



## **Sources and Methods: Capital Investment in Infrastructure**

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# Sources and Methods: Capital Investment in Infrastructure

## 1. Introduction

Infrastructure, or what is commonly referred to as public infrastructure, is often defined by its contribution to the economy and the public good: how it supports economic growth, enhances quality of life and ensures national security. Data on infrastructure is therefore of great importance for public policy and economic research. In an effort to address data gaps related to capital investment in infrastructure, Statistics Canada, in collaboration with Infrastructure Canada, developed the expanded Annual Capital and Repair Expenditures Survey (CAPEX)<sup>1</sup> starting with the 2018 reference year. Statistics Canada defines infrastructure as:

“The physical structures and systems that support the production of goods and services and their delivery to and consumption by governments, businesses and citizens.”<sup>2</sup>

Although the CAPEX program provides estimates of investments by industry and type of asset, this classification did not provide sufficient information to delineate spending on certain assets by purpose. For example, it was impossible to determine if investments by the local, municipal and regional public administration industries to acquire service building assets were for road transportation infrastructure, for public transit infrastructure, or to support another function altogether.

In order to provide policymakers, researchers, economists and other users the information required to study investments in various types of infrastructure, the expanded CAPEX questionnaire collects capital and repair expenditures according to the function they support. In addition, the expanded questionnaire collects information on the funding of capital expenditures related to government grants and contributions, by level of government.

This report provides an overview of data sources and methods used to develop new estimates of capital investment in infrastructure. It also contains information concerning the comparability of the new capital expenditures series with alternative data sources.

## 2. Data sources and methods

Data on capital and repair expenditures in infrastructure are collected annually from spring to fall for the last completed fiscal year as part of CAPEX’s actual survey. The Institut de la statistique du Québec collects data from government departments and crown corporations in the province of Québec.

The target population for the measurement of infrastructure capital and repair expenditures comprises all business and government entities operating in Canada that own or operate infrastructure as defined above. Infrastructure is defined by its role in the Canadian economy – a supportive function – and, as such, the socio-economic objective of the tangible assets are important in determining the scope of infrastructure. For the purposes of CAPEX, infrastructure encompasses a set of tangible assets that serve a set of functions as listed in Appendix A.

In order to determine the target population, Statistics Canada identified industries, such as public administration and utilities, and performed an analysis of the units that historically invested in assets associated with those functions. Data from Canadian Government Finance Statistics on the Canadian Classification of Functions of Government (CCOFOG) were also used in the analysis.<sup>3</sup>

Other data sources and methodology are as described in the [Annual Capital and Repair Expenditures Survey: Actual, Preliminary Actual and Intentions](#).

1. Statistics Canada. No date. [Annual Capital and Repair Expenditures Survey: Actual, Preliminary Actual and Intentions \(CAPEX\)](#). Last updated February 26, 2020.

2. Statistics Canada. No date. [Infrastructure Economic Account](#). Last updated 2018. Statistics Canada Catalogue no. 13-607-x. Ottawa, Ontario.

3. Statistics Canada. No date. [Canadian Government Finance Statistics](#). Last updated November 19, 2019.

### 3. Comparability

#### 1. Capital expenditures, non-residential tangible assets

Although the new series on capital investment in infrastructure are produced from the same source as the existing capital expenditures series, some differences exist in the value of capital expenditures being reported.

- **Used Assets.** One of the main uses of the existing capital expenditures series is to produce capital stock. As such, outlays for used Canadian assets are excluded since they constitute a transfer of assets within Canada and have no effect on the aggregates of our domestic inventory. However, the acquisition of used Canadian assets are not excluded for the purpose of measuring capital expenditures in infrastructure.
- **Residential assets.** Capital investment in infrastructure from CAPEX *includes* certain residential assets as they relate to infrastructure (affordable rental housing for example).
- **Target population.** As described above, the target population is a subset of the total CAPEX population defined by the functions relating to infrastructure. For example, investments in highways, roads and streets, under the transportation engineering infrastructure category (Table 34-10-0039-01 *Capital expenditures, non-residential tangible assets, by industry and type of asset*) may include private roads built on mine sites for the purpose of hauling ore from the mine to the mill. However, for the purpose of this series on investment in infrastructure, the mining of mineral resources function is excluded from the target population and thus investments by these enterprises in highways, roads and streets would be excluded in the aggregates presented in tables 34-10-0280 and 34-10-0281.

#### 2. Infrastructure Economic Accounts

The infrastructure economic accounts are organized using a statistical framework consistent with the Canadian system of national accounts, the Canadian government finance statistics program and Canada's balance of payments. Therefore, the differences outlined above with the Capital expenditures on non-residential tangible assets series also exist for investment used within the Infrastructure Economic Accounts as these align with the concept of investment flows in capital stock (exclude used assets) and gross fixed capital formation (GFCF).<sup>2</sup>

Beyond those relating to investment in infrastructure, there are other differences between CAPEX data and GFCF. Although the concepts are similar and CAPEX is used as a data source, GFCF is broader in scope with a larger asset boundary.<sup>4</sup>

Similarly, investment data on infrastructure from CAPEX and from the Infrastructure Economic Accounts share similar concepts but provide different perspectives. The expanded CAPEX questionnaire was implemented after the release of the Infrastructure Economic Accounts. The function of an asset reported by respondents may differ from the function attributed to that asset in the Infrastructure Economic Accounts.

For example, highways, roads and streets may be reported for the function of electricity if a road was built to service a power plant. However, in the Infrastructure Economic Accounts all highway and road structures and networks are associated to the function of transportation.

Moreover, all investments in an asset identified as an infrastructure asset in the Infrastructure Economic Accounts will be included, whereas CAPEX only includes investments for the target population as defined above. Assets used for other functions such as for manufacturing or other commercial purposes are excluded.

There are also differences in the asset inclusions for both programs. As mentioned, CAPEX does not limit the assets to non-residential assets and includes affordable rental housing. Another important difference is the inclusion of natural gas distribution assets in infrastructure for CAPEX. Furthermore, by collecting expenditures by function, CAPEX includes assets that otherwise would not be directly related to infrastructure. An example is the inclusion of industrial depots and service buildings; these are included in the target population since they support infrastructure-related functions such as public transit or road transport.

4. Statistics Canada. No date. [Reconciliation of capital expenditure and gross fixed capital formation](#). Last updated November 27, 2015. Statistics Canada Catalogue no. 13-605-x. Ottawa, Ontario.

## 4. Appendix A

### Asset Groupings

- Affordable rental housing.
- Transportation engineering infrastructure. Includes highway and road structures and networks, bridges, tunnels, passenger terminals, runways, railway lines and tracks (including light rails), parking lots and parking garages, oil and gas transmission pipelines, and other transportation infrastructure.
- Marine infrastructure. Includes canals and waterways, seaports and harbours, marinas, and other marine infrastructure.
- Waterworks infrastructure. Includes water filtration plants, water treatment equipment, and other water supply infrastructure (aqueducts mains, trunk and distribution mains, water reservoirs, water wells, and fill stations).
- Sewage infrastructure. Includes sewage treatment plants and other sewage collection and disposal infrastructure.
- Public security facilities (prisons, police stations, fire stations, detention centres, and court houses).
- Health facilities. Includes hospitals, nursing homes with exclusive use of kitchen and bathroom facilities, nursing homes without exclusive use of kitchen and bathroom facilities, and clinics and other medical facilities.
- Education facilities. Includes schools, student residences without exclusive use of kitchen and bathroom facilities, and student residences with exclusive use of kitchen and bathroom facilities.
- Culture and Recreation. Includes indoor recreational facilities, outdoor recreational facilities, sports facilities with spectator capacity, libraries, museums, theatres and halls, and historical sites.
- Electric power infrastructure. Includes hydro-electric power plants, thermal power plants, nuclear power plants, nuclear reactor steam supply systems, wind and solar farms, turbines and turbine generators, power transmission networks, and power distribution networks.
- Other fuel and energy infrastructure (natural gas distribution mains, bulk storage and pumping sites).
- Communications networks. Includes telecommunications transmission support structures (transmission towers, broadcasting and telecom antennae and relay towers), telecommunications transmission cables and lines, and telecommunications transmission optical fibre.
- Environmental protection infrastructure. Includes waste disposal facilities, flood protection infrastructure, pollution abatement and control infrastructure, and site remediation.
- Other infrastructure. Includes industrial depots and service buildings, other industrial buildings, industrial laboratories and research and development centres, daycare centres, other collective dwellings, other institutional buildings, and other engineering works.
- Transportation machinery and equipment. Includes buses, locomotives, railway rolling stock, and rapid transit equipment.

### Functions of expenditures

- Transportation
  - ▶ Road transport. Includes expenditures on road transport systems and facilities.
  - ▶ Public transit. Includes expenditures on local and suburban mass passenger transit systems. These establishments operate over fixed routes and schedules, and allow passengers to pay on a per-trip basis.
  - ▶ Other transport not elsewhere classified. Includes expenditures on inland, coastal and ocean water, railway, air and other transport systems and facilities.
- Community amenities and environmental protection
  - ▶ Water supply. Includes expenditures on water supply systems.

- ▶ Storm water management. Includes expenditures on rain or storm water management systems.
- ▶ Waste water management. Includes expenditures on sewage systems and waste water treatment.
- ▶ Waste management. Includes expenditures on waste collection, treatment and disposal systems.
- ▶ Other environmental protection not elsewhere classified. Includes expenditures related to environmental protection (air and climate protection, soil and groundwater protection, noise and vibration abatement, protection against radiation, protection of fauna and flora species and habitats, and the protection of landscapes for their aesthetic values).
- Defense, public order and safety. Includes expenditures on police services, fire protection services, prisons, law courts, other places for the detention or rehabilitation of criminals, military or civil defence affairs and services, and of foreign military aid.
- Health and social protection
  - ▶ Hospital services. Includes expenditures on hospitals, medical centres, maternity centres, nursing homes and convalescent homes.
  - ▶ Health except hospital services. Includes expenditures on medical, dental and paramedical services delivered to outpatients by practitioners and auxiliaries.
  - ▶ Housing. Includes expenditures on social protection in the form of benefits in kind to help households meet the cost of housing.
  - ▶ Social protection other than housing. Includes expenditures related to sickness and disability, old age, and family and children.
- Education. Includes expenditures on all levels of education (primary, secondary and post-secondary), on vocational training, on cultural development, and the provision of subsidiary services to education (transportation, food, lodging, medical and dental care and related subsidiary services for students).
- Recreation, culture and religion. Includes expenditures for the provision of sporting, recreational and cultural services, and the operation or support of broadcasting and publishing services.
- Economic Affairs, except Transport
  - ▶ Electricity. Includes expenditures on the generation, transmission and distribution of electricity.
  - ▶ Fuel and energy, except electricity. Includes expenditures on fuel and energy affairs and services, except electricity.
  - ▶ Communications. Includes expenditures on communication systems (postal, telephone, telegraph, and wireless and satellite communication systems).

The functions used are based upon the classification of the functions of government (COFOG), an official United-Nations-approved classification system developed by the OECD.