LOW CARBON PATHWAYS IN ALBERTA

BOMA EDMONTON AND NORTH

March 2026

WSP AT A GLANCE

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MEET OUR TEAM

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AGENDA

- What does it mean to be Low Carbon?
- What are different kinds of Low Carbon Pathways?
- What kinds of grants/incentives are out there?
- Case Studies / Examples
- The Bigger Picture

Presentation Outcomes

Understand Different Low-Carbon Strategies

- Practical pathways for reducing emissions while managing capital and operating costs
- Energy-efficiency measures that deliver strong ROI in Alberta's climate

Understanding the Funding Landscape

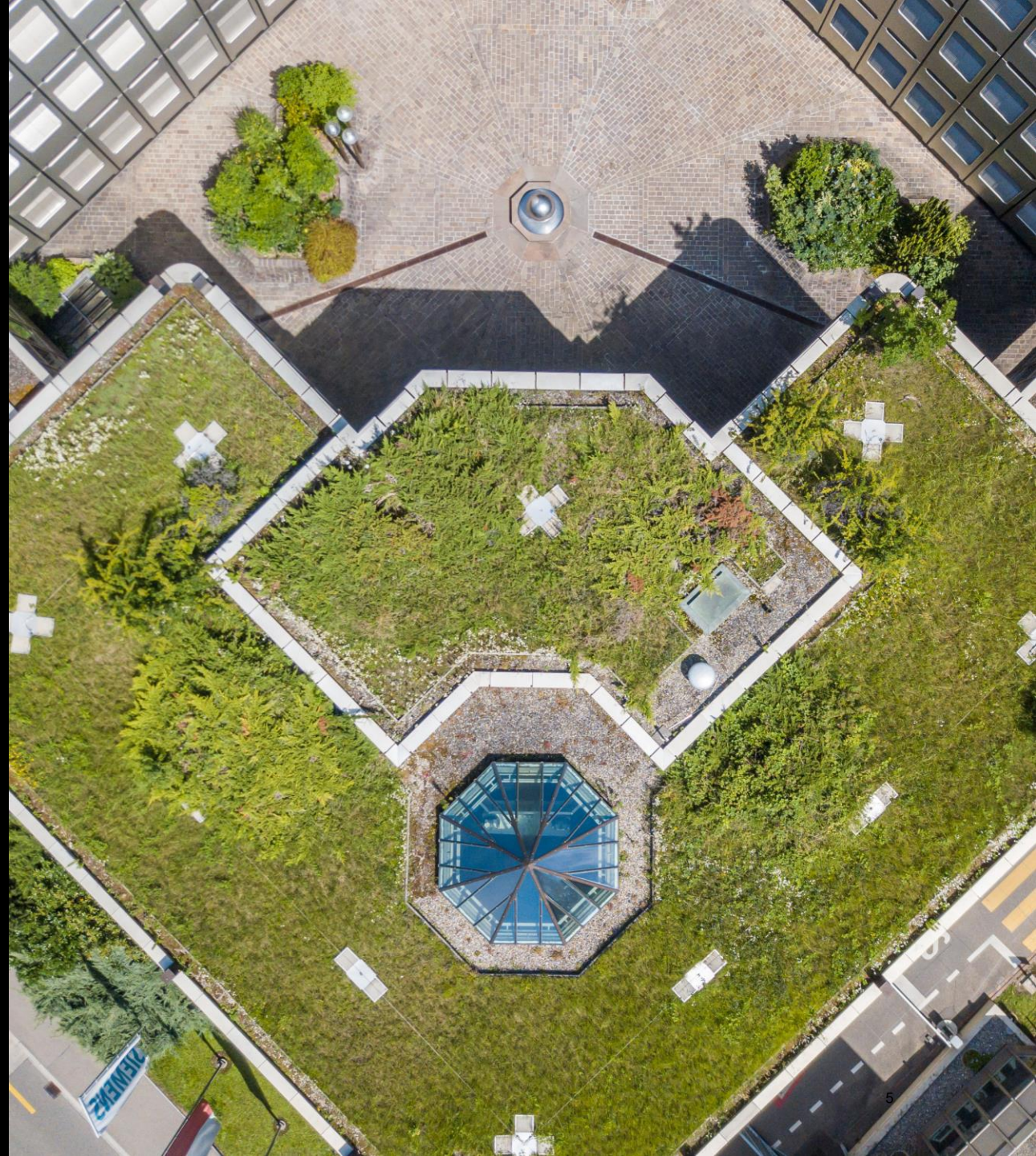
- Current incentive programs available in Alberta
- What types of projects qualify and common eligibility considerations

Real-World Case Studies

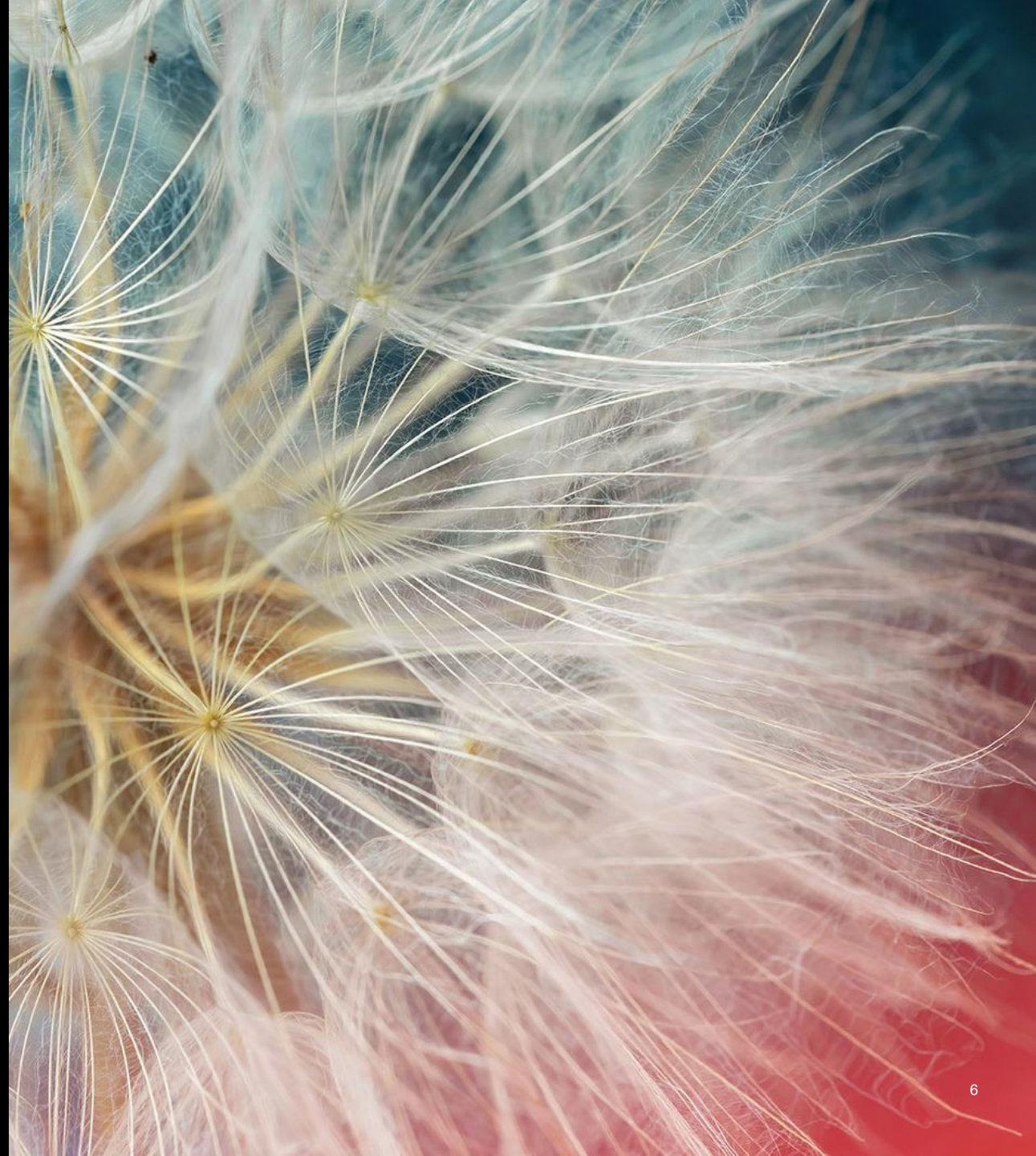
- Examples of funded projects and outcomes
- Lessons learned from successful low-carbon retrofits

Long-Term Asset & Portfolio Planning

- Using data and analysis to support decarbonization roadmaps
- Balancing carbon reduction, affordability, and building resilience



WHAT DOES IT MEAN TO BE LOW CARBON?

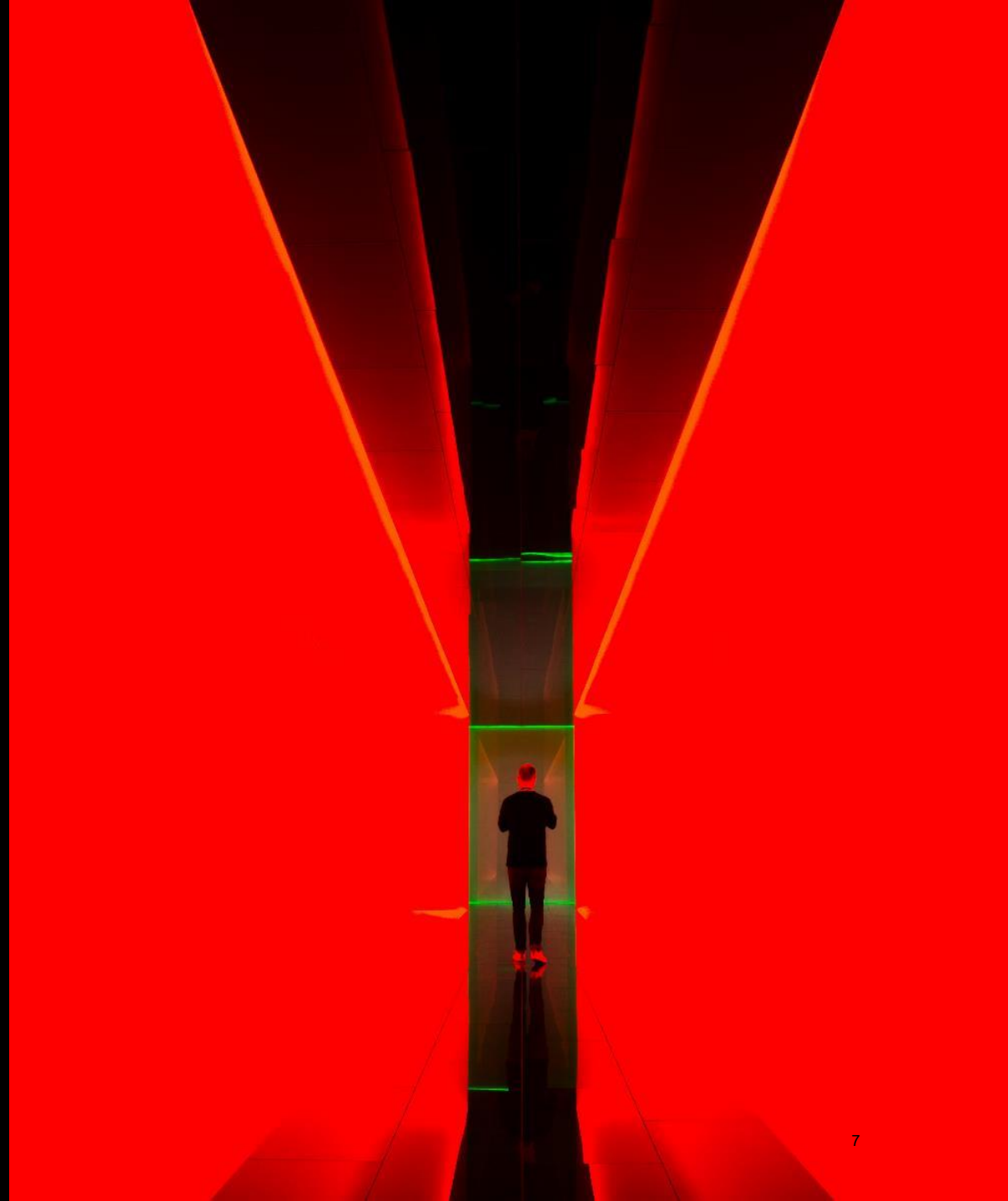


What Is Low Carbon?

“A highly energy-efficient building with minimal greenhouse gas emissions from building materials and operations.” (CaGBC’s ZCB)

- For buildings, typical primary sources of GHG emissions are from **fossil fuels,** purchased energy (**electricity or district energy**), and embodied carbon

- **Everyone defines “low carbon” differently!**



Energy Efficiency vs Low Carbon

- Low Carbon often requires a focus beyond traditional energy efficiency
- Next ASHRAE 211 edition will include a “Decarbonization Assessments Level 1 or Level 2” standard language as well as traditional ASHRAE levels for energy studies (1/2/3)

Traditional Focus

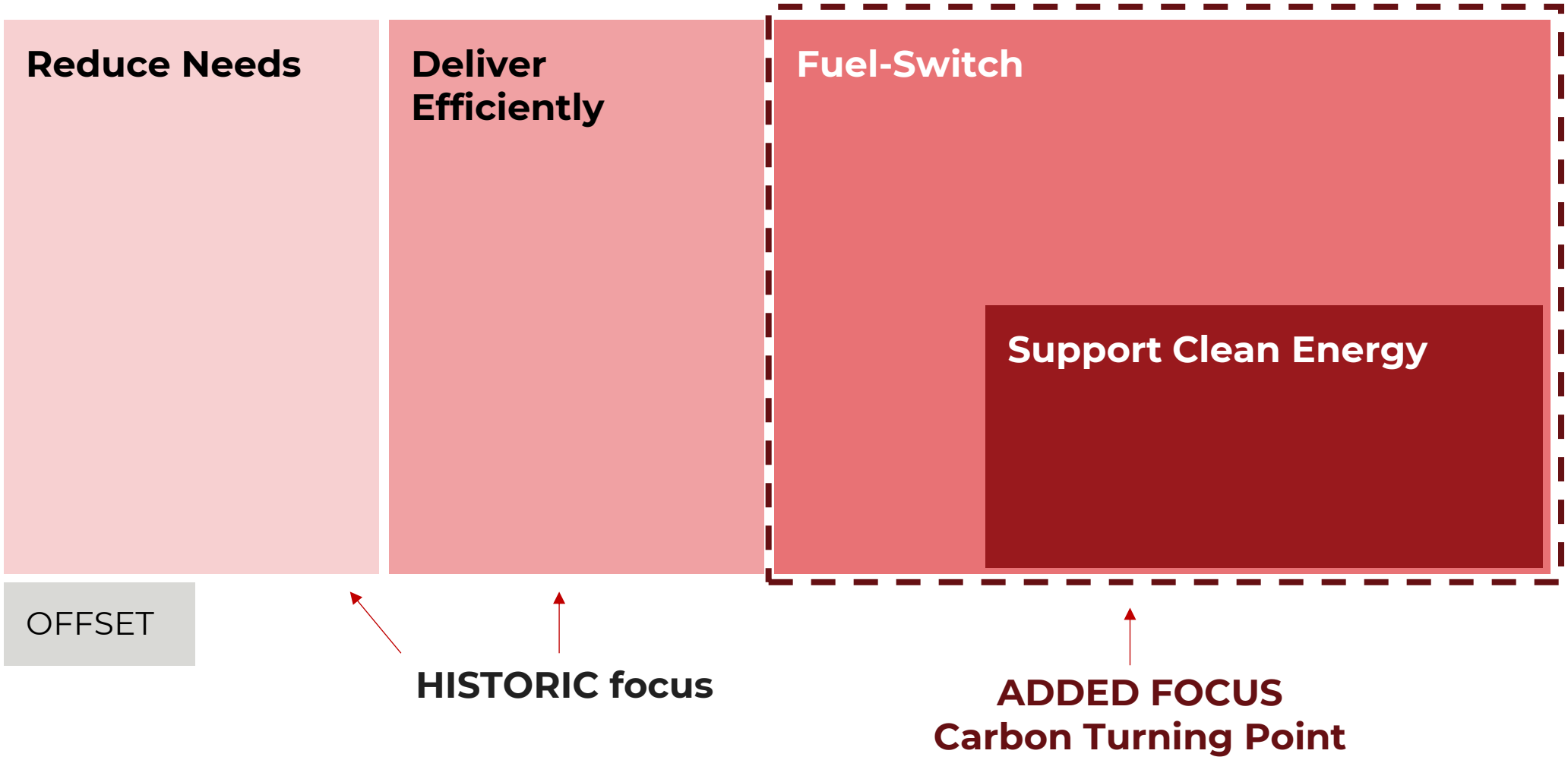
- Reduce Needs (set point adjustments, scheduling, weather stripping, envelope etc.)
- Delivering Efficiency (higher efficiency equipment, LED lighting, VFDs etc.)

+

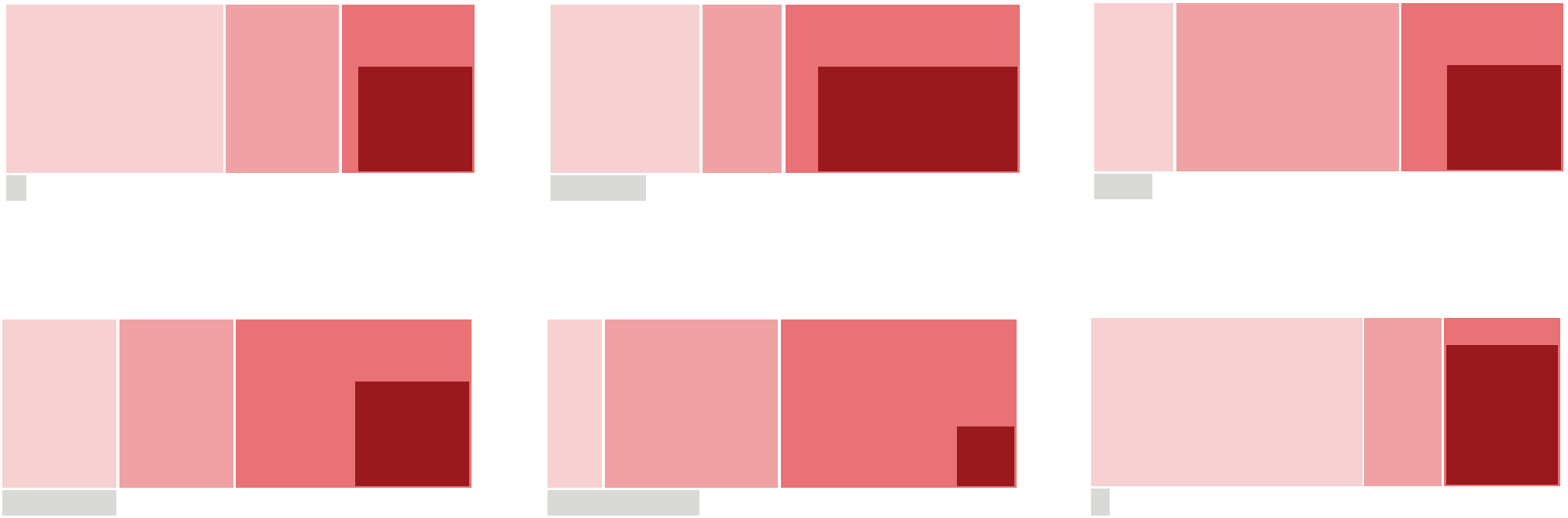
Low Carbon Focus

- Scheme Changes:
  - Fuel Switching
  - Alternative Energy Generation
  - Energy Storage
- Assessment of auxiliary work to support low carbon technology implementation
  - Electrical capacity
  - HVAC configuration
  - Physical space
- Scenario planning
- Phasing

Key Priorities for Holistic Decarbonized Renewal



Priorities vary by Building



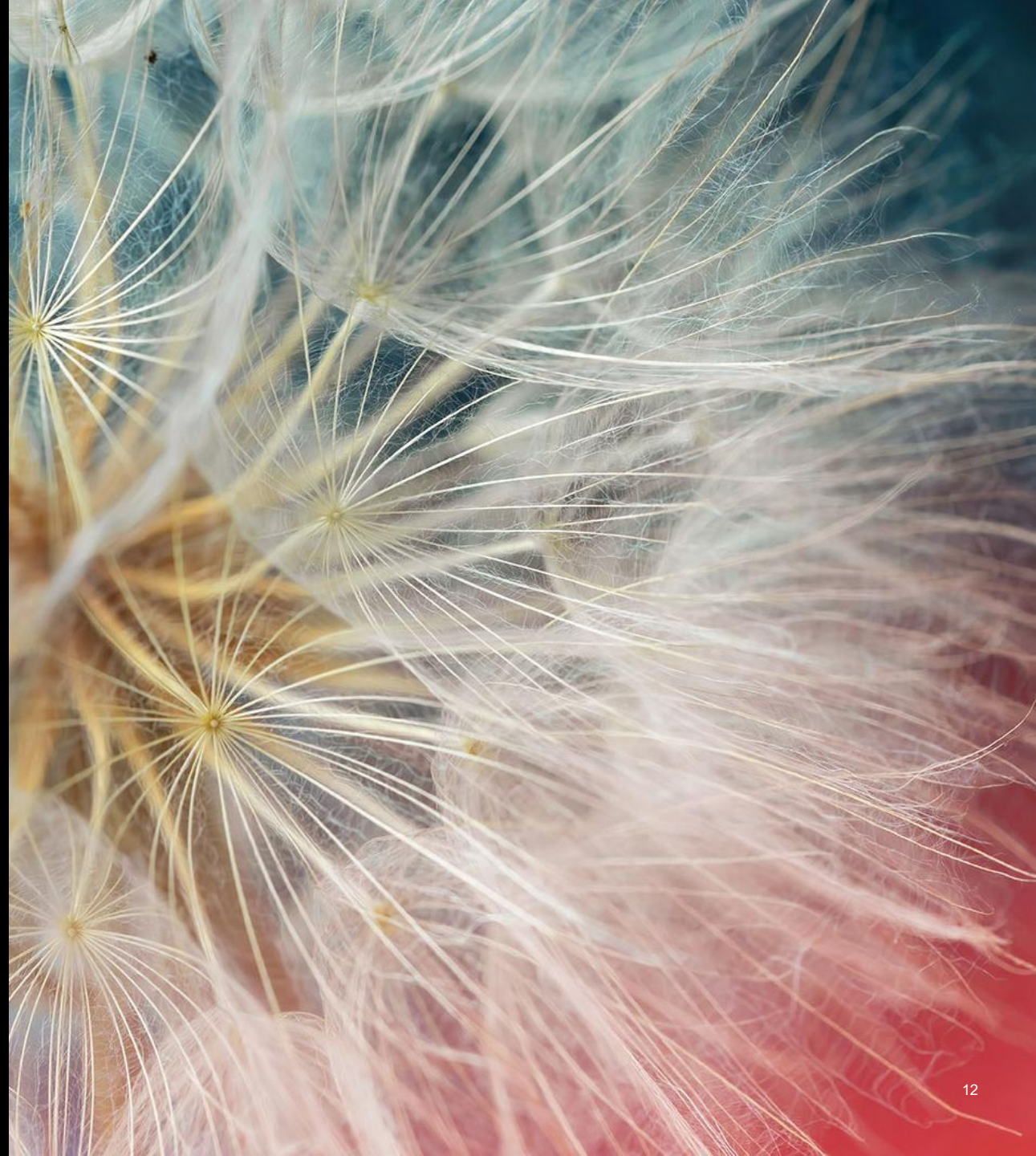
- ***Not a one-size fits all solution***
- ***Also, each building has different systems, in varying condition***

What are some of the challenges to low carbon?

I.E. Why hasn't everyone done it?

- Unclear mandates and timelines
- Uncertain ROIs and costs for implementation
- Often a tension between energy efficiency and decarbonization
- Uncertainty in the emission intensity of the Alberta electricity grid
- More complex than "like-for-like" (Need to phase and plan, more complex)

LOW CARBON PATHWAYS



FOCUS AREAS FOR LOW CARBON PATHWAYS

1. Occupant-connected systems & equipment

2. Enclosure Systems

3. HVAC Delivery Systems

Energy Efficiency and Load Reduction

4. Optimal Fuel-Switching

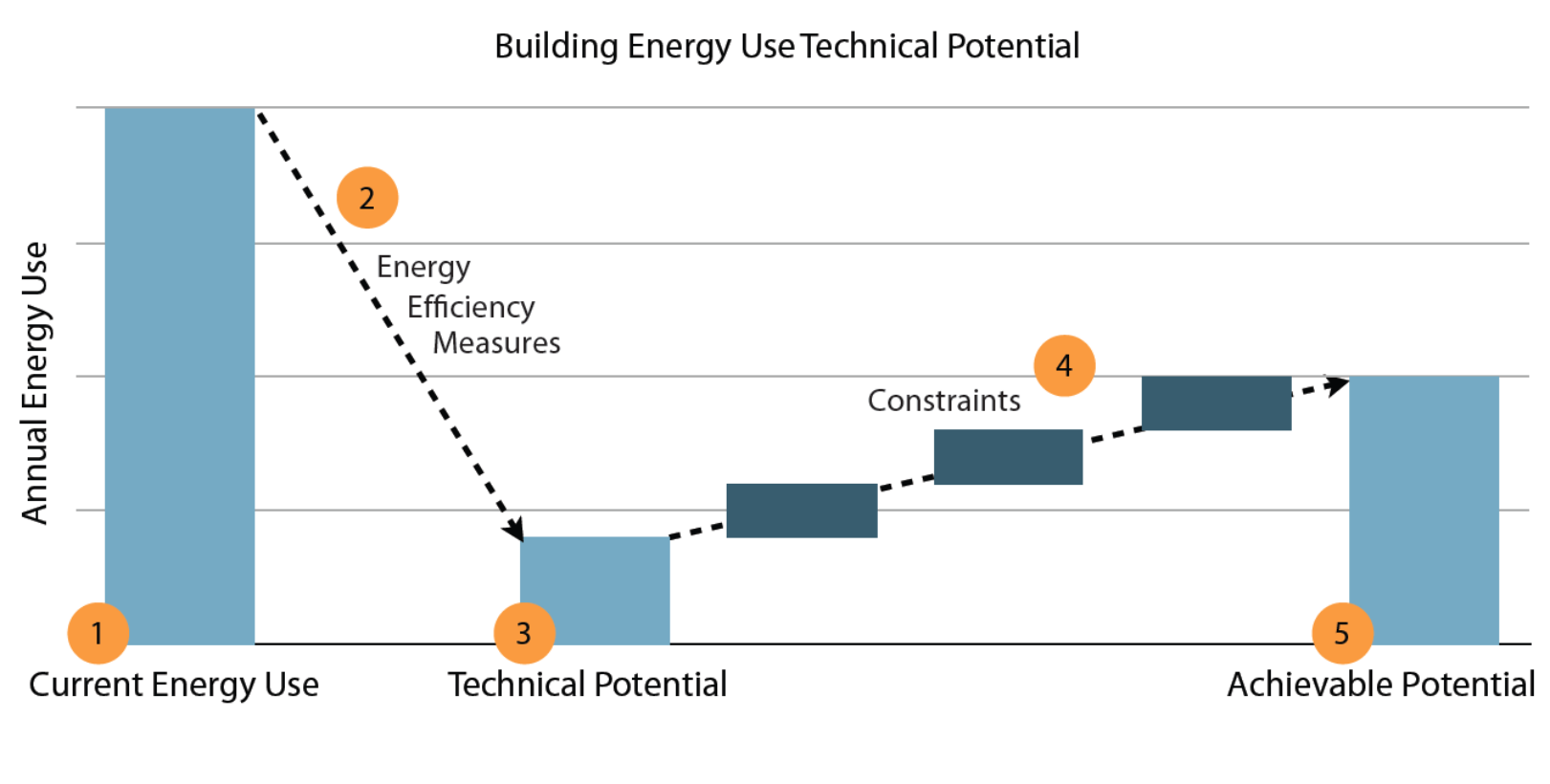
Electrification

5. Grid Stewardship

DER and Storage

HAVING A PLAN IS IMPORTANT TO PROPERLY INCORPORATE HOLISTIC DECARBONIZATION INTO RETROFITS!

THE PATH TO GET THERE



- **Every building will have its own pathway!**
- **Common Constraints**
  - **Organization goals/targets**
  - **Lease obligations**
  - **Business case/ROI**
  - **Market drivers**

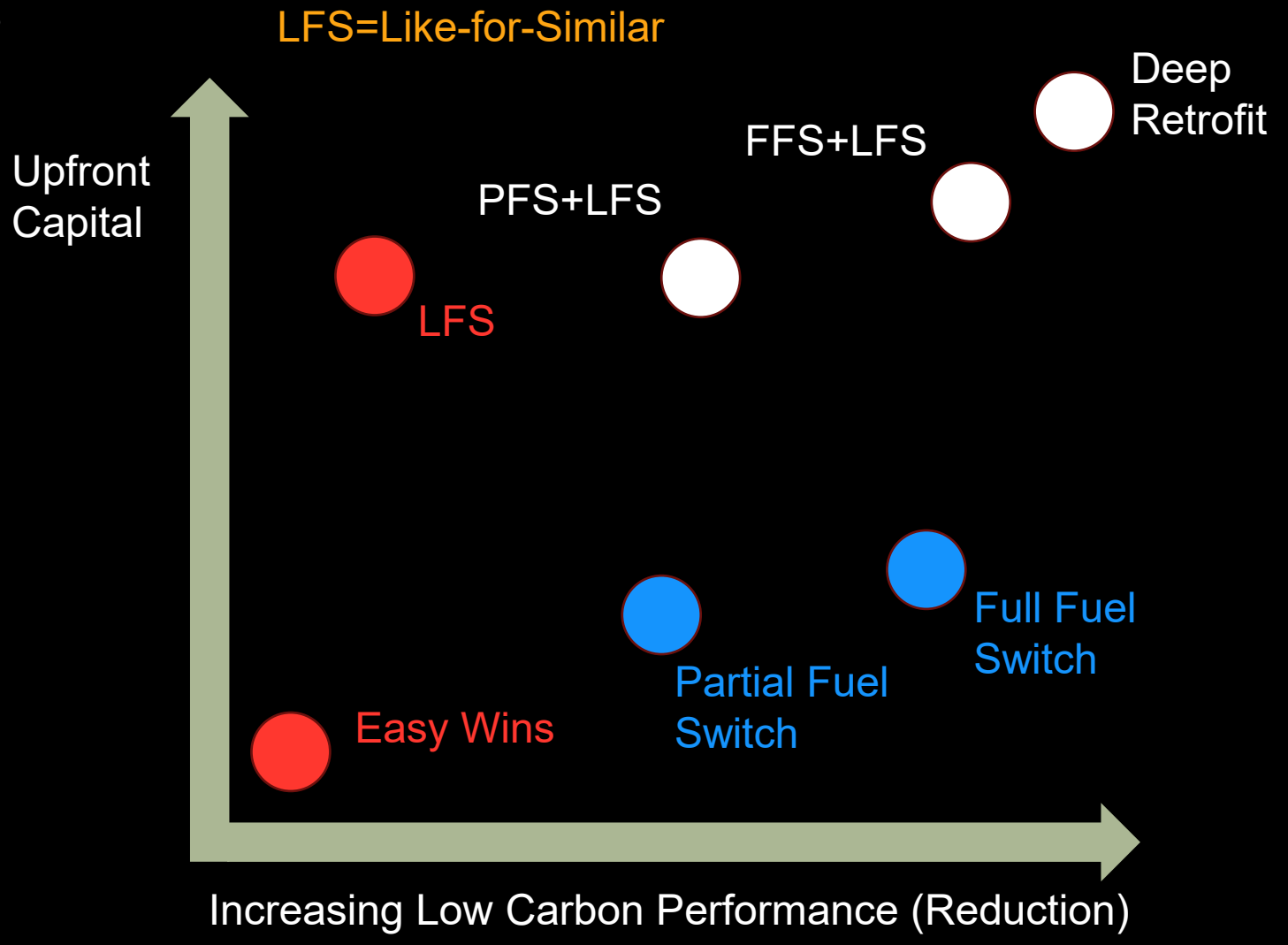
https://rmi.org/wp-content/uploads/2017/04/Buildings-depot_techical_potential.png

WHERE DO YOU FIT?

Energy Efficiency Focused
- Focus reducing emissions through primarily energy efficient

Fuel Switching Only Focused:
- Focus on fuel-switching of gas-fired heating equipment partially or fully

Deeper Investment Focused:
- Explores investments that help address a broader set of goals.

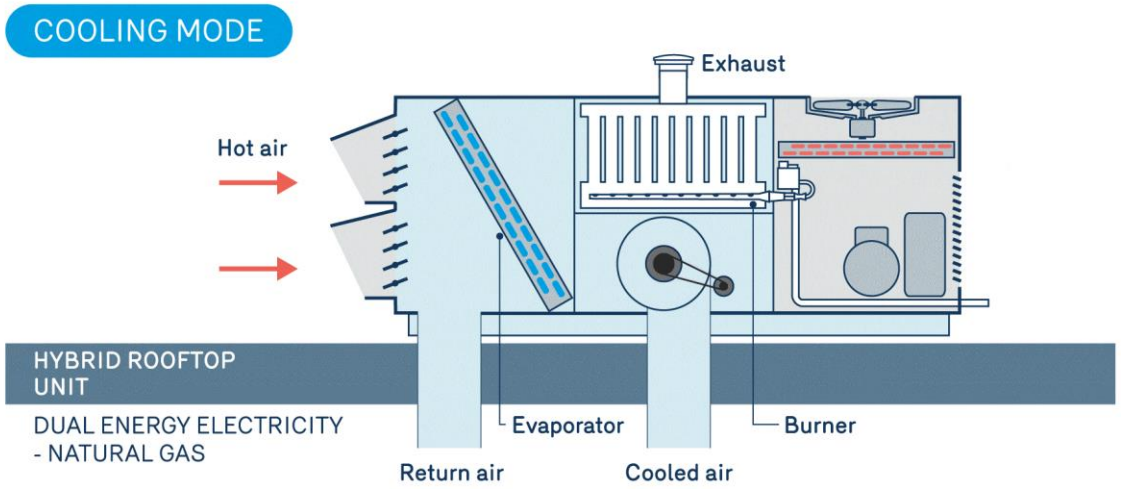


Energy Efficiency Focused Pathway

Typical Strategies	Cost	GHG Savings	Typical ROI
Retro-Commissioning	$	Low-Med	High
LED Lighting and Controls	$	Low-Med	High
Heat Recovery	$-$$	Low-Med	High
Alternative Energy Generation (Solar)	$$-$$$	Med - High	Med-High
Like for Similar (High eff. boiler, etc)	$$-$$$	Low	Low-Med
Appliance specific (vertical transport, food service, etc)	$-$$	Low	Low

Fuel Switch Only Focused Pathway

Typical Strategies	Cost	GHG Savings	Typical ROI
Space Heating (Partial) -ASHP + Gas Fired BU	$$	Med-High	Low
Space Heating (Full) -Ground source (GSHP)	$$$$$	High	Med
Domestic Hot Water -Electric Resistance ort ASHP (building type dependent)	$	Med	Low-Med
Ventilation -Dual fuel units (gas fired and electric)	$$	Med	Low-Med
Heat Recover chillers	$	Med	Low-Med



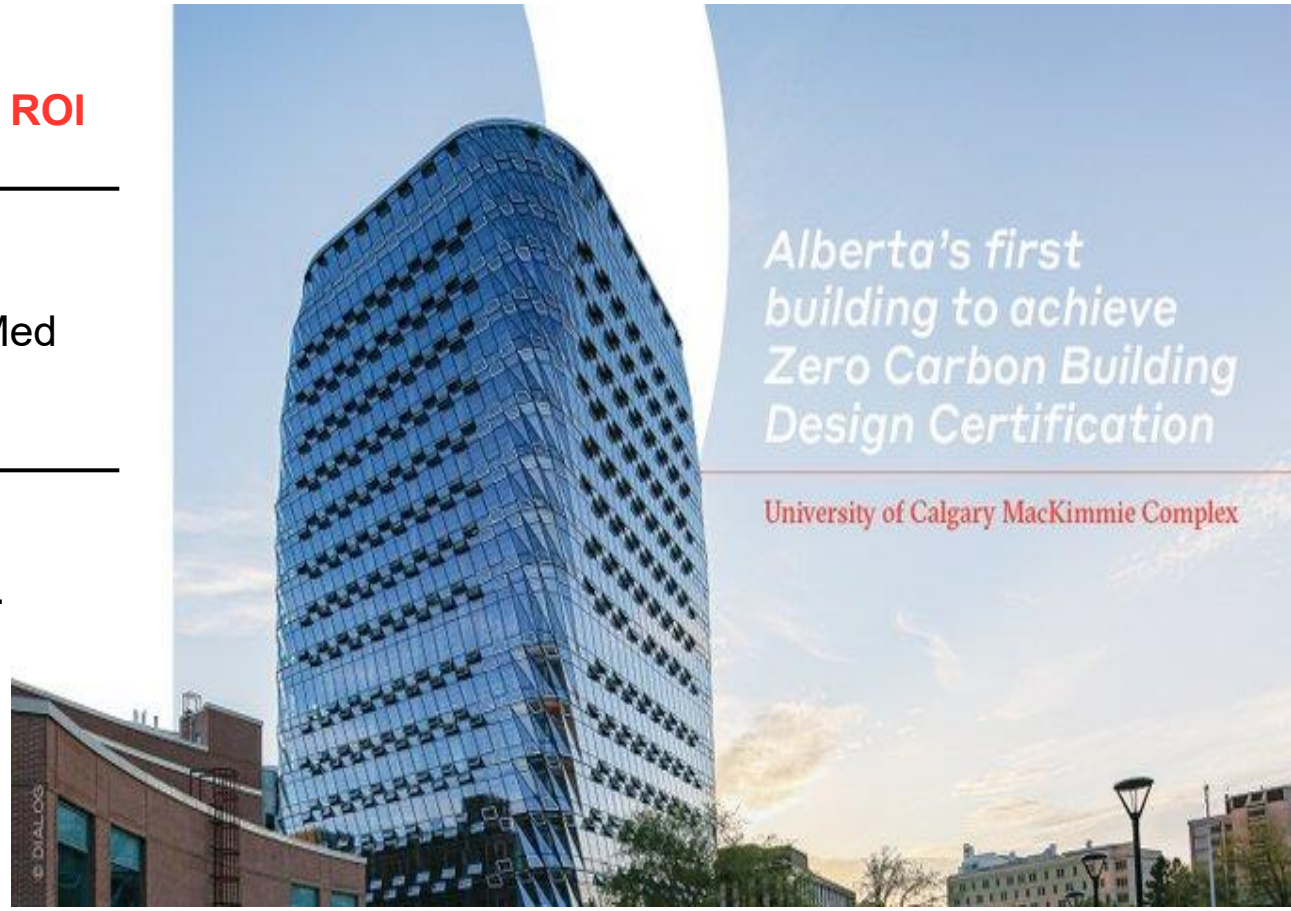
Énergir | Hybrid Rooftop unit

Deeper Investment Pathway

Typical Strategies	Cost	GHG Savings	Typical ROI
Improving enclosure thermal performance + Partial or Full Fuel Switching of systems	$$$$$	High	Low-Med

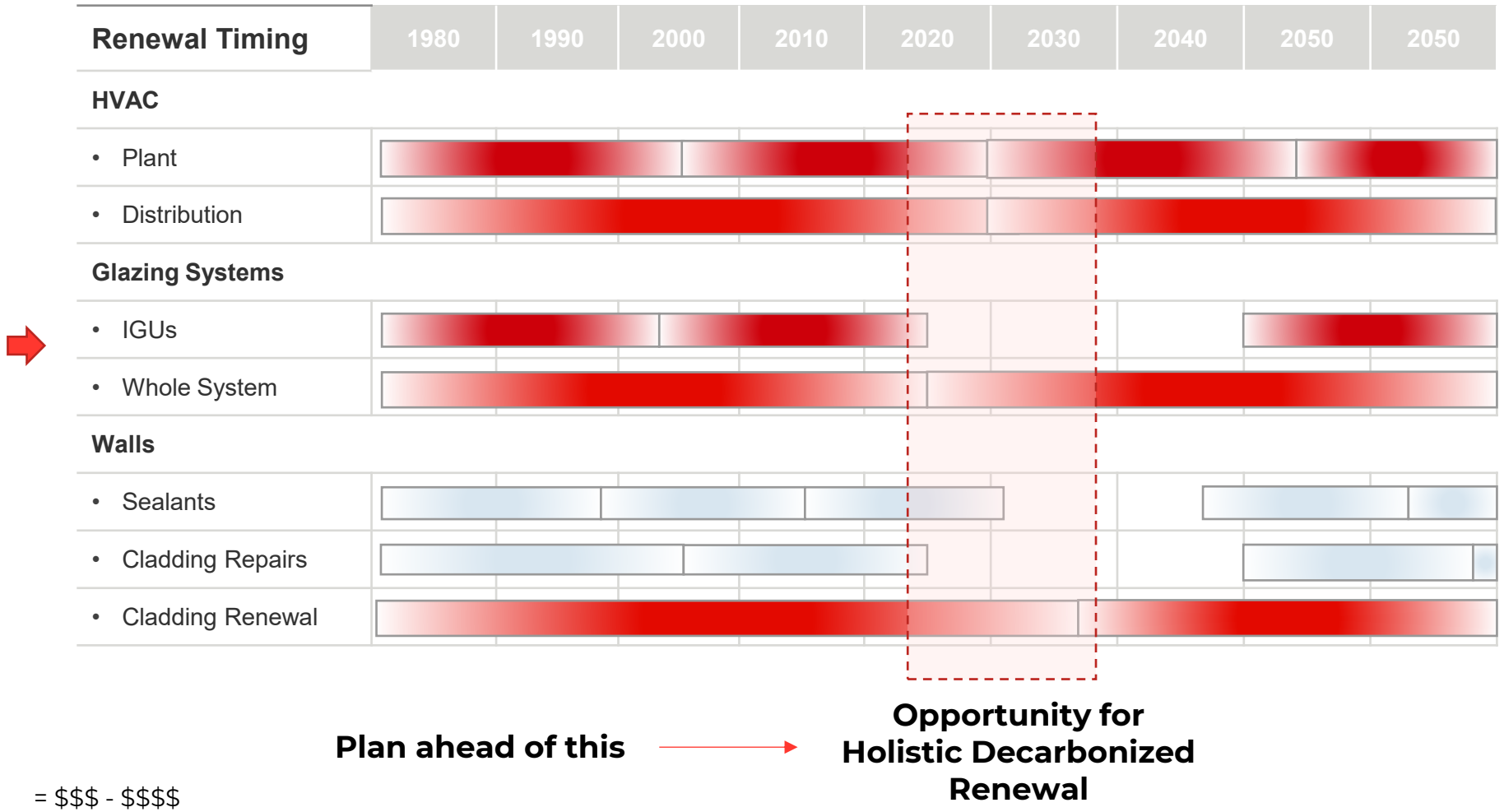
Deeper investment is characterized by:

- More significant capital renewal than already planned.
- Package designed to offer holistic synergies/benefits
- Package could be designed to offer a return on investment over a typical renewal cycle, but typically more than just energy savings considered
- Successful with Aligned Ambition



Deeper Investment success starts with timing it right.

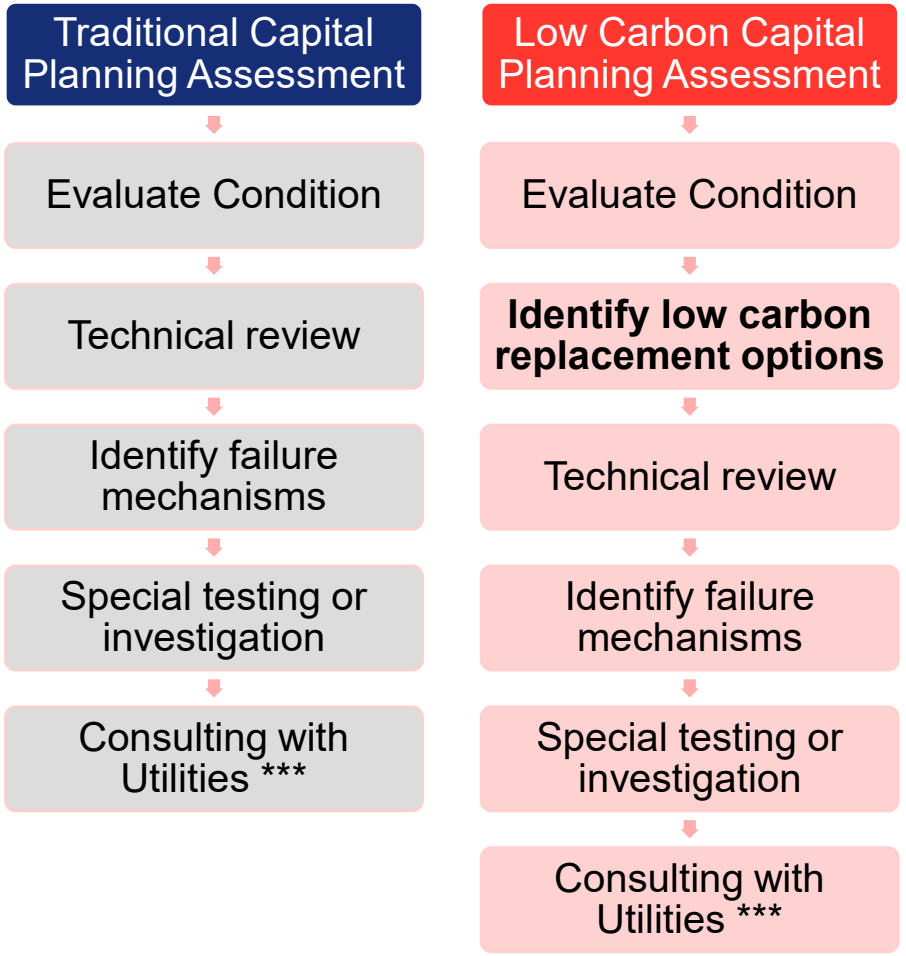
Building Component	Expected Service Life
Plant & Equipment	20-30 years
Distribution (Ductwork)	40+ years
IGUs	25-30 years
Glazing System	40+ years
Sealants	15-20 years
Cladding Repairs	10-20 years
Cladding Renewal	50+ years



HOW DO I FIND THE BEST PATH FORWARD?

AN ENGINEERED, LOW CARBON CAPITAL PLAN!

- Low carbon planning is just an enhanced building condition assessment process
- Aligning BCAs and energy/decarb studies is the sweet spot
- Incorporate “Accurate enough” analysis of options to be embedded into capital planning / asset management plans
- Reduce technical and other barriers for implementation of different low carbon strategies by considering phasing and sequencing of different low carbon strategies



CAPITAL PLAN AS A LIVING DOCUMENT

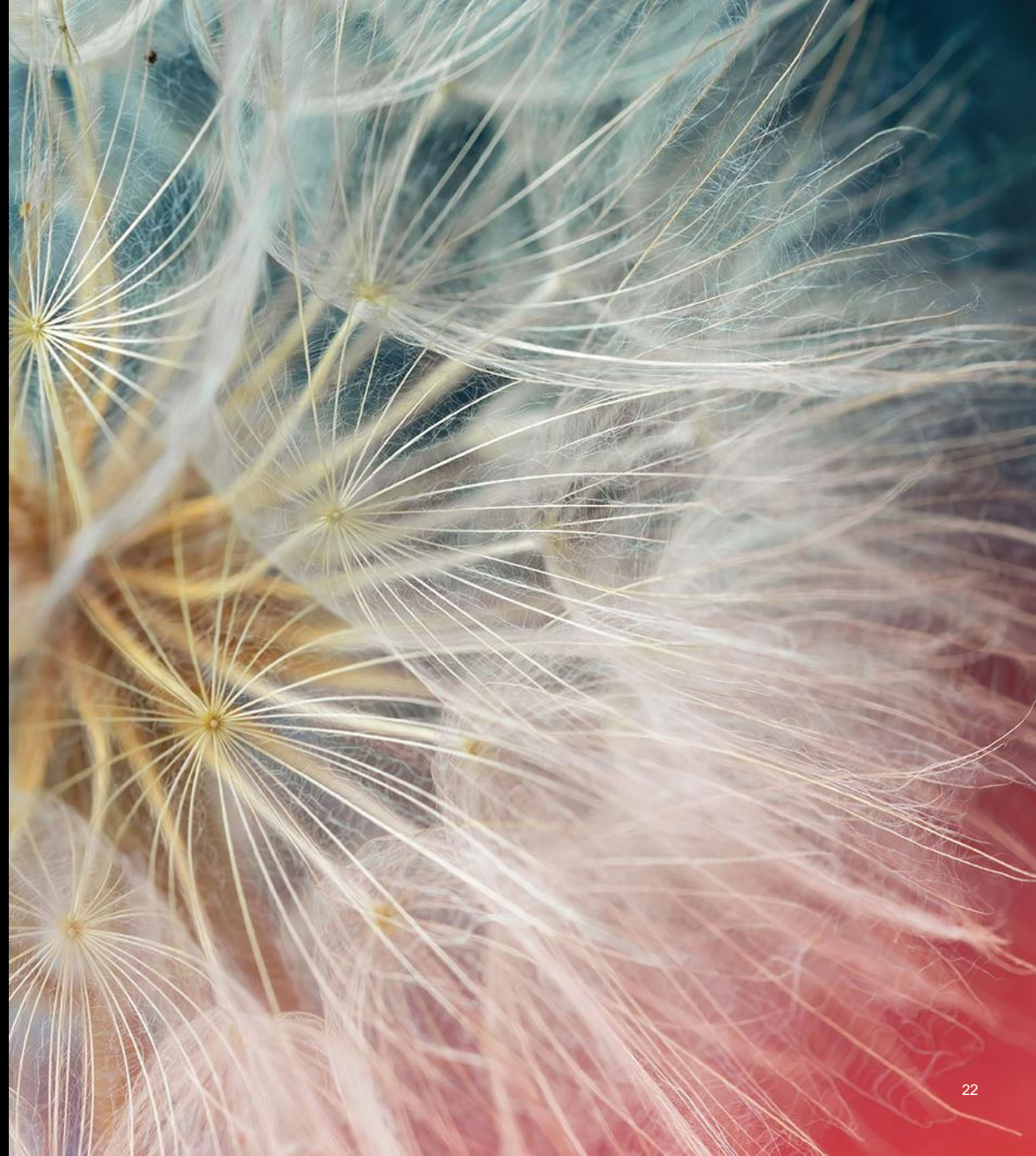
PLAN MAINTENANCE:

- Annually (internally, externally?)
- Engineering review (every 3-10 years?)
- Building Changes:
  - Changes in conditions
  - New or accelerated deterioration

CHANGES IN LEGISLATION:

- Elevators, emissions, CFC phase-out, fire code retrofit, garbage recycling
- New / Ending incentive programs ***

GRANTS AND INCENTIVES



Alberta Ecotrust Retrofit Accelerator Program

- **Funding:**
  - Up to 50% of study costs for deep retrofit planning studies, can be applied to multiple buildings
  - Up to 80% of supporting study costs (BCAs, space planning, IAQ assessments)
  - Up to 80% of pre-tender costs (feasibility studies, design costs)

- Open until **March 2027**

- **Who Can Apply:**
  - ✓ Multi-unit residential buildings
  - ✓ Commercial buildings
  - ✓ Municipalities, universities, schools, and hospitals

✓ **Program Link: https://albertaecotrust.com/initiatives/alberta-ecotrust-retrofit-accelerator**

A good fit for those who want:

Understand retrofit opportunities

Support for retrofit capital planning

Want to explore different scenarios to decarbonize their buildings

Want some free coaching

Commercial CEIP
(Edmonton and Sturgeon County)

Alberta Municipalities Strength In Members | Clean Energy Improvement Program

- **Financing:** Up to 100% of eligible costs up to $1,000,000 for
  - Energy Assessment
  - Retrofit Projects
- **Who Can Apply:**
  - ✓ Non-Residential Properties (commercial, retail, not-for-profit, other)

✓ **Program Link: https://ceip.abmunis.ca/commercial/locations/**

✓ **More Info on Edmonton program:** City of Edmonton's webpage

A good fit for those who want:

Upfront costs spread out at preferred financing rate

To implement soon

Clean Technology Investment Tax Credit

- **Tax Credit:** Federal refundable tax credit, up to 30%, for installation of eligible clean energy equipment

- **Who Can Apply:**
  - ✓ Taxable Canadian corporations
  - ✓ Partnerships
  - ✓ Mutual Fund Trust – Real Estate Investment Trusts (MFT-REITs)

- **Types of Equipment**
  - Heat Pumps (air and ground source)
  - Solar Panels
  - Battery Storage

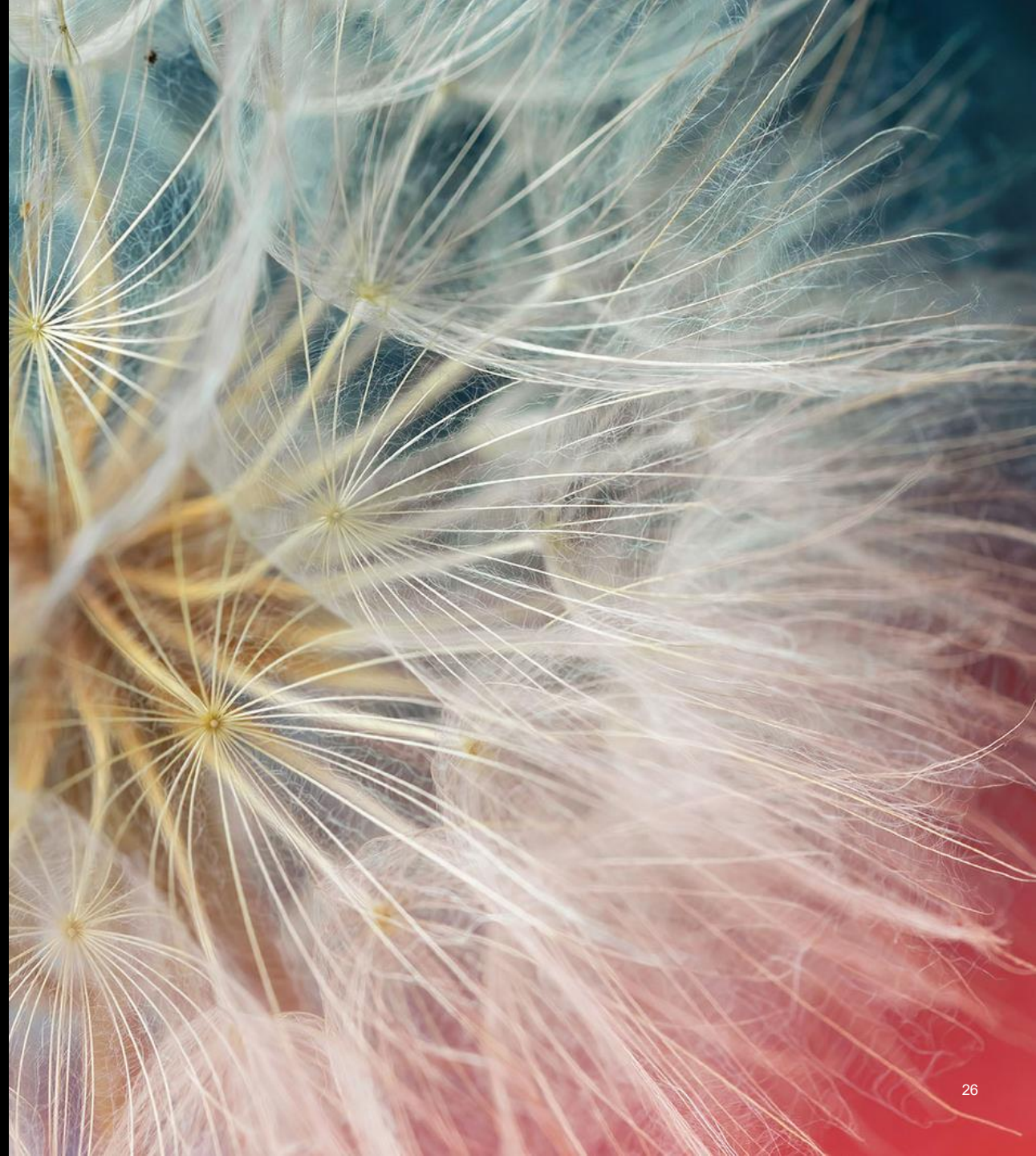
✓ **More Info: https://www.canada.ca/en/revenue-agency/services/tax/businesses/topics/corporations/business-tax-credits/clean-economy-itc/clean-technology-itc.html**

A good fit for those who want:

Want to offset capital costs and improve affordability

Ready to act soon

CASE STUDIES / EXAMPLES



WHAT DOES A LOW CARBON PROJECT LOOK LIKE?

We work on a range of low carbon projects.

Our experience:

A large number of small low carbon retrofit projects. Various stages of construction

How do we define a low carbon project?

Everyone thinks of a large net-zero new build or a deep energy retrofit project, but the reality for most building owners is that they can't do a full retrofit at one time. Reasons for this include:

- Cost
- Electric Infrastructure
- Operational Impact
- Uncertainty in benefit relative to investment

Are they mechanical or electrical projects?

The answer is always at least both.

Often architectural too.

“Deeper Investment Pathway”

Lac La Biche Provincial Building
It’s never to late to study your options!

Study that aligned with renewal planning that we studied for provincial building, project moved into design and implementation

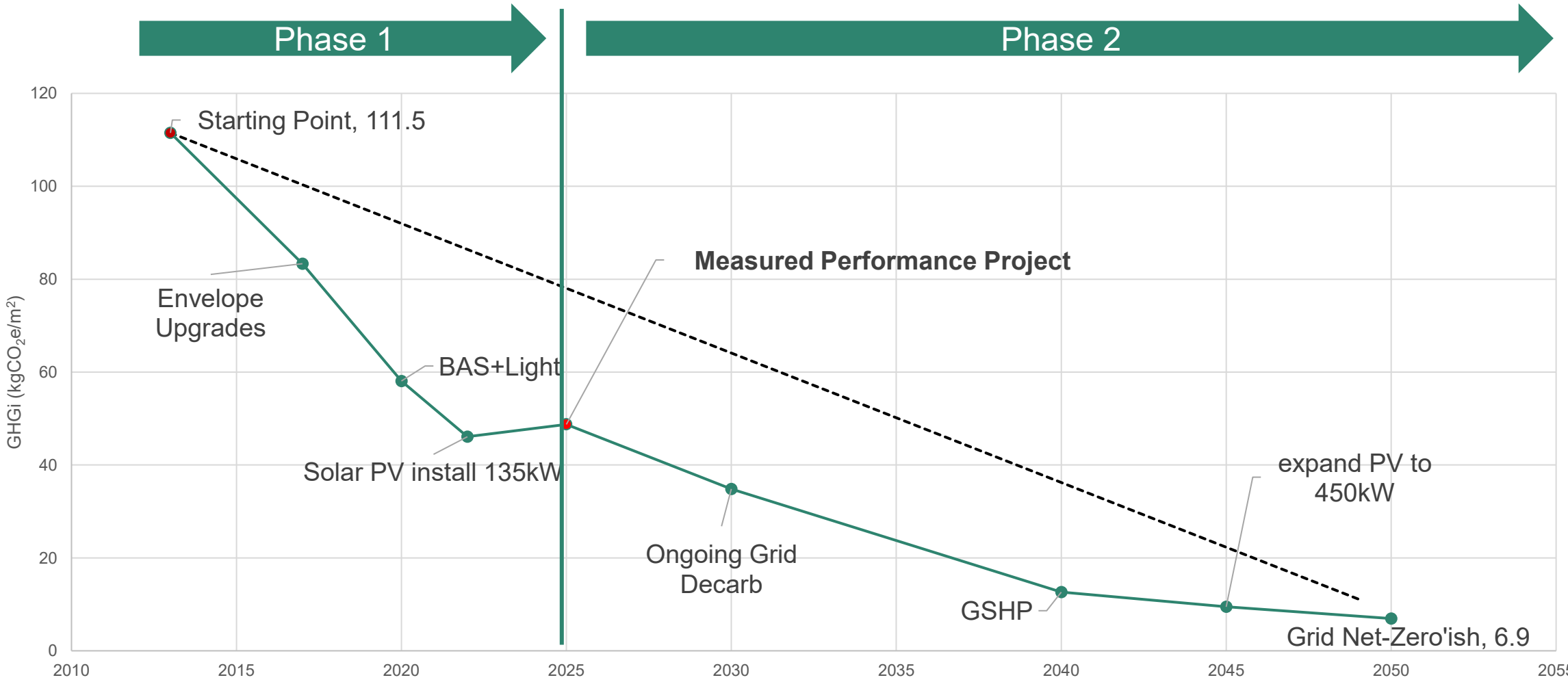
Achieved several goals including upgrading spaces for new workforce needs

- Multiple architectural and mechanical systems in the building were nearing the end of their service life
- Phase 1 work included improving the building envelope, upgrading the controls, upgrading lighting and installation of solar PV

What we learned

- Energy/GHGs aren’t the only driver, some of the envelope upgrades were driven by ongoing IAQ/thermal comfort related issues, and other upgrades aligned with interior renewal
- Having a preliminary budget helped inform study direction and prioritization of study measures
- Progress is gradual, but do what you can now in a tactical way

Lac La Biche Provincial Building Low Carbon Pathway



“Fuel Switch Only Focused”

Retail Building
Heat Pumps are Always the Answer!

Ongoing Project

Example of what happens when an electrification study is done without thinking of the location and practical thought goes out the window.

- Study recommended the implementation of a hydronic system with ASHPs for a heating only system.
- Winter heating needs would require an additional heat source with many hours where the system could not benefit from the heat pumps. Operating at a COP of 1 most of the winter.
- Expensive and disruptive installation. Existing hydronic infrastructure in the building was not set up for low temperature water.

What we learned:

- Studies are better completed by firms that do both study and design in the local market.
- Asking what the client wants is important. They suggested to us at project kick off that they wanted to go in a different direction.

“Fuel Switch Only Focused”

Large Warehouse

Everything Goes Right, Until it Doesn’t

Ongoing Project

End of Life Equipment Replacement ✓

Heat Pumps! ✓

Low Carbon Electrical Grid ✓

- Still driven by organizational ESG goals.
- Low carbon grid makes electrification a no brainer.
- Heat pumps take advantage of shoulder seasons.
- Standard electrical service upgrade.

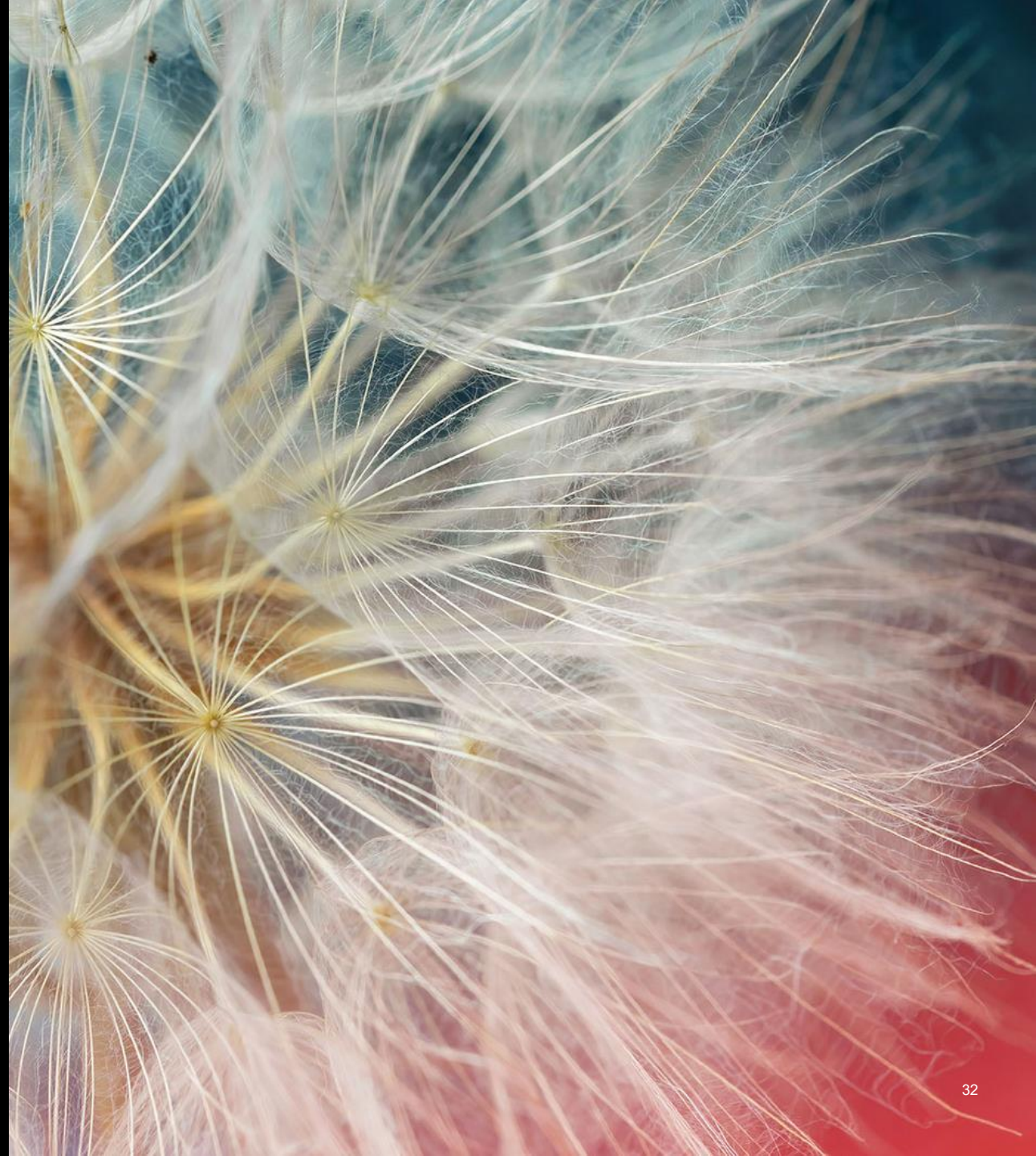
No problems Right?

- Despite the efforts of the owner, project manager and consulting team to coordinate everything ahead of time, including a utility service upgrade to accommodate the new electrical load.
- Team was informed that there was an error on the utility end, and the promised service upgrade would be 1 year later than the team was initially told.

Everyone did their part, but something still went wrong.

Fortunately, no equipment was removed from the building when the delay was discovered. Project delayed for a year. Cost the client contract extension, material storage costs, and extended warranties on equipment.

THE BIGGER PICTURE



Low Carbon is a mindset!

Some important mindset shifts

Shift #1: Low Carbon is a planning exercise

- Consider how BCA and energy studies can be combined with capital plans into a focused, integrated low carbon plan
- BCAs and conventional audits are not a new concept, and typically commissioned separately. If low carbon is the goal, then it makes sense to incorporate these together
- Opportunity to also incorporate other relevant areas such as climate risk and adaptation, tenant lease language
- Look for Aligned Ambition

Shift #2: Significantly reduce emissions likely means fuel switching

- Fuel switching combined with ongoing decarbonization of the provincial grid will be the most significant carbon reduction opportunity
- Knowing if fuel switching is in the cards at some point makes it a key consideration for any building improvements
- Several tradeoffs to consider:
  - Increases to opex (utility costs)
  - Shorter service life
  - Likely some auxiliary changes (service, ducting, curbs, spacing etc)

Shift #3: Think about it as a risk management exercise

- Typically, decarbonization does not always make sense from a traditional business case sense
- Consider how to valuate other low carbon pathways (building valuation, tenant IAQ improvement)
- Consider risks for poor carbon performance
  - Regulatory changes
  - Tenancy (low carbon offices demand projected to outstrip supply!)
  - Stranding risk

Shift #4: Think about the portfolio

- Low carbon will have incremental, additional cost
- Consider how to maximize decarbonization performance across the portfolio, not just site by site
- Also consider how early changes/pilots can inform decisions made for other buildings in the portfolio

THANK YOU

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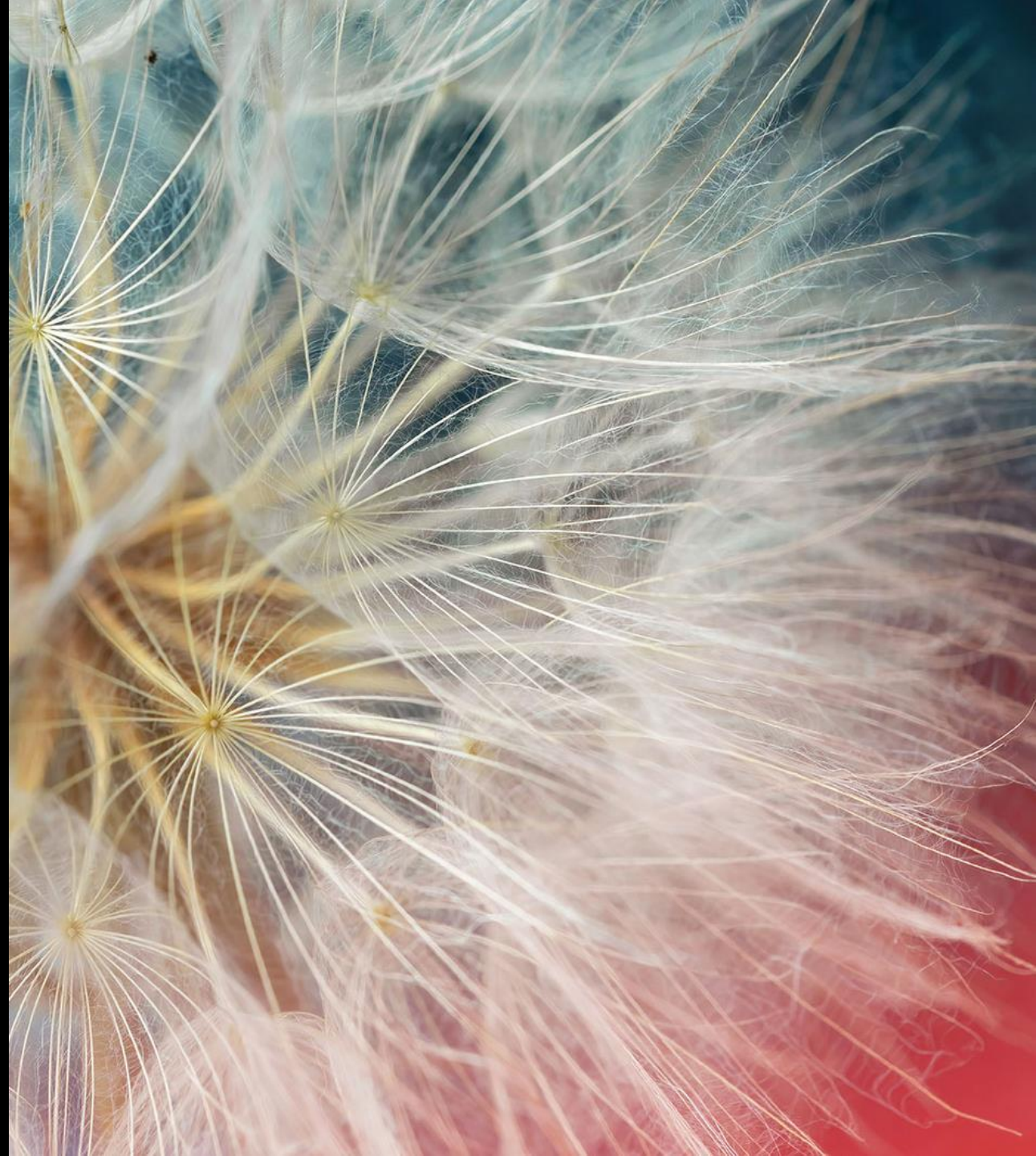

Smart Questions:

Things to ask yourself or your consultant as you get started:

- **What are my goals? Full low carbon in one step? Or is this just the first phase?**
  - The more information the team knows, the better they can set you up for success through all phases.
- **Do we know our budget? Does it need validation?**
  - Often the biggest limiting constraint

If fuel switching is in the cards:

- **What is the makeup of my local electricity grid?**
  - And what is the projected carbon intensity of the grid over the equipment/system's lifetime?
- **Can your operational budget support changes to utility/energy costs?**
- **Can the utility support the additional electrical load.**
  - You can still get started even if the utility upgrade will take time.
  - Or you can just maximize what you can within the existing capacities of the service/equipment.
- **What is my timeline?**
  - Does this project work within seasonal limitations. Or are we modifying heating systems in the winter?
  - Does a utility upgrade fit within the same schedule or do you need to plan for temporary provisions or phased execution.
  - Did we sync up major equipment upgrades with end-of-life replacement cycle.