

# **BlueSky Explorer**

**Technical Manual**

Year 2070 ...

Earth is struggling to support life as we know it. The atmosphere is choked with deadly pollution, claiming millions of lives every year, while the devastating vagaries of the climate are multiplying.

You are part of the crew of the "BlueSky Explorer" time vehicle, equipped with revolutionary ecological detection and intervention technology.

Your mission: to travel back in time to territories now devastated by decades of environmental inaction and apply targeted atmospheric improvement actions.

The crew has taken off on board the high-tech experimental vessel, but now an alarm has sounded - time to act in the past is running out. Another problem: only one person has been able to enter the operations room, while the rest of the crew are stuck in the outer airlock with this technical manual.

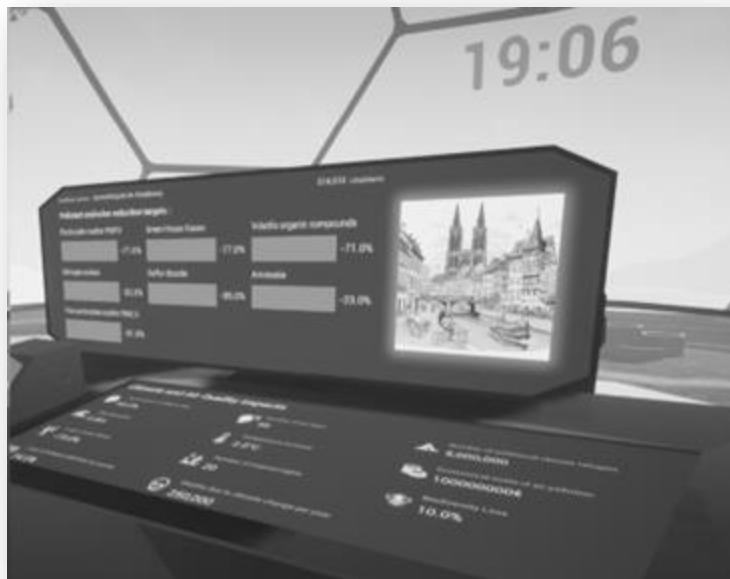
This manual is essential for setting the parameters of the various modules, until the central control panel indicates that the area has been cleared.

The success of your mission is our last hope...

On **arrival** at the station, head for the **central control panel**. You'll find a **button** to activate the station.

The central control panel tells you what targets for reducing emissions of atmospheric pollutants your territory must meet to preserve ecosystems and the health of its inhabitants.

Then head for the first action module, and complete your mission before the countdown reaches zero...





Residential Sector Monitoring		Sector's Impact
Pollutant	Main effects	
Greenhouse Gases	Climate change	46%
Particulate matter PM10	Cardiovascular diseases, impaired lung functions, lung cancer	39%
Fine particulate matter PM2.5	Cardiovascular diseases, impaired lung functions, lung cancer	57%
Nitrogen oxides	Branchial irritation, acid rains, ozone generation	20%
Volatile organic compounds	Generation of ozone and according to compounds, cancers, reproductive toxicity	51%
Ammonia	Branchial irritation, acid rains, eutrophication of water, generation of particulate matter	21%
Sulfur dioxide	Acid rains, generation of particulate matter	61%

After solving **each module**, return to the central control panel and **reactivate** the **button** to see the **impact** of your actions...

Continue solving each pre-selected module until all active modules have been solved.

As you move around the station, use your **right hand** to **scan** some of the necessary information...

Good luck ...

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# Module : Residential

## Zone 1 : Green Spaces & Forests

According to the colors of the trees in the zone, what action is needed to protect the health of the inhabitants? Scan the 3 available buttons, then click on THE right button.



Orange

Poorly maintained massifs that do not stop the spread of fires (high emissions of fine particles)



Blue

Allergic trees and plants



Grey

Insufficient vegetation to create islands of coolness in summer



Green

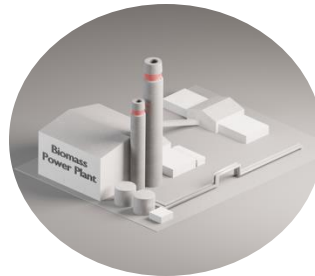
Trees and vegetation OK

## Zone 2 : Services

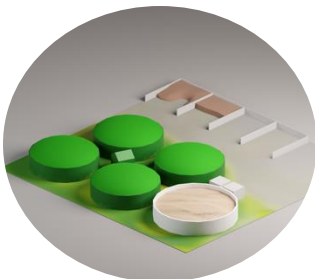
Which of these 5 services is not available in the area to protect the health of local residents? Scan the 3 available buttons, then click on THE right button.



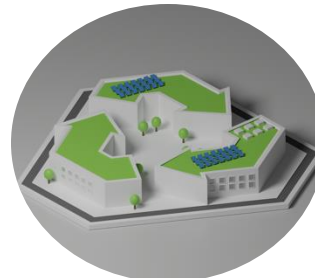
Event to raise awareness of air pollution and its health risks



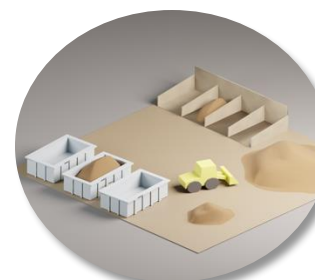
Heating network with renewable energies to avoid pollutant emissions



Production and recovery of biogas from biodegradable waste for less pollutant emissions



Awareness-raising centre on waste reuse, sorting and recycling and zero-waste



Green waste disposal centre to avoid fine particle emissions by burning green waste and for compost production

## Zone 3 : Buildings zone

Using the pictograms on the buildings, find out which problem remains to be solved in this area? Scan the 3 available buttons, then click on THE right button.



Burning green waste (emits large quantities of fine particles.)



Coatings emitting indoor air pollutants



Unknown supplies used, probably emitting indoor air pollutants.



Good conditions for solar panels, panels already installed.



Damp wood, a high emitter of fine particles.



High-performance insulation (less greenhouse gas emissions).



Dry wood (less emitting fine particles).



Heat pump (less greenhouse gas emissions).



Inefficient or old wood heating (high emitter of fine particles).



Heat loss, insufficient insulation (more greenhouse gas emissions).



High humidity inside the house, poor insulation.



Renovation underway with materials that do not emit indoor air pollutants.



Recent and/or efficient wood heating (less emitting fine particles into the air if used with well-dried wood).



Heating with oil (greenhouse gas emitter).



Gas heating (greenhouse gas emitter).

# Module : Mobility



## Module adjustment method

The module is configured as “short trip”, “medium trip” or “long to very long trip”.

1. Determine the module's route type (short, medium, long) and identify the associated table in the technical manual (see below).
2. Scan each button to obtain the associated NOx reduction.
3. Add the NOx reduction to those of the other parameters in the table.
4. Which action has the greatest overall reduction in pollution and nuisance? Click on the right button.



## Short distance (0-5km)

Action		PM10	Climate (GHG)	Energy	Space	Noise	Acceptation	Health	Subtotal		NOX		Total
Zone 1	Developing low-emission last-mile deliveries (commercial activities)	-3	0	0	-1	-1	0	0	?	+	?	=	?
	Reducing parking spaces for non-residents	-1	-1	-1	-1	0	0	+2	?	+	?	=	?
	Organize consultations with residents to implement soft mobility initiatives	-3	-3	-1	0	-1	0	-1	?	+	?	=	?
Zone 2	Limit speed to 30 km/h in all urban areas	0	0	-1	0	-1	0	0	?	+	?	=	?
	Offer efficient public transport (shuttles, minibuses)	-4	-4	-2	-1	-1	-1	-1	?	+	?	=	?
	Create a low-emission zone (LEZ) in dense urban areas (limit polluting vehicles)	-2	-2	-1	0	0	-1	+4	?	+	?	=	?
Zone 3	Develop shared pedestrian/bicycle/car lanes and safe bicycle routes	-2	-2	-1	-1	-1	-1	0	?	+	?	=	?
	Raising awareness of the negative impacts of short car journeys	-3	-3	-1	-1	-1	-1	-1	?	+	?	=	?
	Help residents adopt a new mode of transport (bicycle, scooter, electric or otherwise)	-2	0	0	-1	-1	0	0	?	+	?	=	?



### Medium distance (4-15km)

Action		PM10	Climate (GHG)	Energy	Space	Noise	Acceptati on	Health	Subtotal	NOX	Total
Zone 1	Develop carpooling through subsidies or the creation of a carpooling area	-3	0	0	-1	-1	0	0	-1	?	?
	Create local subsidies to encourage the purchase of electric cars	-1	-1	-1	-1	0	0	+2	-2	?	?
	Encourage better combustion engines	-3	-3	-1	0	-1	0	-1	-9	?	?
Zone 2	Develop free/reduced-price park-and-ride facilities or intermodal hubs	0	0	-1	0	-1	0	0	-2	?	?
	Developing dedicated lanes for public transport	-4	-4	-2	-1	-1	-1	-1	-14	?	?
	Increase public transport network and frequency	-2	-2	-1	0	0	-1	+4	-1	?	?
Zone 3	Developing safe bicycle paths	-2	-2	-1	-1	-1	-1	0	-8	?	?
	Set up a bicycle rental system	-3	-3	-1	-1	-1	-1	-1	-11	?	?
	Develop car-sharing (subscription to a short-term car rental service)	-2	0	0	-1	-1	0	0	-4	?	?

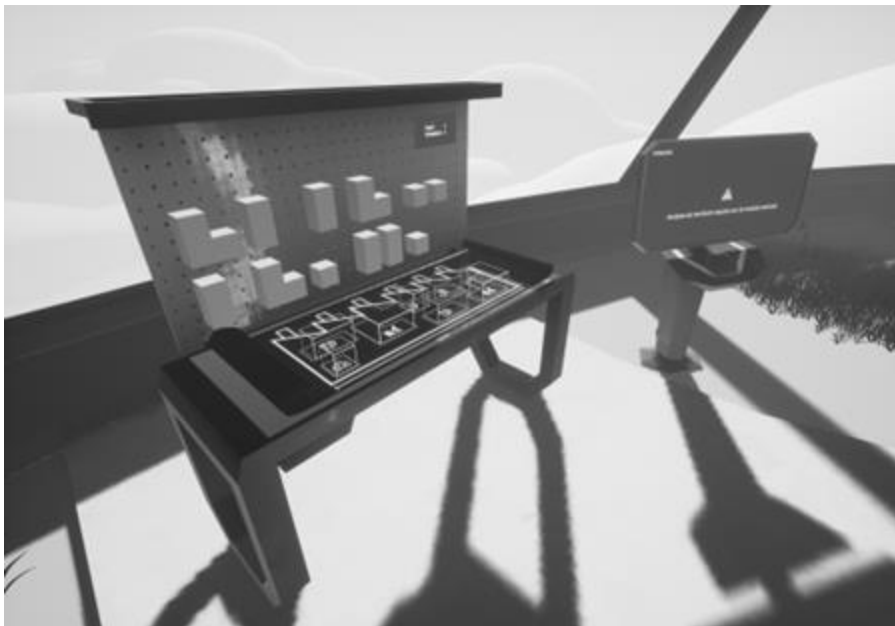
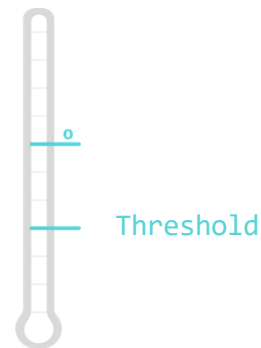
## Long to very long distance

Action		PM10	Climate (GHG)	Energy	Space	Noise	Acceptation	Health	Subtotal			NOX	Total
Zone 1	Create local subsidies to encourage the purchase of cars with a lower environmental impact	-3	0	0	-1	-1	0	0	-1	+	=	?	?
	Promoting teleworking	-1	-1	-1	-1	0	0	+2	-2			?	?
	Develop carpooling through subsidies or the creation of a carpooling area	-3	-3	-1	0	-1	0	-1	-9			?	?
Zone 2	develop dedicated lanes for public transport	0	0	-1	0	-1	0	0	-2			?	?
	Promote the re-establishment of train lines or create a train subscription system	-4	-4	-2	-1	-1	-1	-1	-14			?	?
	Improve public transport network and frequency	-2	-2	-1	0	0	-1	+4	-1			?	?
Zone 3	Encourage the replacement of plane journeys of less than 3 hours by train journeys	-2	-2	-1	-1	-1	-1	0	-8			?	?
	Expand the electricity supply network (charging points for cars, dockside power supply for boats)	-3	-3	-1	-1	-1	-1	-1	-11			?	?
	Develop free/reduced-price park-and-ride facilities or intermodal hubs	-2	0	0	-1	-1	0	0	-4			?	?

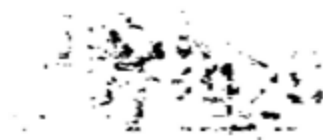
# Module : Industry

## Module adjustment method

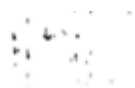
- Determine the type (pictogram) and impact (score) of each part hanging on the workbench
- Build the industry plan:
  - Filling ALL slots with available parts (pictograms must correspond)
  - By passing UNDER the threshold to successfully configure the module



## Industry practices



Action description	Pollution Impact
• Support industrial companies in reducing energy consumption in their buildings (insulation, equipment, awareness-raising), for example through a one-stop shop	-5
• Organize exchanges between citizens and industries (visits, etc.)	-2
• Promote sustainable logistics solutions for industries in its territory	-3
• Purchases of products that do not comply with eco-responsible rules (e.g. not considered in public procurement contracts)	+3
• Cooperation with federations and producers to organize waste prevention actions (reduction in quantity and dangerousness).	-3
• Encourage industrial companies to improve the treatment of their atmospheric emissions (end of pipe)	-2
• Provide its territory with recycling infrastructures that are adapted and accessible to industrial and tertiary actors.	-1
• No communication to encourage reduced consumption of natural resources: reuse, recycling, recovery, etc.	+6
• No response to residents' complaints about odor nuisance	+2
• Encourage industries to implement decarbonization measures	-3
• Encourage companies to implement an ambitious CSR policy (subsidies, free support, etc.)	-5
• Organize meetings with local industries about air pollution and climate change.	-5
• Organize air quality monitoring around facilities	-2
• No penalties for burning biomass or other waste on construction sites	+5
• Promote the circular economy as part of a regional industrial economy dynamic	-3

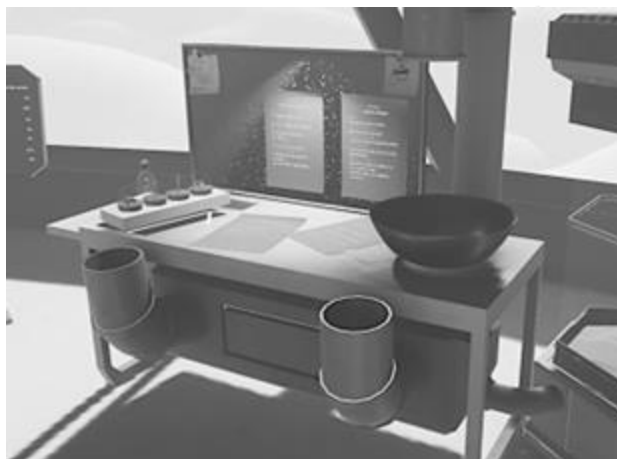


# Module : Agriculture

## Module adjustment method

The eggs on the table represent different farms, to be sorted into the green or red pipe:

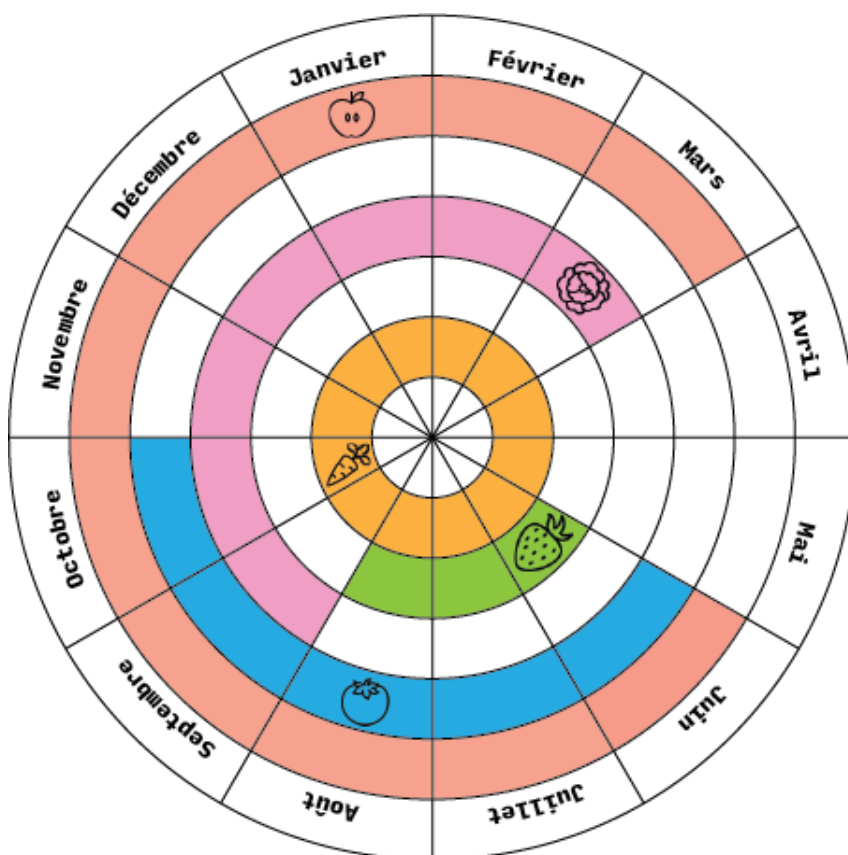
- Take a first egg and identify the corresponding data sheet:
  - Is the harvest period good?
  - Are farming practices good?
  - Is the soil in the egg in good condition?
  - Sort the egg into the right pipe.
- Continue with the other eggs ...



Note: Poorly sorted eggs fall back into the bowl.

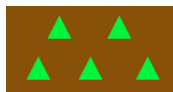
## Harvest periods

Harvesting periods in accordance with the seasonality :



## Soil conditions

Observe the soil in the eggs :



Use of pesticides that pollute the air with a potential negative impact on health.



Large amounts of fertilizer (or poor burial). Potentially harmful to aquatic environments (eutrophication): negative.



The farm uses fertilizers and pesticides correctly.

## Agricultural practices

Check the table to see if farming practices are virtuous or not

Agricultural Practices	Particle	Ammoniac (NH3)	Nitrogen oxides (NOx)	Methane (CH4)	Pesticides	CO2
Good management of livestock manure		😊				
Open burning, eco-burning	😞					
Greenhouse heating			😞	😞		😞
Treated fields close to homes					😞	
Short supply chains, local agricultural projects with outlets nearby						😊
Sustainable agricultural practices: permaculture, agroforestry, agroecology, etc. (training?)					😊	
Buying local feed for livestock						😊

# Module : Energy Production

## Module adjustment method

On the table, there are 12 means of energy production available. To meet the energy production demand shown on the machine, you need to create an energy mix using the resources available in the area. To do so:

- Identify the resources available: illuminated or not.
- Solve the calculations using the data in the document and the data hidden in the scan.
- Transfer the result to the cursor linked to the means of production.
- Continue with the other means of production...



Solar photovoltaics panel :

$$price_{=9} + acceptability_{=5} - surface_{\rightarrow scan}$$



Geothermal Powerplant: =

$$price_{=10} + (acceptability_{=2} + air_{\rightarrow scan})$$



Micro hydroelectric power plant :

$$price_{=10} + acceptability_{\rightarrow scan}$$



Roof Solar photovoltaics panel :

$$price_{\rightarrow scan} + acceptability_{=4}$$



Wave energy :

$$price_{\rightarrow scan} + acceptability_{=2}$$



Wood energy :

$$air_{=3} - price_{=8} + acceptability_{\rightarrow scan} - (surface_{=4} \times 2)$$



Wind turbine :

$$surface_{\rightarrow scan} + acceptability_{=3} - price_{=8}$$



Biomass :

$$surface_{=20} + acceptability_{\rightarrow scan} - price_{=3} - air_{=10}$$



Hydroelectric power plant :

$$price_{\rightarrow scan} - acceptability_{=2} - surface_{=2}$$



Nuclear power plant :

$$acceptability_{=2} + (2 \times price_{\rightarrow scan})$$



Biogas :

$$(price_{\rightarrow scan} \times air_{=2}) - surface_{=7} + acceptability_{=2}$$



Fossil fuels :

$$price_{=3} + air_{\rightarrow scan} - climate_{=11}$$

Life VaiR Game version : 1.1.0  
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