

New Zealand Transport Outlook: Future State

Population and GDP Assumptions

November 2017

Short name

Population and GDP Assumptions

Purpose

These assumptions are used for a single Transport Outlook scenario, including population, GDP, regional GDP, tourism, utilisation of vehicle-sharing services, change in average trip length, and impacts of hypothesised congestion charging in Auckland, Wellington, and Christchurch.

Software used

Excel

For questions and comments:

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Population and GDP Assumptions

1. At a high level, what does this model do?

The Transport Outlook Population and GDP Assumptions provide a set of key assumptions used by other Transport Outlook models, including assumptions about population, GDP, regional GDP, tourism, diversion of private vehicle travel to vehicle-sharing, and impacts of hypothesised congestion charging in Auckland, Wellington, and Christchurch. By keeping all these assumptions together in one file and linking other models to this file, we ensure that all models are using consistent assumptions, and make updating these assumptions easy.

2. Where do I find the model results?

The model consists of a single Excel workbook for each scenario to be modelled. There are five sheets in the workbook.

Population – This sheet shows assumptions about the New Zealand population in three historical years (2012/13, 2013/14, and 2014/15) and projected in five-year increments to 2042/43. There are two results tables at the top of the sheet. One shows only the 2012/13 historical data and projections to 2042/43 in five-year increments, while the other shows all three historical years. The two tables are provided for convenient linking to models that require data in a certain layout; the numbers are the same.

GDP – This sheet shows assumptions about New Zealand's GDP between 1996/97 and 2059/60. There are three sets of results at the top of the sheet. Rows 3-8 shows results for every year; rows 10-14 show results in five-year increments from 2012/13-2014/43; rows 16-20 show results for three historical years (2012/13, 2013/14, 2014/15) and projections in five-year increments to 2042/43. In the medium growth scenarios, the numbers in all three sets of results are the same. In the high-growth scenarios, the annual results in rows 3-8 remain the medium-growth projections, while the results in rows 10-14 and 16-20 have an additional percentage annual growth increment (currently 1%/year) added to make the high-growth projections.

Regional GDP – This sheet shows assumptions about GDP by region. The results are shown in rows 4-21. Results are shown for three historical years (2012/13, 2013/14 and 2014/15) and projections in five-year increments to 2042/43.

Tourism – This sheet shows assumptions about the growth of tourism at a national level. Rows 3-10 show the assumptions on an annual basis. Three measures of tourism are shown: visitor arrivals, visitor days, and visitor spend. Rows 17-20 show the visitor arrivals and visitor days for the historical year 2012/13, as well as projections in five-year increments to 2042/43. Rows 30-33 show the visitor arrivals and visitor days for the historical years 2012/13, 2013/14 and 2014/15, as well as projections in five-year increments to 2042/43. The numbers in all three sets of data are the same.

Other Assumptions – This sheet shows additional transport assumptions. Rows 3-19 show the assumed fraction of household light vehicle travel (light vehicle drivers and light vehicle passengers) diverted to vehicle sharing services. Assumptions are given for the historical years 2012/13, 2013/14

and 2014/15 (all assumed to be zero), as well as projections in five-year increments to 2042/43. Rows 22-38 show the assumptions for diversion of light commercial vehicle travel to vehicle-sharing services in a similar format. Rows 41-57 show an assumed change in average trip length in percentages in a similar format. Rows 60-95 show the assumed impacts of congestion pricing in the Auckland, Wellington, and Canterbury regions. For each region, two rows show the reduction in household light vehicle and commercial light vehicle VKT, respectively, compared with unconstrained levels. Five additional rows for each region show how the assumed percentage of the reduction in light vehicle drivers, light vehicle passengers, and vehicle share passengers are diverted to other modes: additional light vehicle passengers and vehicle share passengers in the remaining light vehicle trips (resulting in increased vehicle occupancy), bus, rail, cycling, and walking. The diversions do not need to sum to 100%; if they sum to less than 100%, the residual reduction is assumed to be a reduction in travel.

3. What are the inputs to this model and where do they come from?

Population - Population projections are based on the subnational population projections by age and sex, 2013(base)-2043 from Statistics New Zealand (<http://nzdotstat.stats.govt.nz/WBOS/Index.aspx?DataSetCode=TABLECODE7517>). In the Base Case and the Staying Close to the Action scenario, these come directly from the 'medium' projection. The Metro-Connected scenario is also based on the 'medium' projection, but with some additional adjustments discussed below. The @Home in Town and Country and Golden Triangle scenarios are based on the 'high' projection, but with some additional adjustments discussed below.

GDP - Total real GDP projections for 2007/08 to 2029/30 are from The Treasury's 2016 Budget and Fiscal Update (BEFU) (www.treasury.govt.nz/government/fiscalstrategy/model). For 2030/31 and beyond, real GDP is based on nominal GDP projections by the Treasury's New Zealand Superannuation Fund Model (www.treasury.govt.nz/government/assets/nzsf/contributionratemodel), with an assumed inflation adjustment of 2% per year, as suggested by the Treasury.

Regional GDP - Historical data on regional GDP in current prices for 2012/13, 2013/14 and 2014/15 is from Statistics New Zealand: www.stats.govt.nz/browse_for_stats/economic_indicators/NationalAccounts/RegionalGDP_HOTPYe_Mar15.aspx. For comparability, historical data on national GDP in current prices for 2012/13, 2013/14, and 2014/15 is from the same source, which differs slightly from the Treasury's numbers in the GDP sheet. This difference is probably because the Stats NZ numbers are for years ending March, while The Treasury's numbers are for fiscal years ending June.

Tourism – historical and projected data on tourism to 2022 comes from MBIE (www.mbie.govt.nz/info-services/sectors-industries/tourism/tourism-research-data/international-tourism-forecasts/2016-2022-forecasts).

Other Assumptions – All data in this sheet are simply assumptions supplied by the modeller. However, there is an additional spreadsheet behind the congestion pricing assumptions in the Staying Close to the Action scenario, which has been peer-reviewed by officials at Auckland Transport and the Greater Wellington Regional Council.

4. How does this model derive its results?

Population – For the Base Case and Staying Close to the Action scenarios, the population projections are taken directly from the Stats NZ ‘medium’ projections. For the other three scenarios, adjustments to the original Stats NZ projections to reflect the assumptions of the scenario are made in this sheet. These are explained in cell A2.

GDP – For the medium-growth scenarios (Base Case, Staying Close to the Action and Metro-Connected), all figures are taken directly from Treasury projections. The only adjustment is the conversion of nominal GDP projections to real GDP projections for 2030/31 and beyond, which are based on an assumed 2% per annum inflation rate. For the high-growth scenarios (Golden Triangle and @Home in Town and Country), an additional percentage increment is added to the assumed growth in real GDP per capita, as shown in cell H1.

Regional GDP – A simple model, contained entirely in this sheet, is used to project regional real GDP. The process works in two stages. First, the real GDP in each region is grown in line with the projected population of the region, a process that implicitly assumes that real GDP/person remains constant over time. Second, this initial projection of GDP in each region for a given year is multiplied by whatever constant forces the sum of all the regional real GDPs to match the projected total New Zealand real GDP in that year. An implication of this modelling approach is that regions that have relatively low or relatively high GDP/person compared with the New Zealand average tend to stay that way.

Tourism – The projections to 2022 come directly from MBIE. However, MBIE does not provide projections beyond 2022. Therefore, we have assumed in the medium-growth scenarios that tourism grows by 3.5% per year to 2025 and 3% per year thereafter. The 3% assumption is the same as the one used by Tim Hazledine in the domestic aviation model that he developed for the Ministry of Transport (refer his paper “Projections of regional air passenger flows in New Zealand 2018-2043”, 18 March 2016, footnote 16), which he argues is very close to actual 2009-2015 growth in visitor arrivals. For the high-growth scenarios, we assume that tourism grows by 4% per year to 2043.

Other Assumptions – These projections are entirely created by the modeller to reflect the assumptions of the scenario.