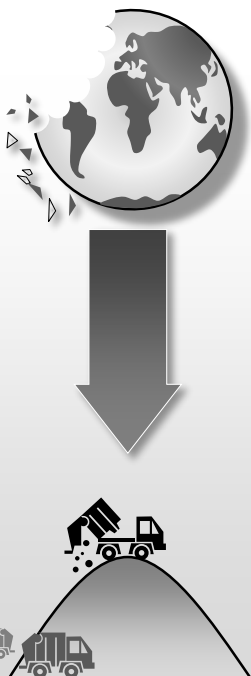


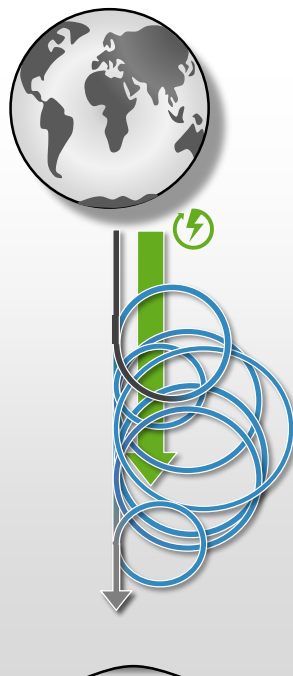
LINEAR  
ECONOMY



RECYCLING  
ECONOMY



CIRCULAR  
ECONOMY



 **BASF**

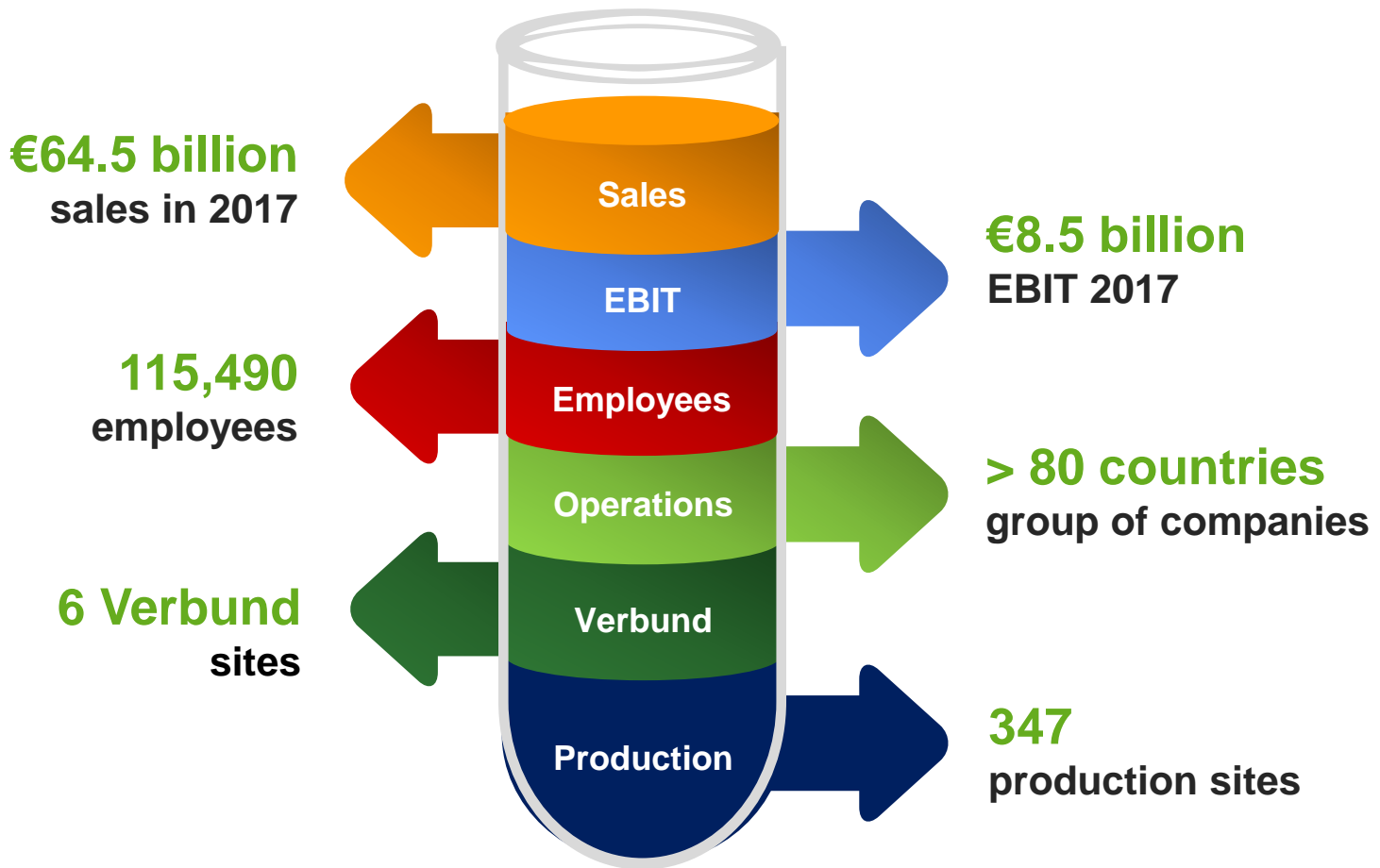
We create chemistry

## Circular Economy powered by BASF

Daniel Loh, President Director,  
BASF Indonesia

Jakarta, October 25, 2018

# BASF – We create chemistry for sustainable future



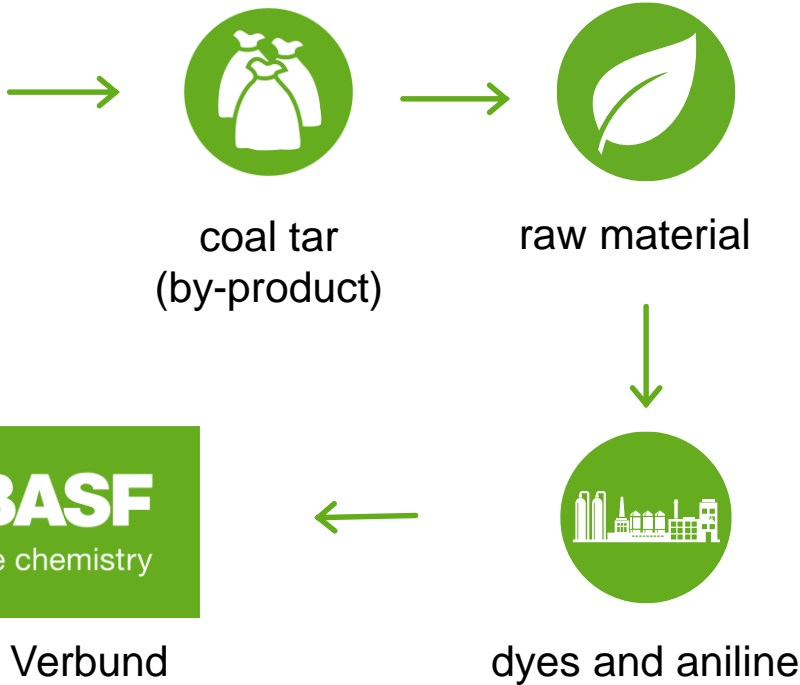
Our chemistry is used in almost all industries

# BASF's roots in circular economy

Verbund Concept was introduced as early as 1865

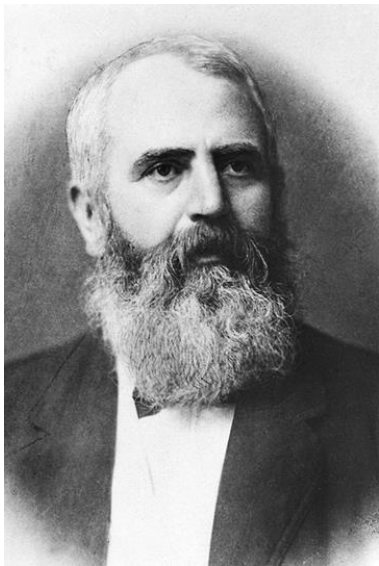


Coal gas for street lamps



BASF's Verbund Concept

**3.9 mio tons**  
of CO<sub>2</sub> emissions  
avoided in 2017



BASF's founding father  
Friedrich Engelhorn

# Innovation – meeting challenges, developing new business areas

Research for the future: With our innovative products and processes, we provide sustainable solutions for global needs.

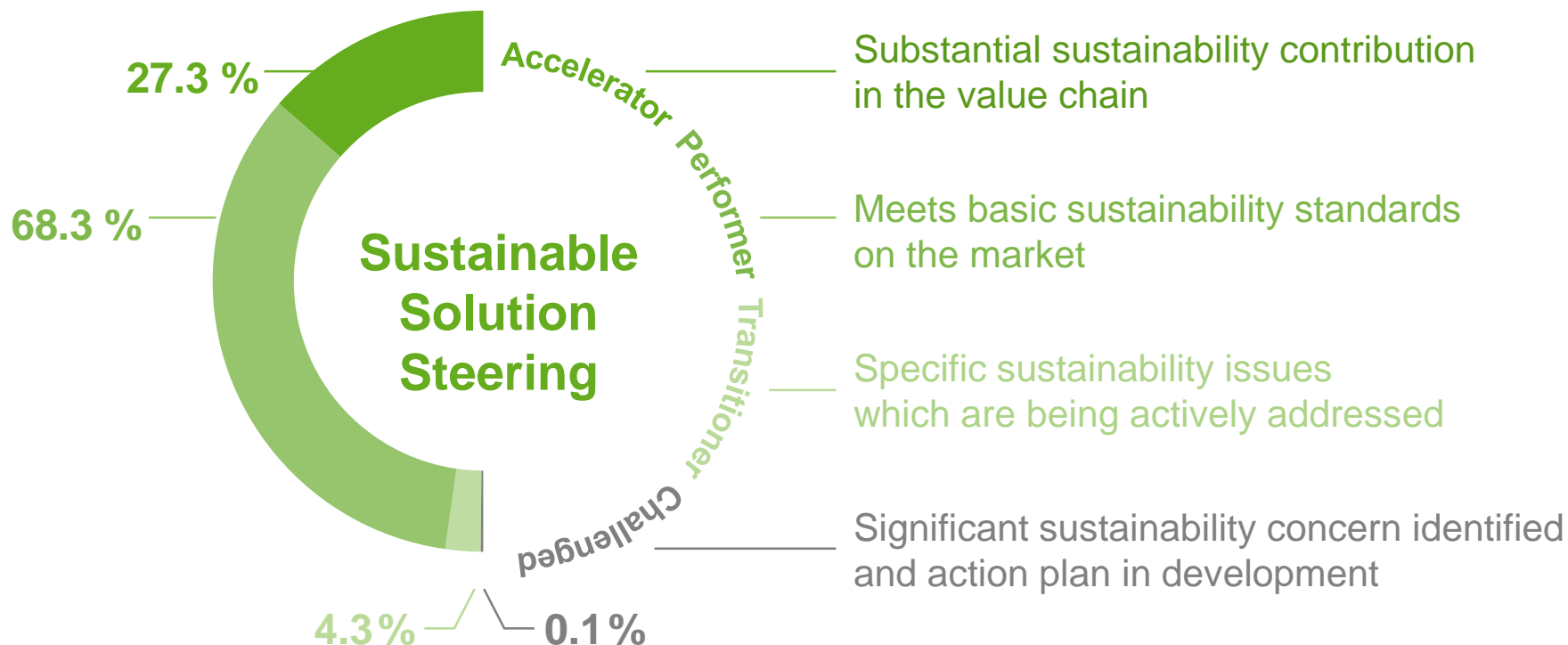
- R&D Expenditures in 2017 was **€1,863 million**, world leader in chemical industry
- **~10,000 employees** in R&D
- Around **3,000 research projects**
- Around **850 new patents** filed
- Leading position in Patent Asset Index for 18 consecutive years



**BASF list as #23 in BCG's Top 50 Most Innovative Companies 2018**

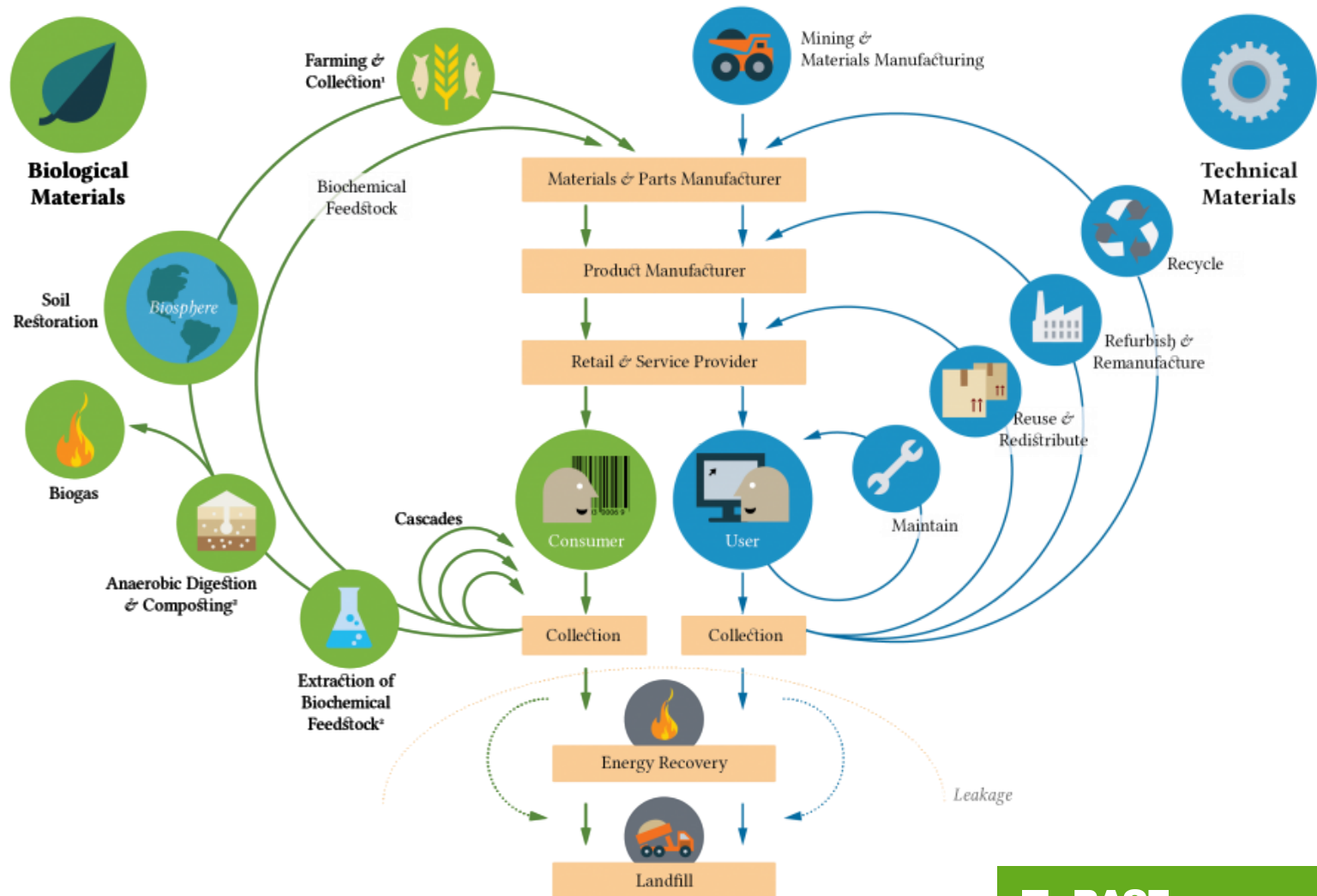
# Sustainable Solution Steering®

How our products contribute to sustainability



We strive to increase the “Accelerators” and phase-out “Challenged” solutions

# The Circular Economy includes two cycles: A Biological Cycle and a Technical Cycle



Source: Ellen MacArthur Foundation, 2017

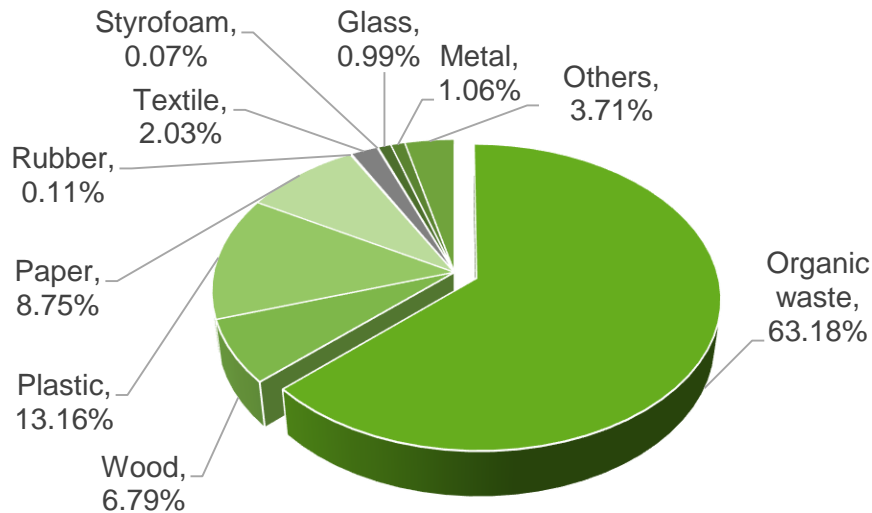
# Biological cycle: massive amount of organic waste

– one of the most abundant biomass

- Indonesia produces 65.8 mio tons of Municipal Solid Waste (MSW) per year
- 65% of MSW is sent into landfills
- Only 7% is recycled
- Increasing environmental concerns



Waste Composition in Indonesia



Source : Ministry of Environment & Forestry, Sustainable Waste Indonesia (2018), World Bank, Indonesia Marine Debris Hotspots Rapid Assessment (Apr 2018)



# Inconvenient truth: hazards of a landfill

The Sydney Morning Herald

WORLD ASIA BALI

## Bali waste dump fire rages for more than a day

By James Massola & Amilia Rosa  
25 September 2018 – 4:33pm

f t e A A A

**Denpasar:** A fire has been raging for than 24 hours at a major waste dump on the tourist island of Bali, generating a plume of thick smoke several kilometres long and causing breathing difficulties for locals.

The fire, at the Suwung final dump site, began just after 11.20am local time on Monday and is believed to have been started by methane gas at the landfill heating up and igniting.



- cattle grazing at the Bali landfill on a clear day

The Jakarta Post

FRIDAY October 19, 2018

## Bekasi raises stink again over Jakarta's garbage

Callistasia Anggun Wijaya  
THE JAKARTA POST/JAKARTA

The Jakarta administration's dependence on the Bantar Gebang dump site in Bekasi, West Java, stemming from a lack of waste treatment in the capital, has resulted in recurring conflict, in which city garbage trucks were blocked by the Bekasi administration as a result of issues related to compliance and grants.

Early on Wednesday, 16 of 51 city garbage trucks were stopped near the Bekasi Barat tollgate on Jl. Ahmad Yani. The vehicles were eventually released at 2 a.m. on Thursday.

Bekasi Transportation Agency head Yayan Yuliana said the trucks were stopped because the Jakarta administration had failed to fulfill some of its obligations under the cooperation agreement signed by the Jakarta and Bekasi administrations.

**16 of 51 city garbage trucks blocked en route to Bantar Gebang**

**Bekasi administration accuses Jakarta of violating its obligations**

use compactor trucks," Yayan said on Thursday.

As they used open trucks, not compactors, liquid waste spilled onto the toll road and made it smelly, he said.

While inspecting the trucks, the Transportation Agency found some of the trucks did not have vehicle registration certificates (STNKs) and vehicle roadworthiness test (KIR) certificates.

A similar incident in which city garbage trucks en route to Bantar Gebang were blocked also occurred in November 2015.

Jakarta Environment Agency head Isnawa Adji said the Jakarta

could only use two other access roads in Cipendawa and Cibubur.

"The closure of the tollgate will result in traffic jams and resident complaints," Isnawa added.

Earlier, the Bekasi administration threatened to block trucks en route to the dump site, as the Jakarta administration had not given grants that would be used by Bekasi to continue the development of the Rawa Panjang-Cipendawa overpass, which will ease the journey of the Jakarta garbage trucks to Bantar Gebang.

The estimated cost of clearing land for and developing the overpass is Rp 1 trillion (US\$65.7 million).

Jakarta Governor Anies Baswedan said on Thursday that the city administration had paid its compensation of Rp 141 billion in May this year.

Compensation, also known as *uang bau* (smelly money), is money allocated by the city administration to each affected house-

grants of Rp 2.09 trillion on Oct. 15 to continue the development of the overpass and execute land acquisition.

Back in 2017, the city administration had helped the Bekasi administration develop the overpass, but it had yet to submit accountability reports regarding use of the grants, Premi said.

Therefore, the city administration asked Bekasi to complete its documents first.

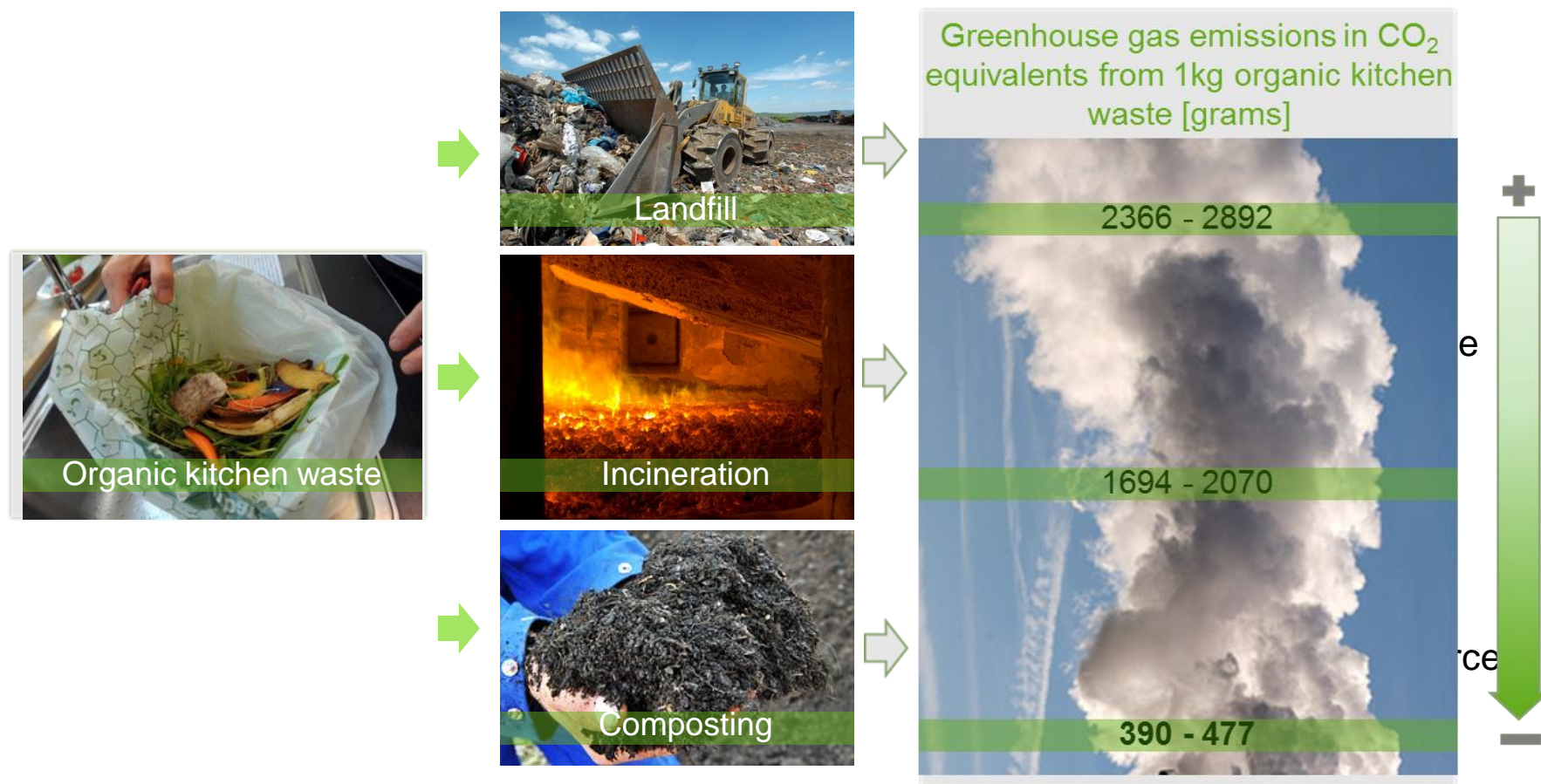
"We need them to submit documents regarding the development plan. We need to know how much money they had used and their further plans," Premi said.

According to Home Ministry regulations, grants to other regions can be given by taking into account the city's financial condition, Premi said.

The city administration will review the proposal submitted by the Bekasi administration before giving Bekasi the grants, Premi



# Composting as end of life options for organic waste minimizes impact to the environment



Source: ROUGH calculations by BASF (not third party verified) with assumptions taken over from a certified EEA study

# The beneficial cycle for food waste (Nutrient Loop) – enabled by ecovio®



# Technical cycle: waste to raw materials

## Construction Industry's Impact to the Environment



Contributes to **30%**  
of the global greenhouse gas emissions

Consumes up to **40%** of the world's  
energy

**Concrete:**  
most widely used man-made  
material (1m<sup>3</sup> /Pers/annum)



# Reducing the environment impact with technology

Using construction chemicals as enabler to reduce environmental impact



- Green Sense® Concrete Technology - Unique performance package that optimizes concrete mixtures
- Increases the use of **recycled materials** in Concrete mixtures formulation by using
  - **Alternative aggregates (up to 25%)**
  - **Alternative binders (up to 60%)**
- Benefits
  - Up to 45% reduction in carbon footprint<sup>1</sup>
  - 50-70% less manual compaction in comparison to conventional concrete
  - Up to 5X increase in work productivity

Notes :

<sup>1</sup> Source: Lifecycle analyser on Project at Office BldgD105, Ludwigshafen

# Alternative aggregates

Natural sand supplies are becoming scarce

- Reduce environmental impact on aggregate mining:
  - silting of river
  - sound, air & dust pollution
  - damage of ecosystem
  - reduction of green area
- 1.3 bio tons/yr construction waste generated, set to increase to 2.2 bio tons/yr by 2025\*
- Alternative aggregates
  - Concrete waste
  - Higher usage of manufactured sand
  - Higher “green points” accreditation



\*Source: Transparency Market Research, Construction Waste Market: Global Industry Analysis, Size, Share, Growth, Trends & Forecast 2017-2025

# Alternative binders

Cement production causes 6% of the world's CO<sub>2</sub> emissions

- Fly ash can be utilized as alternative pozzolan
  - Globally, 65% of fly ash ends up in landfills and ash ponds
  - 53% of Indonesia's electricity comes from coal-fired power plants, producing **5.2 mio tons** of fly ash annually
- Other alternative binders from by-products
  - Slag from steel production
  - Silica fume from quartz metal silicon production







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# Sustainability Ratings, Rankings and Awards

## CDP Disclosure Leadership

BASF is one of the world's leading companies in reporting on climate protection and in sustainable water. BASF has been included in the „CDP Water A“ list for the second time.



## FTSE ESG Rating & FTSE4Good Global Index

BASF received the highest score in the chemical industry in ESG rating and has been included again in the FTSE4Good Global Index.



FTSE4Good

## MSCI

In 2017, BASF achieved a AA-ESG rating the fifth time in a row and, therefore, currently belongs to the top 13% of the industry group „Diversified Chemicals“.



## Sustainalytics

BASF has scored in the overall ESG rating well, whereas the company has even finished as Leader in the Governance category.

