Comparative LCA of Electric and ICE Cars

LCA Congress – AvNir - November 2014

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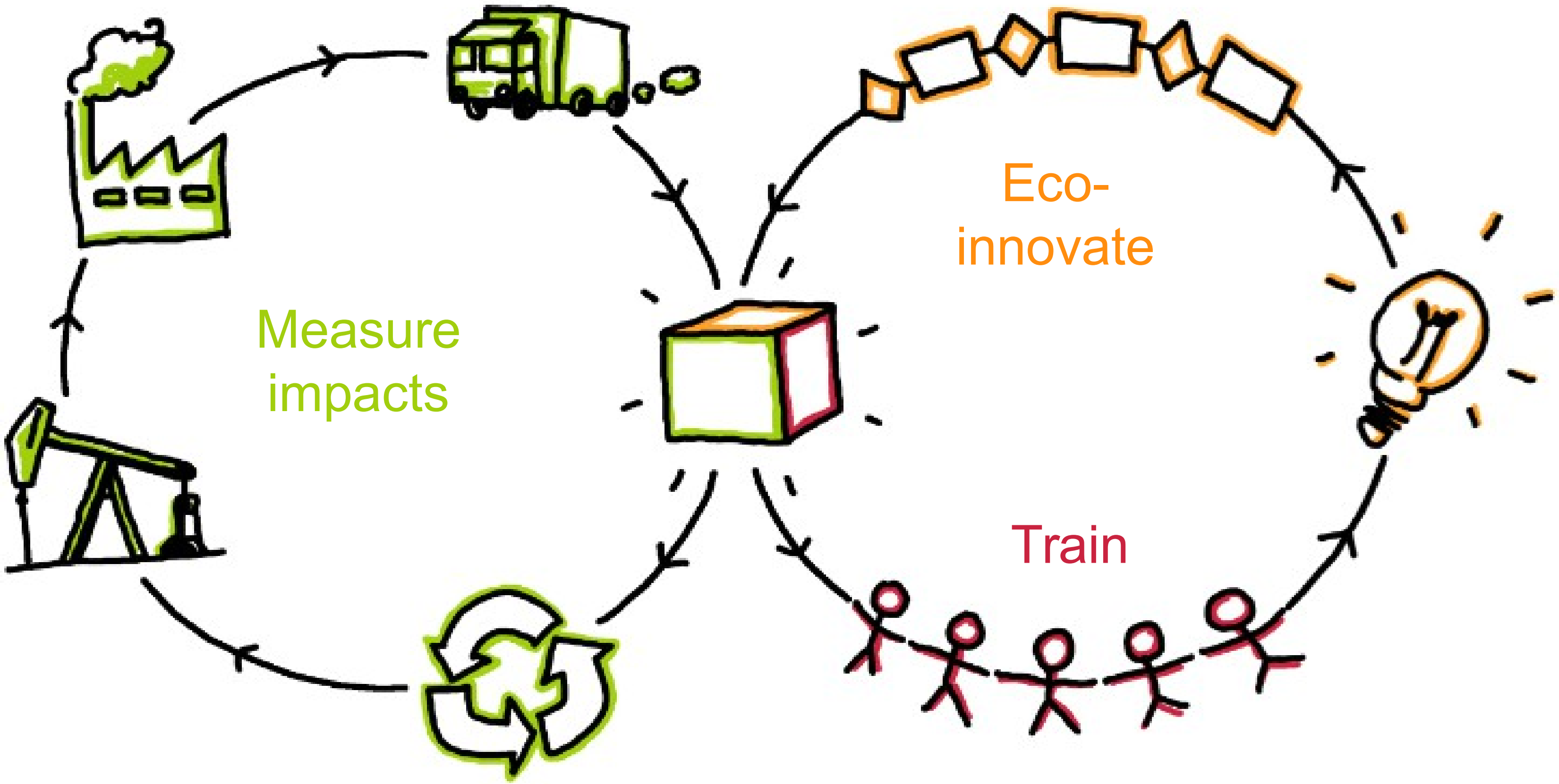
Gingko 21 ?

Gingko 21 supports companies in the transformation of their offer towards responsible and innovative goods and services.



PE INTERNATIONAL

Software and Services Overview

Product Sustainability Software (GaBi)

- Life cycle assessment
- Design for compliance and environment
- Integrated/ embedded impact calculations
- Compliance process management (CPM)
- Collaborative Sustainability and Communication

Enterprise Sustainability Software (SoFi)

- Carbon & Energy Optimization
- Environmental Management
- Sustainability Reporting
- Supply Chain Sustainability
- Portfolio Sustainability Management

Sustainability Consulting Services

- Sustainability Assessment
- Planning and Management
- Performance and Improvement
- Corporate social responsibility auditing & benchmarking (CSR Insight™)

Proprietary & Industry-Specific Content

- LCI Databases and Sustainability Content: GaBi Databases
- Regulatory Content for Product Compliance
- Best Practices Library
- Benchmarking Libraries

Comparative LCA of Electric and ICE Cars

ADEME

Agence de l'Environnement et de la Maîtrise de l'Energie

ELABORATION SELON LES PRINCIPES DES ACV DES BILANS ENERGETIQUES, DES EMISSIONS DE GAZ A EFFET DE SERRE ET DES AUTRES IMPACTS ENVIRONNEMENTAUX INDUITS PAR L'ENSEMBLE DES FILIERES DE VEHICULES ELECTRIQUES ET DE VEHICULES THERMIQUES, VP DE SEGMENT B (CITADINE POLYVALENTE) ET VUL A L'HORIZON 2012 ET 2020

Étude réalisée pour le compte de l'ADEME par Gingko21 et PE INTERNATIONAL

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- Ordered by ADEME
- Published in December 2013
- Objective
  - Define domains of environmental relevancy for EV
- Classical LCA + additional investigation

http://www.ademe.fr/analyse-cycle-vie-comparative-vehicule-electrique-vehicule-thermique

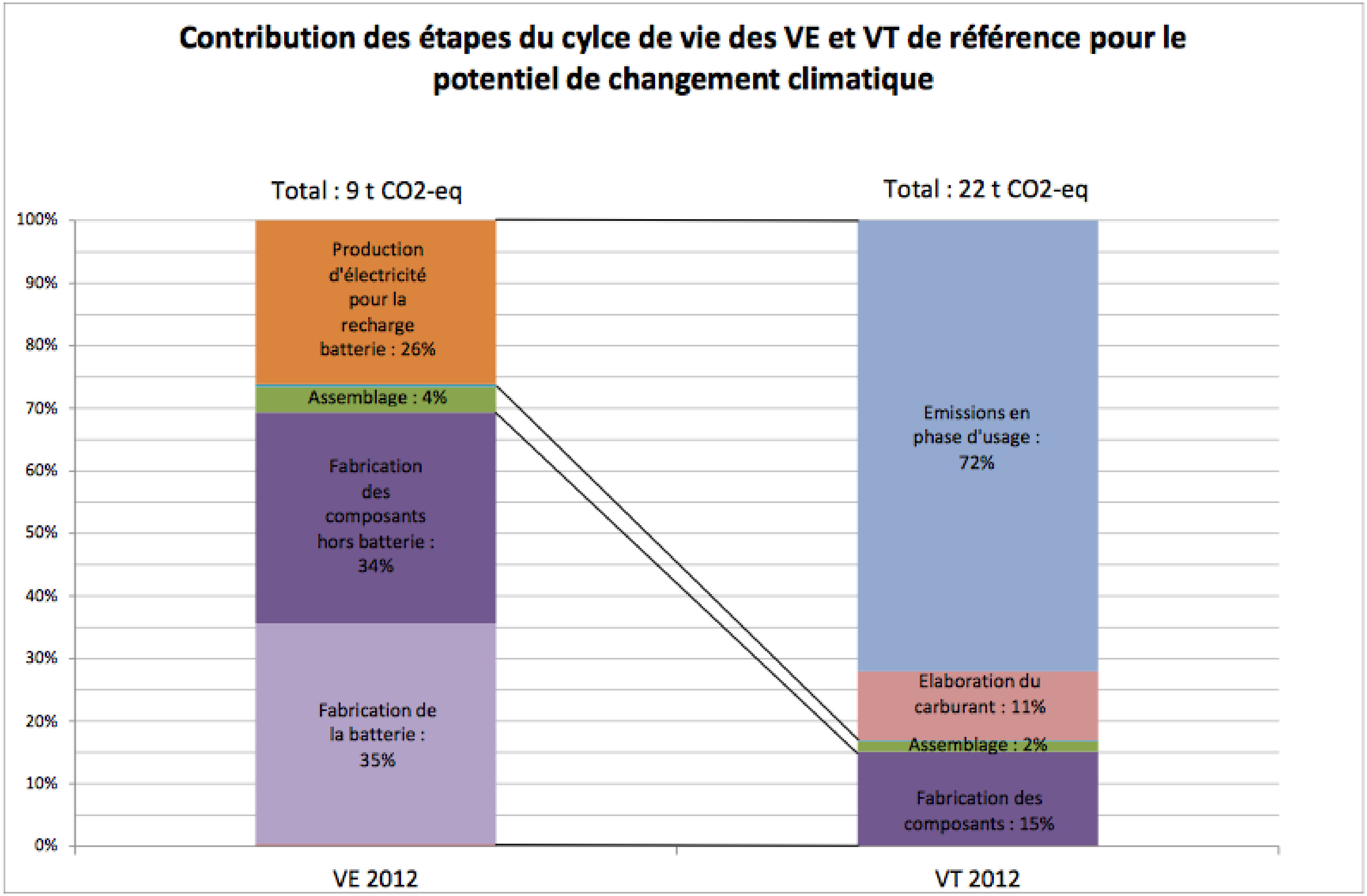
Comparative LCA of Electric and ICE Cars

- Functional unit
  - Availability of a small size vehicle for short distances – less than 80 km per day over a lifetime of150 000 km
  - Produced in France
  - Used in France and Europe

Data sources

- Primary data collection from 2 OEMs
- Extended technical committee
  - Batteries, energy, network, end of life treatment…
- Use of additional bibliographical and expertise data
- 2020 scenario built with the technical committee

Example of Results: Global Warming Potential



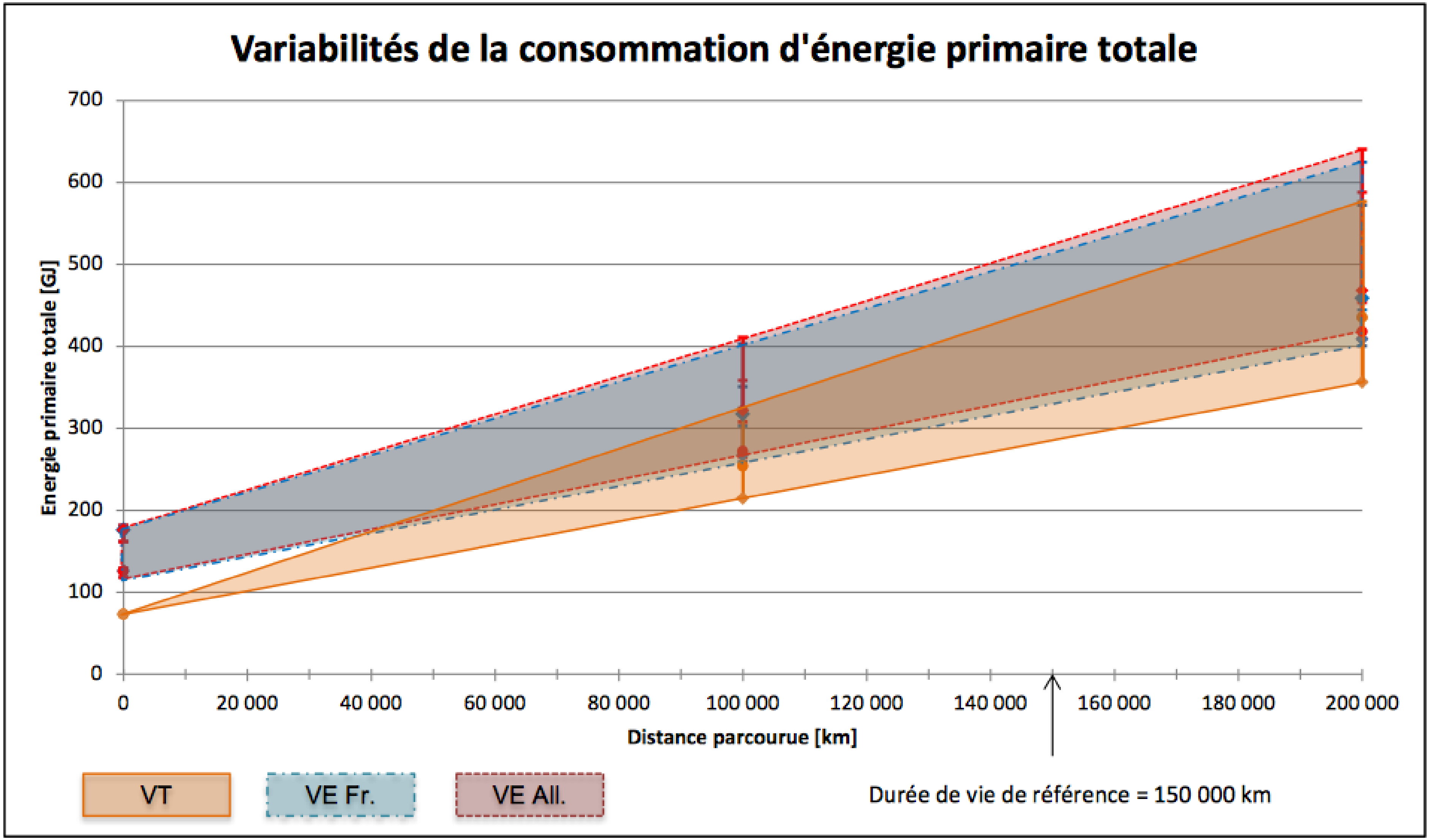
Sources of uncertainty

- Battery
  - Composition
  - Energy density
  - Lifetime
  - Production country
  - Recycling
- Energy consumption
  - Driver behavior
  - Outside temperature
- 2020 scenario
  - Battery
  - Vehicle
  - Electricity mix

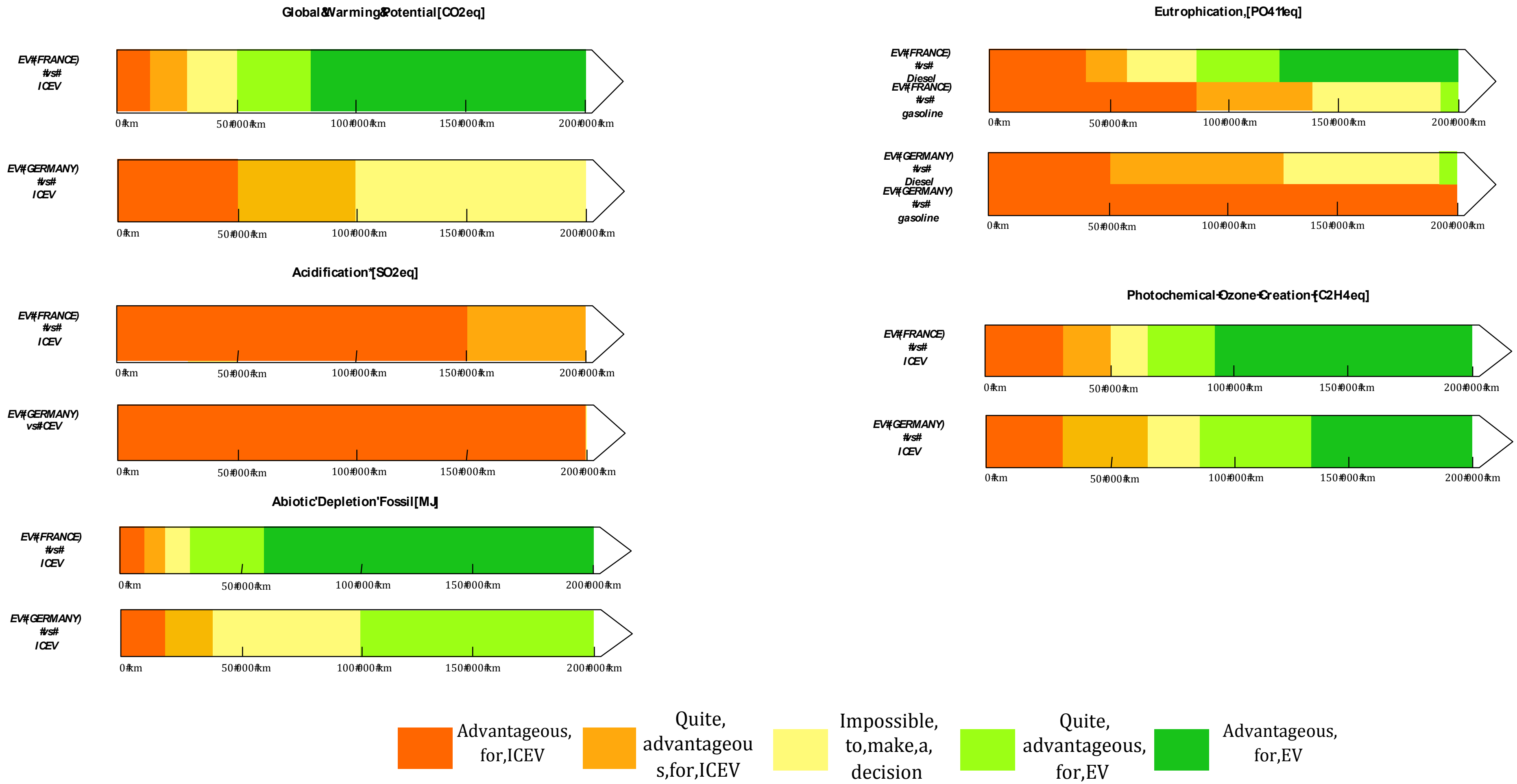
Treatment of Uncertainties

- Best and worst case scenarios based on critical parameters
- Calculation of margins of uncertainty
  - Definition of « domains of environmental relevancy » for the electric vehicle

Total Primary Energy Consumption



Domains of Environmental Relevancy for the EV (in France)



Conclusions and Suggested Investigations

Conclusions

- In France, EV shows lower environmental impacts than ICEV except for acidification
- Not true for other European countries
- Local pollutants and noise: dedicated zones to be defined for a significant impact
- Critical resources: consumption of Cobalt only might be significantly affected

Suggested investigation

- Charging infrastructure
- Real use emission factors for ICEV and electricity consumption for EV
- Indicators
  - Include toxicity and eco-toxicity
- Hybrid vehicles
- Other batteries
- More intensive use of EVs for mobility services
  - Quick charging?

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Questions ?
Ask us!

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