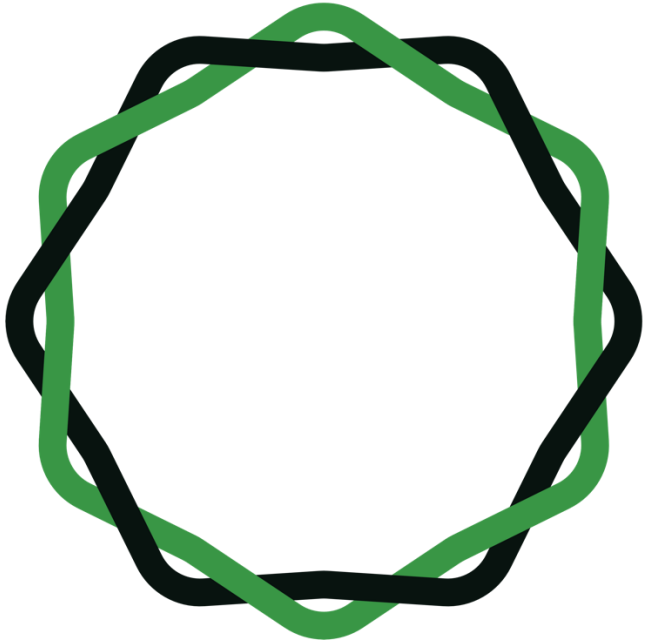

Transformation

Green Chemistry Change Management

Tabitha Petchey
Green Rose Chemistry
19 Sep 2024

Agenda

- What is Transformation?
- Areas of Transformation
  - Operations
  - Culture
  - Products and Services
  - Ecosystem
- Steering Transformation from Below
- Conclusions and Further Reading
- Exercise: Planning Your Transformation

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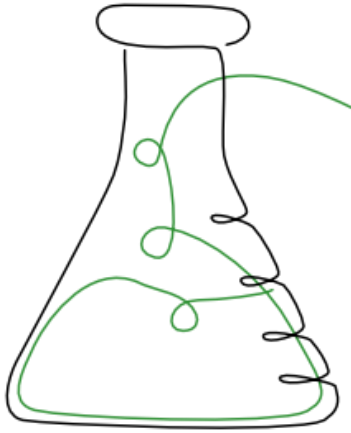
What is Transformation?

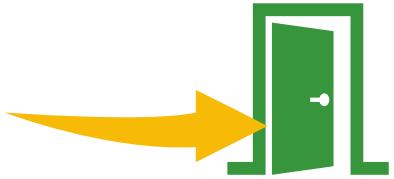


Business Transformation

- A shift, realignment, or fundamental change in business operations
- Change could apply to:
  - Processes
  - People
  - Systems/Technology
- Can apply to entire organisation, or just part of it
- Can be opportunistic or responsive

Transformation Types

Opportunistic

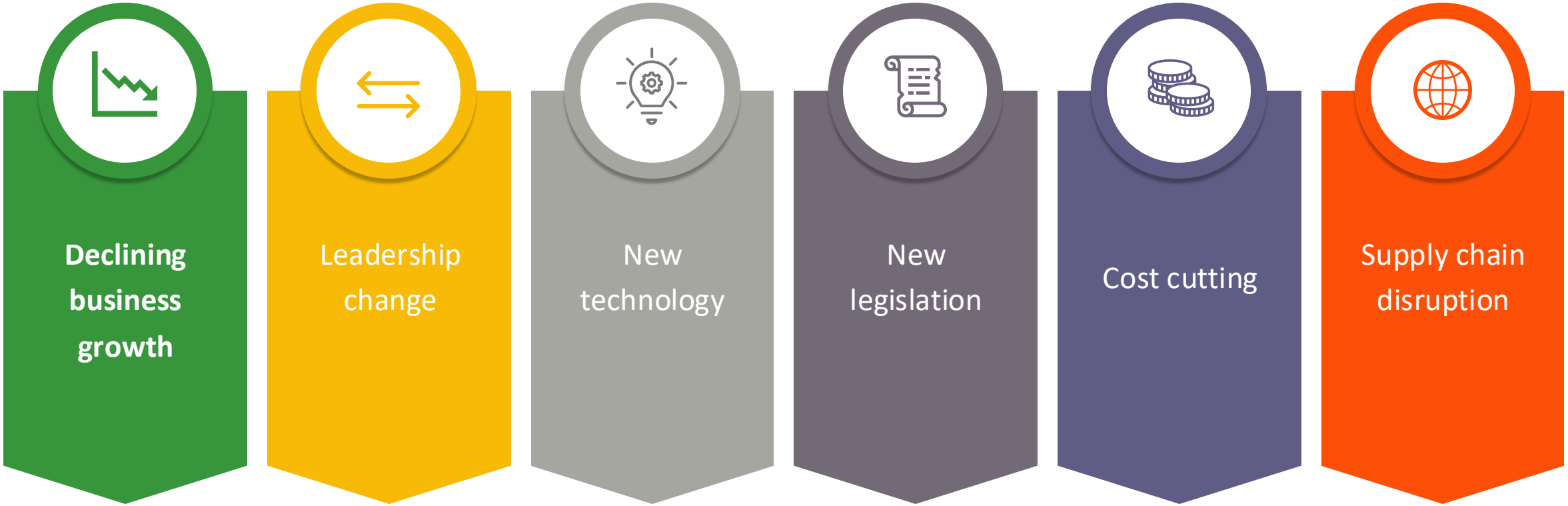


- Proactive transformation to take advantage of an opportunity
- E.g. Netflix creating a streaming service
- In green chemistry:
  Creating a safer product line to enter a new market

Responsive

- Reactive transformation when forced to respond to a change in conditions
- E.g. Businesses going remote due to COVID-19 restrictions
- In green chemistry: Substituting a chemical when it is banned by legislation

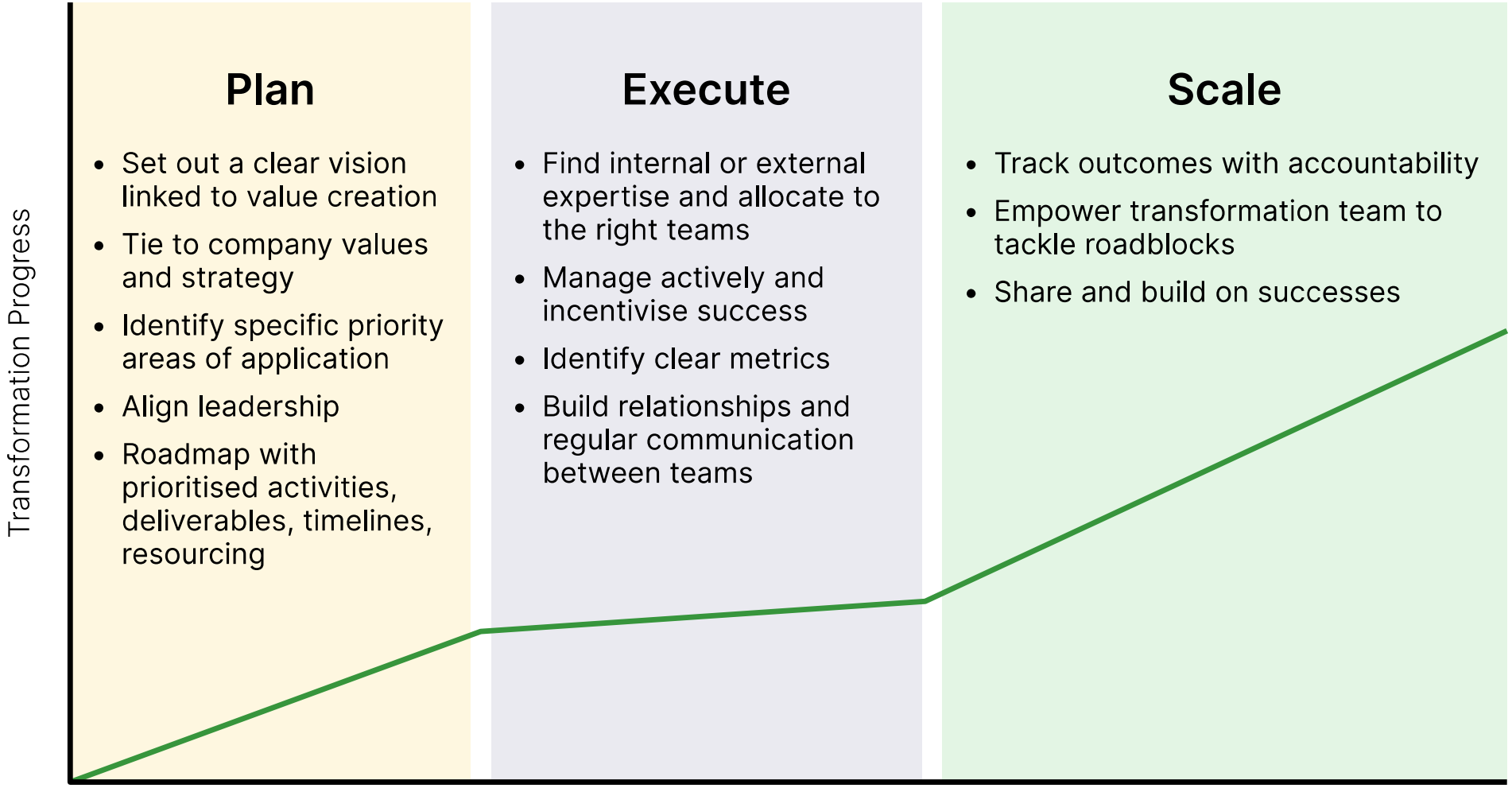
Some Triggers for Transformation



Chemistry-Related Transformations

- Developing new product lines
- Terminating unsuccessful product lines
- Changing the supply chain
- Cultural transformation – green chemistry literacy
- Changing R&D approach
- Overhauling process efficiency

Transformation Process



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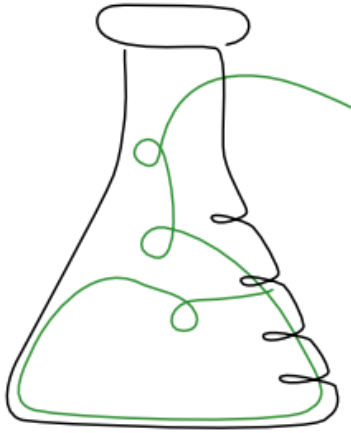
Areas of Transformation



Areas of Transformation

Operations

Culture

Products & Services

Ecosystem

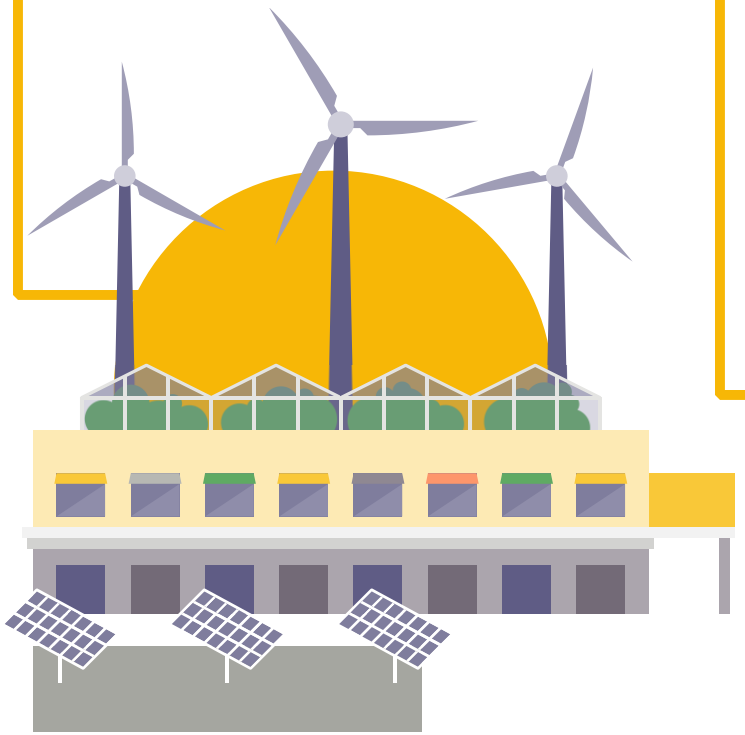
Overview

- Internal transformation, but involves supply chain
- Reduce losses of energy, water, materials
- Reduce emissions of GHG and pollution
- Source drop-in replacements to improve safety and sustainability

Sustainable Inputs

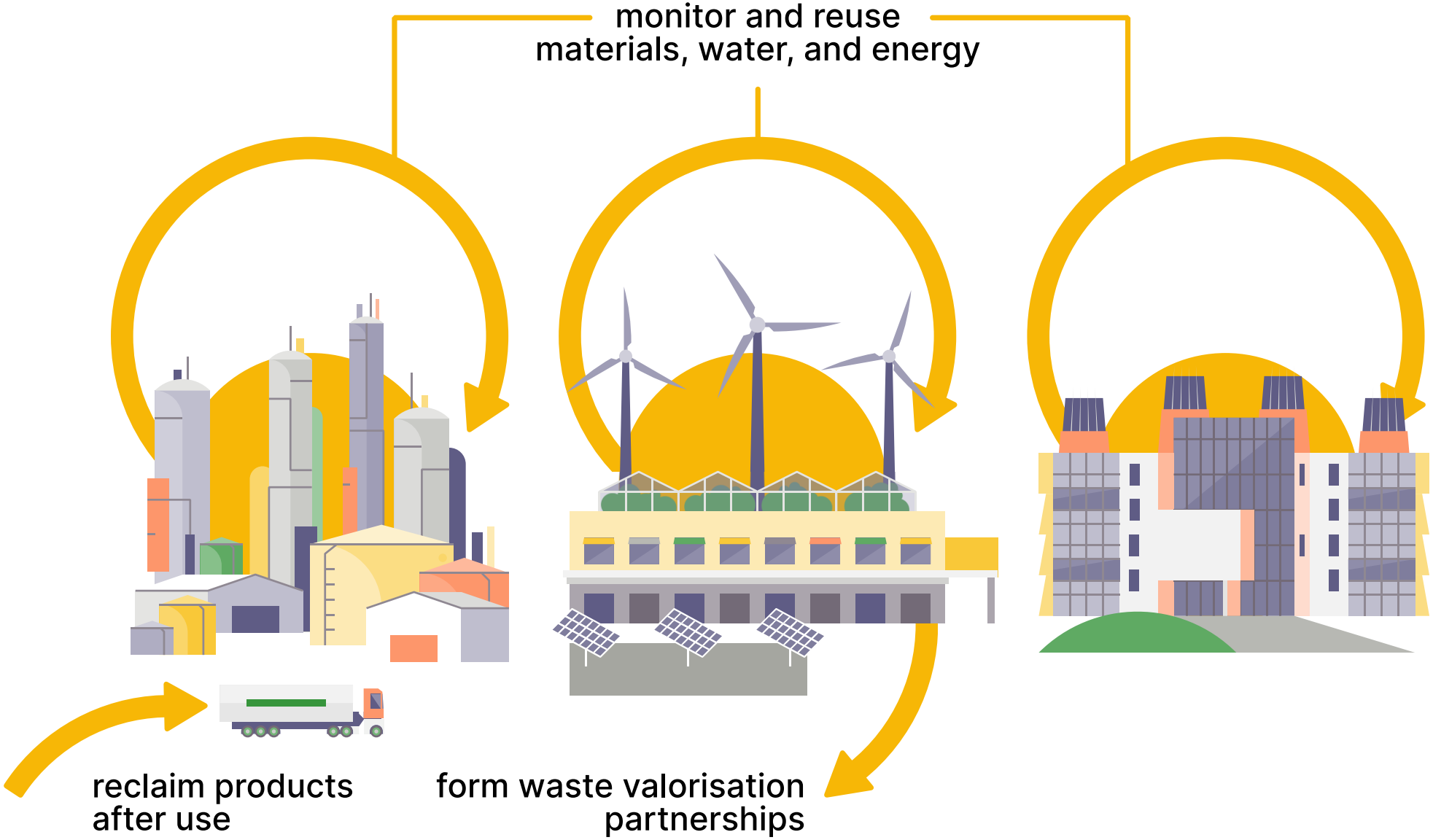
renewable, biobased, or recycled materials

renewable energy

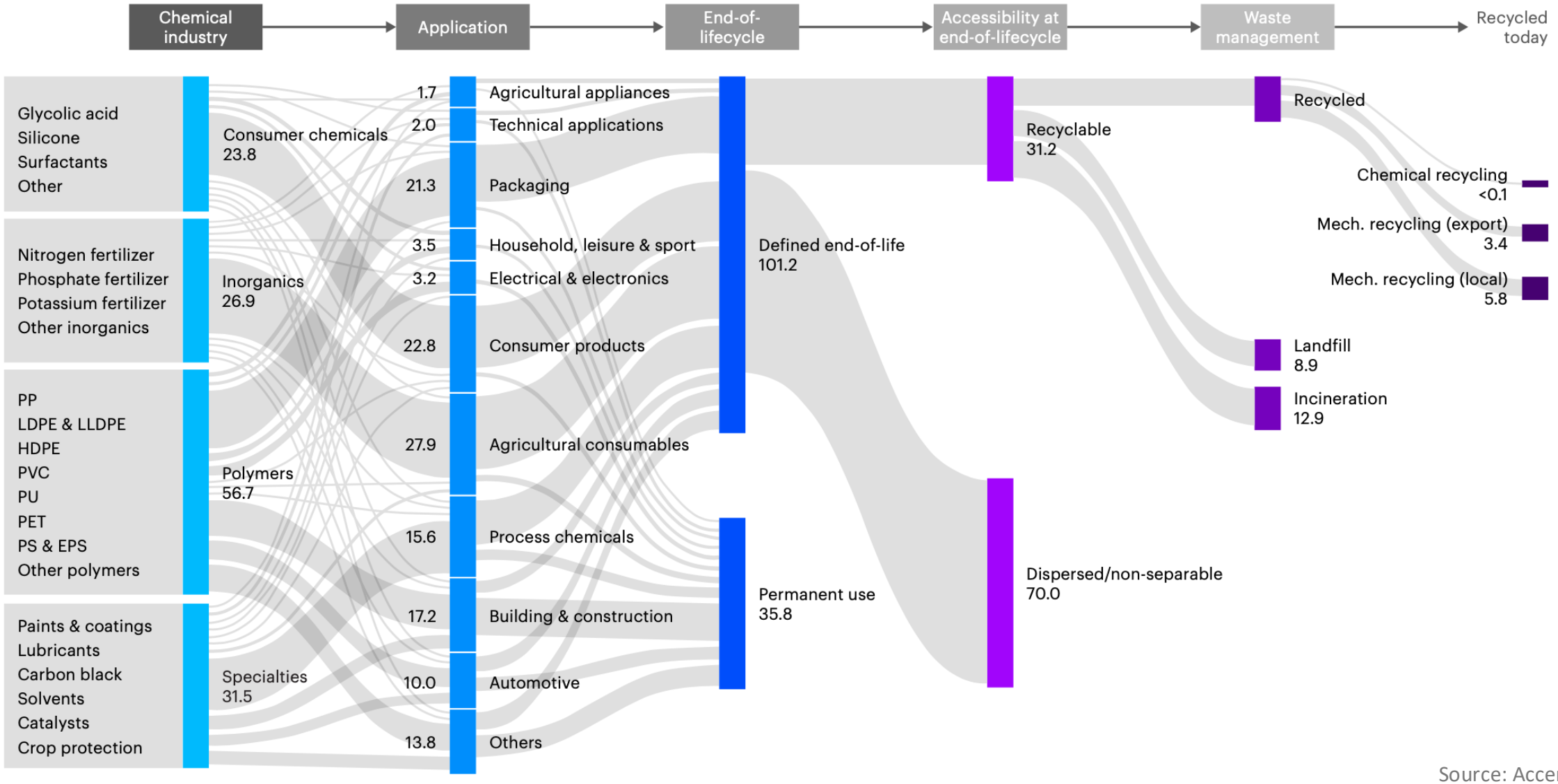


substitute hazardous chemicals and materials

Closed Loops



Closed Loops



Source: Accenture

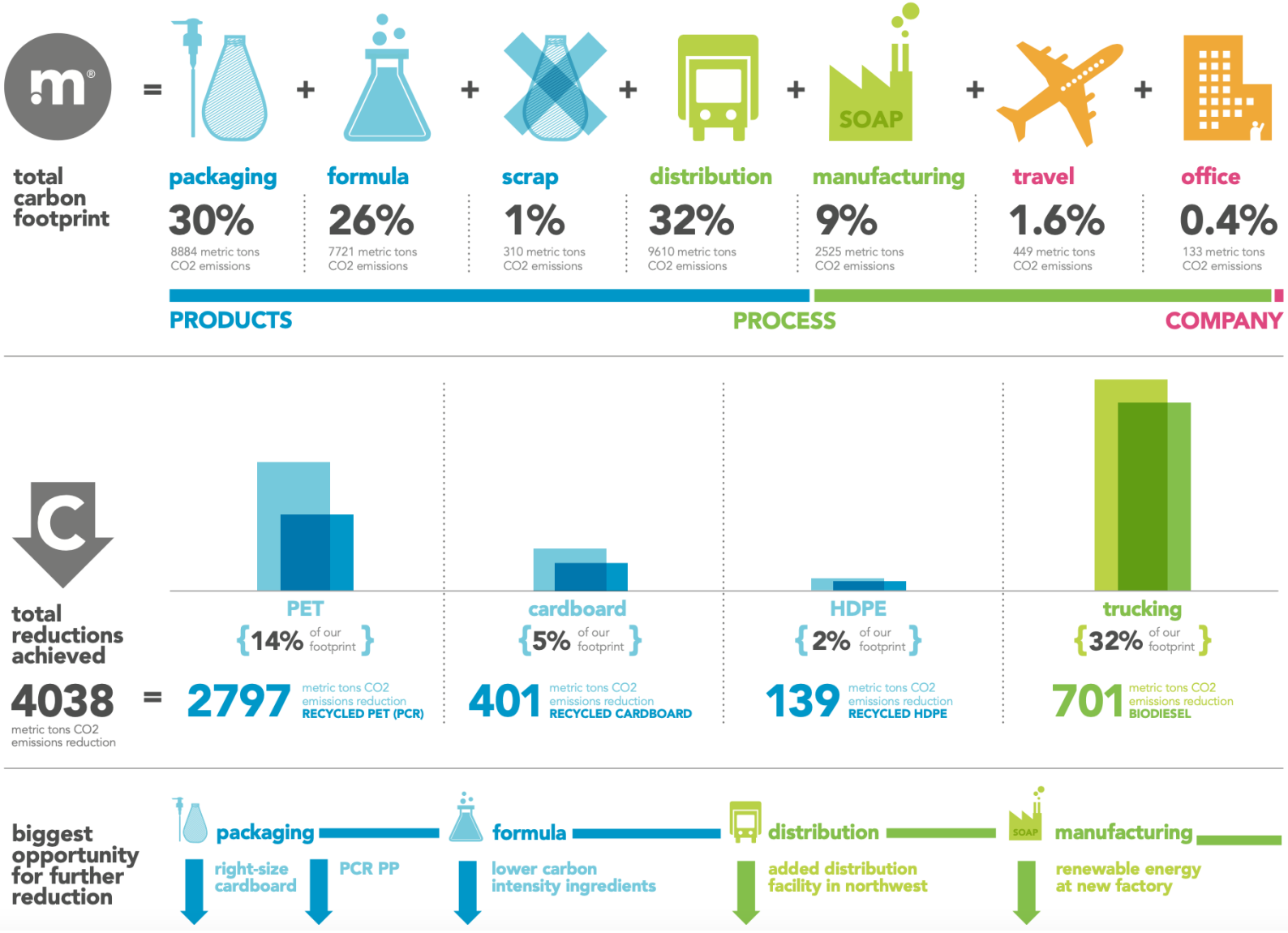
Efficient Asset Usage

- Maximise supply chain efficiency by optimising asset usage
- Consider sharing with external partners:
  - Production assets
  - Delivery capacity
- Use digital enabling technologies to predict maintenance needs and minimise downtime

Case Study: Method

- Multi-pronged approach to greening operations
- Achieved zero water waste in one factory, now scaling
- Working towards zero material waste
- Incentivising suppliers to reduce carbon emissions
- Combine transparency with great branding to deliver strong marketing message

Case Study: Method



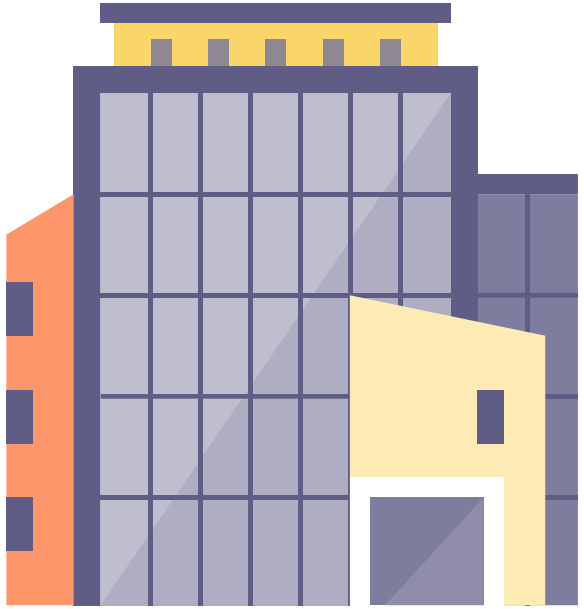
Source: Method

Overview

- Change starts with an overarching sustainability strategy
- Align leadership, management, and employees
- Build capabilities through hiring, training, partnering
- Measure progress and ensure accountability
- Embed reproducible practices

Clarify Vision

- Sustainability strategy must be long-term, but with clearly communicated targets
- Measurable, achievable goals help with motivation
- Very difficult to drive change without commitment from leadership
- Can be implemented on a smaller level for specific teams



Foster Innovation

- Many of the best innovative ideas come from inside
- Encourage employees at all levels to innovate towards strategic vision
- Frequent, transparent communication about metrics and goals can spark ideas
- Teach technical team about business value

Build Expertise

- Assess internal capabilities and need for external resources
- Hire, contract, partner when needed
- Build internal capabilities through training
  - Sustainability
  - Green chemistry
  - Business value
  - Business models

Organise for Sustainability

- Collaboration across functions is critical for green chemistry adoption
- Empower cross-functional teams to lead change
- Consider a dedicated sustainable chemistry team
- Communicate broadly and transparently about progress and setbacks: group-wide or company-wide townhalls

Embed Processes

- Without metrics and accountability, sustainability programs can get bogged down in “fluff”
- Identify metrics at the outset of new programs
- Create policies and procedures that make green chemistry the default choice
- Hold teams accountable when targets are not being met

Case Study: Kiilto

- Kiilto is a Finnish family-owned company which develops, manufactures and markets chemical industry solutions in four business areas
  - Construction
  - Industrial bonding and hygiene solutions
  - Professional cleanliness and hygiene
  - Consumer business
- In 2018, Kiilto started a group-wide *Promise to the Environment* programme, which consists of four key themes
- Each theme has a dedicated steering committee consisting of representatives from various functions that meet regularly to track progress
- Kiilto has also set concrete group-level targets for each theme, which guide company- and unit-specific operations
- Programme updates are also given in group-wide townhall meetings, and all new employees are given a sustainability-related training as part of their induction

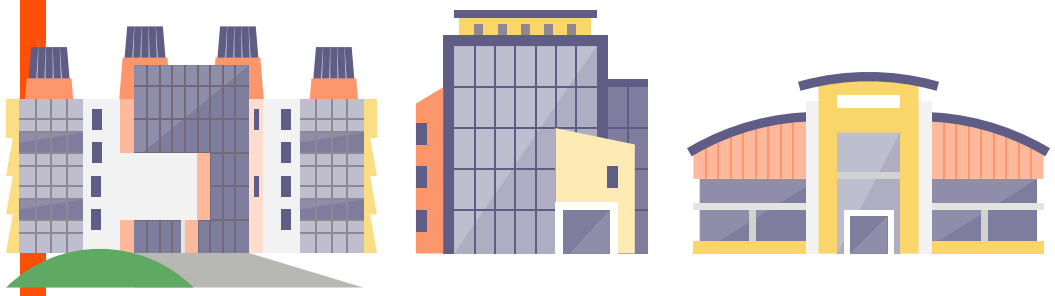
Kiilto Promise to The Environment

Theme	Promise	Targets
Green energy	By 2028, all company operations are carbon neutral	▪ From 2019 onwards, Kiilto will participate in environmental projects aimed at adding carbon sinks (e.g. planting forests in nearby areas) ▪ By 2025, we will reduce our energy consumption per ton produced by 20% from the level in 2010 ▪ By 2028, we will only use energy that is fully renewable ▪ Our logistics and business travel will be carbon neutral by 2028
Green packaging and logistics	A positive environmental impact is the foundation of our packaging solutions	▪ By 2025, 70% of our packaging materials are reusable, renewable or made from recycled materials ▪ Kiilto will start a packaging waste collection program by 2019
Green services	We provide the best circular economy solutions in our industry	▪ By 2020, all Kiilto trainings will have contents on sustainable development and environment. We train 20 000 people per year in Finland ▪ All of our customer meetings in 2020 will include the discussion of environmental issues ▪ All Kiilto personnel will receive environmental training in 2020 ▪ We will reduce our customers' use of materials. From 2023 onwards, our target is 200 000 kg per year
Green material choices	We are the leading circular economy company of our industry	▪ Towards zero waste. We will halve our amount of waste (per produced tons) by 2022 ▪ Circulating materials. We will double the share of renewable and circular raw materials by 2022

Source: Accenture

Overview

- Redesign what you're selling
  - Design, lifecycle, end of use – SSbD
- Redesign how you're selling it
  - New business models
  - Close product loops
- Technology is important, but focus on customers is key



Focus on Customers

- Customer demand can be a strong driver or barrier
- Monitor sales and feedback to understand values and pain points
- Redesign for added function and performance as well as sustainability

Design for Circularity

- Start with resource efficiency
  - Reduce resource input to products
  - Extend product lifespans
- Substitute for safety and sustainability
  - Reduce hazard as much as possible, then control risk
  - Recycled, biobased, lower-carbon materials
- Consider sustainability in transport
  - Less water, less packaging, lighter packaging, efficient stacking
- Design for end of life
  - Separable and recyclable materials

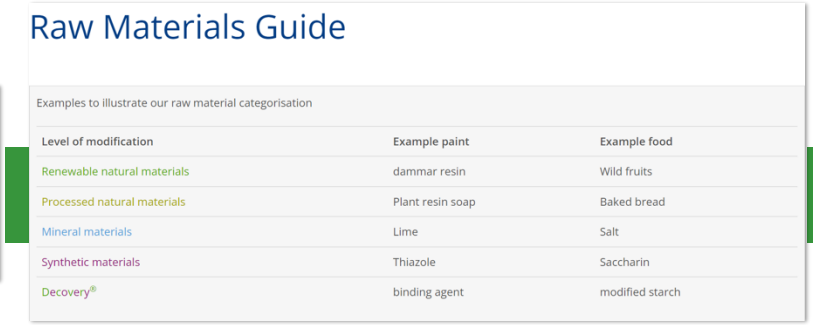
Transparency

- Honest communication with customers is critical to build trust and avoid greenwashing
- Share your goals and progress, even obstacles
- Share information as much as possible
  - Product composition
  - Material origin
  - Sustainability metrics and certifications
- Consumer education campaigns can build trust, while also serving as effective marketing content

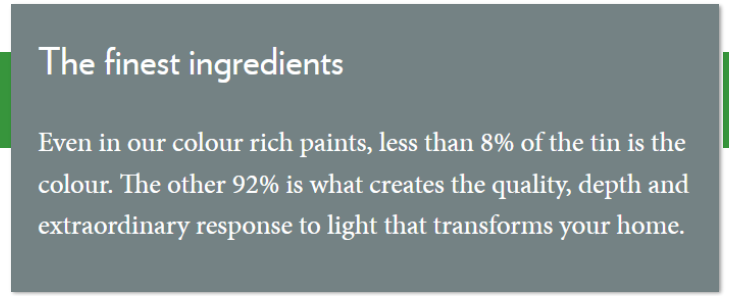
Case Study: Auro

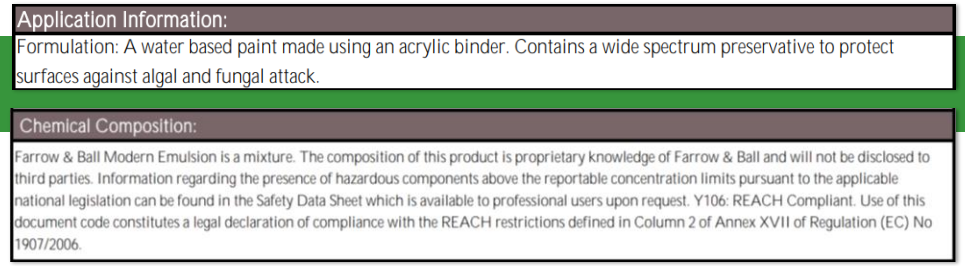
Transparency – ingredient disclosure

Auro



Farrow & Ball

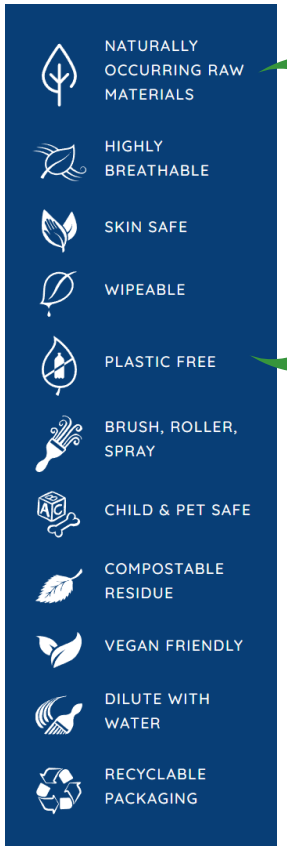




Source: Auro and Farrow & Ball

Case Study: Auro

Substitution - biogenic binder

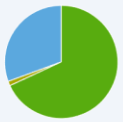


Replebin

Replebin® is an innovative, biogenic binding agent, developed by AURO in a sophisticated research project that lasted over several years. Replebin®consists of plant alcohol ester with organic acids. The innovative binding agent is legally protected and available exclusively from AURO.

Substitution/Transparency - thiazoles

Full declaration



- Renewable natural materials
- Processed natural materials
- Mineral materials
- Synthetic materials

water, calcium hydroxide, mineral fillers, cellulose

Information about our raw materials

What are thiazoles and why are they used by AURO?

Thiazoles are organic compounds containing sulfur and nitrogen. They are used for the preservation of products, e.g. cleaning agents, paints, cosmetics.

When choosing ecological raw materials, AURO always makes the least possible compromise. In this way we have managed to skip preservatives for 92% of our product range. Unfortunately, for a few products using preservatives is inevitable. The valid EU regulations on biocides restrains the usage of natural preservatives, even though they have a history of several hundred years. Thiazoles are the only synthetic material used by AURO. The amount is minimal: depending on the product, the concentration ranges from 0,01 to 0,02%.

Even these products comply with AURO's philosophy because they are still the most ecological solutions of their kind. Nonetheless, our R&D department works on an improvement of their composition with high priority. Generally, it needs to be mentioned that the currently valid and the expected future regulations (EU, biocide regulation etc.) will without doubt have an increasing impact on the the choice of raw materials.

Resource efficiency

Compostable paint residues

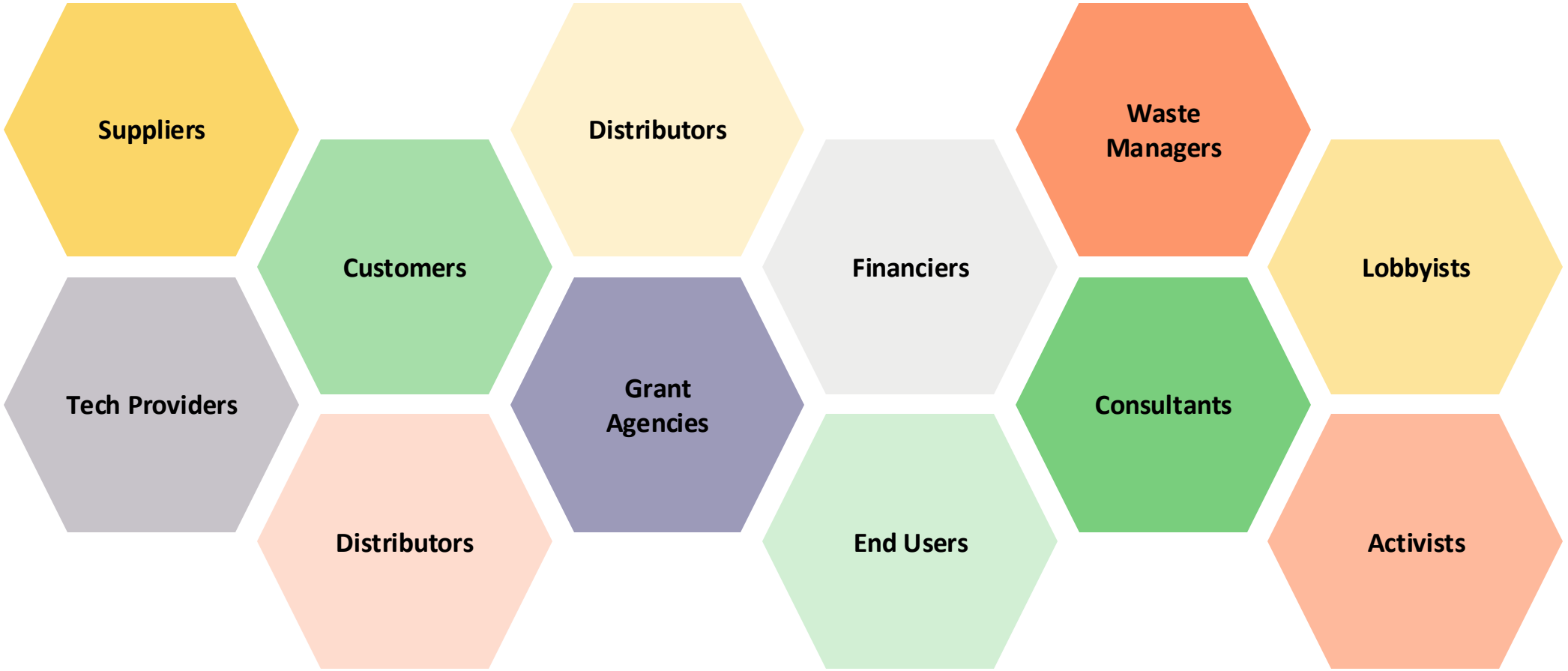
Each year, we filter around 8,640 kg of solids from our production wastewater, which can, of course, be returned to the natural material cycle without hesitation. The dried production residues from the vessels are first dissolved with AURO stripping paste and then cleaned with rain-water from our cistern. The filtered suspended solids are dried and the purified water is discharged into the public sewer system. The dried paint residues can be returned to the natural cycle, as it is biomass and can be used for fertilization.

Source: Auro

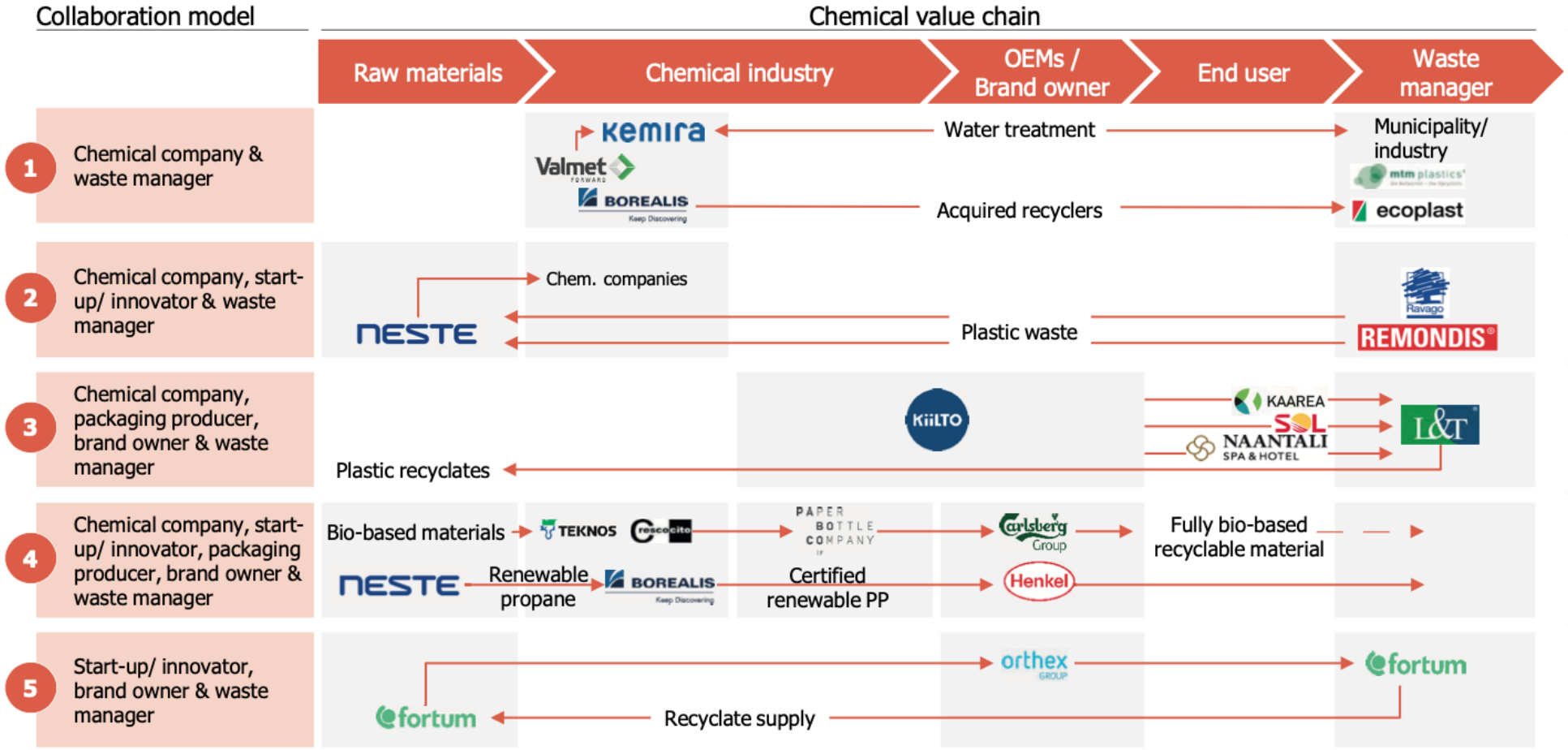
Overview

- Collaboration is critical to sustainable transformation
- Traditional partnerships, but also newer models
- Public, private, and non-profit sector must all be involved

Potential Partners



Example Partnerships



Examples

Kemira and Valmet collaborate to bring significant improvements to wastewater treatment processes.

Borealis acquired plastic recycling companies Ecoplast and mtm plastics to expand its recycling capabilities.

Neste is collaborating with Ravago and REMONDIS to enable chemical recycling of over 200 000 tons of plastic waste annually

Kiilto collaborates with its customers to promote the recycling of plastic packaging used for its products.

Teknos is contributing to the development of a bio-based and recyclable paper bottle, working closely with Crescocito.

Orthex sources recyclates that have been processed by Fortum to use them as new plastic material in their furniture products.

Source: Accenture

Case Study: Apple

Partnerships

Founding member of Clean Electronics Production Network. Launched Toward Zero Exposure program focusing on substituting toxic process chemicals.

Worked with Clean Production Action to create safer cleaner criteria for electronics

Work with ChemForward on chemical hazard assessments

Worked with ChemSec to develop ChemCoach approach for evaluating alternatives to endocrine disruptors

Work with Beyond Benign on university-level green chemistry education to build talent pipeline

Funding Sources

- EU Innovation Fund
- Horizon Europe
- Circularity Capital
- Capricorn Investment Group
- Closed Loop Partners
- Chemical Angel Network
- PTT GC Ventures
- Safer Made
- European Circular Bioeconomy Fund
- Check your country and region

Organisations

- Change Chemistry (formerly GC3)
- Beyond Benign
- ISC3
- EuChemS
- OECD
- Biobased Industries Consortium
- Cefic

Exercise (30 min solo, then discuss with a partner)

Brainstorm possible transformation initiatives for your organisation – at least one for each area.

Operations	Culture	Products/Services	Ecosystem

Which initiative would be most realistic for your organisation to pursue right now? Circle or highlight one above to expand on.

Actions	Partners	Technologies	Expertise
What are the key actions needed to make the initiative happen?	*What sort of partners might be helpful?*	*Are there technologies that can enable or support the effort?*	*What expertise do you need? Do you have it internally?*

If you wanted to move this initiative forward right now, what would be the first step you could take?

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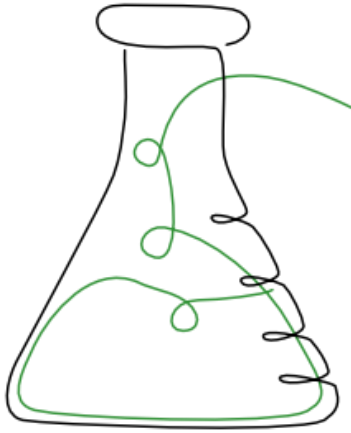
Transformation from Below



Intrapreneurship

"Healthy growth requires a smattering of intrapreneurs who drive new projects and explore new and unexpected directions for business development."

Richard Branson
Virgin Group

Intrapreneurship

- Stable companies have inertia; can be averse to change
- Innovation from within – intrapreneurship – can create significant value

- Range of intensity levels, from suggesting idea to leading a project

Transformation from Below

01

Identify a problem

“If I were given one hour to save the planet, I would spend 59 minutes defining the problem and one minute resolving it.”

Albert Einstein

01

Identify a Problem

What are you trying to solve?

- Sources of information
  - Talk to peers
  - Industry-specific events and publications
  - Sustainable chemical literature
  - NGO publications
  - ECHA SVHC list
- List existing problems
- Prioritise by urgency or easy solutions

01 Identify a Problem

Examples:

- Hazardous chemical in product or process
- Inefficient chemical synthesis
- Energy-intensive manufacturing method
- Fossil-based chemical product
- Excessive plastic packaging

Today’s example: hazardous sunscreen ingredient, oxybenzone

02

Transformation from Below

Gather information

“Passion provides purpose, but data drives decisions.”

Andy Dunn,

Bonobos Inc.

02

Gather information

How bad is the problem? How could you fix it?

- Consequences
- Possible solutions
- Implementation strategy
- Cost
- Competition
- Past work by your company
- Market trends

02 Gather Information

Examples:

- Consequences: lose market share, fall behind IP, future regulations
- Possible solution: ZnO or octocrylene alternative
- Reformulation/process changes: one physical, one chemical
- Consequent costs: single ingredient changed or more?
- Competing brands on the market: yes
- Company history: has this been tried before? Other reformulations?
- Market trends: negative PR about reefs, consumer behaviour

Transformation from Below

03

Know your buyer

“The two words 'information' and 'communication' are often used interchangeably, but they signify quite different things. Information is giving out; communication is getting through.”

Sydney J. Harris

03

Know your buyer

How can you convince the decision maker(s)?

- Level of technical knowledge
- Goals and priorities
  - Profit?
  - New product lines?
  - IP?
  - Corporate sustainability goals?
- Approach to change
- Company culture
  - Radical vs. incremental

03 Know Your Buyer

Example:

- Head of R&D (they have a chemistry background)
- Has a PhD and 20 years working in formulation
- You've noticed from previous comments that sustainability doesn't seem to be a top priority and they have directives from above to focus on highly profitable products
- Are they proud of staying loyal to a coffee brand for 15 years? Or do they regularly talk about new restaurants they try?

03 Know Your Buyer

Example:

- How does the company present itself in internal meetings and the press?
  - Look for wording around stability, loyalty, family-owned, age of the company vs. innovative, disruptive, cutting-edge, advanced
- Lead them to a solution collaboratively:
  - “Have you considered…”
  - “What if we…”
  - “I think we might have more luck with…”

Transformation from Below

04

Find the business value

“The fastest way to succeed is to look as if you're playing by somebody else's rules, while quietly playing by your own.”

Michael Korda

04

Find the business value

How can the solution benefit the company?

- The solution needs to create value
- Change and innovation come with risks
  - losing sales
  - losing market share
  - reputation harm
  - losing R&D investment
  - regrettable substitution
- Need to outweigh the risks with sufficient benefit

04 Find the Business Value

Example:

- Consumer demand
- Future-proofing against legislation
- New IP
- Enter new markets – baby sunscreen
- Grant or investment money to derisk R&D
- Cost reductions by switching to safer chemistry

Transformation from Below

05

Follow up and get commitment

“Pinging people is a critical skill.”

Joel Tickner

Change Chemistry

05

Follow up and get commitment

What’s the first reasonable step?

Commitment doesn’t have to be large right away:

- Put a 10-minute discussion on the calendar
- Ask them to read a specific case study
- Planting the initial seeds is important - can be a long-term effort
- At later stages can try to set a date for a decision

05 Follow Up and Get Commitment

Decision-makers are busy, often overwhelmed - often need to be (politely) nudged (“pinged”):

- Be aware of how often it’s reasonable to ping someone
  - depends on how closely you work with them and how busy they are
- Give 1-2 weeks between follow-ups unless something is very urgent
- For more distant relationships, could be as long as a month

Bonus: Benefit professionally from your efforts

- Measurable change can go on a CV and be brought up in performance reviews
- Keep records of quantifiable outcomes of your efforts for promotion applications or job interviews
- Use good business sense throughout the process to prove your initiative and drive - not just making a fuss and aggravating your boss/colleagues
- If your efforts aren’t benefiting the company, you’re probably going about it the wrong way

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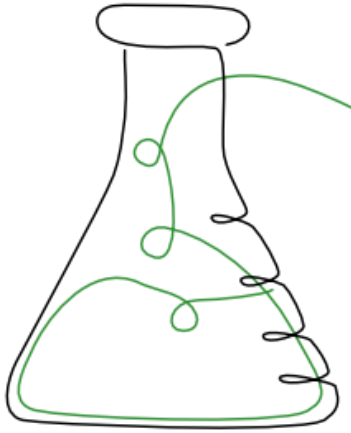
Conclusions



To sum up…

- Complete green chemistry transformation covers all areas of business
  - Operations
  - Culture
  - Products and services
  - Ecosystem
- Partnerships are particularly important to accelerate the transition
- You don’t need decision-making power to create change

Further Reading

- Sustainable Business Models for Chemical Industry https://www.sitra.fi/en/publications/circular-business-models-for-chemical-companies/
- Winning in a Circular Economy https://cefic.org/app/uploads/2020/04/Accenture-Winning-In-A-Circular-Economy-Executive-Summary.pdf
- Blueprint of Green Chemistry Opportunities for Circular Economy https://greenchemistryandcommerce.org/documents/gc3-circular-economy-report.pdf

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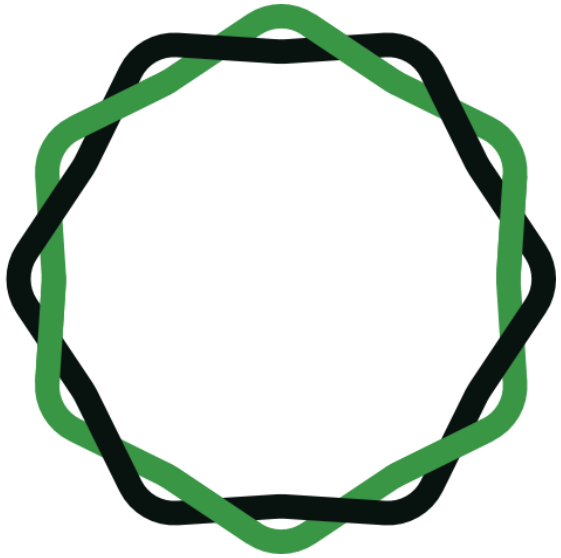

Questions?

Contact Tabitha Petchey at tabitha.petchey@greenrosechemistry.com.