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
Guy Negre
Founder & Pioneer in sustainable transportation

“Ecology will only have a real impact if it is accessible to all”
– 1991
Motor Development International

Origins & Location

Since 1991

Based in Luxembourg (Europa)
Work Team

< 20 people

A small structure with big ideas
II. Sustainable Transportation approach
Sustainable Transportation

Problems

- non-renewable resources
- geopolitical dependance
- 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

MDI Solutions
How?

Two distinct concepts

Production Concept

Compressed Air Technology
III. MDI Achievements
III.1 MDI Production Concept
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

- Compressed air tank
- Engine
- Wheel
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>
<td></td>
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<td></td>
<td></td>
<td>Flexibility</td>
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**Diagram:**
- **AIR**
- **Quick refill:** 2' min
- **MDI engine**
- **MDI Products**
III.3

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

III.3. Examples of Products
AirPod 1.0 Development
Approval
AirPod 2.0

III.3. Examples of Products

2016 UN-DESA Grant
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

2016 UN-DESA Grant
MDI Partnerships

III.4. Partnerships

2016 UN-DESA Grant
MDI Partnerships

KLM

III.4. Partnerships

2016 UN-DESA Grant
IV. Obstacles & Barriers
## Obstacles & Barriers

<table>
<thead>
<tr>
<th>Cultural barriers</th>
<th>Financial barriers</th>
<th>Government barriers</th>
<th>Technical barriers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reluctance to change from: Interlocutors, Professionals, Manufacturers, Institutions</td>
<td>Need for funding due to: The size of the company, The nature of and duration of the project</td>
<td>Rigidity and complexity of domestic standards</td>
<td>Solved: Increase the engine efficiency to match urban expectations</td>
</tr>
<tr>
<td></td>
<td>Monopolistic behavior of manufacturers in the transport market (relayed by the institutions).</td>
<td></td>
<td>Very low temperatures</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td>Systems &amp; engine control</td>
</tr>
</tbody>
</table>
V. Future Plans
Scalable Technology

- Electric generator
- Kinetic energy
- Refrigeration
- CAES

MDI TECHNOLOGY
Short Term Generating Sets

1h at 2.5kW/h
15’ at 10kW/h

Autonomy x3 with burner

Electricity

22 gal Capacity

V. Future Plans

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Medium Term Refrigeration

COLD EXPANSION

compressed air tank
two cylinders engine
temperature management
exhaust pipe

FROZEN AIR

Ambient Temperature

0°

TECHNOLOGY APPLICATIONS

AirPod
AirPod Cargo
AirPod Pick-Up
AirOne

V. Future Plans
2016 UN-DESA Grant
Medium Term
AirPod 2.0 Range
Thank you for your attention