

Reimagining Waste to Change our World



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General Motors Company



GM Sustainability Goals

- All manuf. sites will have a wildlife habitat certification or equivalent (where feasible)
- GM will utilize 125 MW of renewable energy sources
- Reduce energy intensity by 20% (baseline 2010)
- Reduce carbon intensity by 20% (baseline 2010)
- Reduce total waste by 10% (baseline 2010)
- Reduce water intensity by 15% (baseline 2010)
- Reduce VOC intensity by 10% (baseline 2010)
- 100 mfg. sites and 25 non-manufacturing sites are landfill-free





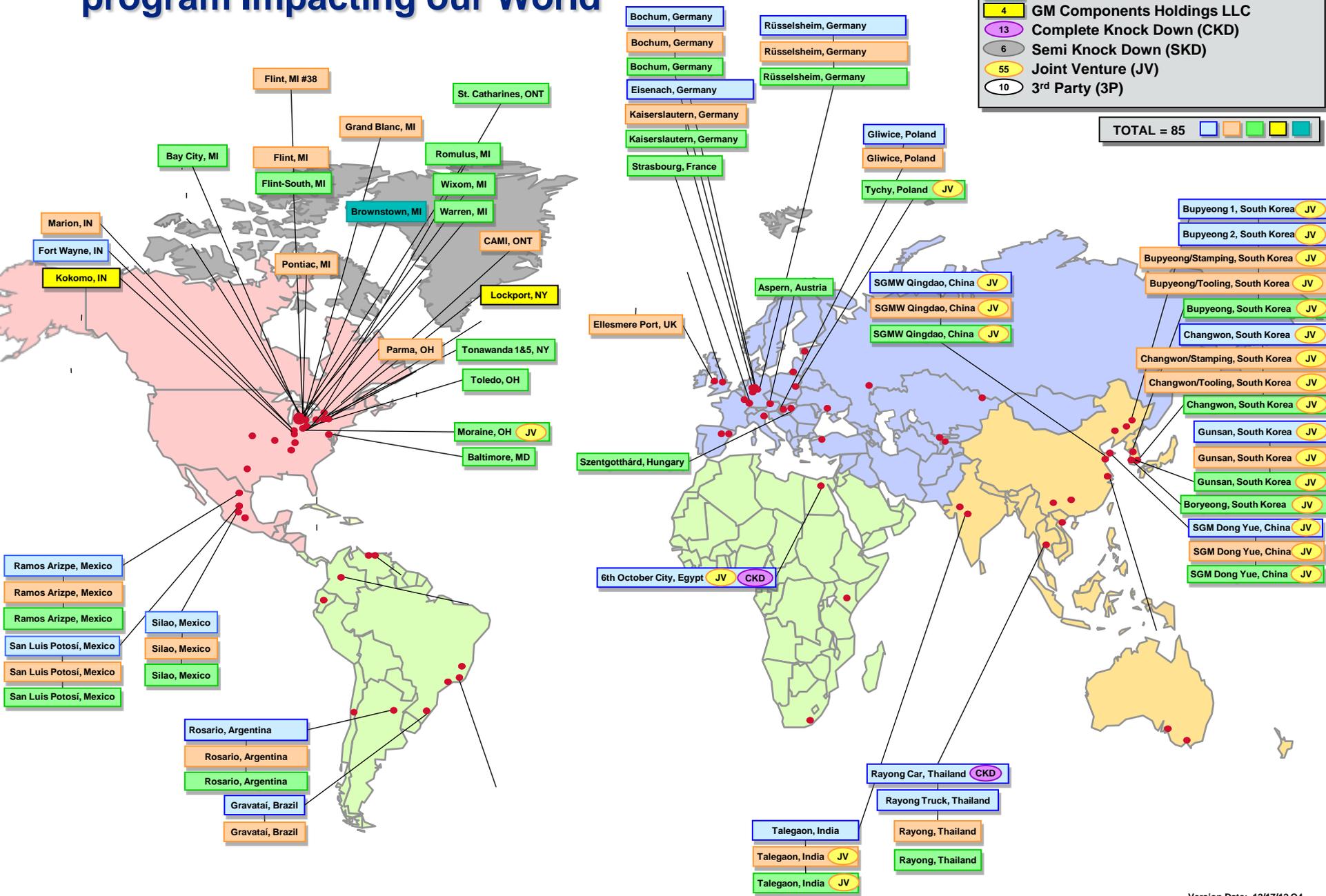
Can you imagine the day all wastes are viewed as resources

It will be a day of by-product synergies

GM and Supply Base Landfill Free program Impacting our World

74	Assembly
49	Die & Stamping
39	Powertrain
1	Battery
4	GM Components Holdings LLC
13	Complete Knock Down (CKD)
6	Semi Knock Down (SKD)
55	Joint Venture (JV)
10	3 rd Party (3P)

TOTAL = 85



Can you imagine using scrap vehicle parts to make coats for the homeless?

4,000 yards of sound absorption material donated from production of Malibu and Verano sedans

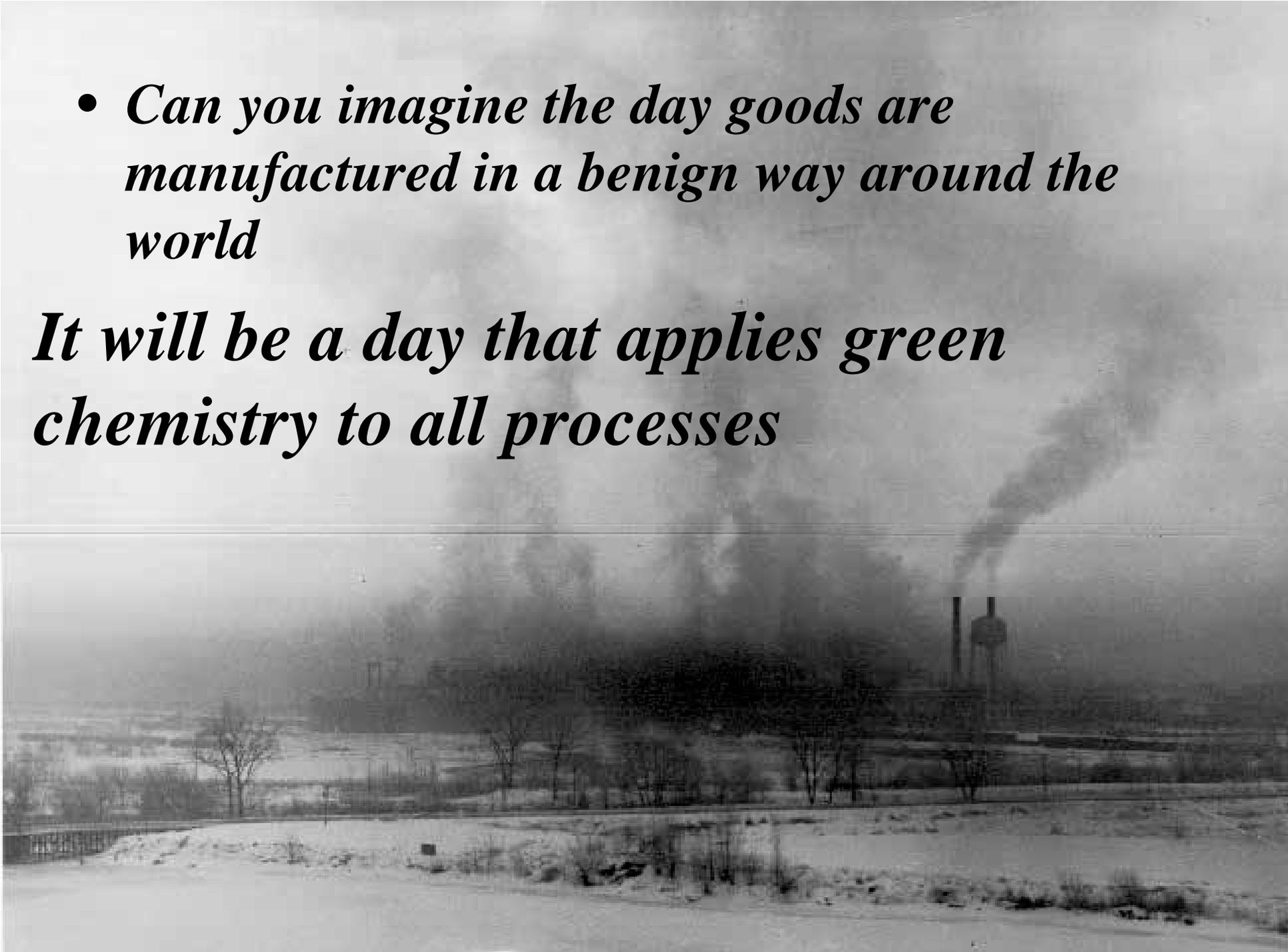


Insulates 800 self-heated waterproof coats that transform into sleeping bags for the homeless.

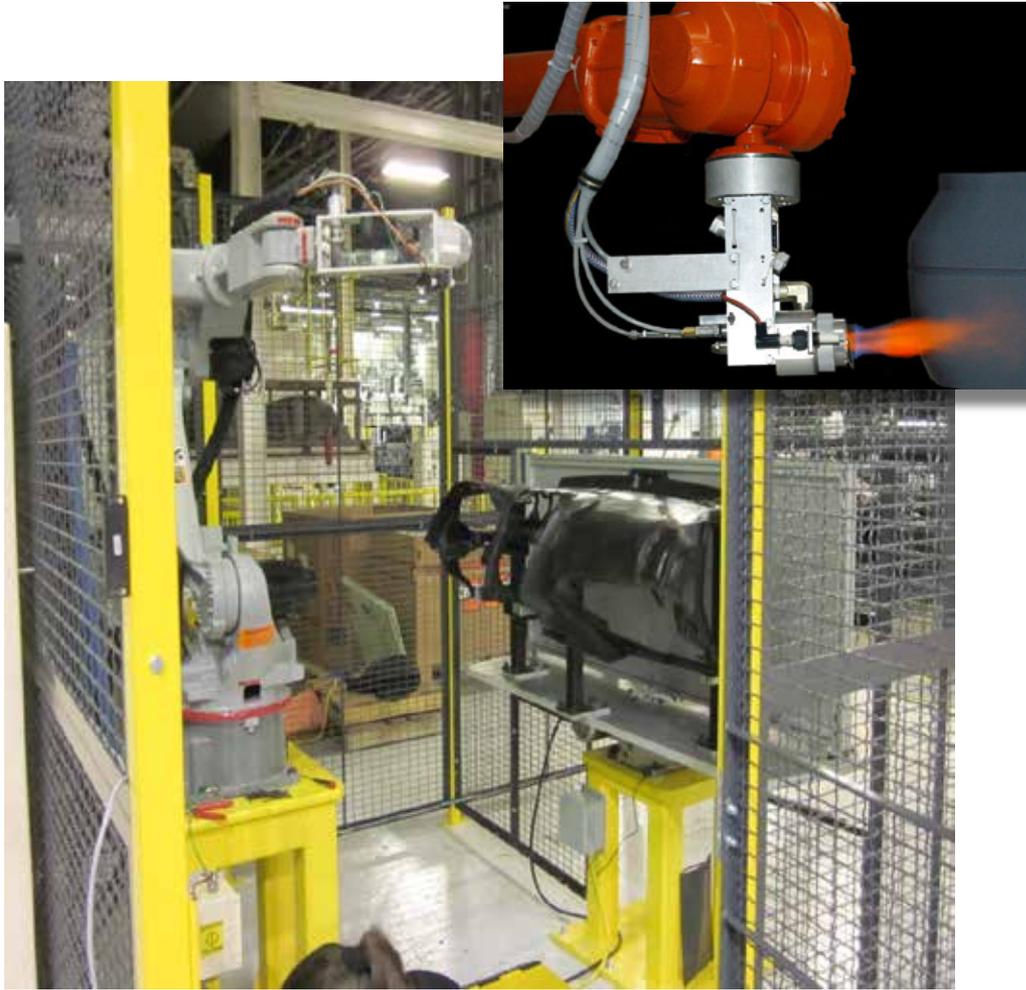


- *Can you imagine the day goods are manufactured in a benign way around the world*

It will be a day that applies green chemistry to all processes



Process Technology, Flame Treatment of TPO IP' s Project



- Lower Costs:
 - Lower Energy Usage Over Traditional Processes
 - Lower Emissions - Carbon Footprint
 - Significant Reduction in CO2 Emissions
 - No VOC' s or HAP' s produced
- Near Zero Production of Solid Waste
 - No Clean Up Costs
 - No Disposal Costs
- Reduced Cost Of Compliance
- Reduced Risk Of Cost Of Non-Compliance

Can you imagine a company using their outputs as their inputs



Buick Verano
Recycled cardboard used in headliner

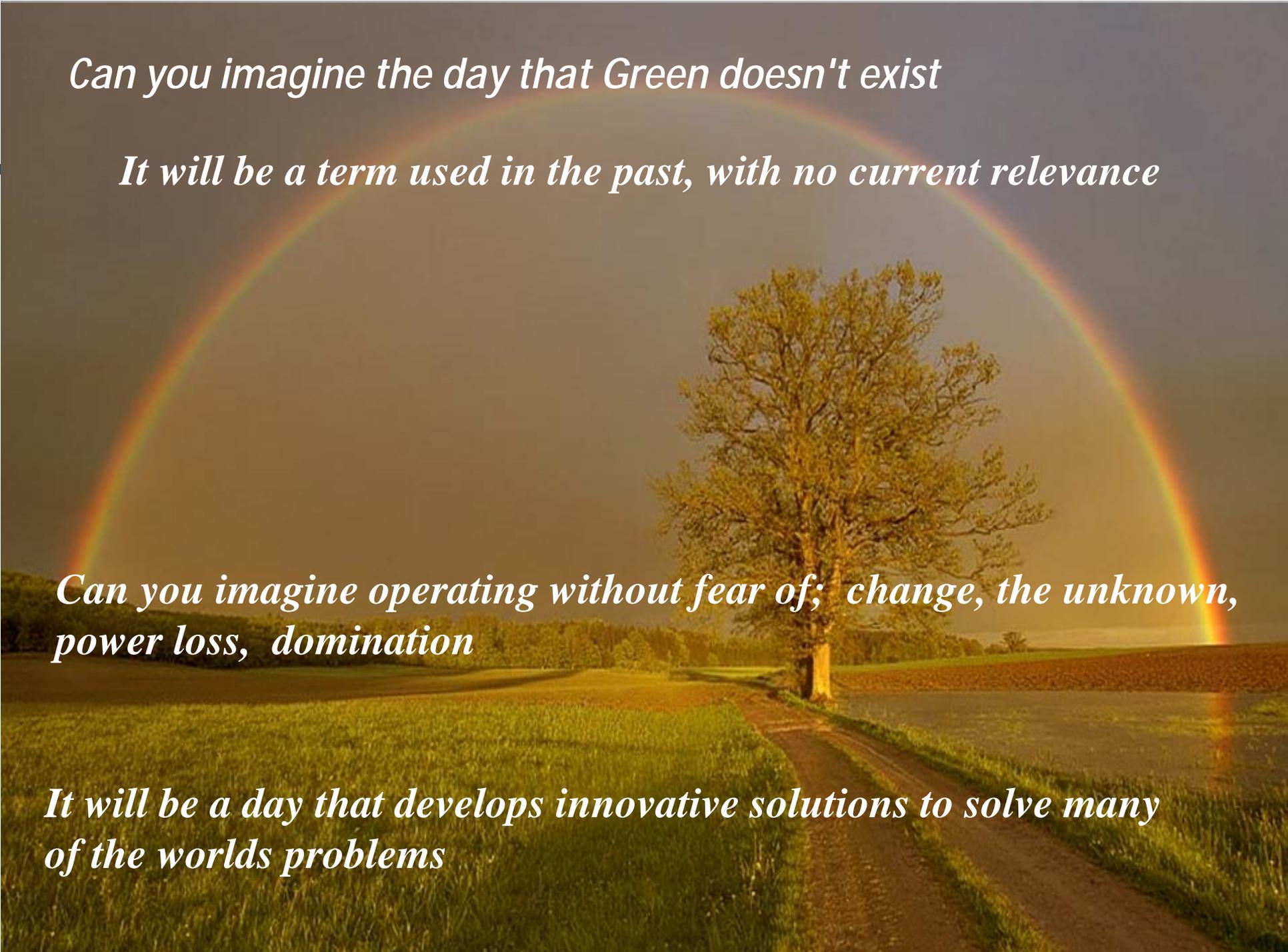


GMC Sierra
Plastic caps and shipping aids used in radiator shrouds



Chevrolet Volt
Old tires used in air and water baffles



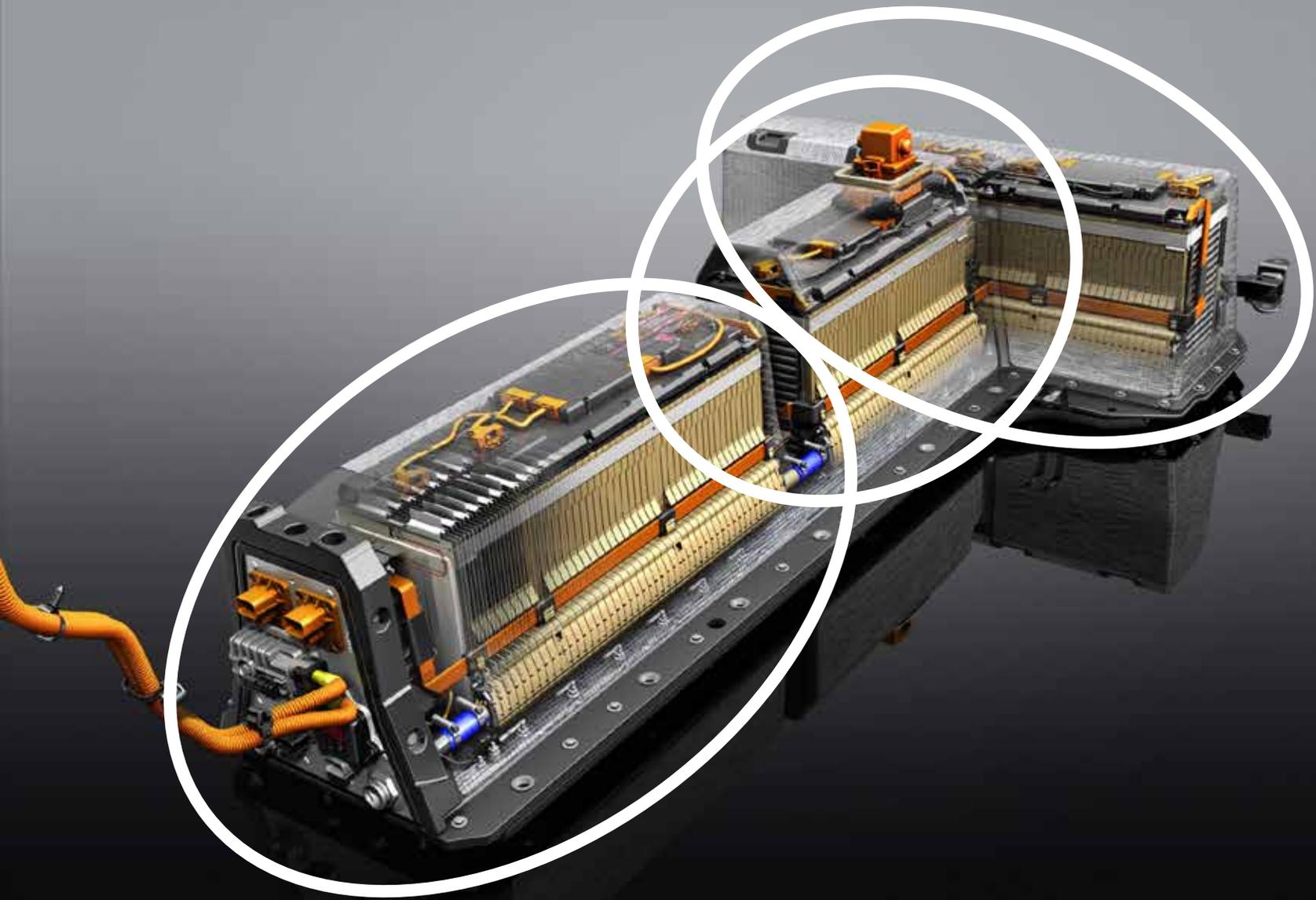
A landscape photograph featuring a vibrant rainbow arching across a grey, overcast sky. In the foreground, a dirt path leads from the bottom center towards the right, flanked by green grass. A large, leafy tree stands prominently on the right side of the path. The background shows rolling green hills under the rainbow's glow.

Can you imagine the day that Green doesn't exist

It will be a term used in the past, with no current relevance

Can you imagine operating without fear of; change, the unknown, power loss, domination

It will be a day that develops innovative solutions to solve many of the worlds problems





A decorative planter box filled with various plants, including yellow calla lilies, pink anthurums, and purple pansies. The planter box is light green and features a sign with the text "Design, Build & Sell The World's Best Vehicles". The sign is white with black text and is surrounded by floral illustrations. The planter box is set on a concrete surface.

Design, Build & Sell
The World's Best Vehicles

Wood Crates from Europe





Deploying Reuse Projects Through Experiences

- One-way containers shipped to the U.S. reused to build trailers
- Chevrolet Cruze center console repurposed as a fishing sled



What can be done with this parking lot to improve people's health and environment



International trade impacts material and methodology choices



You can start with this



Add This



And turn it into this



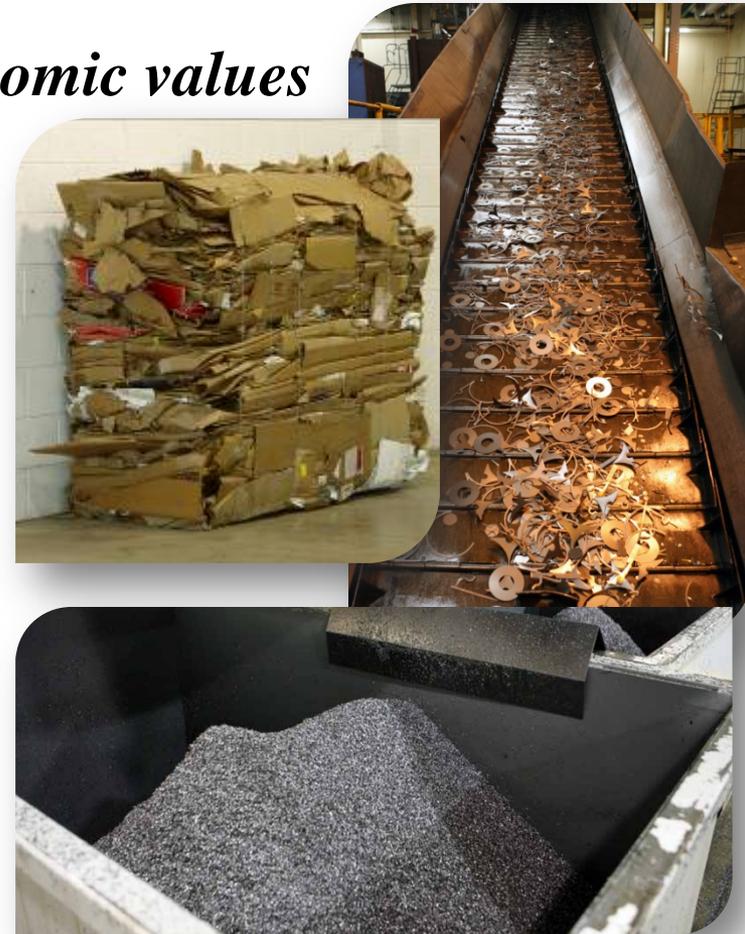


See the Pallets?

We look forward to the day that resources continue in use phases

It will be a day that validates resource economic values

- Approach waste elimination from sustainable financial perspective; generates leadership interest
- Since 2007, GM has generated over \$2.5B in revenue through recycling activities
- View by-products from a systems perspective to:
 - Reuse and repurpose as inputs
 - Protect the environment
 - Eliminate cost/create revenue
 - Increase efficiency



All companies should set a goal to generate 0 revenue, have 0 costs from by-products



***That which man brought together,
can be separated***

<https://vimeo.com/56820882>





*Can you imagine the day we find solutions to our
greatest sustainability challenge, Global Turbulence*

*War, floods, drought, hurricanes, tsunamis,
tornados,
Terrorism*

Poverty

Disease

Hunger

It will be a day of Sustainable Development

Adapting technology for innovative

OIL ABSORBENTS

uses



Helping the world during a time of crisis

- } *The Gulf oil spill stirred the emotion of environmental professionals in the automotive industry to assist.*
- } Used expertise to demonstrate what can be accomplished in the realm of polymer recycling when all levels of the product chain work in unison.
- } Technologies involved included a **closed loop recycling** system already in place, and repurposing current recycled material for oil absorbent boom that can be re-introduced into the recycle stream in lieu of landfill after serving clean-up purpose.
- } Chevrolet Volt baffles included:
 - 25% boom material
 - 25% recycled tires from our vehicle test facility
 - 25% packaging plastic from Fort Wayne plant
 - 25% mixture of post-consumer recycled plastics and other polymers



Gulf Oil Booms Find New Life in



GM

Installs Parts in
Chevrolet Volt



GDC Inc.

Produces Volt
Components



**Mobile Fluid
Recovery**

Extracts Oil and
Wastewater



**Heritage
Environmental**
Collects Booms



Boom

Manufacturer

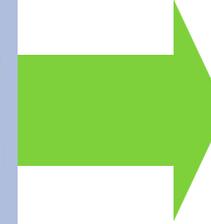
Trim Scrap is Sent to
be stuffed into
Absorbent Booms



GDC Inc.

Produces Sonozorb™
Acoustical Material
and Parts for GM

Circular Commodity Management – Creating New Business Opportunities



Cardboard, that includes bamboo and rice-based ('Asian') types enters GM facility waste streams through delivery of assembly parts

Federal-Mogul processes cardboard with recycled polyester to form nonwoven fabric called QuietShield. QuietShield is used as acoustical padding in automotive componentry

Buick Lacrosse (pictured above) and the Buick Verano use QuietShield in the production of headliners

Uzbeckestan



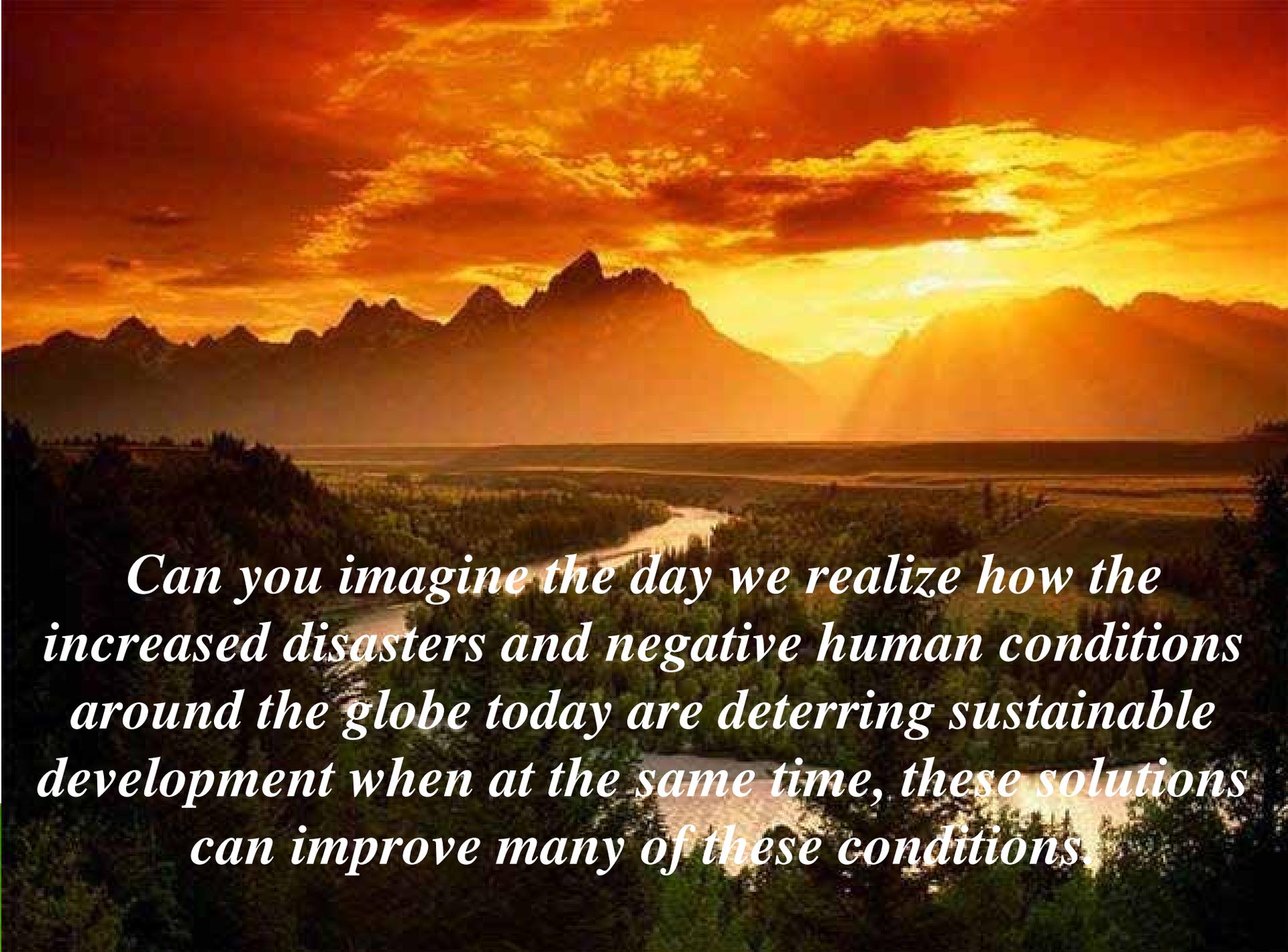
When is recycling a material bad?

When it can be reused for more value, less energy demands



What can Paint sludge Become?





Can you imagine the day we realize how the increased disasters and negative human conditions around the globe today are deterring sustainable development when at the same time, these solutions can improve many of these conditions.

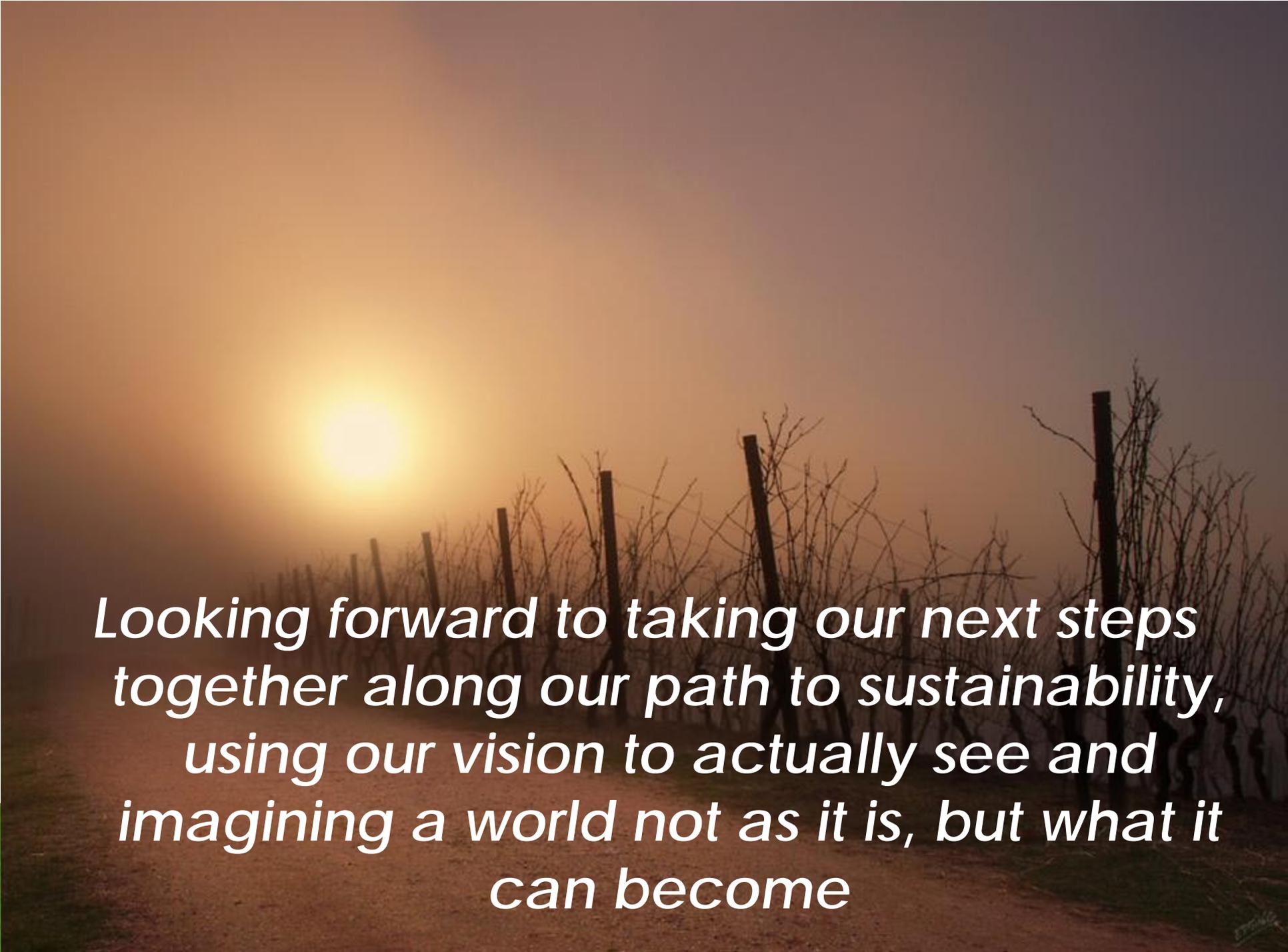
Bio digestion Technology



A photograph of a classroom full of young African girls. They are wearing blue school uniforms and are seated at wooden desks. Each desk has a book and a pencil. The girls are looking towards the camera with various expressions of interest and attentiveness. The background shows more girls in the same uniforms, creating a sense of a large, active classroom.

*Can you imagine the day that basic
human needs are met*

It will be a day of equality and joy

A photograph of a sunset over a field of bare trees. The sun is a bright, glowing orb on the left side of the frame, casting a warm, orange light across the sky. In the foreground, a line of wooden fence posts runs across the field, with bare, dark trees behind them. The ground is a mix of brown and green, suggesting a field or farm. The overall mood is contemplative and hopeful.

*Looking forward to taking our next steps
together along our path to sustainability,
using our vision to actually see and
imagining a world not as it is, but what it
can become*