EHS FIRST

Implementing Life Cycle Thinking in Industry: Challenges and Opportunities on the Path to Sustainability

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Alcan's Global Presence

(December 31, 2004)

70'000 employees
510 facilities in 55 countries

Alcan's Business Groups

BAUXITE AND ALUMINA

PRIMARY METAL

ENGINEERED PRODUCTS

PACKAGING

Engineered Products

12,000 employees in 36 countries – 136 facilities

Products

- Cable, rod and strip
- Hard and soft extruded alloys, large extrusions
- Forged and die-cast aluminum
- Brazing sheet
- Composite materials
- Aluminum safety components and structures

Markets

- Mass transportation and automotive
- Aerospace and marine
- Building construction and display
- Electricity transmission
- Wind-power generation
- Recreation and leisure

Highlights

- World's second largest supplier of aluminum aerospace products
  - #1 in Europe
- Europe's #1 supplier of large extrusions
- Leader in composite materials technology
- Full range of products and technical solutions for aerospace and transportation applications

Packaging

34,000 employees in 27 countries – 179 facilities

Products

- Transformation of a wide range of flexible and rigid materials (plastics, engineered film, aluminum, paper, paperboard) into customer branded products

Markets

- Food
- Beauty and personal care
- Pharmaceutical and medical
- Tobacco

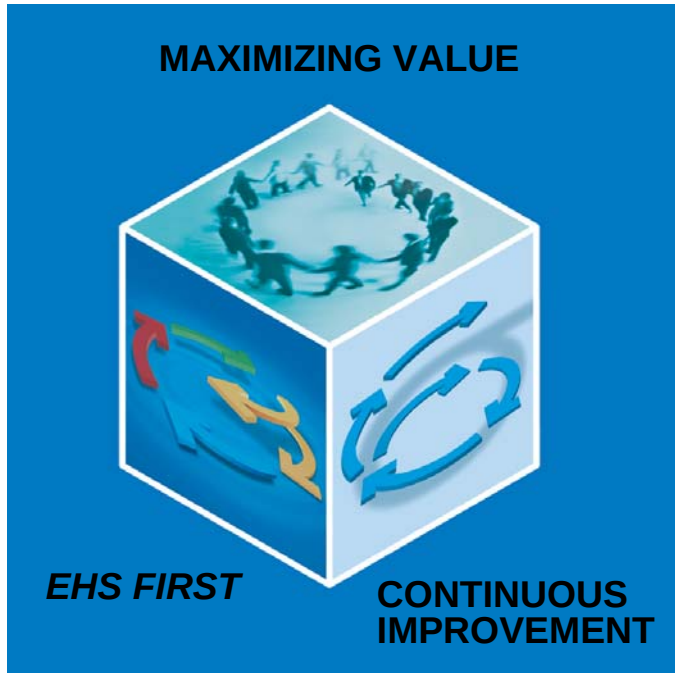
Highlights

- World-leading positions in major business sectors:
  - #1 in food flexible, pharmaceutical and cosmetics
  - #2 in tobacco packaging
- Improved ability to serve multinational customers through size and scale

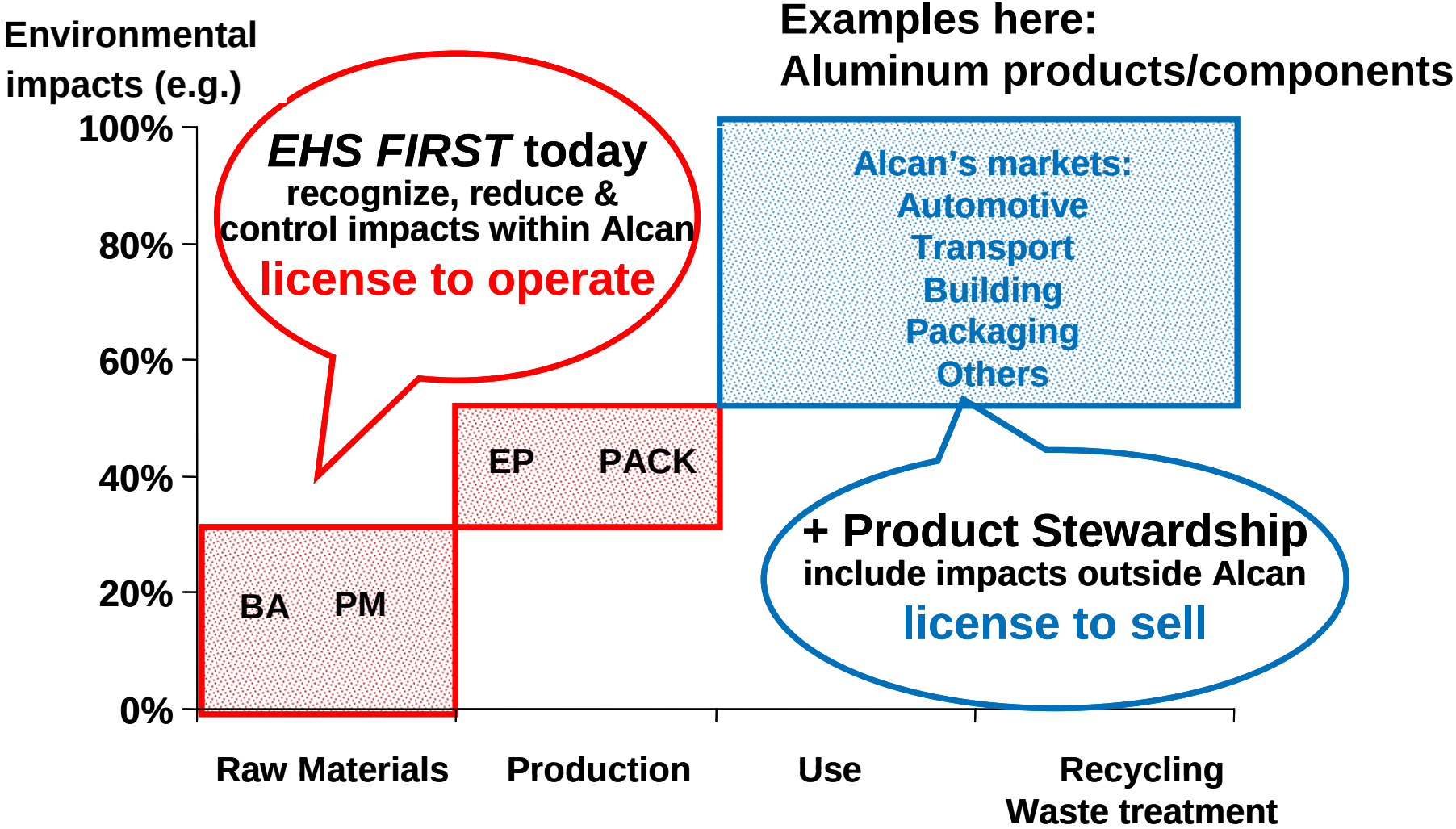
Alcan Integrated Management System (AIMS™)

Based on three pillars
Maximizing Value – *EHS FIRST* – Continuous Improvement

- **Maximizing Value** – Governing Objective
  - Maximizing shareholder value, whereby contributing to create social value, environmental value and broader economic value
- ***EHS FIRST***
  - Articulates Alcan's vision of EHS excellence
  - Build on common foundation (standardized EHS requirements) for achieving world-class EHS performance at all sites
  - Mandatory requirements for all site to be certified according to ISO 14001 and OHSAS 18001 across all business groups
- **Continuous Improvement**
  - Alcan's tool box: Lean Manufacturing – Six Sigma



Engineered Products and Packaging are in the Drivers Seat



Sustainability at Alcan

Top Management Commitment

At Alcan, we are *Taking the Next Step* by focusing our Corporate Sustainability framework on **"doing more good"**. **Whether it's through the design and application of innovative products** or by building long-term partnerships through our stakeholder engagement efforts, we are **working to integrate sustainability into all aspects of our business.**

Travis Engen, CEO of Alcan, Introduction Alcan Sustainability Report 2004

Product Stewardship at Alcan

Management of the sustainability aspects of products throughout their life cycles

- Equivalent to life cycle management, but different terminology
  - less confusion with other uses of term “life cycle management”
  - the perception of “life cycle management **system**” is avoided → **no need/interest for ‘another” (new) management system**
- Based on Alcan’s Sustainability Framework, which includes stakeholder perspectives and a broad range of values
    - **Environmental aspects** - LCA as essential element!
    - **Economic aspects** - life cycle costing as an element
    - **Social issues**, including health and safety
- **Crosscutting role**, addressing e.g.
  - R&D
  - Sales and Marketing
  - Purchasing
  - EHS

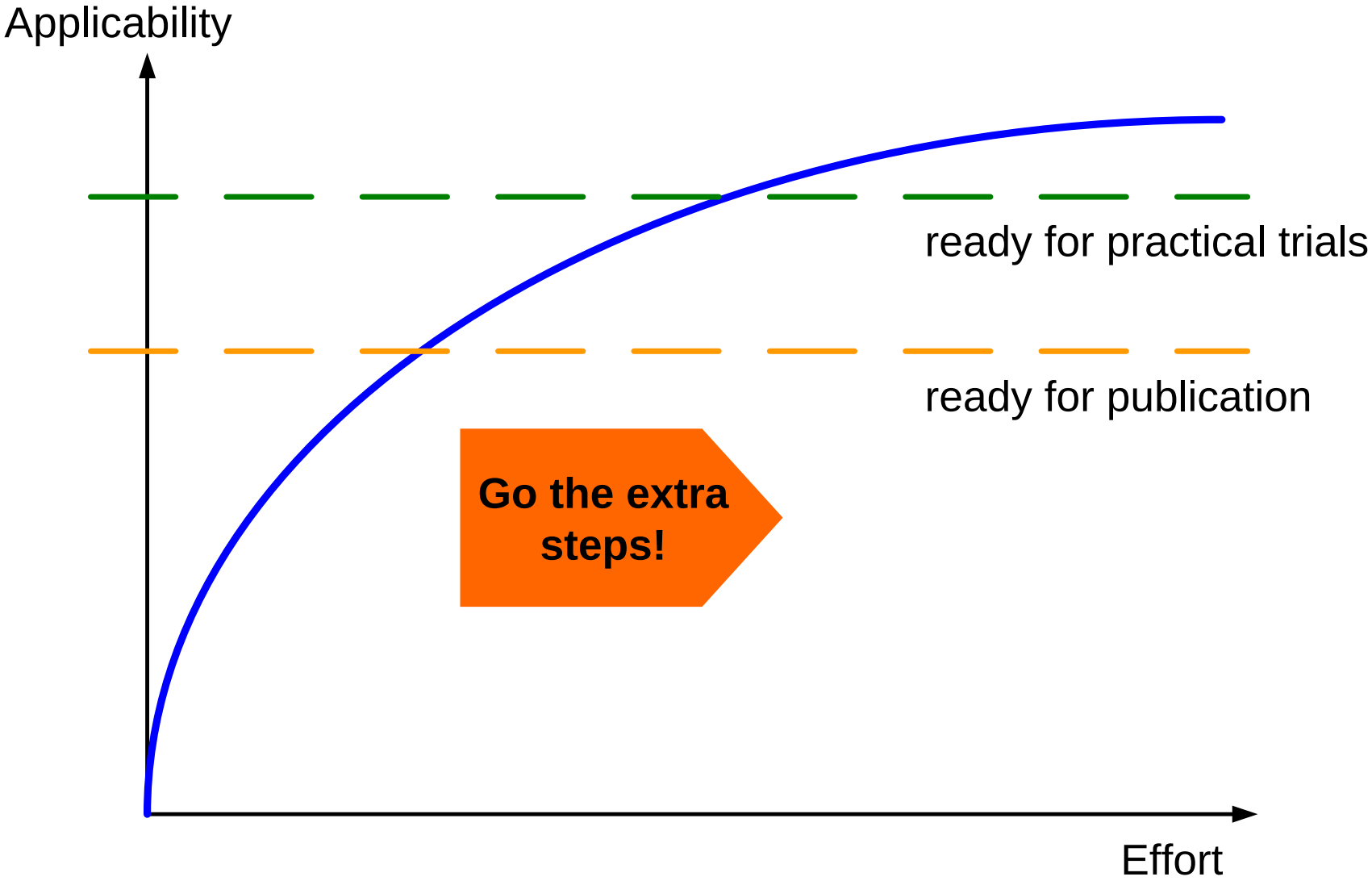
Challenges for Implementation: The Process

- How to **create internal awareness** and understanding, specifically for R&D, sales and marketing, purchasing?
- How can life cycle approaches be embedded in the business processes?
  → **life cycle approaches MUST bring added value into the existing functions and processes**
- **From projects to processes**
  (one time studies vs. continuous application)

Challenges for Implementation: Tools and Methods

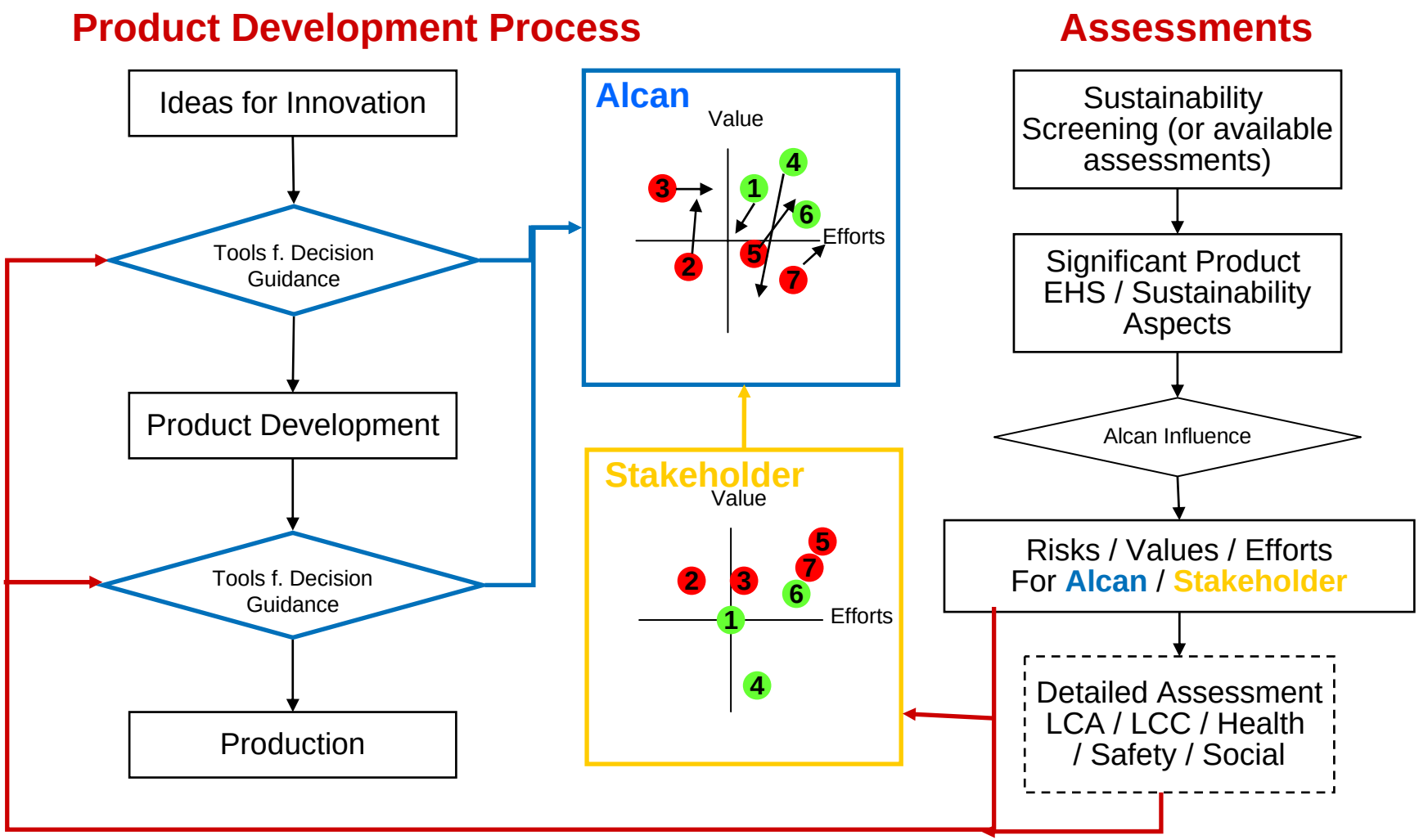
- How can existing tools be used effectively?
  - **methods and models are available, further sophistication of less priority**
  - **research should focus on how tools can be used**
- Assessment of social aspects
- Focus not only on impacts, but also on **opportunities**

Role of Scientific Community
Development of tools and methods

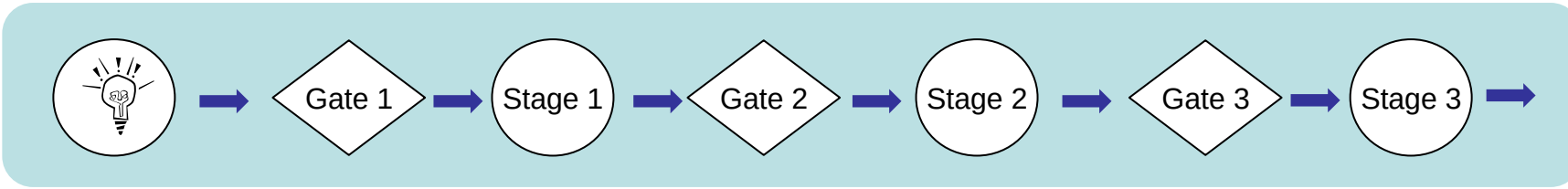


Example: Product Stewardship in R&D

What can we influence? What about values, risks, efforts?



Product Stewardship within the Stage Gate Process of R&D



"Ideas stage"	"Proof of concept"	"Product & Process Definition"	"Transfer"
Checklist: 5 to 10 standard questions	Sustainability Screening (where appropriate)	Simple LCA and/or LCC calculations (where appropriate)	Specific Product Stewardship support (such as manufacturing, sales & marketing, purchasing, EHS)
all projects	depending on checklist result	depending on screening result	

Available Tools and Efforts

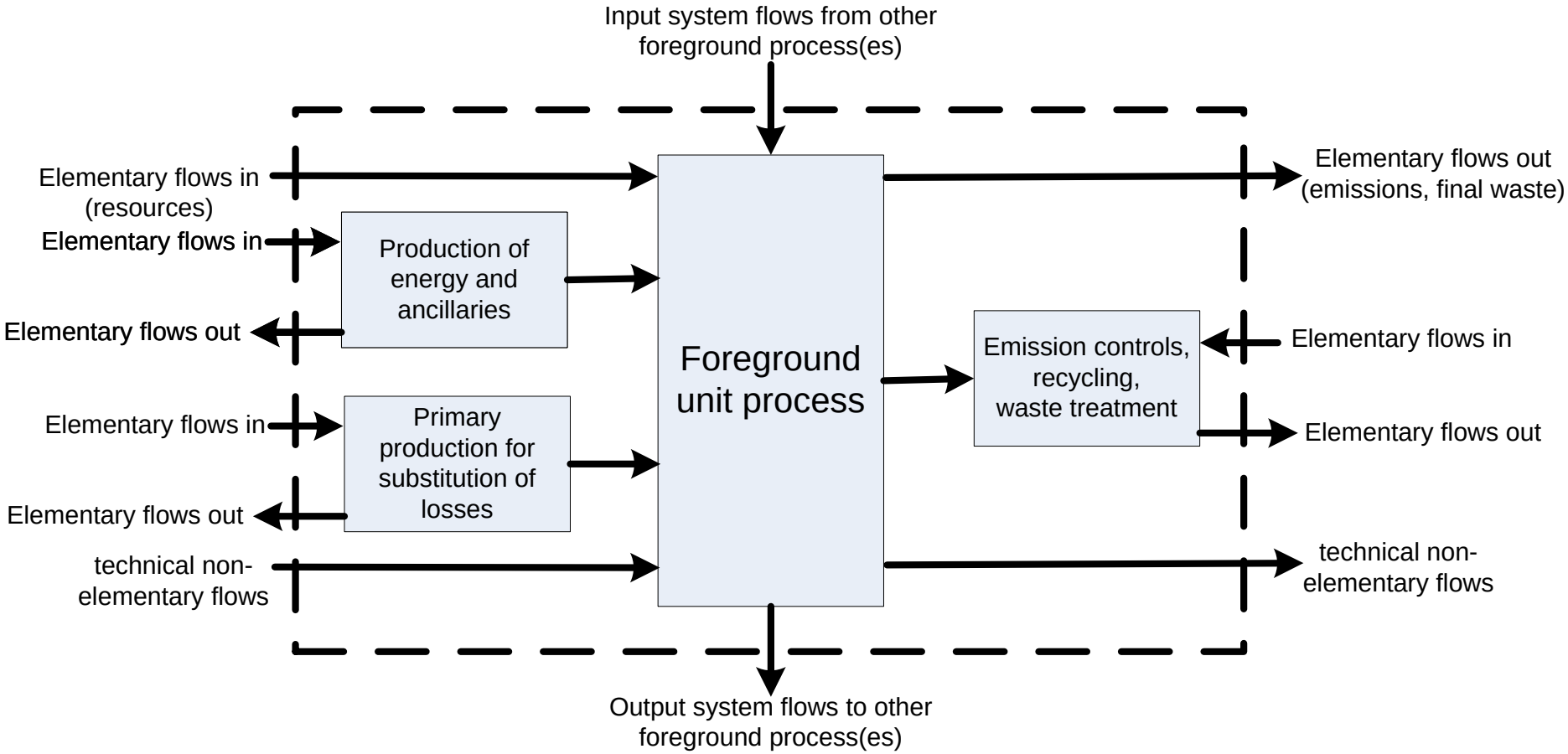
The right tool at the right place

- **Checklists (qualitative)**
  - Simple questions to identify if there could be risks and/or opportunities
  - effort: about 15 minutes
- **Sustainability Screening (qualitative)**
  - Matrix of life cycle phases and impacts
  - effort: about 1 to 8 hours (depending on complexity, options)
- **Simple life cycle assessments and life cycle costing analyses (quantitative calculations)**
  - Calculation of environmental impacts and/or life cycle costs
  - effort: 0.5 to 5 days (depending on complexity, options, comparisons on existing/competing solutions)

Workshop with Business Functions Example: Sustainability Screening

	EHS FIRST												
	Environment				Social						Economic		
	Energy consumption (fuel, gas, electricity)	Water consumption	Discharges (Air / Ground / Water)	Waste/qute of disposal	Safety	Health (indoorexposur, noise, ergonomics, vibration)	Social differentiation	Major risks (explosion,fire,leak)	Impact on community	Threats or risks in public perception	Raw material's availability	Assets needed	Market differentiation
Raw Materials	x						x				x		
Production	x	x	x	x	x	x	x	x	x	x		x	
Distribution	x												
Use customer	x	x	x	x	x	x	x			x			
Use				x	x					x			x
End of life				x						x			x

Extension of Foreground Processes w/ Background Data and Models



Benefits of Modular LCA in Regards to Applicability

- **Usability of models and data for both LCA and site-oriented environmental management**
- **Minimization of effort for assembling and modifying product system models**
- **Facilitating the interpretation of the results at different levels** (process, site, supply chain, product, etc.)
- **Aligning environmental impacts and points of leverage** (influence → what can be controlled at which level)

Conclusions

- The real challenge are not the tools, methods, models, but their application
  → more research on application is needed
- Focus should be on how existing tools
  can be used/modified to be used in business processes
- Orientation for and adaptation to decision-support is essential (**no new questions, but rather a way of better answering existing questions**)
- SMEs and multinationals are often not that different
- The existence of subjective value choices, esp. for social aspects, should be accepted (rather than searching for the ‘perfect’ evaluation/weighting)

LCM 2007 Conference in Zürich, Switzerland

- Date for conference fixed to:

August 27-29, 2007

→ **reserve it in your agenda**