

2020 GTI SUSTAINABILITY MANAGEMENT PLAN



Wise Water Use



Natural Environment



Energy Savings



Waste Reduction



Employee Engagement

Letter from the President and Chief Executive Officer



Climate change is an urgent societal challenge that requires a broad, committed effort to minimize. At GTI, we create innovative technology solutions that address this challenge and deliver meaningful value for our customers. In addition, we have our own sustainability management plan that examines the environmental, social, and financial impacts of activities to guide our internal operations and align with the customer segments we serve.

As a leading energy research organization, we promote efficiency and sustainability through all phases of technology research and development. From the projects we choose to the way we run our business, we take responsibility for preserving our planet for future generations.

As we enter a new decade, we are committed to monitoring and reducing our own environmental impact. To that end, we have set a specific corporate sustainability goal—to establish an enterprise standard for calculating and communicating the greenhouse gas (GHG) impact of GTI technologies and solutions—and have taken steps to achieve that goal.

We have surveyed partners and customers to align with their Life Cycle Assessments (LCA) needs, established a system to baseline and monitor gas use, water consumption, and output of recycling waste plus landfill waste, and prepared an implementation plan for the coming year. In 2021, we will roll out the harmonization plan enterprise-wide and build awareness of these LCAs among staff.

At our headquarters in Des Plaines, we are building on last year's energy savings investments, lighting retrofits, and the installation of a high efficiency boiler by lowering the amount of energy needed for safe and efficient building ventilation. Additionally, programs sponsored by the Environmental Sustainability Committee throughout 2020 focused on reducing waste—such as electronics and running shoes recycling, shredding paper, and disposing of household items. Our passionate employees are actively engaged through both internal communications and social media channels to raise awareness about climate issues and promote ways to practice good stewardship for our planet.

Sustainability is where the environment, economics, and society's needs meet. We will keep the focus on sustainability in everything we do, serving our customers safely and effectively, while minimizing the consequences of our operations.

Please join me in our continuing efforts to achieve GTI's sustainability goals.

David C. Carroll,
President & CEO

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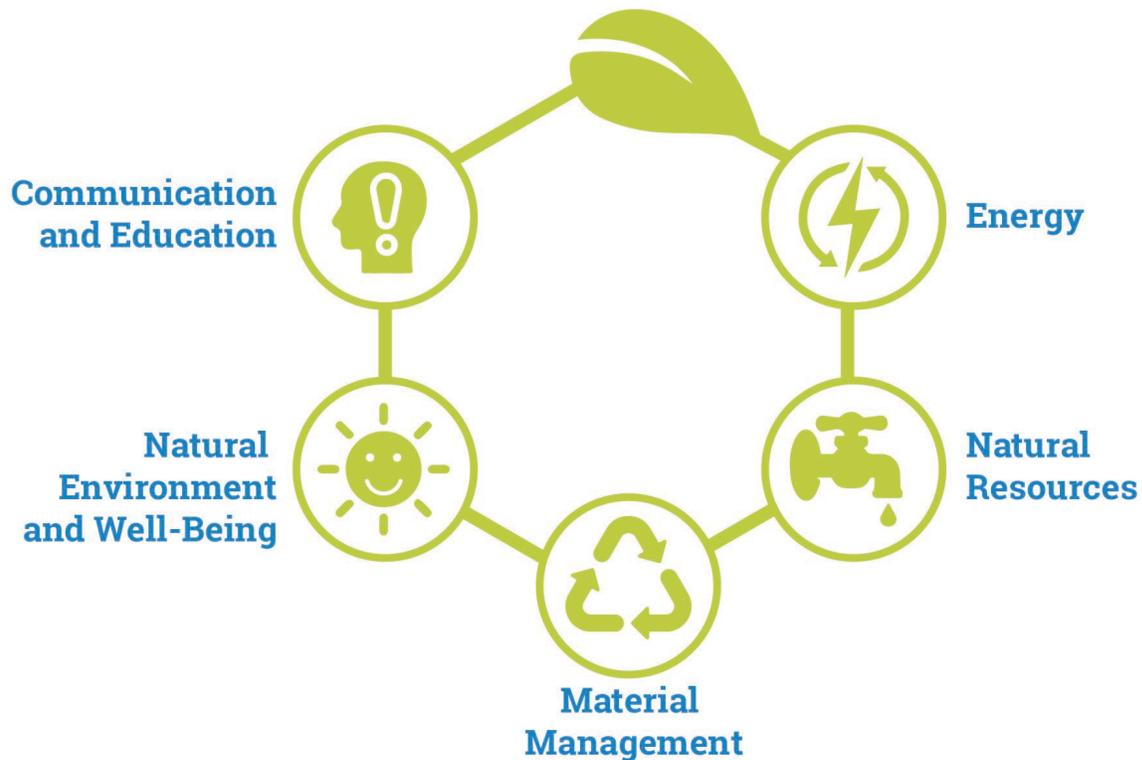
Senior Vice President, Corporate Development & President, GTI International

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Mission Statement

GTI is committed to extending efficiency and sustainability through all phases of technology research and development. From the projects we choose to the way we run our operations, GTI believes everyone has a key role in protecting the integrity of our planet for future generations.



We approach our commitment to a sustainable future from five angles:

- Energy – Use energy in an efficient and responsible way
- Natural Resources – Conserve resources strategically through building upgrades research operations and day-to-day activities
- Material Management – Responsibly manage material re-use, recycling, and disposal
- Natural Environment and Well-Being – Provide productive, safe, outside spaces for work or casual enjoyment
- Communication and Education – Raise awareness on the importance of a sustainable lifestyle

Introduction

Climate change, resource scarcity, and pollution are pressing societal challenges that require a concerted effort across all angles. GTI innovates technology solutions against these problems and this management plan brings these efforts back to GTI's operations and work culture.

Sustainability is where the environment, economics, and society meet. These values are central to the goals laid out in this document and are reflected in the objectives.

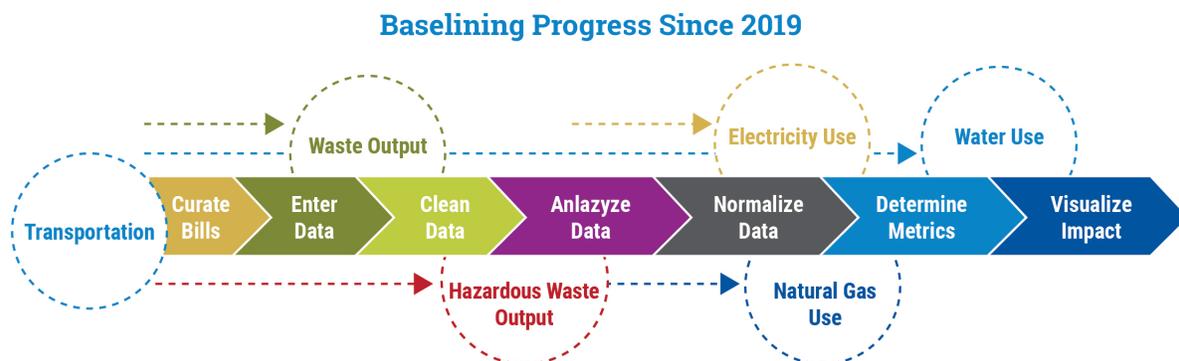
Our 2020-2022 focus areas planned in 2019:

- Establish a system to baseline and monitor the use/output of electricity usage, natural gas usage, water consumption, municipal waste disposal, and hazardous waste production
- Establish a system to baseline and monitor GTI's carbon footprint from transportation
- Converge baselining efforts and determine GTI's carbon footprint
- Extend outreach and education events to a larger variety of pressing environmental issues
- Create a more welcoming and useful front courtyard with the native garden

2020 Update

In 2020, the COVID-19 pandemic separated everyone from working together in-person, but it never stopped the Sustainability Committee's progress towards our goals. Our technical team made tremendous progress in baselining since 2019, their work continued on smoothly as planned in 2020, and we are on track for completion by 2022.

We adapted to a new working environment, and by year's end, we were more fluent in virtual collaboration, and took advantage of online platforms for hosting webinars and organizing remote events. The Sustainability Committee was able to host our fifth consecutive Electronic Recycling Event, with drop-off locations at GTI and across the Chicagoland area.



Although the majority of the Committee's work continued without disruption, a remote working environment put a hold on sustainable building upgrades and changes at the Des Plaines headquarters to create a more inviting natural environment in our front courtyard.

2020 Corporate Sustainability Goal

Life cycle analysis (LCA) has become a powerful tool for industry, governments, and technology developers leveraged in business decisions, but approaches range widely. For 2020, a specific corporate sustainability goal was set to establish an enterprise standard for calculating and communicating the greenhouse gas emissions (GHG) impact of GTI technologies.

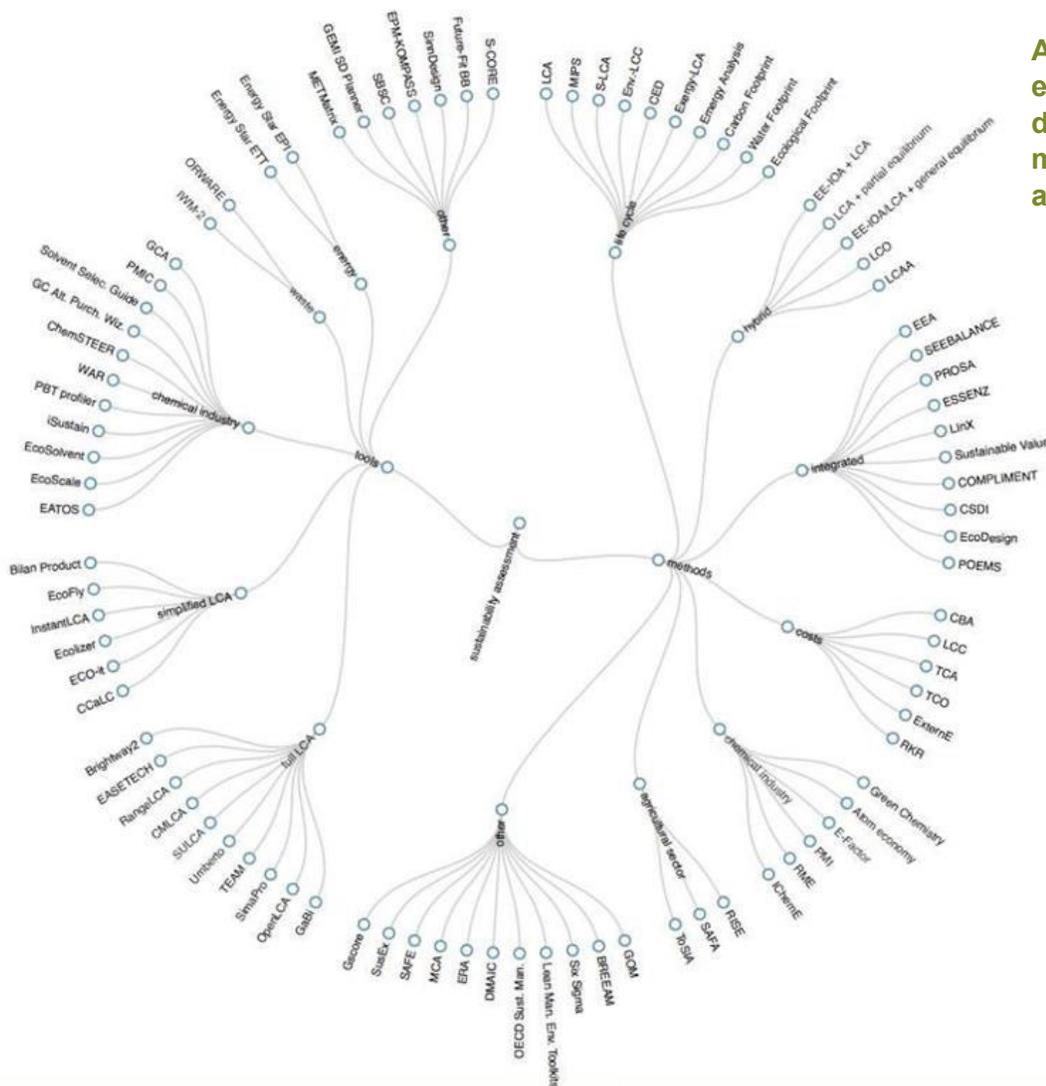
Objective:

1. Develop a harmonized approach across the GTI enterprise to conducting LCA for purposes of assessing and communicating the greenhouse gas emissions impact—or “carbon footprint”—of GTI technologies and solutions, along with preparation of a 2021 implementation plan.

Priority/Timeline: High, 2020

Champion: Molly Garcia, Paula Gant (Strategy & Innovation)

Status: The LCA Harmonization Working Group harmonized our approaches this year across the GTI enterprise for conducting lifecycle analysis of greenhouse gas emissions from GTI technologies and solutions, along with preparation of 2021 implementation plan.



Approach to LCAs entail an incredibly diverse range of methodologies and tools

Energy

GTI relies on energy to power our innovations, laboratories, offices, HVAC and exhaust systems, lighting fixtures, and more. Although a large portion of our energy expenses fluctuate project-to-project, GTI is committed to reducing non-project related energy uses. Energy efficiency is not only our professional service, it is also one of our core missions.

Current Activities: Over the past several years, GTI undertook several building upgrades. We decommissioned 35 hoods in early 2017 and replaced 50% of office lighting with LEDs in 2019.

Goal: Reduce non-project related energy use by 2% yearly

Objectives:

1. Complete historical and current baseline energy monitoring— the Sustainability Committee curated 5 years of utility bills and is detrending for weather and investigating methods to factor our project-related usage.

Priority/Timeline: High, 2020

Champion: Michael Mensinger Jr., Ramanathan Dharmarajan, Jason Stein

Status: Normalized energy usage against weather impact, began visualizing data

2. Recommend improvements to decrease non-project energy usage by 2% yearly – After baselining, Sustainability Committee members will research building improvements and propose low-effort and high-impact projects with Facilities and Leadership.

Priority/Timeline: Medium, 2021

Champion: Michael Mensinger Jr., Ramanathan Dharmarajan, Jason Stein

3. Approximate carbon emissions from non-project energy usage – Sustainability Committee will unify all baselining efforts to approximate GTI's total carbon footprint

Priority/Timeline: Low, 2022

Champion: TBD

Material Management

GTI must span beyond our *direct* impact on the environment and incorporate the *indirect* environmental footprint caused by the materials and services we acquire. GTI routinely cycles through office supplies, chemical reagents, and appliances that can be sourced more locally or from more “green” companies. We approach this area from purchasing and disposal perspectives.

Disposal

Our waste removal service bills us by-the-ton. Waste can also be measured volumetrically by how many 10 cubic meter containers are hauled away over a certain amount of time. In order to determine if recycling programs are effective, we must first baseline our waste system and have a means to track changes.

Goal: Decrease the amount of waste we send to the landfill, as well as the amount of money we spend for hauling the waste.

Objectives:

1. Baseline GTI’s current and historic generation of hazardous and municipal waste – Garbage disposal, recycling, document shredding, and hazardous waste pickups are costly. The Sustainability Committee is investigating accurate and useful ways to present GTI’s output.

Priority/Timeline: High, 2020

Champion: Marta Guerrero Merino, Karen Crippen

Status: Completed data entry into 2019, now approximating weight from volumes

2. Reduce hazardous waste - Each department manages hazardous waste disposal independently. Inefficient pickups are costly.

Priority/Timeline: High, 2020

Champion: Karen Crippen, Marta Guerrero Merino

Status: Baselined costs through 2019, will analyze in 2021

3. Recommend solutions to decrease municipal waste – After baselining, Sustainability Committee members will research solutions and propose low-effort and high-impact projects with Facilities and Leadership. (Ex: compositing network, double-sided printing)

Priority/Timeline: Medium, 2021

Champion: Jason Stein

Purchasing

Goal: Develop a materials management program including purchasing

Objective:

1. Assess blanket PO vendors for local vs out of state vs out of country. Determine if vendors have sustainability programs.

Priority/Timeline: Medium, 2021

Champion: TBD

Natural Resources

GTI realizes our institution’s activities have impact connected to our planet’s land, water, and air. To conserve our natural resources strategically, GTI will establish a baseline of operation water use, decrease our impact from daily commuting, and develop a comprehensive plan for sustainable building upgrades and maintenance.

Current Activities: Sustainability Committee members reached out to neighboring businesses to petition collectively for a Pace bus stop from the Rosemont Blue Line. We continue to advocate for alternative means of transportation in Des Plaines.

Water Use

Goal: Establish baseline monitoring database for GTI water use

Objective:

1. Using historic and current water bills, the Sustainability Committee will track water use over time. This will allow us to determine if new initiatives such as building upgrades using low flow or dual flush toilets decrease our overall water use.

Priority/Timeline: High, 2020

Champion: Eric Brown, Brent Grossman

Status: Curated bills, entered data, and visualized data – started trend analysis

Building Upgrades

Goal: Have facility management consider sustainable options during building upgrade planning

Objective:

1. Develop a plan of alternative, sustainable options for anticipated building upgrades in the next 5 years.

Priority/Timeline: High, 2020

Champions: Mark Alcantara, All

Status: On hold due to limited access onsite, will resume in 2021

Transportation

Goal: Increase use of GTI van share and carpool to decrease carbon footprint of transportation.

Objectives:

1. Baseline carbon footprint due to transportation – Most employees drive to GTI in a standard combustion vehicle and many fly frequently for our research. Transportation comprises one of the largest carbon footprints in the US and will be incorporated.

Priority/Timeline: Medium, 2021

Champion: TBD

2. Identify a low-carbon vehicle replacement for the GTI vanpool.

Priority/Timeline: Low, 2022

Champion: TBD

3. Generate carpooling pipeline app to encourage employee ride sharing.

Priority/Timeline: Low, 2021

Champion: TBD

Natural Environment and Well-Being

The human / social aspect of sustainability is central to a functioning sustainability program. GTI believes everyone deserves the ability to reap the benefits the planet provides, such as fresh foods and green spaces. Currently, GTI offers healthy, seasonal, ecologically conscious food options for all employees. Now, we are focusing on improving our outdoor spaces to provide areas for gathering, socializing, and thinking in an “out of the box” environment.

Outdoor Spaces

Goal: Work with Management and Facilities to develop usable, ecologically conscious outdoor space for the courtyards

Objectives:

1. Develop front courtyard into a functional patio with the native plant garden. Native plants are already adapted to the Illinois terrain and climate. Design will include tables, chairs, and benches to encourage education of sustainable landscaping.

Priority/Timeline: High, 2020

Champion: Rachel Kunz, Kimna Chak, Amy Russell

Status: On hold due to limited access onsite, will resume in 2021



Communication and Education

The most important source of sustainable development is human ingenuity and persistence. GTI is investing in its people through the communication and education program.

Plans may be developed, but transient habits and underutilized resources do not result in lasting change. The sustainability committee raises awareness of today's pressing environmental problems and educates our community to act through the behavioral changes.

Education and Employee Engagement

Goal: Increase GTI employee engagement in sustainable actions and activities

Objectives:

1. Organize events, training, and activities around sustainable practices such as proper waste disposal, energy saving techniques, and hood monitoring. Inform GTI members that dollars saved through these efforts will be routed back to employee benefits.

Priority/Timeline: High, 2020+

Champion: Mary Bazan, Sarah Townsend, Ron Snedic, Amy Russell

Status: Shoe Recycling Drive diverted 72 pairs of shoes from the landfill. Electronics Recycling Event collected 1,435 pounds of waste.

2. Plan fun, educational Earth Day events each year to raise awareness on environmental issues and practical solutions not normally encountered.

Priority/Timeline: High, yearly

Champion: Sarah Townsend, Mary Bazan

Status: Held a webinar featuring Martin Linck's technology solution addressing the global plastic waste crisis. Posted trivia polls on Yammer. Planting Day was cancelled in 2020.

Communication

Goal: Reach out to all employees of GTI on a regular basis (monthly) on sustainability at GTI

Objectives:

1. Advertise monthly articles encouraging participation in education events, sustainable practices, and initiatives on the Pipeline

Priority/Timeline: High, yearly

Champion: Sarah Townsend, Mary Bazan

Status: Held 11 engagement activities in the form of webinars, onsite events, virtual events, trivia questions, and awareness articles.

2. Produce an annual report to describe sustainable efforts, results, and plans.

Priority/Timeline: High, Ongoing

Champion: Kevin Dinh

The Sustainability Team in Action

SHOE RECYCLING EVENT 2020

gti ENVIRONMENTAL SUSTAINABILITY PROGRAM

THANK YOU!

16 pairs will be recycled into low-grade textiles

20 pairs will be recycled into new turf

36 pairs will be reused

REUSED & RECYCLED



Old fire extinguisher disposal/recycling 2019



Earth Day campus beautification planting 2019

gti **Electronics Recycling Event 2020**

Monday, November 2 – Thursday, November 12, 2020

Sign up [here](#) to recycle your old electronics at GTI or at a participating Chicagoland [location](#).

Advance participant sign-up is required. Choosing to drop off onsite will also require filling out the [Tier 1 Facilities Re-entry Form](#).

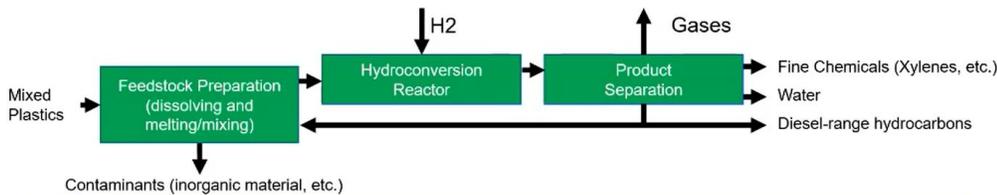
Any questions? Please contact [Mary Bazan](#).

gti ENVIRONMENTAL SUSTAINABILITY PROGRAM

Virtual Employee Engagement and Communications

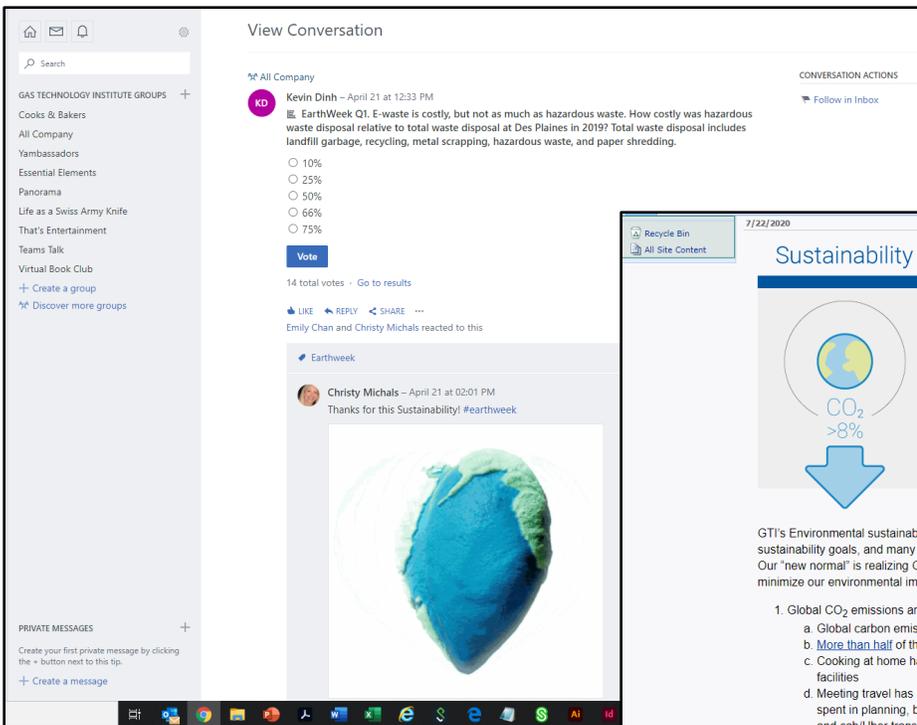
Concept

- Transform mixed thermoplastics into plastic precursor molecules (BTEX and/or xylenes, benzene, etc.) via hydrodeoxygenation (HDO) and hydrotreatment (i.e. hydrocracking).
- Streams of water (H₂O), diesel-range hydrocarbons, and of light hydrocarbons (i.e. methane, ethane and/or propane) may also be obtained
- Thermoplastic feedstocks may be of biological origin (i.e. lignin, etc.) or of fossil origin (PET, PE, Nylon, etc.)
- Perform conversion in existing refinery equipment



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Excerpt from Martin Linck 2020 Employee Webinar “A Solution to the Plastic Waste Problem”



Employee news articles and internal social media outreach

Sustainability and Positive Practices of Working Remotely

CO₂
>8%

less
transport
fuels

cooking
at home

using less
paper

GTI's Environmental sustainability committee is always on the lookout for ways to be more focused on supporting sustainability goals, and many positive practices have come out of the work from home situation driven by COVID-19. Our "new normal" is realizing GTI's potential to continue our business, protect the health of our employees, and minimize our environmental impact too.

- Global CO₂ emissions are dropping at record rates
 - Global carbon emissions have decreased by **more than 8%**
 - More than half** of the reductions are due to using less transportation fuels
 - Cooking at home has increased, which minimizes emissions from restaurants and commercial foodservice facilities
 - Meeting travel has declined, which lowers emissions from the transportation sector. It also eliminates time spent in planning, being on the road, and spending time away from home, plus decreases expenses for air and cab/Uber transportation, hotel accommodations, meals, and outings.
- Businesses are transitioning to **online processes**
 - Less paper is being consumed at GTI, which reduces the cost of supply and minimizes recycling pick-ups

The Sustainability Committee is still baselining the environmental footprint of GTI for 2019 but will soon quantify the impacts of the stay-at-home order and the gradual re-entry too.