The Real Estate Hot Potato - Challenges and Solutions for Whole-Building Re-Cladding Projects

Scott R Armstrong, Senior Façade Specialist, Building Sciences

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AGENDA

- CURRENT PARADIGM – IT'S OVERSIMPLIFIED
- RENEWAL REALITY – IT'S COMPLICATED
- THREE CASE STUDIES – REPAIR, RENEW, MAINTAIN
- SUMMARY

EXISTING PARADIGM

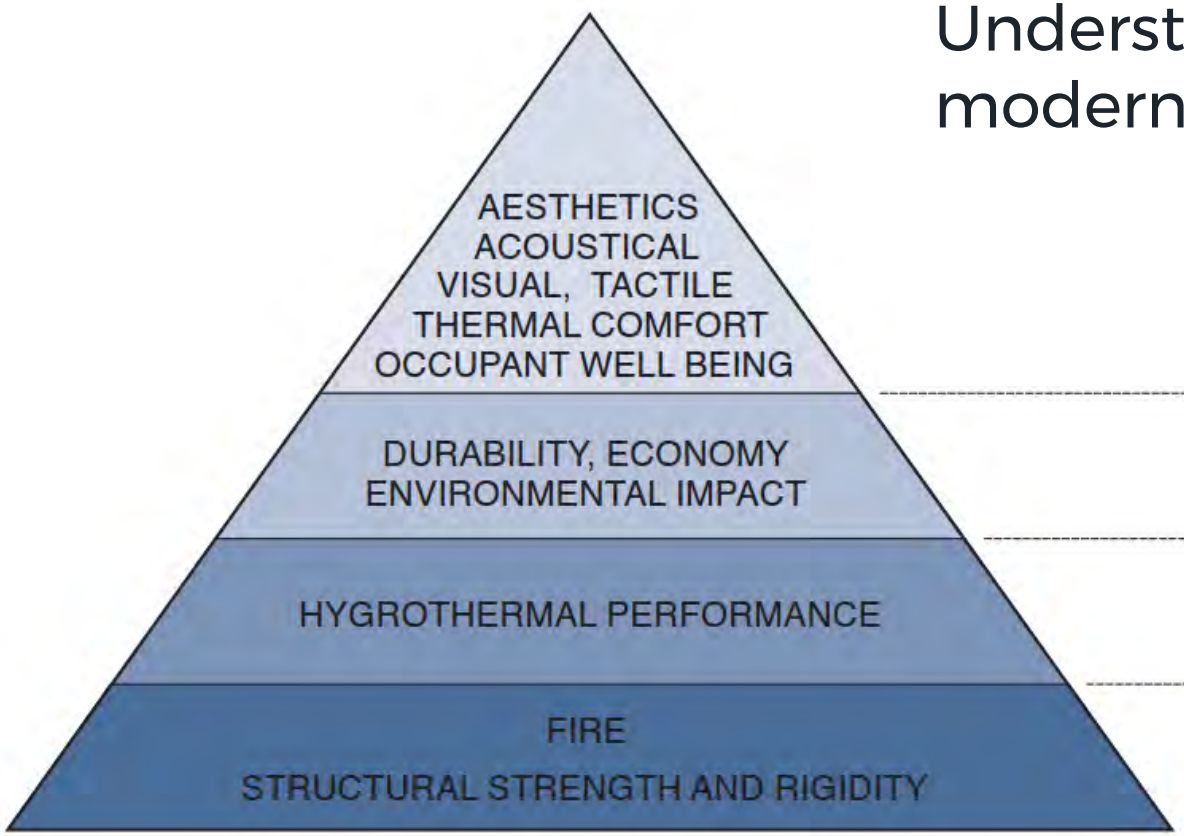
Façade Renewal Paradigm

Existing Frameworks: Design & Assessment

- Design
  - *NIBS Guideline 3*
  - *CSA Z320 – Building Commissioning Standard*
  - *ASTM E2813 / E2947 – Building Enclosure Commissioning*
  - *CSA S478 – Guideline on Durability in Buildings*
  - *Tower Renewal Guidelines*
  - *Green Building Guidelines*

- Assessment
  - *Performance Audits & Reserve Fund Studies*
  - *ASTM E2018 – Building Condition Assessments*
  - *Capital Plans*
  - *Acquisition & Disposition Reports*
  - *Façade Ordinances*

Hierarchy of Needs



Understanding the function of modern building enclosures

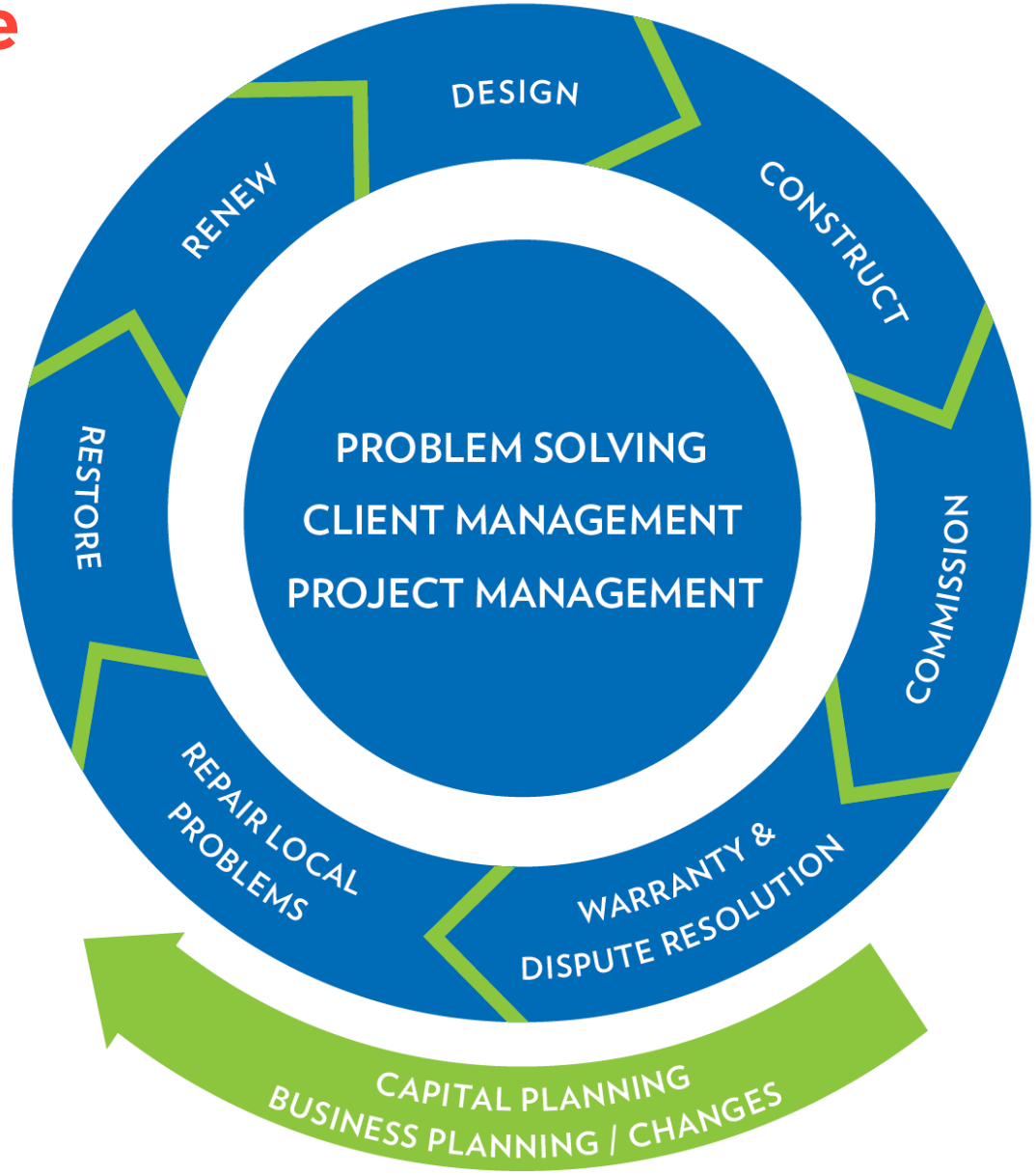
AESTHETICS
Aesthetic considerations may be applied to building envelope alternatives that satisfy the preceding criteria.

SUSTAINABILITY
Hygrothermal performance, along with the selection of materials and methods influence sustainability.

ENVIRONMENTAL SEPARATION / MODERATION
Control of heat, air, moisture and solar radiation define the quality of indoor environment.

HEALTH AND SAFETY
Minimum requirements for health and safety represent a necessary but insufficient condition.

The Building Circle of Life



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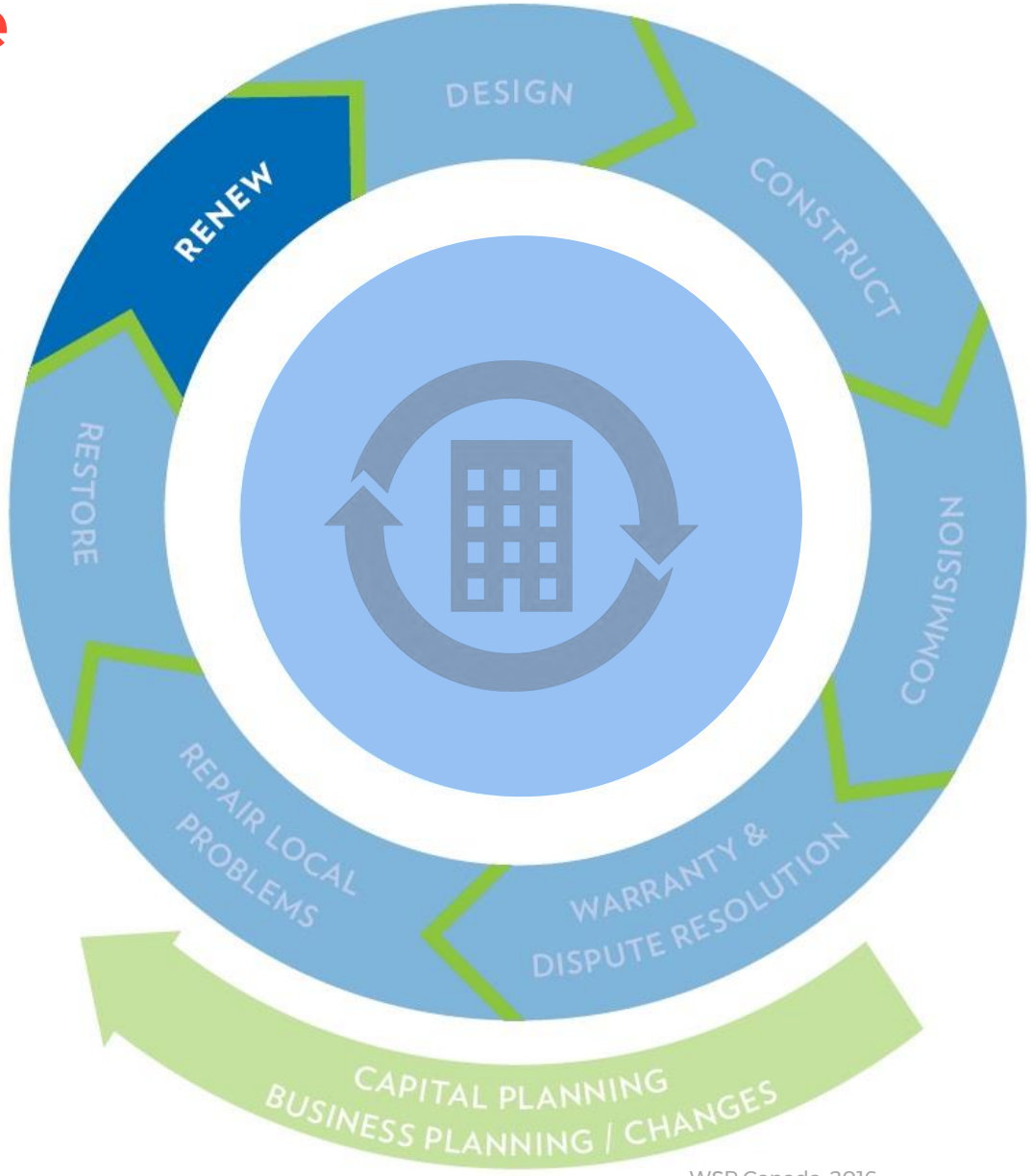
The Building Circle of Life

- Reduce
  - Ongoing maintenance
- Reuse
  - Building infrastructure
- Replace
  - Failed/deteriorated materials
- Improve
  - Overall building performance (i.e. air, water, thermal)
- Rejuvenate
  - Spaces to increase leasing revenue



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Key Elements for Success

- Money
- Time
- Experience
- Diplomacy
- Patience & Communication

..... Stay tuned for a re-visioning of this adage

RENEWAL REALITY

Traditional Design / Bid / Build Process

PROJECT FEASIBILITY

- Identify the issues
- Assess and document existing conditions
- Feasibility assessment

CONCEPT DEVELOPMENT

- Identify client's needs and goals
- Identify retrofit solutions and paths
- Optional: Mock-ups

DESIGN & TENDER

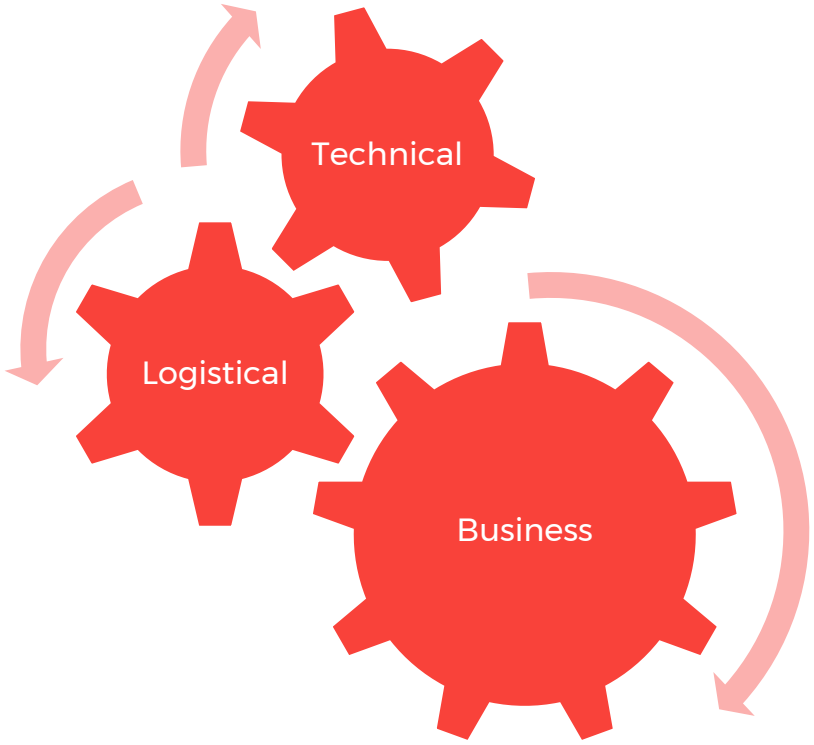
- Develop specifications and drawings for selected retrofit solution
- Obtain pricing

CONSTRUCTION

- Shop Drawings, Submittals
- Mock-ups
- Ongoing Quality Control

Real Estate Market Forces

- Capitalization Rates
- Return on Investment
- Vacancy Rates
- Class categorization
- Lease Terms / Agreements
- Development Pressures
- Green Building Ratings
- Energy Benchmarking



Real Estate Hot Potato

CASE STUDIES

CASE STUDY 1
REPAIR

Case Study 1 – REPAIR

Project History	
Date of construction:	Early c1980s
Enclosure system:	Aluminum-framed curtain wall Minimal thermal break Sheet membrane stack joint
Vision units:	6mm clear outer lite Reflective low-e on surface #2 12mm air-filled cavity with aluminum spacer 6mm clear inner lite Fully captured
Spandrels:	Insulated metal back pan Stainless steel composite panel cladding
Service history (pre 2006):	Delaminating panel skins identified c1995 Retrofit fasteners installed to secure panel skins c1999 Retrofit fasteners failing and panel skin deformation Low rate of IGU failure.

Case Study 1 – REPAIR

KEY FINDINGS

- Loose fasteners
- Lack of redundancy
- Retrofit fasteners failing
- Movement restricted

Good news: framing, IGUs, back pans, and insulation were serviceable.

Case Study 1 – REPAIR

OPTIONS ANALYSIS

- MAINTAIN
  - *Re-secure existing system and install new fasteners where missing*
  - *Remove retrofit fasteners, seal defunct holes, and install new fasteners to reinstate the design intent (i.e. allow differential movement)*
- SELECTIVELY REPLACE
  - *Replace cladding with similar looking metal panels (not including IGUs)*
- FULLY RENEW
  - *Replace cladding with similar looking metal panels and replace the solar reflective IGUs with optically clearer IGUs while maintaining necessary solar control*
- Re-Clad:
  - *Replace the curtain wall system with new*

Study included thermal performance, energy performance, comparative daylight analysis, and schematic 3-D renderings.

Case Study 1 – REPAIR

Attribute	Option 1	Option 2	Option 3	Option 4
Risk Mitigation	Low	Moderate	High	High
Tenant Disruption	Low	Moderate	Moderate	Significant
Aesthetic Benefit	Low	Moderate	High	High
Maintenance Requirements	High	Moderate	Low	Low
Implementation	Rapid	Rapid	Phased	Phased
Daylight Improvement	None	None	Significant	Significant
Thermal Improvement	None	Low	Low	Low
Energy Savings	None	Low	Low	Low
Service Life * Excluding IGUs ** mid-life IGU replacement	1a: 3-5 yrs 1b: 5-8 yrs	20-30 yrs *	20-30 yrs	40+ yrs **
Capital Cost (Estimated)	1a: $300K 1b: $2M	$15M	$25M	$38M
Ongoing / Future Costs (Estimated)	1. $20K / yr for inspection 2. $2.5M/yr for 6 years for IGU replacement 3. $15M for future recladding	$2.5M / yr for 6 years for IGU replacement	None planned for 20 years	None planned for 20 years

CASE STUDY 2
RENEWAL

Case Study 2 – RENEW

Project History	
Date of construction:	Tower 1: Mid c1960s Tower 2: Late c1970s
Enclosure system:	Aluminum-framed curtain wall Minimal thermal break Back-pan deflection interface at stack joint
Vision units:	6mm grey-tinted outer lite 12mm air-filled cavity with aluminum spacer 6mm clear inner lite Fully captured
Spandrels:	Insulated metal back pan 3mm aluminum cladding panel
Service history (pre 2012):	Water infiltration High rate of IGU failure Localized panel deterioration (failed clips)

Case Study 2 – RENEW

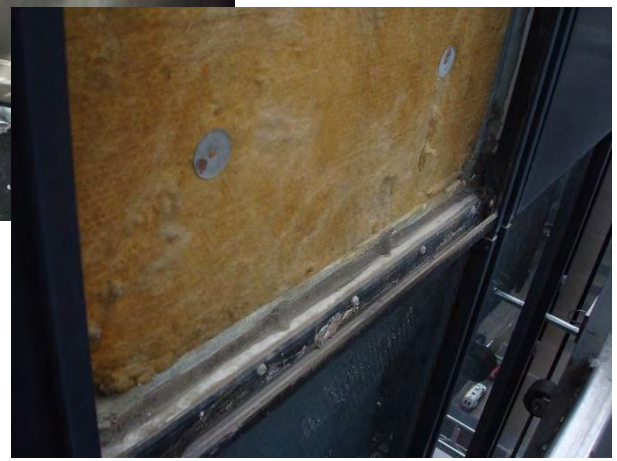
KEY FINDINGS

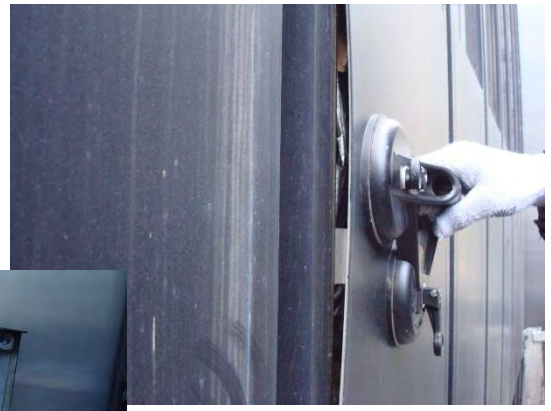
Tower 1:

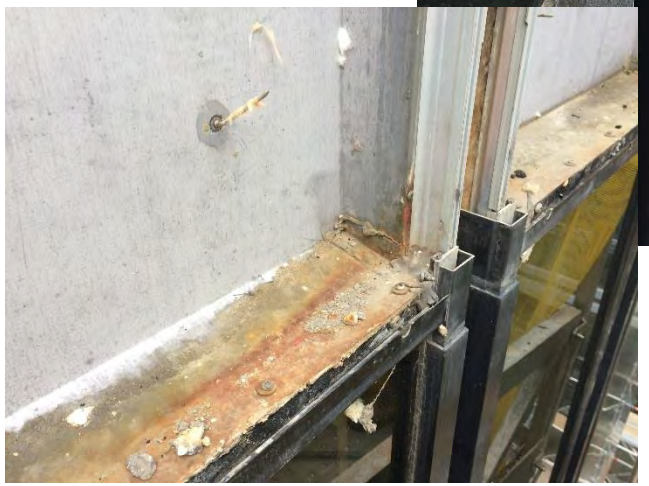
- Sporadic retrofit fasteners
- Loose clips
- Failed clips
- Backpan corrosion
- Water infiltration
- 30% IGU failure
- 10-year IGU remaining life

Tower 2:

- All of the above
- Backpans serviceable







Case Study 2 – RENEW

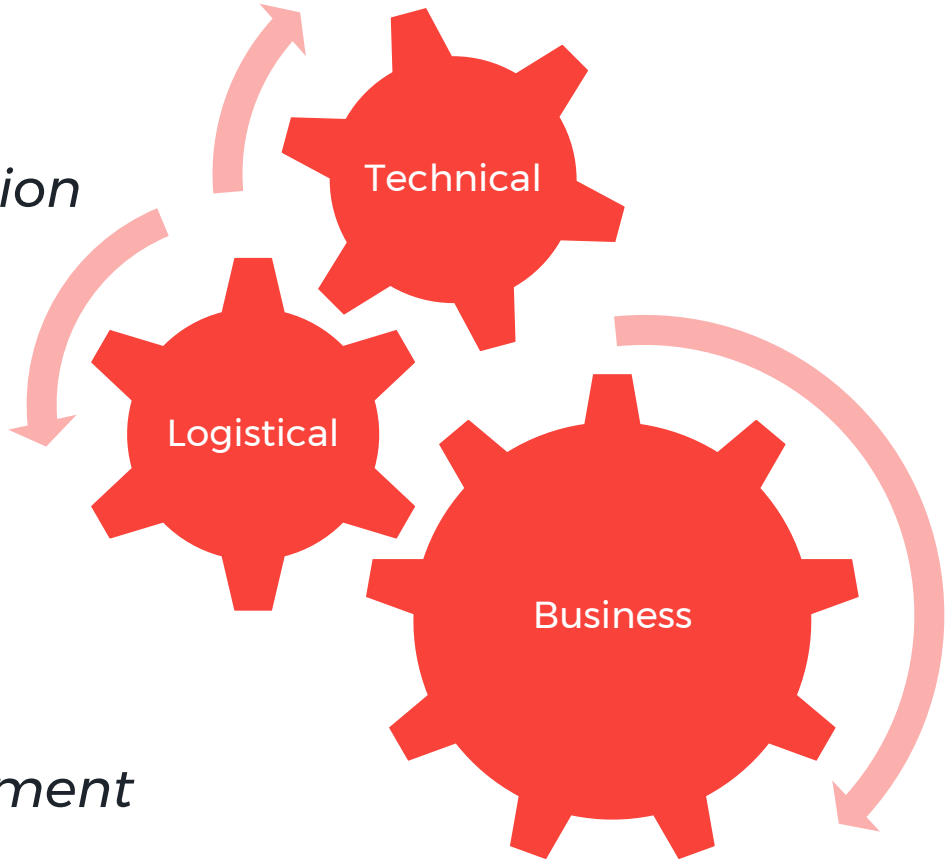
TECHNICAL & BUSINESS EVALUATION

- Technical Evaluation
  - *Survey existing systems*
  - *Assess transition details*
  - *Evaluate embedded anchorage*
  - *Evaluate framing capacity*
  - *Model wind loads*
  - *Test designated substances*
- Business Evaluation
  - *Analyze finances*
  - *Assess vacancy*
  - *Evaluate lease term renewals*
  - *Review maintenance costs & tenant satisfaction*
  - *Understand market pressures*

Case Study 2 – RENEW

PROJECT IMPLEMENTATION

- Design Concepts and Pricing
  - *Confirm pricing*
  - *Design a technically feasible solution*
  - *Vet potential contractors*
  - *Construct mock-ups*
  - *Get consensus*
- Construction & Logistics
  - *Negotiation – scope is king*
  - *Ownership of existing conditions*
  - *Procurement model*
  - *Communication & client management*



CASE STUDY 3
INFLECTION POINT

Case study 3 – INFLECTION POINT

Project History	
Date of construction:	Tower 1: Early c1960s Tower 2: Early c1970s
Enclosure system:	Aluminum-framed curtain wall Localized precast cladding on Tower 1
Vision units:	6mm clear outer lite 12mm air-filled cavity with aluminum spacer 6mm clear inner lite Fully captured
Spandrels:	Single lite, back painted spandrel glazing Fully captured Tower 1: insulation adhered to spandrel glazing Tower 2: insulated backpan assembly
Service history:	Face sealing

Case Study 3 – INFLECTION POINT

KEY FINDINGS

Tower 1

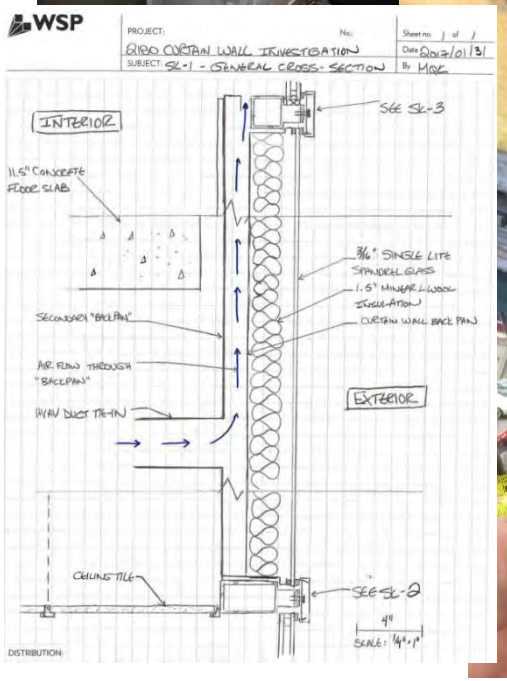
- face-sealed
- blocked drainage
- spandrel breakage
- no backpans
- IGUs serviceable

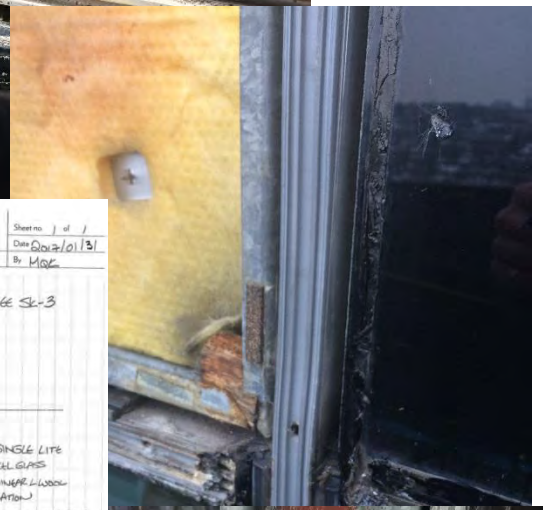
Tower 2

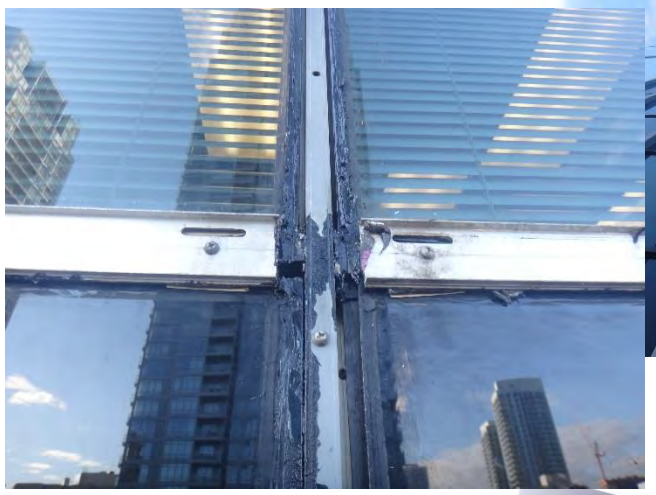
- As above and….
- water infiltration
- air leakage
- weather seal failure

Co-operative work:

Vertical expansion







SUMMARY

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Katiescucina.com

Kraftcanada.com

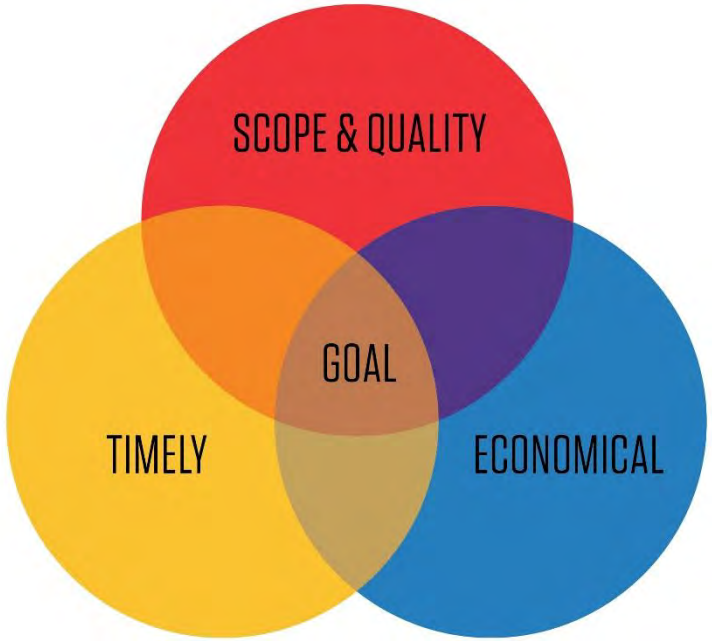
Vancouverisawesome.com

Summary

- Prioritize
  - *Integrate projects to meet short-term and long-term needs/goals*
  - *Phase projects if needed*
- Understand
  - *Clients drivers and goals. Tailor project accordingly*
- Prepare / Implement
  - *Plan, due diligence, design, and quality control*
  - *Identify / communicate potential risks (design & construction)*
  - *Minimize variables for construction phase, achieve Client's goals*
- Maximize Opportunities
  - *Beyond Façade - Implement other potential retrofits*
  - *M&E Re-Commissioning (energy payback)*
  - *Expansion / revitalization*

A NEW PARADIGM

berkonomics.com HEINLEY



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Money Time Experience Diplomacy Communication

EVERY EXISTING BUILDING IS A POTENTIAL FAÇADE RENEWAL CASE STUDY

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Scott R. Armstrong
Senior Façade Specialist,
Building Sciences, WSP
Toronto, Ontario
416-640-5456
scott.r.armstrong@wsp.com