CROW ADVISORY

Household costs of infrastructure model guide

Effects of sector-level infrastructure investment programs for household budgets

Model technical manual
Prepared by Crow Advisory
For Te Waihanga / New Zealand Infrastructure Commission
September 2025

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1. Purpose of this work

This technical report explains key inputs, assumptions, and workings for the spreadsheet model titled *Household Impacts of Infrastructure Investment* ('the model'), and has been prepared for Te Waihanga, the New Zealand Infrastructure Commission.

The purpose of the model is to provide a consistent and transparent tool for estimating the financial impacts of sector-level infrastructure investment under the infrastructure needs analysis (INA) and current investment intentions (CII) forecasts for New Zealand household budgets. It supports evidence-based decision making by quantifying potential household burdens under different scenarios.

It will address two key questions:

- What are the impacts on costs faced by an average household, and by different types of households, of a given investment programme?
- How would household impacts differ depending upon how the programme is funded, e.g. through different types of infrastructure user charges or through taxes?

2. Overview

The Household Impacts Model ("the model") is a scenario-based financial modelling tool. It quantifies changes in household costs under different infrastructural investment forecasts, enabling users to assess cost impacts across household types, broken down by:

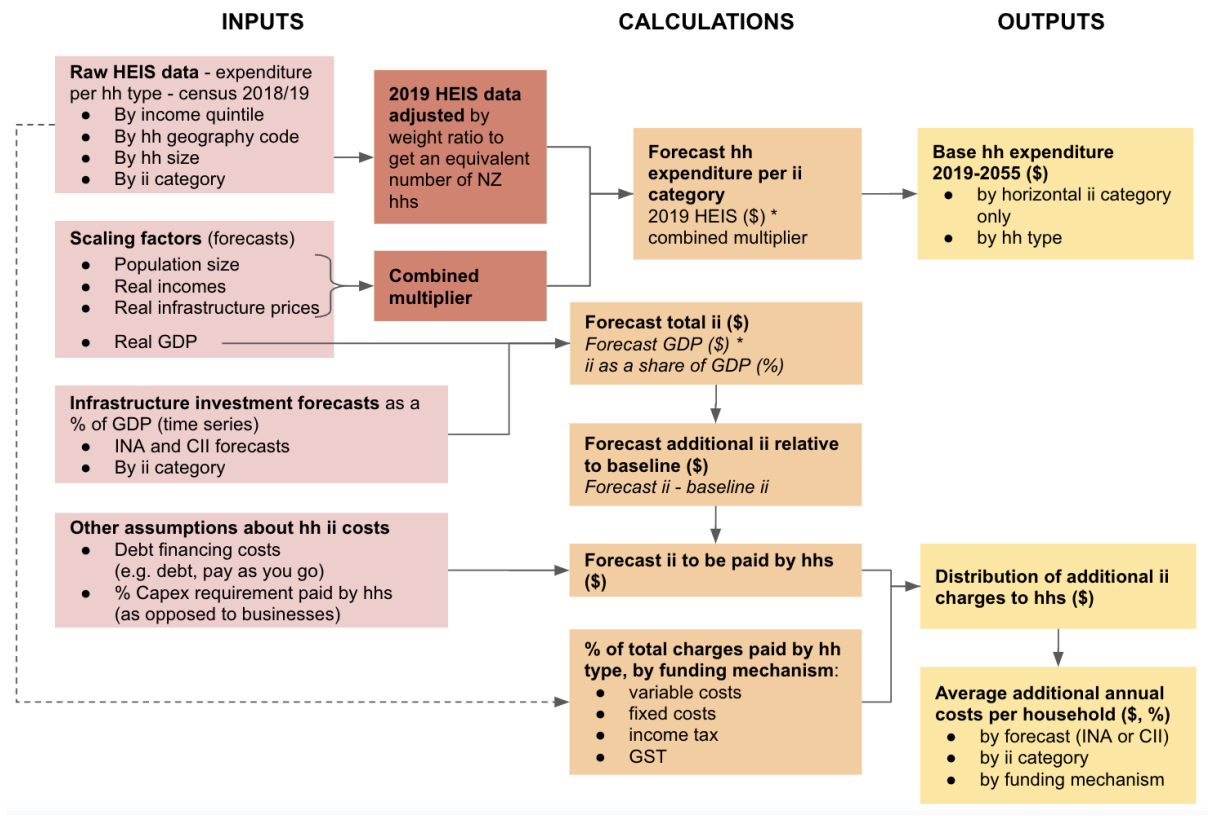
- Time period
- Expenditure type
- Household demographics
- Funding mechanism chosen to fund the investment
- Infrastructure forecast: INA or CII

The model is a time series covering 2019 - 2055, using 2019 as a base year to align with the key source dataset, the 'Household Expenditure on Infrastructure Services' (HEIS) database, which is derived from Statistics New Zealand's Household Economic Survey via the Integrated Data Infrastructure database and made available by Te Waihanga. The model takes additional inputs from Te Waihanga's INA and CII forecasts to simulate investment programmes over time. It translates sector-level investment data into household-level cost impacts by applying assumptions about funding mechanisms—such as taxes, rates, or user charges—and about demographics—such as population growth, income distribution, or geographic distribution.

The model produces outputs at both the average and disaggregated "household group" level (with groups defined by income quintile, rural/urban geographies, and household size), highlighting the distributional effects of investment decisions. All outputs are adjusted for inflation using a 'real incomes' scaling factor, which accounts for changes in the purchasing power of household incomes over time.

The model is structured to support transparency, consistency, and replicability, and to enable evidence-based policy decisions about infrastructure planning and funding. A high-level illustration of the model structure is shown in the model map below.

Figure 1: Model overview map



Note: hh = household, ii = infrastructure investment. Source: Crow Advisory.

This technical guide is designed to support user navigation and understanding of the model and underlying calculations. It is written for users familiar with economic modelling using MS Excel. The following section introduces the user interface, after which the rest of the guide outlines inputs, calculations, outputs, limitations, and areas for future development.

3. User interface

The model is designed to be easily used by technical analysts at Te Waihanga. The two main ways that users can interact with the model are through drop-down menus or manual entry in designated cells.

Drop-down menus are found in the dashboard, and throughout the model in relevant sheets in the 'calcs' and 'outputs' sections. There are five drop down menus in total, which are as follows:

- Analysis focus year (2035 is the default)
- Horizontal expenditure/ investment category to focus on
- Funding mechanism chosen to fund horizontal investment
- Vertical expenditure/ investment category to focus on
- Funding mechanism chosen to fund vertical investment

The input cells that users can manually edit are found in the 'general' inputs tab. These include:

- Proportion of road spending allocated to bus infrastructure
- Funding requirement paid by households (as opposed to businesses)
- Toggle for whether to finance capex using debt (smooths household expenditure burden over time)
- Debt financing rates by sector
- Financing thresholds (over which all capex will be financed) by sector
- Debt financing average loan tenor (all sectors)

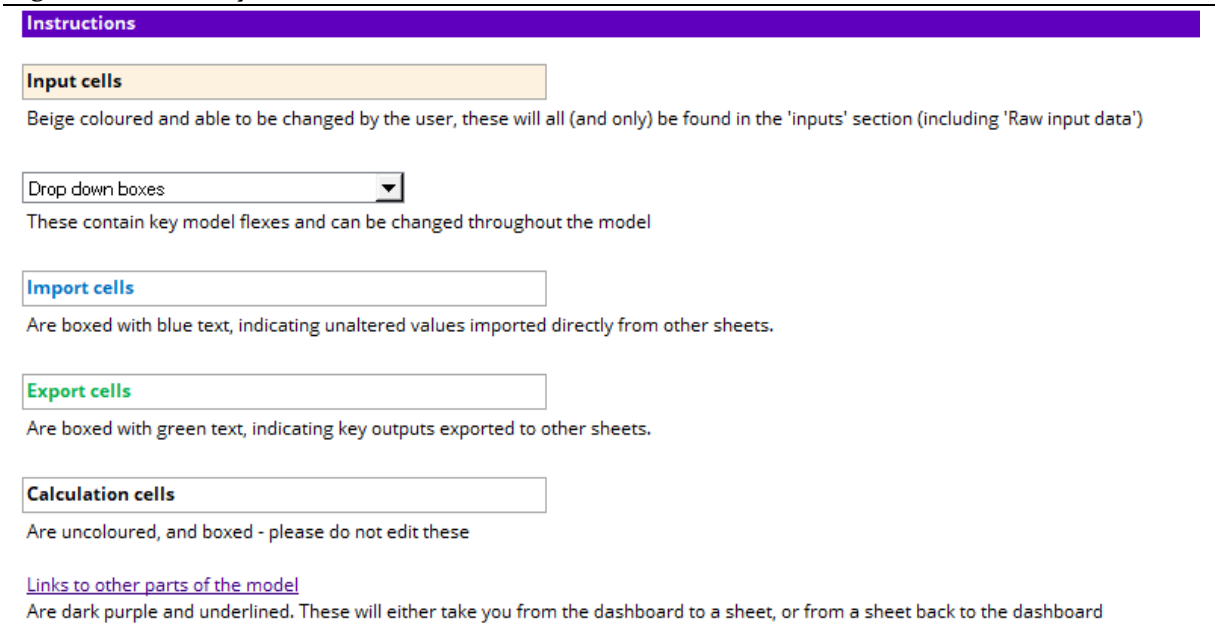
These variables are described in further detail in the following section.

The inputs section also contains key datasets and parameters that define the analysis. These can be updated when new data or forecasts become available. However, under normal use, we recommend leaving them unchanged to maintain consistency. If a user needs to modify the underlying inputs or calculations, we recommend creating a copy of the model first, so that the original settings can be easily referenced or restored.

Core calculations are grouped together in five sheets, while outputs are separately visualised through summary tables and charts that update automatically based on user inputs.

Different cell types are colour-coded in the model to enhance ease of navigation and usability, as explained by the following key located in the model 'Dashboard' sheet.

Figure 2: Model key



Source: Crow Advisory.

4. Inputs

Economic assumptions

Provided by Te Waihanga

GDP inputs

- Historical GDP data from NZIER Data1851 and SNZ
- GDP per capita projection based on Treasury LTFM (2021 base)
    - Used to generate a 'real incomes' scaling factor - which accounts for changes in the purchasing power of household incomes over time, removing the effects of inflation.

Population inputs

- Historical population data from NZIER Data1851 and SNZ
- Population projection from SNZ median projections (2022 base).

Inflation adjustment inputs

- 'Real infrastructure prices' scaling factor - which accounts for how the inflation-adjusted (real) cost of delivering infrastructure is expected to evolve over time.

HEIS data

Provided by Te Waihanga

- The HEIS dataset provides household-level expenditure data across 11 infrastructure-related categories, with each category further divided into fixed and variable components. These categories are detailed in Figure 3.
- Households are classified by income quintile, household size, and rural or urban location type (see Appendix Afor a further explanation of these classifications).
- The base year for the HEIS data used in the model is 2019.

INA and CII forecasts of government infrastructure spending as a % of GDP

Provided by Te Waihanga

The model includes two forecasts (INA and CII) of central government infrastructure spending across 13 categories, split into horizontal and vertical sectors, as defined in the INA and CII data frameworks developed by Te Waihanga. These categories are listed in Figure 3.

For each infrastructure category, the model incorporates:

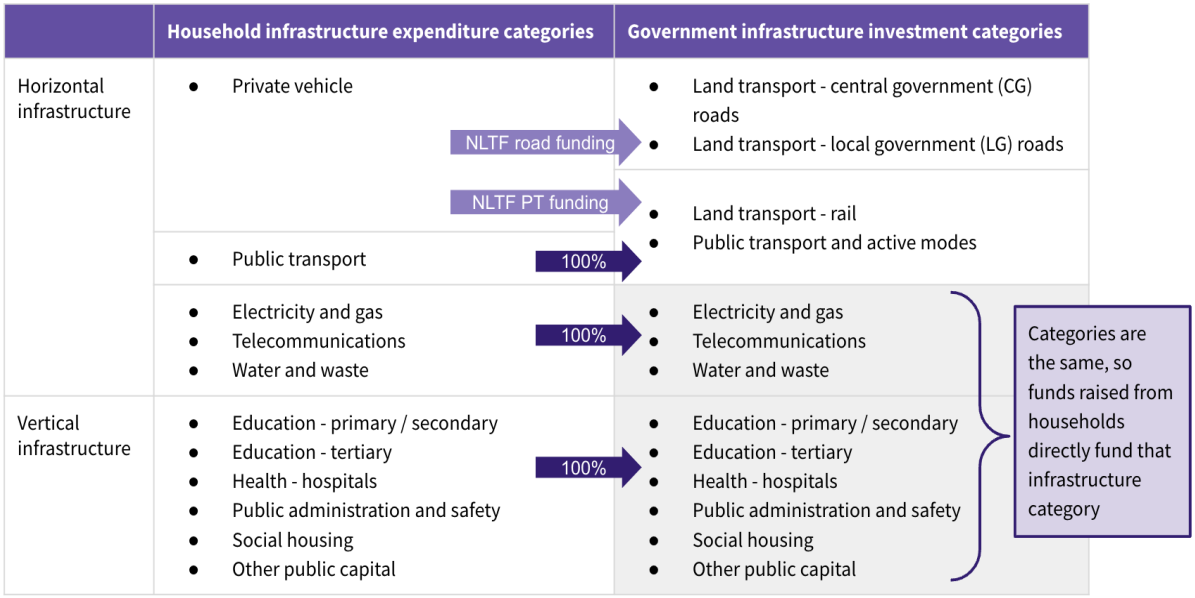
- Historical capital investment in these sectors, as a % of GDP.
- Two projection scenarios of government infrastructure spending, also as a % of GDP, drawn from:
    - INA modelling, which covers a 30-year period
    - CII modelling, which covers a 10-year period.

Note: As Te Waihanga has not provided a CII forecast, the model as delivered uses placeholder values, set at 120% of the corresponding INA forecast.

Since the CII forecast will only span 10 years, we suggest holding the final year's % of GDP constant beyond the 10-year horizon.

The following table shows how the 11 household infrastructure expenditure categories align with the 13 infrastructure investment categories used in the model.

Figure 3: Mapping of HEIS categories and government infrastructure investment categories



Note: for an explanation of NLTF funding, see 'portion of road spending allocated to public transport', below.

Usage levels

Assumptions from previous work commissioned by Te Waihanga

For water and telecommunications, the HEIS data shows no breakdown between fixed and variable expenditure, although our understanding of these services implies such a breakdown is possible. To model this, we use estimated usage levels for the different household types derived from a previous study commissioned by Te Waihanga, titled 'Approaches to Infrastructure Pricing Study: Part 3 - Equity Exploration', the usage levels and assumptions used are outlined in Appendix B. This study relied on data from published sources, the HEIS dataset, and additional assumptions to estimate fixed and variable usage levels for each household group.

This approach better reflects how households incur costs for these services and enables a more accurate representation of household cost impacts for water and telecommunications.

Portion of road spending allocated to public transport

Flexible input - to be manually entered by user

The National Land Transport Fund (NLTF) is predominantly funded by road users through fuel excise duties and road user charges - i.e. costs captured under household 'private vehicle' expenditure. These funds are then used to support a broad range of land transport

infrastructure, including public transport services. This funding structure is explained by NZTA in their 2024 report titled *'Increasing the private share of public transport operating expenditure'.*

To align the HEIS household expenditure categories and the government investment categories in the model, we need to estimate what share of public transport infrastructure is effectively paid for by road users. The model includes a flexible input where users can specify this portion, allowing adjustment based on their preferred assumption or updated evidence.

Funding requirement paid by households

Flexible input - to be manually entered by user

Some infrastructure investment costs will initially be borne by businesses rather than directly by households. However, since the focus of the model is on household-level impacts, costs paid by businesses are excluded from the model.

The model includes a flexible input that allows users to set the proportion of infrastructure costs directly attributed to households. Any remaining share - assumed to be paid by businesses - is excluded from the results. Users can choose to include some or all of these business costs back into the analysis, to reflect the possibility that businesses may pass these costs on to households indirectly by charging higher prices for goods and services.

Finance charges

Flexible input - to be manually entered by user

The model includes functionality to smooth expenditures over time by financing capex with amortized loans. Loan interest rates and the dollar threshold over which added capex is loan-financed can be set for each sector. Loan tenor must be set as fixed for all sectors (this is to avoid unhelpful complexity). The model then calculates the debt service over time, which is added to any unfinanced capex in each year before flowing on to calculate household cost effects. Debt service is broken down by interest and principal portions for each sector.

This mechanism reflects that while some infrastructure investments will be paid for up front on a pay-as-you-go basis, others will be debt-financed, delaying expenditure but also incurring additional financing costs over time.

In the current version of the model, amortized loans are the only financing mechanism modelled, and financing can only be applied to all capex over a given threshold. The model does not force loans to be paid in full before the end of the modelled period in 2055, so applying this option will usually mean that sectors hold outstanding debt in that year which is not reflected in annual household cost burdens.

5. Calculations

Scaling of the HEIS dataset

The model uses key variables from the 2019 HEIS dataset and projects them forward to 2055 for each household type, applying economic assumptions such as population growth and changes in real income over time.

Because HEIS is a sample survey, the data must be scaled to reflect the full population of New Zealand households. To achieve this, the model applies a "household weight ratio" across all HEIS-based forecasts. This includes:

- Household expenditure forecasts (e.g. fixed and variable costs for private vehicles)
- General forecasts (e.g. household income, goods and services tax (GST) paid), except for 'number of households', which is already population-representative
- All household categories used in the model

The household weight ratio is derived from two HEIS variables:

- Weighted count households: the estimated number of households in the full population for each category
- Count households: the number of households sampled in the HEIS survey for that category

By applying this ratio, the model scales the sample data to provide nationally representative estimates of household-level cost impacts.

General forecasts

The model applies the following methods to generate forecasts for the key variables below.

Table 5.1: HEIS data forecasting methods

Forecast	HEIS variable	Scaling factors used	Formula used *(for each year)*
Number of households **unweighted*	Weighted count households	Population size	Weighted count households 2019 x population size scaling factor
Household income after tax **weighted*	Sum income after tax weighted	Population size Real incomes	Sum income after tax weighted 2019 x population size scaling factor x real incomes scaling factor
Gross income **weighted*	Sum income gross weighted	Population size Real incomes	Sum income gross weighted 2019 x population size scaling factor x real incomes scaling factor
GST paid **weighted*	Sum expenditure non-capital after tax weighted	Population size Real incomes	Sum expenditure non-capital after tax weighted 2019 x population size scaling factor x real incomes scaling factor

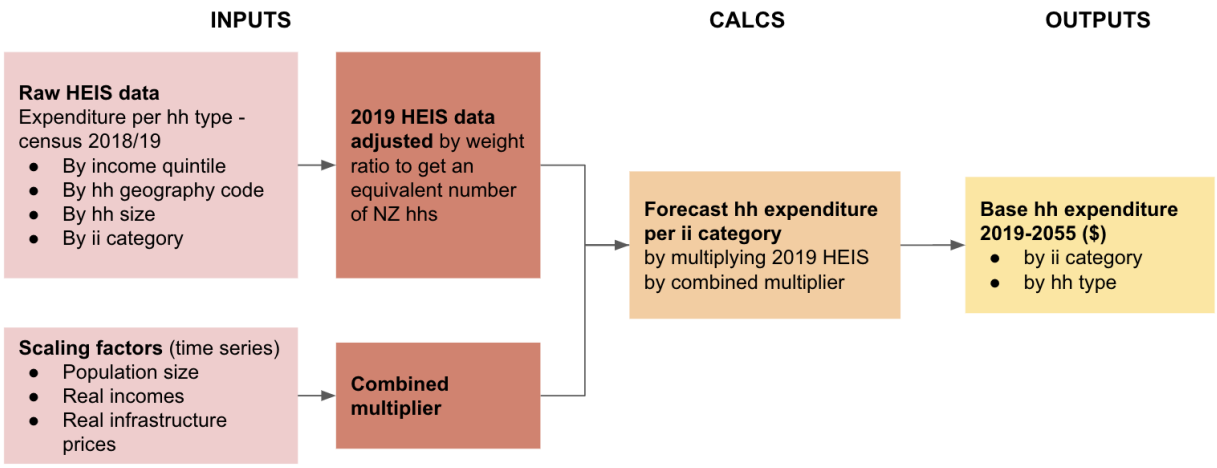
**Note: General forecasts are weighted using the household weight ratio described above, except for 'number of households', which is already population-representative.*

Base household spending on horizontal infrastructure

The model estimates base household spending on each horizontal infrastructure category (already adjusted using the household weight ratio) by applying a combined multiplier. This multiplier reflects the cumulative impact of key economic scaling factors provided by Te Waihanga:

- population growth
- GDP growth
- changes to real incomes, which accounts for changes in the purchasing power of household incomes over time (% change compared with 2019 baseline)
- changes in real infrastructure prices, which accounts for how the inflation-adjusted (real) cost of delivering infrastructure is expected to evolve over time (% change compared with 2019 baseline).

Figure 4: Household expenditure model map



Note: hh = household, ii = infrastructure investment. Source: Crow Advisory.

We cannot calculate base household expenditure on vertical (social) infrastructure, as households do not directly pay for the use of social infrastructure through fixed or variable costs.

Government infrastructure spending forecast

The model forecasts changes in government infrastructure spending across each investment category by comparing INA and CII projections to the 2019 baseline. These changes—whether increases or reductions—are then distributed and passed onto households.

The model forecasts changes in government infrastructure spending across each investment category by comparing INA and CII projections to the 2019 baseline. These changes—whether increases or reductions—are then distributed and passed onto households.

The '*funding requirement paid by households*' can be adjusted to reflect that a share of government infrastructure investment may be borne by businesses, instead of households. and may also be adjusted to account for '*finance charges*', depending on user-defined inputs (see Section 4 for a further explanation of these inputs).

Distribution of infrastructure spending to households, using different funding mechanisms

When government infrastructure spending deviates from baseline levels (either increases or decreases), this results in corresponding changes to household costs.

How these costs are distributed across household types depends on different households' propensity to use or access infrastructure networks, as well as the chosen funding mechanism used to fund the investment:

- User charges (horizontal categories only)
  - Variable costs
  - Fixed costs
- Income tax
- GST

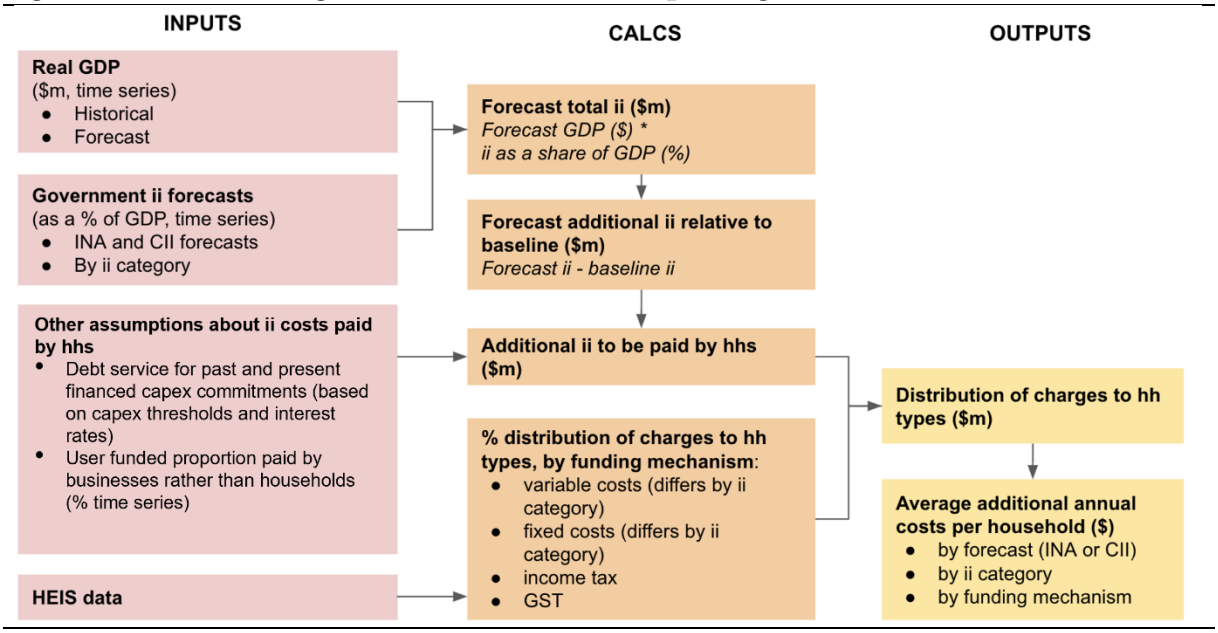
The model assumes a single funding mechanism is used to cover the full cost of the investment. For vertical (social) infrastructure, we exclude the fixed and variable user charges mechanisms, as households do not typically pay directly for these services through user charges. Instead, vertical categories are modelled using only income tax and GST.

However, for horizontal categories, fixed or variable charges are distributed based on each household group's share of relevant expenditure category in the 2019 HEIS dataset. Note that for waste & water and telecommunications, the model allocates charges based on estimated usage levels, which provides a more realistic estimate of how costs are incurred by households for these services (see '*Usage levels',* under Section 4).

The model uses the following formula to allocate infrastructure spending:

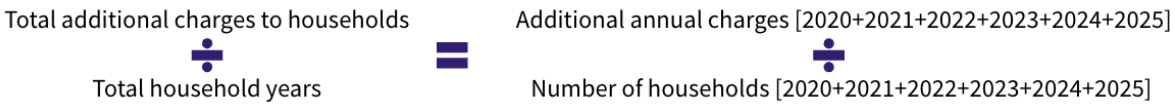
Forecast government investment to allocate × (Base year charges paid by household type ÷ Total base year charges paid)

Figure 5: Distribution of government infrastructure spending onto households



Source: Crow Advisory

Average additional annual charges per household is calculated as follows for each household type:



6. Outputs

The model generates a range of outputs which are structured to support both high-level summary analysis and detailed distributional insights.

The model's primary function is to quantify expected increases in charges, taxes, or rates required to meet changes in investment levels, broken down by:

- infrastructure investment category
- funding mechanism
- household type - summarised by income quintile, and rural/urban status
- forecast - INA or CII.

Outputs update dynamically as users adjust inputs and assumptions, enabling flexible scenario testing and exploration of trade-offs. Results are presented through pre-formatted tables and charts to support interpretation and communication.

Key outputs are described in the following subsections.

Average household cost impacts

Sheets: Horizontal > 'Time series' and Vertical > 'Timeseries_'

- Annual average household costs by infrastructure category
- Comparisons of INA vs CII scenario impacts
- Differences across funding mechanisms (user charges, income tax, GST)
- Cost impacts are presented as:
    - Added annual per household cost
    - Incremental % of household income
    - Total % of household income
- Note: Base household expenditure is calculated for horizontal categories only, as households do not directly pay for vertical (social) infrastructure.

Distributional analysis

Sheets: all outputs sheets

- Cost impacts disaggregated by household type, including:
    - Income quintile
    - Household size and composition
    - Urban vs rural location.

Time series outputs

Sheets: 'By time period', Horizontal > 'Time series' and Vertical > 'Timeseries_'

- Annual cost projections to 2055 for each household group
- Summary of average annual costs over defined time periods:
  - Single chosen year
  - 2020–2025, 2026–2035, 2036–2045, 2046–2055
- Comparison of long-term trends across investment and funding scenarios.

Funding mechanism comparisons

Sheets: Horizontal > 'Charts' and Vertical > 'Charts_'

- Side-by-side comparisons showing how costs vary across funding mechanisms for different household groups
- Highlights relative equity or regressivity of each mechanism.

Te Waihanga outputs

Te Waihanga have also produced a number of outputs which have been appended onto the end of the model.

7. Potential limitations and areas for further development

There are a few limitations to the model which should be acknowledged:

- Proportions of population, income, and expenditure by household groups are assumed constant over time. These proportions may change in practice. For example, the share of population in urban areas may increase over time, or the share of income held by the middle quintiles may decrease over time.
- Outstanding debt in 2055 for sectors using financing is not reflected in HH cost effects, as the remaining debt service will be paid by future households beyond the modelled horizon.
- Placeholder CII forecasts: the model uses placeholder estimates for CII forecasts which should be replaced with actual values when provided.
- No behavioural response: The model assumes household behaviour remains unchanged in response to pricing or tax changes. Incorporating elasticity or behavioural models could enhance accuracy.

Potential areas for further development:

- Integrate actual CII forecasts when available.
- Introduce behavioural modelling to reflect how households might adapt to changes in costs.
- Expand the model to consider mixed funding scenarios (e.g. blended tax and user charge combinations).

Appendix A: HEIS dataset household categories

Households in the HEIS dataset are categorised based on the following factors:

- Income quintile, rated from 1 to 5, where 1 represents the lowest income quintile.
- Household geography code:
  - Small regional centre / Rural: Rural and small regional centres
  - Medium / Large regional centre: Medium and large regional centres
  - Metro, PDQ = 1: Metropolitan households in SA2 population density quintile 1
  - Metro, PDQ = 2 & 3: Metropolitan households in SA2 population density quintiles 2 or 3
  - Metro, PDQ = 4 & 5: Metropolitan households in SA2 population density quintiles 4 or 5
- Household size:
  - One or two person households
  - Three or more person households

All possible combinations of these categories result in 47 distinct household classifications, as shown below. Our analysis focuses primarily on income quintiles and the rural/urban split.

Table A.1: HEIS household categories

HEIS household code	Income quintile	Rural or urban
1Small reg. centre / RuralOne or two	1	Rural
1Small reg. centre / RuralThree or more	1	Rural
1Med. / large reg. centreOne or two	1	Urban
1Med. / large reg. centreThree or more	1	Urban
1Metro and PDQ=1All	1	Urban
1Metro and PDQ=2 & 3All	1	Urban
1Metro and PDQ=4 & 5One or two	1	Urban
1Metro and PDQ=4 & 5Three or more	1	Urban
2Small reg. centre / RuralOne or two	2	Rural
2Small reg. centre / RuralThree or more	2	Rural
2Med. / large reg. centreOne or two	2	Urban
2Med. / large reg. centreThree or more	2	Urban
2Metro and PDQ=1All	2	Urban
2Metro and PDQ=2 & 3One or two	2	Urban
2Metro and PDQ=2 & 3Three or more	2	Urban
2Metro and PDQ=4 & 5One or two	2	Urban
2Metro and PDQ=4 & 5Three or more	2	Urban
3Small reg. centre / RuralOne or two	3	Rural
3Small reg. centre / RuralThree or more	3	Rural
3Med. / large reg. centreOne or two	3	Urban
3Med. / large reg. centreThree or more	3	Urban
3Metro and PDQ=1One or two	3	Urban
3Metro and PDQ=1Three or more	3	Urban
3Metro and PDQ=2 & 3One or two	3	Urban
3Metro and PDQ=2 & 3Three or more	3	Urban
3Metro and PDQ=4 & 5One or two	3	Urban
3Metro and PDQ=4 & 5Three or more	3	Urban
4Small reg. centre / RuralOne or two	4	Rural
4Small reg. centre / RuralThree or more	4	Rural
4Med. / large reg. centreOne or two	4	Urban
4Med. / large reg. centreThree or more	4	Urban
4Metro and PDQ=1One or two	4	Urban
4Metro and PDQ=1Three or more	4	Urban
4Metro and PDQ=2 & 3One or two	4	Urban
4Metro and PDQ=2 & 3Three or more	4	Urban
4Metro and PDQ=4 & 5One or two	4	Urban
4Metro and PDQ=4 & 5Three or more	4	Urban
5Small reg. centre / RuralOne or two	5	Rural
5Small reg. centre / RuralThree or more	5	Rural
5Med. / large reg. centreOne or two	5	Urban
5Med. / large reg. centreThree or more	5	Urban
5Metro and PDQ=1One or two	5	Urban
5Metro and PDQ=1Three or more	5	Urban
5Metro and PDQ=2 & 3One or two	5	Urban
5Metro and PDQ=2 & 3Three or more	5	Urban
5Metro and PDQ=4 & 5One or two	5	Urban
5Metro and PDQ=4 & 5Three or more	5	Urban

Appendix B: PwC equity report findings and assumptions

In order to analyse the equity effects of the cost of water and telecommunications, we use estimated usage levels for the different household types derived from a previous study commissioned by Te Waihanga, titled 'Approaches to Infrastructure Pricing Study: Part 3 - Equity Exploration'. This study relied on data from published sources, the HEIS dataset, and additional assumptions to estimate fixed and variable usage levels for each household group. The assumptions used in this analysis for water and telecommunications are outlined below.

Water

- An average water usage based on household geography was assigned using the average daily usage per person for a proxy water entity. For the five categories of household geography the average water usage was assigned based on a water utility provider in a region where average population densities approximate the household geography category. Table B1 shows the water entities assigned to the differing household geography groups.
- The average water use was then adjusted for differing income groups using a multiplier for each income quintile. The middle-income group received a multiplier of 1. Based on estimations of income elasticity in the literature, it was assumed a higher income group would use relatively more water than a lower income group, but that this difference will be proportionately less than the difference in income. A household size elasticity of water demand was also used, this assumed that households with more occupants would use more water than smaller households. The multipliers used are displayed in table B3 and the relevant elasticities are in table B2.

Table B.1: Proxy water entities (2021 usage levels)

Household geography	Water entity	Avg. daily usage per person (L)
Small reg. centre / Rural	Kaipara	321
Med. / large reg. centre	New Plymouth	282
Metro and PDQ=1	Tauranga	168
Metro and PDQ=2 & 3	Hamilton	187
Metro and PDQ=4 & 5	Wellington Water	263

Source: Water New Zealand, cited in PwC Equity Report.

Table B.2: Elasticity assumptions and usage multipliers

Elasticity assumptions

Elasticity	Source
Income elasticity of water demand = 0.25	*National Infrastructure Commission (UK). 2017. Economic growth and demand for infrastructure services.*
Household size elasticity of water demand = 0.48	*Sebri, Maamar. 2013. A meta-analysis of residential water demand studies.*

Water usage by income multipliers

Income group	Water usage multiplier
1	0.85
2	0.92
3	1
4	1.09
5	1.32

Water usage by household size example multipliers

Household size	Difference vs mean HH size	HH usage multiplier at 0.48 elasticity
1	-63.4%	0.695
2	-29.6%	0.871
3	9.7%	1.046
4	46.2%	1.222
5	82.8%	1.397

Source: PwC Equity Report.

Telecommunications

- In order to obtain an average telco usage in GBs per household, assumptions had to be made for both mobile usage and fibre usage. Because mobile coverage varies less by geography than fibre coverage, variation in mobile data usage was assigned based on income group. It was assumed that higher income households would have a higher mobile usage than lower income households as higher income households would be more willing to purchase higher cost plans with higher limits or unlimited data usage. The assigned average monthly mobile usage values for each income group are shown in table B5.
- A home broadband plan and associated assumption for average usage was assigned based on both income group and household geography. There were ten home broadband plans available in NZ at the time of collection for our HES data, all with varying average data usages. Households with a low density geography were assigned plans with low speeds and usages due to limited accessibility. Low income households were also assigned plans with a lower usage and cost. A combination of these two factors was then used to determine each household's expected fibre usage. The breakdown of these categories and how they were assigned is shown below.
- A household's expected fibre and mobile usage were then combined to derive a total telco usage for each household in our analysis.

Table B.3: Monthly mobile and fibre usage

Monthly mobile usage by income group

Income group	Mobile usage (GB)
1	0.8
2	2.5
3	6
4	8.5
5	18

Monthly fibre usage by plan

Fibre plan	Estimated monthly usage per person (GB)
ADSL (Copper)	50
WISP Fixed wireless	55
4G Fixed wireless	65
VDSL (Copper)	80
Low Earth Orbit Satellite	125
Fibre 100	127
5G Fixed wireless (lightweight)	290
5G Fixed wireless (standard)	550
HFC Max (Cable)	734
Fibre Max	833

Source: PwC Equity Report.

Table B.4: Assigned fibre usage based on household income and geography

Income group	Household geography	Fibre plan assumption	Expected fibre usage (GB)
1	Small reg. centre / Rural	ADSL (Copper)	50
2	Small reg. centre / Rural	ADSL (Copper), VDSL (Copper)	65
3	Small reg. centre / Rural	WISP Fixed wireless	55
4	Small reg. centre / Rural	WISP Fixed wireless, VDSL (Copper)	68
5	Small reg. centre / Rural	Low Earth Orbit Satellite	125
1	Med. / large reg. centre	WISP Fixed wireless, 4G Fixed wireless	60
2	Med. / large reg. centre	4G Fixed wireless, VDSL (Copper)	73
3	Med. / large reg. centre	VDSL (Copper), Fibre 100	104
4	Med. / large reg. centre	Fibre 100	127
5	Med. / large reg. centre	Fibre 100	127
1	Metro and PDQ=1	VDSL (Copper)	80
2	Metro and PDQ=1	VDSL (Copper), Fibre 100	104
3	Metro and PDQ=1	Fibre 100	127
4	Metro and PDQ=1	Fibre 100, Fibre Max	480
5	Metro and PDQ=1	Fibre 100, Fibre Max	480
1	Metro and PDQ=2 & 3	VDSL (Copper)	80
2	Metro and PDQ=2 & 3	VDSL (Copper), Fibre 100	104
3	Metro and PDQ=2 & 3	VDSL (Copper), Fibre 100	104
4	Metro and PDQ=2 & 3	Fibre 100, Fibre Max	480
5	Metro and PDQ=2 & 3	Fibre 100, Fibre Max	480
1	Metro and PDQ=4 & 5	VDSL (Copper)	80
2	Metro and PDQ=4 & 5	VDSL (Copper), Fibre 100	104
3	Metro and PDQ=4 & 5	HFC Max (Cable)	734
4	Metro and PDQ=4 & 5	HFC Max (Cable), Fibre Max	784
5	Metro and PDQ=4 & 5	Fibre Max	833

Source: PwC Equity Report.

The resulting usage-based proportions for each household type are below:

Table B.5: Usage-based expenditure proportions - Water and Telco sectors

HEIS household code	Waters and waste	Telecommunications
1Small reg. centre / RuralOne or two	1.75%	0.19%
1Small reg. centre / RuralThree or more	2.72%	0.46%
1Med. / large reg. centreOne or two	1.53%	0.22%
1Med. / large reg. centreThree or more	2.39%	0.53%
1Metro and PDQ=1All	1.22%	0.45%
1Metro and PDQ=2 & 3All	1.36%	0.45%
1Metro and PDQ=4 & 5One or two	1.43%	0.27%
1Metro and PDQ=4 & 5Three or more	2.23%	0.65%
2Small reg. centre / RuralOne or two	1.89%	0.37%
2Small reg. centre / RuralThree or more	2.95%	0.90%
2Med. / large reg. centreOne or two	1.66%	0.39%
2Med. / large reg. centreThree or more	2.59%	0.94%
2Metro and PDQ=1All	1.32%	0.78%
2Metro and PDQ=2 & 3One or two	1.10%	0.47%
2Metro and PDQ=2 & 3Three or more	1.72%	1.13%
2Metro and PDQ=4 & 5One or two	1.55%	0.47%
2Metro and PDQ=4 & 5Three or more	2.41%	1.13%
3Small reg. centre / RuralOne or two	2.05%	0.64%
3Small reg. centre / RuralThree or more	3.20%	1.53%
3Med. / large reg. centreOne or two	1.80%	0.77%
3Med. / large reg. centreThree or more	2.81%	1.83%
3Metro and PDQ=1One or two	1.07%	0.82%
3Metro and PDQ=1Three or more	1.68%	1.97%
3Metro and PDQ=2 & 3One or two	1.20%	0.77%
3Metro and PDQ=2 & 3Three or more	1.87%	1.83%
3Metro and PDQ=4 & 5One or two	1.68%	2.37%
3Metro and PDQ=4 & 5Three or more	2.62%	5.68%
4Small reg. centre / RuralOne or two	2.24%	0.88%
4Small reg. centre / RuralThree or more	3.49%	2.11%
4Med. / large reg. centreOne or two	1.97%	1.03%
4Med. / large reg. centreThree or more	3.07%	2.47%
4Metro and PDQ=1One or two	1.17%	1.93%
4Metro and PDQ=1Three or more	1.83%	4.63%
4Metro and PDQ=2 & 3One or two	1.30%	1.93%
4Metro and PDQ=2 & 3Three or more	2.03%	4.63%
4Metro and PDQ=4 & 5One or two	1.83%	2.71%
4Metro and PDQ=4 & 5Three or more	2.86%	6.48%
5Small reg. centre / RuralOne or two	2.71%	1.82%
5Small reg. centre / RuralThree or more	4.23%	4.35%
5Med. / large reg. centreOne or two	2.38%	1.82%
5Med. / large reg. centreThree or more	3.71%	4.36%
5Metro and PDQ=1One or two	1.42%	2.72%
5Metro and PDQ=1Three or more	2.21%	6.52%
5Metro and PDQ=2 & 3One or two	1.58%	2.72%
5Metro and PDQ=2 & 3Three or more	2.46%	6.52%
5Metro and PDQ=4 & 5One or two	2.22%	3.63%
5Metro and PDQ=4 & 5Three or more	3.46%	8.68%

Source: Stats NZ IDI extract provided by Te Waihanga. Crow Advisory analysis.