



Knowledge grows

Circular Economy in Yara:

To Integrate Renewable
Resources to Feed a
Growing Global Population

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Mission



*Responsibly feed the world
and protect the planet*

Vision



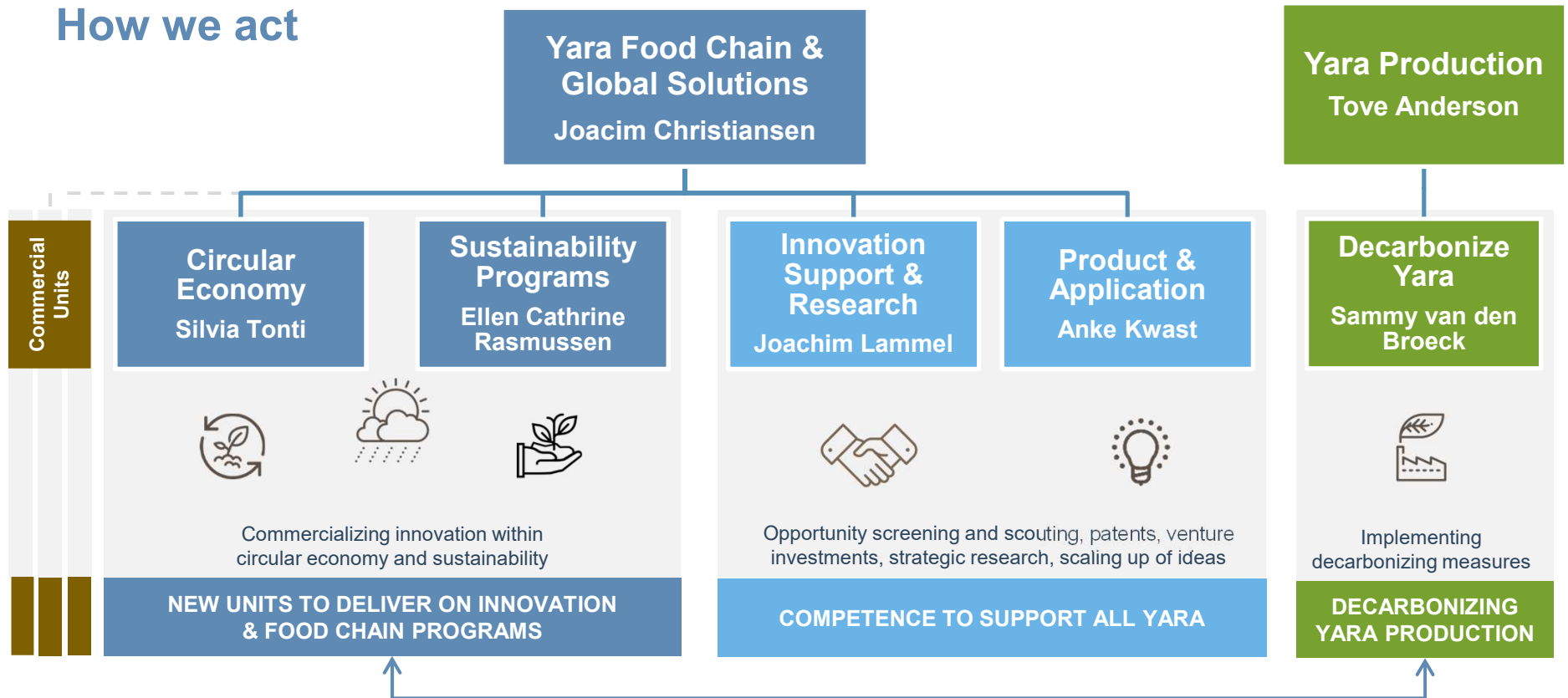
*A collaborative society;
a world without hunger;
a planet respected.*

The Crop Nutrition Company for the Future

Over the coming years, we will take significant steps toward realizing our vision

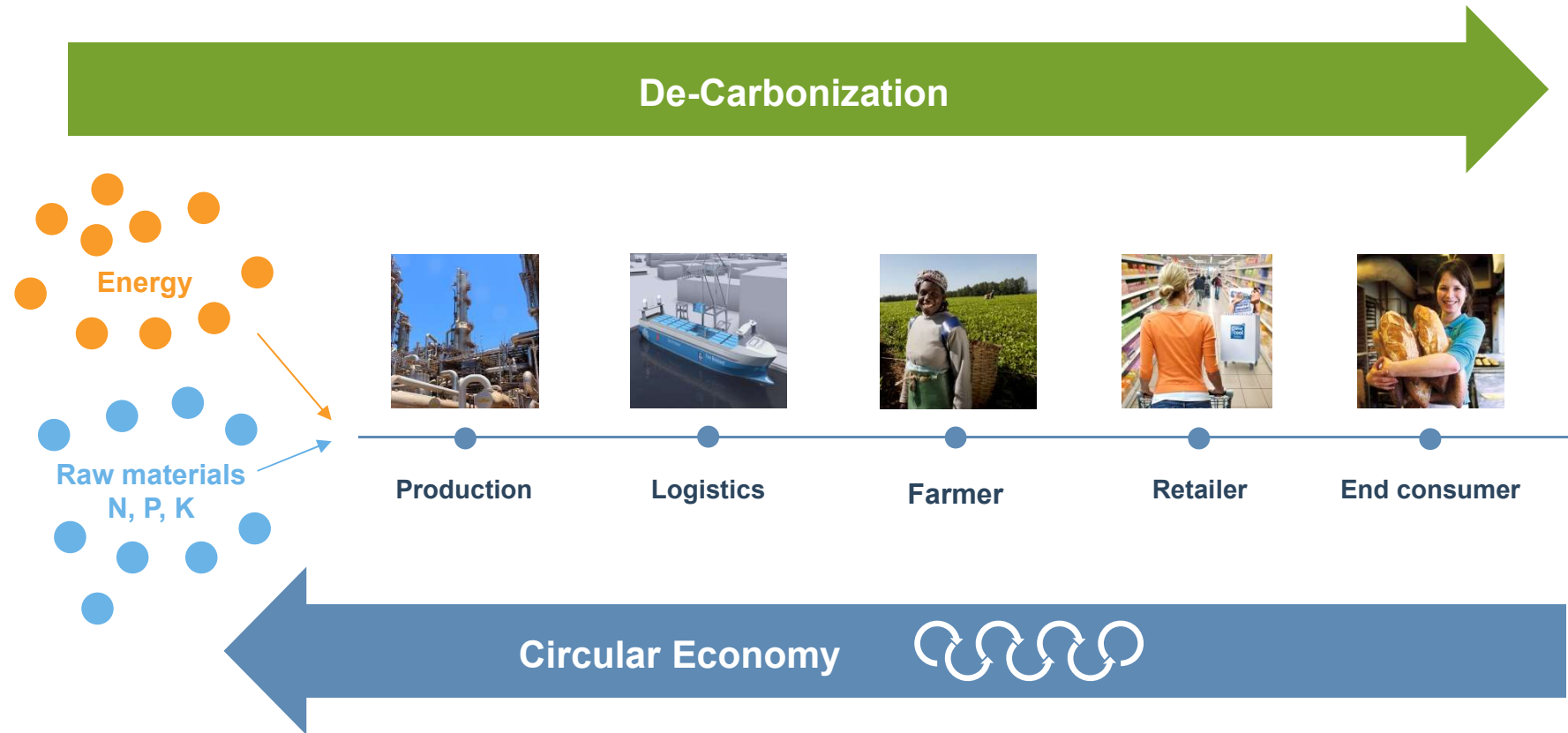


How we act

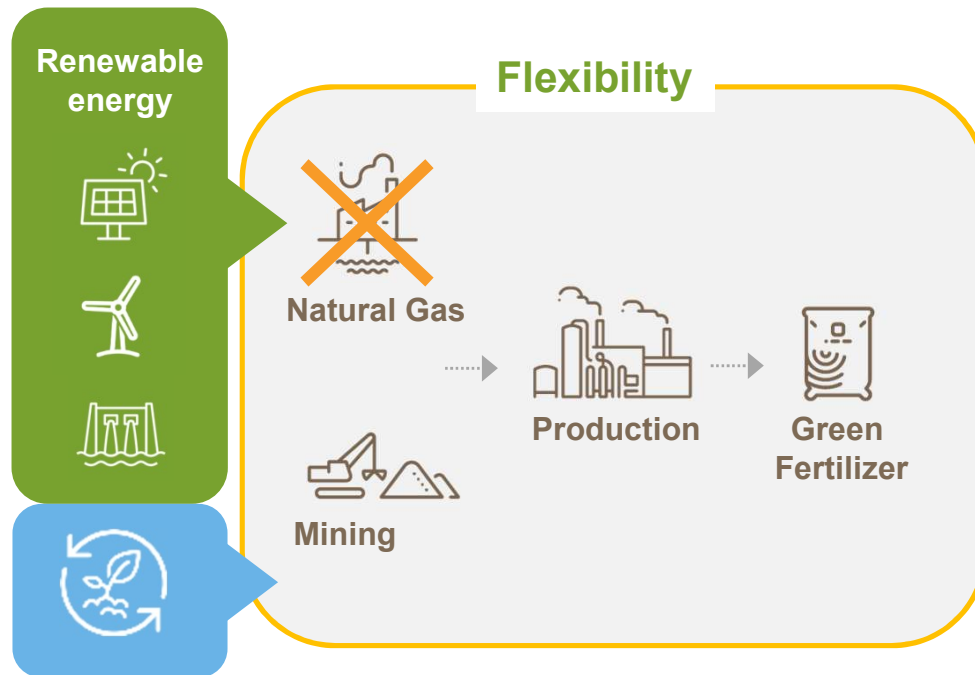


Combination of existing businesses, new Business Units and competence functions in Yara

Climate Solutions across the Value Chain



Green fertilizer



August 20, 2019

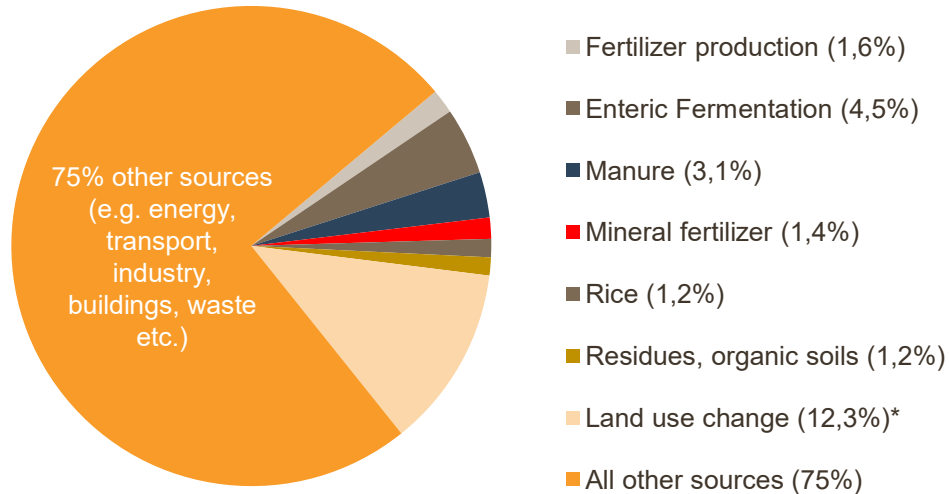
Yara and Nel collaborate to produce carbon free hydrogen for fertilizer production

In an agreement signed today, Yara and Nel confirm their shared ambition of developing clean hydrogen which would allow Yara to realize low carbon footprint fertilizer production.



“The Agricultural Sector Contributes to 25% of Global GHG Emissions”

Total: 49 Billion t CO₂-equivalents



Yara's Response



- Carbon neutral production



- Circular economy



- Digital solutions



- Farmer practice



- Logistics and ammonia energy

* Emissions only, no sinks such as afforestation considered

Yara Intends to Deliver Business Solutions to the Resource Scarcity and “Waste” Management Challenges

RESPONSE to the Circular Economy call

Yara engages in full **3R concept** of Circular Economy to achieve the overall goal of EU policy to establish a **"zero waste" society by 2050: reduce, reuse, recycle**

- Yara's crop nutrition practice is **already strong in the 'reduce'**: highest yield by most efficient nutrient uptake and minimum nutrient run off
- Yara dedicates additional efforts to **identify appropriate nutrient sources** to be reused and recycled back to agriculture.
- Yara exploits its **know-how and services** for a new offering of 'precision circular agriculture'.

Clear MANDATE on Circular Economy

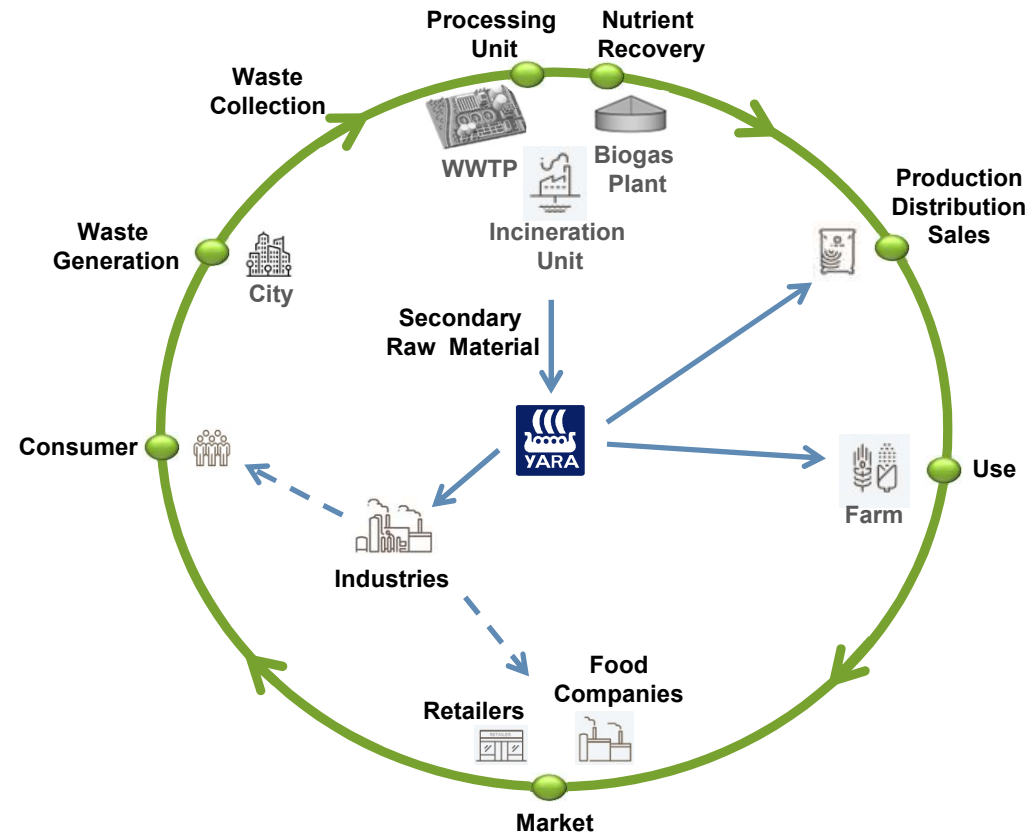
The Yara Circular Economy approach will **create sustainable and scalable business solutions** and new economic models across the nutrient value chain to responsibly feed the world and protect the planet.



Strategic Priorities for Circular Economy in Yara

Focus Areas

Recovered nutrients directly to agricultural market	Extension of existing product portfolio / services with solutions originating from processed organic material
Secondary raw material to fertilizer production process	Use of extracted nutrients from recyclates as raw material back to existing production plants
Industrial symbiosis	Promote “Industrial loops” to re-use chemical, secondary raw material from recyclates (circularity as offer)



Contribution to Circular Economy via Strategic Partnership

Yara evaluates opportunities related to P- and N recyclates, with the aim to utilize them directly e.g. in the agronomic sector, in Yara production processes or in small industrial loops in the future.

Press release:

Oslo/Paris, 21 January 2019: Today, global resource recovery company Veolia and leading crop nutrition company Yara signed an agreement to develop circular economy in the European food and agricultural chain by recycling nutrients and creating nutrient loops.

The expert partnership integrates Veolia's access to growing volumes of recovered nutrients and expertise in handling organic materials with Yara's mineral fertilizer production expertise and crop nutrition knowledge. The partnership connects the end and beginning of today's linear food value chain and will effectively close the nutrient cycle.



Contribution to Circular Economy via Strategic Partnership

Yara evaluates opportunities related to P- and N recycles, with the aim to utilize them directly e.g. in the agronomic sector, in Yara production processes or in small industrial loops in the future.



“Reducing global resource depletion and nutrient loss by increasing the recycling of nutrients such as nitrogen and phosphorus is an important task. The collaboration with Veolia is a contribution to our mission to responsibly feed the world and protect the planet.”

SVEIN TORE HOLSETER
PRESIDENT AND CEO OF YARA



“We are delighted that Yara has chosen Veolia to support its circular economy strategy. Veolia and Yara already aim to have several new initiatives fully operational by 2024, including the launch of new fertilizer products and the start-up of nutrient recovery installations in several major European cities. The collaboration between our companies is a step closer to effectively closing the nutrient cycle.”

ANTOINE FRÉROT
VEOLIA CHAIRMAN AND CEO

Contribution to Circular Economy – Examples & Focus Areas

Yara evaluates opportunities related to P- and N recyclates, with the aim to utilize them directly e.g. in the agronomic sector, in Yara production processes or in small industrial loops in the future.

Evaluate opportunities in different sectors for N- and P recovered products

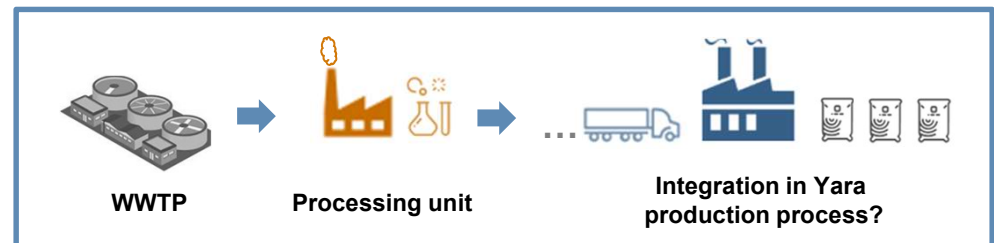
- Wastewater / sludge
- Biogas / digestate
- Manure

➤ Case studies

- Yara production (or direct re-selling):
 - Possible integration into production process
 - Sufficient quality / quantity
 - Cost / benefit analysis (process & transport)
- Legislative requirements

Exchange & Collaboration with key stakeholders

- Associations
- Technology providers
- Scientific level:
Universities, institutes, Yara R&D dept.



Contribution to Circular Economy - Examples & Focus Areas

Yara evaluates opportunities related to P- and N recyclates, with the aim to utilize them directly e.g. in the agronomic sector, in Yara production processes or in small industrial loops in the future.



Different P-recycling products

Source: Iris Wollmann,
<https://www.oekolandbau.de/landwirtschaft/pflanze/grundlagen-pflanzenbau/duengung/phosphor-duengung/recycling-phosphorduenger/>

Example wastewater: - P from sludge ashes
- P from liquid phase



**“Berliner Pflanze”
(struvite)**



**“ChrystalGreen”
(struvite)**



**“Struvia”
(organo-mineral fertilizer)**

Source: webpages Berliner Wasserbetriebe, Ostara, Veolia

Summary

- The Yara Circular Economy approach will **create sustainable and scalable business solutions**.
- **New economic models** across the nutrient value chain will be developed to responsibly feed the world and protect the planet.
- Yara evaluates opportunities related to P- and N recycling.
- We aim to utilize new solutions as sustainable crop nutrition offering in the agronomic sector, in Yara production processes or in small industrial loops.
- Yara is open for partnerships to progress the circular economy journey in line with its mission and vision.

Thank you for your interest!



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