

ROADEF/EURO 2016 Challenge

Inventory routing for gas distribution

Serious Game's Guide



The logo features the word "Road" in green with a white arrow pointing right, "F" in green below it, and "EURO" in blue to the right.

July 2015

Air Liquide R&D | Applied Mathematics Global Lab | Operations Research Team

Benefits of the challenge

Experience a basic dispatch situation

- Even with a very simple scenario, billions of solutions are possible. Only a few are really efficient.
- Experience the main steps of a dispatch process like a real dispatcher
- Touch the technical and business constraints of an Air Liquide dispatcher
- Understand the benefit of an optimizer without going into details of complex equations.
- **Enjoy and have fun**



Basic Assumptions

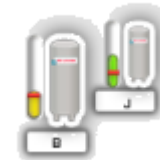
- One source with unlimited production
 - Transport center located at the source site



- 2 vehicles, each with a capacity of 23.000 kg



- 12 customers with a daily linear forecast



- “Daily consumption at midnight”

- No usage during driver shifts => No impact on timing of deliveries for each day

■ COST Structure

- Distance cost = 1 € / km
- Delivery cost = 20 € / del
- Loading cost = 10 € / load



How to access the game

■ Download the simulator from this url

<http://challenge.roadef.org/2016/en/>



How to launch the IRP Serious Game

Double click
on IRPSeriousGame.exe



Skip identification step

- Click ok – no need to enter your e-mail address



START Step

■ Click on START



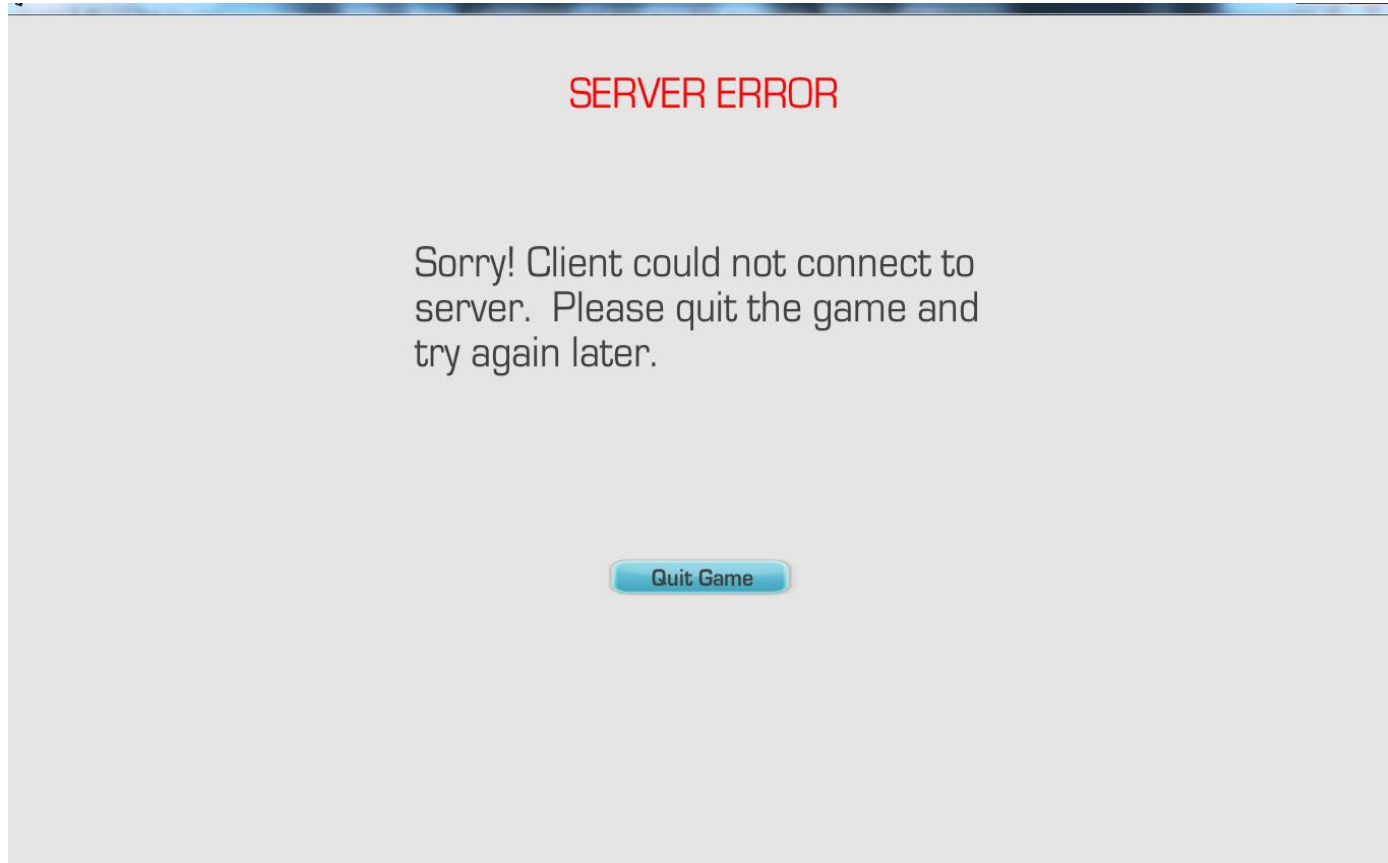
Chose Level 1 – Map 1 or Map 2

- Click on START (only Map 1 Level 1 are available – no need to change default settings)

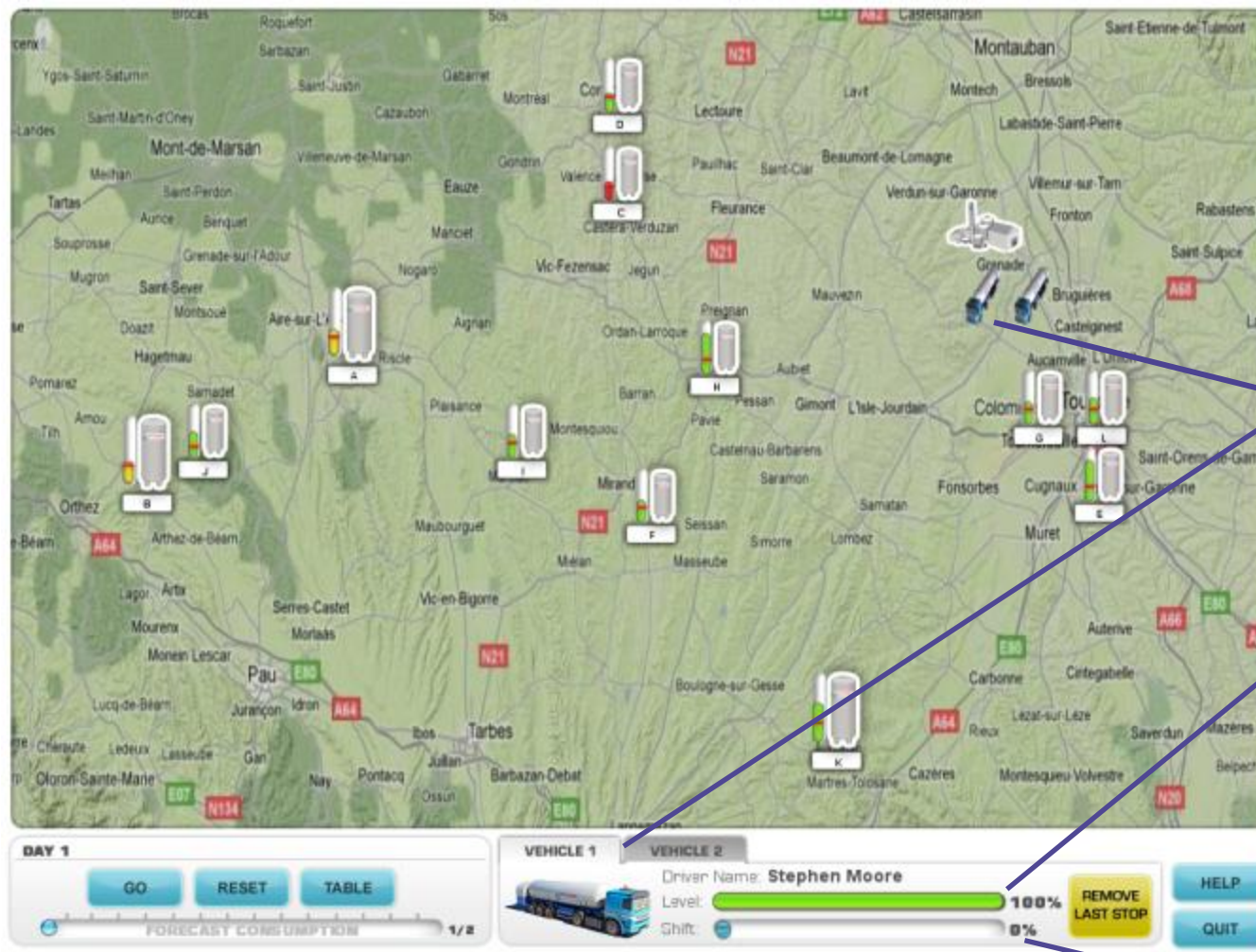


Internet connection is mandatory

- If not, you will get this message



Shift creation process: 1 – Select a Vehicle



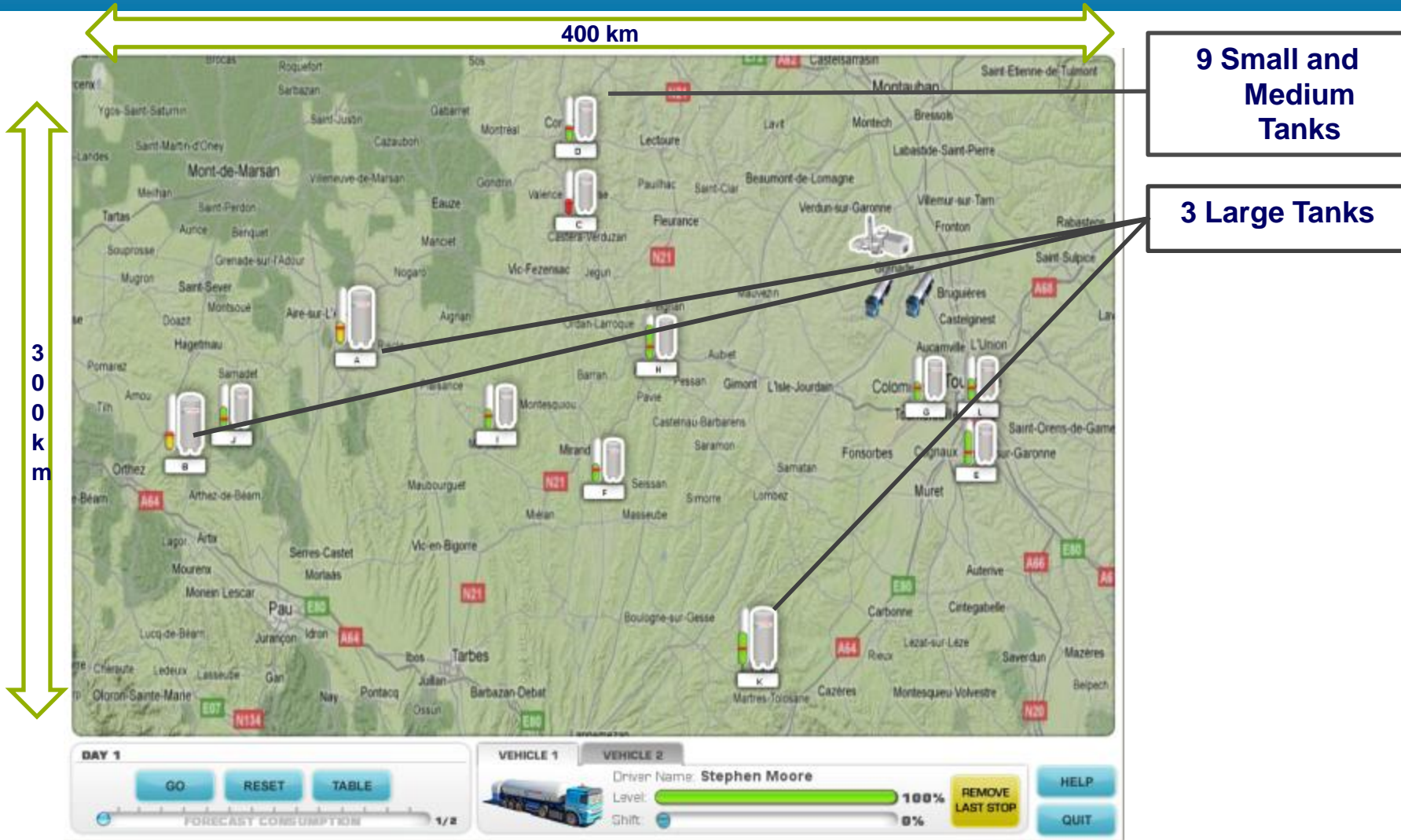
**2 vehicles
Located at the
source**

**Trailer inventory
100% of 23 ton**

**Shift duration
0% of 14 hours**



Shift creation process: 2 - Select a Customer



Shift creation process: 2 – Select a Customer

400 km

300 km

Below safety => MUST BE DELIVERED

Under safety next day => TENOR delivery date

Above safety

DAY 1

GO RESET TABLE

FORECAST CONSUMPTION 1/2

VEHICLE 1 VEHICLE 2

Driver Name: Stephen Moore

Level: 100%

Shift: 0%

REMOVE LAST STOP

HELP

QUIT



Shift creation process: 3 - Select quantity

The screenshot displays a software interface for shift creation. The main area is a map showing a route between two locations, with a central dialog box titled "Confirmation". The dialog box contains two sections: "VEHICLE LEVEL" and "CUSTOMER LEVEL".

- VEHICLE LEVEL:** Shows a truck icon and a progress bar at 87%.
- CUSTOMER LEVEL:** Shows a gas cylinder icon and a progress bar at 68%.

Below these sections, the "Delivery Time" is listed as "0h30 minutes" and the "Quantity" is "3022 kg". A slider bar is positioned below the quantity, with a blue dot indicating the current selection. At the bottom of the dialog are "CONFIRM" and "CANCEL" buttons.

At the bottom of the screen, there are two vehicle status panels:

- DAY 1:** Includes "GO", "RESET", and "TABLE" buttons, and a "FORECAST CONSUMPTION" slider.
- VEHICLE 1:** Shows "Driver Name: Stephen Moore", "Level: 100%", and "Shift: 0%". It includes "REMOVE LAST STOP" and "HELP" buttons.
- VEHICLE 2:** Includes a "QUIT" button.

Select the quantity to deliver



Shift creation process: 4 - Confirm the delivery

DAY 1

GO RESET TABLE

FORECAST CONSUMPTION 1/15

VEHICLE 1 VEHICLE 2

Driver Name: Stephen Moore

Level: 78%

Shift: 15%

REMOVE LAST STOP

HELP QUIT

Trailer inventory is updated

Shift duration is updated



Shift creation process: 5 - Validate the day

Confirmation

Are you sure you want to run your schedule?

YES

NO

DAY 3

GO RESET TABLE

VEHICLE 1 VEHICLE 2

Driver Name: Stephen Moore

Level: 100%

Shift: 88%

REMOVE LAST STOP

HELP

QUIT

Vehicles must be back at the source

Be careful it is impossible to undo when it is confirmed

Validate by clicking on GO

Penalties in case of constraints violation

1 - Emergency trip



Confirmation

You received a penalty cost for letting a customer's tank go below its safety level.

Penalty Amount: 474 Euros

OK

2 - Long shifts



Confirmation

This driver's maximum shift duration has been exceeded. You must bring the vehicle back to the source or remove customer(s) from your driver's itinerary.

OK

**WARNING: Penalties are possible only to play with the serious game.
In the challenge,
no penalties are allowed and the respect of the constraints is mandatory!**

System requirements

- This serious game is made using Unity engine, and compiled for Microsoft Windows OS.
- For *native* Windows systems, it should simply work !
- If you are using Windows in a sandbox under Linux and MacOS, please make sure that the graphical hardware acceleration is fully enabled.
- For any issue on running the serious game, the good place to ask is the challenge **forum**.



ENJOY !





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