycle

- Formulation
- Implementation
- Evaluation

The model's potential

The model is tailored to chargers for mobile phones and other small devices but could be adapted to be applied to any product, which could be valuable across a range of product policies such as Ecodesign, Energy Labelling, Ecolabel, GPP. It's main purpose is to simulate the markets (flows) and stock of a particular product which lends itself primarily to policy formulation, i.e. establishing a baseline and policy options and their impacts. It could also be used to assist in the monitoring of implementation or ex-post evaluation of policies.

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Previous use of the model in ex-ante impact assessments of the European Commission

Use of the model in ex-ante impact assessments since July 2017.

In the Year	TRI-STOCK-CHARGER contributed to the Impact assessment called	Led by	By providing input to the	The model was run by	Details of the contribution
2021	Impact assessment accompanying the document Proposal for a Directive of the European Parliament and of the Council: amending Directive 2014/53/EU on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment SWD/2021/245 final	GROW	Baseline and assessment of policy options	*Trinomics B.V.*	The model helped to assess the following impacts: - Prices, quality, availability or choice of consumer goods and services - Economic growth and employment - Impact on jobs - Emission of greenhouse gases - Waste production, treatment, disposal or recycling - Use of non-renewable resources Documented in: - DOI 10.2873/788086

Bibliographic references

- *Impact assessment study to assess unbundling of chargers : final report. - 10.2873/788086*