Restorative Development Partnership

Workshop #1: Introduction and Initial KPIs

14 January 2021

1. Welcome, Introduction

Welcome, Introductions

- Thanks to everyone who's here today from public, nonprofit and private organizations
- **Please enter your name, organization, and title/role in the chat box**
- We are recording the presentation so others can learn, but the final video will *not* include participant images
- Use chat for questions; we'll get to some today and more in Workshop #2 and on the website: RestorativeDevelopmentPartnership.org

Workshop #1 Overview, Agenda

Purpose, objectives, structure: Offer a refresher on restorative development community benefits, focus on a systems model and necessary changes, and provide first set of in-depth Feasibility Study Part 1 results. Presentations by consultants and Partners, and Q&A/group discussions.

Topic
1 Introduction
1.1 Welcome/introductions, agenda, workshop series overview
1.2 Partnership overview
1.3 Restorative development overview, context
2 Feasibility Study: Assets and Resources
2.1 Introduction and key performance indicators
2.2 Understanding first four KPIs: Deep dives, baseline assessments (scores, key takeaways)
2.3 Integrating water, energy, food, and materials: Overview of integrated utility hub technical analysis
3 Preview of next workshop

Workshop Series: Overview

- **Workshop 1, January 14: Introduction and Initial KPIs**
  - Understanding and commitment to restorative development
  - Feasibility Study Phase 1 deep dives into first 4 key performance indicators, scores, and technical analysis
- **Workshop 2, January 25: Equity and Remaining KPIs**
  - Building equity-centered communities
  - Feasibility Study Phase 1 deep dives into remaining 7 key performance indicators, scores
- **Workshop 3, February 2, Alignment and Moving Forward**
  - Aligning RD with Partner priorities: goals and gaps, opportunities, conflicts, untapped synergies
  - Phase 2: what it is, what it means, how to move forward
- **Workshop 4, date to be determined: Action-planning workshop for Partners**

2. Feasibility Study: Restorative Performance

Restorative Development Partnership: Summary

History:

- Began in 2017 as a loose coalition of individuals and organizations working toward restorative development in the Minneapolis-St. Paul area in collaboration with Yorth Consulting
- By 2019, leaders had refined the focus on Minneapolis/Hennepin County, built a logic model, and through 2020 began organizing into a more formal entity with governance structures

Statement of purpose: The Restorative Development Partnership (RDP) includes public, private, and nonprofit organizations committed to advancing a replicable systems model of restorative development that equitably optimizes environmental, social, and economic outcomes for future redevelopment

Partners are <u>organizations</u> that agree to actively participate in and contribute to the RDP's work

Partnership Leadership Team (PLT) members are Partner organizations that commit to all Partner expectations *plus* leadership and management obligations; the PLT is the governing and decision-making body for the Partnership

Commitment to restorative development

- **The need for a mindshift:** The Minneapolis 2040 Comprehensive Plan places a key focus on promoting **equitable growth**. Restorative Development is a pathway to reaching that goal.

- **Restorative development:**
  - Simultaneously solves environmental, social, and economic challenges. It is inclusive and equitable by design.
  - Requires a strong and collaborative public, private, people, partnership to design equitable systems
  - Relies on innovation and is feasible with technology that already exists

By setting goals in the restorative, net-positive space, we commit to *not* settling for incremental changes. Restorative development systematically and intentionally helps build the necessary foundations for an inclusive economy.

Restorative Districts & Cities

Restorative Processes	Integrated utilities	Biophilic landscapes	Smart city	Materials reclamation	Industrial symbiosis
Outputs		Clean energy Clean vehicle fuels Reclaimed water		Fish, vegetables & fertilizer Materials Municipal income	
Outcomes	Reduced stress levels Reduced crime rates Reduced social costs Increased productivity Higher health levels		Eliminated environmental costs Increased climate resilience New local businesses New locally made products New local green jobs		Living wages + career pathways Closed-loop industrial value chain Zero waste communities Zero emissions community

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Feasibility Study

- **Consultants: Orascom/Yorth/Ramboll consulting team**
- **Phase 1** (2020-present) assesses the environmental, social, and economic equity; establishes benchmarks; and guides subsequent restorative development efforts
- **Phase 2** (2021) designs the core elements of a restorative ecosystem that includes an integrated utility hub and governance

Introduction: Key Performance Indicators (KPIs)

KPIs let us assess environmental, social, and economic equity

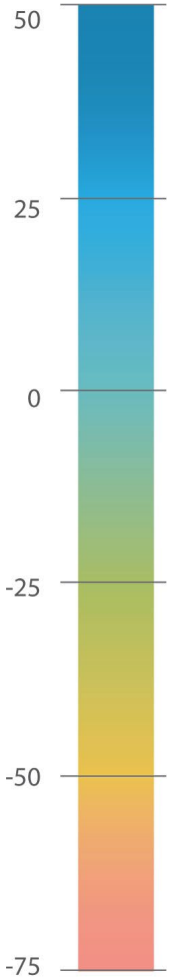
3. Outcomes
- Health + Wellbeing
- Culture + Identity

1. Assets & Resources
- Water
- Energy
- Materials
- Food

Our focus for today

2. Resource Management
- IT & Smart City
- Management + Governance
- Land use + Planning
- Mobility + Access
- Economy

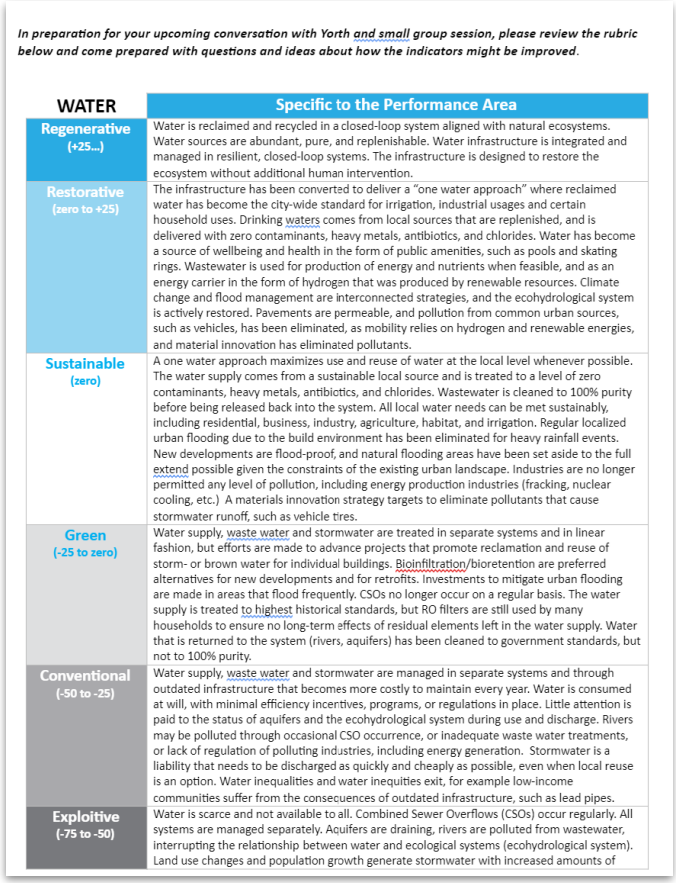
Introduction: Scale, zero points, rubric



+ Positive
Restorative performance is a net-positive position. There are measurable positive impacts at the system level. Equity is gained at this performance level.

Neutral (Zero Point)
Sustainability is a neutral position. There are no negative or positive impacts measurable anywhere in the system. Equity is neither gained nor lost at this performance level.

- Negative
Conventional performance is a net-negative position where the impact is negative. Equity is lost at this performance level.



In preparation for your upcoming conversation with Yorth and small group session, please review the rubric below and come prepared with questions and ideas about how the indicators might be improved.

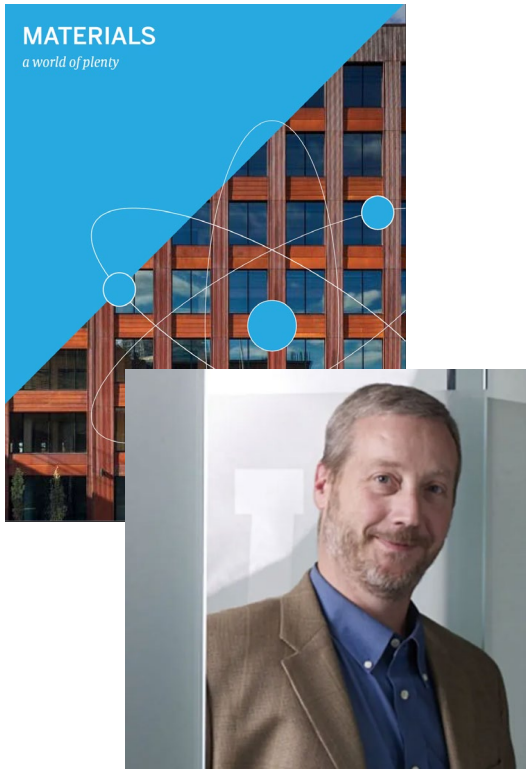
WATER	Specific to the Performance Area
Regenerative (+25...)	Water is reclaimed and recycled in a closed-loop system aligned with natural ecosystems. Water sources are abundant, pure, and replenishable. Water infrastructure is integrated and managed in resilient, closed-loop systems. The infrastructure is designed to restore the ecosystem without additional human intervention.
Restorative (zero to +25)	The infrastructure has been converted to deliver a "one water approach" where reclaimed water has become the city-wide standard for irrigation, industrial usages and certain household uses. Drinking waters comes from local sources that are replenished, and is delivered with zero contaminants, heavy metals, antibiotics, and chlorides. Water has become a source of wellbeing and health in the form of public amenities, such as pools and skating rings. Wastewater is used for production of energy and nutrients when feasible, and as an energy carrier in the form of hydrogen that was produced by renewable resources. Climate change and flood management are interconnected strategies, and the ecohydrological system is actively restored. Pavements are permeable, and pollution from common urban sources, such as vehicles, has been eliminated, as mobility relies on hydrogen and renewable energies, and material innovation has eliminated pollutants.
Sustainable (zero)	A one water approach maximizes use and reuse of water at the local level whenever possible. The water supply comes from a sustainable local source and is treated to a level of zero contaminants, heavy metals, antibiotics, and chlorides. Wastewater is cleaned to 100% purity before being released back into the system. All local water needs can be met sustainably, including residential, business, industry, agriculture, habitat, and irrigation. Regular localized urban flooding due to the build environment has been eliminated for heavy rainfall events. New developments are flood-proof, and natural flooding areas have been set aside to the full extend possible given the constraints of the existing urban landscape. Industries are no longer permitted any level of pollution, including energy production industries (fracking, nuclear cooling, etc.) A materials innovation strategy targets to eliminate pollutants that cause stormwater runoff, such as vehicle tires.
Green (-25 to zero)	Water supply, waste water and stormwater are treated in separate systems and in linear fashion, but efforts are made to advance projects that promote reclamation and reuse of storm- or brown water for individual buildings. Bioinfiltration/bioretention are preferred alternatives for new developments and for retrofits. Investments to mitigate urban flooding are made in areas that flood frequently. CSOs no longer occur on a regular basis. The water supply is treated to highest historical standards, but RO filters are still used by many households to ensure no long-term effects of residual elements left in the water supply. Water that is returned to the system (rivers, aquifers) has been cleaned to government standards, but not to 100% purity.
Conventional (-50 to -25)	Water supply, waste water and stormwater are managed in separate systems and through outdated infrastructure that becomes more costly to maintain every year. Water is consumed at will, with minimal efficiency incentives, programs, or regulations in place. Little attention is paid to the status of aquifers and the ecohydrological system during use and discharge. Rivers may be polluted through occasional CSO occurrence, or inadequate waste water treatments, or lack of regulation of polluting industries, including energy generation. Stormwater is a liability that needs to be discharged as quickly and cheaply as possible, even when local reuse is an option. Water inequalities and water inequities exit, for example low-income communities suffer from the consecuences of outdated infrastructure, such as lead pipes.
Exploitive (-75 to -50)	Water is scarce and not available to all. Combined Sewer Overflows (CSOs) occur regularly. All systems are managed separately. Aquifers are draining, rivers are polluted from wastewater, interrupting the relationship between water and ecological systems (ecohydrological system). Land use changes and population growth generate stormwater with increased amounts of

Understanding Key Assets + Resources (First 4 KPIs)

Partner Presentations: Key Assets and Resources

Dick Gilyard,
Architect
Towerside Innovation

Dan Kalmon
Mississippi Watershed
Mgmt Organization



Jeff Ellerd
Developer,
Wall Companies

Karen Galles
Hennepin County,
Environment & Energy

Water: Highlights (Partner Dick Gilyard)

Water

System summary

- The metropolitan area is enormously rich in water assets, but ⅔ is used for power generation
- Minneapolis has the purest, mass produced drinking water in the nation
  The region has one of the most advanced wastewater treatment systems in the country
- Water is managed in three siloed centralized systems: supply, waste, stormwater

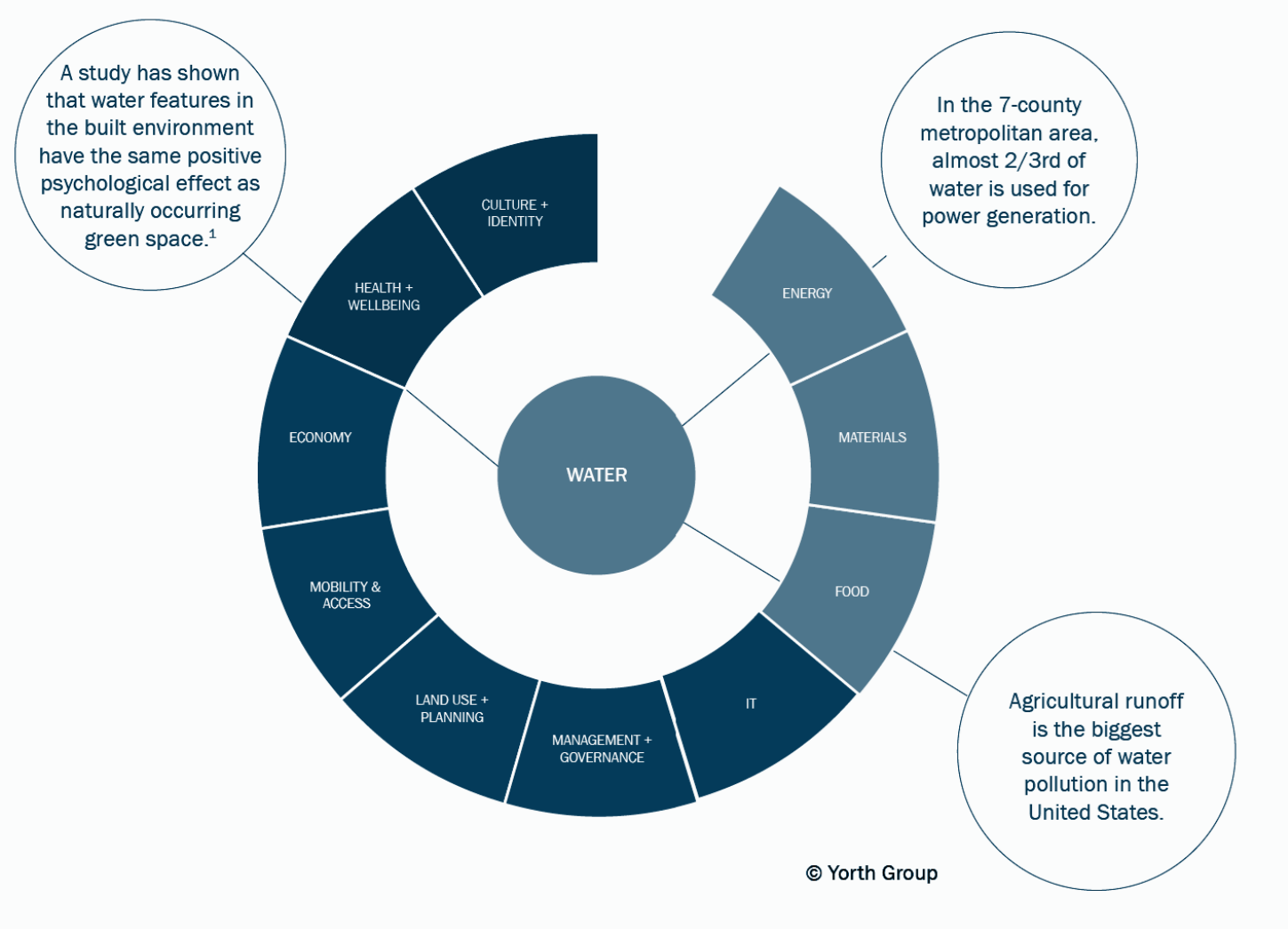
Leakages, liabilities

- Aging infrastructure is not capable of meeting future demands
- Stormwater and wastewater are discarded with very little reuse
- Water used for energy generation carries the risk of being released in a degraded, polluting state through chemical spills or thermal pollution (hot water is put back into the river after nuclear cooling)

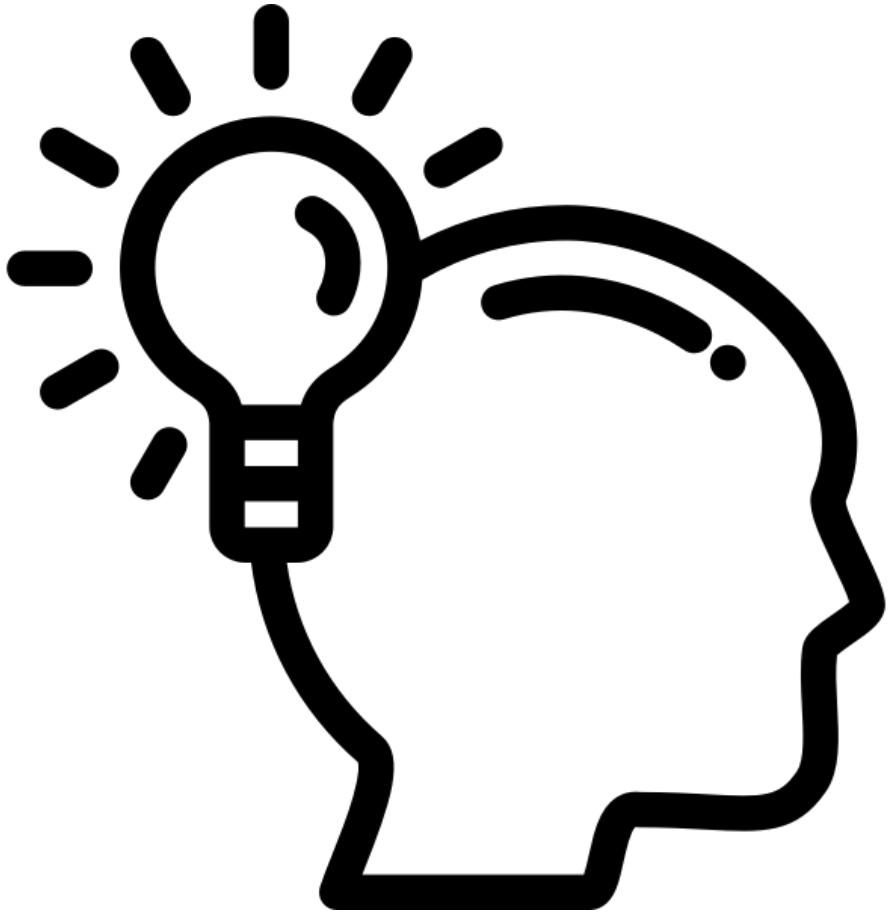
Water integration opportunities

- The regional experience of managing wastewater positions us to redesign systems to achieve integrated closed-loop, one-water systems
- Capture, treat, reuse stormwater on site to relieve strain on aquifer and enrich public realm by means of a blue-green infrastructure
- Consider zoning as a tool to identify closed-loop districts where water is integrated with other resources

➔ *What opportunities do others see? (speak up or use chat)*



Water insights, aha moments, surprises

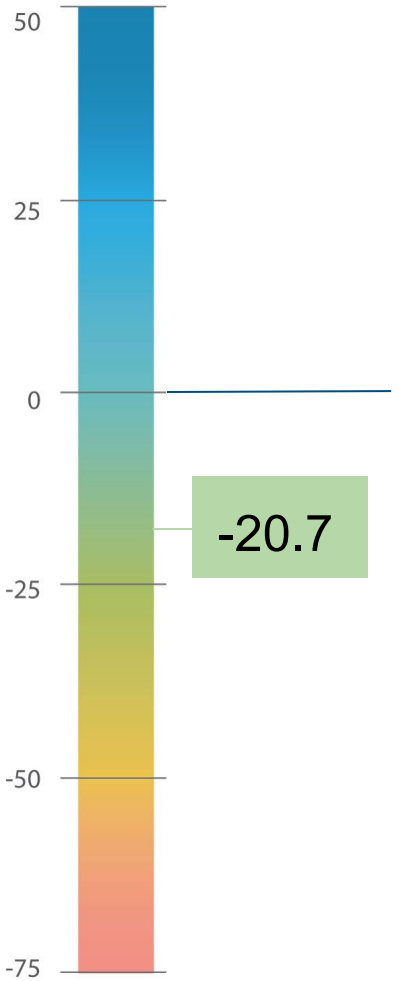


- Severe drought would cause the groundwater-supplied communities surrounding Minneapolis to turn to Minneapolis and the Mississippi as a source.
- Electricity comes at cost of water pollution, and water produces greenhouse gas emissions due to the electricity needed to pump to homes.
- Dawn of Replacement is not a band, it's American Waterworks Assn. term describing replacement of century old water infrastructure systems

➔ *What can others add? (speak up or use chat)*

Zero Point: Water

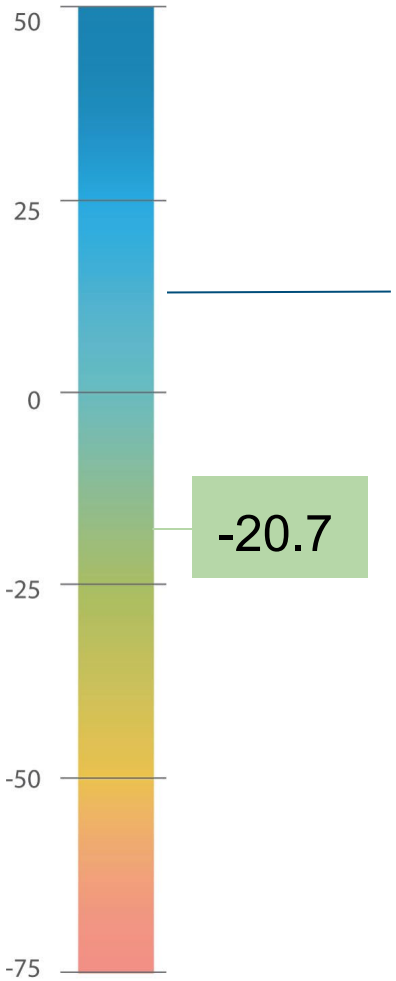
Water Zero Point



At the <u>zero point</u> for water, it means:

- **A "One water" approach maximizes use and reuse of water at the local level whenever possible**
- **Water supply comes from a sustainable local source and is treated to a level of zero contaminants**
- **Wastewater is cleaned to 100% purity before being released back into the system**
- **Industry is no longer permitted any level of pollution**
- A materials innovation strategy has been put into place to eliminate pollutants that cause stormwater runoff, such as those coming from vehicle tires
- Urban flooding due to the built environment has been eliminated for heavy rainfall events.
- New developments are flood-proof, and natural flooding areas have been set aside

Water Zero Point



At restorative development:

- **Water leads to health and wellbeing through public amenities (natural pools, skating rinks)**
- **Wastewater is used for production of energy and nutrients when feasible**
- **Water is an energy carrier in the form of hydrogen produced by renewable resources**
- Pavements are permeable, and pollution from common urban sources, such as vehicles, has been eliminated, as mobility relies on hydrogen and renewable energies, and material innovation has eliminated pollutants

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Energy: Highlights (Partner Dan Kalmon)

Energy

System summary

- Minneapolis mirrors the characteristics of the state's energy system
- Minnesota, a net-importer of energy, has no natural resources of its own
- Minnesota has made incredible progress towards renewable energy (wind), but the largest source of electricity still comes from fossil fuels

Leakages, liabilities

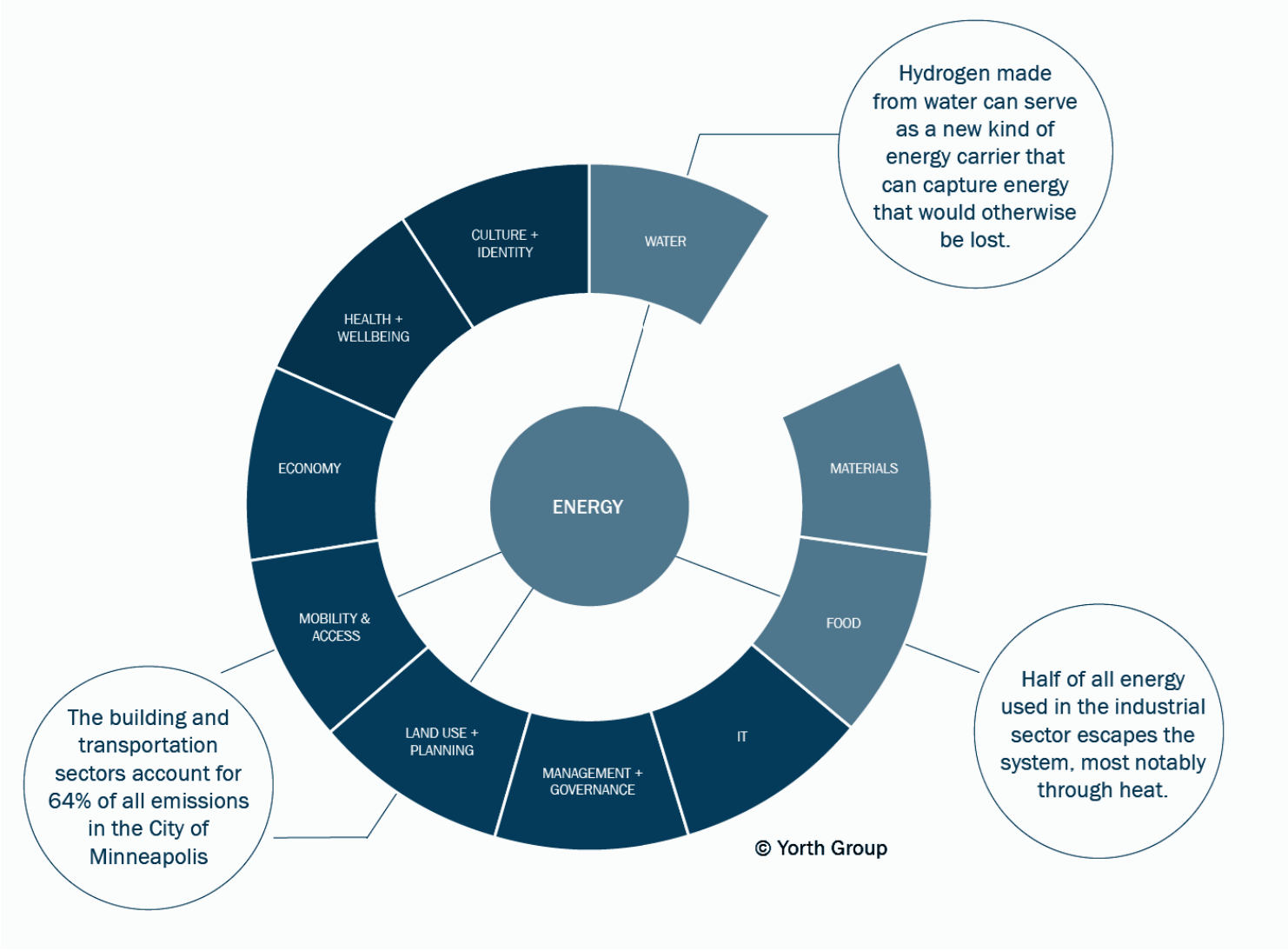
- With the exception of ethanol, the transportation and heating sectors are entirely dependent on domestic and international imports
- In Minnesota, 56% of energy produced is rejected, mostly in the form of heat - the loss is 67% in the U.S.!
- The centralized nature of U.S. power system makes it vulnerable to systemic failures due to catastrophic events
- The value of water (hydrogen) as a key energy resource is not being recognized

Energy integration opportunities

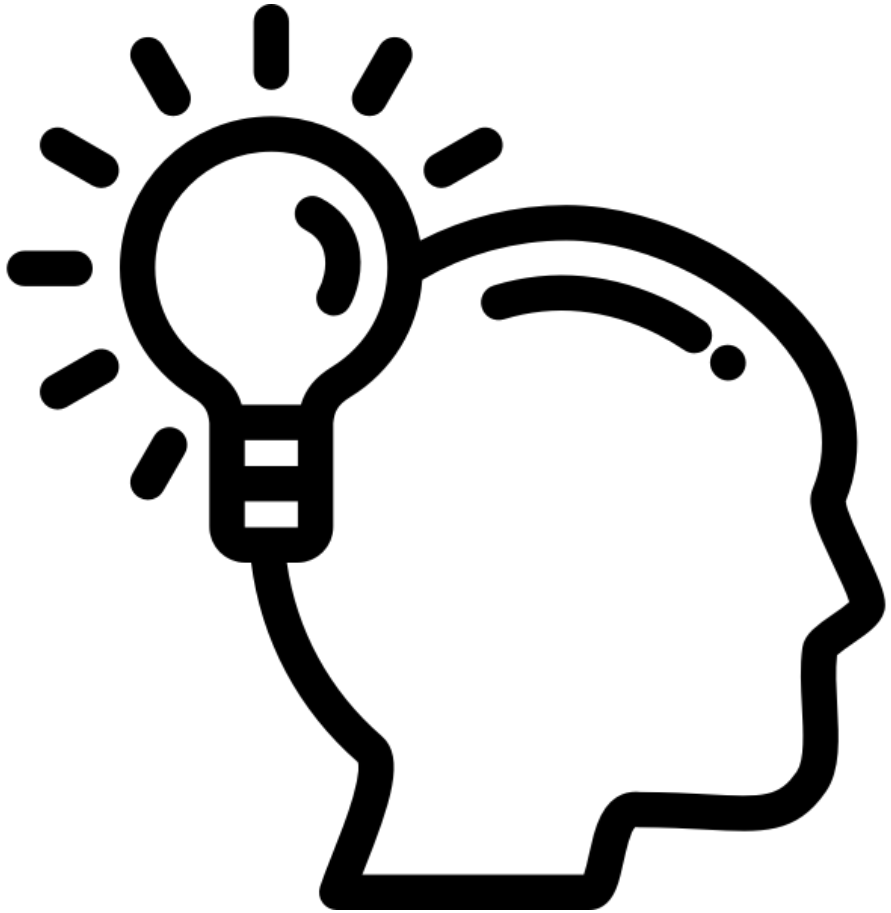
Integration opportunities:

- New technologies and closed-loop designs can convert some of MN's > 50% energy losses into new liquid and gas fuels.
- Hydrogen made from water, can be used in industry, transportation, and building heating and cooling.

➔ *What opportunities do others see? (speak up or use chat)*



Energy insights, aha moments, surprises



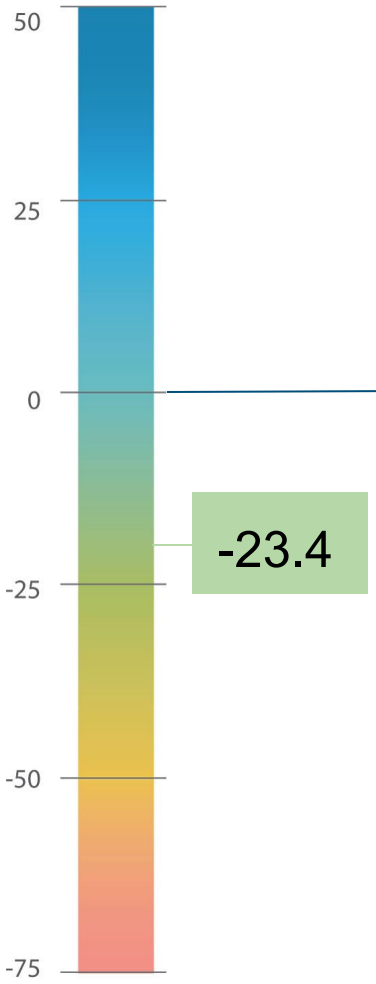
Surprises:

- Thinking only in terms of production, I did not realize Minnesota had to import natural gas, coal, and petroleum from other states and Canada. What a significant dependency.
- I was not aware that within the next decade the trend is for renewable energies to financially outperform the estimated operational costs of gas. Now seems to be the tipping point.
- I'm very interested in the role water will play in unlocking a new scale of energy integration between sectors, such as industry, transportation, and building heating and cooling.

➔ *What can others add? (speak up or use chat)*

Zero Point: Energy

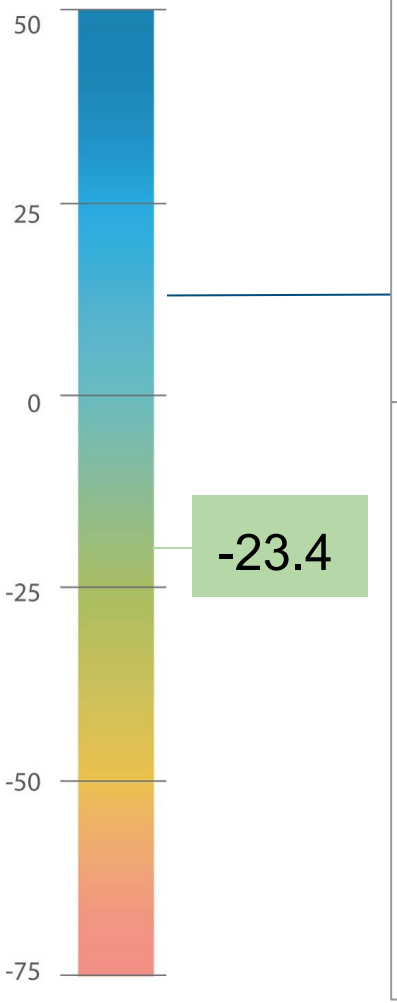
Energy Zero Point



At the <u>zero point</u> for energy, it means:

- The grid is semi-decentralized and diversified, with a balance of locally-produced energy and a reliable baseload from the larger grid
- Sources may include fossil fuels with an integrated carbon capture and use system
- There are zero emissions at source and use and there are no negative effects on other vital resources such as air and water
- Energy is integrated with larger resource and materials strategies in a closed loop whenever possible (i.e. anaerobic digestion of organic materials, Power-to-X applications that capture heat loss)
- The energy system benefits the local economy and provides local energy resilience and price control. (Local can be defined as district, city or region, depending on context)

Energy Zero Point



At restorative development:

- A diversified energy system allows for best use of energy for each application.
- Excess energy is stored in district-based storage systems and available for use in any part of the larger grid in emergencies and to optimize energy flows.
- Energy independence and autonomy strengthens resilience and socioeconomic wellbeing at all levels

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Materials: Highlights (Partner Jeff Ellerd)

Materials

System summary

- In 2019, 58% of waste was incinerated, 20% of materials were recycled, 18% were composted, 4% were landfilled.
- Majority of Minneapolis' waste goes to HERC - Waste To Energy Plant and generates electricity for 25,000 homes. However, this leads to additional air emissions/health risks and does not move the City towards its recycling goal (less bad solution)
- Building construction and demolition represents huge opportunity

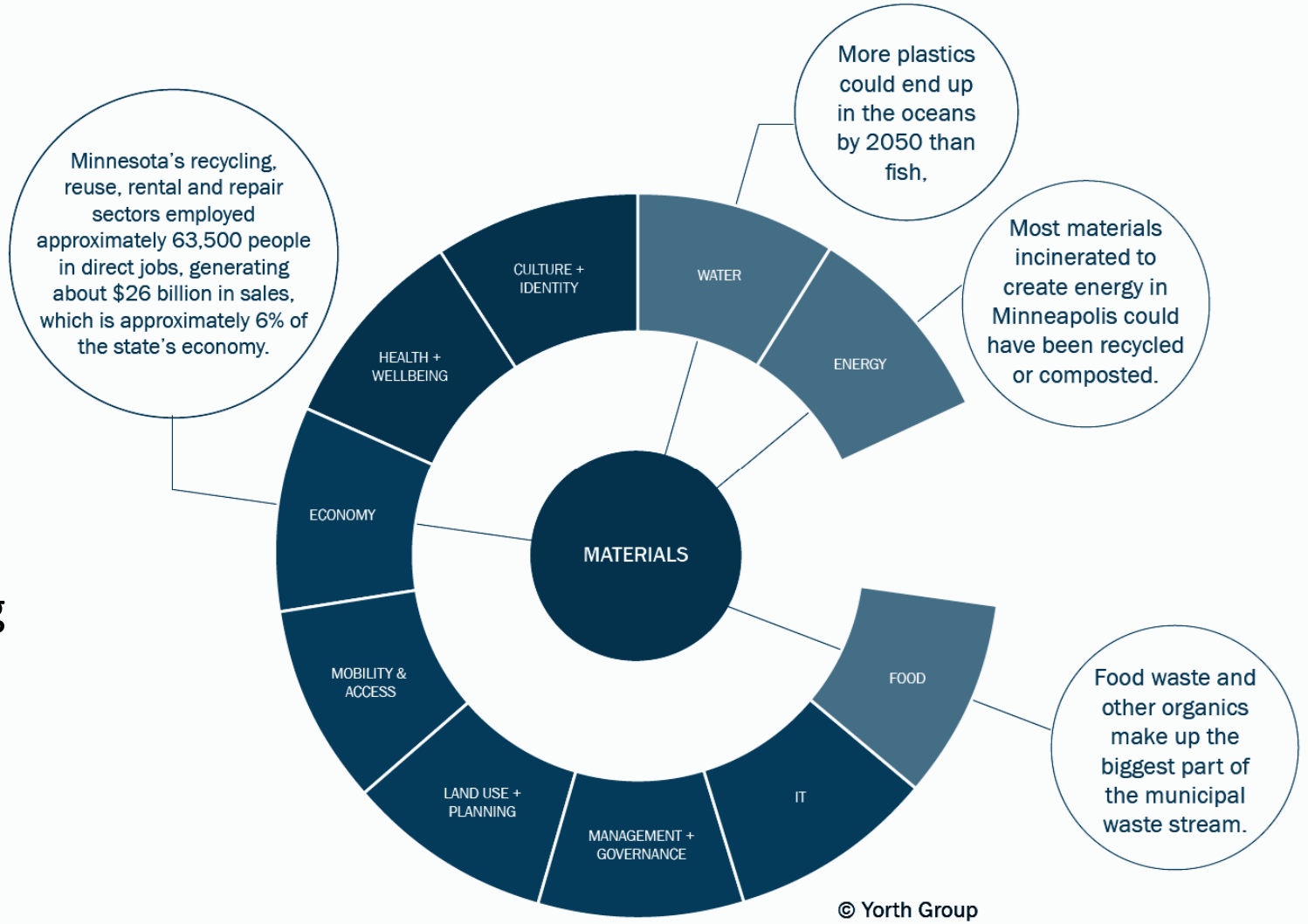
Leakages, liabilities

- Estimated $2.3B in materials landfilled between 1996 and 2013
- Recycling market fluctuations (China stopped accepting in 2018) cause collected potential recyclables to go to HERC or to be landfilled
- Building demolition and redevelopment sector has no focus on reclaiming existing building materials for future use

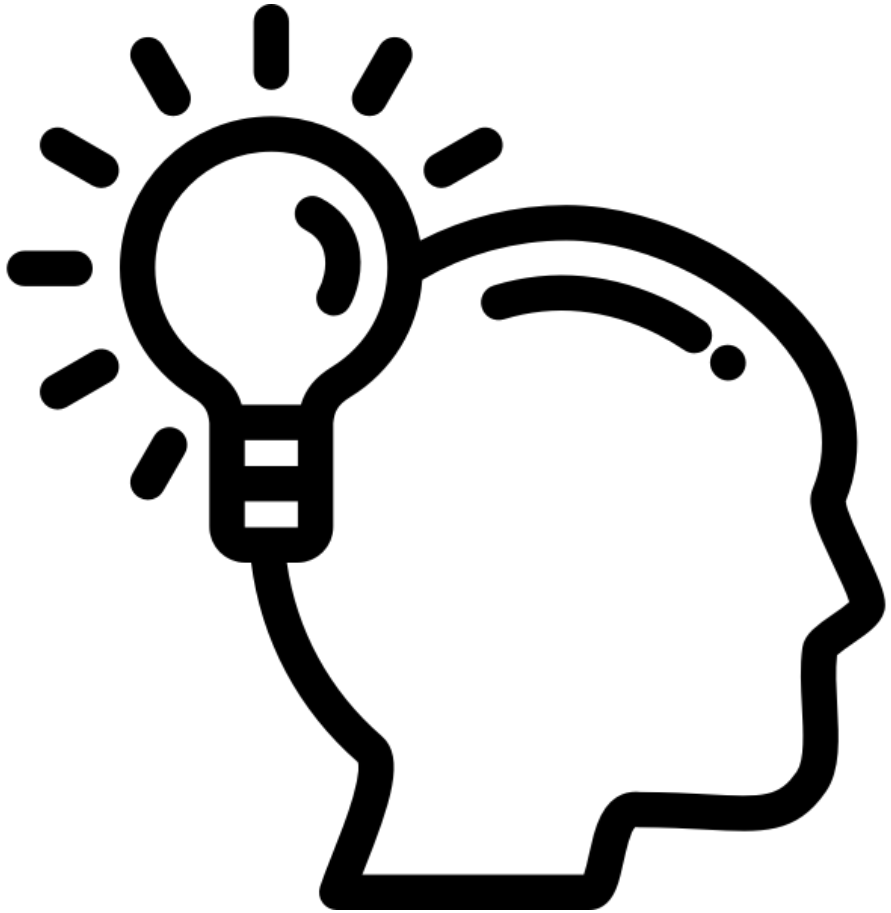
Materials integration opportunities

- Robust C&D recycling through public/private partnerships
- City collects/composts organics for local value creation. Biodigestion?
- Economic incentives for new business opportunities in recycling and remanufacturing with a goal of keeping materials at equal or higher value.

➔ *What opportunities do others see? (speak up or use chat)*



Materials insights, aha moments, surprises

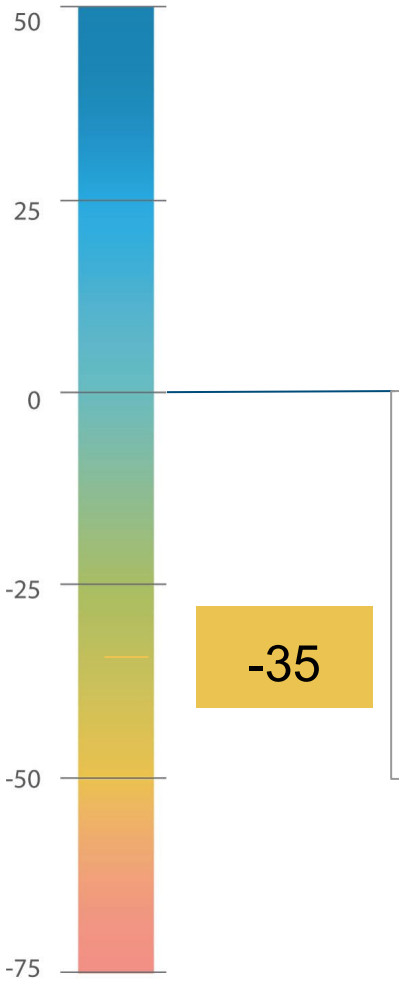


- HERC - Waste to Energy has provided for a “less bad” solution that may have inadvertently decreased recycling, innovation
- Minneapolis currently has largest mass timber building in US (T3); carbon sequestration and renewable resource for larger building projects

➔ *What can others add? (speak up or use chat)*

Zero Point: Materials

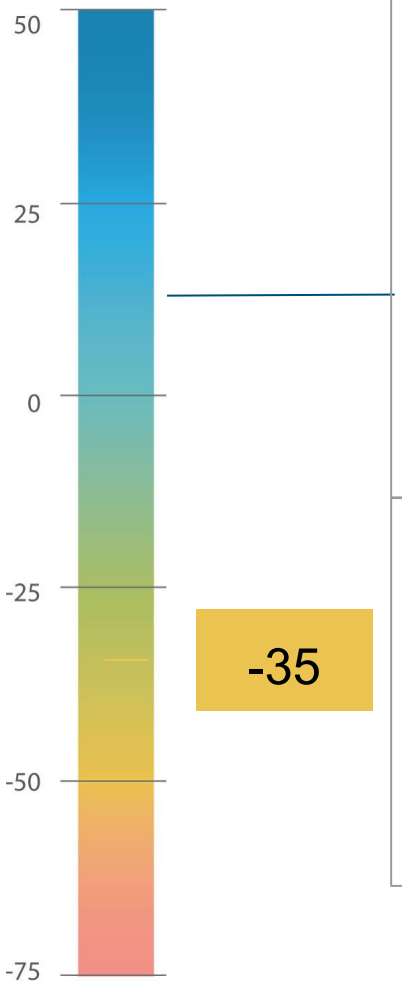
Materials Zero Point



At the <u>zero point</u> for materials, it means:

- Tipping fees to dispose of waste reflect the true cost, leading to eco-innovation opportunities
- A material innovation strategy has been put in place to eliminate waste streams
- Toxic and non-recyclable materials have been outlawed through regulation
- The concept of waste is nonexistent

Materials Zero Point



At restorative development:

- **Systemwide material strategy and roadmap in place to capture and repurpose all materials**
- **Toxic and non-recyclable materials have been designed out of the system**
- **Landfills/other waste sites are mined for energy and other value before natural habitat is restored**
- Industrial symbiotic infrastructure systems characterize city and region; local businesses process waste materials for recycling, reuse, remanufacturing, selling products back to local manuf, users
- City attracts businesses seeking long-term resource security, economic resilience and eco-innovation
- City is resource resilient with strong economic foundations
- Social costs are dramatically reduced

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Food: Highlights (Partner Karen Galles)

Food

System Summary

- Move toward increasing mechanization and dependence on external inputs → "Get big or get out"
- Most production (86% corn and soy in Hennepin County) requires animals (conversion to meat) or food companies to make it edible
- Farming is a capital-intensive, difficult, and risky way to make a living
- U.S. food policy incentivizes this kind of food production, while providing very little support for alternative models

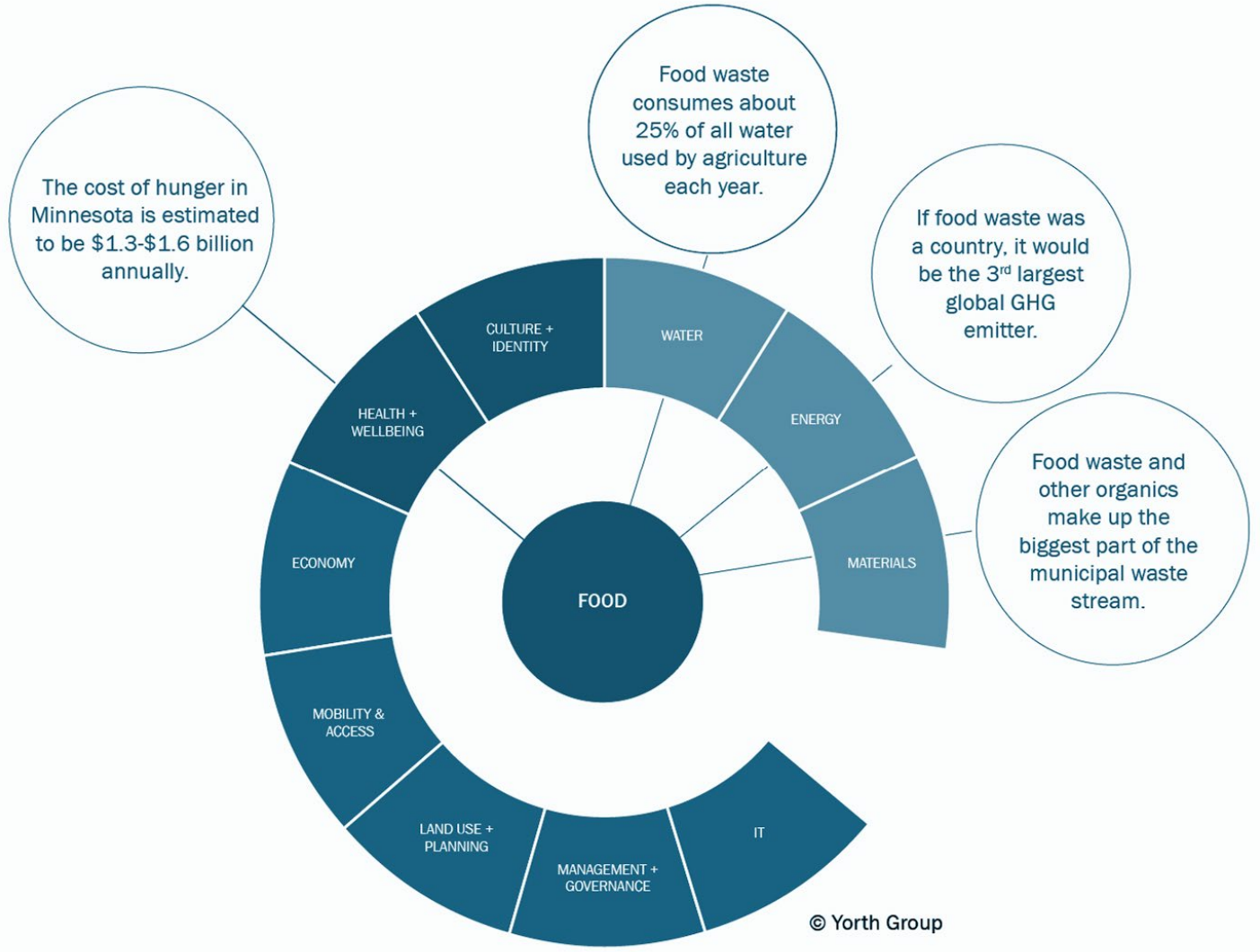
Leakages, Liabilities

- Food production externalities (often) → soil degradation, soil water holding capacity, greenhouse gas emissions, habitat destruction, antibiotic resistance, rural livelihoods
- 1/3 of food is wasted → all these externalities, and for what?
- Diets we can afford make us sick (which is costly), especially for people experiencing poverty

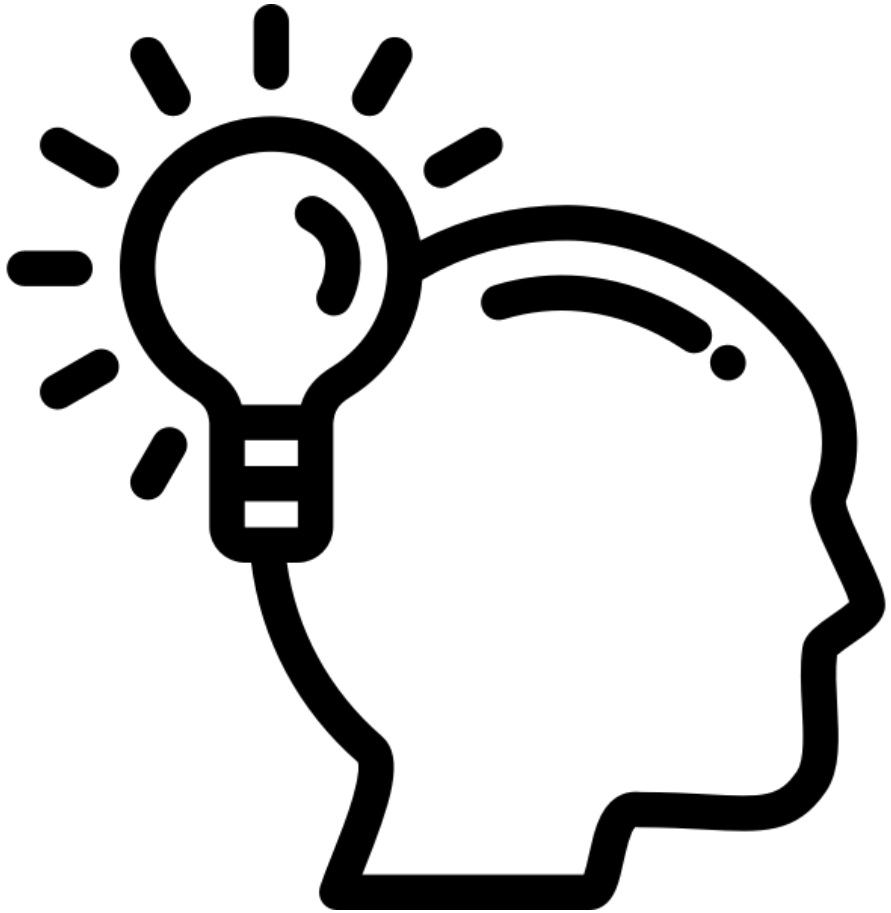
Food integration opportunities

- Energy capture from food waste
- Food as medicine
- Job creation through bringing back forms of agriculture that are more labor intensive
- Reduce food waste → reduce land in annual crop production → store more water on land/in soil in wet climates (like here)/reduce wasted water in dry climates (like CA)

➔ *What opportunities do others see? (speak up or use chat)*



Food insights, aha moments, surprises

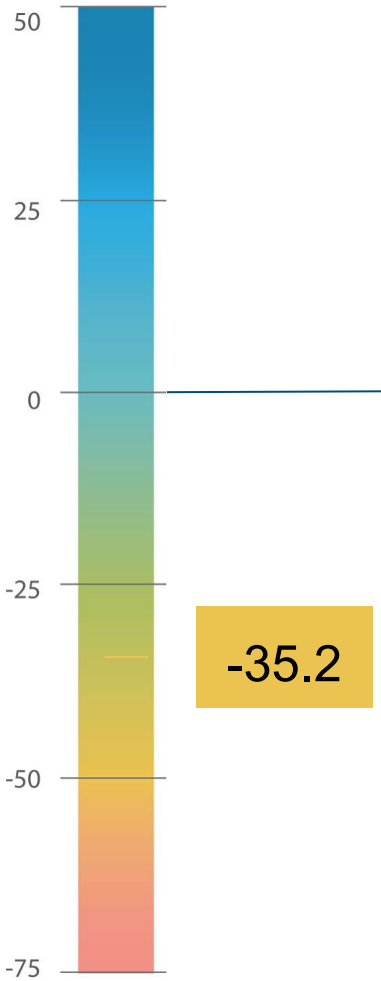


- Pre-COVID: 12.4% of kids in Hennepin County experiencing food insecurity
- Hunger costs MN $1.3B to $1.6B/year
- Value of food wasted every day in Mpls = 3X cost to eliminate food insecurity in Hennepin County
- BONKERS: Cheaper to buy a box of cereal than a pound of brussels sprouts
- Also BONKERS: Prevalence of food insecurity AND food waste - do people experiencing poverty waste less food? What do economists have to say about this?

➔ *What can others add? (speak up or use chat)*

Zero Point: Food

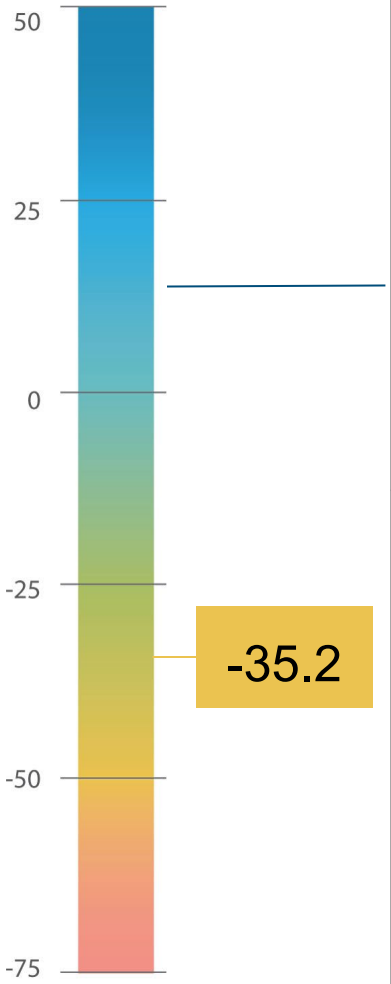
Food Zero Point



At the <u>zero point</u> for food, it means:

- Hunger and food insecurity have been eliminated.
- Food is managed within a system that ensures equal access to nutritious food.
- The city and region's food supply contains enough local production to weather disruptions within supply chains.
- Access to healthy and affordable food removes social liabilities associated with a lack of food, such us chronic diseases, lower educational attainment, high incarceration rates, etc.
- Food production does not result in negative environmental outcomes.
- Food waste is recovered within a closed-loop system.

Food Zero Point



At restorative development:

- The city and region enjoy food abundance from local sources
- Food production and food waste is integrated into a larger resource strategy that closes many resource loops such as carbon emissions and stormwater, adding local value.
- Symbiotic infrastructure and partnerships support local food, plant, and flower growers that make up neighborhoods that are an attractive place to live, work, and visit.
- Urban food programs have become economically viable and pose a new norm in the region.
- Urban food production supports a high number of jobs earning living wages.
- Social costs are dramatically reduced while economic output increases, resulting in higher health and productivity, educational attainment and workforce participation, and lower incarceration rates.

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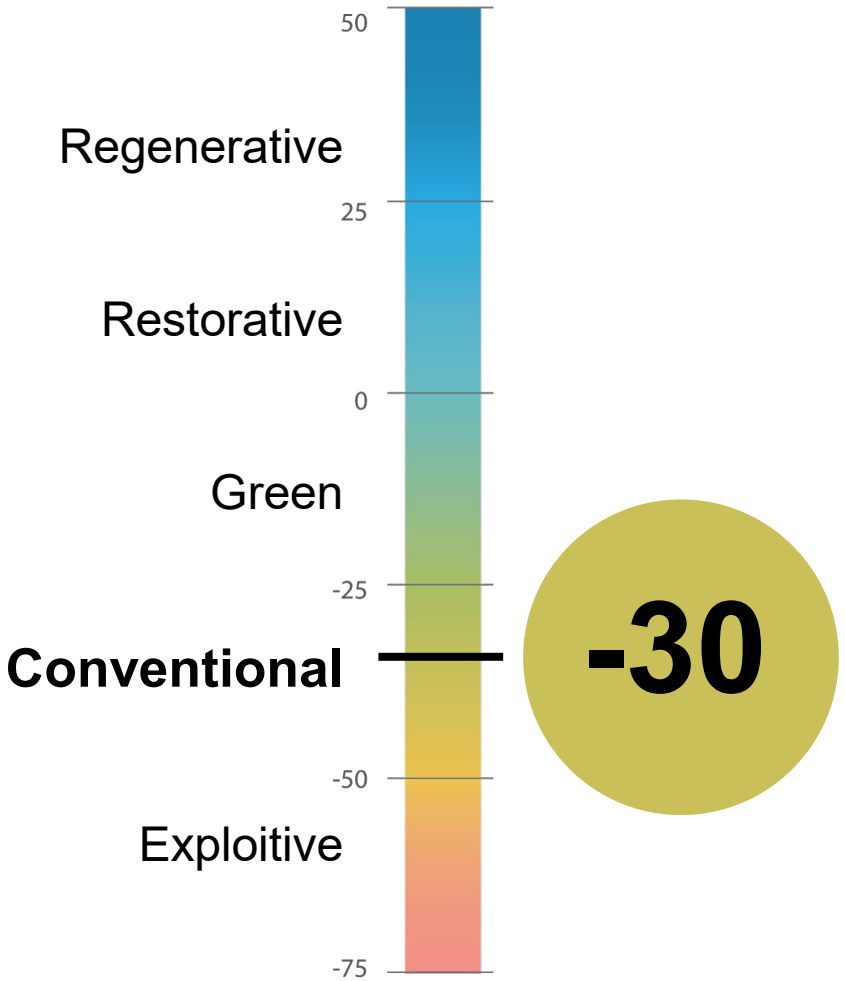
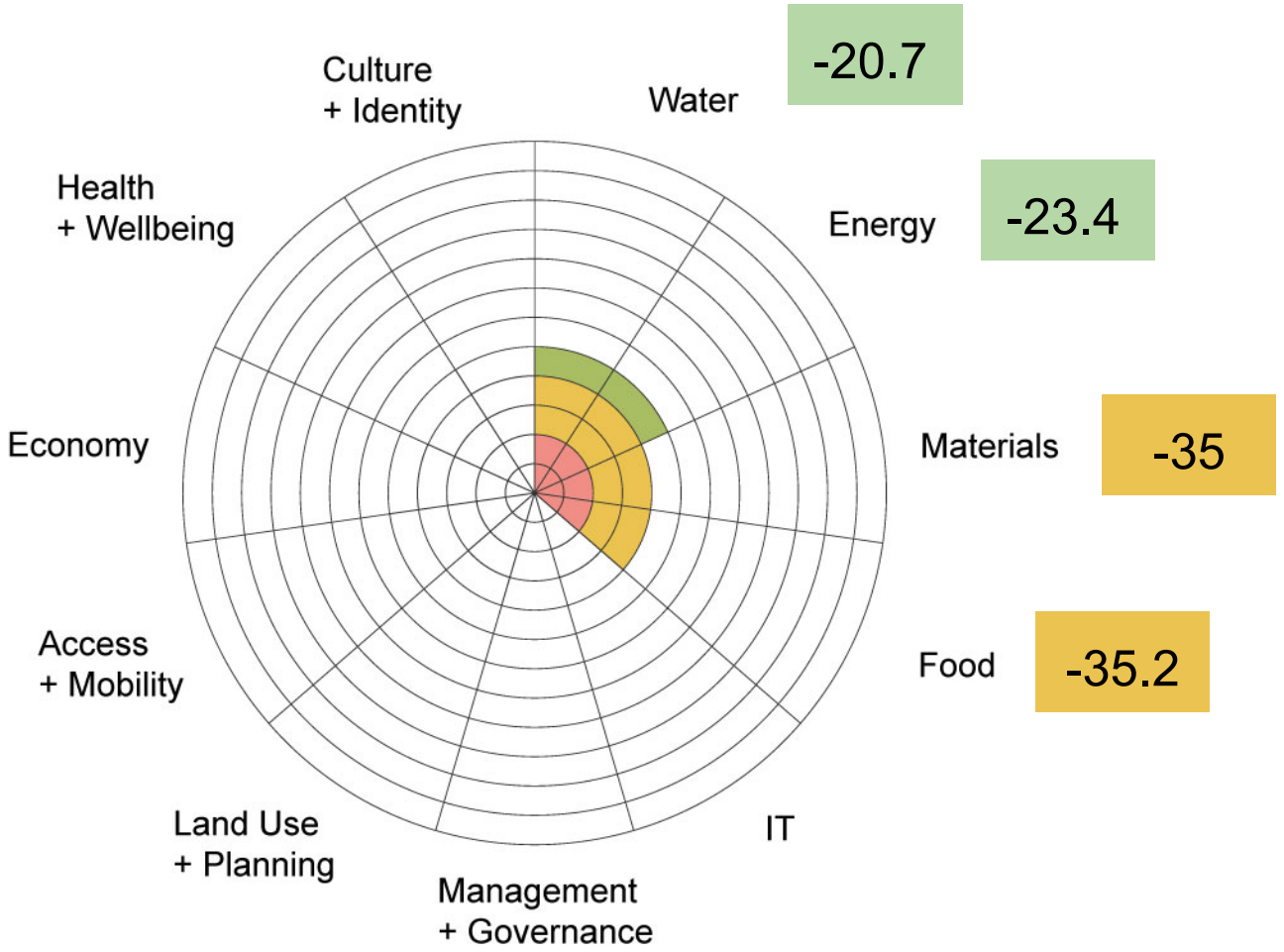
- Food waste is recovered within a closed-loop system.

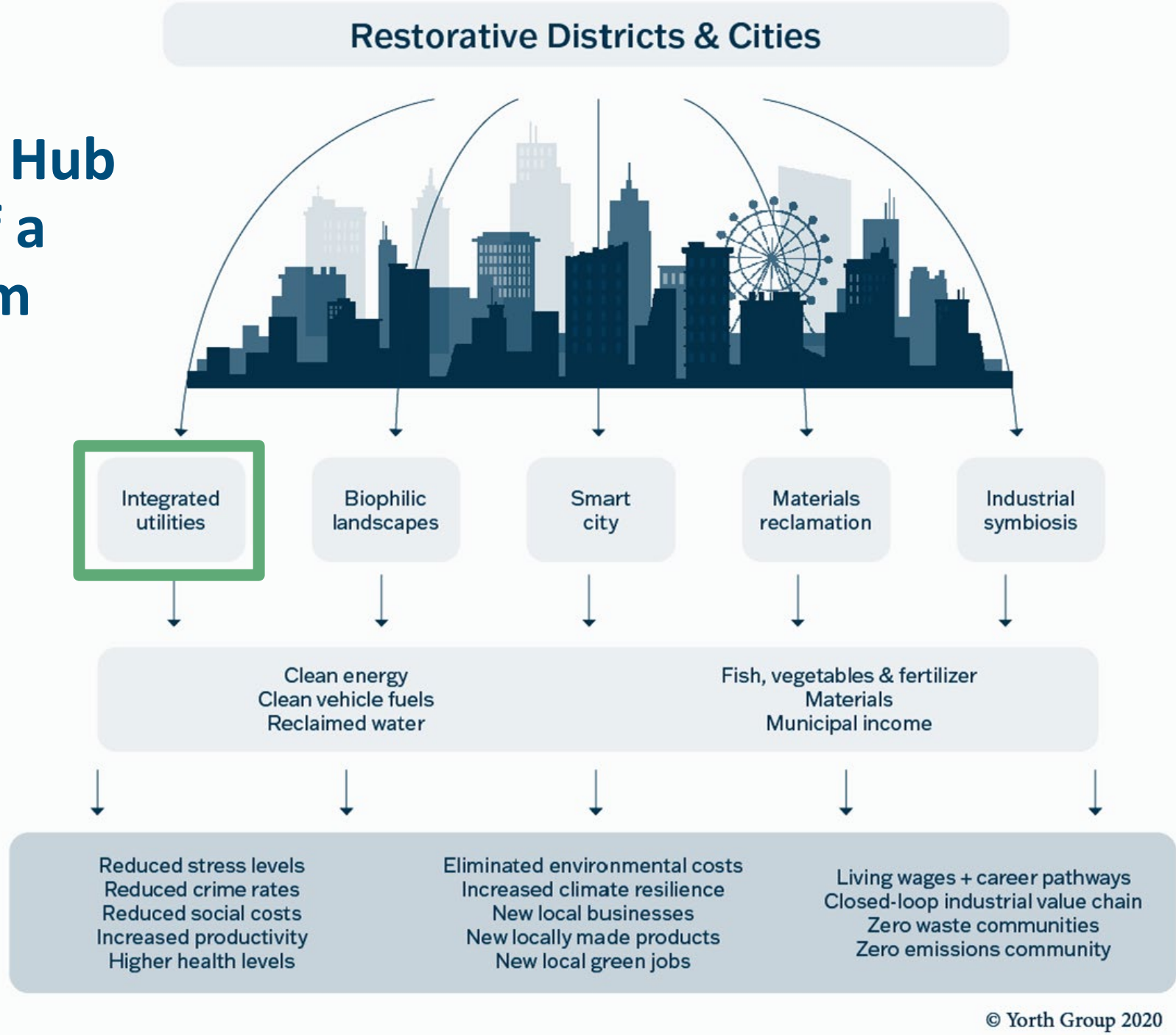
Yorth: City Performance Scorecard



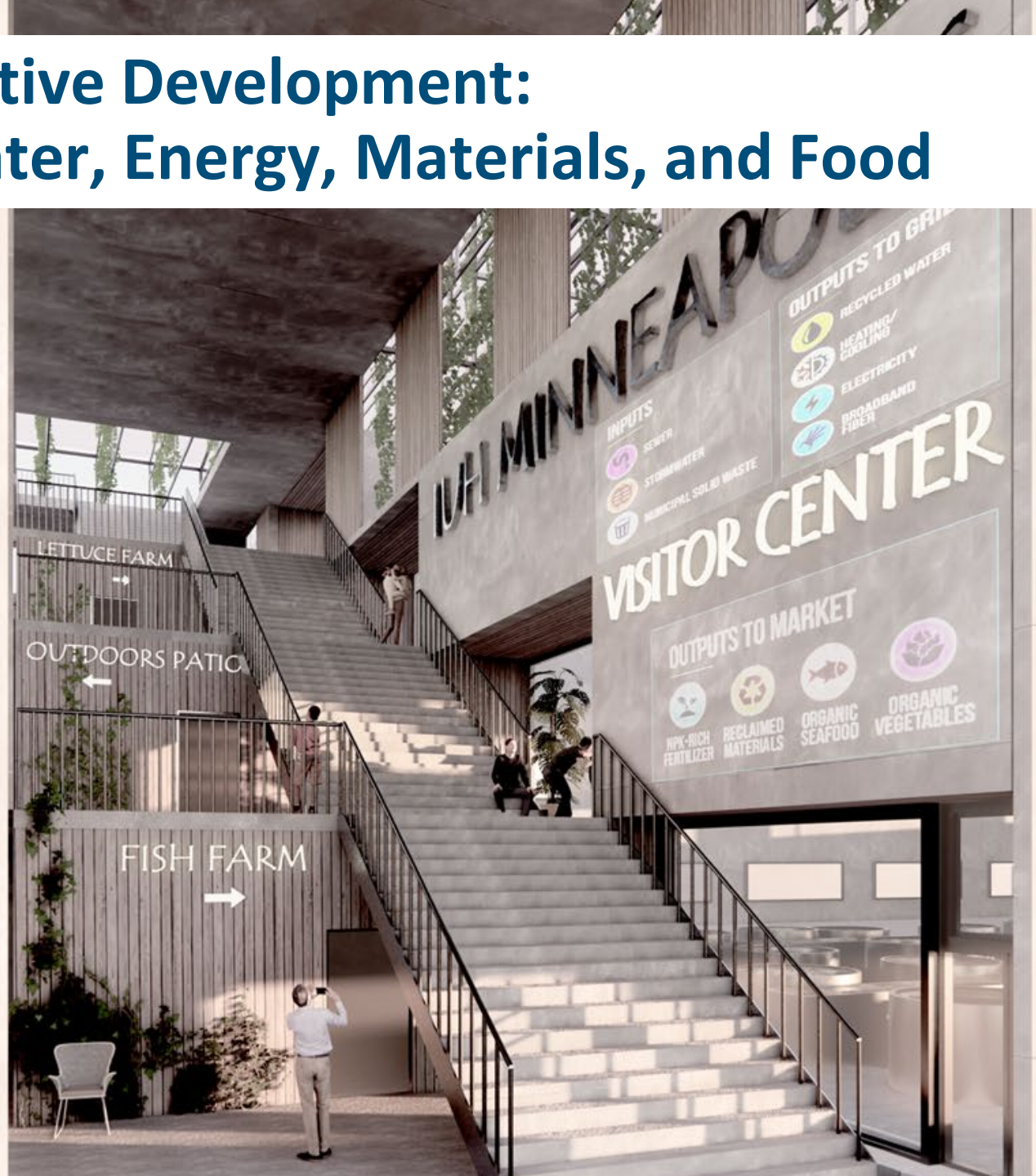


Feasibility Study: IUH Technical Analysis

Integrated Utility Hub (IUH): Key part of a restorative system



Key to Restorative Development: Integrating Water, Energy, Materials, and Food



Key to Restorative Development: Integrating Water, Energy, Materials, and Food

Integrated Utility Hub: A building and system that integrates utilities and converts waste to value. It is designed to catalyze restorative development and kickstart a circular economy. It is a community asset.

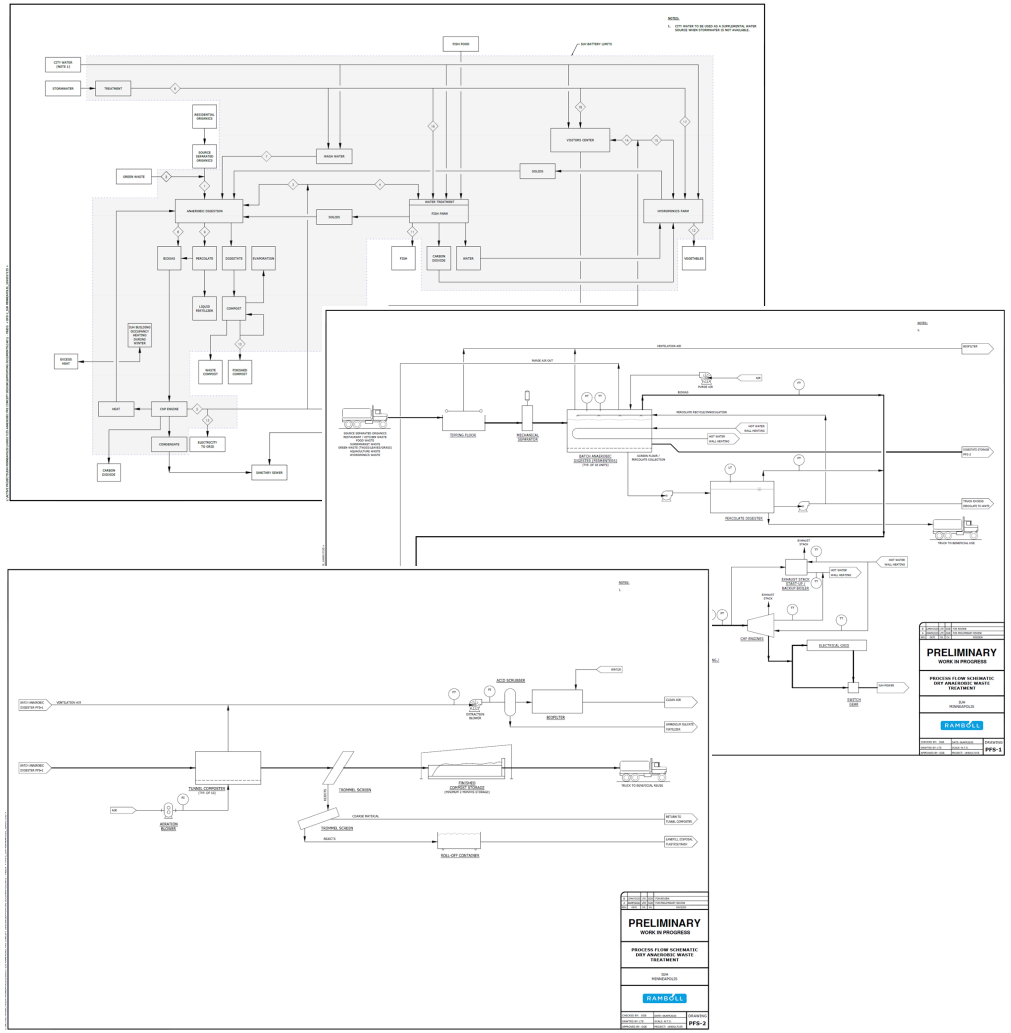
Phase 1 Study Scope & Deliverables

IUH conceptual technical analysis:

- Available **waste sources** for the IUH
- Appropriate **technologies**
- **Stormwater** capture for the area
- **Aquaponics** and **hydroponics** options

Helped define IUH components:

- Overall IUH **block flow** diagrams
- **Anaerobic system process flow** schematics
- **Greenhouse gas emissions** offset calculations
- 3D **conceptual arrangement of the IUH**
- **Visitor Center** ideas, drawings



Integrated Utility Hub

Image Credit: Ramboll & Yorth Group

Aquaponic Fish Tank

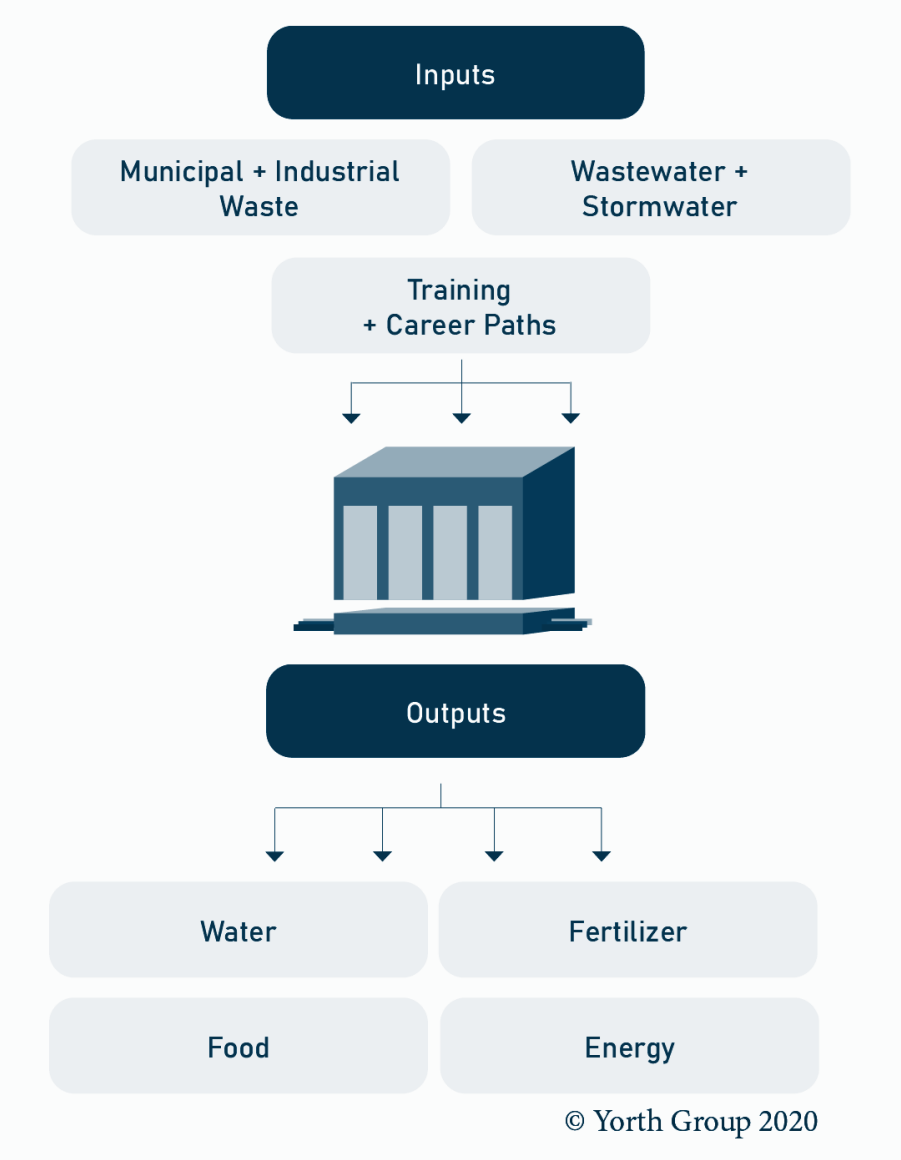
Image Credit: Ramboll & Yorth Group

Conceptual design: Inputs and outputs

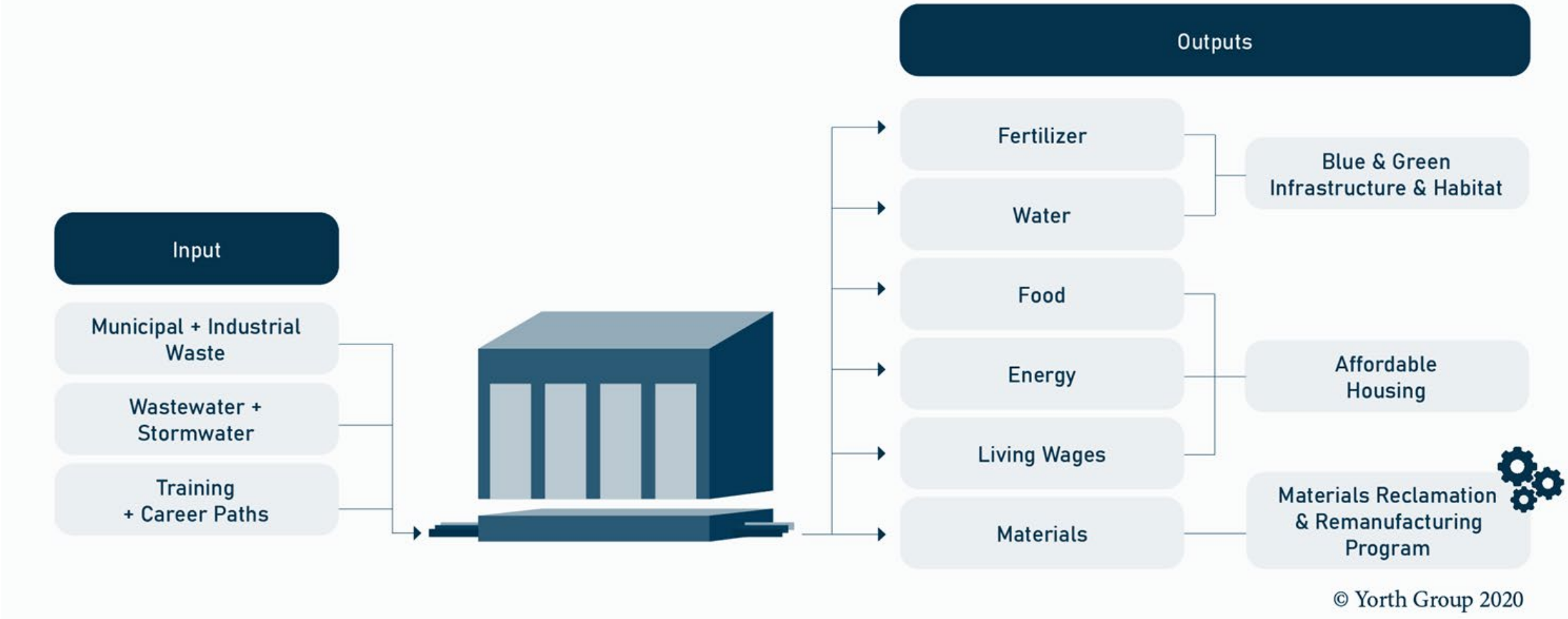
Using local data, the following <u>is</u> technically feasible at the case site:

- Food **waste and green waste** can be received and used to create energy and compost in an anaerobic digester
- **Stormwater can be** collected, treated, and used in the digester and fish farm and greenhouse
- **Fish and vegetables** can be grown to be sold to local market and made available to food programs
- **Water and carbon dioxide from the fish farm** can be used in vegetable growing process in the greenhouse

(Financial analysis occurs in Phase 2)



The IUH as a catalyst for restorative and circular development



Next Steps and Thanks!

- **Workshop 2, January 25: Equity and Remaining KPIs**
  - Building equity-centered communities
  - Feasibility Study Phase 1 deep dives into remaining 7 key performance indicators, scores
  - Learn more at www.RestorativeDevelopmentPartnership.org

- **Membership:** Organizations committed to restorative development are encouraged to complete the Partnership Application at www.RestorativeDevelopmentPartnership.org

- **Questions:** Answers will be provided via website and in the upcoming workshops, so stay tuned

Thanks so much for joining today and we hope to see you at Workshop #2