ESCP EUROPE

PARIS LONDON BERLIN MADRID TORINO BUSINESS SCHOOL

Measuring Material efficiency: a "Shared Scoring System"

WORLD MATERIALS FORUM

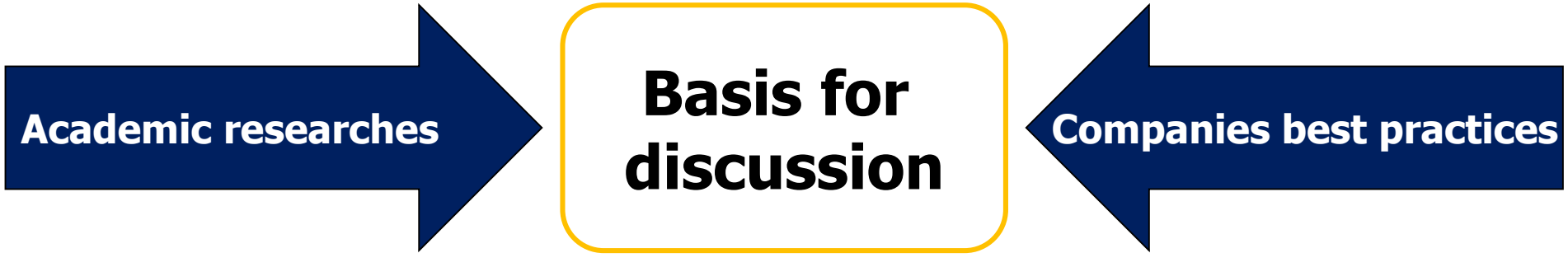
June 9th 2016

Prof. Frank Bournois
Dean & Director-General

Chambre de commerce et d'industrie de Paris

1. Where are we now?

- Very few academic researches on measuring material efficiency
- Current measures are limited to Life Cycle Analysis (thorough and backward looking)
- Some companies are developing interesting ideas



2. Questionnaire

Qualitative questionnaire

Companies

Academics

Answers

3. Sample

- We have submitted the questionnaire to a sample of 8 companies and experts in the field of materials
- The questionnaire was equally distributed between people involved in this WMF session and other WMF participants

Plenary session 2 participants

Jean-Pierre CLAMADIEU - CEO

Shunichi MIYANAGA - CEO

Olivier Cauquil - SVP, Head of Material and Parts Procurement- Airbus

Cynthia ARNOLD - CTO

Other WMF participants

Antoine FREROT - CEO

Janne STRID – VP Corporate R&D SAPA

Michel LOUBRY - Director West Region

Dr. Ton BASTEIN - Director Resource Efficiency

Prof. Arnold Tukker- Director of the Institute of Environmental Sciences

4. Questions

1 According to you, what would be the benefits of a shared scoring system across the industry for "Improving Materials Efficiency"? In particular, how would you regard a system helping to prioritize key improvement actions?

- High expectations for KPIs
- KPIs should be flexible (taking into account business sectors) and allow for benchmarking comparisons

2 Would you agree that the respective contribution of increasing recycling rates AND eliminating weight/waste to materials efficiency varies according to materials residence time in the economy and to capital intensity of the application segment?

- Recycling should always be considered carefully
- KPIs should take into account material dependency

4. Questions

3 **Beyond direct KPIs such as recycling rate or weight/waste reduction, some indirect KPIs should also be considered such as final product usage rate or lifetime, and energy savings or valorisation?**

- KPIs should address the "use less / use longer" principle

4 **For each segment (packaging, automotive, aeronautics, building), in which order do you rank the respective impact of product design, materials composition, digital content, manufacturing process and recycling route to the improvement of materials efficiency ?**

- Solutions like product design and materials composition are very important
- KPIs should be Business Sector sensitive

4. Questions

5 **Beyond single materials efficiency, how could this 'shared scoring system' help to monitor/improve materials intensity of a multi-materials end product?**

- Clearly a scope for further investigation
- Materials efficinecy metrics should also consider the creation of value for Society

6 **Finally, what would you personally propose as KPIs for measuring materials efficiency of the 4 market segments identified in question 3 just above?** A variety of responses including :

- **Packaging**: Recycling rate, an *"easiness to recycle index"*
- **Automotive:** Recycling rate, material wastage rate, easy to recycle material content rate, energy consumption
- **Aeronautics:** End to end waste ratio / buy to fly ratio, re-use rate of wasted materials, re-cycle rate of wasted materials, material wastage rate, easy to recycle material content rate, fuel consumption
- **Building:** lightweight by design, easy to recycle material content rate, energy efficiency

5. A General Framework

	Packaging	Automotive	Aeronautics & Construction	
Use Longer		Recycling rate, material wastage Rate, easy to recycle material content Rate,…	**Aeronautics:** End to end waste ratio, re-use rate of wasted materials, re-cycle rate of wasted materials, material wastage rate, easy to recycle material content rate	***Use Longer***
Use Less	*"easiness to recycle index"*		**Building:** material intensity rate, easy to recycle material content Rate,…	***Use Less***

6. Conclusion

- It's the first attempt to develop an upstream tool to be used as a framework for decision-making
- The next step will be to perform a quantitative analysis
- It's a starting point for next year discussion at WMF 2017 when a shared scoring system could be finalised