VALESOR – new online tool for valuation of environmental stressors

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Katarina Yaramenka (IVL)

Funded by the European Union

VALESOR
Valuation of environmental stressors

VALESOR = VALuation of Environmental StressORs

https://valesor.eu/

Start date: **01/01/2023** → End date: **31/12/2025**
12 partners = 11 European partners and 1 associate partner (Mike Holland, UK)

Multidisciplinary project, including economics, medicine, toxicology, epidemiology, environmental sciences, atmospheric dispersion modelling etc.

General objective : Promote a better use of economic values in public decisions aimed at reducing environmental stressors

Final operational objective: Develop the VALESOR tool = a multi-stressor economic valuation model

The Valesor Consortium

France

- Angers Univesity
- Nantes University
- French National Institute for Industrial Environment and Risks - INERIS
- UNIVERSITE PARIS DAUPHINE (UPD)
- Mines Paris – PSL

Sweden

- IVL Swedish Environmental Research Institute
- Umeå University
- Anthesis

Norway

- Menon Economics

Italy

- Joseph Spadaro, SERC
- Forastiere Francesco

Serbia

- University of Novi Sad, Medical Faculty

UK

- Michael Holland, EMRC

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VALESOR Structure

- 8 WP (7 WP + 1 Project Managament WP)
- ≈ 30 tasks

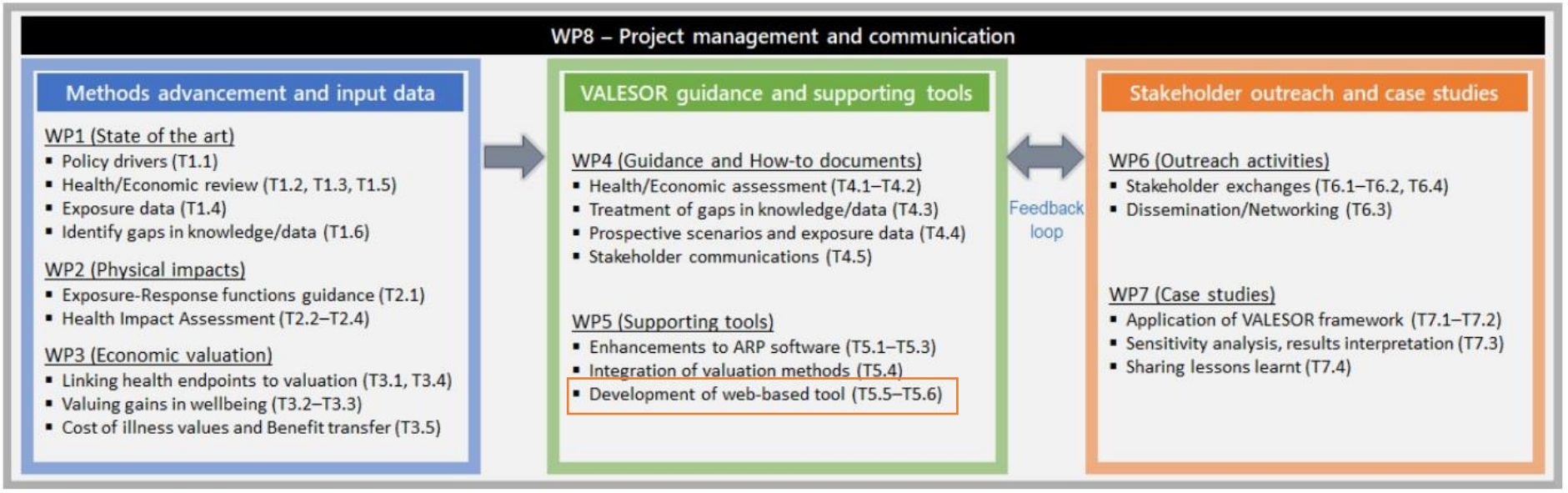


Figure 7: VALESOR WP PERT chart

VALESOR online tool

AIR-module is Based on Alpha RiskPoll (ARP) model used for CBA within EU/CLRTAP

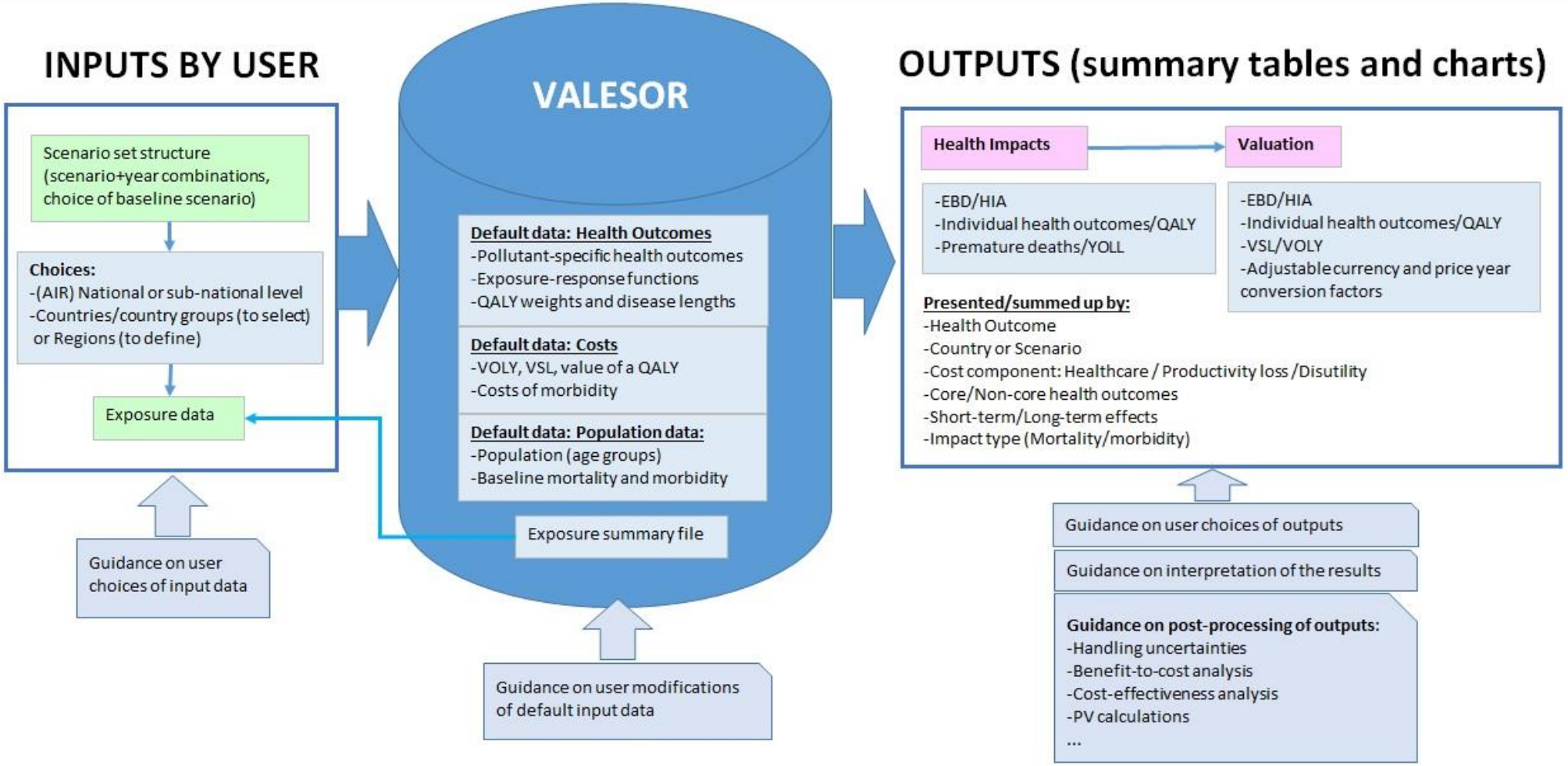
Accessible from VALESOR project website since 19/12-2025: https://tool.valesor.eu/

VALESOR tool calculates **health impacts** from air and chemical pollution and **economic values (damage)** using:

- Exposure data
- Population data
- Exposure-response functions
- Baseline morbidity and mortality rates
- Country-specific valuation parameters

Exposure is country-average (not gridded data)

VALESOR tool concept



VALESOR AIR

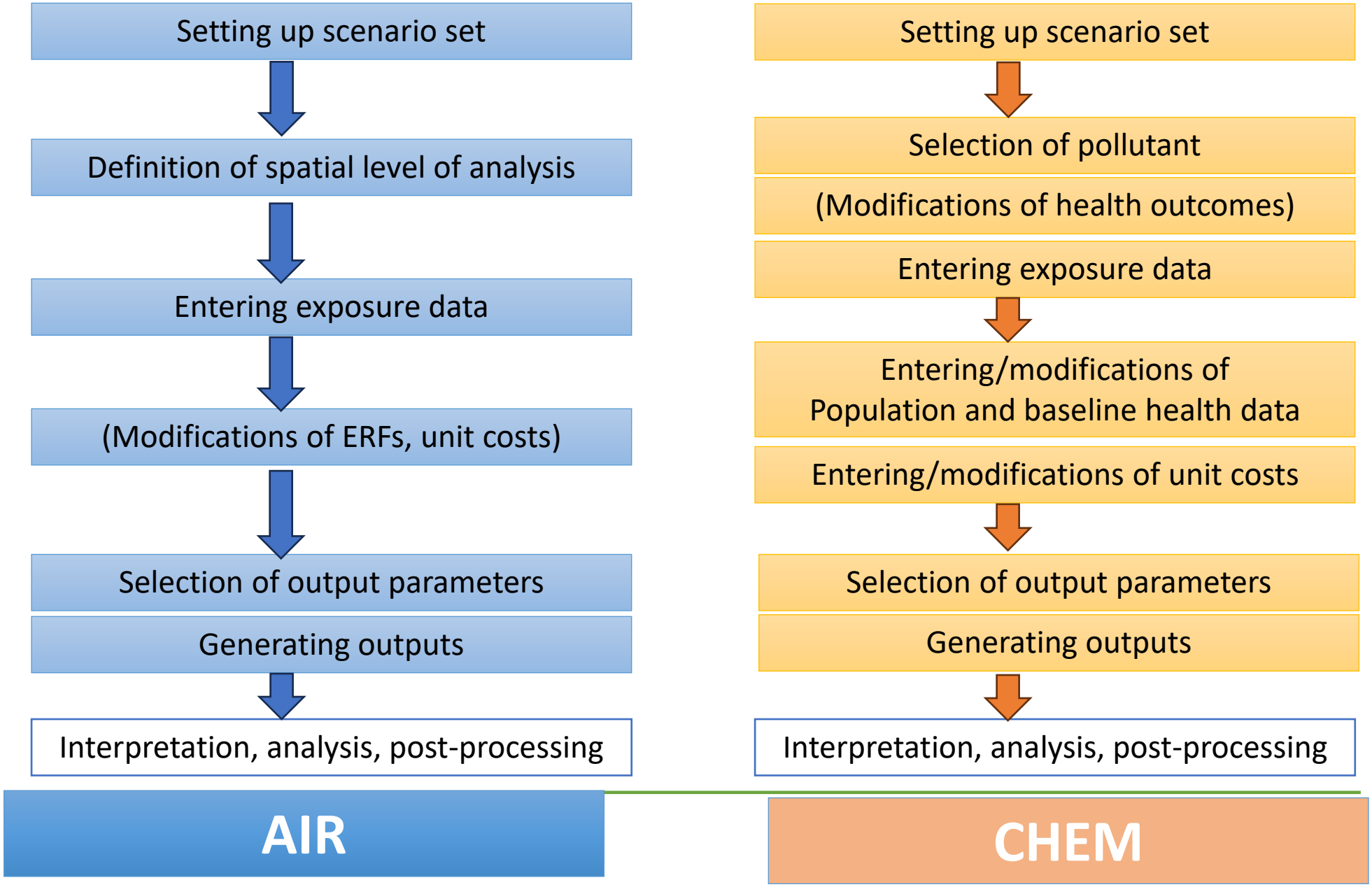
- Based on Alpha RiskPoll model
- Multi-pollutant analysis
- National or sub-national level of analysis
- 49 countries, 6 country groups
- ERFs and costs can be modified
- Population and baseline health cannot be modified (on national level)

VALESOR CHEM

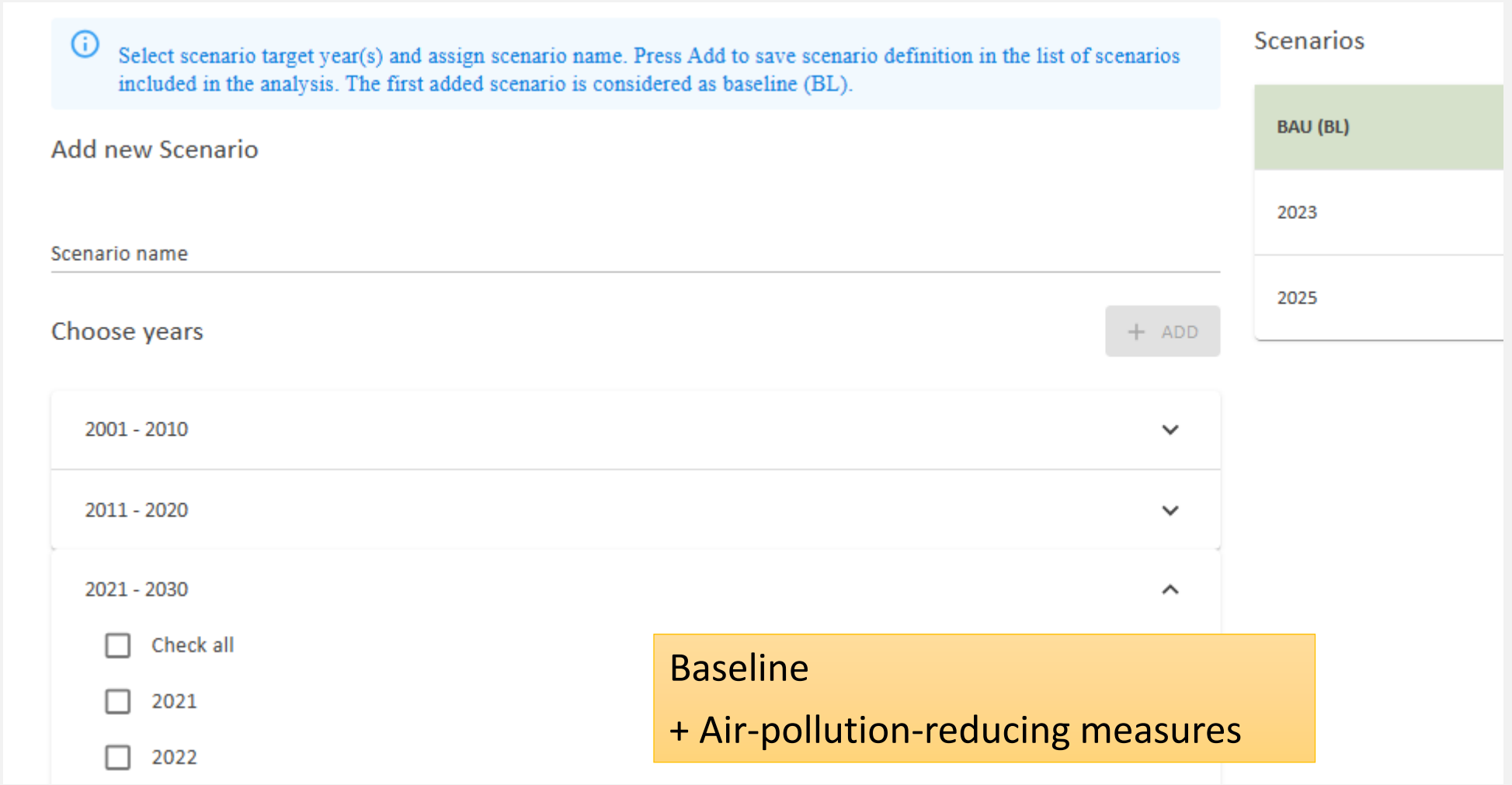
Framework for analysis, with a high degree of flexibility in inputs.

- Single-pollutant analysis, one region in one model run
- Exposure routes: inhalation or ingestion
- Several pollutants are explicitly included in the tool (including AIR pollutants)
- Possibility to analyse any pollutant with own data
- Country-specific data on population and/or costs can be uploaded from the database
- Very flexible model open for data modifications

Steps in the analysis



AIR: Scenario set definition



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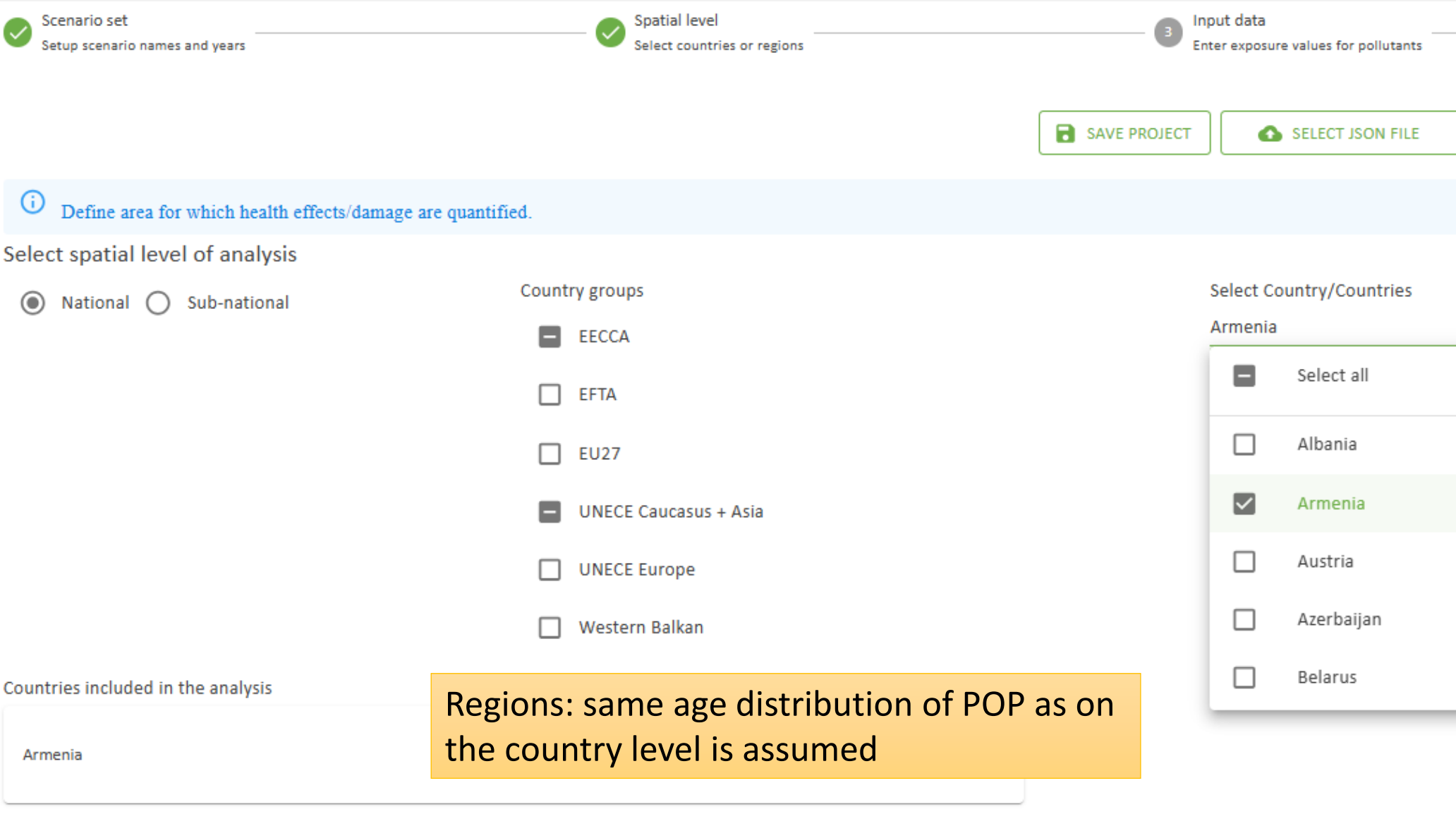
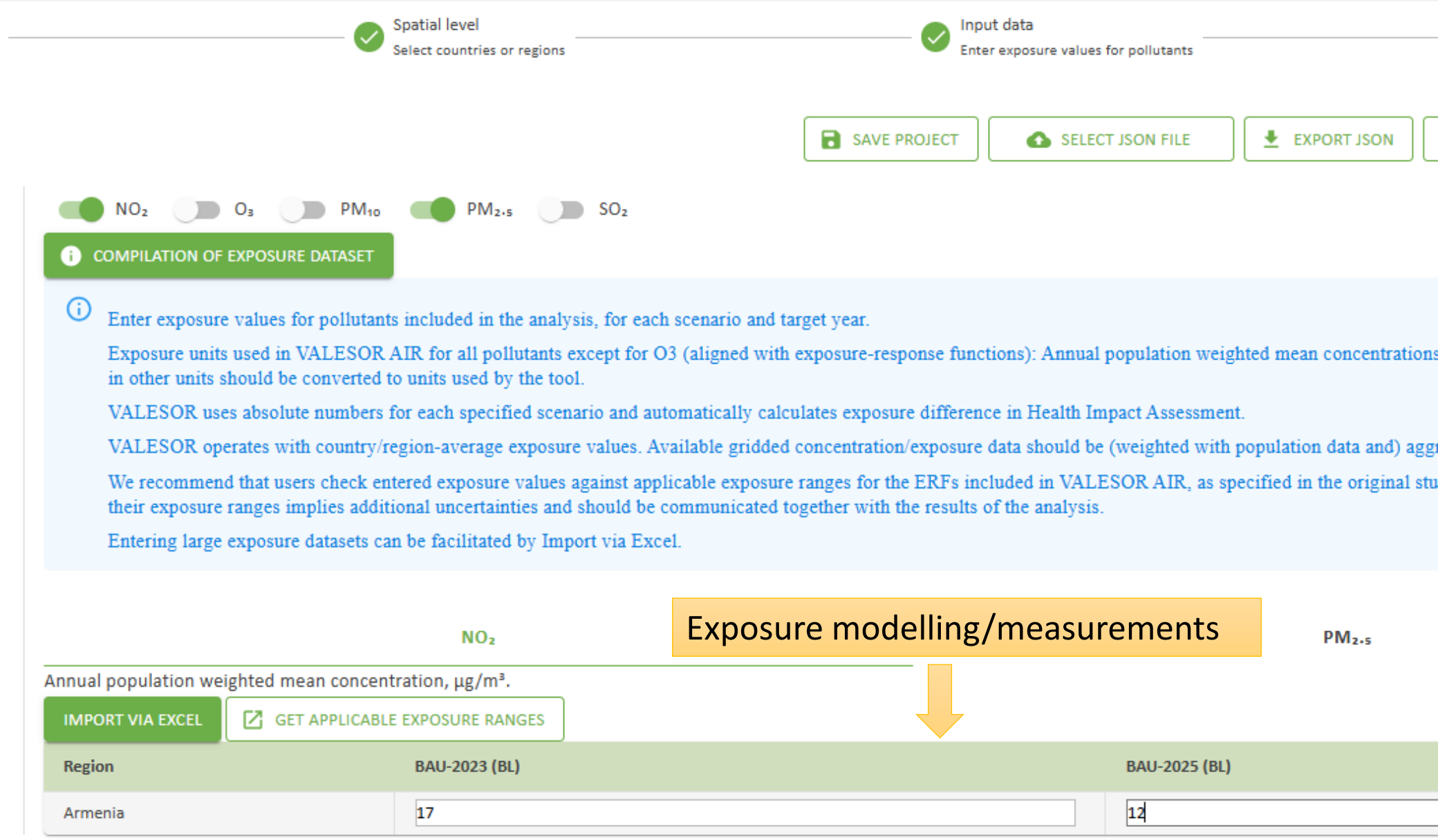
AIR: Definition of spatial level of analysis



AIR: Entering exposure data



AIR: Check other input data

COLLAPSE TABS

- Exposure Data
- Health Outcomes
- Cost Values
- Population and Baseline Health

Structure of cost values in VALESOR follows classification of health outcomes into morbidity and mortality impact types. Morbidity cost values for each individual health outcome are presen
table below by costs component; these are lifetime costs of each new case of disease. Mortality cost metrics (VOLY, VSL) are opened by button VOLY, VSL AND VQALY. Choice between V
as mortality valuation metric is made on the Output page.

Country-specific values should be used when carrying out analysis within a single country. However, when analysis concerns a common policy across multiple countries (e.g. across the EU, o
UNECE Member States) it is common practice to use a value averaged across the countries that are covered by the analysis. This practice has been followed in numerous analyses for the EU a
over the last 30 years and is recommended to be followed in VALESOR.

Pan-European cost value set refers to values averaged across all 49 countries included in VALESOR.

Cost values displayed as 0 indicate data gaps and should be interpreted as 'non-available' rather than actual zero costs.

Select Region: Armenia

GET COST VALUES | VOLY, VSL AND VQALY | COST VALUES: METHOD AND DATA SOURCES

Cost unit: Euro

Damage Type	Total, Morbidity	Health Care	Productivity Loss	Disutility
ALRI in children	60 €	30 €	10 €	20 €
Asthma in adults	20320 €	500 €	1560 €	18260 €
Asthma in children	54740 €	700 €	1560 €	52480 €
Bladder cancer	216750 €	4270 €	1380 €	211100 €
Breast cancer	216720 €	3670 €	1950 €	211100 €
COPD	15500 €	1640 €	870 €	12990 €

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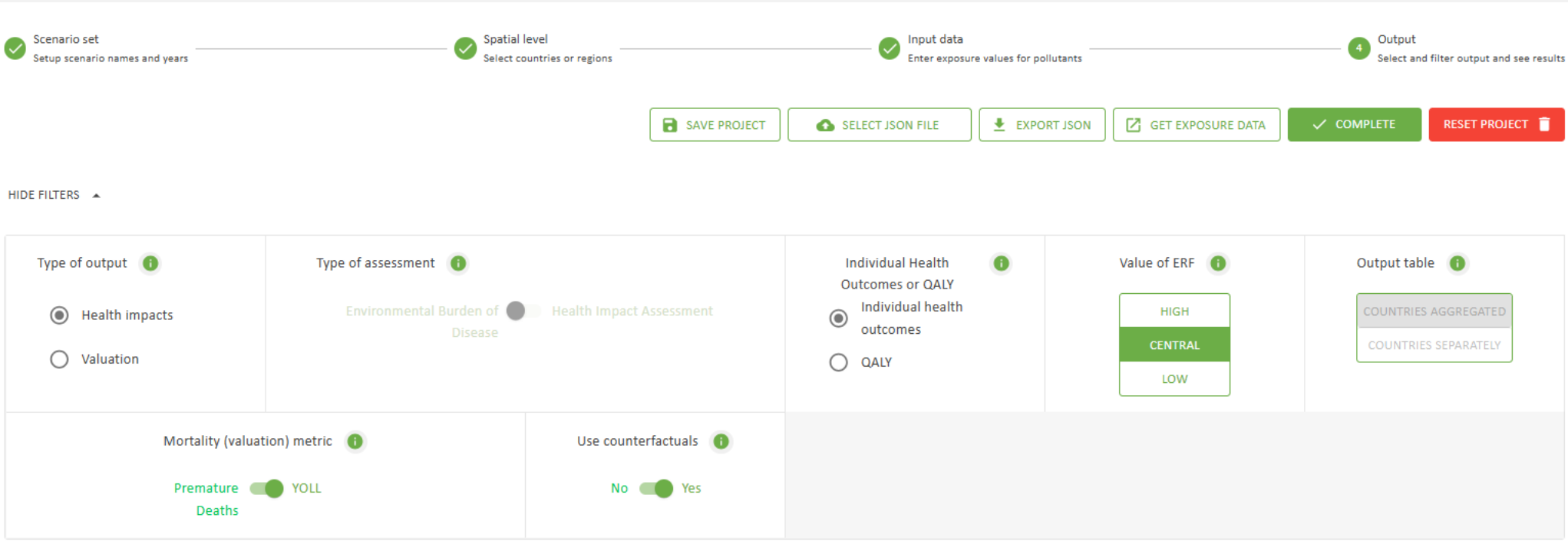
AIR: Output page: Selections (upper panel)



Additionally for valuation:

- Cost value set (country-specific or region-averaged)
- Currency and price year conversion factors

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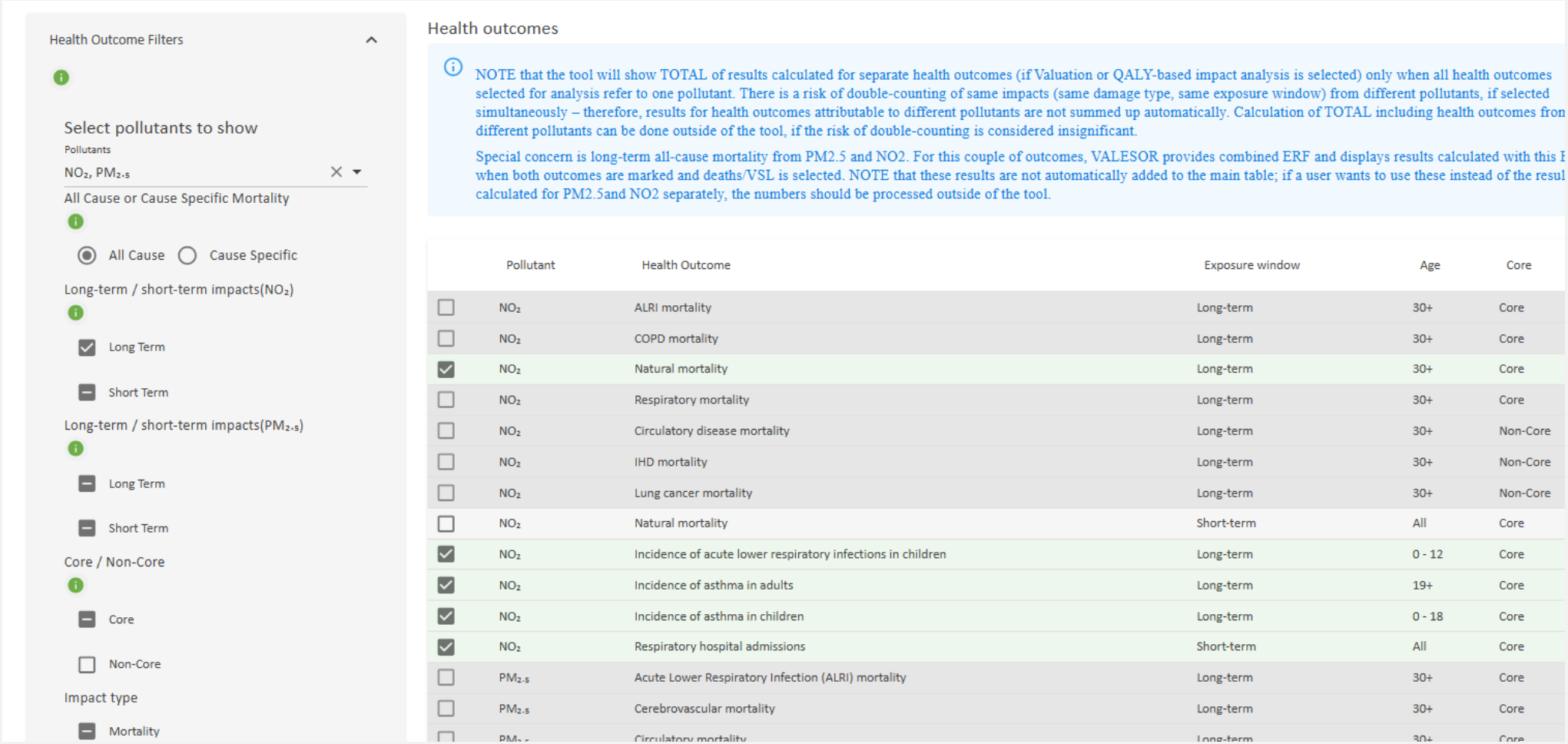
AIR: Output page: Selections (left panel, filter list)



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Examples of the generated outputs

Health impacts

DOWNLOAD TABLE AS CSV

INTERPRETATION OF THE RESULTS

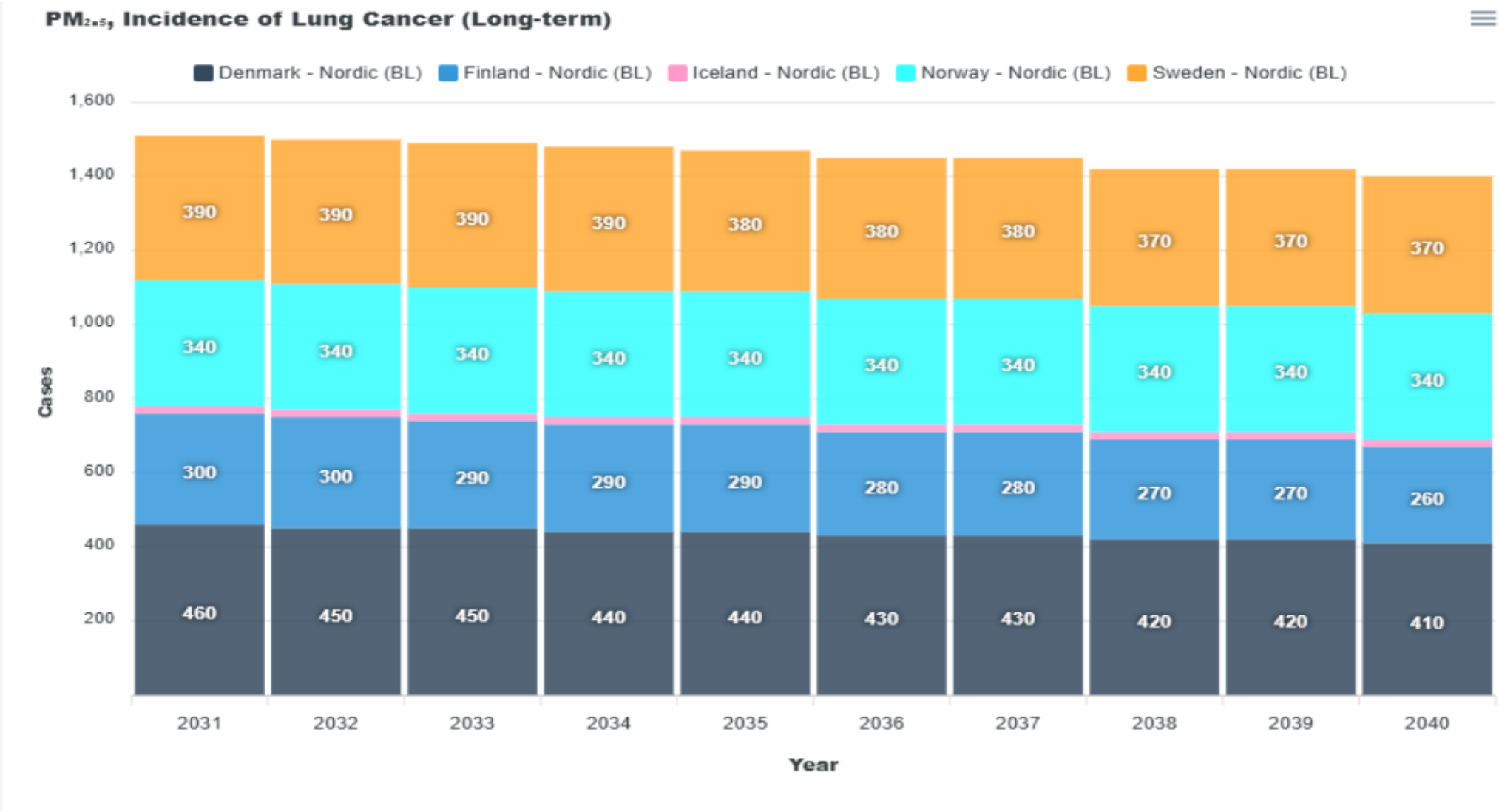
Pollutant	Health outcome	Exposure window	Core	Age	Unit	BAU-2023 (BL)	BAU-2025 (BL)
$PM_{2.5}$	Natural mortality	Long-term	Core	All	YOLL	51,798	45,826
$PM_{2.5}$	Incidence of Lung Cancer	Long-term	Core	30+	Cases	288	274
$PM_{2.5}$	Incidence of asthma in children	Long-term	Core	0 - 18	Cases	2,039	1,841
$PM_{2.5}$	Incidence of COPD	Long-term	Core	30+	Cases	1,959	1,856
$PM_{2.5}$	Incidence of IHD events (i.e. Acute Myocardial Infarction)	Long-term	Core	30+	Cases	4,966	4,659
$PM_{2.5}$	Incidence of Stroke	Long-term	Core	30+	Cases	1,043	981

Damage

$PM_{2.5}$	Incidence of Stroke	Long-term	Core	30+	175,127,000	164,768,000
$PM_{2.5}$	Cardiovascular hospital admissions	Short-term	Core	All	0	0
Total					2,461,469,000	2,205,193,000
From which:	Healthcare				30,852,000	28,989,000
	Productivity loss				9,601,000	8,945,000
	Disutility				520,013,000	485,429,000
	Mortality				1,901,004,000	1,681,829,000

Examples of the generated outputs

Lung cancer cases in the Nordic countries 2031-2040



Technical solutions to decrease the risk of double-counting

- (AIR) Possibility to use combined ERF for all-cause mortality from PM2.5 and NOx;
- (AIR) If more than one pollutant is selected in outputs – results are not summed up or presented as charts – only as tables without a “Total” row;
- (AIR, CHEM) Particle fractions (PM2.5 and PM10) are separated, only one can be selected in one calculation run;
- (AIR, CHEM) All-cause and cause-specific mortality outcomes are separated, only one mortality type can be selected in one calculation run;
- (AIR) Hierarchical structure of cause-specific mortality outcomes;
- (AIR, CHEM) User guidance as text (in Interpretation of the results).

VALESOR online tool

Value of the tool: Provides both health impact estimates and damage estimates (valuation) for user-defined scenarios, using as inputs the most recent scientific results and the latest data from open databases.

The data is transparent; all the sources are documented.

Tool documentation: 1) user manual; 2) detailed methodology guidelines; 3) input data files (Excel)

- Exposure data ← aggregated data from CAMs, at two resolution levels
- Population data ← UN population prospects, by 1-year age group
- Baseline morbidity and mortality rates ← UN, IHME (GBD), WHO
- Country-specific valuation parameters ← Extensive literature review and results of two own VALESOR surveys on Willingness-to-Pay
- Exposure-response functions ← Most recent research results, including HRAPIE-2 outcomes published in late November 2025.

AIR health outcomes, PM2.5

Pollutant	Core?	Health_outcome	Exposure window	Show age	ERF_L	ERF_C	ERF_H
Fine particles ($PM_{2.5}$)	Core	Natural mortality	Long-term	30+	1.064	1.095	1.127
Fine particles ($PM_{2.5}$)	Core	Natural mortality	Short-term	All	1.0059	1.0068	1.0077
Fine particles ($PM_{2.5}$)	Core	Circulatory mortality	Long-term	30+	1.102	1.127	1.152
Fine particles ($PM_{2.5}$)	Core	IHD mortality	Long-term	30+	1.102	1.143	1.186
Fine particles ($PM_{2.5}$)	Core	Cardiovascular mortality	Short-term	All	1.0061	1.0092	1.0123
Fine particles ($PM_{2.5}$)	Core	Respiratory mortality	Long-term	30+	1.079	1.136	1.197
Fine particles ($PM_{2.5}$)	Core	Respiratory mortality	Short-term	All	1.0029	1.0073	1.0116
Fine particles ($PM_{2.5}$)	Core	COPD mortality	Long-term	30+	1.08	1.138	1.198
Fine particles ($PM_{2.5}$)	Core	ALRI mortality	Long-term	30+	1.095	1.204	1.325
Fine particles ($PM_{2.5}$)	Core	Cerebrovascular mortality	Short-term	All	1.0012	1.0072	1.0132
Fine particles ($PM_{2.5}$)	Core	Cerebrovascular mortality	Long-term	30+	1.101	1.146	1.192
Fine particles ($PM_{2.5}$)	Core	Lung cancer mortality	Long-term	30+	1.053	1.093	1.135
Fine particles ($PM_{2.5}$)	Core	Incidence of asthma in children	Long-term	0-18	1.1	1.34	1.63
Fine particles ($PM_{2.5}$)	Core	Incidence of COPD	Long-term	30+	1.13	1.18	1.23
Fine particles ($PM_{2.5}$)	Core	Incidence of IHD events	Long-term	30+	1.05	1.13	1.22
Fine particles ($PM_{2.5}$)	Core	Incidence of Stroke	Long-term	30+	1.12	1.16	1.2
Fine particles ($PM_{2.5}$)	Non-core	Incidence of Dementia	Long-term	60+	1.04	1.17	1.25
Fine particles ($PM_{2.5}$)	Non-core	Incidence of Diabetes	Long-term	30+	1.03	1.1	1.18
Fine particles ($PM_{2.5}$)	Core	Incidence of Lung Cancer	Long-term	30+	1.1	1.16	1.23
Fine particles ($PM_{2.5}$)	Core	Cardiovascular hospital admissions	Short-term	All	1.0017	1.0091	1.0166

CHEM health outcomes

CAS	Pollutant	Health_outcome	ERF_type	Core?	Exp_route	Impact_type	ERF_C
—	Nickel refinery dust	Incidence of lung cancer [T]	UR	Non-core	Inhlation	Morbidity	0.00024
106-99-0	1.3-Butadiene	Incidence of leukemia [T]	UR	Non-core	Inhlation	Morbidity	0.00003
12035-72-2	Nickel subsulfide	Incidence of lung cancer [T]	UR	Non-core	Inhlation	Morbidity	0.00048
14797-55-8	Nitrate	Incidence of stomach cancer [E]	RR	Non-core	Ingestion	Morbidity	1.91
18540-29-9	Chromium (VI) compounds	Incidence of lung cancer [T]	UR	Non-core	Inhlation	Morbidity	0.018
50-32-8	Benzo(a)pyrene	Incidence of lung cancer [T]	UR	Non-core	Inhlation	Morbidity	0.087
50-32-8	Benzo(a)pyrene	Incidence of general cancer [T]	SF	Non-core	Ingestion	Morbidity	2,0
542-88-1	Bis(chloromethyl)ether	Incidence of respiratory tract tumor [T]	UR	Non-core	Inhlation	Morbidity	0.062
630-08-0	Carbon monoxide (CO)	Acute myocardial infarction hospital admissions [E]	RR	Core	Inhlation	Morbidity	1.056
7440-38-2	Inorganic arsenic	Incidence of lung cancer [E]	RR	Core	Ingestion	Morbidity	1.0053
7440-38-2	Inorganic arsenic	Lung cancer mortality [E]	RR	Core	Ingestion	Mortality	1.0059
7440-38-2	Inorganic arsenic	Incidence of kidney cancer [E]	RR	Non-core	Ingestion	Morbidity	1.006
7440-38-2	Inorganic arsenic	Bladder cancer mortality [E]	RR	Core	Ingestion	Mortality	1.0106
7440-38-2	Inorganic arsenic	Incidence of bladder cancer [E]	RR	Core	Ingestion	Morbidity	1.0074
7440-38-2	Inorganic arsenic	CHD mortality [E]	RR	Non-core	Ingestion	Mortality	1.0407
7440-38-2	Inorganic arsenic	CVD mortality [E]	RR	Non-core	Ingestion	Mortality	1.0158
7440-38-2	Arsenic	Incidence of lung cancer [T]	UR	Non-core	Inhlation	Morbidity	0.0043
7440-38-2	Arsenic	Incidence of lung cancer [T]	SF	Non-core	Ingestion	Morbidity	21.3
7440-38-2	Arsenic	Incidence of bladder cancer [T]	SF	Non-core	Ingestion	Morbidity	17.6
75-01-4	Vinyl chloride	Incidence of liver angiosarcomas. angiomas. hepatomas. and	UR	Non-core	Inhlation	Morbidity	0.0000088
75-01-4	Vinyl chloride	Incidence of liver angiosarcomas. angiomas. hepatomas. and	SF	Non-core	Ingestion	Morbidity	1.4
75-21-8	Ethylene oxide	Incidence of breast cancer [T]	UR	Non-core	Inhlation	Morbidity	0.005
79-01-6	Trichloroethylene	Incidence of renal cell carcinoma. non-Hodgkin's lymphoma.	UR	Non-core	Inhlation	Morbidity	0.0000048
80-05-7	Bisphenol A	Incidence of diabetes type 2 [E]	RR	Non-core	Ingestion	Morbidity	1.28
8007-45-2	Coke Oven Emissions	Incidence of respiratory cancer [T]	UR	Non-core	Inhlation	Morbidity	0.00062
92-87-5	Benzidine	Incidence of bladder cancer [T]	UR	Non-core	Inhlation	Morbidity	0.067
92-87-5	Benzidine	Incidence of bladder cancer [T]	SF	Non-core	Ingestion	Morbidity	230
71-43-2	Benzene (inh_µg/m3)	Incidence o Leukemia [T]	SF	Non-core	Ingestion	Morbidity	0.027
71-43-2	Benzene (inh_µg/m3)	Incidence of leukemia [T]	UR	Non-core	Inhlation	Morbidity	0.000002
71-43-2	Benzene (inh_ppm-years)	Incidence o Leukemia [T]	SF	Non-core	Ingestion	Morbidity	0.027
71-43-2	Benzene (inh_ppm-years)	Incidence of Leukemia [E]	RR	Core	Inhlation	Morbidity	1.0097

Potential users

- Authorities/decision-makers at different levels (national, local, EU, UNECE)
- Scientists and academia
- Consultants within environment and health areas
- NGO, industries

Case study reports:
https://valesor.eu/download/18.1d34c6bf19c989180c023233/1773159186415/VALESOR_D.7.2_Case%20studies%20reports.pdf

Thank you for your attention!