FISHER WEBINARS

Could Consumer Focus on Sustainability Disrupt the Tissue Business?

Bruce Janda
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What We Believe
Every Company Should Have the Best Possible Business Intelligence.

Our Vision
To enable pulp and paper businesses worldwide to make informed decisions precisely, fast, broadly, and efficiently.

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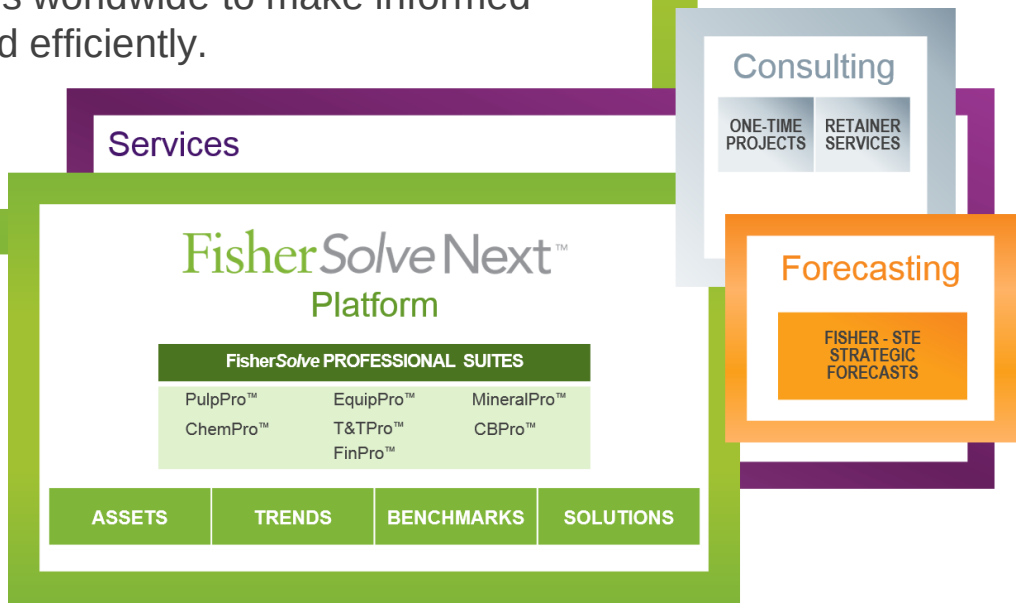

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What Is Tissue Sustainability?

What Does “Disruption” Mean?

Should I Care?

Business Sustainability Definition and Importance

The Economist Intelligence Unit, 2018

"A growing concern for sustainability is changing how companies do business. … product quality, operational efficiency and price now regularly compete for attention with concerns such as working conditions and environmental impact."

Sustainability Defined

"Sustainability is … an organization's ability to operate without violating **ethical norms**, compromising **social structures** or **depleting natural resources** for future generations. … the ability to do business without causing economic, societal or environmental damage."

"**Sustainability has proven business advantages**: consumers are willing to pay more for sustainable products and services, and businesses with leading environmental and social sustainability policies tend to see higher stock valuations."

Source: The Economist Intelligence Unit, November 2018

Dimensions of Tissue Sustainability Analysis and Business Disruption

Tissue Sustainability Dimensions

1. Fiber Supply and Type
2. Water Consumption/Discharge
3. Carbon Emissions
4. Product Design/Substitution

Disruptive Technology – A term coined by Clayton Christensen of the Harvard Business School in 1997 to denote an advance in technology that, due to its capabilities, has the potential to displace an existing technology. For example, the gasoline-powered car displaced the horse and carriage.

Source: The Future of Tissue Manufacturing to 2023, Bruce Janda, Smithers Pira 2018

Tissue Sustainability in the News

NRDC “Issue with Tissue” Sustainability Scorecard

Sofidel’s *sustainable growth strategy is completely in line with “building an inclusive, sustainable and resilient future for people and planet”, the aim of the United Nations (UN) through the 17 Sustainable Development Goals (SDGs)*

Further Improves Performance in 2018 Carbon Disclosure Report

Sustainability has always been a business driver for ***Essity****, in addition to contributing to a better world. By 2030, our ambition is to improve the well-being of two billion people every day and reduce the environmental footprint of our solutions by 33%.*

P&G Announces New Global Commitment to Reduce Plastic
Wednesday, April 10, 2019 5:18 pm EDT

Georgia-Pacific *goals include increasing paper recovery for recycling; improving energy efficiency; reducing greenhouse gas emissions; increasing the amount of certified fiber procured; improving our safety incident rate with a vision of zero injuries; and reducing water use.*

Kimberly-Clark Applies Innovative Tech to Address Risk in Global Water Scarcity

National Resources Defense Council*

*Natural Resources Defense Council

Source: 2019 Internet Search on Sustainability

Tissue Fiber Supply

Tissue Fiber Sustainability Headlines

Greenpeace and NRDC have focused on Canada's Forests

Fight Climate Change: Use Recycled Toilet Paper and Less of It

Americans prefer the softness of virgin tree fiber, but at what cost?

America has a "tree-to-toilet" problem.
That's according to a study out Wednesday that says the largest U.S. makers of at-home tissue products use only virgin fiber in their major brands, and no recycled content, a vast sustainability gap compared to other brands that use all recycled fiber.

"Fortunately, solutions to the tree-to-toilet pipeline already exist," the NRDC says, highlighting alternatives like recycled wood pulp, wheat straw and bamboo.

Americans Are Literally Flushing Canada's Forests Down the Toilet - VICE

Greenpeace calls for a halt on logging in five key boreal forest areas in Quebec, Ontario, Manitoba

A BUYER'S GUIDE TO THE SUSTAINABILITY OF AT-HOME TISSUE PRODUCTS

TOILET PAPER

BRAND	GRADE
Green Forest	A
365 Everyday Value, 100% Recycled	A
Earth First	A
Natural Value	A
Seventh Generation	A
Trader Joe's Bath Tissue	A
Marcal 1000[a]	B
Marcal Small Steps	B
365 Everyday Value, Sustainably Soft	D
Cottonelle Ultra	D
Scott 1000	D
Scott ComfortPlus	D
Trader Joe's Super Soft Bath Tissue	D
Charmin Ultra[b]	F
Kirkland	F
Angel Soft	F
Quilted Northern	F
Up & Up Soft & Strong	F

PAPER TOWELS

BRAND	GRADE
Green Forest	A
365 Everyday Value	A
Earth First	A
Natural Value	A
Seventh Generation	A
Trader Joe's	A
Marcal	B
Marcal Small Steps	B
Viva	D
Bounty	F
Brawny	F
Sparkle	F
Up & Up	F
Kirkland	F

FACIAL TISSUE

BRAND	GRADE
Green Forest	A
365 Everyday Value, 100% Recycled	A
Natural Value	A
Trader Joe's	A
Fluff Out	B
Marcal Small Steps	B
Seventh Generation	B
365 Everyday Value, Sustainably Soft	D
Kleenex Everyday	D
Kirkland	D
Puffs Ultra Soft	F
Up & Up Soft	F

a Due to a fire at their New Jersey paper plant in January 2019, Marcal is suspending manufacture of their at-home products, including all Marcal products listed in this report. However, they could become available again in the future.

b This entry applies to both Charmin Ultra Soft and Charmin Ultra Strong.

Tissue products such as toilet paper, paper towels, and facial tissue are cheap and convenient—but they cost the planet a great deal. The vast majority of the tissue products found in our homes are made from wood pulp, the use of which drives the degradation of forests around the world. Their everyday consumption facilitates a "tree-to-toilet pipeline," whereby centuries-old trees are hewn from the ground, converted into tissue pulp, rolled into perforated sheets or stuffed into boxes, and flushed or thrown away. The consequences for Indigenous Peoples, treasured wildlife, and the global climate are devastating.

Source: 2019 Internet Search on Sustainability

Tissue Fiber Sustainability Corporate Headlines

The Positive

UPM: ***Climate Heroes Caring For Their Forests***

- In Finland, there is more forest than ever, and forests are growing faster than ever.
- In 1990, when climate reporting began, Finnish forests contained 1.9 billion cubic metres of wood, and the same amount was harvested between 1990 and 2017. However, the forests now contain a record 2.5 billion cubic meters of wood.
- The forests' increasing growth can mainly be attributed to good forest management.
- Harvesting restrictions would mean restrictions on forest management. That would slow down the growth of forests and carbon sinks.
- These climate heroes should not be accused of destroying forest sinks but thanked for growing these sinks in a sustainable way.

Saving American Trees—with Paper

- Does it remove incentives to keep the landscape forested?
- Do the environmental advantages persist when the production expands to the necessary scale, or does it result in more negative environmental impacts (i.e., consider water use, chemical inputs, energy requirements, climate effects, etc.)?
- What is the risk that forest land will be converted to agriculture?
- What effects, both positive and negative, would this have on local communities and indigenous peoples?
- Is independent, third-party certification available to ensure environmental, social, and economic baselines are being met?

Ahead of the Curve
North America's First Tree-Free Pulp Mill

Wood and Non-Wood Based Paper Can Be Equally Sustainable

Source: 2019 Internet Search on Sustainability

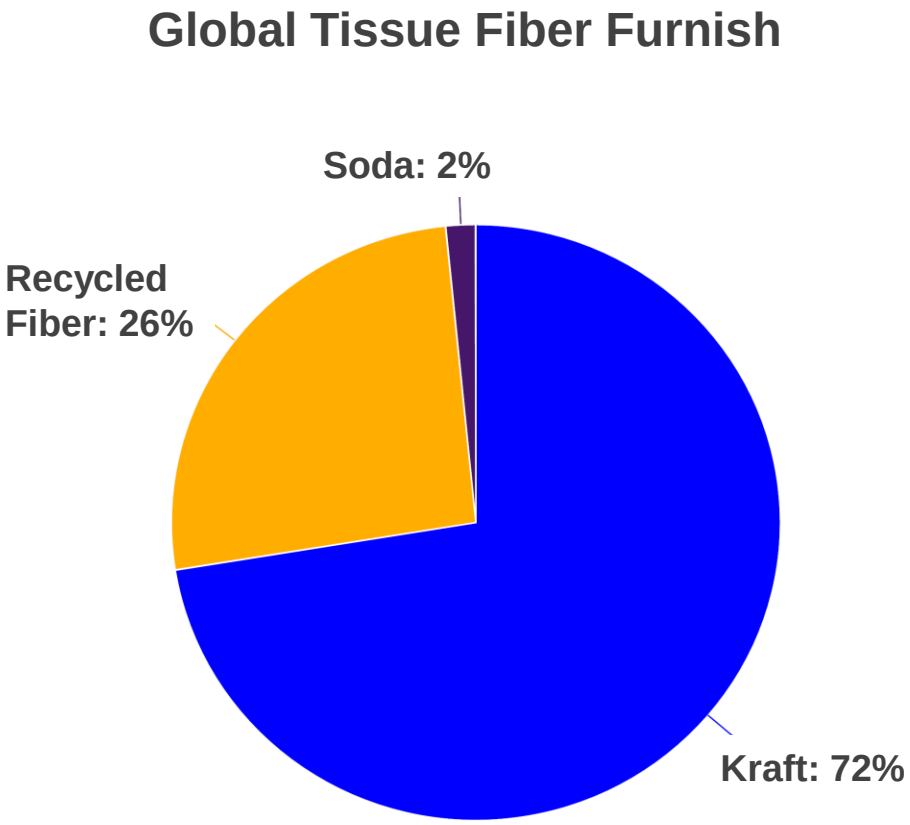
World Wildlife Fund Identifies ‘Deforestation Fronts’

No.	WWF Deforestation Fronts	Location	Type	Issues
1	**Amazon**	Latin America	Tropical	A new wave of deforestation for agriculture is underway.
2	**Atlantic Forest and Gran Chaco**	Latin America	Temperate	Up to 97% of the forest has been lost to development.
3	**Borneo**	South Asia	Tropical	Deforestation due to a new culture and fires.
4	**Cerrado**	Brazil	Tropical	The forest ration due to unsustainable agriculture.
5	**Choco-Darien**	Latin America	Tropical	One-third of the area has been cleared.
6	**Congo Basin**	Africa	Tropical	Unsustainable resource extraction.
7	**East Africa**	Africa	Tropical	Slash and burn clearing.
8	**East Australia**	Australia	Tropical	Deforestation in the northern ecoregions is a substantial contributor of sediment pollution affecting the Great Barrier Reef.
9	**Greater Mekong**	South Asia	Tropical	Illegal and unsustainable logging and conversion of forests for agriculture are the direct causes of deforestation and biodiversity loss in the Greater Mekong.
10	**New Guinea**	Oceania	Tropical	Already, more than 2% of Papua New Guinea forests have been felled Planned forestry concessions cover a major portion of the country.
11	**Sumatra**	Indonesia	Tropical	Sumatra's Riau Province, nearly 10.5 million acres of tropical forests and peat swamp, has been cleared in the last 25 years. Significant species loss is imminent.

*11 of the World’s Most Threatened Forests

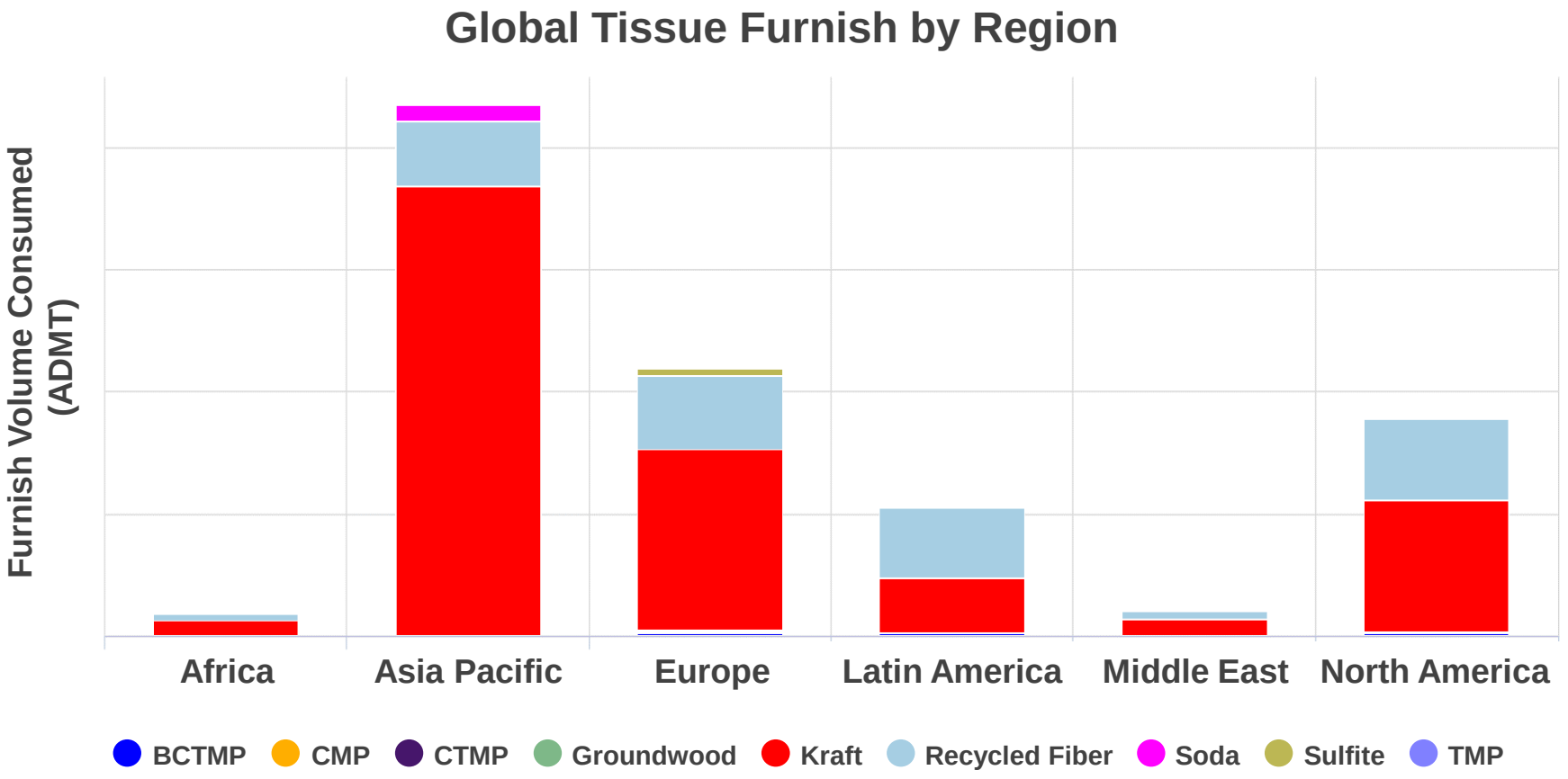
Source: World Wildlife Fund

Tissue Fiber Composition



- Will WWF focus drive sustainable forestry certification?
- Do we need to measure sustainable forest certification of pulps?
- New Non-wood pulp sources coming online may change mix and offer sustainable alternative
- Is the NRDC/Greenpeace campaign in North America focused on the right thing?

Global Tissue Fiber Furnish



North America has the greatest proportion of recycled fiber in tissue products

Is There a New Pulp Game in Town?
Can “Tree-Free Fiber” Find a Place in Tissue?

Our ultra premium bath tissue is 100% tree-free. Our proprietary blend of bamboo and sugarcane results in a product that has a soft, luxurious feel. Two-ply construction means we can create a tissue that feels soft but does not compromise strength. Our bath tissue has 500 sheets per roll and features a light emboss to provide some texture, but does not take away from its natural softness

- Maybe, but not as a Green Wash niche product with boutique fibers
- Fibers must be sustainably grown and pulped
- Not being from wood or recycled paper is not enough to drive disruption
- Sustainable Fiber Technologies Phoenix Process™ is specific for non-woody fibers is known to be non-pressurized and to use no sulfur* and claims to meet required fiber properties
- Wheat straw and other cereal straws are either plowed under by the farmer where possible, or literally burned in the fields. Both methods of disposal have issues associated with them

Stuart Sharp, Senior Researcher, Fisher International

*Fisher Analysis - Is There a New Pulp Game in Town?

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Key Sustainability Issues – Tissue Fiber Supply

1. Tissue products permanently remove fiber from the recycle stream
2. Corrugated boxes and paperboard used in industrial and consumer packaging can be recycled back into the same formats with higher relative sustainability scores than producing recycled fiber tissue
3. Cutting old or older growth forests in northern climates will be seen as less sustainable than plantations in temperate or sub tropical zones (such as USA southern pine or Brazilian eucalyptus). At the same time, monoclonal silviculture runs a risk from pests and climate change that may not be seen as sustainable
4. Destruction of tropical rainforests to build plantations at the cost of biodiversity and endangered species will not be sustainable
5. Growing fiber as annual crops either on land currently used for food production or expanding fiber production to lands that are not currently used for agriculture risk sustainability scrutiny

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Source: The Future of Tissue Manufacturing to 2023, Bruce Janda, Smithers Pira 2018

Water Sustainability

Tissue Water Sustainability News

BREAKING NEWS

Kimberly-Clark Takes Action on Clean Water

Company helps communities develop sustainable water management

Cascade Tissue Group's Kingsey Falls, Quebec mill claims a leadership position in water reduction by a factor of five in tissue making. They have reduced water consumption from 50 cubic meters of water per ton to 10 cubic meters per ton of tissue paper produced.

How 5 Manufacturers Reduce Water Use

UPM Recognized For Its Water Efficiency Efforts In China (Friday, January 12, 2018)

(China) UPM has been recognized as a water efficiency frontrunner in Jiangsu province under a Chinese government initiative, in eastern China. In total, 11 companies received the water efficiency recognition nationwide.

UPM Recognized as a Water Efficiency Frontrunner in China

The world is facing a water crisis.

In the developed world, increasing demands for water—for cities, for industry, for agriculture, and for the extraction of fossil fuels—are straining an already burdened system. In the developing world, **nearly 1 billion people lack access to safe drinking water and sanitation because of the absence of distribution systems for clean water.**

Climate change may increase risk of water shortages in hundreds of U.S. counties by 2050

Projecting Water Withdrawal and Supply for Future Decades in the U.S. under Climate Change Scenarios

Source: 2019 Internet Search on Sustainability

AQUEDUCT Water Risk Atlas

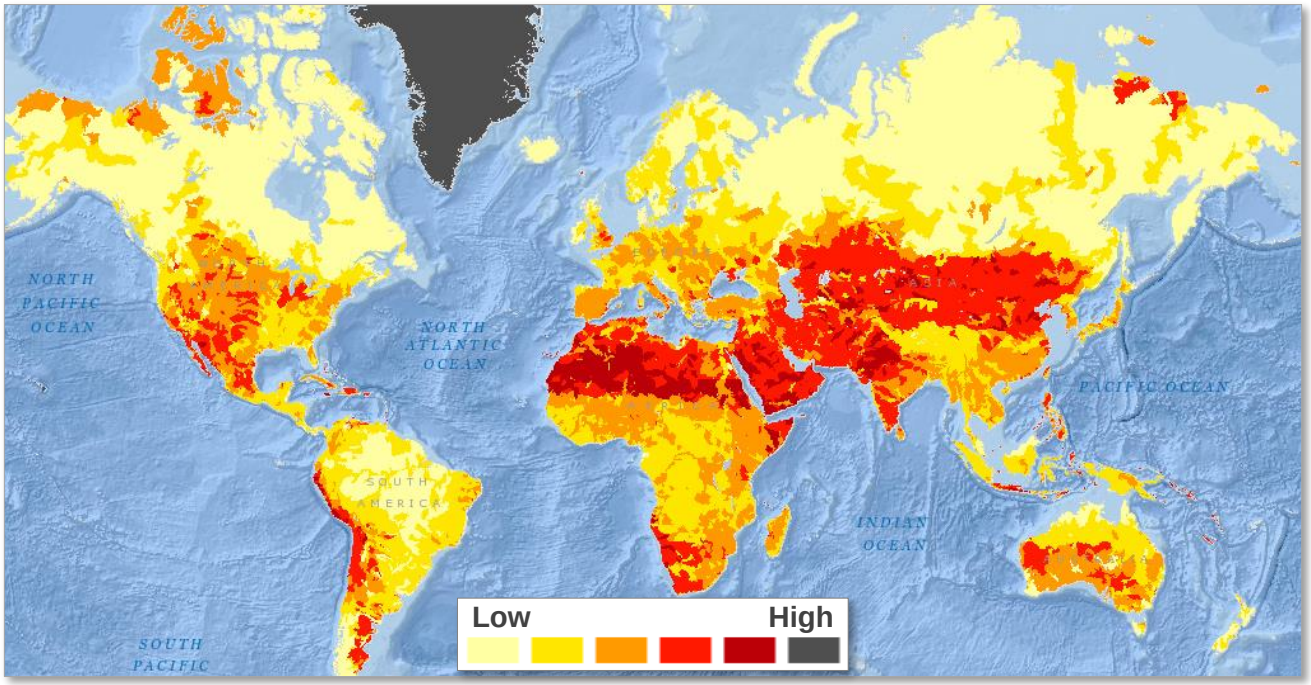
Water, Water Everywhere. Or, Is It?

Subhash Deodhar
Senior Consultant
Fisher International
(Watch the Fisher Webinar here)

All Water Risk Is Local

Local availability of fresh water may change

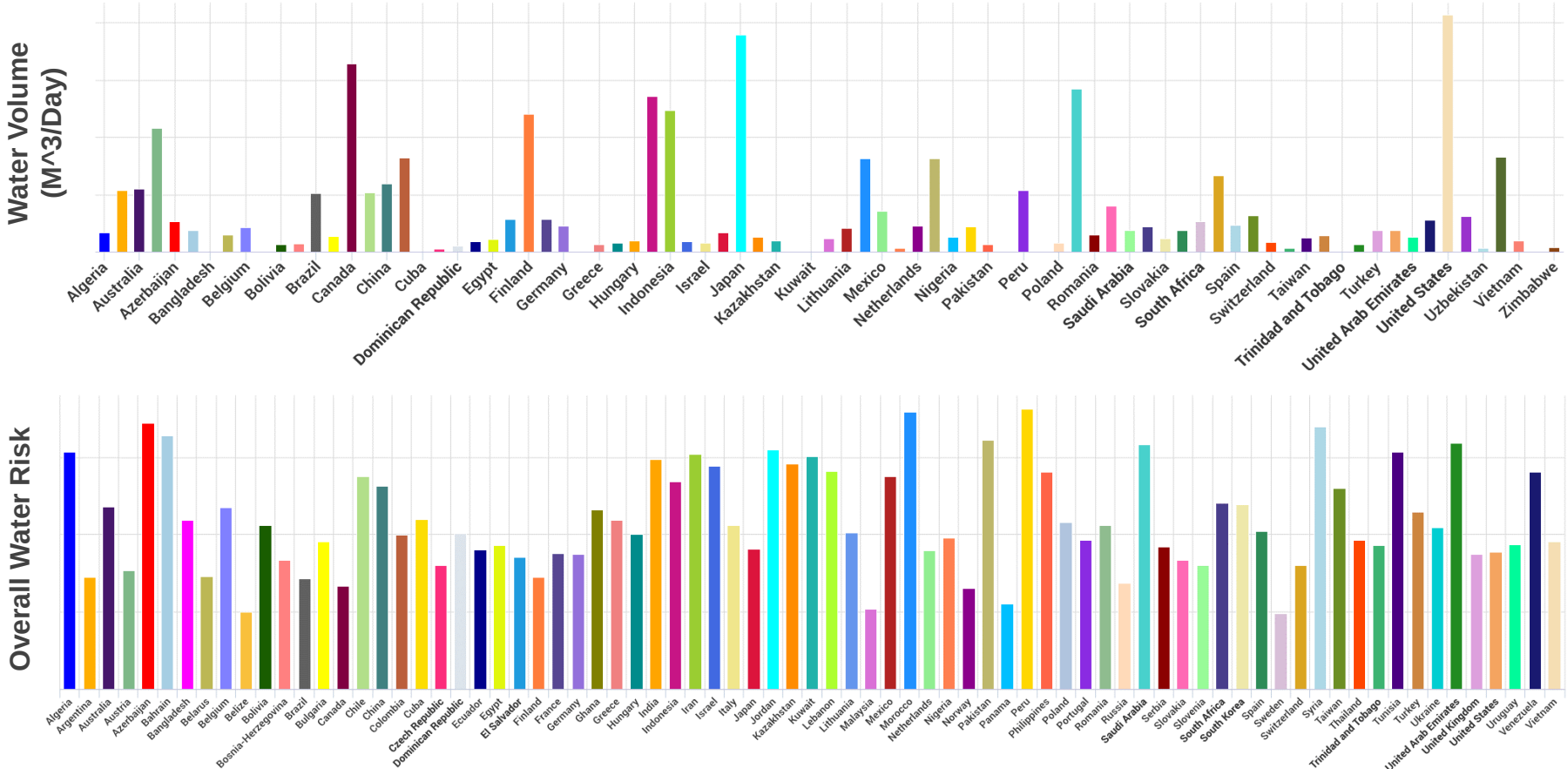
- Changes in demand
- Climate change
- Seasonal changes in precipitation
- Water risk at mill site location?



Source: World Resources Institute

Tissue Machine Water Consumption and Risk

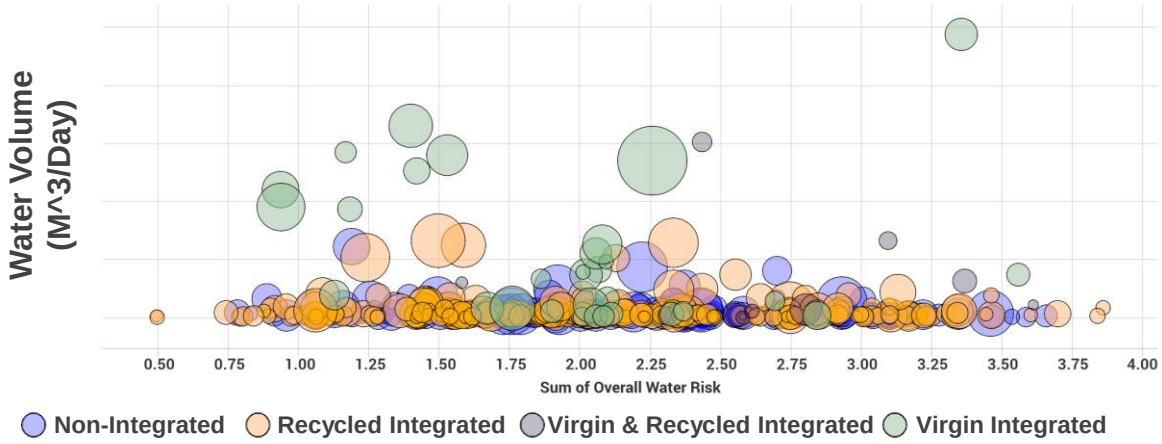
Tissue Machine Average Water Risk* and Consumption by Country

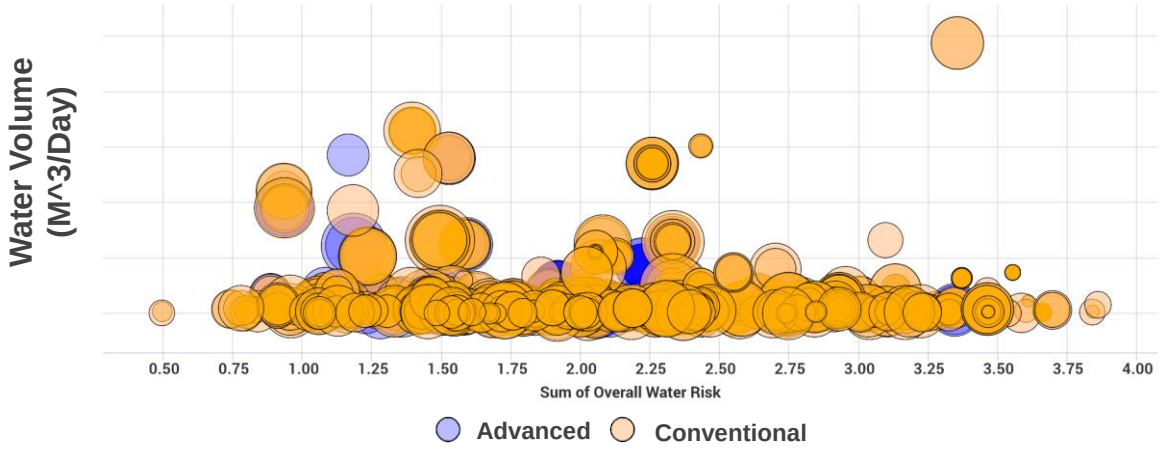


*Average water statistics by country will not always predict local mill risk

Tissue Machine Water Status

Tissue Machine Water Status by Technology and Fiber Source





Each mill location is a unique case.

Virgin and Virgin/Recycled Integrated fiber sites have the highest water usage.

They tend to be located by large a water source.

Advanced structured or TAD processes do not use more water.

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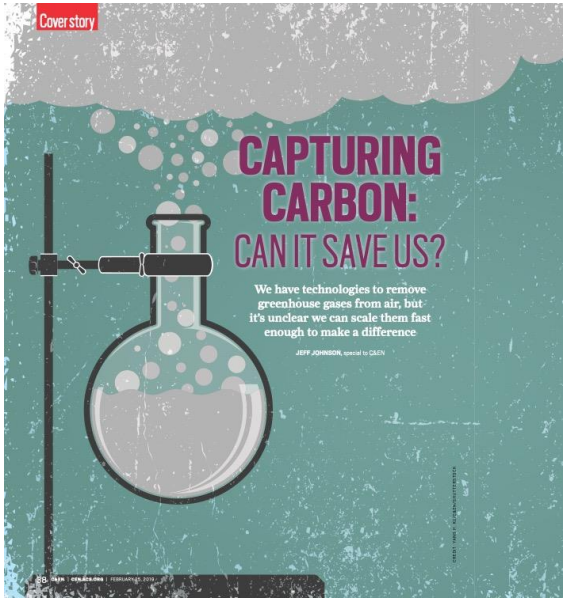
Carbon Footprint

Carbon Emissions Are a Serious Consumer Concern
Are Regulations and Taxes the Next Step?



- EXTRACTING FROM AIR
- BURNING NEW FUELS
- MAKING ROCKS
- BURYING UNDERGROUND
- GROWING PLANTS

Tissue consumers are hearing this news daily:

“Time is not on our side”

Catastrophic consequences of climate change are just steps away, according to a slew of reports released at the end of 2018. The Intergovernmental Panel on Climate Change (IPCC) says that without swift action, global temperatures will rise by 1.5 °C by 2030 and 2 °C by 2050—and will continue to climb beyond then. Those increases will cause disastrous effects, including record-breaking sea-level rise, flooding, wildfires, extreme weather events, famine, and wildlife habitat destruction, the IPCC says. The impacts will hit the world’s poor particularly hard.

Source: C&EN - The American Chemical Society, February 25, 2019

Benchmarking Paper Mill Energy Efficiency and GHG Emissions for Major Producer Countries*

Subhash Deodhar, Senior Consultant, Fisher International

Observations and Conclusions

Many paper mills have significant potential for improvement in their energy efficiency.

Cogeneration is a win-win option from every angle.

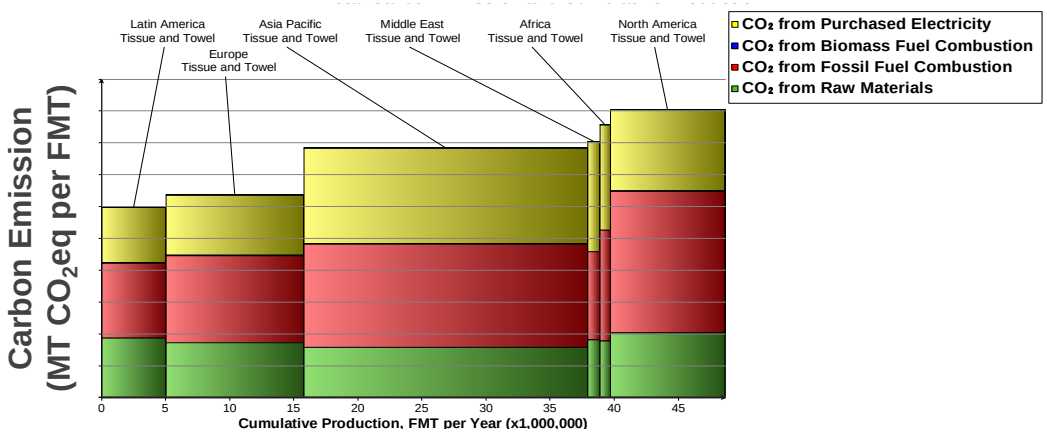
Reduction in GHG emission is good for the earth, but it can also be good for the paper mill's bottom line.

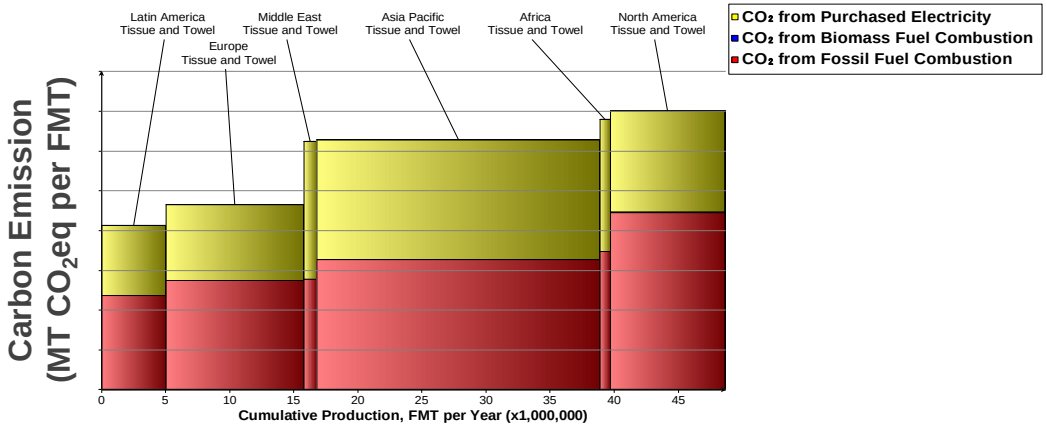
Coal will remain the dominant fuel in India, Indonesia and China. But it is worthwhile looking at alternate biomass fuels. Most biomass fuels can be burned in coal fired boilers.

*Fisher Analysis - Benchmarking Paper Mill Energy Efficiency and GHG Emissions

Tissue Production Carbon Emissions

Total Carbon Emission and Cumulative Production by Region





Cradle to Gate measure includes fiber

- North America = highest rate
- Probably counts carbon twice as raw material and production else where

Gate to Gate measure excludes raw materials

- North America still highest rate
- This is probably the base for carbon tax
- Carbon tax likely to be regional or national based
- Will this separate Mills by cost?

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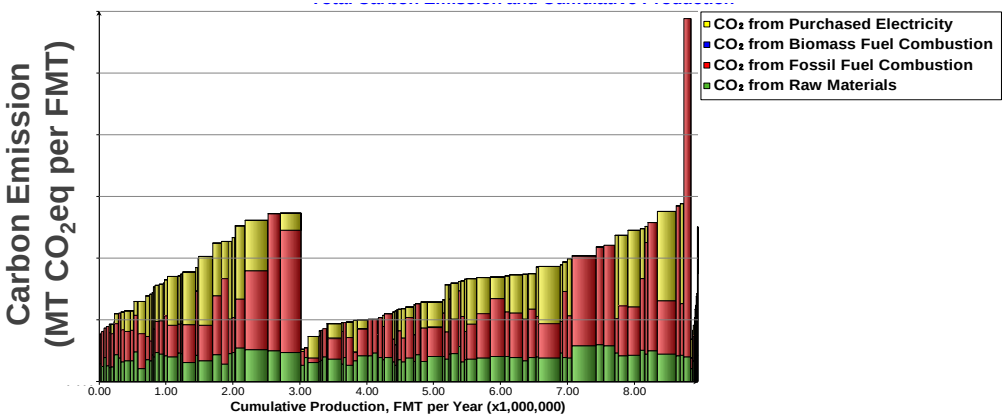
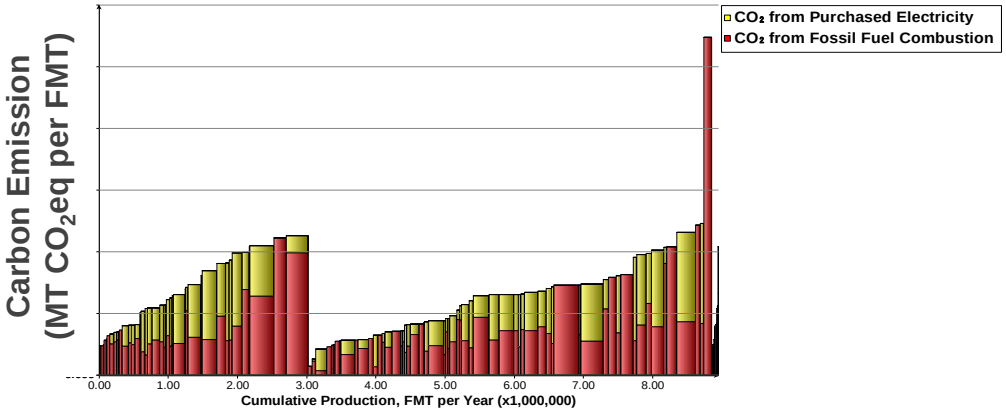
North American Total Emissions versus Mill Contribution by Mill and Tissue Grade

Total Carbon Emissions per Ton by Mill





Cradle to Gate includes pulp fiber emissions

Commercial grade curve is very steep

- Mostly integrated recycled recycled fiber
- Carbon tax or emission cap could quickly disrupt the cost order for this market

Consumer Tissue is mostly non integrated purchased pulp

- Curves are not as steep but could easily be disrupted
- Do integrated virgin tissue mills have an advantage?

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Does the Through Air Drying Tissue Process Really Use More Energy?*

Bruce Janda, Business Intelligence Consultant, Fisher International

- TAD tissue processes always use more energy per ton of tissue produced
- Both electrical and thermal energy consumption is increased by TAD
- They may use less energy per sheet or consumer use depending on the product format and consumer application. The product furnish cost determines the overall economic impact as extra fiber can be used in a conventional dry creped tissue process to improve consumer performance
- Do “Structured Tissue” alternatives to TAD make sense?
  - Maybe

*Fisher Analysis - Does the TAD Tissue Process Really Use More Energy?

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Tissue Product Design

Tissue Product Designs for Sustainability or Greenwashing?

Now go up to **ONE MONTH before changing your roll.** Looking for an irresistibly soft toilet paper that seems to last forever? Charmin has got you covered. With Forever Roll, you can go longer between roll changes without sacrificing your comfort. It's super convenient and long-lasting, so you have one less thing to think about!

With free shipping and a money back guarantee, all you have to lose is the hassle!

•• Brushed stainless steel roll holder included with Starter Kit
•• Comes in the Charmin Ultra Soft you know and love
•• Available in both Multi-User (12" diameter) and Single-User (8.7" diameter) sizes
•• Free delivery on all products, right to your doorstep
•• Subscribe and save 20% off all orders
•• Clog-safe and septic-safe

TOSS THE TUBE

Every year 17 billion TP tubes are thrown away.

To lessen the environmental impact, we created Scott® Tube-Free TP, an innovative product that doesn't use a cardboard tube.

Are these a big deal? Maybe both products could save transportation energy?

Source: 2019 Internet Search

Tissue Product Replacements/Substitutions

Would These Products Change Your Tissue Consumption?

Eco-friendly alternatives

Family cloth

This might be an option that is **out of most people's comfort zone**, but in the spirit of cloth diapers comes family cloth — wiping with **fabric swatches**, which are then placed in a **wet-dry bag** and laundered so they can be **reused**.

Bidet attachment

For some reason, Americans haven't fallen in love with alternatives like bidets as many Europeans have. This is unfortunate, because bidets have amazing environmental benefits. Plus, they are great for personal hygiene.

Substantive Change versus Green Washing? Some Changes Can Have Real Impact

Greenwashing?

Who Gives A Crap

This company began with crowdfunding back in 2012, and it has been growing ever since. It offers **eco-friendly toilet paper** made from 100 percent **recycled paper** as well as no added inks, dyes or scents. Who Gives A Crap claims its 3-ply is as “soft as unicorn kisses and as strong as 1,000 ponies,” and you can buy it in bulk at just $1 per jumbo roll, which is 400 sheets. This company also donates 50 percent of profits to help improve sanitation and build toilets in developing countries.

Photos from Appleton, WI Starbucks, 2019

Substantive Change?

Photo taken at N.A. Perini

Greenwash:

- Eco-friendly toilet paper
- High priced plastic water bottle includes water fund contribution
- Air dryer fueled with coal-based electricity vs. paper

Real Sustainability:

- Eliminate plastic wraps in packaging

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Conclusions

Conclusions and Questions

- Recycled versus virgin pulp tissue is the wrong question. Sustainable tissue fiber can come from certified forests, recovered paper, and non-wood sources
- Fiber source certification requires meaningful standards and control. Blockchain opportunity?.
- All water risk is local. Tissue production sites near water sources tend to use more. Advanced Tissue/TAD does not appear to use more water.
- Water factors are potential disruptor only in water stressed local areas. Why doesn't the cost of water wasted get more attention in papermills?
- Carbon tax or restriction could have a major disruptive impact on individual mill cost position within a country or region. How will they be calculated?
- Product Greenwashing is common by manufacturers, facilities, and interest groups. Will consumer, government, and industry focus shift to real issues?
- Plastic wrap replacement by paper is a potential disruptor that could come quickly in several markets. Why is a paper product packaged in plastic?
- Most Tissue ships by volume, not weight. Can product footprint redesign reduce transport carbon footprint?
- What is next? How will your mill(s) or product be affected?

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