



RIAT+

(Regional Integrated
Assessment Tool)

RIAT+ Interface

G.Maffeis & R.Gianfreda - TerrAria srl

riat@terraria.com

+390287085654

Via Gioia 132 Milano Italy

Domain

Domain Configuration

Name: Lomb_domain_POP_Cost [Delete] [New] [Save]

Grid Information

SW corner X (UTM, m): 310279 N° X cell: 95
SW corner Y (UTM, m): 4844657 N° Y cell: 62
Cell size (km): 6 UTM zone: 32 N

Domain Maps

Domain: Domain95x62.txt

Subdomains:
[Add Subdomain] [Remove Subdomain]
Subomain92x65.txt

Population: Pop2012_Lomb92x65.txt
 External Cost: external_cost_pop_data.txt

[Help] [OK]

Domain

The domain file contains all the cells involved in the grid. Cells are divided into:
0 – outside region
1 – inside region
2 – boundary cells

Calculations are different according to the type of cell.

Subdomains

It is possible to enter more subdomains. Subdomains are areas of interest on which you can apply particular policies (PAD – Policy application domain). All subdomain must be inside the region.

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Population
Pop2012_Lomb92x65.txt

External Cost
external_cost_pop_data.txt

[Help] [OK]

Population

This file contains resident population. This information is useful to calculate population weighted output.

External costs

Useful information to compute external costs.

Data are requested for each cell:

- Population per age (%)
- Mortality rate per age (%)
- Asthmatic per age class over total population
- Fraction of population > 30 years

Emission inventory

Emission Inventory Configuration

Name: Lomb_testMilano [Delete] [New] [Save]

Emission Data

Detailed Municipality
 Detailed Gridded
 Aggregated Scenario

Pollutant

Pollutant	Id
NOx	2
VOC	3
NH3	8
PM10	9
PM25	33
SO2	1

[Delete] [Add]

Emission Mapping

[File icon] mapping_LOMB_NEW2014.bt

Temporal Profile

[File icon] Semester_Lombardia.bt

Temporal Horizon

[File icon] 2005-2020.txt

Reference Year: 2010

Outside Region Emission

Pollutant	Filename
NOx	Emiss_AR_OUT_NOx.bt
VOC	Emiss_AR_OUT_COV.bt
NH3	Emiss_AR_OUT_NH3.bt
PM10	Emiss_AR_OUT_PM10.bt
PM25	Emiss_AR_OUT_PM25.bt
SO2	Emiss_AR_OUT_SO2.bt
CO	Emiss_AR_OUT_CO.bt

Outside Projected Emissions

Yes No

Biogenic Emission

Semesters	Filename
Summer	select
Winter	select

[Help] [OK]

Emission inventories

The system can manage three different kinds of emission inside the region. They are characterized by different spatial, temporal and activity or macrosector aggregation. They are:

- Municipalities (polygonal) and annual emissions with regional activity and fuel detail;
- Gridded and temporal disaggregated emissions with regional activity and fuel detail
- Gridded and temporal disaggregated emissions with macrosector detail.

Outside region emissions

The user can specify whether the outside region emissions are already projected to the CLE optimization year or not. In case the user select "NO" outside emissions will be projected with CLE average.

Emission inventory

Emission Inventory Configuration

Name: Lomb_testMilano [Delete] [New] [Save]

Detailed Municipality
 Detailed Gridded
 Aggregated Scenario

Pollutant

Pollutant	Id
NOx	2
VOC	3
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[Delete] [Add]

Emission Mapping

[File] mapping_LOMB_NEW2014.bt

Temporal Profile

[File] Semester_Lombardia.bt

Temporal Horizon

[File] 2005-2020.bt
Reference Year: 2010

Emission Data

Areal Sources Inside Region

[File] emi_areal_NEW2014.bt

Point Sources

[File] emi_psource.bt

Outside Region Emission

Pollutant	Filename
NOx	Emiss_AR_OUT_NOx.bt
VOC	Emiss_AR_OUT_COV.bt
NH3	Emiss_AR_OUT_NH3.bt
PM10	Emiss_AR_OUT_PM10.bt
PM25	Emiss_AR_OUT_PM25.bt
SO2	Emiss_AR_OUT_SO2.bt
CO	Emiss_AR_OUT_CO.bt

Outside Projected Emissions

Yes No

Biogenic Emission

Semesters	Filename
Summer	select
Winter	select

[Help] [OK]

Mapping

Correspondence between emission regional activity (and fuel) and GAINS database.

Temporal profile

By default an annual profile is considered but is possible to add up to 4 temporal profiles.

Temporal horizon

In this file all years of technologies AR are listed.
The user must select the reference year according to emission inventory.

Pre-processing

- The pre-computed emissions are required to speed up the optimization procedure (this is not applied in the “aggregated scenario” evaluation).
- These pre-computed emissions have to be recreated each time one of the input data (domain, emissions and measure database, S/R functions) and the information set in this screen are modified.
- Region PAD is mandatory and it is computed as default configuration.
- The optimization year chosen (inside the region) is used to calculate virtual emissions.

Run settings

Four decision approaches are available:

- Multi Objective (single or combined AQI)
- Cost Effectiveness (single or combined AQI)
- Scenario Detailed approach
- Scenario Aggregated approach

If “Aggregated Scenario” has been set in Emission Inventory only Scenario Aggregated approach is available in Run Settings screen.

Run settings

TECHNOLOGY REPLACEMENT

- Only for technical measures, the user can decide if technologies are replaceable or not for the optimization module:
 - "yes" means that technologies are replaceable: $0 \leq \text{their application rates} \leq POT$
 - "no" means they are not replaceable $CLE \leq \text{their application rates} \leq POT$
- Another constraint: the final reduction after replacement must be greater than the initial one (without) replacement
- For those technologies considered «state of the art» the it must be respected the constraint: $CLE \leq \text{their application rates} \leq POT$

Run settings

AIR QUALITY OBJECTIVE

- To obtain yearly PM10 exceedances the user has to fill in the two text boxes with the two coefficients (a and b), that allows to implement the following linear relation linking yearly PM10 exceedances and yearly PM10 average:

$$(Number\ of\ times\ PM10\ threshold\ is\ exceedances) = a * (mean\ PM10) - b$$

- All AQIs available in the Air Quality Objective box are the same for which the neural networks/models and their seasonality has been uploaded in S/R Functions screen.

WEIGHTS

Two different ways to weight different AQIs (only if more than one AQI has been selected):

- User defined: These weights must be between 0 and 1, for each of the AQIs to be considered simultaneously; the sum of the weights cannot be greater than 1
- Fairness: the user lets the algorithm decide the weights

Run settings

POLICY APPLICATION DOMAIN

Only the list of PADs for which the Pre-run process has been made appears. So the user can always choose the whole region domain (that is the default PAD) or a subdomain for which pre-computed emissions are ready from Pre-run process.

AQI TARGET DOMAIN

- It is the domain used to compute the AQI, strictly related to the PAD selected.
- The AQI Target Domain is always a smaller or equal part of the selected PAD: AQI Target Domain are zones of the subdomain (PAD) selected
- Also multiple selection

Run settings

SPATIAL AQI AGGREGATION

- Only for Multi Objective and Cost Effectiveness approaches says which method is used to compute the AQI by aggregating single cell values. It can also set the local thresholds to be applied to cell values.
- The Spatial AQI Aggregation method (only for the AQI chosen) are:
 - spatial average
 - total number of cells whose local value exceeds the corresponding threshold
 - population weighted spatial average
- The AQI aggregation method can be different for the different AQIs to be considered simultaneously; When these threshold values are set, the algorithm disregards the cells with lower local values.

Run settings

TRAFFIC SPLITTING

It offers the user the possibility to generate consistency constraints for the variables representing the application rates of the technologies related to traffic.

The Traffic Splitting option is available only when Multi Objective or Cost Effectiveness mode are set.

When "yes" is selected, it means that constraints are required; because the measure DB has been generated in such a way that quadruples SNAP1-HIGHWAY-activity-technology, SNAP1-EXTRA_URBAN-activity-technology and SNAP1-URBAN-activity-technology are associated with the same activity-technology pair. This means that the same technology can be applied to HIGHWAY, EXTRA_URBAN and URBAN traffic, respectively. For such a technology the penetration level has to be kept consistent while acting on HIGHWAY, EXTRA_URBAN and URBAN traffic.

Run settings

SNAP1 BUDGET Constraint

- Only when multi objective or cost effectiveness mode are set and allows the user to constrain the budget for each macrosector;
- to establish a maximum budget that can be accepted for a particular macrosector.
- the sum of these parameters can't be greater than 1.