




Workshop: Light electric vehicles





workshop agenda

- 14:00 Welcome, warm-up & technical notes
 - 14:15 Presentation of XD
 - 14:45 Q&A
 - 15:00 Discussion in break out groups
 - 15:30 break
 - 15:35 Discussion in break out groups
 - 16:00 Presentation of results in plenary and prospects
- 



XD

France and the
big picture



Structure

- Project background
- Project goals
- Concept/ procedure / special features
- Project organisation
- Results to date
- Relevance for Germany
- Vehicle ideas Phase I





Project background

Obstacles to sustainable mobility



... in rural areas

- Lack of/insufficient infrastructure and mobility offers
- Less pressure to change in sparsely populated areas, e.g. parking issue

... in everyday life (distances up to 50km)

- Safety
- Bad weather conditions
- Lack of secure parking facilities
- Lack of charging infrastructure

Status-Quo



- 70% of journeys are shorter than 10km
- On average, one car is used by 1.2 people
- On average, people travel 39km per day - very mobile people travel 46km on average
- 1/3 of trips work or education related (34%)
- 1/3 of trips shopping and private errands (30%)
- 1/3 leisure trips (28%)
- 8% accompanying journeys
- 1% of car journeys longer than 100km (but equivalent to 25% of car mileage)

Potential Solution



Les moyens de transports les plus insolites



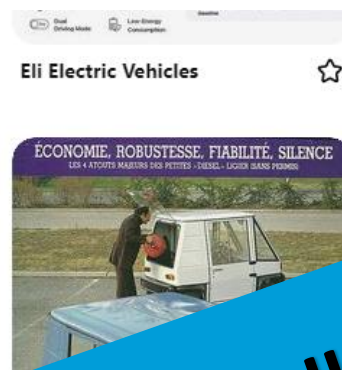
Concept Cars from the 20th Century



Zundapp technische gevegens janus



Toyota Car - FT-X Race Car: A Conceptual Design Proje...



Ligier



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F&O Fabforgottenobility



Vhélio - Le véhicule de demain



DÉLIRES DE DESIGNERS... - Page 2



Blog...



Blog...



Ligier



Piaggio Scooter



Friends of SAM



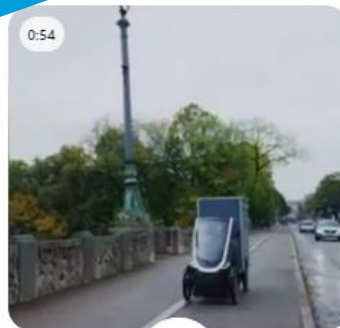
Nimbus EV, le trois-roues électrique avec jusqu'à 191...



Goulème, une start-up met les watts sur le véhicul...



LOOK OUT



0:54



Photo



Golf - BunkerShot.com: Photo



Photo

Replace conventional cars with very small electric cars

Studies show...



- The European LEV market is relatively small
- LEVs from large manufacturers often remain in the pilot or concept phase (VW Nils, Audi Urban Concept, Canyon Urban Mobility Concept, etc.)
- Many of the LEVs for sale are manufactured by start-ups or SMEs
- China offers a larger and in many respects a more cost-effective LEV range. However, it does not meet our environmental and sustainability requirements.
- Overall, there is a lack of knowledge about the widespread use of LEVs in traffic and user experience.



Expected benefits of LEVs



- Space efficient
- Energy efficient (also compared with BEVs)
- Better air quality
- Low noise
- CO2-reduction
- Better quality of life (especially in urban areas)
- Potentially more cost-efficient
- Lower speed

Expected disadvantages of LEVs



- Shift from sustainable transport modes to LEV (especially in cities)
- Insufficient safety of the vehicles and passengers respectively
- Obstruction of the traffic flow
- Lack of awareness among consumers and possible reservations about new vehicles

Challenges



- Currently, the prices of LEVs are still relatively high (e.g. Microlino from 14,900.00€)
- Overall low supply in Europe
- Relatively unknown mode of transport
- Road safety (no crash test required in vehicle classes L1e-L7e)
- High speeds and lack of infrastructure

Window of opportunity



- In **Europe** the supply in this vehicle segment has so far been
 - Very small
 - Relatively expensive
- There is already a relatively extensive range in China
 - Quality often does not meet our (environmental) requirements
 - Very cheap
 - Vehicles will conquer the European market if there are no local alternatives available
- Due to the e-bike boom, many required components are already available and ready for use.





Project idea and aims

« Extreme Challenge » 1000 times better



10 x cheaper

Car cost 0,6-0,8 €/km
every 1000 km/pa

10 x durable

Indefinitely
recyclable

10 x lighter

1240kg average mass
of cars sold in 2019

10 x simpler

Standardised
components

10 x less powerful

E-bike: 0,25 kW
Citroën 2CV: 22kW
BMW i3: 125kW
Tesla X: 750kW

1 x fast

Speed maximum
25-80km/h

Project aims



Aim 1: Development of new vehicles

clean

recyclable

cheap

light

efficient

Long-lasting

Repair-friendly

durable

Requirements for the vehicles

For daily
life

1- 3
persons

Daily
errands

100 kg load

Project aims II



Aim 2: New manufacturing processes

Decentralised
manufacturing

Exchangeable
batteries

Easy maintenance

Adaptation to local
needs

Decentralised further
development

Aim 3: Joint development

All results = open
source

Intensive exchange
in forums

network
+2000

Holistic project idea



Developing vehicles in Europe beyond the large corporations

Decentralised manufacturing and development

Focus on societal and ecological benefit and applicability



Create French/European network of interested actors

Using available knowledge and make it usable

Focus on rural areas

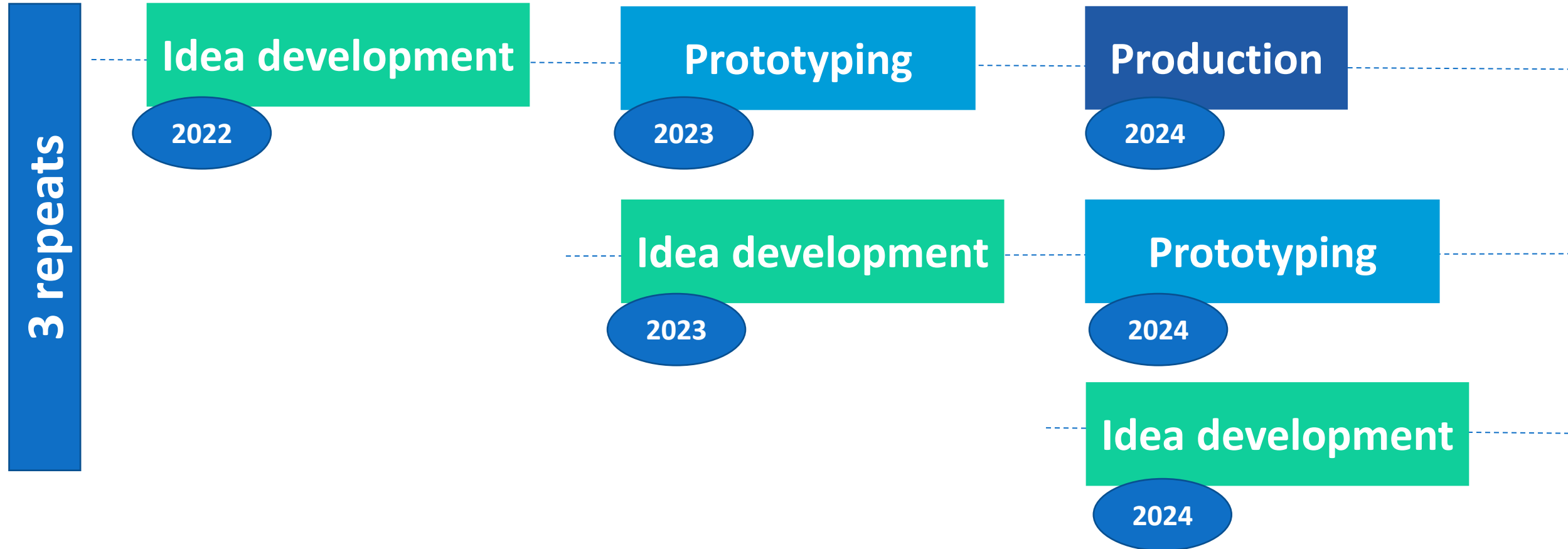


Project structure and procedure

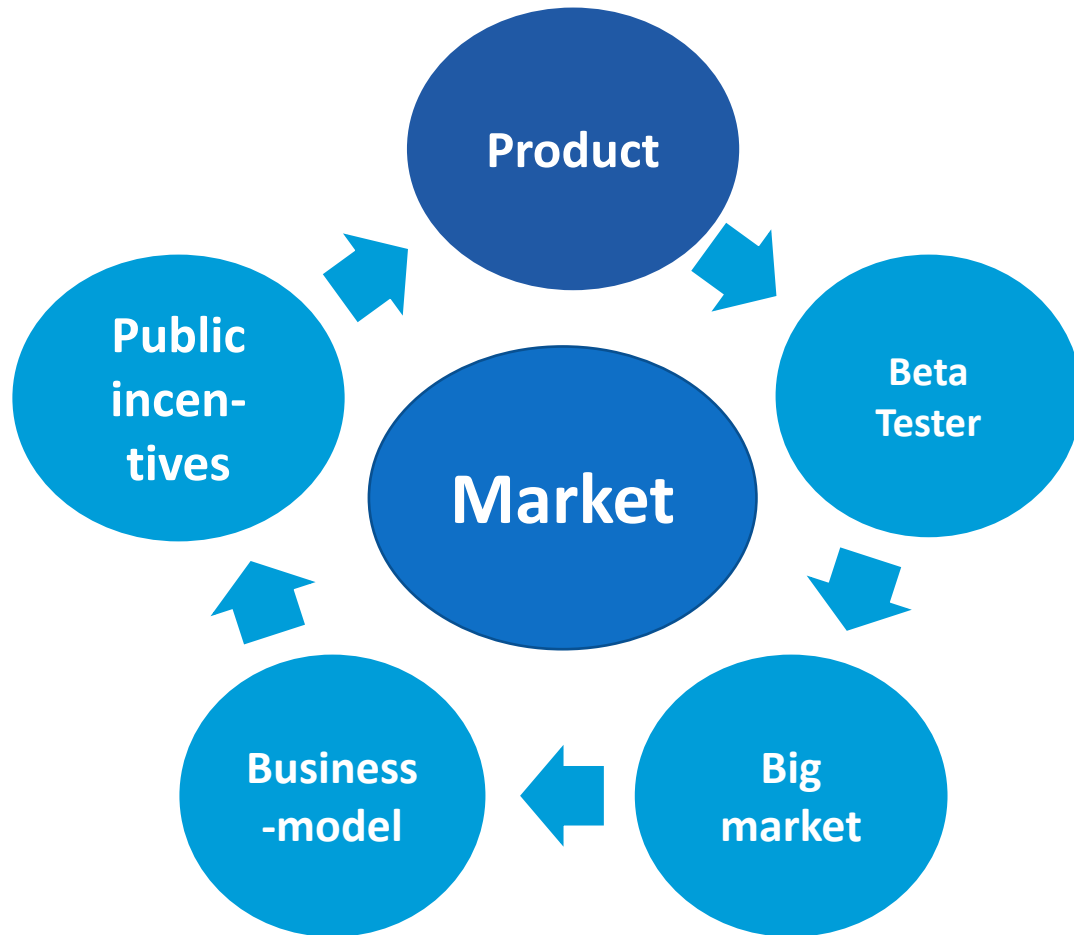
Project structure



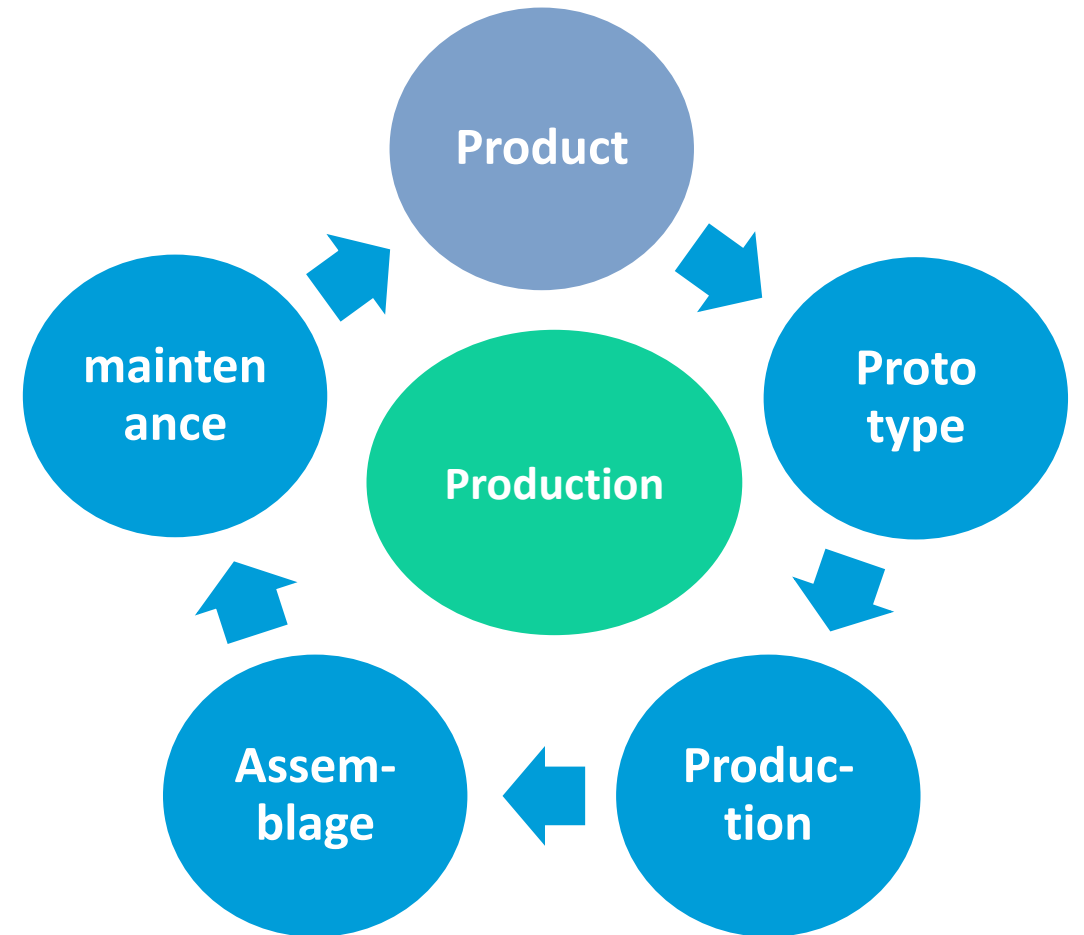
3 Phases



Product cycles for continuous improvement



Feedback from users



Feedback from producers

Actors XD



1. **candidates**, working in teams on vehicle development
2. **Companions**, who support candidates with professional expertise
3. **Partners**, are for example companies, ministries, associations, insurances that support XD in various ways
4. **Witnesses**, who follow the project and report about it
5. **Pioneers**, who test the newly developed vehicles

**Join
anytime**



Not all players have to participate in all phases OR can always join in

Test regions



Properties

- Municipalities from rural and suburban areas
- Less than 20,000 inhabitants
- Strong car dependence
- Close to a highway
- Clear commitment to sustainable development

Tasks

- Search for local pioneers (individuals, families, etc.)
- Communication around the project
- Create conditions for testing (e.g., speed limits, parking restrictions, etc.)
- Pre-test with existing vehicles (e.g. Citroën Ami)



Project organisation

Finance/ Organisation



Project initiated and organized by the subordinate authority for ecological transition in France: ADEME

- 80% position distributed among several people
- Communication through subcontract
- Reserach on project contracted by ADEME (~300.000€)

1. **Project phase:** each team receives a maximum of 70% of the costs and up to 10.000€.
2. **Project phase:** each prototype is supported by 50% up to a maximum of 40.000€.
3. **Project phase:** piloting is financially supported - partners from the industry are currently being sought for this purpose.



First results

What is happening – in figures



- 43** Teams of candidates (min. 3 pers.) from all over France
- 38** Experimental spaces in small municipalities
- 20+** Conferences, webinars and exchange opportunities
- 6** Interdisciplinary working groups on common topics (battery, market, etc.)
- 9** Conferences offering a chance to exchange, share and collaborate

What is happening – phase 1



Technical solutions are based on social and everyday challenges as well as economic considerations.

Answer the following 6 questions by 21.10.2022:

- 1 Description of the challenges to be solved with a strong orientation towards users and local conditions
- 2 (technical) vehicle description
- 3 Description of the business case
- 4 Description of the key players and practical areas of application
- 5 Description of energy use (components/ procurement/ reusability etc.)
- 6 Description of the project implementation and anticipated hurdles



Prize for the 3 best/most promising concepts were awarded + prize from insurance for 1 concept

How it proceeds – Phase 2



- Further finalize ideas/plans and build prototypes
- Work out commonalities of developed projects (especially of components)
- Exchange between projects
- Check whether components and/or vehicles can be labelled
- Search for international partners to promote/ initiate XD abroad



Relevance for Germany

Relevance for Germany



- Similar challenges in rural and suburban areas
- Large automotive suppliers
- Existing tinkering scene
- Testing a new approach and project design
- Harnessing citizen knowledge and creating a network regarding LEVs
- Create a forum for a new constellation of actors
- Become part of a European network/ endeavor
- Potentially strengthen a new mode of production
- European response to Chinese developments

Innovative aspects of XD



Cooperative
innovation

Publicly funded
tinkering

Decentralized approach
(manufacturing/production/development)

Uniform components
from catalog



Actor constellation

Flexible project
design

Open target
formulation

Linking technical and
social solutions

Fundamentally
international

Swarm knowledge

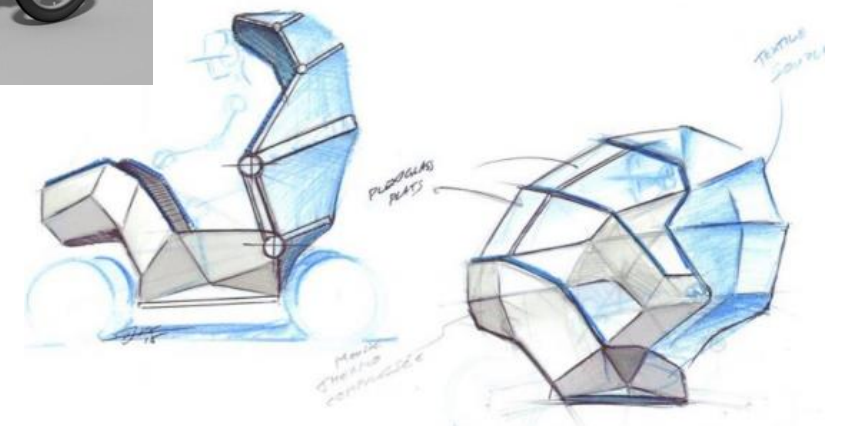


First concrete
vehicle concepts

Vehicle ideas Phase I



Team:
Tinkerers in the fields of
economics & electrical
engineering



EV 4 L6e - Cabrio -ultralight – 1 Pers.

Vehicle ideas Phase I



Team:
universities &
research
institutions



Scaramobile L6e/L7e – Solar/ aluminum body - 3 pers. + 1 child

Vehicle ideas Phase I



Team:
(Automotive)
designer



L'Adéquate L7e – Tube frame + aluminium body – 2 Pers. + load

Vehicle ideas Phase I



Team:
Doctoral students
(STEM) and
entrepreneurs

E-nvy One L7e – Tubular frame/ UHMP - adaptable to users

Vehicle ideas Phase I



Team:
Association "Vélo
solaire pour tous"



Vhélio L5e – solar panel, battery, pedal - self-construction



Thank you for listening



Questions and answers



Discussion in
2 groups



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