

Our planet is on its way to shelter 10 billion people who all deserve health and progress. This is why the United Nations have defined 17 Sustainable Development Goals (the so called SDG) which are a call to action by all countries and economic actors to achieve a better and more sustainable future for all

As providers of materials and technologies it is our duty to contribute to the SDG by developing the advanced technologies that humanity requires to continue thriving.

To this effect , some eminent personalities of the World Materials Forum

- Victoire de Margerie (Vice-Chairman WMF)
- Hirofumi Katase (Vice-Chairman IPulse, Japan)
- Matt Price (President Activate, USA)
- Philippe Varin (Chairman WMF)
- Stephane Mangin (Prof Institut Jean Lamour, France)
- Shunichi Miyanaga (Chairman MHI, Japan)

have selected in the field of materials 10 breakthrough technologies that will determine the way the next decades will be shaped and are expected to have widespread consequences for human life.

How was this choice made?

Humanity needs increasing access to drinking water, to affordable renewable energy, to communications and transport to fulfill the needs of a large fraction of the population that only marginally benefits from it today

In the last few years, the WMF has defined three major KPI's in the way to use materials:

- Use Less (illustrated for example by the buy-to-use ratio, the % of recycled material, the end-of-life recycling);
- Use Longer (product life time from cradle to grave);
- Use Smarter (% of innovative materials, the product performance per unit weight).

The purpose of these KPI's is to decouple material efficiency from economic growth while creating value for all stakeholders involved.

We will now briefly introduce each of these technologies and try to associate them with the most relevant KPI's.

(Pour mémoire) **The 10 Technologies**

- Tech no 1: Recycling of plastics & composites

WMF Objective: end of life recycling rate

Nick Stanage (CEO Hexcel, USA)

Bernard Pinatel (Président Total Petrochemicals, France)

Jean Hornain (CEO Citeo, France)

- Tech no 2: Design EV batteries for easy recycling -

WMF Objective : end of life recycling rate.

Shigeru Oi (Chairman JXNMM, Japan)

Peter Carlsson (CEO Northvolt, Sweden)

Preston Bryant (CEO Momentum Technology, Texas)

- Tech no 3: Improve EV battery chemistry towards better performance to weight

Ilham Kadri, CEO Solvay (Belgium) - Interview date to be decided tomorrow

Richard Wang (CEO Cuberg, USA)

Victoire de Margerie (Vice Chair WMF, France)

- Tech no 4: Storage of renewable energy at lower cost.

WMF objective: storage duration (beyond 12 hours and more than 25 years life cycle)

Bernard Salha (CTO EDF, France)

Mianyan Huang (CTO VRB, China)

Hirofumi Katase (Vice Chair IPulse, Japan)

- Tech no 5: Lower cost hydrogen based on renewable energy for fuel cell applications

WMF objective: performance (H2 cost and % of renewable energy) to stack weight

Shunichi Miyanaga (Chairman MHI, Japan) - Interview on July 31st

Patrick Koller (CEO Faurecia, France) - Interview on July 28th

Jelena Stojadinovic (CEO Membrasenz, Switzerland) - Interview on July 21st

- Tech no 6: Spintronics to reduce energy consumption for data usage/storage

WMF objective: lower energy consumption per device

Andrew Kent (Founder Spin Memory, USA)

Hideo Ohno (Président Tohoku University, Japan)

Stéphane Mangin (Institut Jean Lamour, France)

- Tech no 7 : No CO2 production of bulk materials

Philippe Varin (Chairman WMF, France)

Tadeu Carneiro (CEO Boston Metal, USA)

Enrico Borgarello (Director of Innovation Heidelberg, Germany/Italy)

- Tech no 8: Low energy access to potable water

WMF objective: lower energy consumption

Cody Friesen (CEO Zéro Mass Water, USA)

Moshe Kelner (CEO Memtech, Israël)

Musabbeh Al Kaabi (CEO Mubadala Petroleum & Chemicals, UAE)

- Tech no 9: 3D manufacturing of plastics and Carbon Fiber composites

WMF objective: performance to weight

Thierry Le Hénaff (CEO Arkema, France)

Jos Burger (CEO Ultimaker, NL)

Bronwyn Fox (Swinburne University, Australia)

- Tech no 10: AI & Quantum for accelerated materials discovery

WMF KPI: % of innovative materials.

Luc Julia (CTO & Senior VP Innovation Samsung, Korea/USA)

Greg Mulholland (CEO Citrine Informatics, USA)

Matt Price (Président Activate, USA)