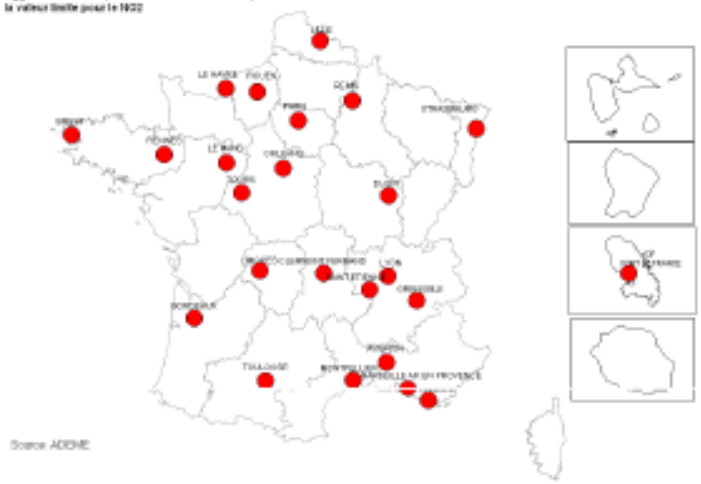
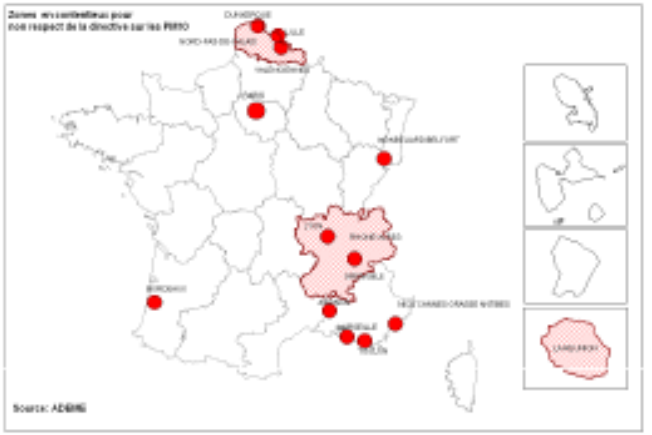
Air Quality and Energy Consumption
Tools in place need to be completed

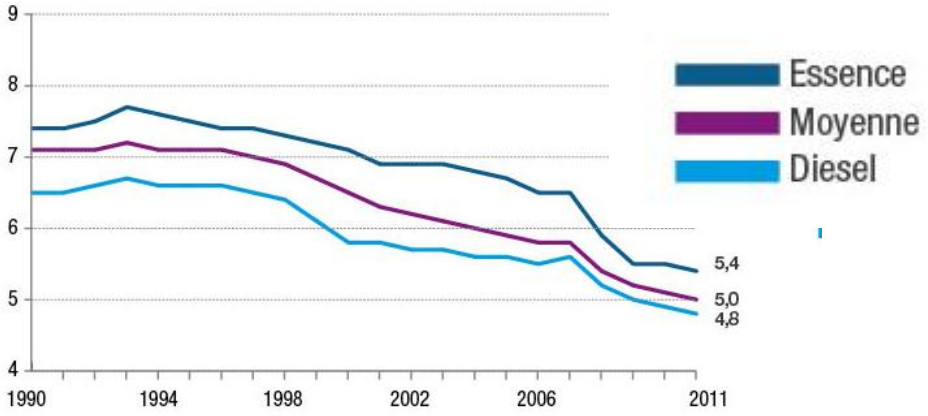
NO2



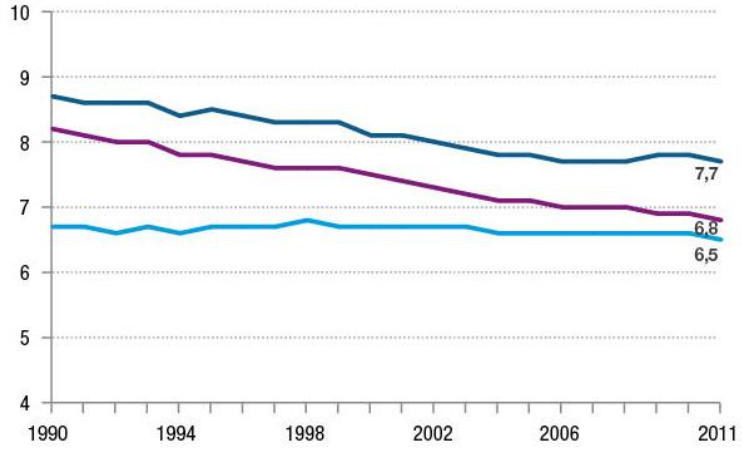
PM10



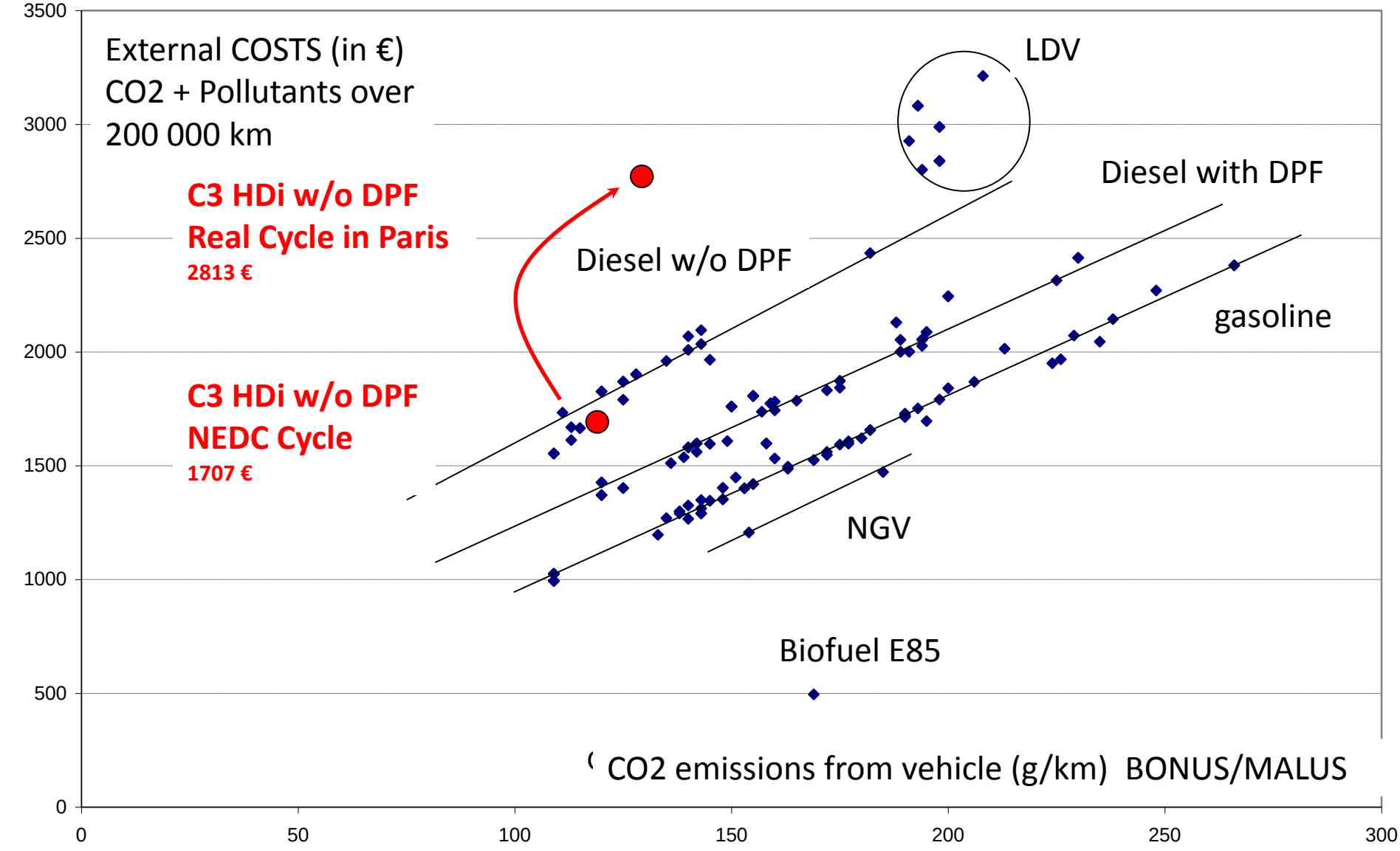
Average FC for new vehicle (l/100 km)



Average FC for french fleet (l/100 km)



European Directive on Clean & Efficient Directive Application with One Manufacturer



From « Clean vehicle » to « Real Life Global Performance »

1. Pollution, [GHG], Health impacts are based **only** on Real life Emissions
2. **Bad correlation** between CO2 & Pollutants (OK/NOK) on test cycle and Real life Emissions
3. **Need to approach Real life Emissions & Context Knowledge**
4. **Presentation of one potential Technology : NODBOX**

Energetic and environmental efficiency metrology from vehicle usage

Part 1 – Proof of CONCEPT / First MARKET

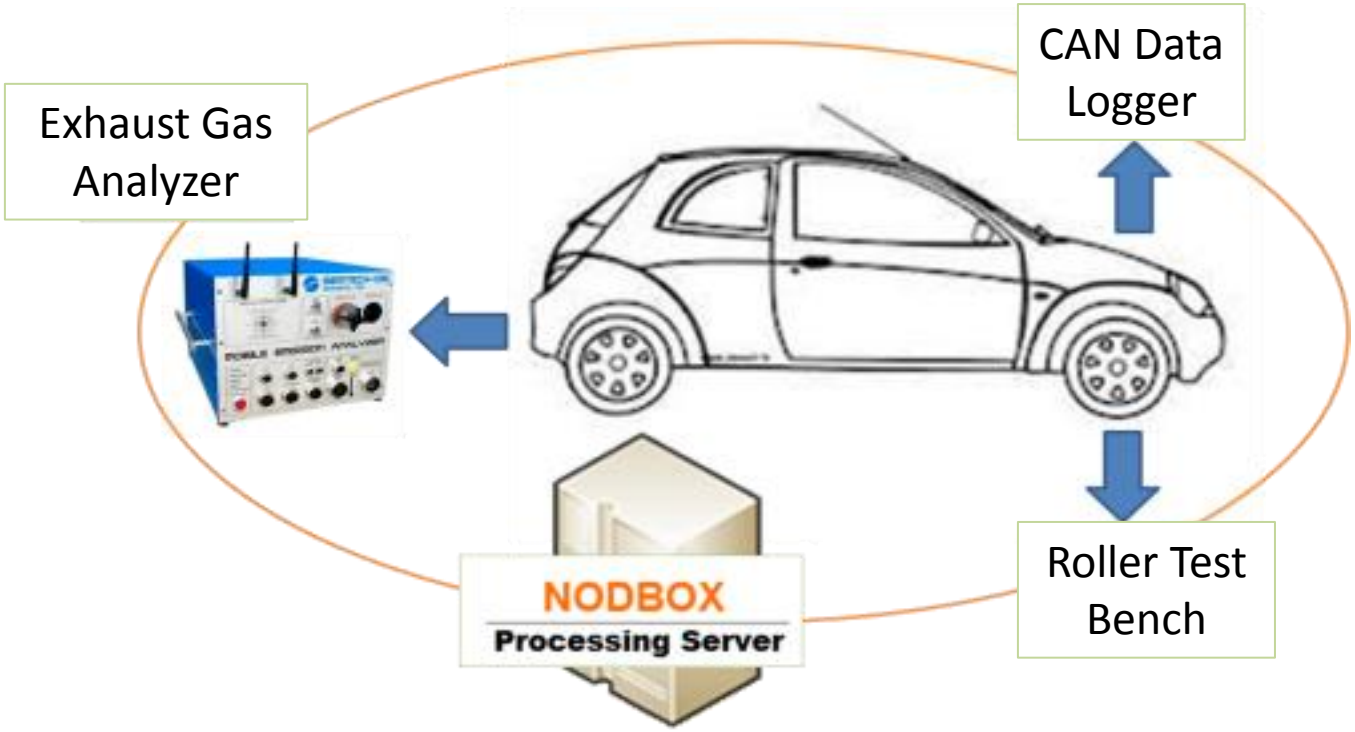
- Knowledge acquisition process
- Basic fonctions / validation test

- Real Time Emissions Estimations (available)
- Real Time Advanced Functions
- Real Life Global Performances

Part 2 – Deployment

- Functions / Time to market
- New Integrated Project

Knowledge acquisition process



Knowledge acquisition process

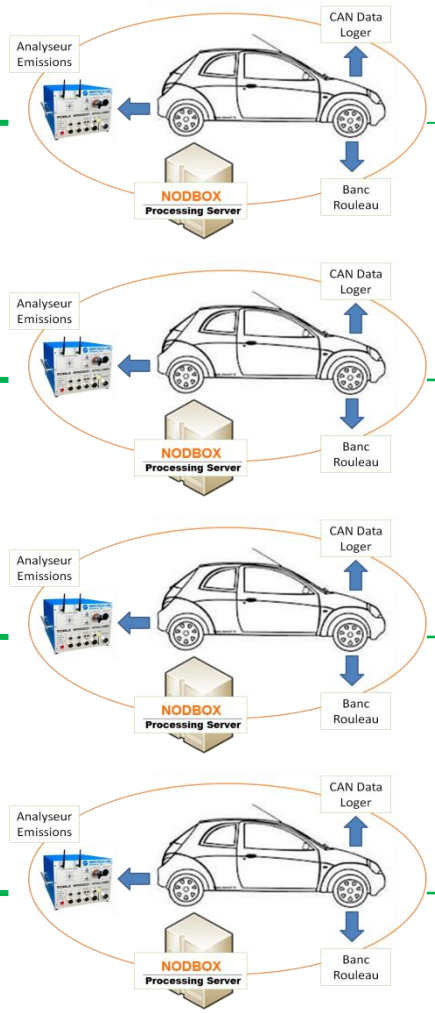
1.6 L Engine X
ECU version Y
Emissions control system Z
Vehicle Model :
A, B, C, D, E

New vehicle

1,3,5 years old vehicle

DPF clogging
Injection issue
…

Used battery



NODBOX
Capture Control Center

Synchronized Database

Torque and power
Speed
RPM
Pressure
Temperature
Fuel/Energy injection
Urea injection
DPF regeneration
Battery current
Battery voltage
Battery temperature
…

CO2, NO, NO2, THC, PM…

Knowledge acquisition process

Neural Network used for Simulating Complex relations

+

Integration of physical models of engine, vehicle dynamic, …

+

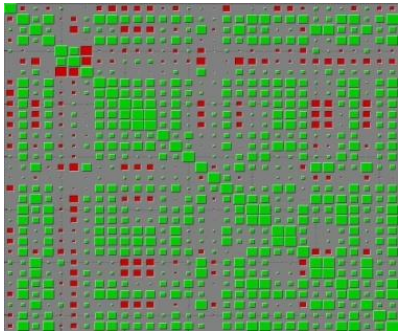
Synchronized Database

Torque and power

Speed
RPM
Pressure
Temperature
Fuel/Energy injection
Urea injection
DPF regeneration
Battery current
Battery voltage
Battery temperature
…

CO2, NO, NO2, THC, PM…

Correlation Analysis



NODBOX
Consolidation Center

Knowledge Extraction for Trust Chip

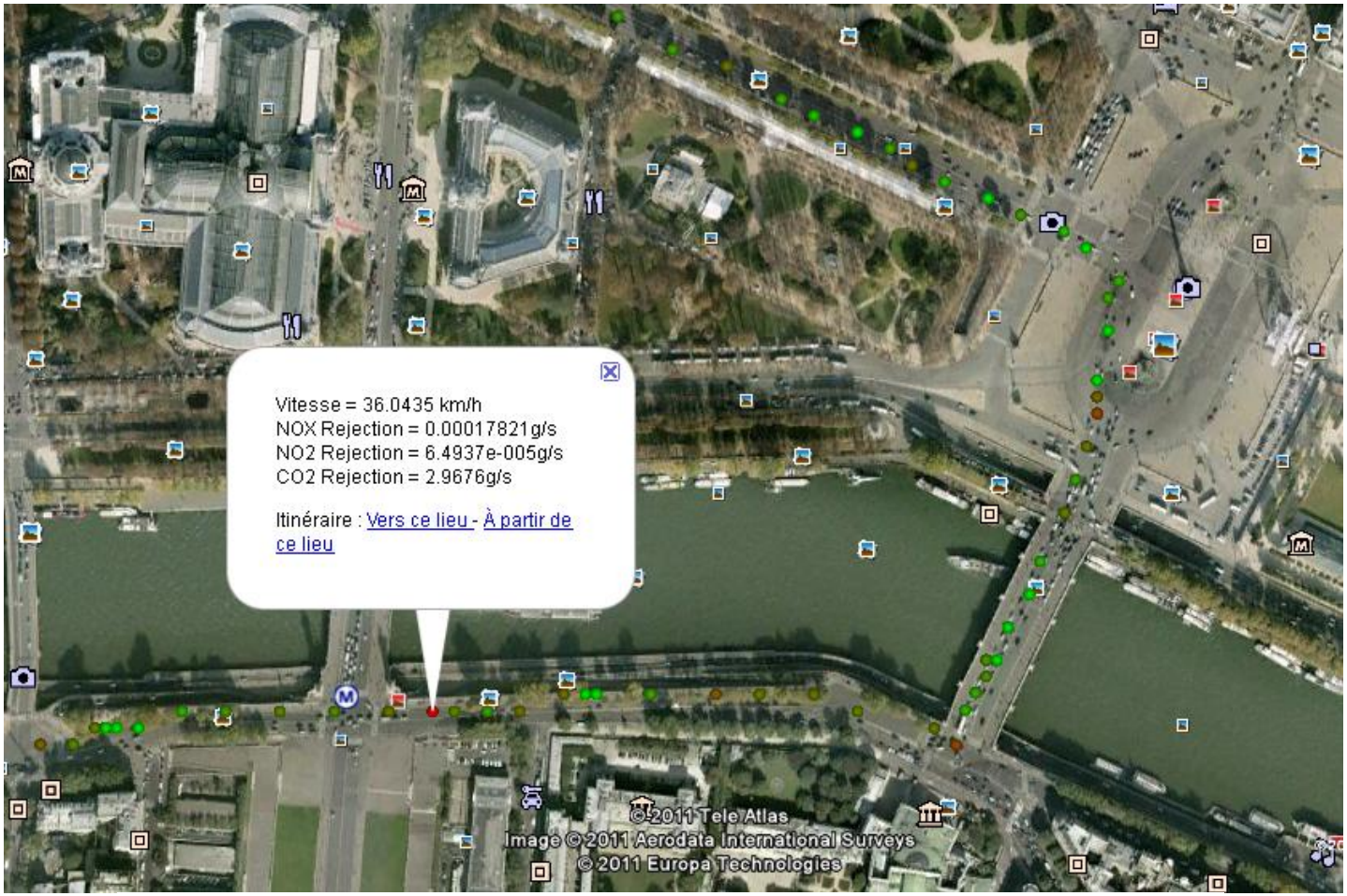
NODBOX
Knowledge & Model Creator

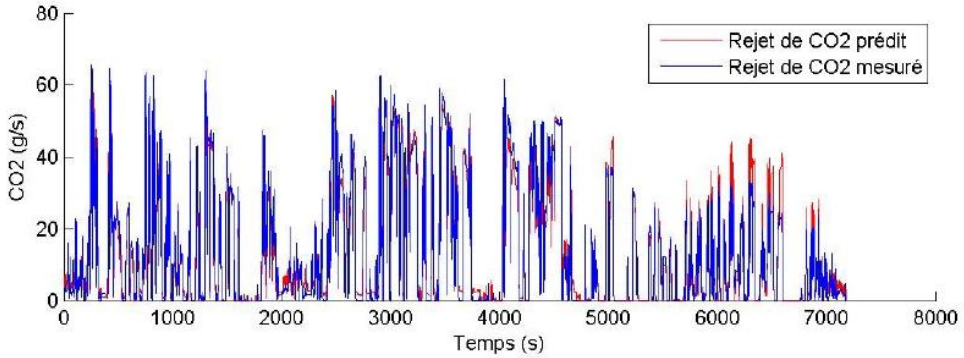
Real Time Emissions Estimations (available)

CAN Bus

Time
Date
ID
Start trip x
Localization

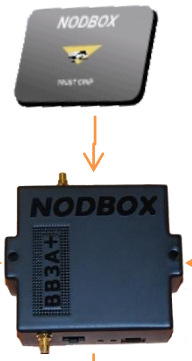
Cumulative values
Distance
Fuel/Energy consumption
CO2
CO
NOX
NO
NO2
THC
PM



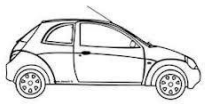


Real Time Advanced Functions

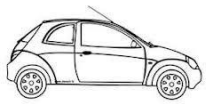
1. Accelerometer
2. Gyroscope
3. 3D road geometry
4. Weather conditions
5. Traffic conditions
6. Navigation info
7. Business factors
8. Usage factors



CAN Bus



Engine start



Localization n

- ✓ Corporate social responsibility
- ✓ Predictive maintenance
- ✓ CO2 labeling of weight carried
- ✓ Safety
- ✓ Eco drive
- ✓ Energetic efficiency
- ✓ Environmental efficiency

Real Life Global Performances

Vehicle data

External data

GHG & pollutants rejection computation

Driving monitoring (lack of anticipation, wrong gear ratio use, AC…)

Weather conditions

Road geometry

Vehicle load

Impact on GHG & pollutants rejection quantification

Rolling conditions Impacts

Vehicle and Driver efficiency

Driver performance Impacts

Level 3 / external data ponderation

Level 2 / driver performance ponderation

Vehicle Label
Real Life Global Perf.

Level 1 = efficiency from real vehicule usage

Functions / Time to market

2013 2014 2015

After Market solution Providers

Truck & bus OEMs

Automotive suppliers

Car OEMs

Fleets Managers : HDV, Passager cars, Taxi, Rental companies, Business Fleet Operators

Insurances companies, Maintenance companies

Cities Transport Authorities, Cities Air Pollution Authorities

Conclusions

For a technical point of view :

- Real time emissions can be estimated
- Context and driving conditions can be extracted

Need to address Business Models for large dissemination :

- Several **linked** and **high added value** deliverables :
  - Vehicle label for **Consumers**,
  - **Business** Tools for Vehicles & Fleets Optimisation, Insurances, Maintenance operators
  - **Cities Authorities** Tools for Transports, traffic, Pollution management

Need to integrate "Label / Business Tools / Cities Tools"

- **Integrated project to be launched in 2013**

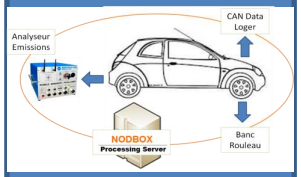
Integrated PROJECT

Host Organization
ADEME and GFEI ??

Certification Organization
TÜV or UTAC

Industrial companies

Data Acquisition center



NODBOX

- **NODBOX** Processing Server
- **NODBOX** Consolidation Center
- **NODBOX** Knowledge & Model Creator
- **NODBOX** Capture Control Center

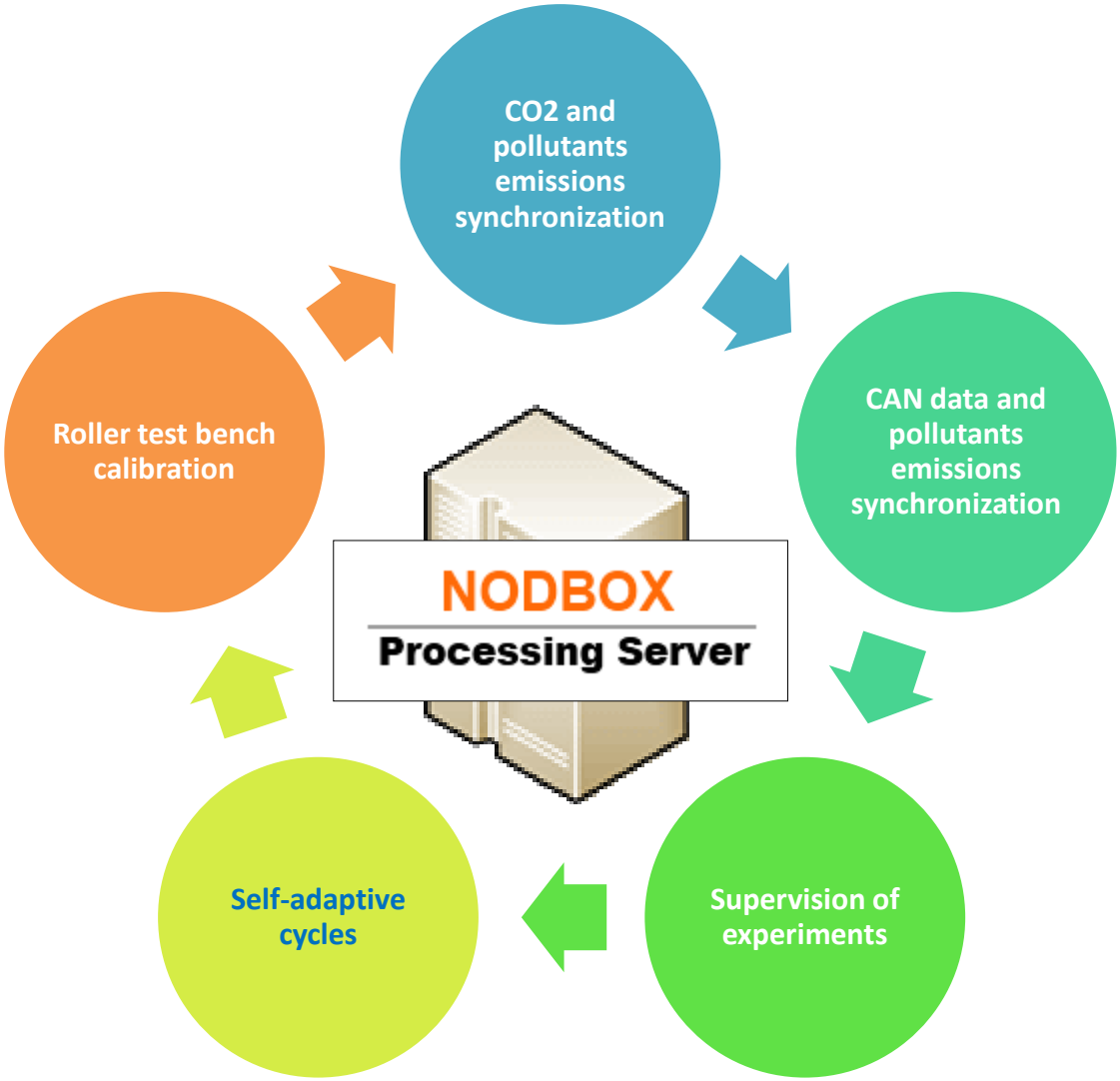
Automotive supplier

IT services & consultancy companies

NODBOX BUSINESS INTELLIGENCE

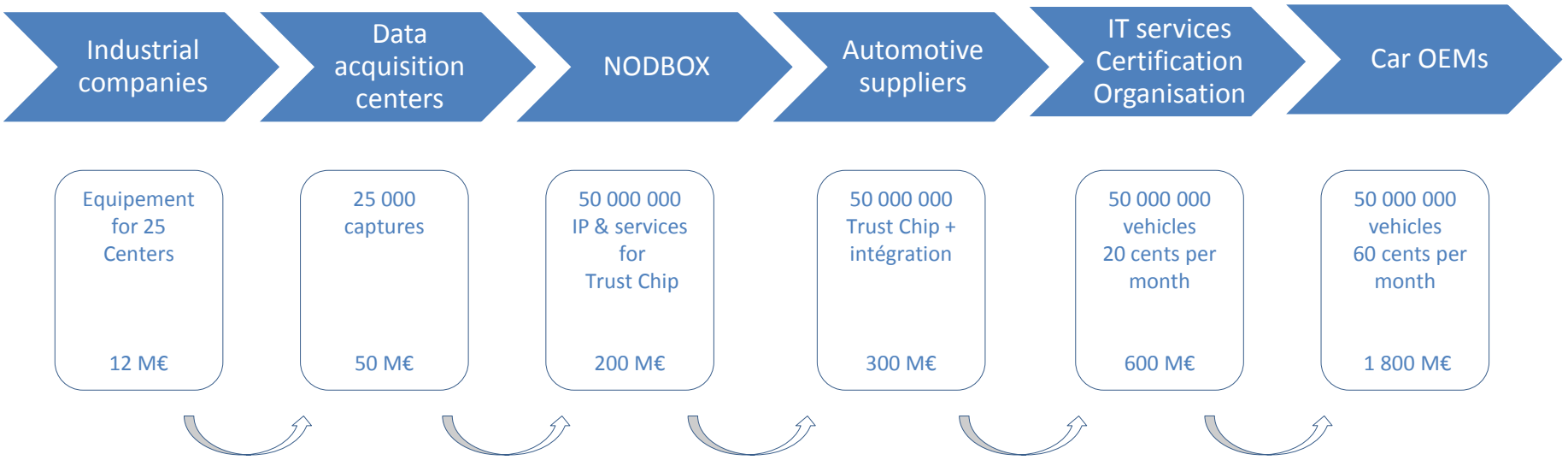
Stakeholders (Offer Side) : Vehicle, Service for efficiency
Stakeholders (Demand Side) : Fleet owners, fleet managers, Insurances, …

2 Synchronization & Processing step



Total cost for the end customer for 5 years = 50 €

Service for 50 million vehicles



Cumulated Turn Over for 5 years

4 Road Map

Q2 2013	Consortium constitution & communication
Q3 2013	Technical specification validation
Q4 2013	Prototype validation
Q1 2014	COFRAC ISO 17025
Q2 2014	1st certification
Q3 2014	International Deployment - After Market
Q3 2015	International Deployment - OEM