Summary

MDI Company

Sustainable Transportation

Achievements

Obstacles & Barriers

Future Plans
I. MDI Company background
Guy Negre
Founder & Pioneer in sustainable transportation

1972
UN Stockholm Conference

End of the 80s
A new vision

1992
UN Rio de Janeiro Earth Summit
“Ecology will only have a real impact if it is accessible to all”

– 1991

Guy Negre
Founder & Pioneer in sustainable transportation
Motor Development International

Origins & Location

Since 1991

Based in Luxembourg
(Europa)

Motor Development International

Origins & Location

Since 1991

Based in Luxembourg
(Europa)
< 20 people  A small structure with big ideas

Work Team

I. MDI Company - Background

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II. Sustainable Transportation approach
Sustainable Transportation

Problems
non-renewable resources

big, polluting & inhuman production factories

rigid & expensive manufacturing processes

governmental dependence

expensive technologies

range constraints

huge energy & water utilisation & soiling

heavy & polluting supply chain

expensive technologies

range constraints

Sustainable Transportation Problems

- Non-renewable resources
- Geopolitical dependence
- Big, polluting & inhuman production factories
- Rigid & expensive manufacturing processes
- Huge energy & water utilisation & soiling
- Heavy & polluting supply chain
- Expensive technologies
- Range constraints
Sustainable Transportation

MDI Solutions

- AIR: Universal energy carrier / renewable compression
- Local supplies / independance
- Human mini-factories network
- Flexible process thanks to composite materials
- Low energy/water consumption
- Local production & distribution
- Affordable to all
- Quick refill
How?

Two distinct concepts

Production Concept

Compressed Air Technology
III. MDI Achievements
III.1

MDI Production Concept

produce on the point of sale

sold at the point of production

mini factory

showroom
Mini Factory

Production

Produced at the point of sale
Showroom
Sales

Sold at the point of production
III.1. MDI Production Concept

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First MDI Factory
Nice, France
All around the World

Implantation
MDI Process **Benefits**

**Earth-friendly**
- 1/3 ground compared to classic factories
- Best energy repartition for production
- No pollution due to transport of finished products

**Economical & Social**
- Local employment
- 30% more workers
- Knowledge & expertise sharing
- Partnership network

**Quality / Technical**
- Use of techniques not compatible with mass production
- Functions integration thanks to composite materials
- Increased energy efficiency through technology

**Costs & Benefits**
- Reduction in import taxes
- No stock of spare parts
- Logistic costs drastically reduced
- Decreased costs of production
- Affordable products
III.2

Compressed Air Technology
Air Tank & **Engine**
Simple & Efficient
## Compressed Air Technology Benefits

<table>
<thead>
<tr>
<th>Energy vector</th>
<th>Quick refill</th>
<th>MDI engine</th>
<th>MDI Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>Universal</td>
<td>Quick charging time</td>
<td>High efficiency</td>
<td>Scalable / multiple applications</td>
</tr>
<tr>
<td>Does not involve any reserve replacement</td>
<td>No range constraint</td>
<td>Simple</td>
<td>Lightweight</td>
</tr>
<tr>
<td>Constant performances</td>
<td>Renewable compression</td>
<td>Well-known mechanical parts</td>
<td>Life cycle</td>
</tr>
<tr>
<td>Well-known</td>
<td></td>
<td>Reliability</td>
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<td></td>
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<td>Flexibility</td>
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</tbody>
</table>

**AIR**

- **Quick refill**: Quick charging time, No range constraint, Renewable compression
- **MDI engine**: High efficiency, Simple, Well-known mechanical parts, Reliability, Flexibility
- **MDI Products**: Scalable / multiple applications, Lightweight, Life cycle
III.3

Examples of **Products**
AirPod 1.0
AirPod 1.0 Development
Design Process
AirPod 1.0 **Development**

Approval
AirPod 2.0

III.3. Examples of Products
AirPod 2.0 Development
New model design
III.3. Examples of Products
AirBOM **Light**

Development & approval
III.4

MDI Partnerships

TATA

VEOLIA

KLM Flight Academy
III.4. Partnerships

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MDI Partnerships
VEOLIA

III.4. Partnerships
MDI Partnerships
KLM

III.4. Partnerships

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IV. Obstacles & Barriers
## Obstacles & Barriers

### Cultural barriers
- Reluctance to change from
  - Interlocutors
  - Professionals
  - Manufacturers
  - Institutions

### Financial barriers
- Need for funding due to
  - The size of the company
  - The nature of and duration of the project
- Monopolistic behavior of manufacturers in the transport market (relayed by the institutions).

### Government barriers
- Rigidity and complexity of domestic standards

### Technical barriers
- Solved:
  - Increase the engine efficiency to match urban expectations
- Very low temperatures
- Systems & engine control
V. Future Plans
Scalable Technology

Diagram showing Scalable Technology with sections for Kinetic energy, Electric generator, Refrigeration, and CAES.
Short Term

AirPod 2.0 Finalization

V. Future Plans

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Short **Term**
Generating Sets

- **1h at 2.5kW/h**
- **15' at 10kW/h**
- **Autonomy x3 with burner**
- **Electricity**
- **22 gal Capacity**
Medium Term Refrigeration

COLD EXPANSION

two cylinders engine

temperature management

A/C

COLD AIR

exhaust pipe

FROZEN AIR

Ambiant Temperature

TECHNOLOGY APPLICATIONS

AirPod

AirPod Cargo

AirPod Pick-Up

AirOne

V. Future Plans

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Medium Term
AirPod 2.0 Range
Long Term Other Projects

3 x 5 seats 400 kg 100 km/h 1 m² max 600 km on 1 liter of fuel

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V. Future Plans
Thank you for your attention