

Capturing the Building Energy Transformation Opportunity



Clean Air Partnership

About Clean Air Partnership

- Charitable Environmental Organization
- Works with municipal governments and partners to reduce GHGs and air pollution, increase resiliency to extreme weather and make advancements towards a low carbon economy.
- Outreach, Awareness Building & Collaboration
- Capacity Building and Implementation Support
- Transfer of Actions & Scale Up of Actions

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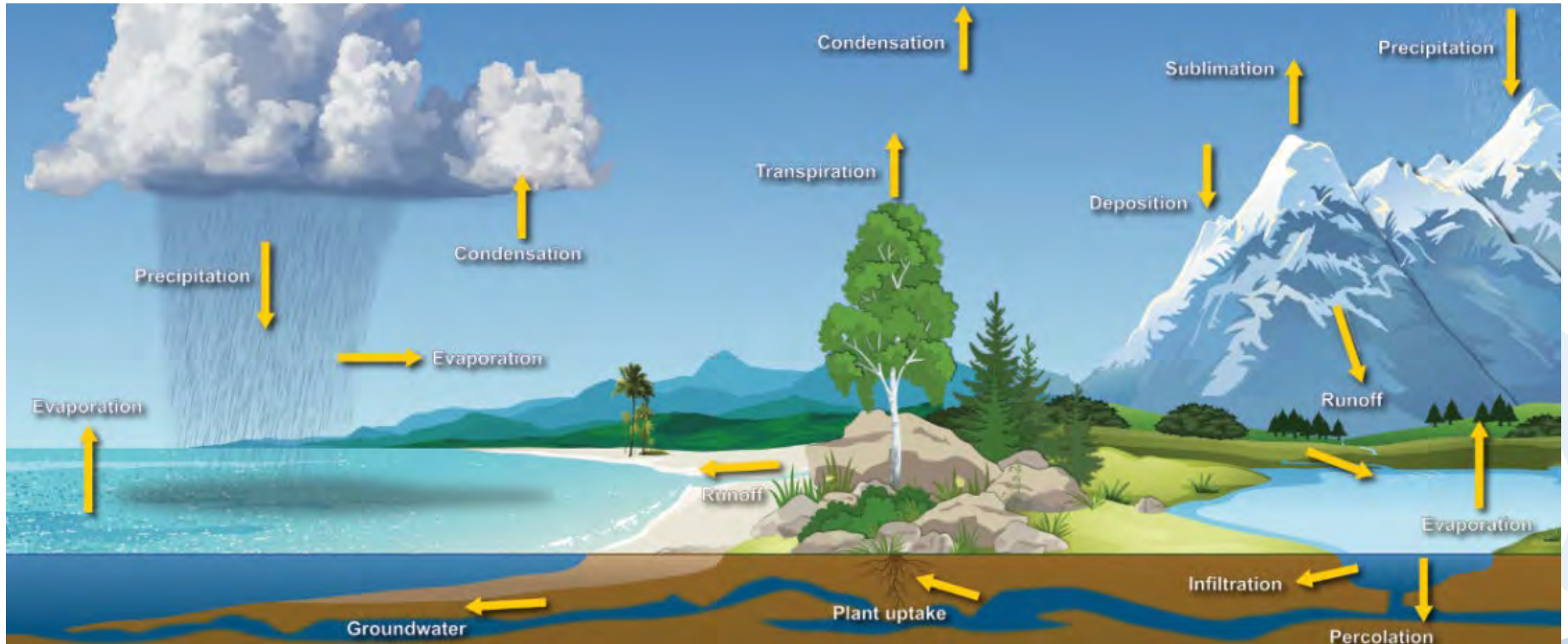


The Heat is On.....

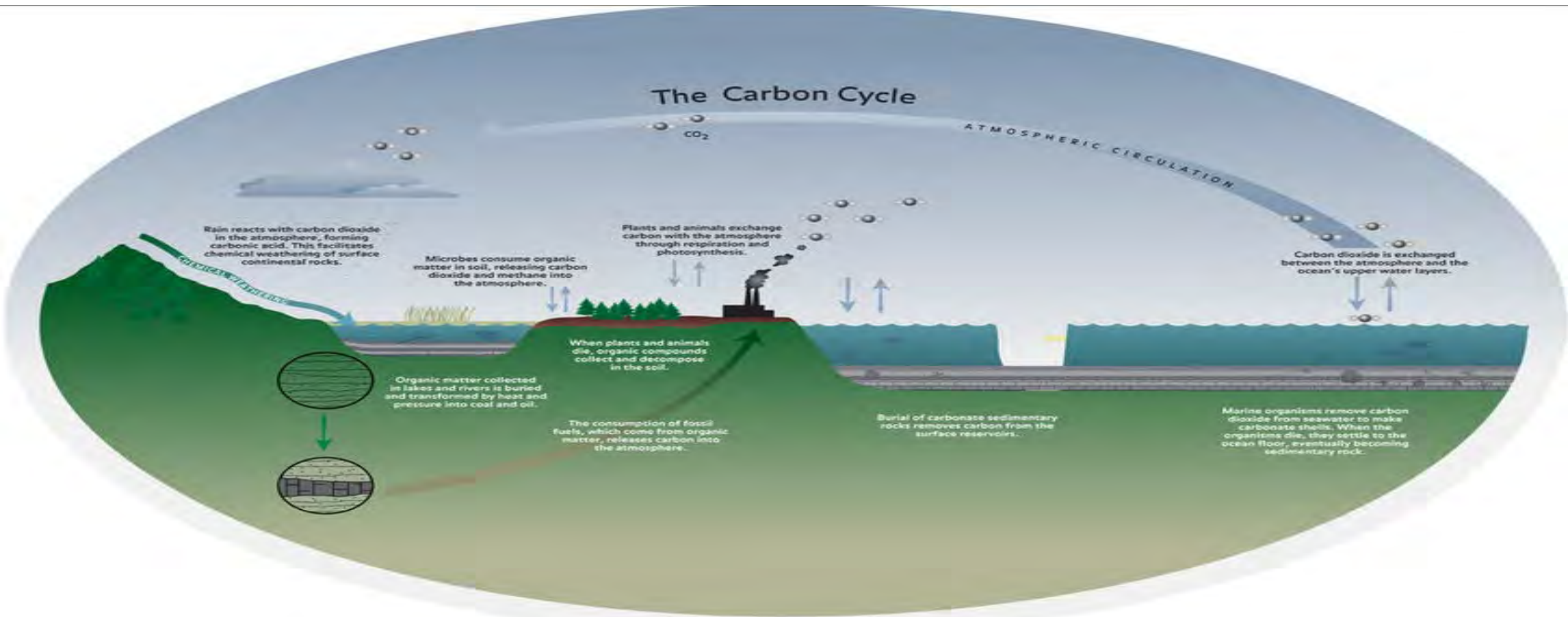
- Climate emergencies are being acknowledged across sectors
- Pace of implementation lags
- Moving from words to actions
- Moving from isolated actions to scale up
- Addressing Necessary Systemic Changes
- https://www.instagram.com/p/CVTAp-jDM6B/?utm_source=ig_web_copy_link



The More Popular Water Cycle



Let's Meet the Carbon Cycle



Why 1.5 or 2 or 2.5 or 3 Degrees Matters

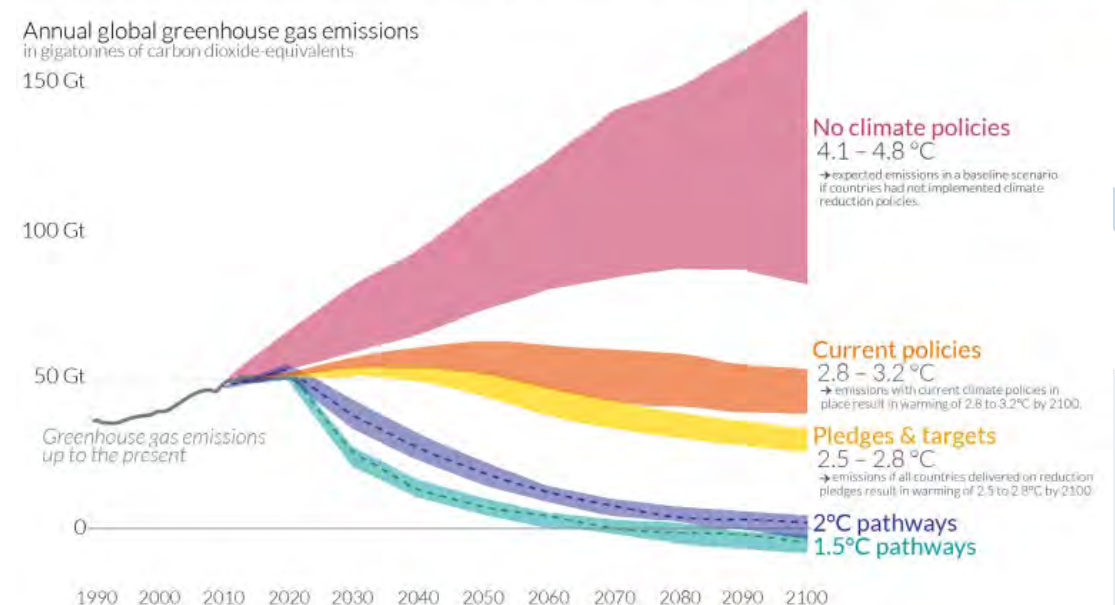
- Limiting global warming to 1.5°C could mean 11 million fewer people exposed to extreme heat. At warming above 1.5°C, twice as many megacities as today are likely to become heat stressed, potentially exposing 350 million more people by 2050
- 61 million fewer people exposed to drought
- 10 million fewer people exposed to the impacts of sea-level rise
- Reducing risk re: triggering feedback loops

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Global greenhouse gas emissions and warming scenarios

– Each pathway comes with uncertainty, marked by the shading from low to high emissions under each scenario.
– Warming refers to the expected global temperature rise by 2100, relative to pre-industrial temperatures.

Annual global greenhouse gas emissions
in gigatonnes of carbon dioxide-equivalents



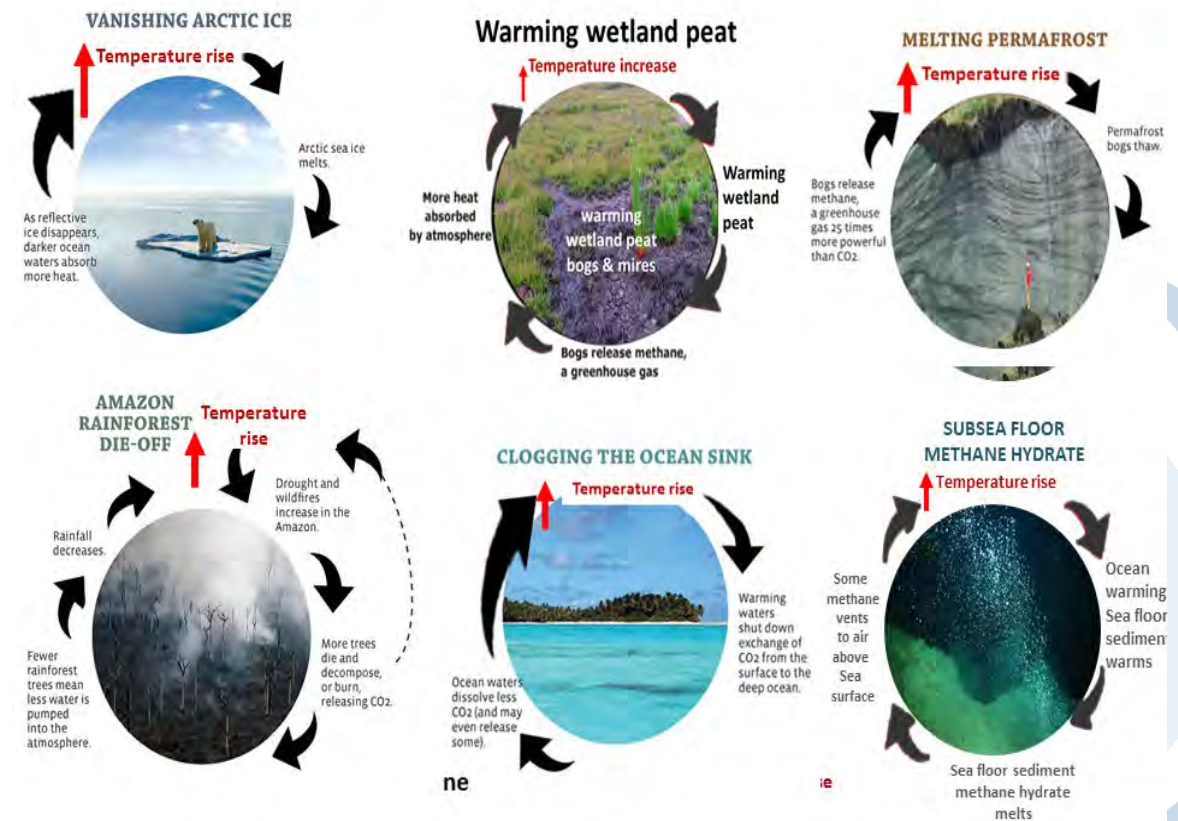
Data source: Climate Action Tracker (based on national policies and pledges as of December 2019).
OurWorldinData.org – Research and data to make progress against the world's largest problems.

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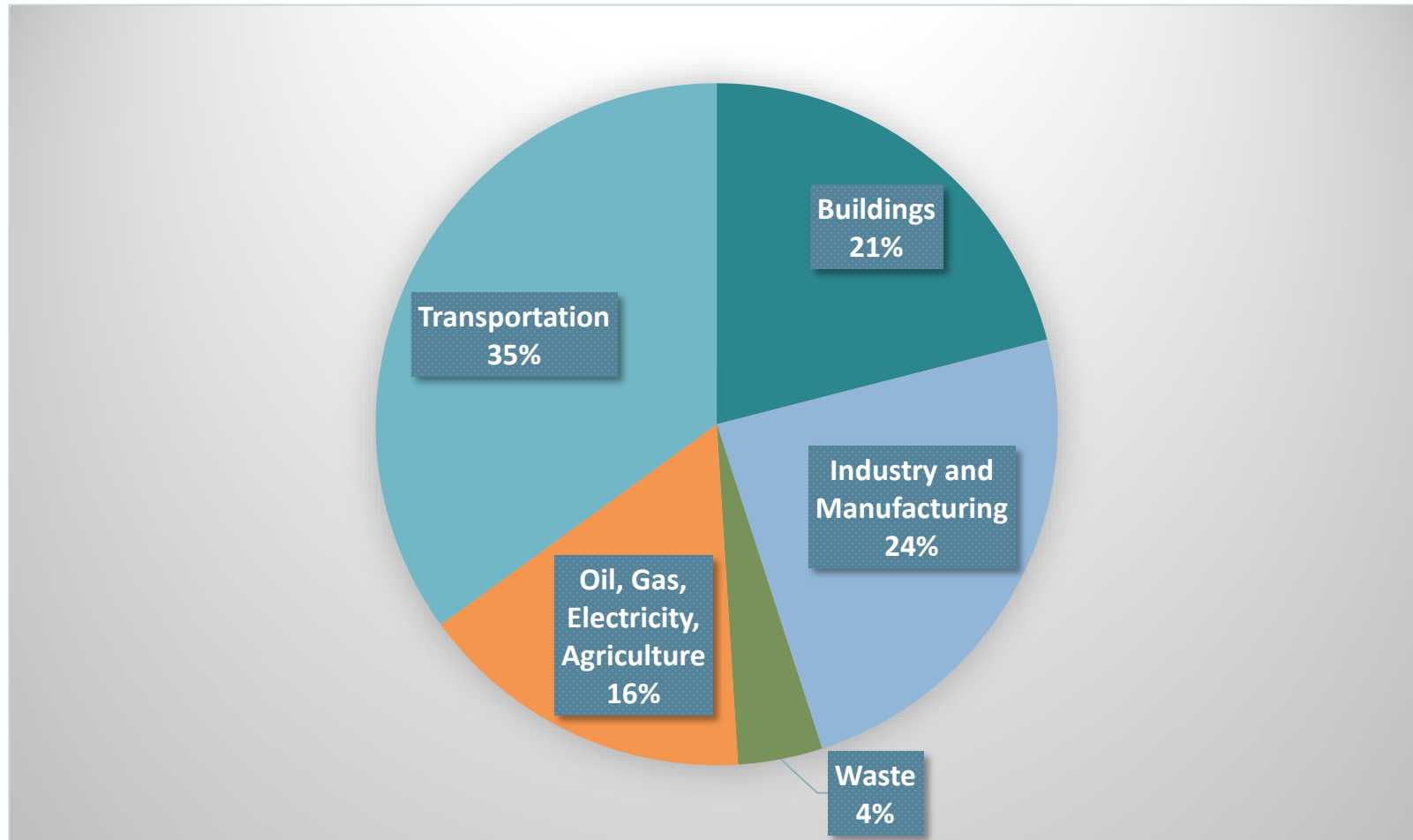
Feedback Loops We MUST Avoid

- This is not Earth's First Rodeo
- The past offers lessons to guide our future
- Loss of sea ice
- Ocean temperature, acidification, pH, coral reefs
- Methane release from permafrost
- The risk of triggering feedback loops is far greater beyond 1.5 degree increases significantly

Some large +ve amplifying feedbacks

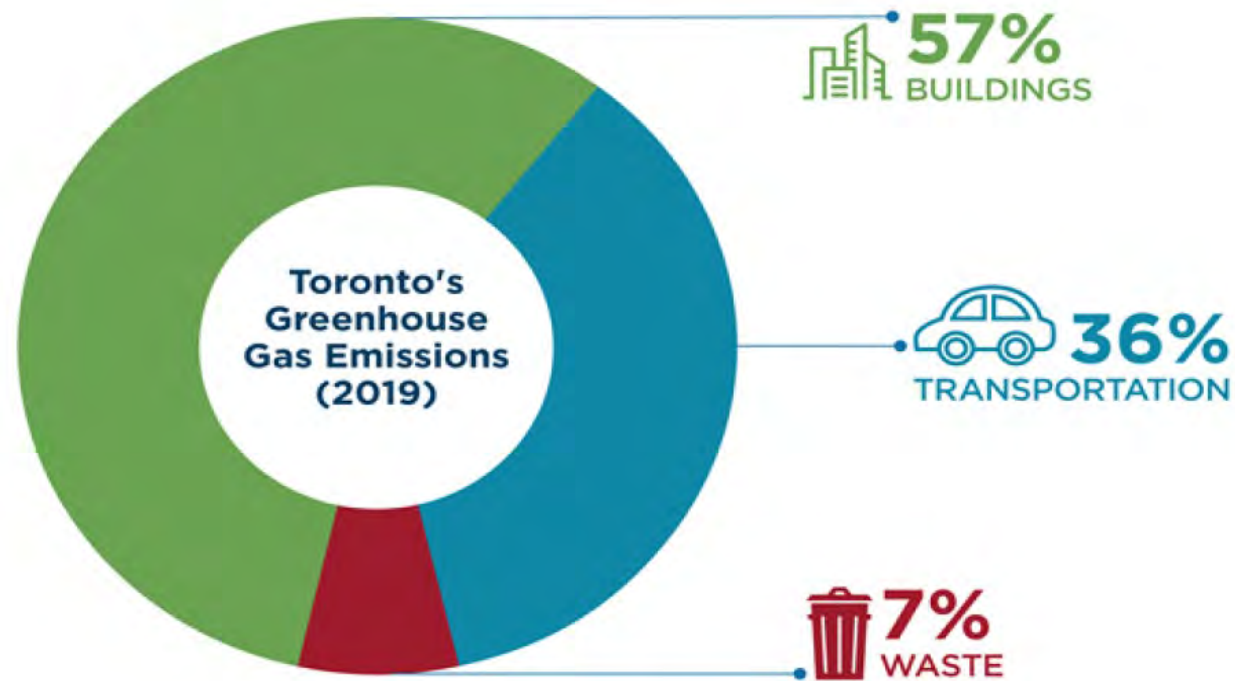


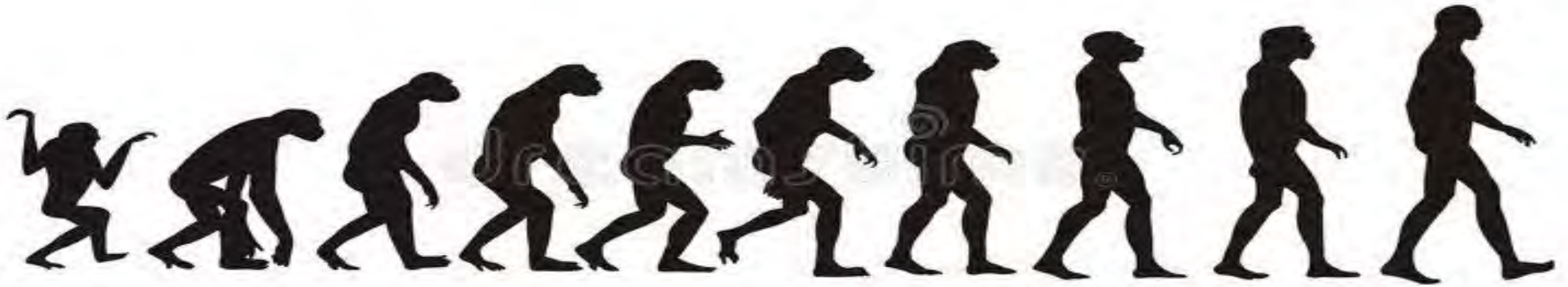
Ontario GHG Emissions by Sector



Toronto GHG Emissions by Sector

Figure 1. Toronto's GHG emissions (2019).





Alignment between
Energy Plans and
Climate Emergency
Declarations

Asset Management
Zero Over Time
Integration

Lifecycle Costing, Internal
Carbon Price, Discount Rate,
Revolving Fund, Recoverable
Debt & Public/Private
Partnerships

Monitoring to Verify
Savings and
Operational
Performance

Moving from Silos to
Teams and Building
Science Expertise



Energy
Plans to
Emissions
Plans

Update to Municipal
Corporate Green
Development
Standards/Carbon
Budgeting

Financial
Policies

Measurement
and Progress
Reporting

Integrated
Design

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Getting the Municipal House in Order

- Green Fleet 1.0: rightsizing, anti-idling, driver training, fuel-efficiency, pedal power
- Green Fleet 2.0: EV transition, light duty equipment
- Green Fleet 3.0: heavy duty vehicles (electric, RNG, hydrogen...)



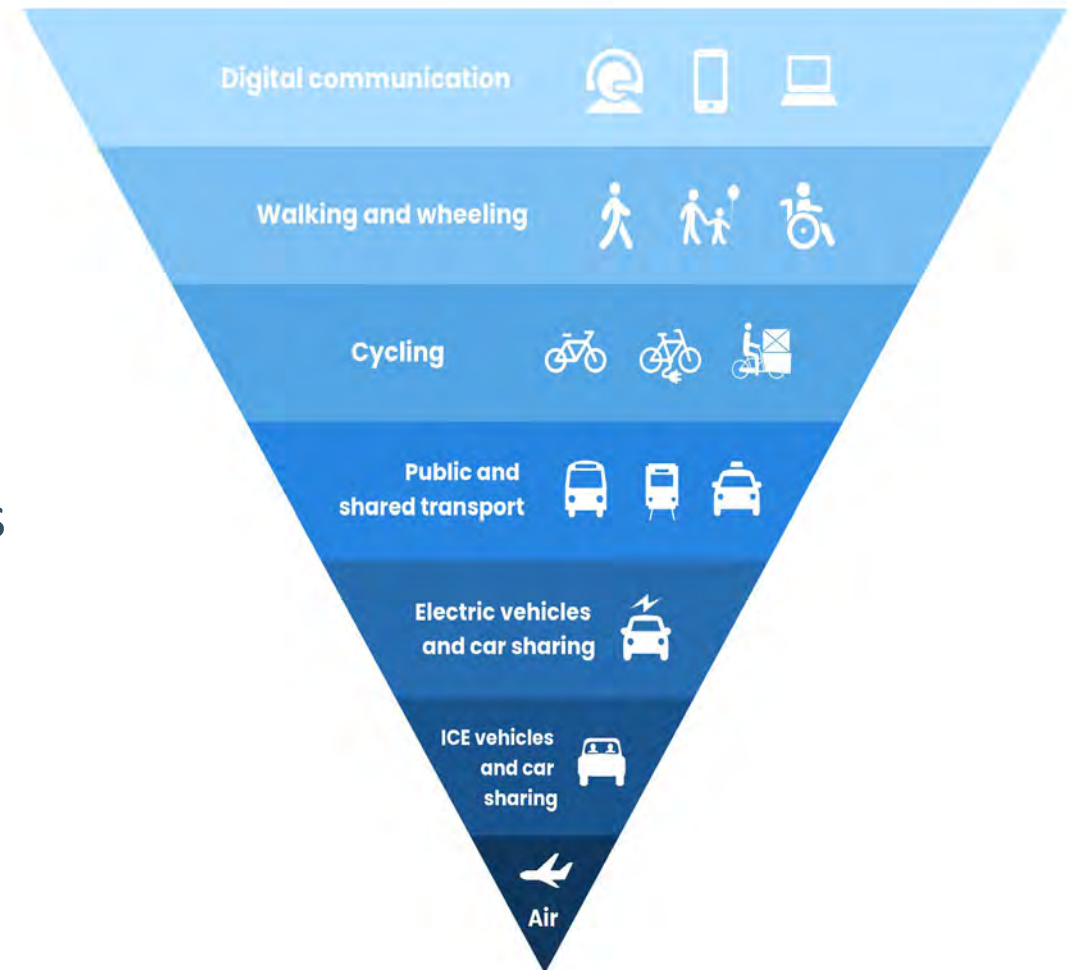
Net Zero Emission Buildings

- Middlesex Centre Net Zero Energy Fire Hall
- 5 Markham Fire Stations
- Barrie Transit Building
- Toronto Mount Dennis Net Zero Emission Day Care Centre
- Guelph Solid Waste facility
- Toronto Paramedic Station
- Toronto Community Centre
- More and more at the planning/design stage



Transportation Transformation

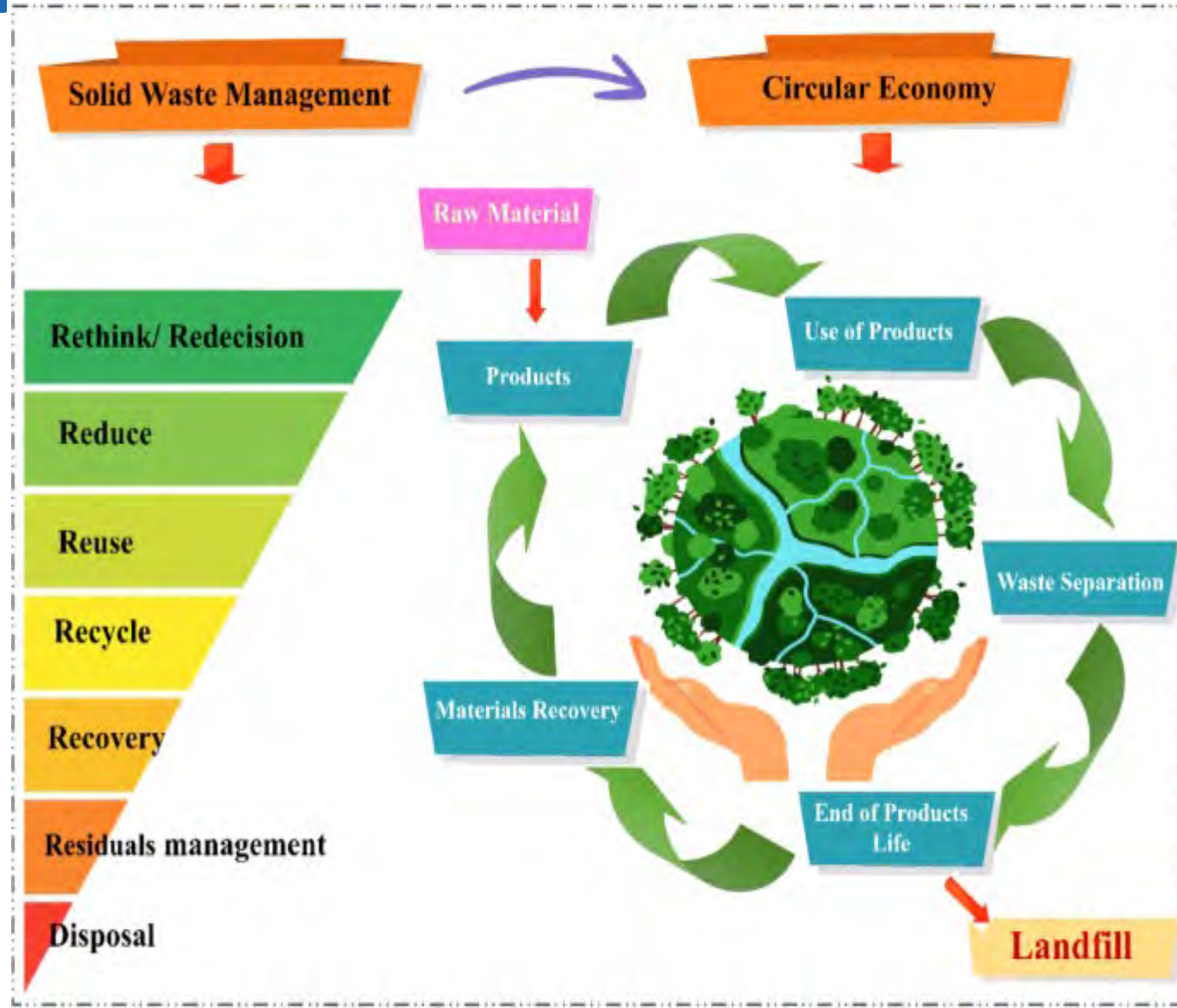
- Reduce the need to commute
- Walk any trips less than 1 km
- Cycle any trips less than 5 km
- Advocate for safe and dedicated spaces to walk and cycle in your community
- Choose the lowest carbon option in your transportation choices
- Electric and autonomous vehicles won't address our congestion issues
- Vehicle sharing is critical and is providing benefits for vehicle sharing (dedicated lanes)
- Zero carbon electricity grid is critical



Waste Transformation

- Reduce, Reuse (and Recycle)
- Flip that hierarchy
- It is mind blowing how virgin materials can be cheaper than recycled materials
- If that isn't a market failure, I don't know what is
- Design for reuse right from the start
- Anything that can't be reused in the circular waste economy has to get out of the stream

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Now Let's Get Back to Buildings.....

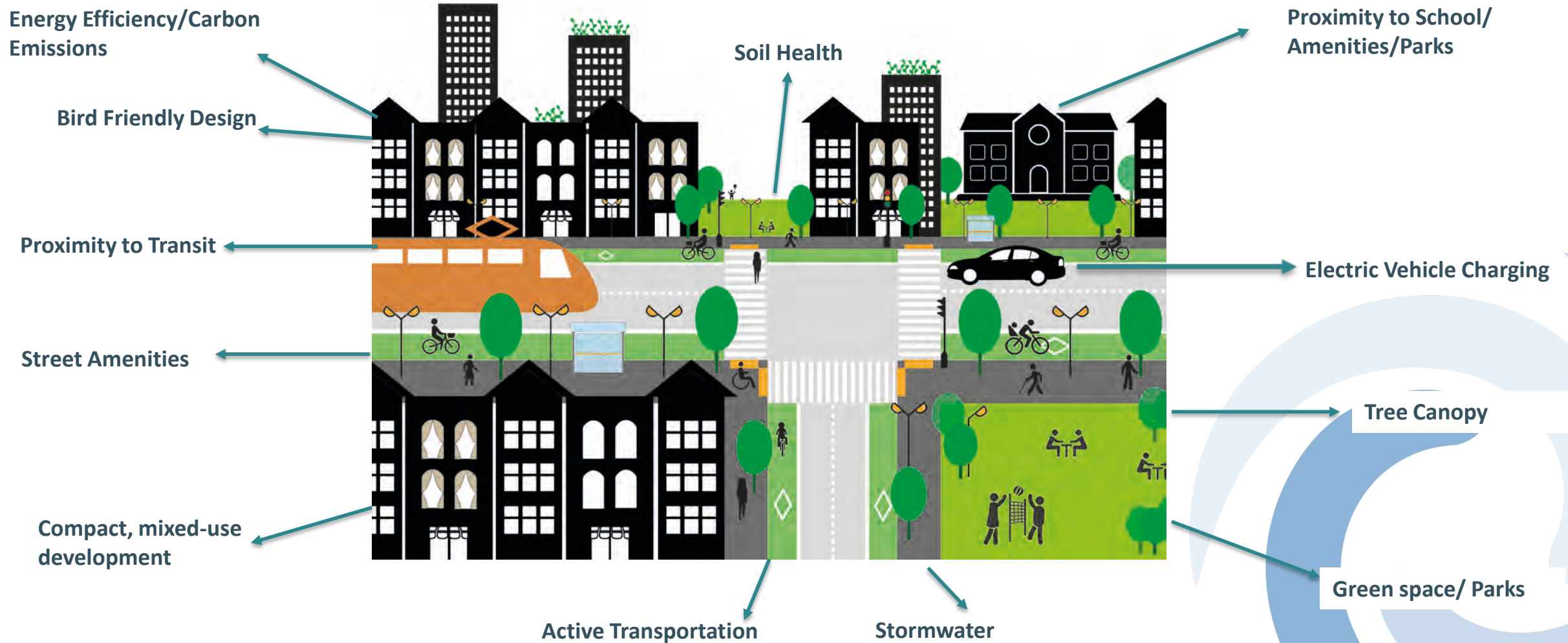


New Buildings: What are Green Development Standards (GDS)?

- Voluntary or mandatory standards implemented by municipalities to encourage sustainable community design
- Guide development at a level of planning and design that focuses on the community as a whole
- Integrated into the planning approvals process for development applications



What do Green Development Standards cover?



Why Green Development Standards?

- Climate emergencies are being declared all over the world
- Ontario's population is projected to grow by 30.2 per cent (4.3 million) between 2017 to 2041.
- Addressing energy and infrastructure costs
- New buildings present an ideal opportunity
- In order to reach GHG targets, new buildings and neighborhoods need to be built to minimize GHG emissions through:
 - Energy efficient building principles (easier to build to net zero than retrofit)
 - Addressing opportunities at constructions provides the greatest return on investment

Value Proposition for GDS

- Integrating standards and requirements that already exist into one place
- Provides clarity and transparency to the development community on metrics that the municipality wants to increase
- Brings the sustainability discussion to the beginning of the development application process
- Provides the direction for where standards will be going over time
- Key tool for municipalities to implement the goals of their Official Plans and to stimulate local economic development
- Increasing growth offers a key opportunity to ensure that new developments consider public health, climate change, energy, and resource use

Legislative and Policy Context for GDS



Key Outcomes of GDS for communities

- Minimize GHG emissions
- Address infrastructure costs
- Preserve the natural environment
- Create thriving, connected communities
- Improve public health
- Support the local economy
- Provide flexibility and certainty for developers



The Toronto Green Standard

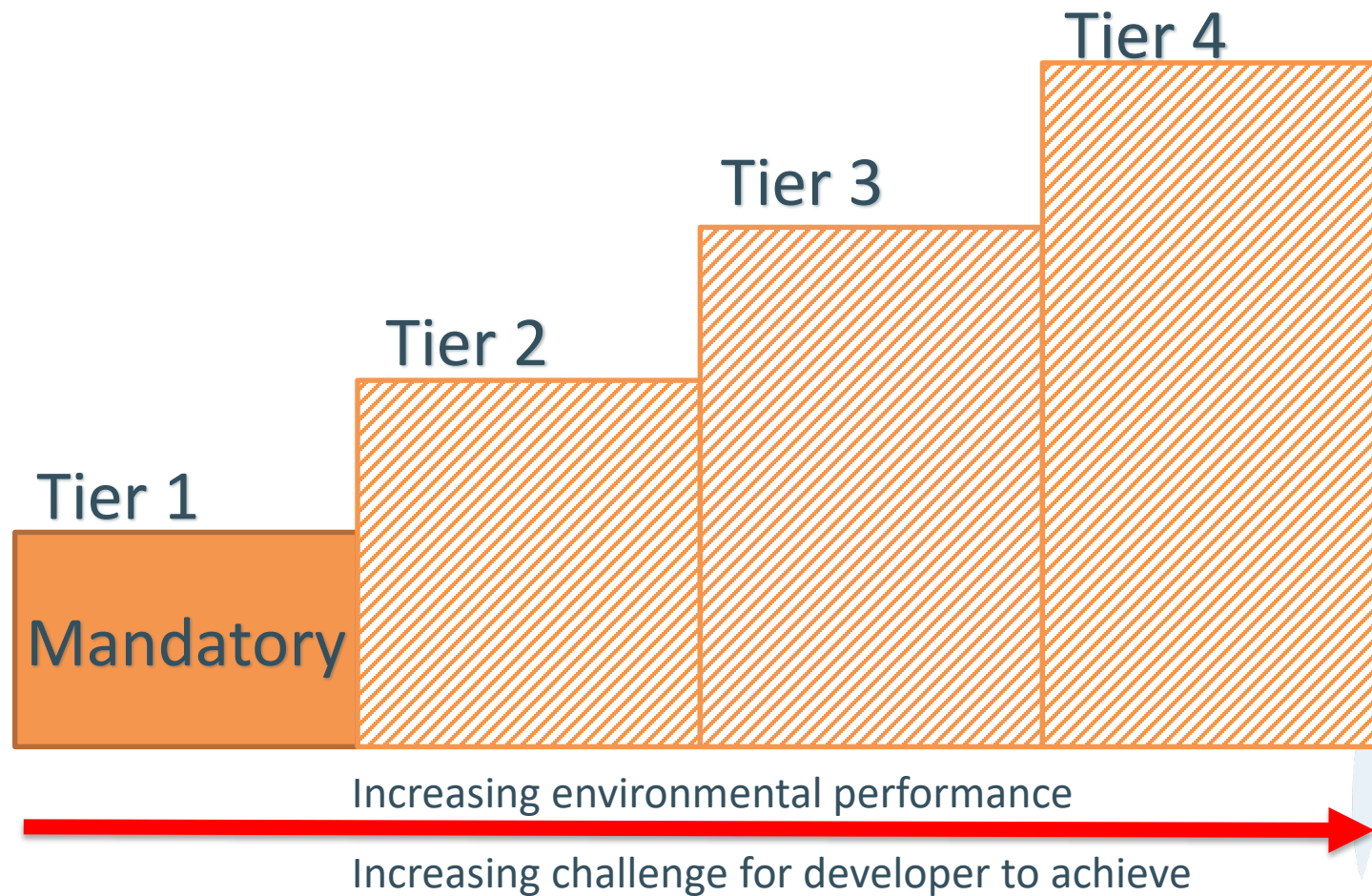
- Covers private and city-owned buildings
- Tiered system, where Tier 1 is mandatory and Tiers 2-4 are voluntary
- Financial incentives – Development Charges Refund Program (voluntary)



The Whitby Green Standard

- Provides a one-stop-shop for navigating municipal sustainability policies, plans & strategies in new development.
- There are four tiers of the Whitby Green Standard:
- Tier 1 of the checklists identifies mandatory criteria that need to be met by all new development applications.
- Tiers 2 to 4 identify ways in which developers can achieve high-performance sustainable development on a voluntary basis.

Tiered, Prescriptive Approach to GDS



GDS Examples in Ontario



Embodied Carbon

- Bringing embodied carbon into eligible products
- What is the embodied carbon of retrofit products?
- Builders for Climate Action – [BEAM Estimator](#)
- [Achieving Real Net Zero Homes](#)
- Carbon Leadership Forum – [Carbon Storing Materials Report](#)
- Embodied Carbon – MURB (more to share on that soon)
- Embodied carbon villains can be addressed via eligible products/customer concierge supports/contractor knowledge

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Understanding Carbon



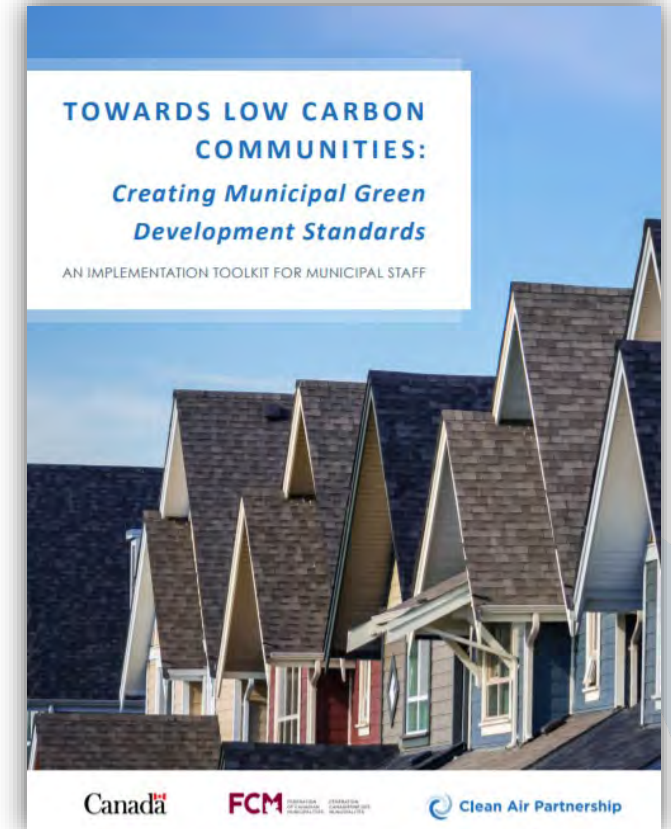
Potential Incentives for Green Development

1. Community Improvement Plans
2. Development Charge Rebates
3. Tax Increment Based Grants
4. Expedited Approval Process
5. Recognition Program
6. Density/Height Increases
7. LIC Financing



CAP's GDS Toolkit

- **Helps municipal staff:**
 - Communicate to decision makers the value of GDS
 - Understand the legislative authority for creating GDS
- **Provides:**
 - A way to discuss sustainability metrics with developers right from the beginning
 - A milestone framework for tracking your progress with GDS
 - Resources, education for staff and stakeholders
 - Sample metrics to be used in developing your own GDS



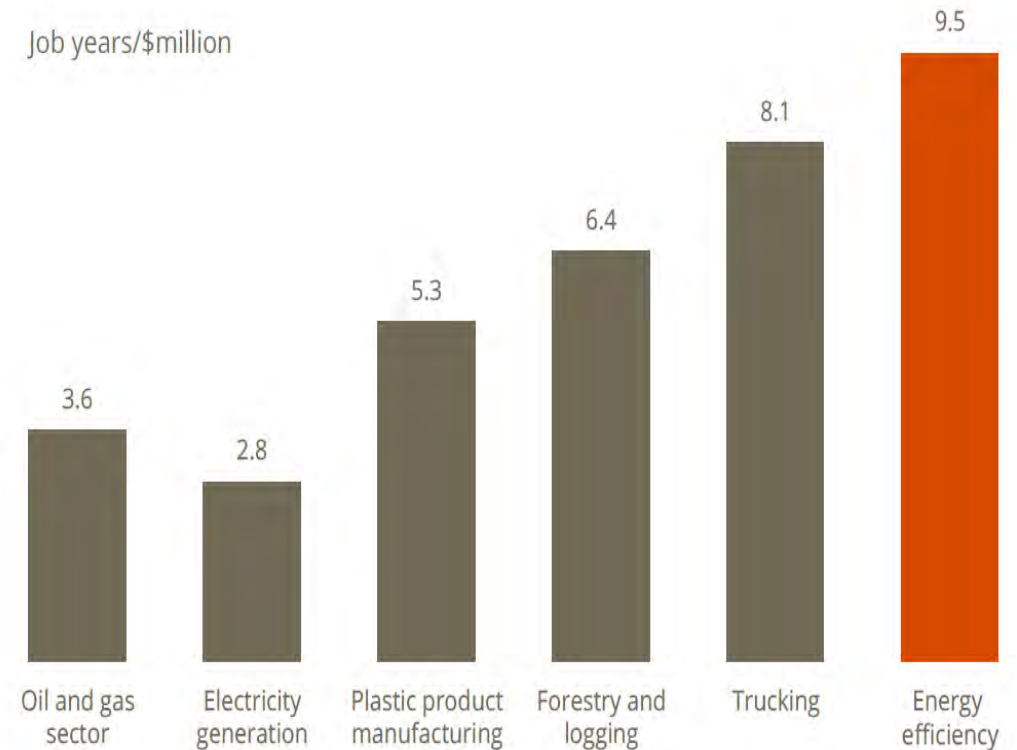
Existing Buildings – Advancing the Retrofit Ecosystem

- Get more retrofit programs in market
- More supports for building managers/property owners on their roadmap to zero and how it aligns with the asset renewal
- More business models/utility models
- More capacity in renovator/contractor market
- Need to bring in efficiency and building envelope into the business/utility models



Existing Buildings – Job Creation Opportunity

- Most Ontario energy efficiency programs have focused on the non-residential sector
- Residential sector has a huge gap in terms of retrofit programs/supports
- Energy efficiency jobs present a mix between higher pay and lower barriers to entry
- Ontario potential: Total investment: residential (\$ 5.6 billion/year) and commercial (\$ 2.4 billion/year); Gross jobs per year residential (53K/year) and commercial (23K/year).



Existing Buildings – Economic Opportunity

- We need to do a better job bringing together up-front capital costs and operational costs to advance life cycle costing
- Present and future carbon prices
- Need to show how it is already economic
- Where it isn't economic what can be done to make it more economically more attractive?
- More sharing between municipalities and the industry on the economics of lower carbon buildings
- We are all in this together

TRADITIONAL POWER SYSTEM

GENERATION

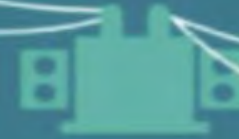


Power Station



Power Transformer

TRANSMISSION



Transmission substation



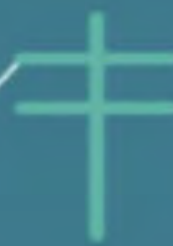
DISTRIBUTION



COMMERCIAL
& INDUSTRIAL
BUSINESS CONSUMERS



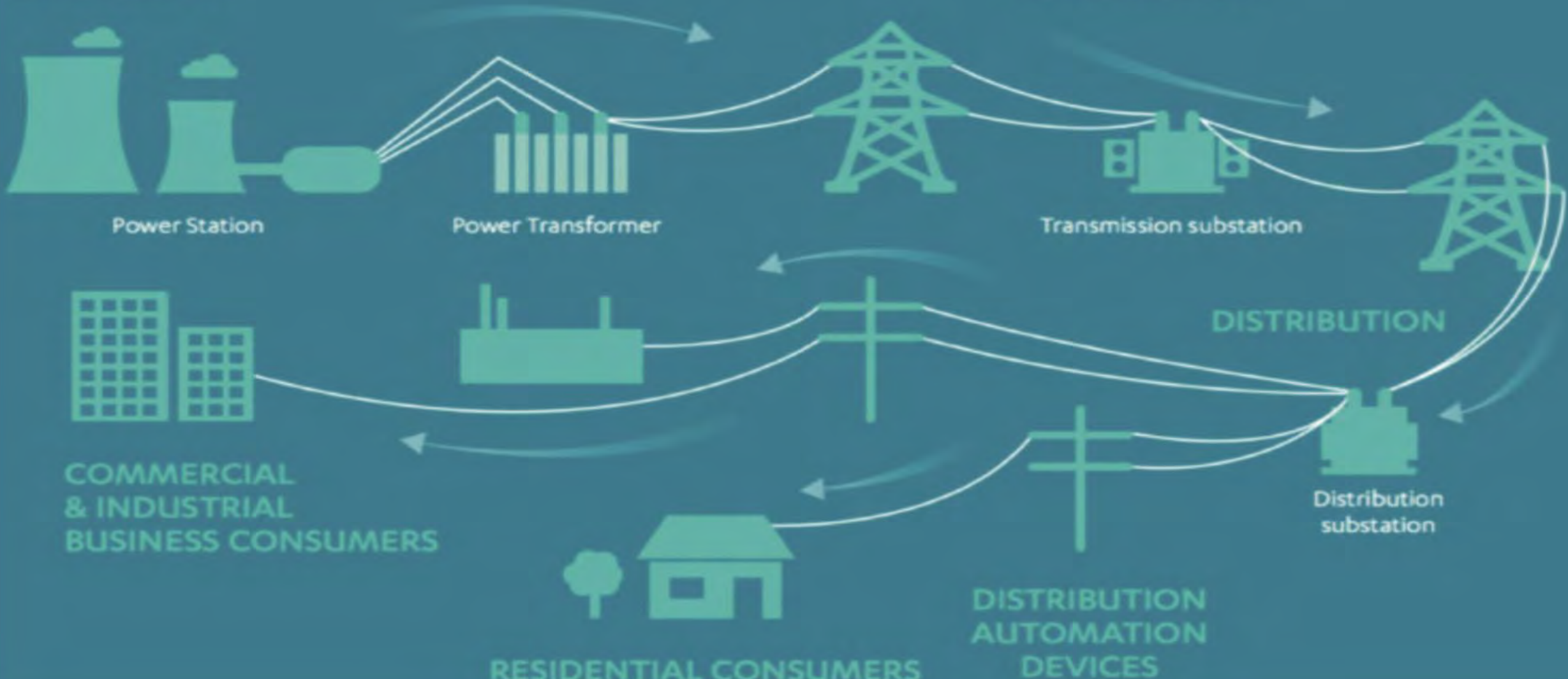
RESIDENTIAL CONSUMERS



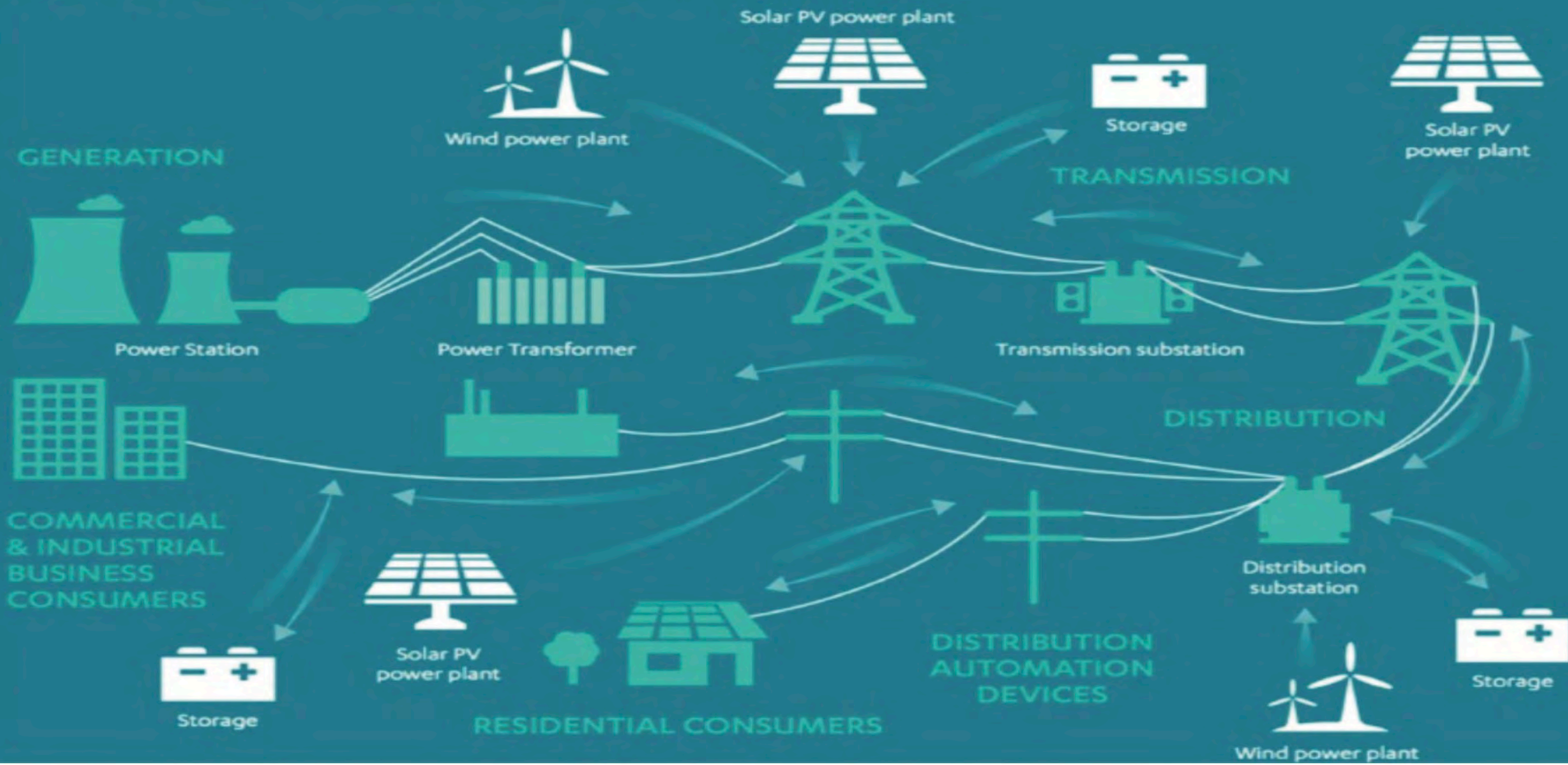
DISTRIBUTION
AUTOMATION
DEVICES



Distribution
substation



FUTURE POWER SYSTEM



How to Lean into Disruption

- Increasing Alignment across municipalities, utilities, energy developers, provincial entities is imperative.
- Those who break down siloes will win the transition game.
- Decision makers need to know that climate ambition is expected of them and that they will be judged on their ability to advance action implementation.
- We need an all of government approach and an all of society approach.



Energy Decision Matrix

- Is needed to help understand and compare potential options for meeting our energy needs.
- Advancing deeper energy efficiency opportunities;
- Traditional, decentralized and individual generation scenarios, and how they impact or support each other;
- Identification of the various pros and cons, and costs and benefits associated with each of these scenarios, and the development of a transparent decision matrix to compare among them; and
- The application of different lenses to these decisions, including resilience, climate, traditional economic, social, market transformation, etc.



Example of Energy Decision Matrix Use

- For example: Lets take the expansion of the natural gas system in Ontario
- Phase 2: \$234 million for 8,750 connections. Comes to \$26,742 per connection
- Estimated to save customers an estimated \$250-\$1500 per year (\$2.2 million - \$13 million) it is somewhere between that as it can't be \$13 million since not all save \$1500
- At \$250/year that comes to a 106 years pay back; and a 17 year pay back.
- Subsidized on the Ontario wide rate base, estimated at 1\$ per month from ALL natural gas customers - not just those within those newly connected communities. Not able to find info for how long that will be on the rate base. This is another example of a fossil fuel subsidy.
- How might have efficiency, geothermal, heat pumps, net metering, etc compared re costs and benefits of reducing electricity costs for these customers?

Thank You for Your Time

- Gabriella Kalapos
- gkalapos@cleanairpartnership.org
- Have geo-exchange business cases to share? Let us know
- Earth is such an amazing planet!!!
- It takes care of us. We need to take better care of it to enable it to continue to take care of us.

