CIIX - Standardized Input, Methodology & Output

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Infrastructure Finance - Unmet Demand, Frustrated Supply

- There is a demand for infrastructure funding – but projects are unfunded,
  - Too small, no comparability, governments have scaled back funding and so applications have become more competitive
- There is a supply of funds – ESG investors want to invest but,
  - Too much work to evaluate, projects are heterogeneous, and so transaction costs are high

Canadian Impact infrastructure Exchange

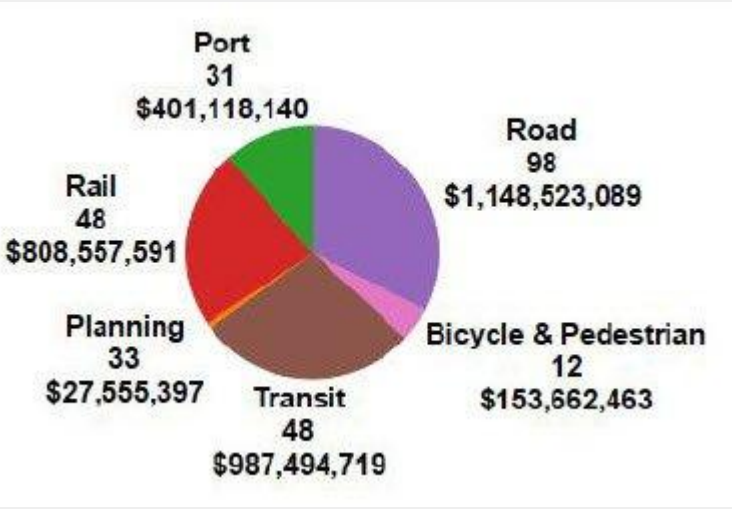
- For trade there must be trust
- Standardization engenders trust, allows for people to design to standard, automation, lowers transaction cost, and enables bundling
- CIIX proposes to deliver:
  - a common set of metrics to value the economic, social and environmental benefits
  - a means of understanding the risk involved
  - a forum for investors and project sponsors to exchange information and find investment and funding opportunities

How to Give ESG Investors Information, Trust and Give Impact Investments Scale?

- Standardize methodology – quantify, monetize and compare sustainability with CBA
- Standardize data going into analysis
- Engage stakeholders – show multiple perspectives. Answers to: “what’s in it for me?”
- Explicitly account for risk

Standardization Example - TIGER

- Since 2009, U.S. Congress has dedicated more than $4.1 billion for six rounds to fund projects.
- The TIGER program enables DOT to examine a broad array of projects on their merits and public benefits.
- This helps ensure that taxpayers are getting the highest value for every dollar invested.



- Merit-based grants given to projects of different infrastructure type with different benefits, beneficiaries in different locations

Standardized Methodology?

Long-Term Outcome	Types of Societal Benefits
Livability	Land Use Changes that reduce VMT Accessibility Property Value Increases
Economic Competiveness	Travel Time Savings Operating Cost Savings
Safety	Prevented Accidents (property damage), Injuries, and Fatalities
State of Good Repair	Long-Term Replacement Maintenance & Repair Savings Reduced VMT from not closing bridges.
Environmental Sustainability	Environmental Benefits from Reduced Emissions

Types of Societal Benefits

Travel time savings can result from transportation improvements whose purpose is to expand capacity or improve state of good repair. Where this is the case, applicants should clearly demonstrate the derivation of the travel time savings to the affected population. If travel time savings vary over time, the applicant must clearly show savings by year. The applicant must also be careful to estimate savings solely from the project funded by the requested grant, and not from other related projects not funded by the requested grant. Once the applicant generates its estimate of hours saved, it should apply the Department's guidance on the value of time to those estimates (*http://ostpxweb.dot.gov/policy/reports.htm*) to monetize them for both business and non-business travelers.

Standardized Inputs?

<table>
<tr><th>Cost/Benefit Category</th><th>Recommended Monetized Value(s)</th><th>Reference and Notes</th></tr>
<tr>
<td>Value of Emissions</td>
<td>
<table>
<tr><th>Emission Type</th><th>$ / short ton ($2010)</th><th>$ / metric ton ($2010)</th></tr>
<tr><td>Carbon dioxide (CO_2)</td><td>(varies)*</td><td>(varies)*</td></tr>
<tr><td>Volatile Organic Compounds (VOCs)</td><td>$1,700</td><td>$1,874</td></tr>
<tr><td>Nitrogen oxides (NOx)</td><td>$6,700</td><td>$7,385</td></tr>
<tr><td>Particulate matter (PM)</td><td>$306,500</td><td>$337,858</td></tr>
<tr><td>Sulfur dioxide (SOx)</td><td>$39,600</td><td>$43,651</td></tr>
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* See “Social Cost of Carbon (3%)” values below.
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<td>
Corporate Average Fuel Economy for MY2017-MY2025 Passenger Cars and Light Trucks (August 2012), page 922, Table VIII-16, "Economic Values Used for Benefits Computations (2010 dollars)" http://www.nhtsa.gov/staticfiles/rulemaking/pdf/cafe/FRIA_2017-2025.pdf

NOTE:
Emissions units are frequently reported as “tons” throughout documents such as the CAFE rulemaking referenced above. There is a distinction between short tons, long tons, and metric tons, however. Carbon dioxide emissions (as reported in the SCC guidance and elsewhere) are typically reported in metric tons, whereas emissions for VOCs, NOx, PMs, and SOx are measured in short tons. The English “long ton” is not used in these tabulations. A short ton is 2000 lbs., while a metric ton is approximately 2,205 lbs., and a long ton is 2,240 lbs.
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Choose/Prioritize Across Scale, Type?

Urban/Rural		(All)		
Type	**Sum**	**Average**	**Min.**	**Max.**
Planning	$27,555,397	$835,012	$85,000	$2,800,000
Regional Planning	$7,933,533	$991,692	$210,000	$2,500,000
Passenger Rail	$12,669,963	$ 6,334,982	$200,000	$12,469,963
Maritime	$74,241,904	$10,605,986	$1,101,904	$20,000,000
Road	$1,369,638,817	$10,870,149	$125,000	$49,480,000
Freight Rail	$54,469,652	$10,893,930	$2,800,000	$25,000,000
Bicycle and Pedestrian	$209,545,163	$12,326,186	$100,000	$25,000,000
Port	$401,118,140	$12,939,295	$1,300,000	$30,000,000
Rail	$808,557,591	$16,844,950	$1,400,000	$105,000,000
Transit	$1,145,243,260	$17,619,127	$300,000	$83,000,000
Total/Average	**$ 4,110,973,419**	**$12,020,390**	**$85,000**	**$105,000,000**

Standards

- CBA's methodology, input data, and outputs have been standardized. Examples come from U.S., E.U., Canada, and Australia.
- Risk analysis and meta-analyses mean that uncertain or controversial inputs can be used.
- And, multiple account CBA allows for an understanding of all stakeholders' perspectives.

CIIX – Common Valuation for Comparison & Bundling

- Standardize input, methodology and output

- Deconstruct project value into risk-adjusted benefits & costs by sectors
  - Common monetary value
  - Adjusted for risk
  - Value to different groups or sectors

- Enable evaluation of different projects and aggregation into tranches or portfolios that meet ESG or risk-return objectives

CIIX – Standardized Valuation

- There are standards* that can be used to provide metrics the impact investment community
- Using these standards, automation of the methodology and data can reduce the cost of evaluation
- Application of standard to projects can be done by AEC community

* Multiple account CBA with risk analysis. Also BIM and Envision.

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