Building The First Circular Economy

Rolling out the Recycling Red Carpet

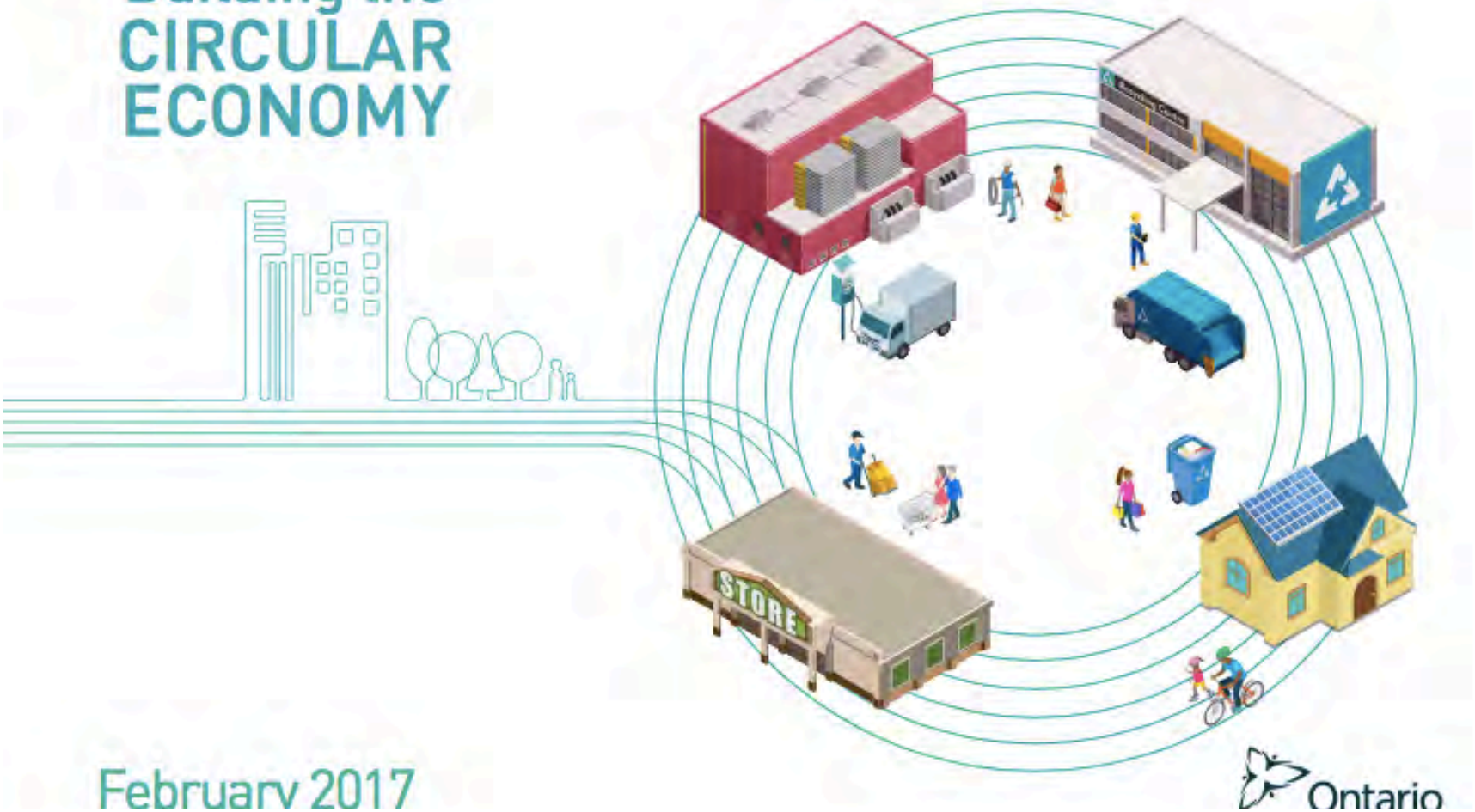
A waste reduction conference
September 20, 2018
Banff Alberta

Glen Murray
Senior Adviser
Emerge Knowledge Design

Strategy for a

WASTE-FREE ONTARIO

Building the CIRCULAR ECONOMY

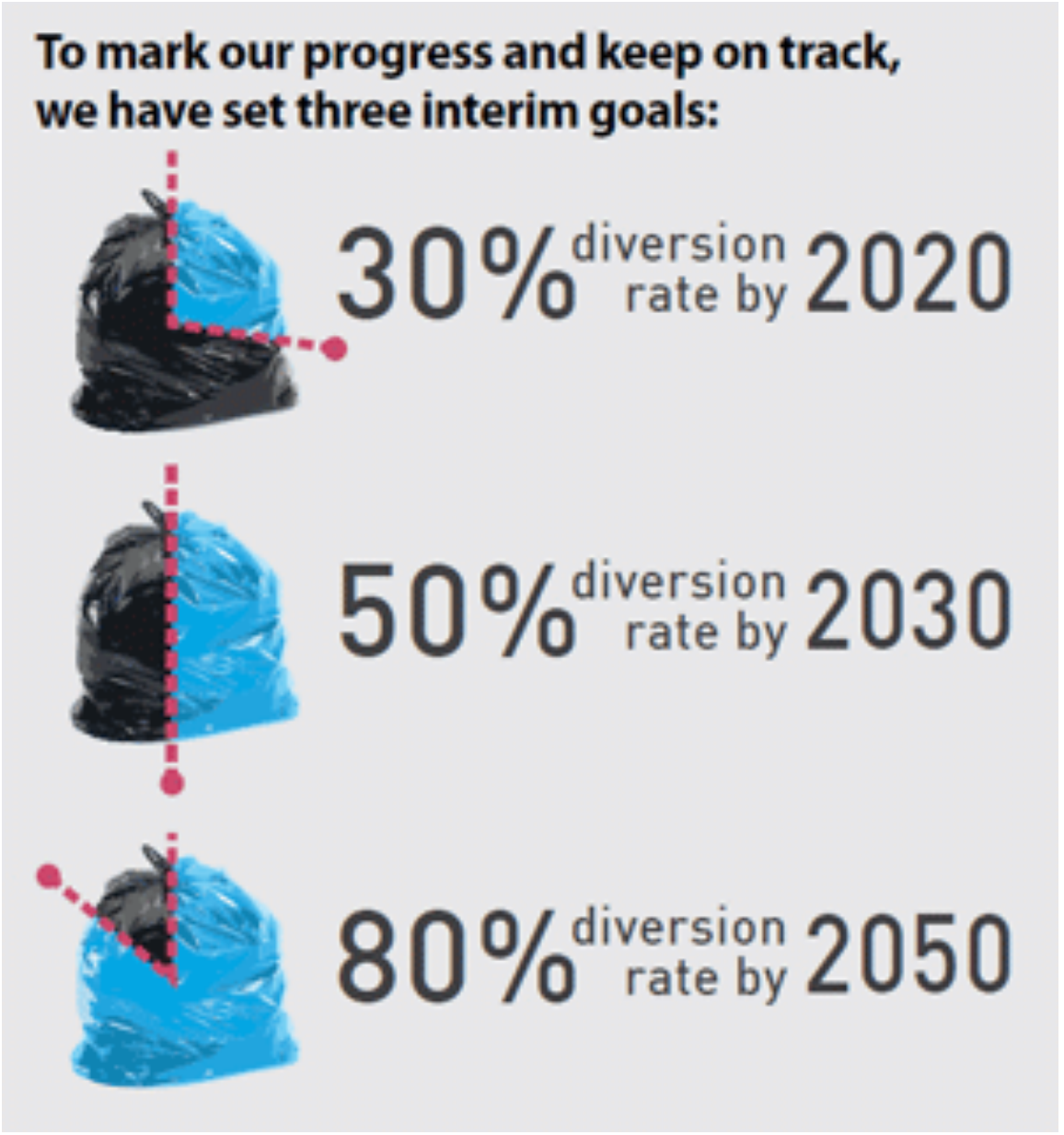


February 2017

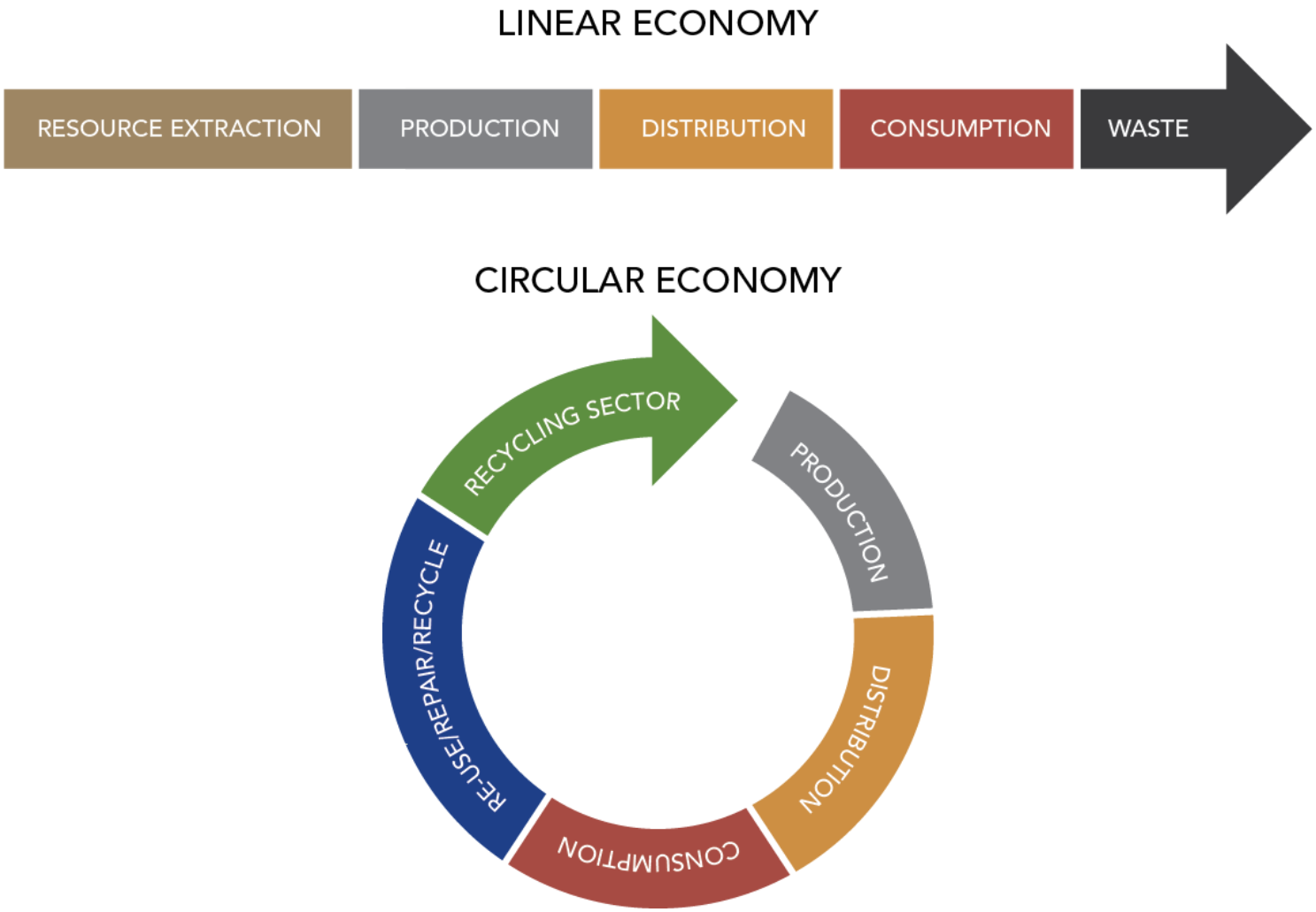
Ontario

The Circular Economy & Waste Free Ontario Act Bill 151

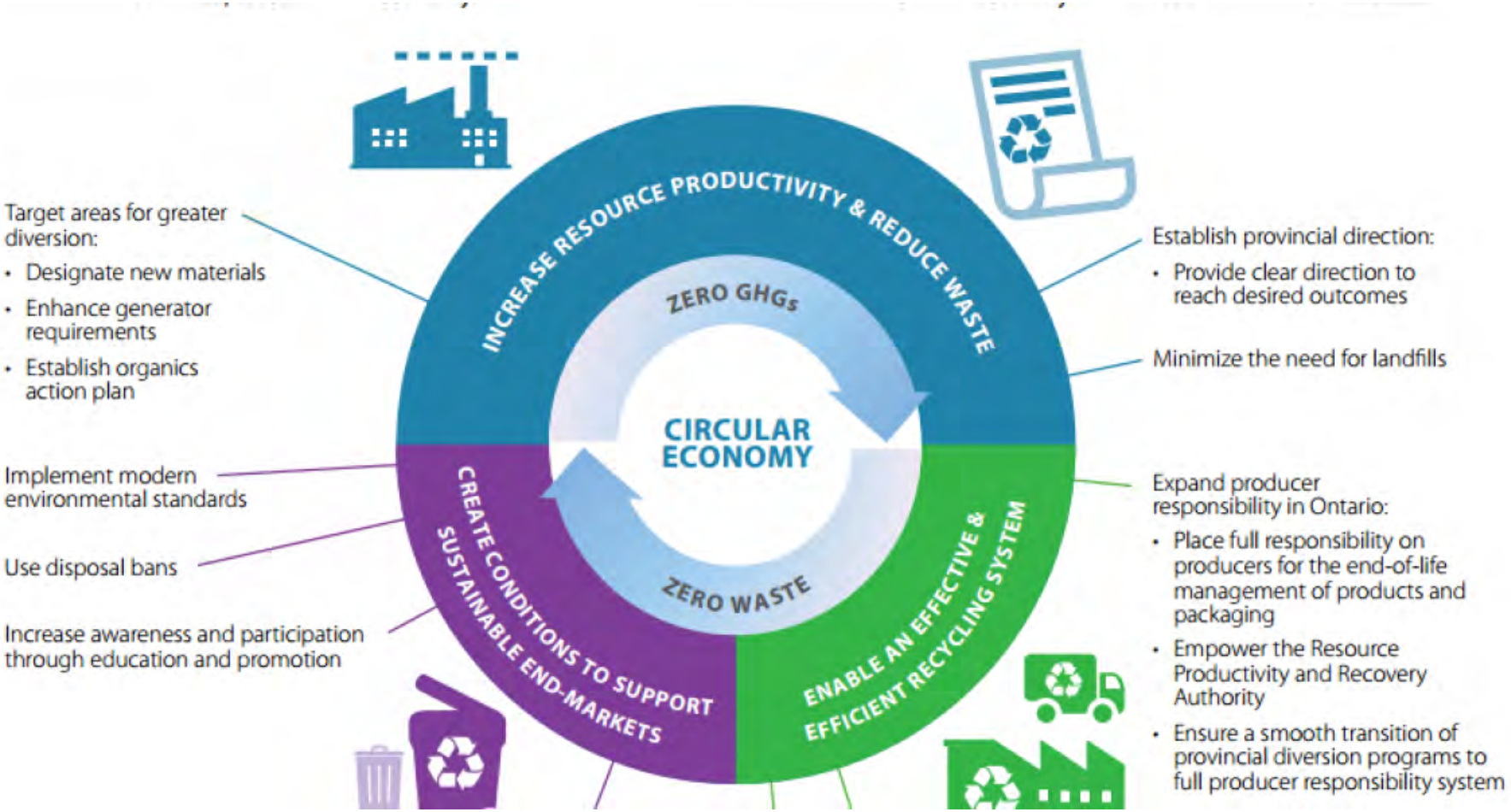
Waste Diversion Goals

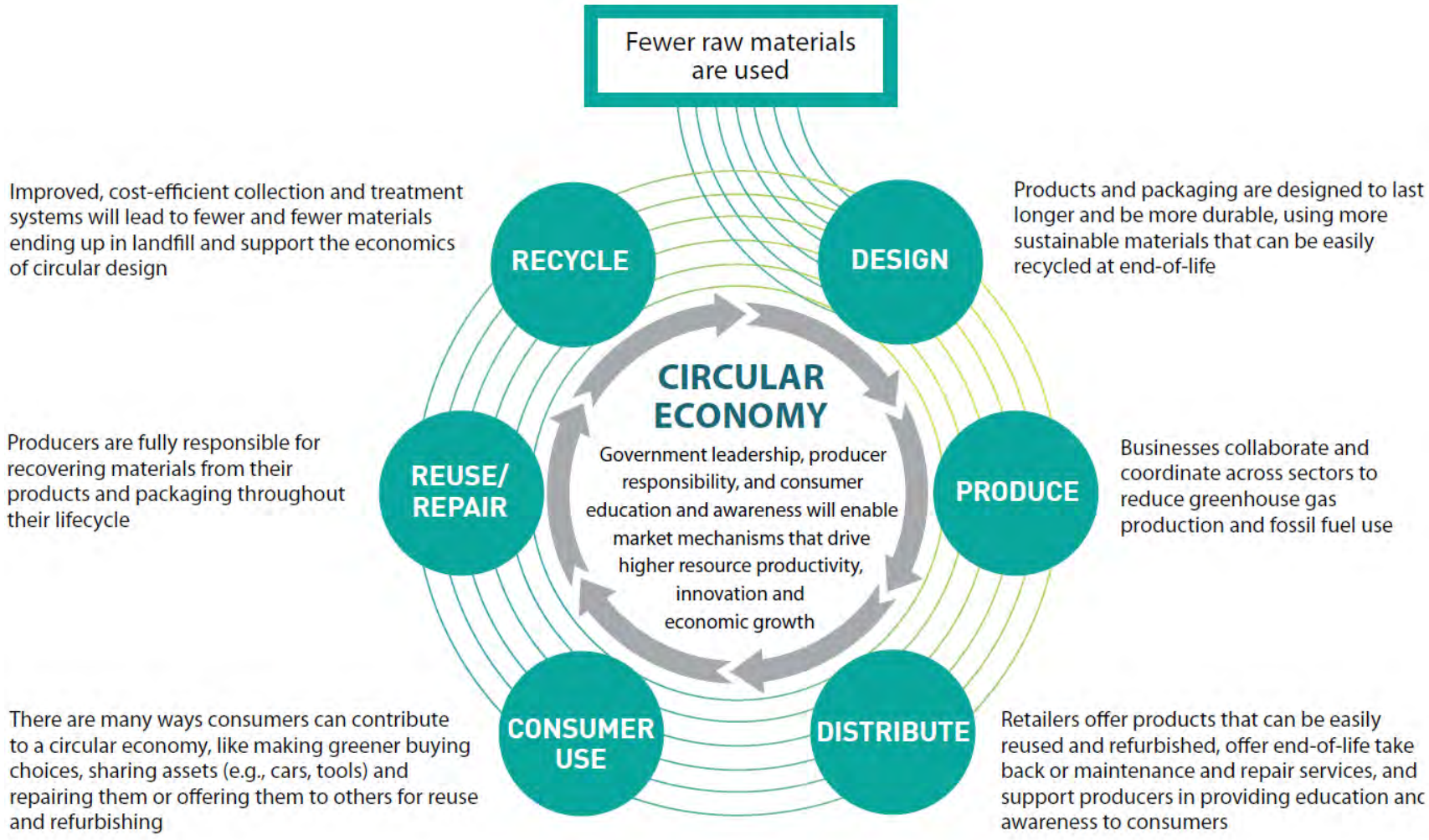


Linear to a Circular Economy



Resource Sourcing
Resource Use
Supply Chain Management
Resource Recovery


Target areas for greater diversion:
• Designate new materials
• Enhance generator requirements
• Establish organics action plan
Implement modern environmental standards
Use disposal bans
Increase awareness and participation through education and promotion
INCREASE RESOURCE PRODUCTIVITY & REDUCE WASTE
ZERO GHGs
CIRCULAR ECONOMY
ZERO WASTE
CREATE CONDITIONS TO SUPPORT SUSTAINABLE END-MARKETS
ENABLE AN EFFECTIVE & EFFICIENT RECYCLING SYSTEM
Establish provincial direction:
• Provide clear direction to reach desired outcomes
Minimize the need for landfills
Expand producer responsibility in Ontario:
• Place full responsibility on producers for the end-of-life management of products and packaging
• Empower the Resource Productivity and Recovery Authority
• Ensure a smooth transition of provincial diversion programs to full producer responsibility system


Fewer raw materials are used
Improved, cost-efficient collection and treatment systems will lead to fewer and fewer materials ending up in landfill and support the economics of circular design
RECYCLE
DESIGN
Products and packaging are designed to last longer and be more durable, using more sustainable materials that can be easily recycled at end-of-life
CIRCULAR ECONOMY
Government leadership, producer responsibility, and consumer education and awareness will enable market mechanisms that drive higher resource productivity, innovation and economic growth
Producers are fully responsible for recovering materials from their products and packaging throughout their lifecycle
REUSE/ REPAIR
PRODUCE
Businesses collaborate and coordinate across sectors to reduce greenhouse gas production and fossil fuel use
There are many ways consumers can contribute to a circular economy, like making greener buying choices, sharing assets (e.g., cars, tools) and repairing them or offering them to others for reuse and refurbishing
CONSUMER USE
DISTRIBUTE
Retailers offer products that can be easily reused and refurbished, offer end-of-life take back or maintenance and repair services, and support producers in providing education anc awareness to consumers

Possible Scenarios

Plastics

The linear economy dysfunction

We have externalized much of our production of goods to countries with high emissions to benefit from low labour costs

Fossil fuels and resources are shipped to these countries to manufacture goods

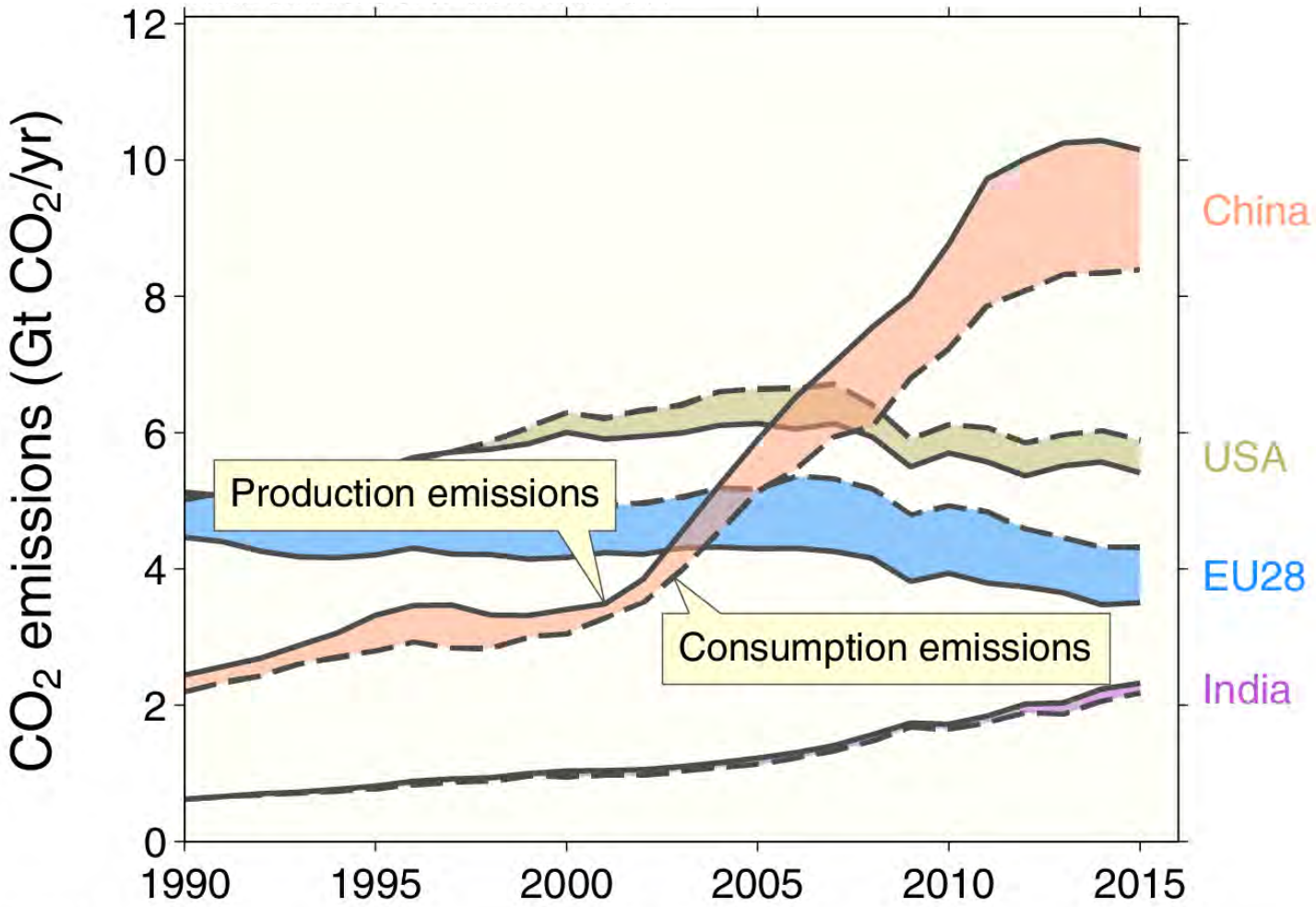
We then import those emissions as embodied in those goods

45% of all our emissions are embodied in the goods we consume

It all moves around powered by fossil fuels

Consumption-based emissions (carbon footprint)

USA and EU28 are net importers of embodied emissions, China and India are net exporters.

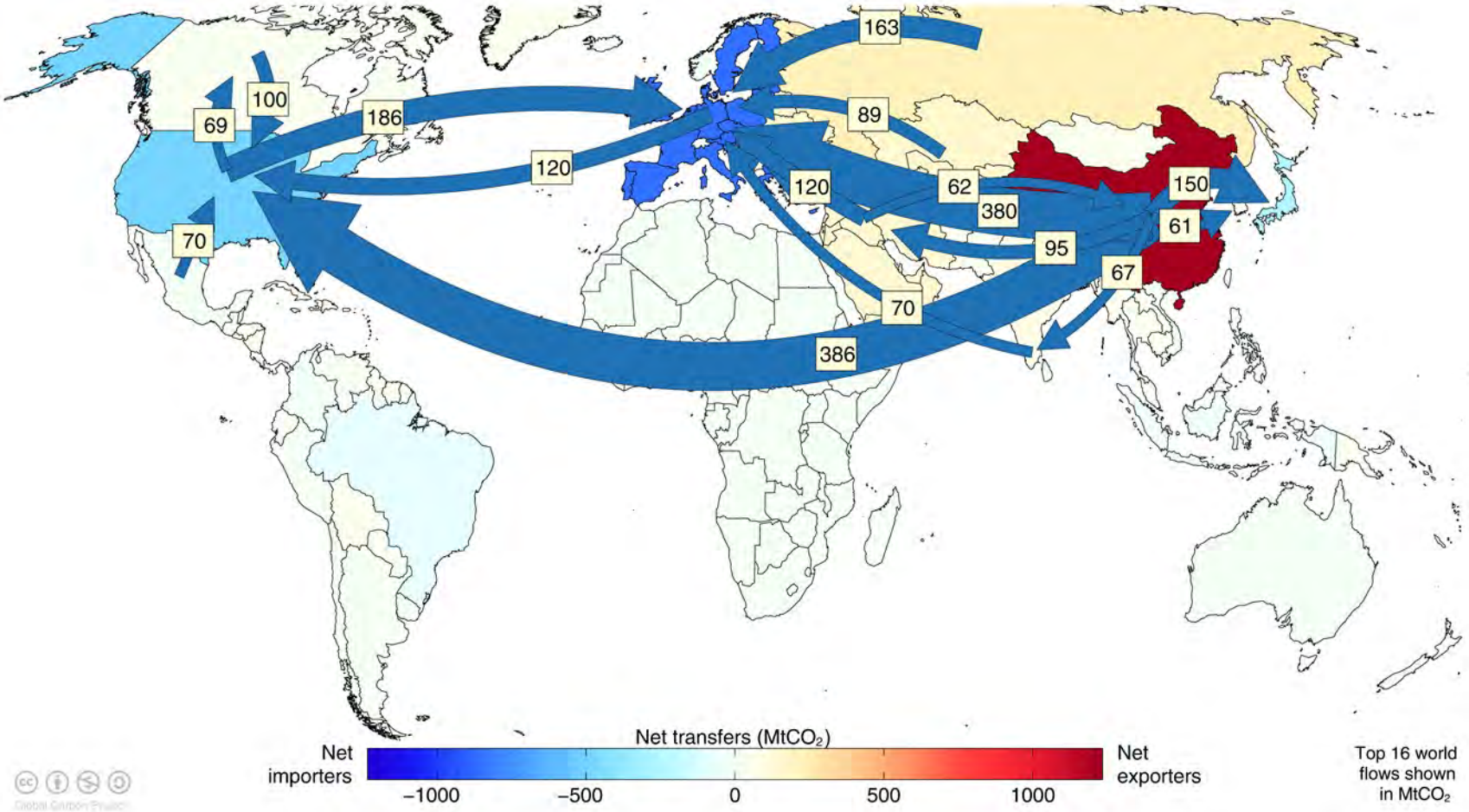


Consumption-based emissions are calculated by adjusting the standard production-based emissions to account for international trade

Source: Peters et al 2011; Le Quéré et al 2017; Global Carbon Project 2017

Major flows from production to consumption

Flows from location of generation of emissions to location of consumption of goods and services

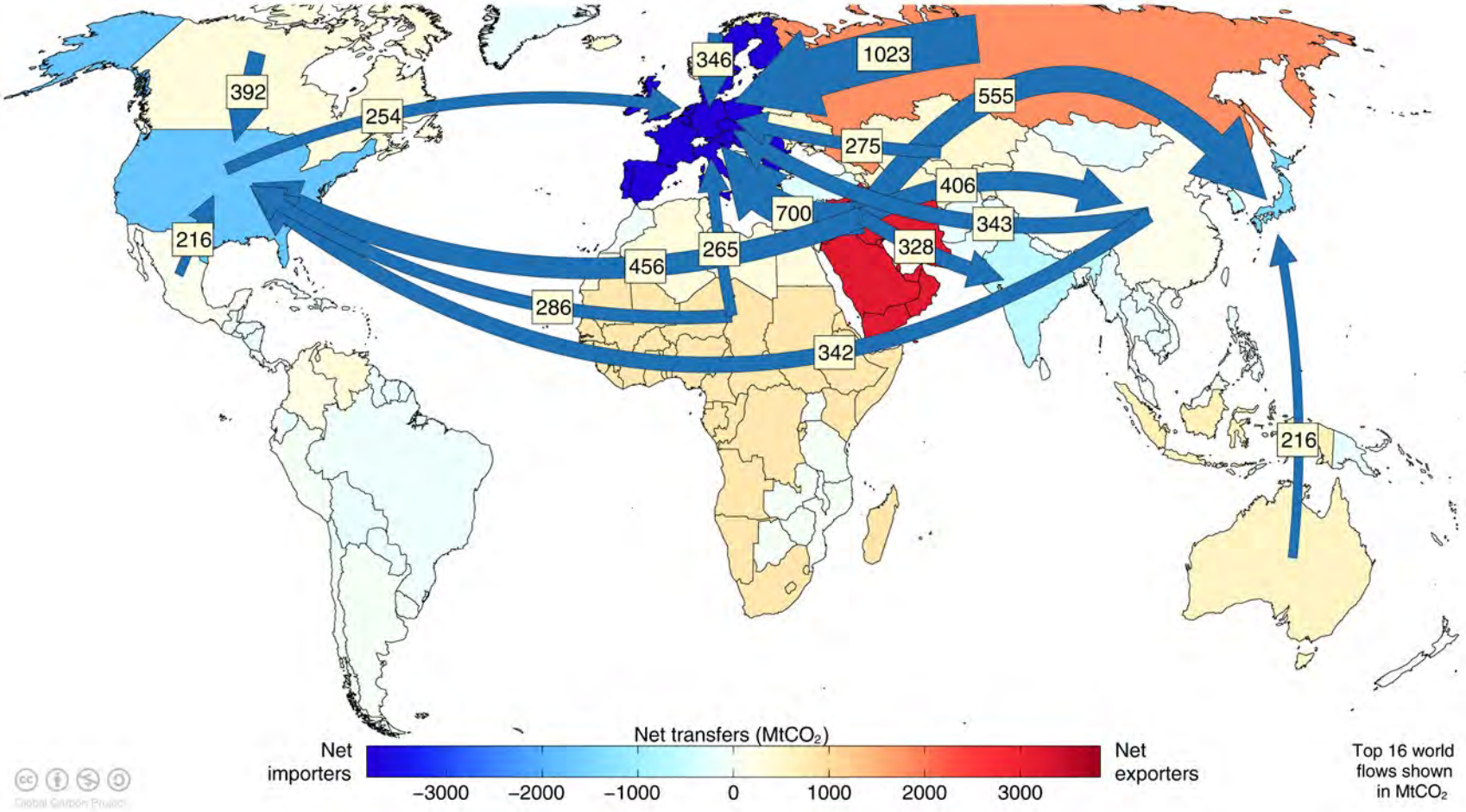


Values for 2011. EU is treated as one region. Units: $MtCO_2$

Source: Peters et al 2012

Major flows from extraction to consumption

Flows from location of fossil fuel extraction to location of consumption of goods and services

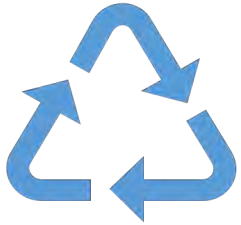


Values for 2011. EU is treated as one region. Units: $MtCO_2$

Source: Andrew et al 2013

The plastics case study

Consumption of plastic products and packaging generated ~3.84 million tonnes of plastic waste in Canada in 2016



Plastics recycling in Canada (2017):

We only collected 8.5% of the waste plastic generated by Canadians – we disposed of the rest

We exported 56.6% of collected plastic to China and Hong Kong (much of it mixed and contaminated)

We don’t know how much of that was actually recycled

Circular economy

Make renewable plastic from synthetic photosynthesis

Carbon dioxide from the ambient air + hydrogen (split from water using solar energy) to produce plastic

Reuse plastic products and packaging

Recycling

Mechanical recycling of plastic back into products and packaging

Chemical recycling of plastic chemical building blocks for making new plastic

The entire system powered by renewable energy

Closed-loop polystyrene packaging

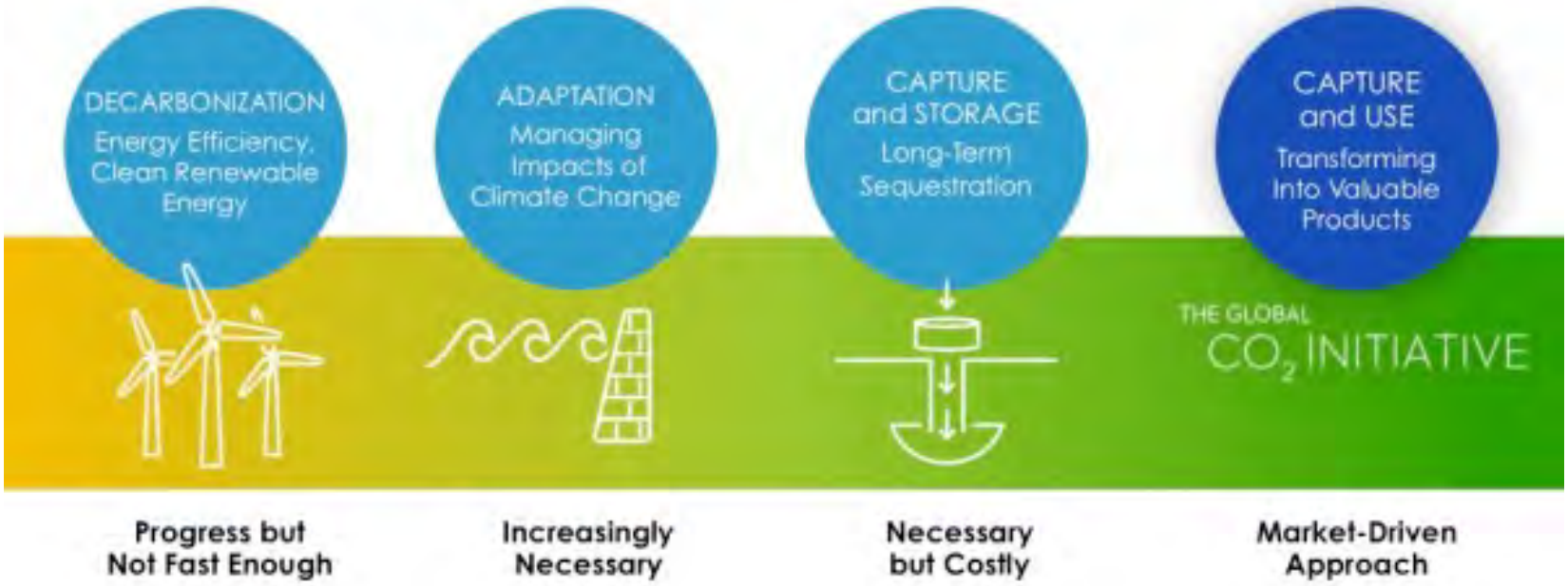
A new plastics economy

- Substitute knowledge, technology, human ingenuity and labor (circular economy) for waste, resource consumption and greenhouse gas emissions (linear-fossil economy)
- Maximizing the enormous value plastics deliver to society – all the benefits none of the costs
- Zero waste (to land and to oceans)
- Net zero greenhouse gases
- Scale efficiencies and innovation will mean lower long-run costs to consumers
- More, not less jobs

Possible Scenarios

CO2_U

CO2_U



THE GLOBAL CO2 INITIATIVE

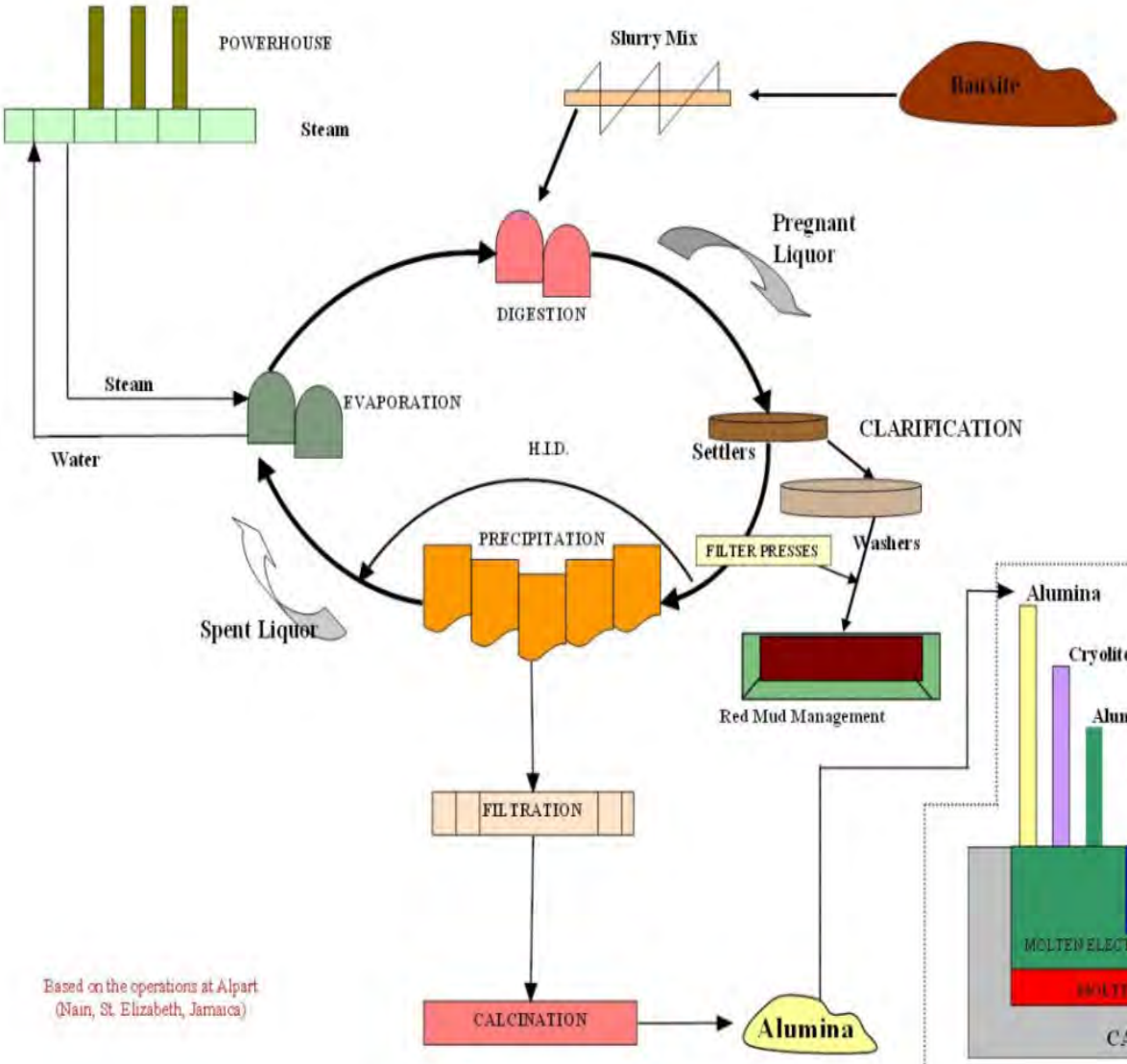
Possible Scenarios

Aluminum

BAYER PROCESS

THE PRODUCTION OF ALUMINA

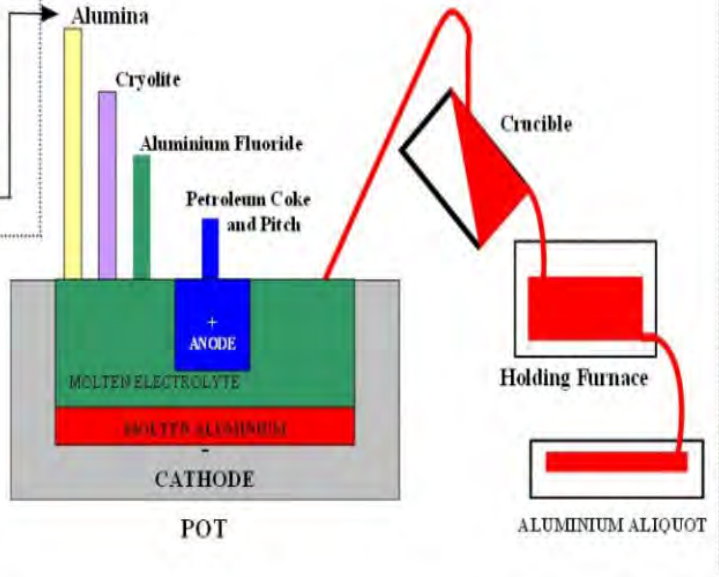
BAUXITE TO ALUMINIUM



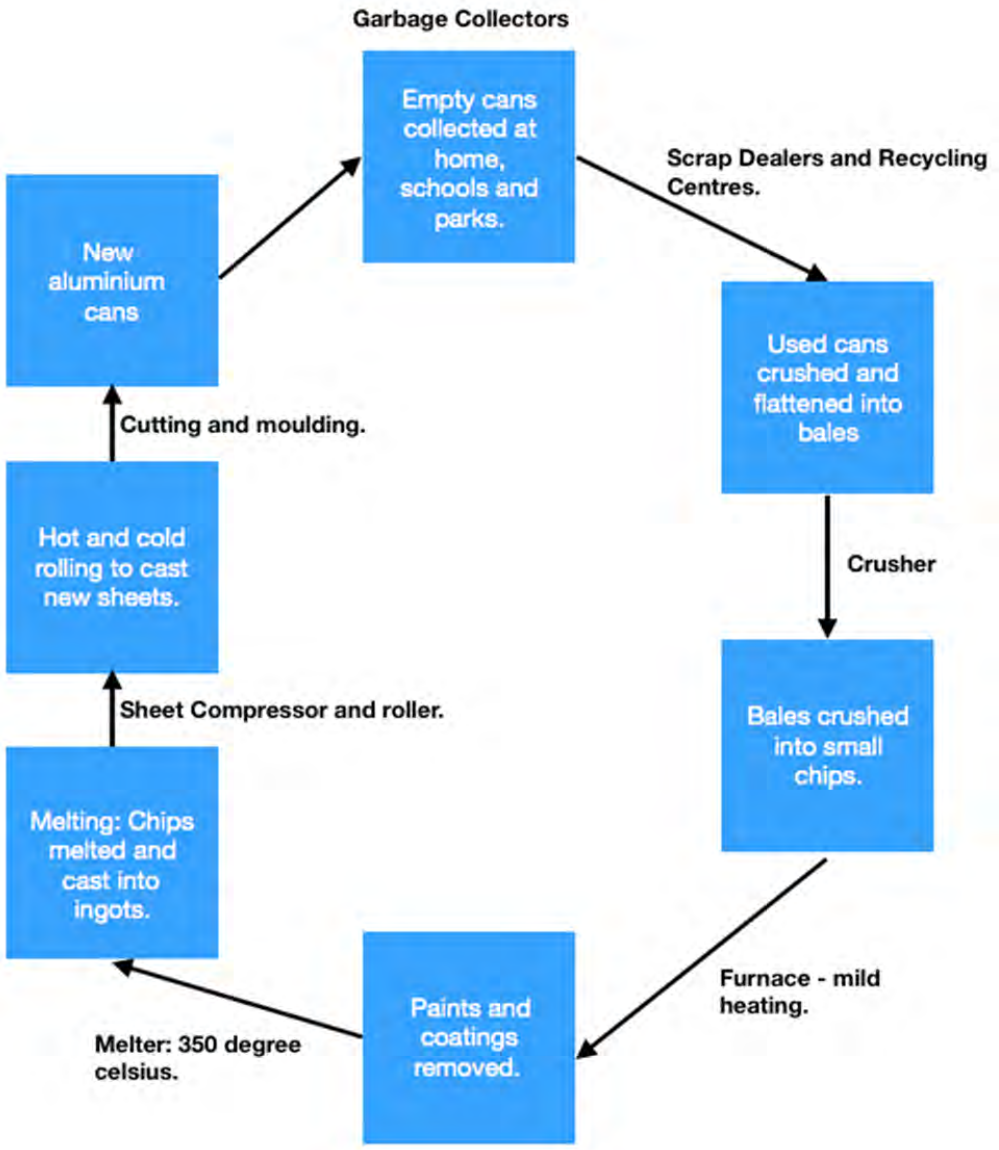
HALL-HEROULT PROCESS

THE PRODUCTION OF ALUMINIUM

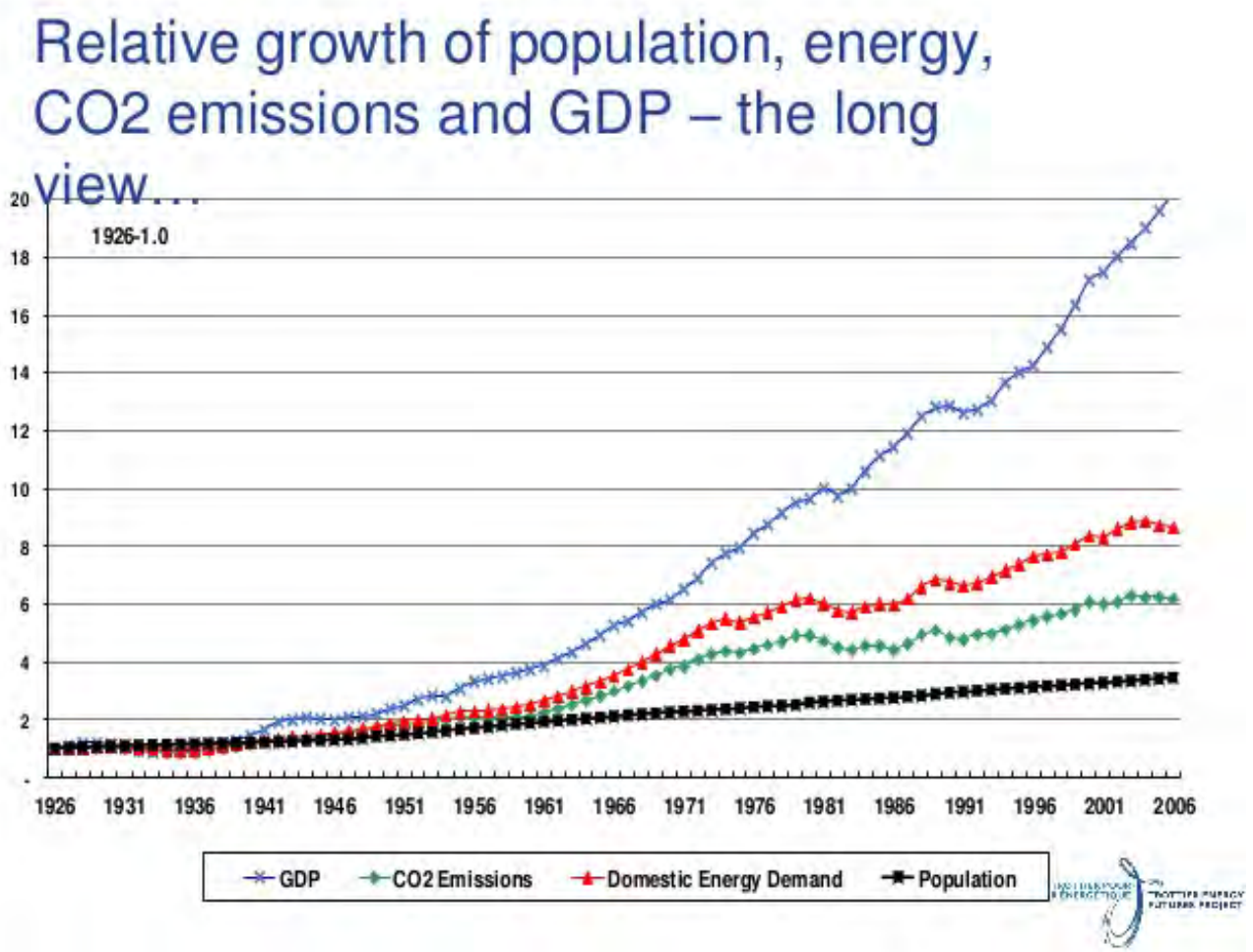
Based on the operations at Alcan
(Kitimat, Canada)



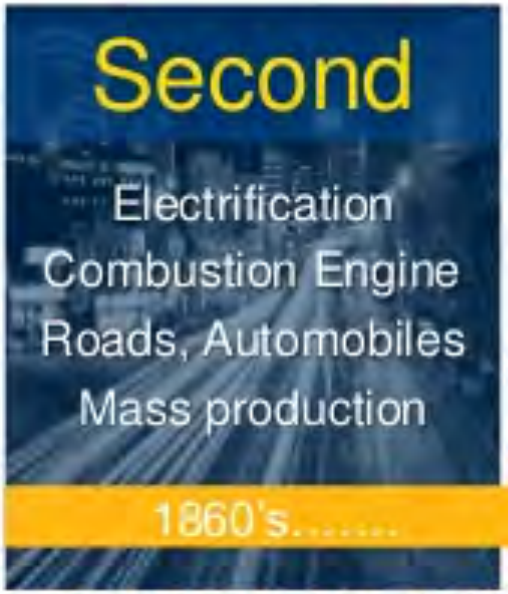
Aluminum Re-processing

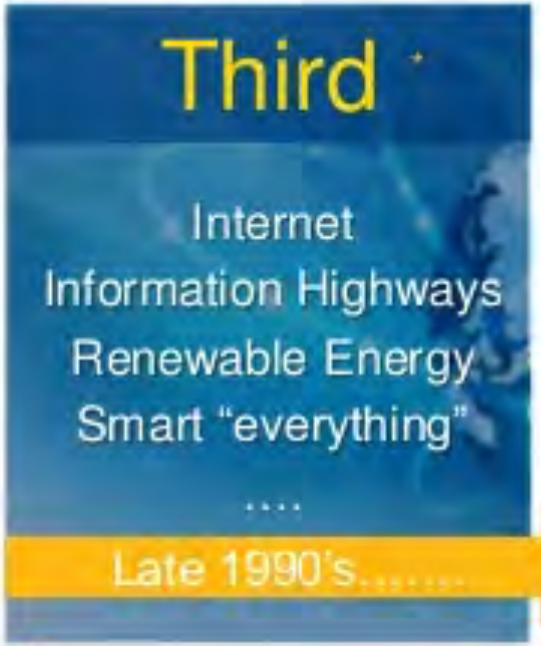


Excess Consumption: Exhausting Natural Resources



The Third Industrial Revolution





We are still at the dawning of the third era…
…A new economic narrative is being written

* The Third Industrial Revolution: How Lateral Power is Transforming Energy, the Economy, and the World by Jeremy Rifkin, president of the Foundation on Economic Trends

Would we have believed 25 Years ago that a billion people could create new products & communicate with each other through a small hand sized device

The Age of Acceleration
Thomas Freidman

Mountains of Waste Cell Phones

Five pillars of the Third Industrial Revolution
Jeremy Rifkin

The Next 25 Years…

Each of these 5 pillars can only function in relationship to the others.

- Shifting to renewable energy
- Transforming the building stock into micro-power plants
- Deploying storage technologies in every building
- Using Internet technology to transform the power grid
- Transitioning the transport fleet to electric vehicles that can buy and sell electricity on a smart interactive power grid