



FEHR & PEERS

trendlab⁺
SBCTA LRMTP

Introduction

TrendLab+

- Evaluates disruptive forces stemming from socio-demographic changes, new technologies, and Covid-19
- Predicts how disruptive forces affect travel, modal performance and equity
- Accounts for trends such as telecommuting, home deliveries, and health and safety concerns
- Assesses effect emerging technologies such as EVs and AVs

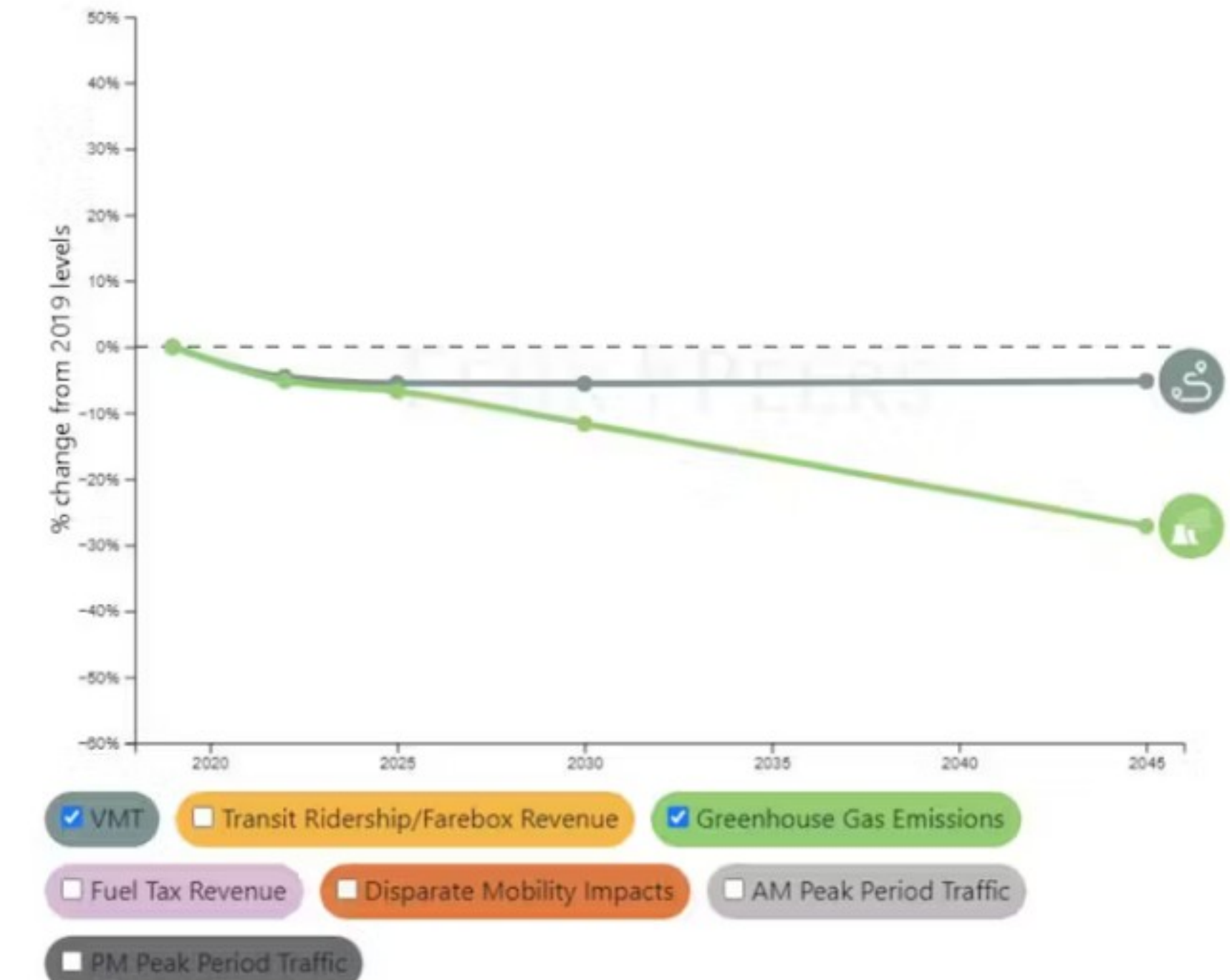
Thematic Conditions

New Status Quo (NSQ) – all trends stabilize at the levels achieved in 2022

Return to Pre-Pandemic (RPP) – trend variables return to the levels and trajectories they held in 2019

Transformative Trends (TT) – trend levels accelerate at greater rates than in 2020 and 2021

See Your Forecasts



Select a Trend

Social Economy

- **Social and Recreational Travel**
- **Labor Force Participation**
- **Migration and Land Use**

Quality of Life and Public Health

- **Telecommuting**
- **E-Commerce**
- **Car Ownership**
- **Health and Safety Concerns**

Technology

- **Electric Vehicle Adoption**
- **Autonomous Vehicles**



Social Economy

- 1) Social and Recreational Travel
- 2) Labor Force Participation
- 3) Migration and Land Use





Social Economy

Social and Recreational Travel

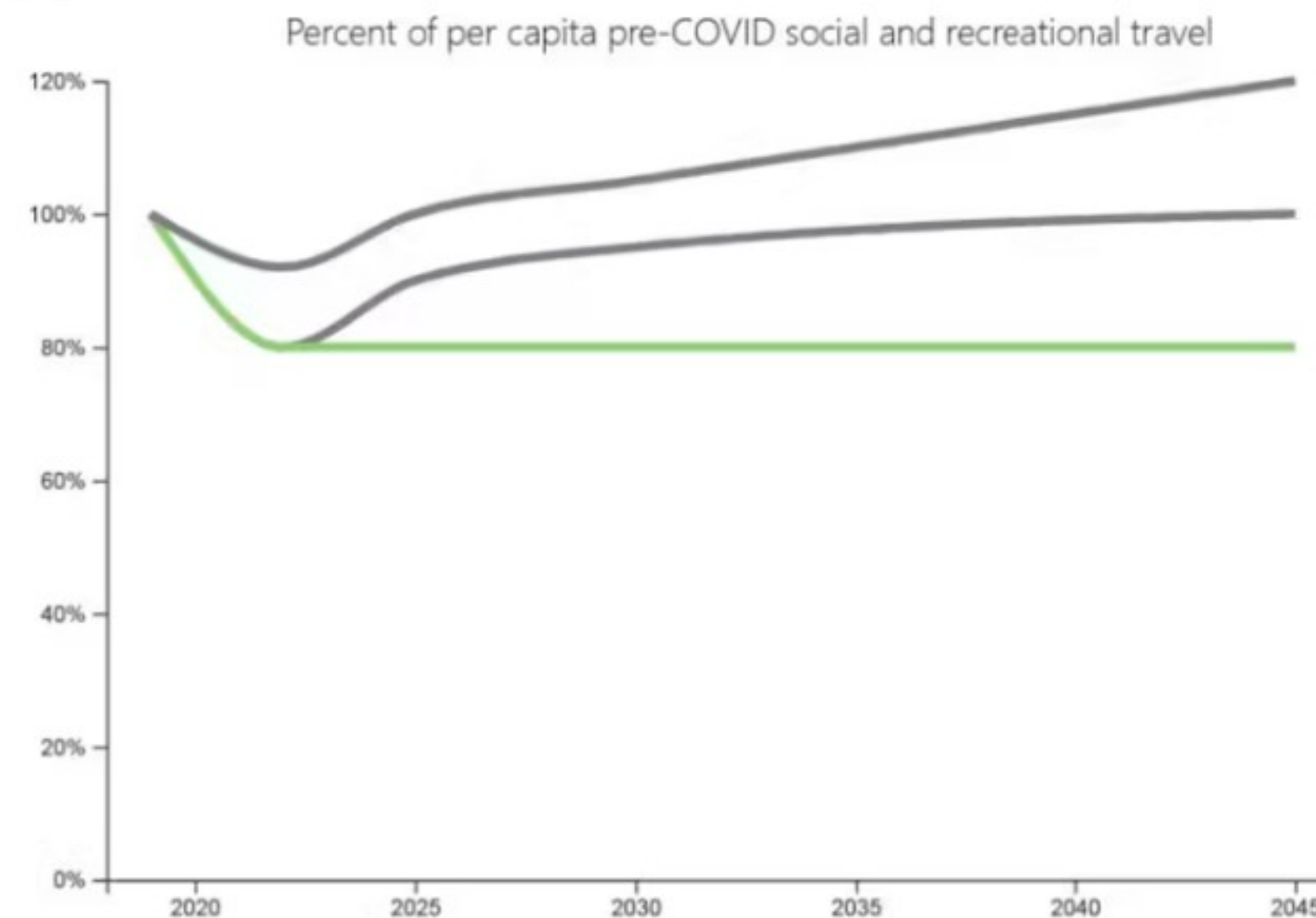
Return to Pre-Pandemic

New Status Quo (default)

Transformative Trends

Make Your Prediction

- ☐ Return to Pre-Pandemic
- ☒ New Status Quo (default)
- ☐ Transformative Trends



Social networking increasingly substitutes for personal interactions, and modern technologies have demonstrated that they can acceptably support large group gatherings. Internet media is supplanting business travel and personal visits for shopping, entertainment, and other forms of interaction. Historically, social and recreational travel represented over 35% of all daily vehicle miles. TrendLab+ users can choose among different future trends for social and recreational travel, assuming lower or higher levels of on-line interactions continue to suppress in-person interactions.



Social Economy

Social and Recreational Travel

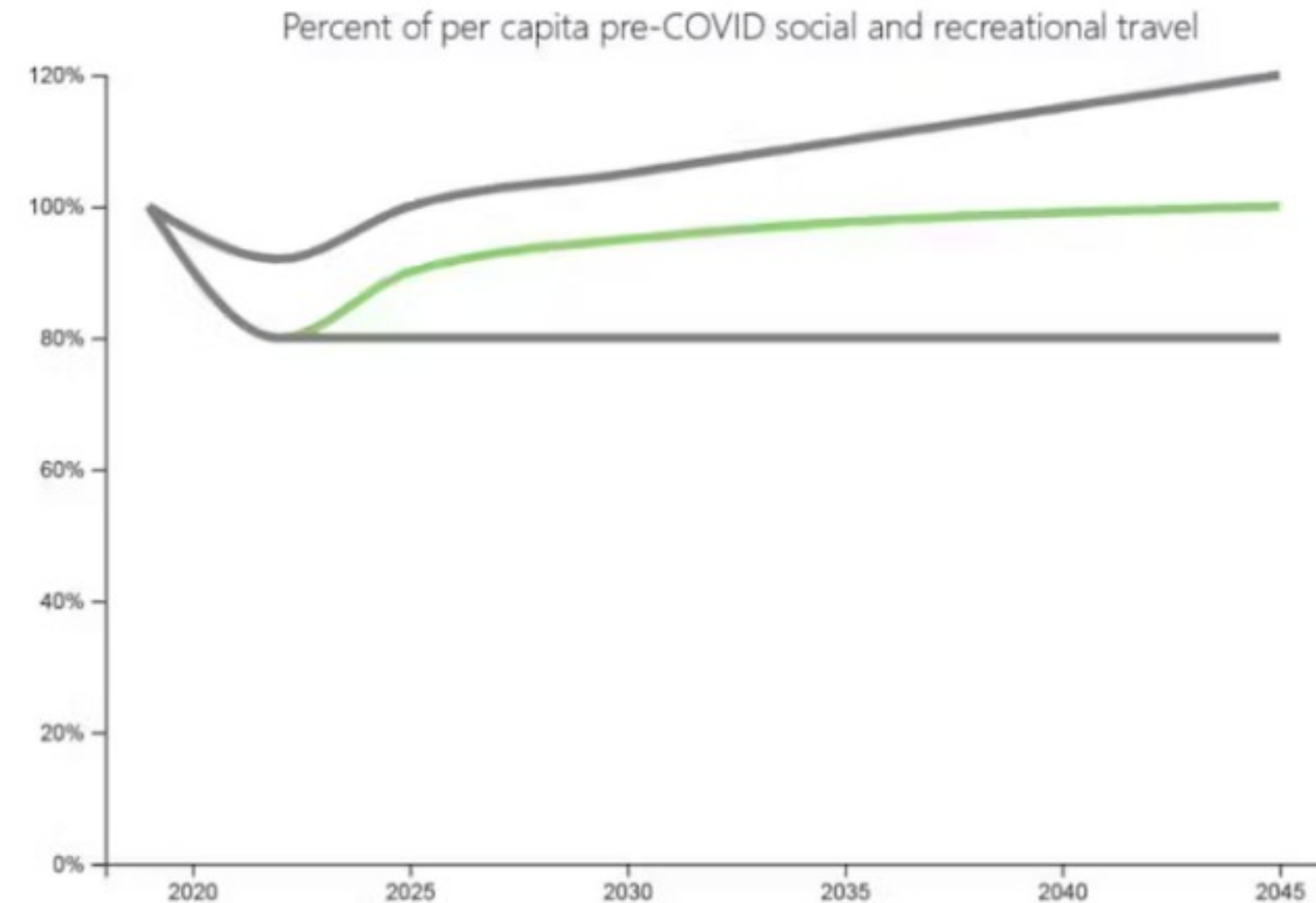
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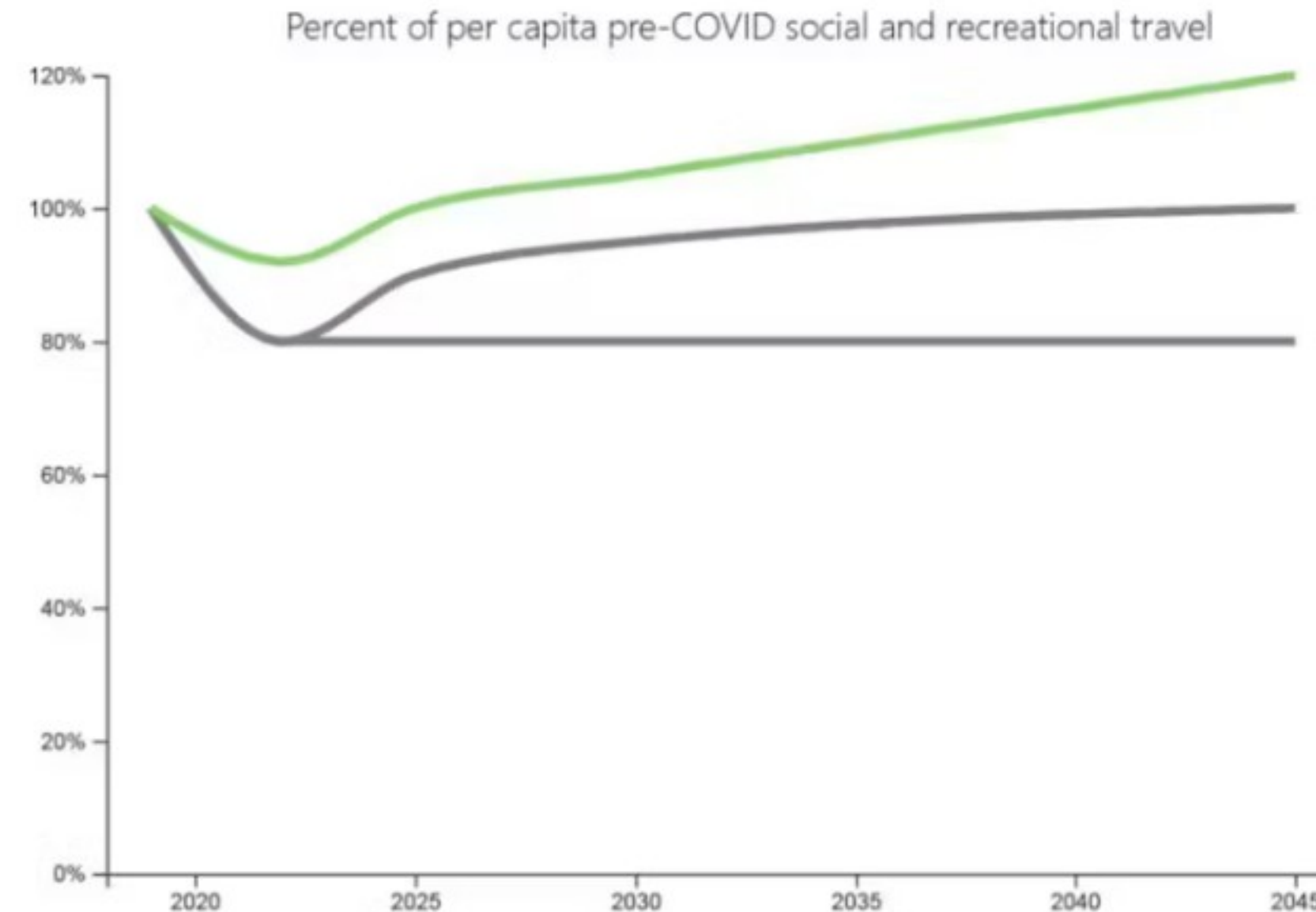
Return to Pre-Pandemic

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Transformative Trends

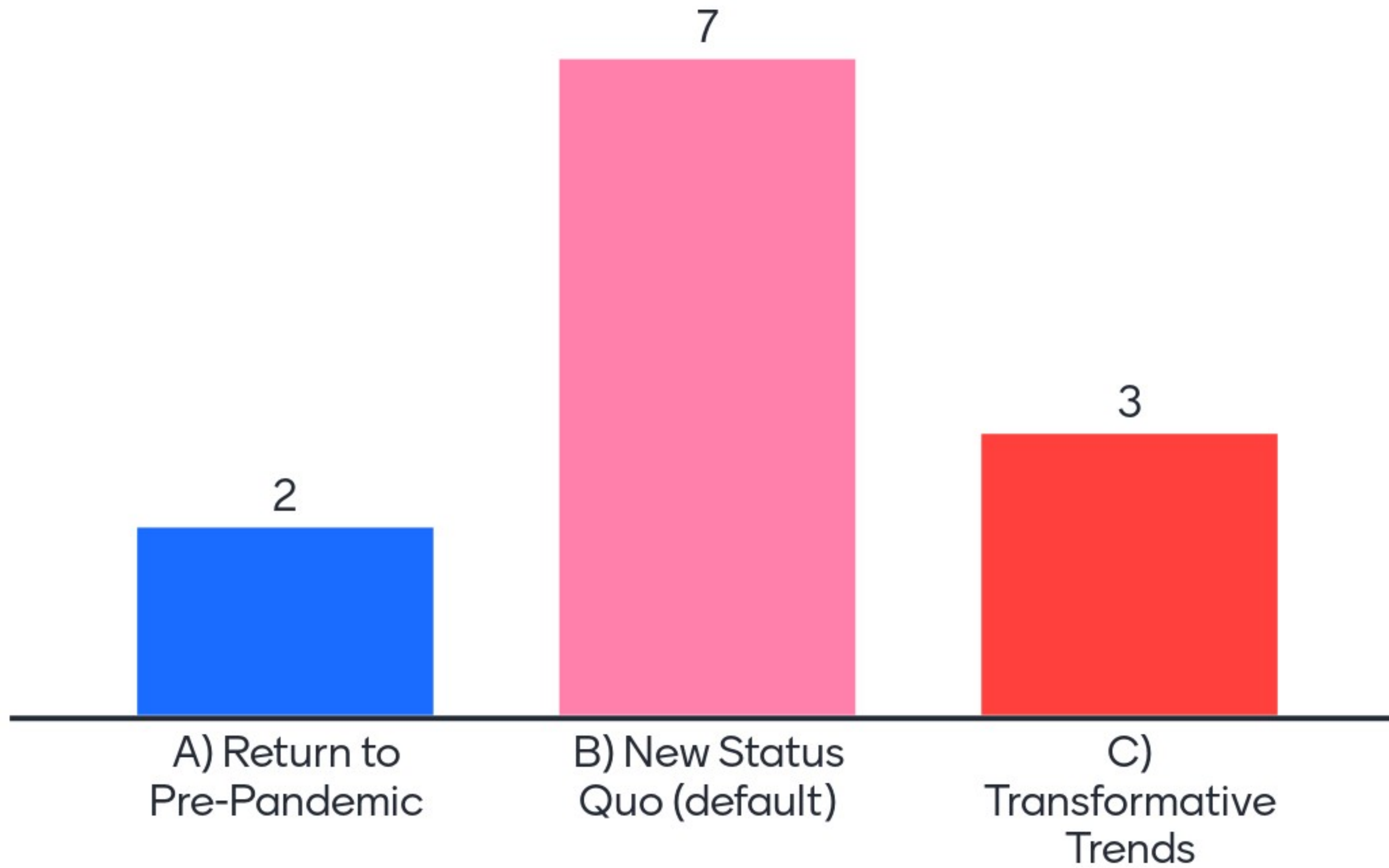
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1) Social and Recreational Travel





Social Economy

Labor Force Participation

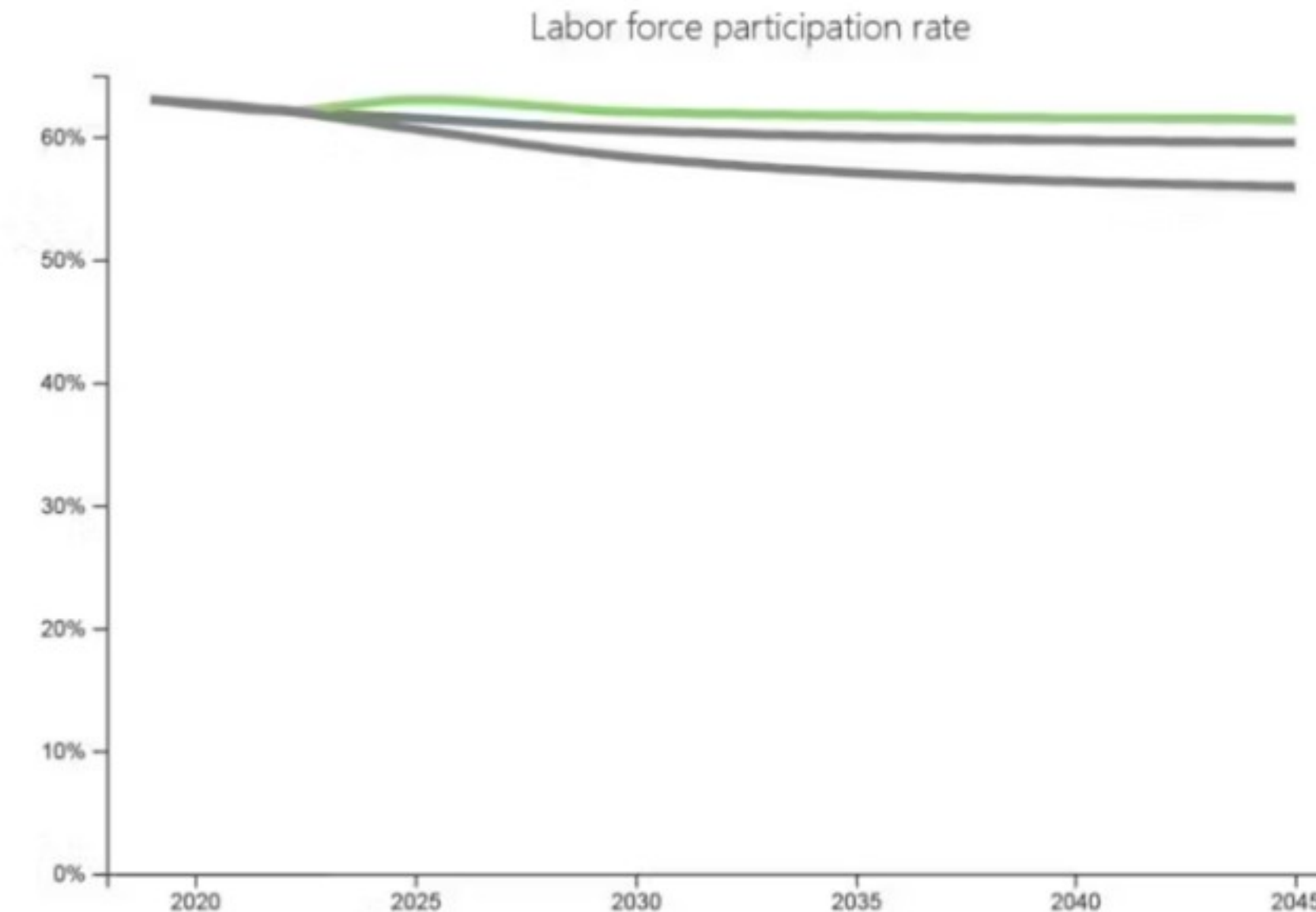
Return to Pre-Pandemic

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Transformative Trends

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This trend captures the effect of employees leaving the workforce entirely. Even prior to COVID-19 and in periods of low unemployment, US labor force participation was declining, and the Bureau of Labor Statistics was projecting a continued decline through at least 2030 independent of COVID. Reduced labor force participation affects VMT, transit use and travel peaking in much the same way telecommuting does, including substitution effects of trips made for non-work purposes.



Social Economy

Labor Force Participation

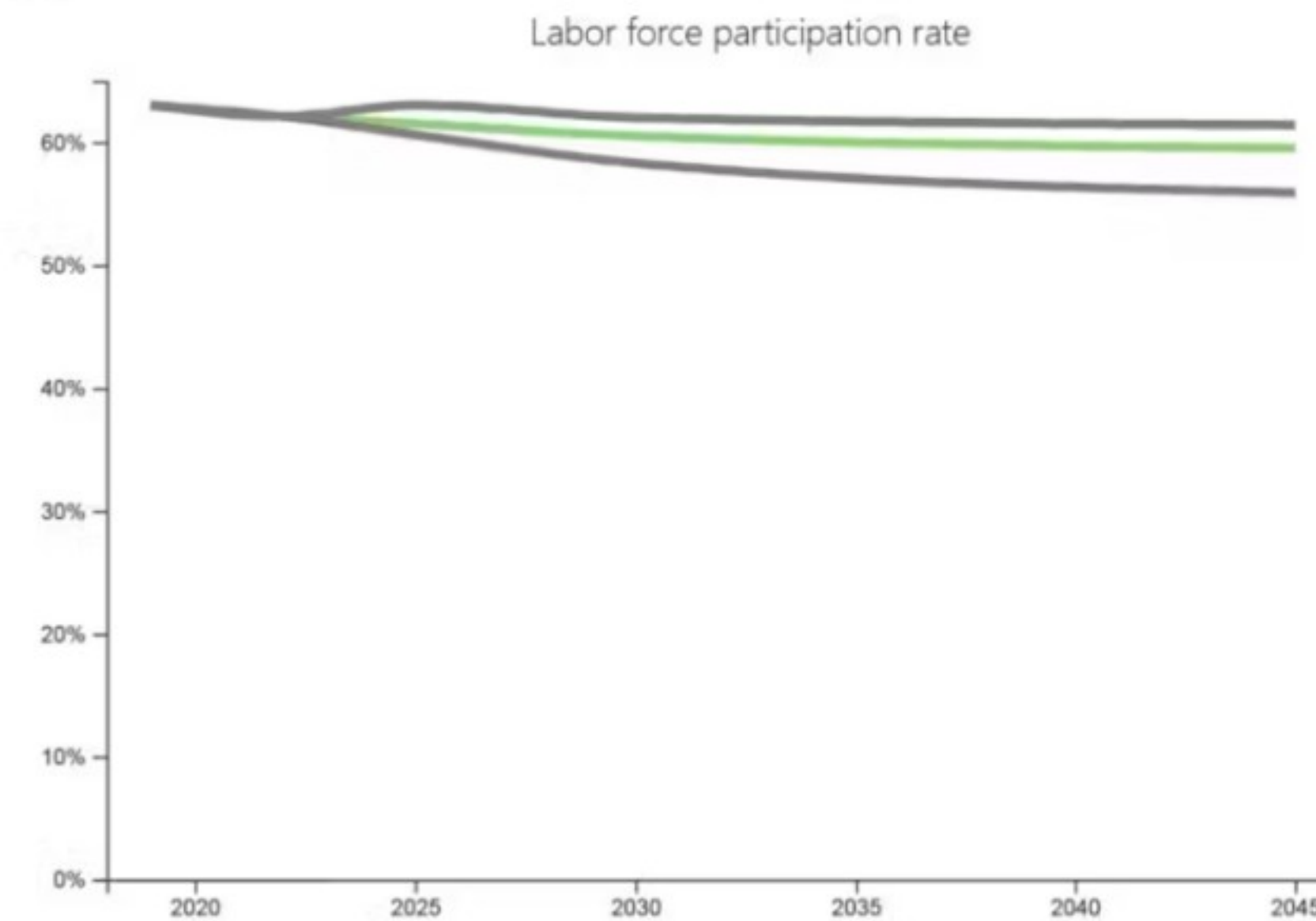
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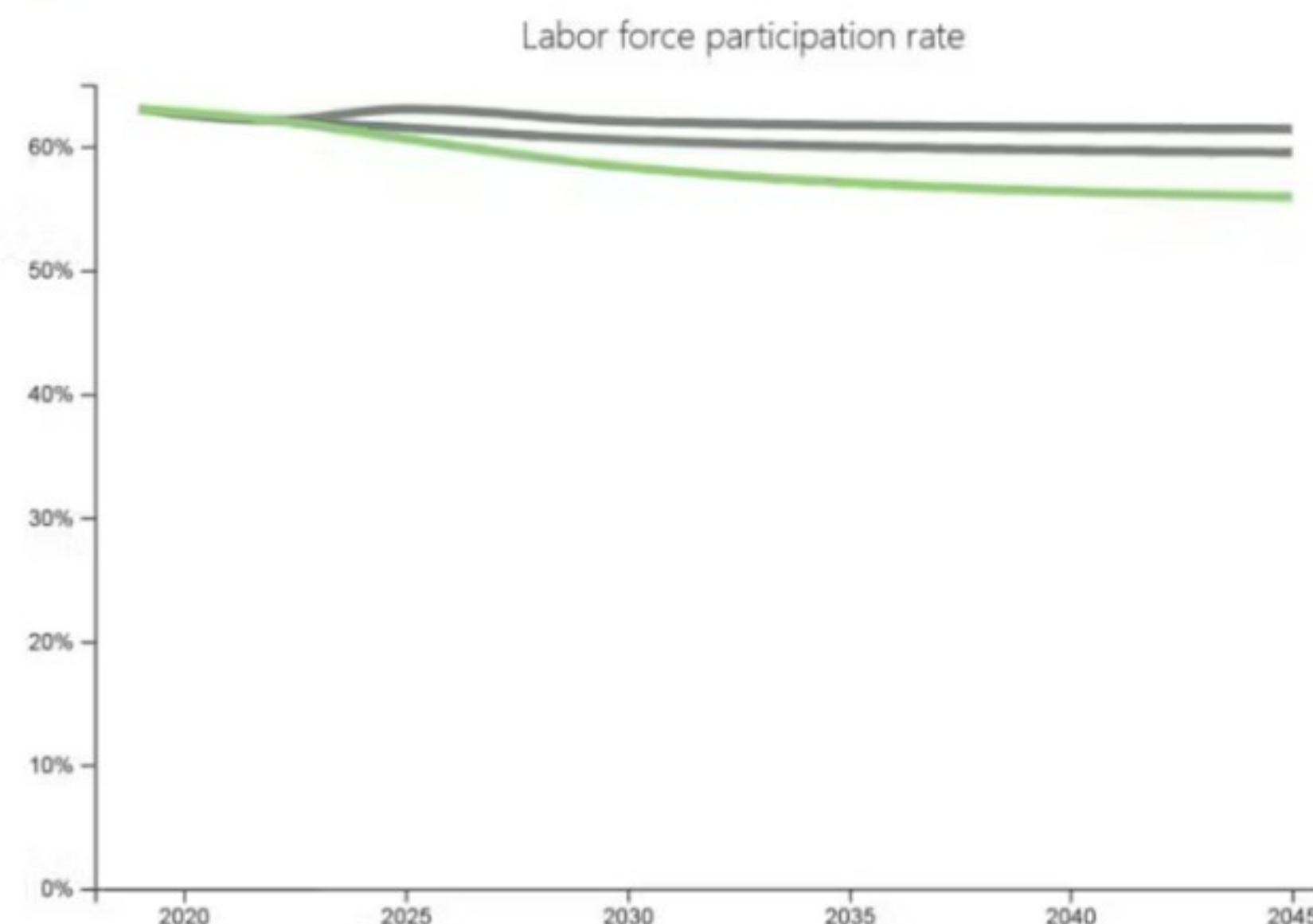
Return to Pre-Pandemic

New Status Quo (default)

Transformative Trends

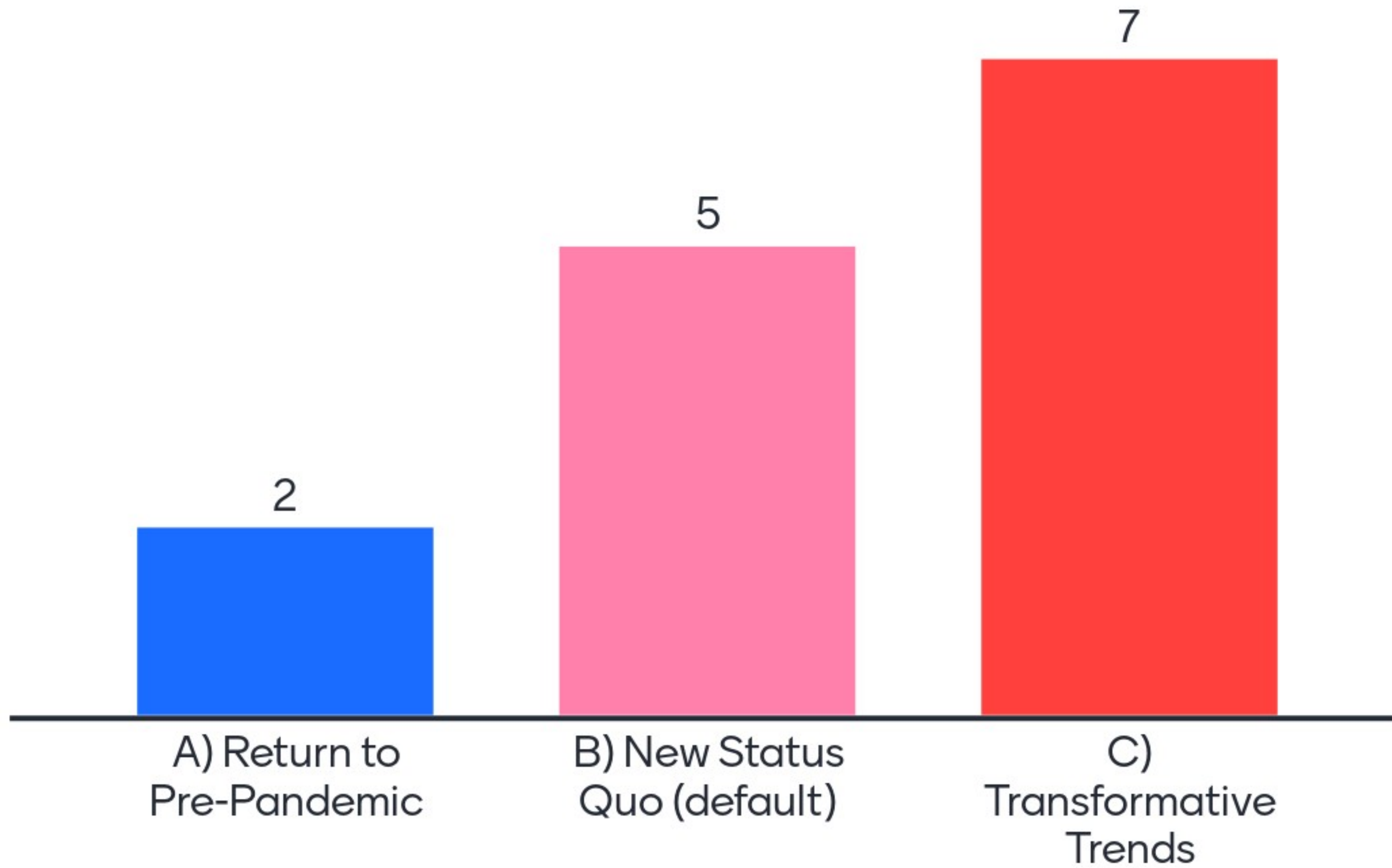
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2) Labor Force Participation





Social Economy

Migration and Land Use

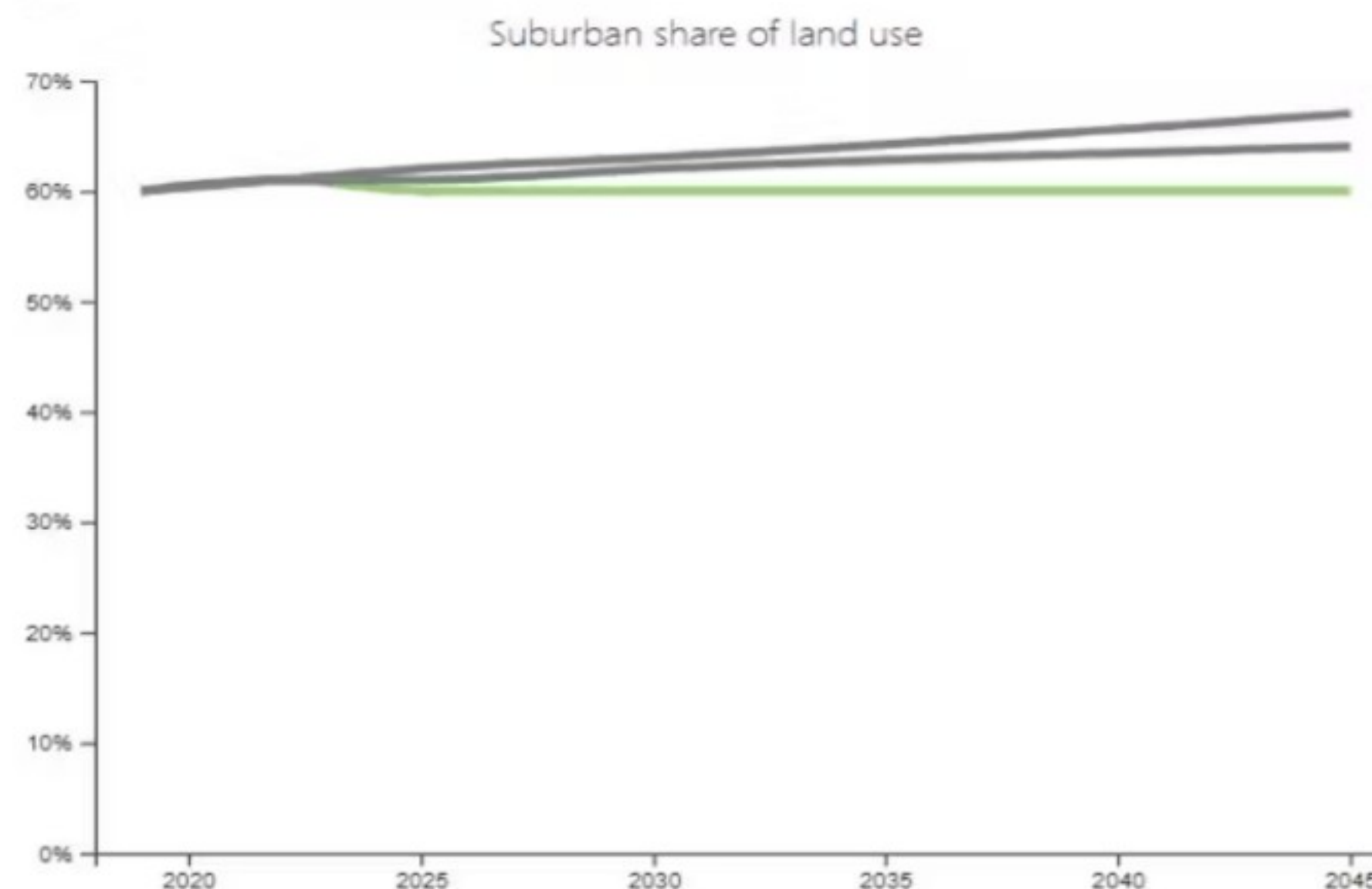
Return to Pre-Pandemic

Remain Fixed at Pre-Pandemic Level(default)

Urban Areas Recover and Stabilize

Make Your Prediction

- ☐ Return to Pre-Pandemic Trends
- ☒ Remain Fixed at Pre-Pandemic Levels (default)
- ☐ Urban Areas Recover and Stabilize



According to the Brookings Institute, "the pandemic year of 2020-21 showed substantial declines in highly dense urban core counties within major metro areas, driven heavily by domestic out migration... in the context of urban core county growth over the previous decade... (with) uncommonly high growth levels in the early 2010s." TrendLab+ users can select from three potential trends and urban development patterns: "return to pre-pandemic" with suburban population raising from about 60% suburban pre-COVID-19 to about 67% in 2045, "new status quo" wherein urban and suburban growth rates return to approximate parity, and "transformative trends" with almost all net growth in suburban counties.



Social Economy

Migration and Land Use

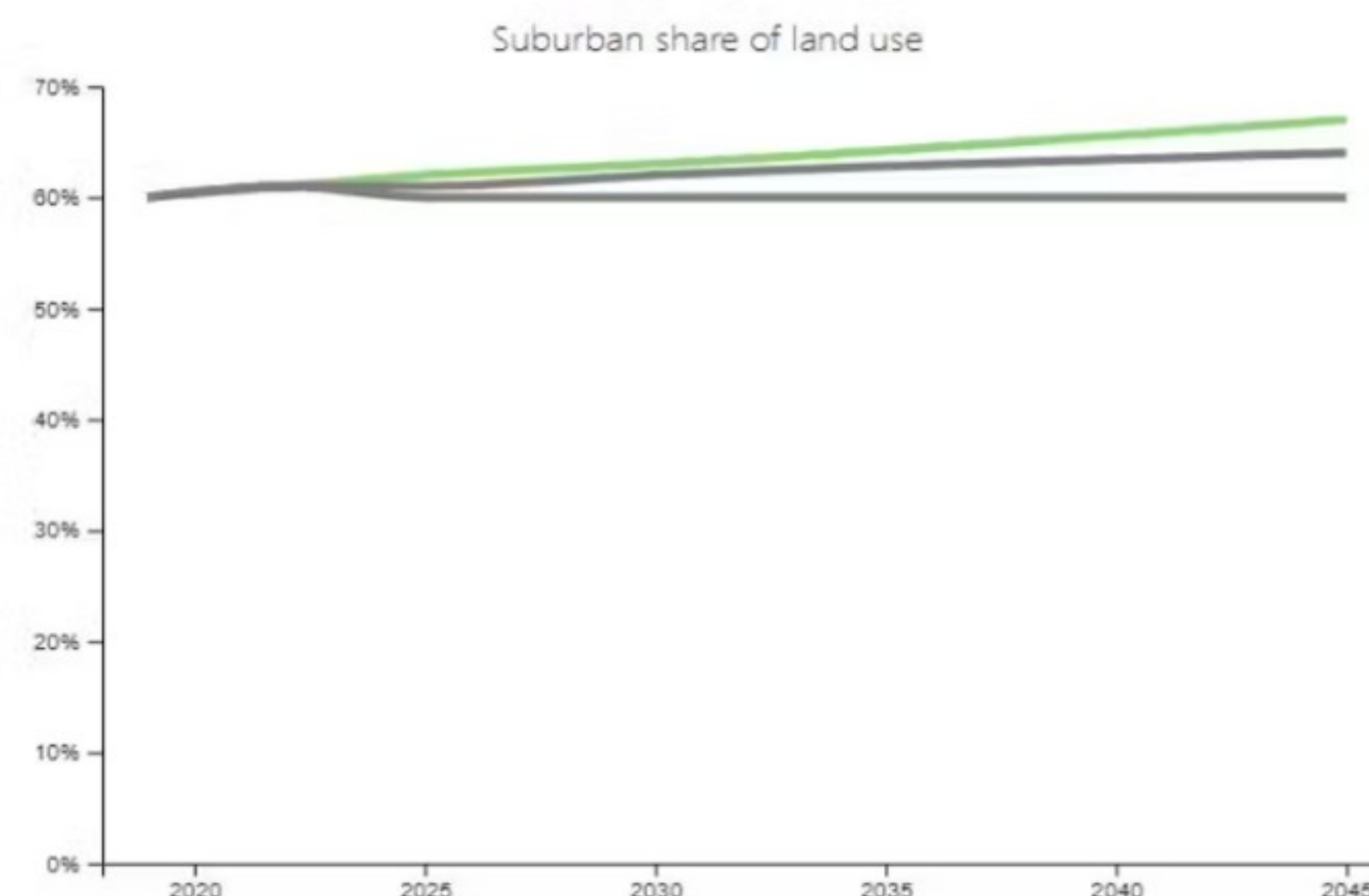
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Urban Areas Recover and Stabilize

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Social Economy

Migration and Land Use

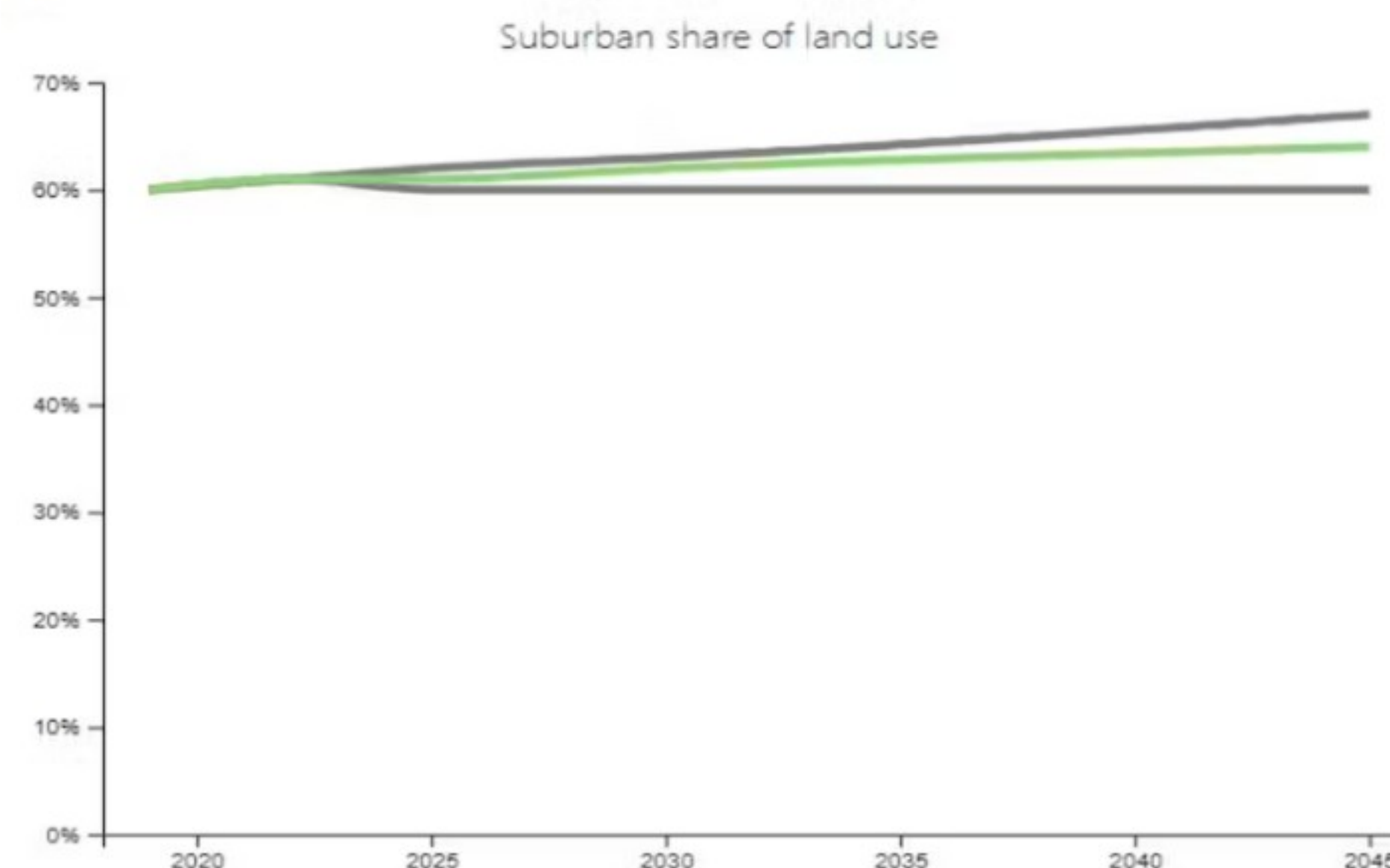
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Urban Areas Recover and Stabilize

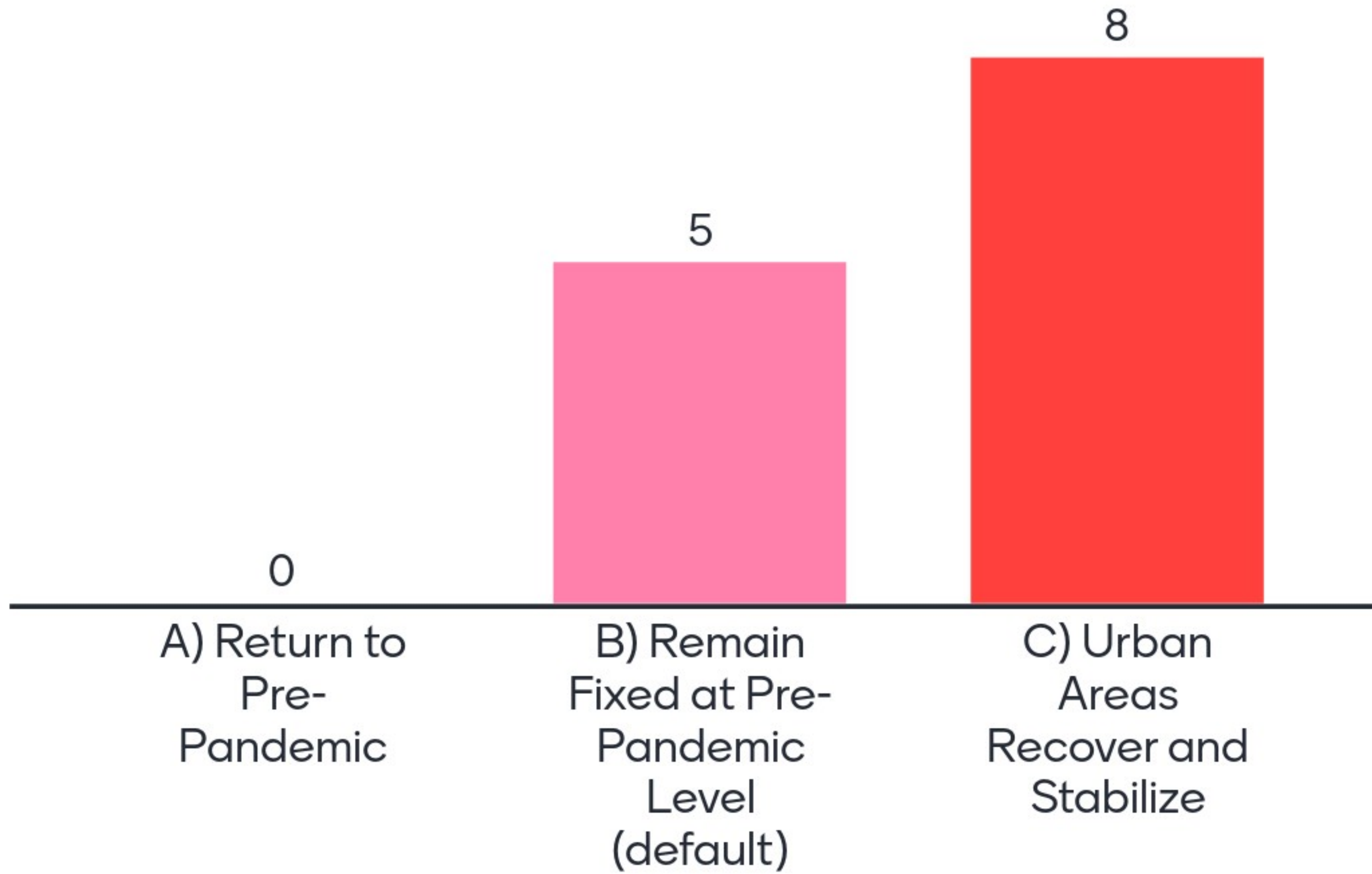
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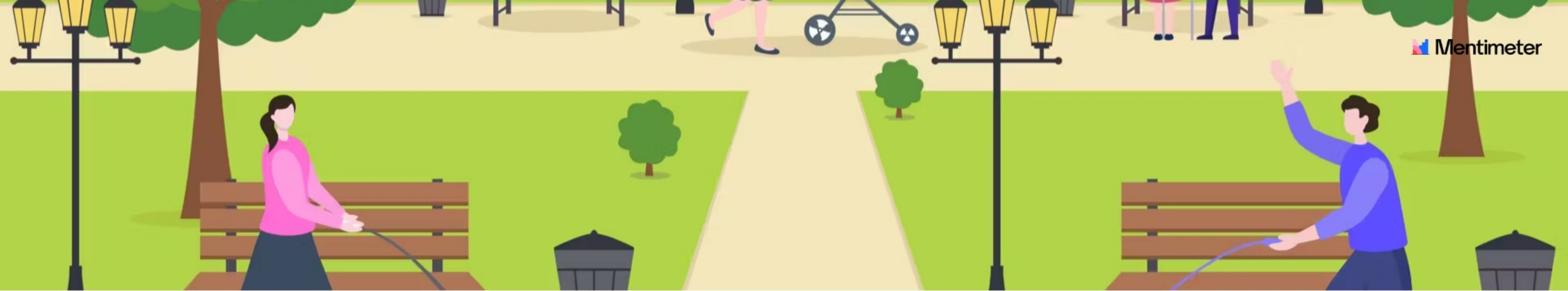
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3) Migration and Land Use





Quality of Life and Public Health

- 1) Telecommuting
- 2) E-Commerce
- 3) Car Ownership
- 4) Health and Safety Concerns



Quality of Life and Public Health

Telecommuting

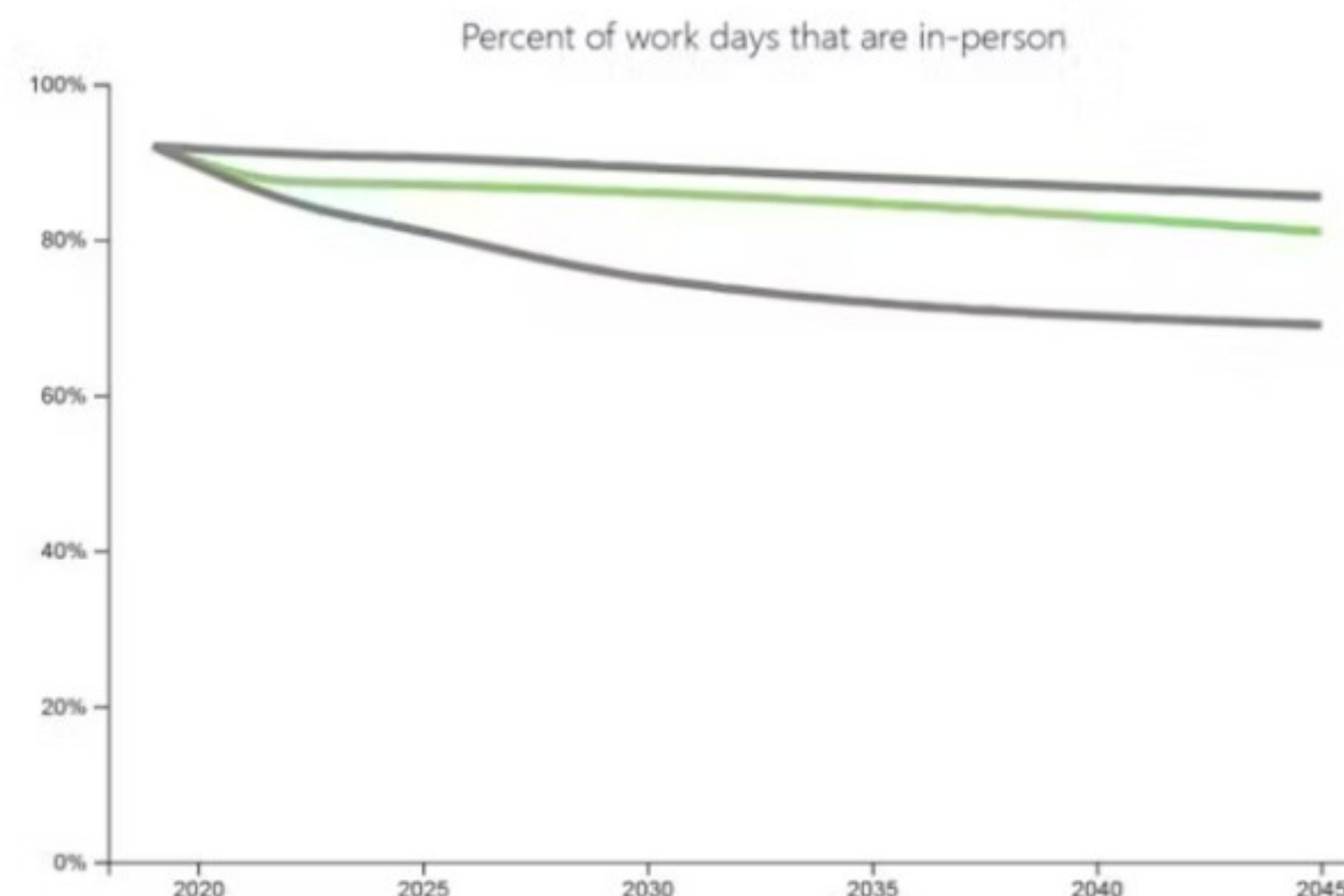
Return to Pre-Pandemic

New Status Quo (default)

Transformative Trends

Make Your Prediction

- ☐ Return to Pre-Pandemic
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The telecommuting trend includes the effects of the increased levels of working from home and hybrid-work that have arisen since the onset of the COVID-19 pandemic, measured in terms to the percentage reduction in in total employee commute days. The percentage should be expressed in terms of the number of office-worker days spent telecommuting assuming, for example, that hybrid workers still commute an average of three days a week. TrendLab+ takes into account that, while these remote work options have been increasingly available to knowledge workers and office environments, about 50% of a region's workforce holds jobs that require a physical presence. It also accounts for the fact that evidence shows that those no longer commuting often undertake trips for other purposes during the course of the day, replacing about 45% of the eliminated work-trip VMT and changing the time-of-day distribution of traffic peaks.



Quality of Life and Public Health

Telecommuting

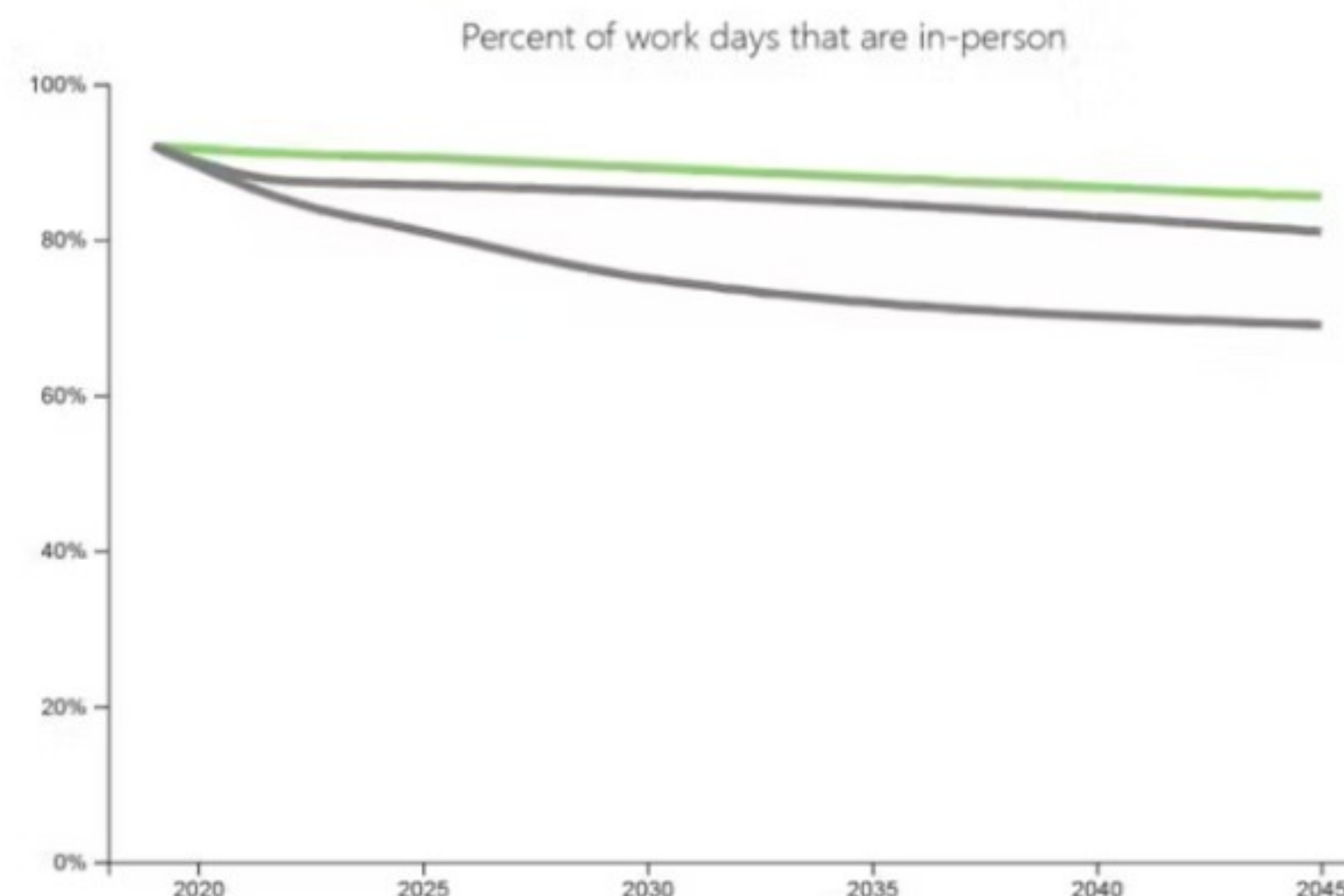
Return to Pre-Pandemic

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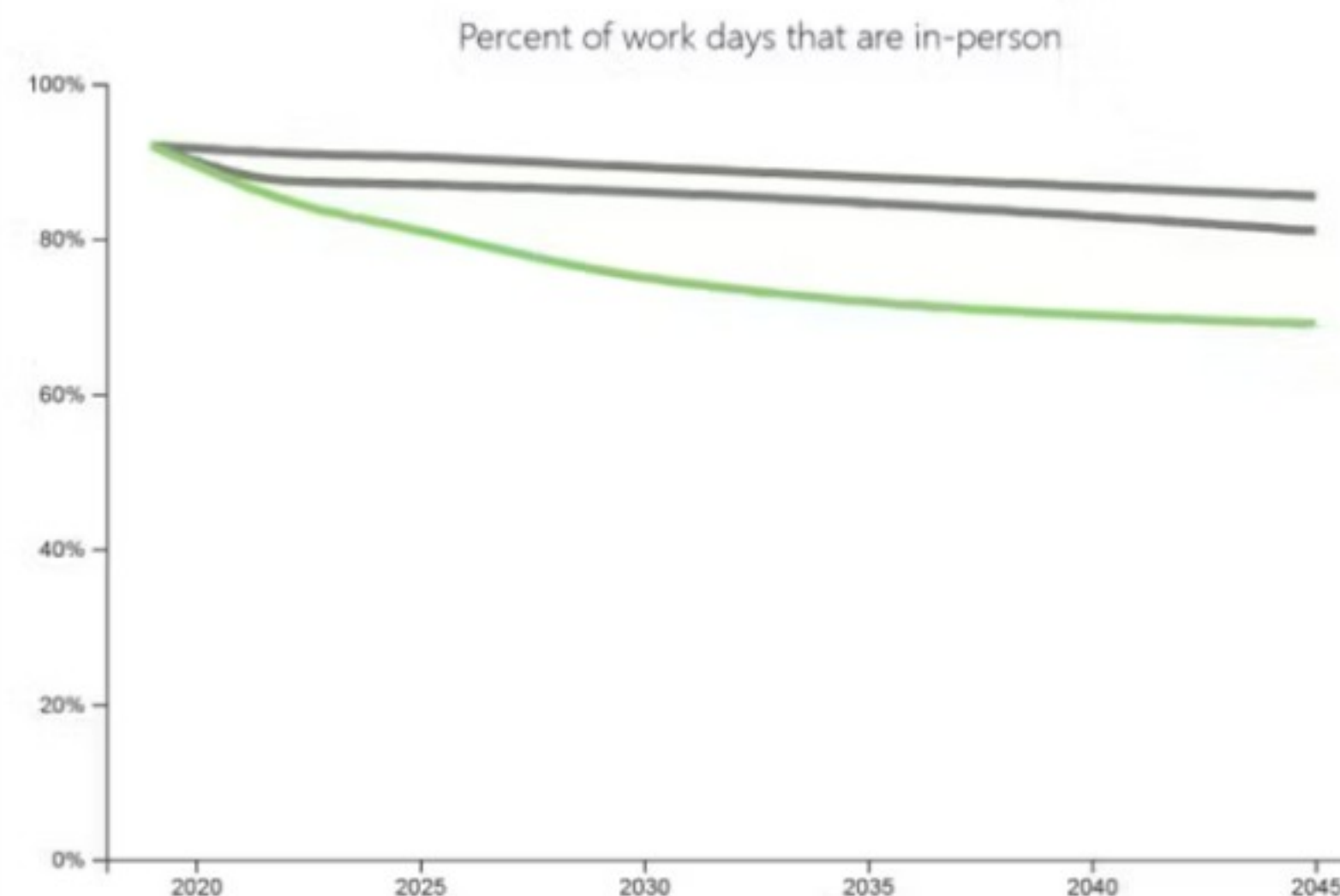
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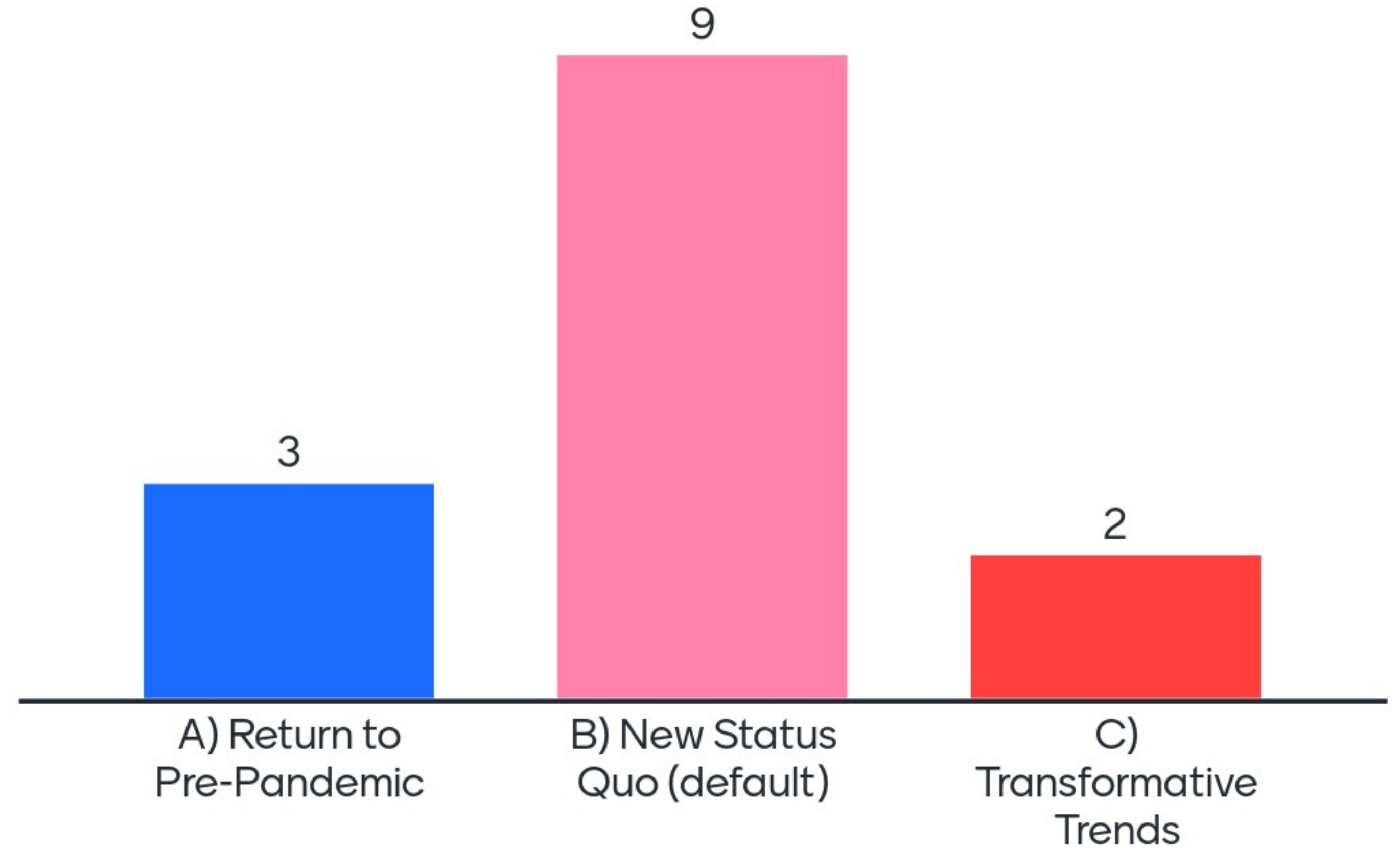
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1) Telecommuting





Quality of Life and Public Health

E-Commerce

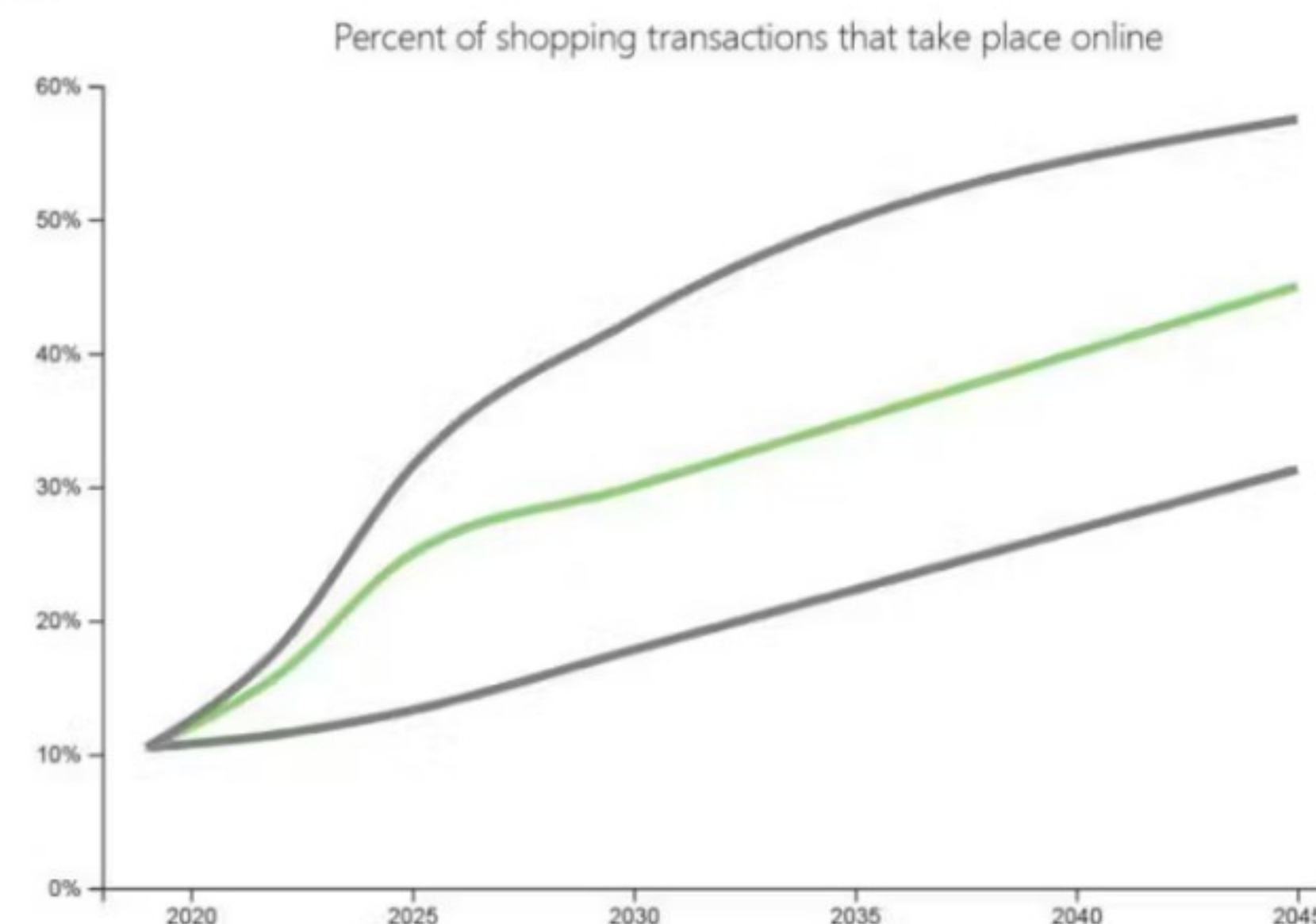
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Transformative Trends

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Home shopping and deliveries have increased steadily over the past ten years and experienced a significant increase during the first two years of the COVID-19 pandemic. Levels in 2022 were still well above 2019 levels. This trend affects travel in two partially offsetting ways: it reduces shopping trips by households, but it increases vehicle miles generated by delivery vehicles.



Quality of Life and Public Health

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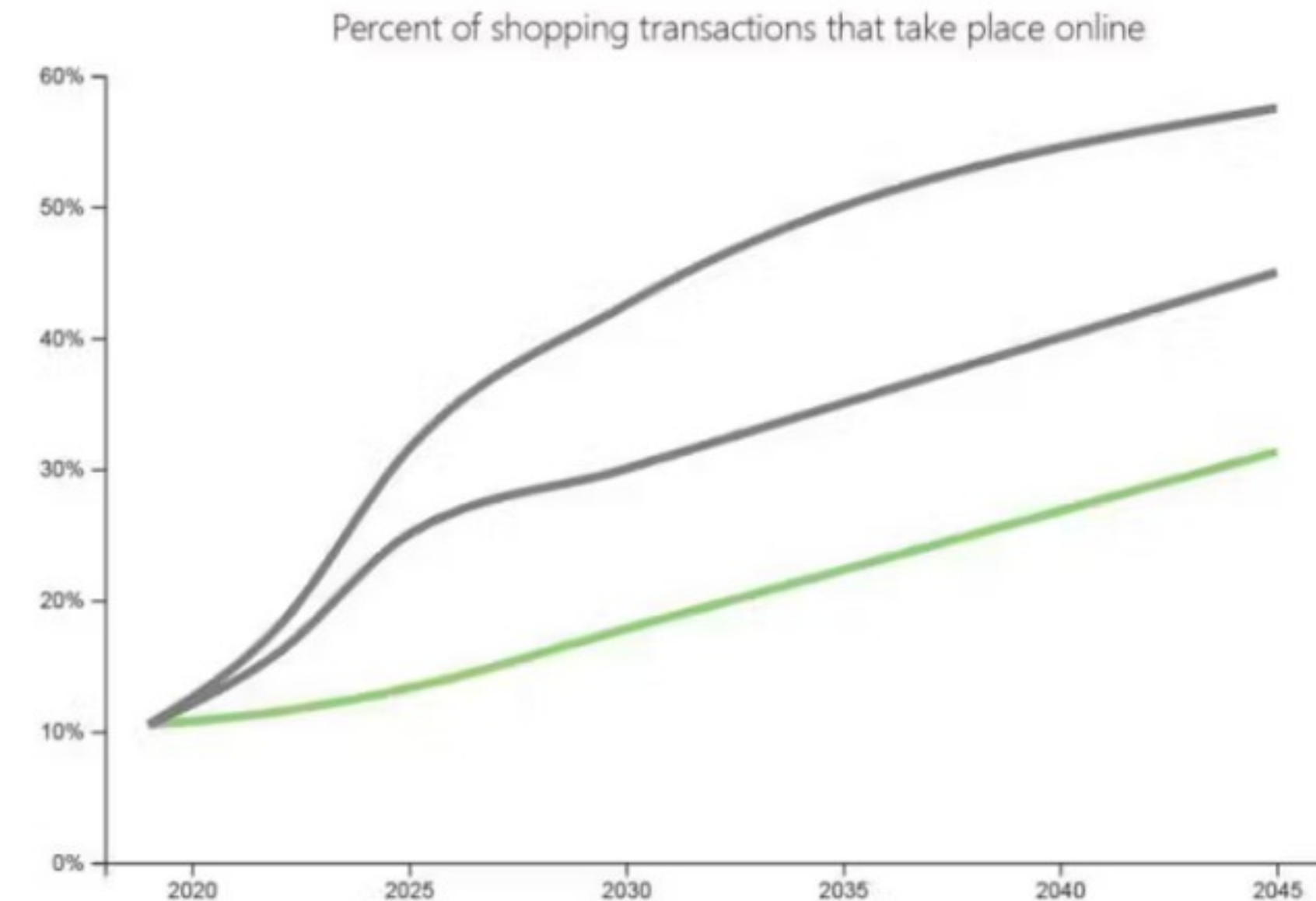
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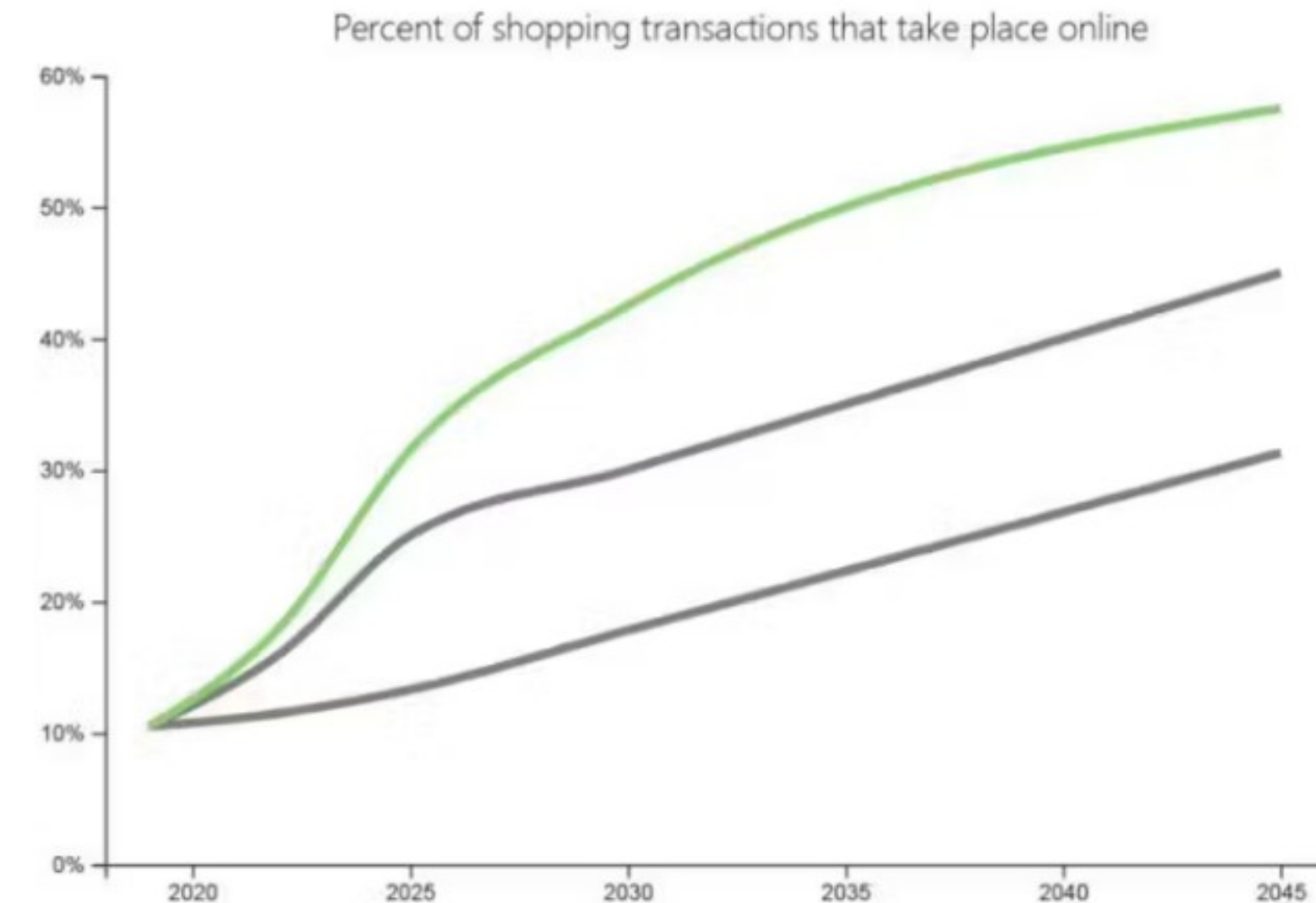
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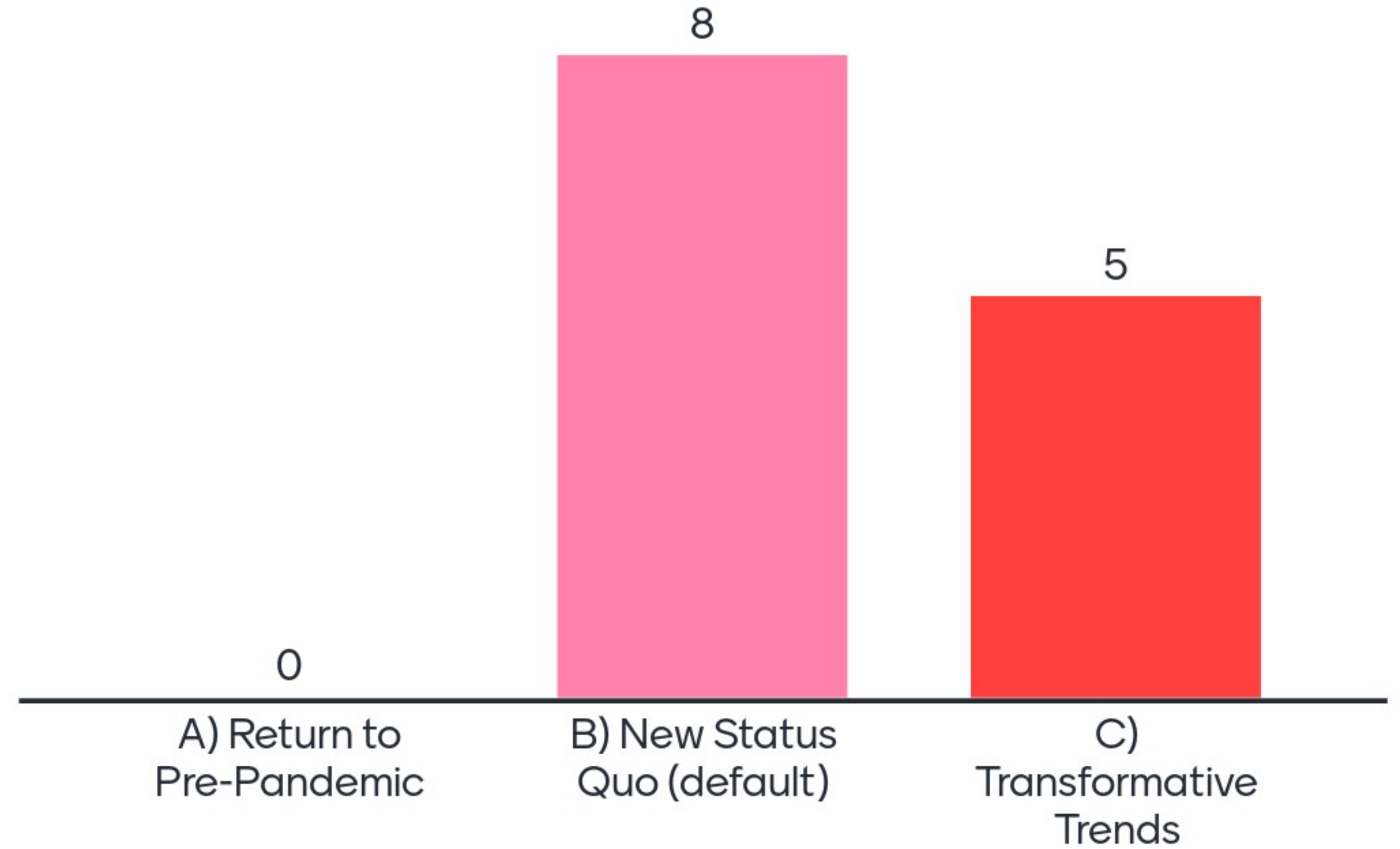
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2) E-Commerce





Quality of Life and Public Health

Car-Ownership

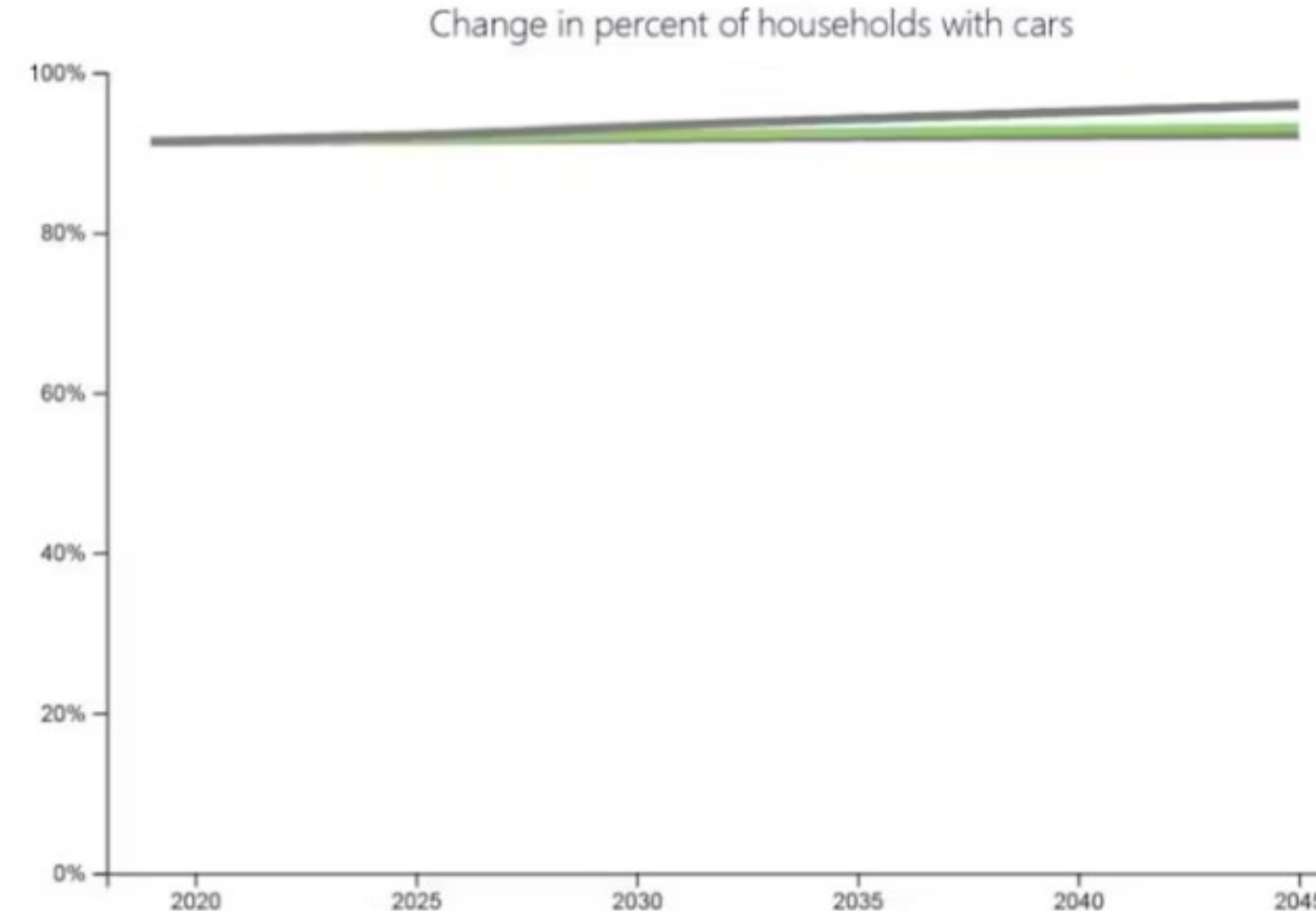
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TrendLab+ forecasts the potential effects of car ownership on VMT, transit ridership and other performance measures based on changes in the percentage of households with cars. Car ownership in the US steadily increased through the 2010's reaching a level of about 92% of households. car ownership levels have had a powerful impact on VMT growth and transit ridership decline, and TrendLab+ users should carefully consider different scenarios on future levels and adjust their assumptions as new, local data becomes available in the future.



Quality of Life and Public Health

Car-Ownership

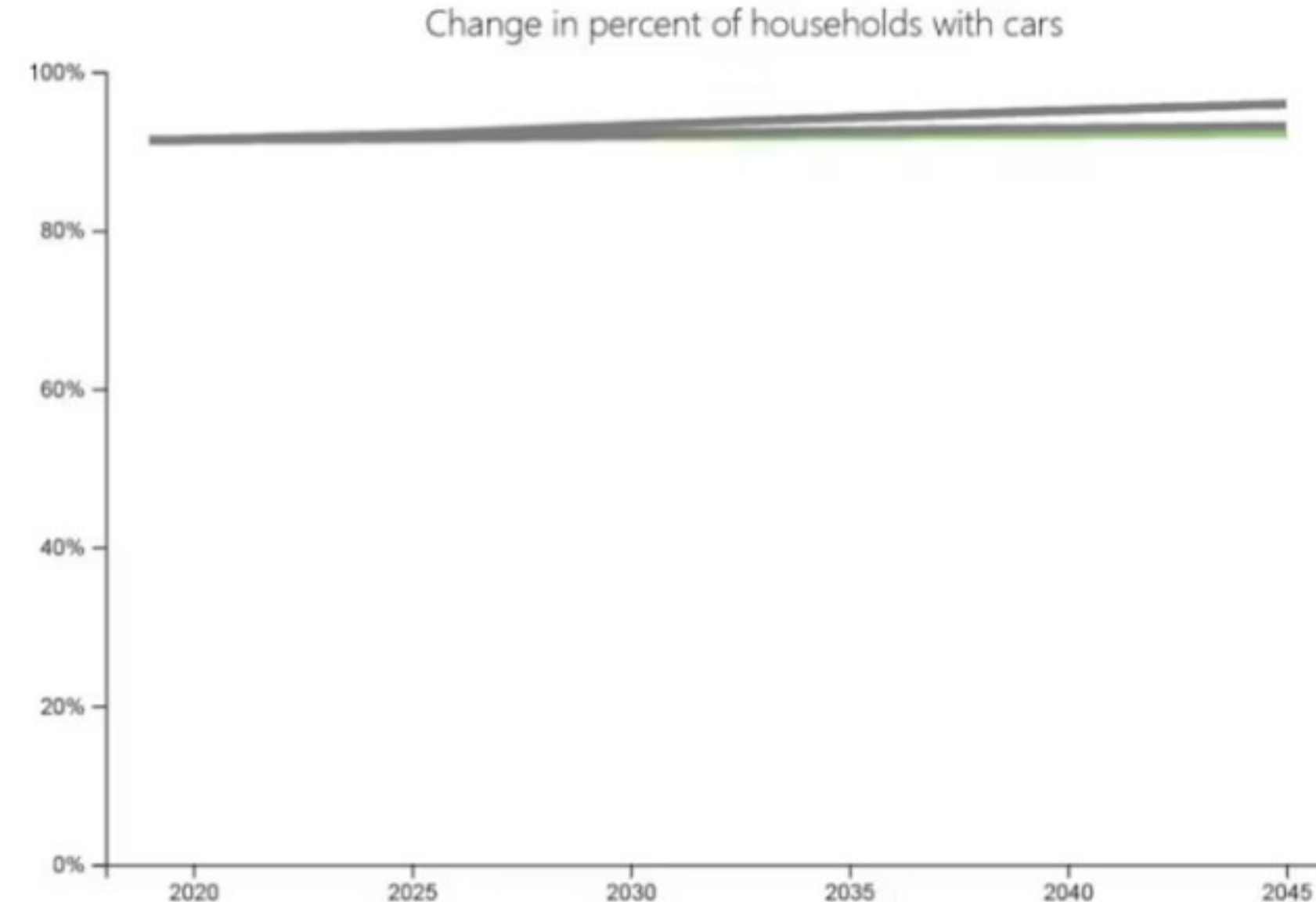
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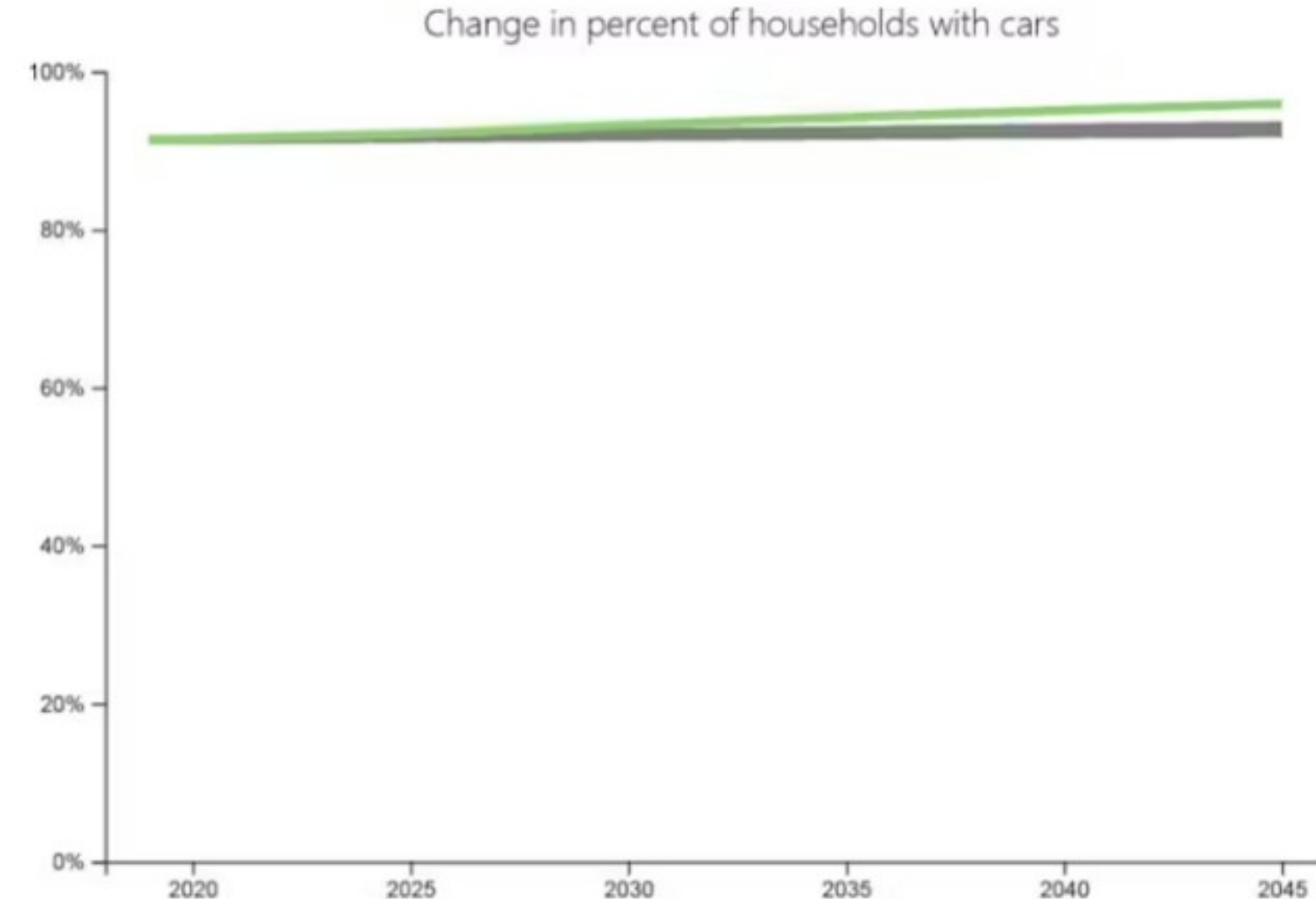
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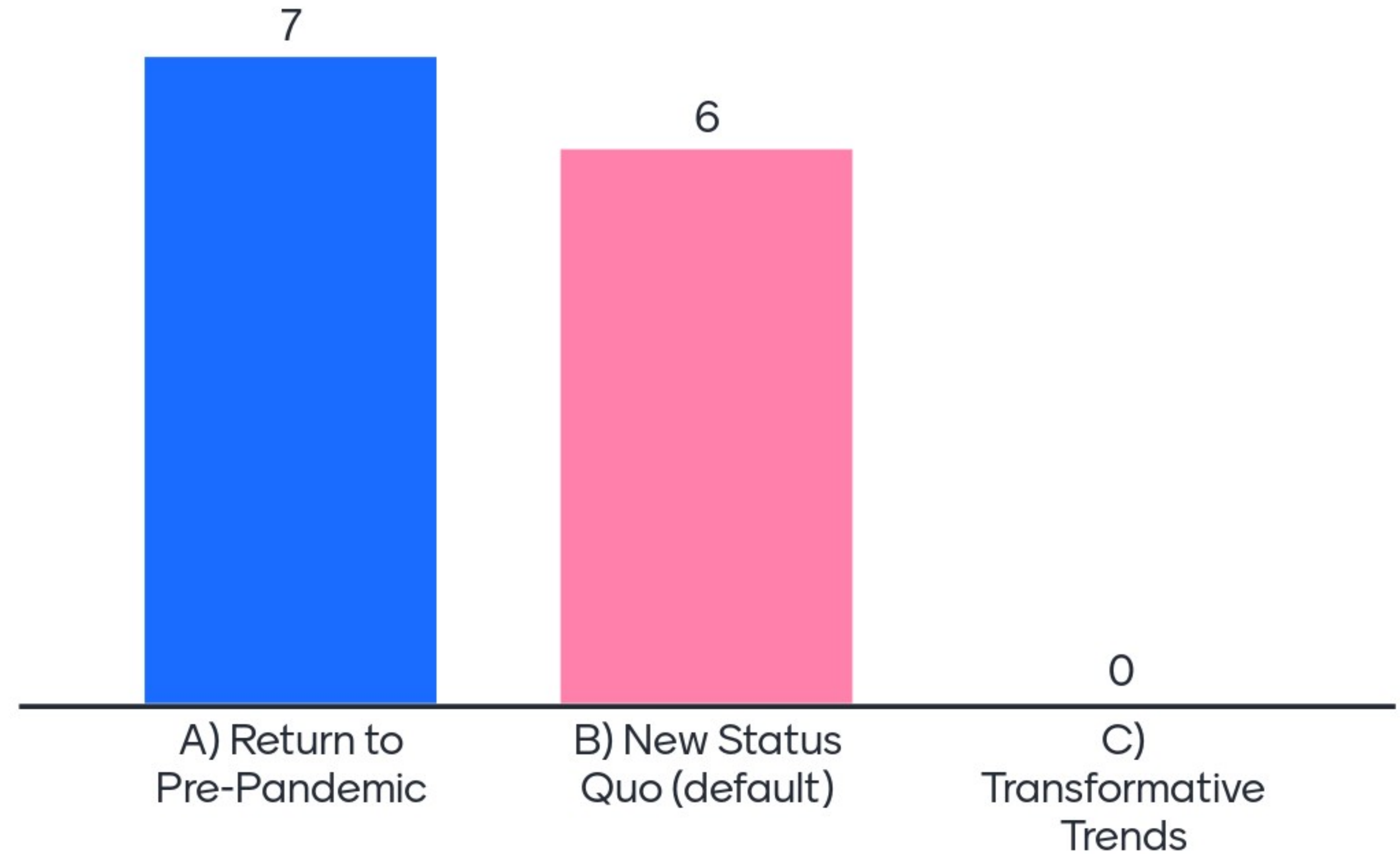
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3) Car Ownership





Quality of Life and Public Health

Health and Safety Concerns

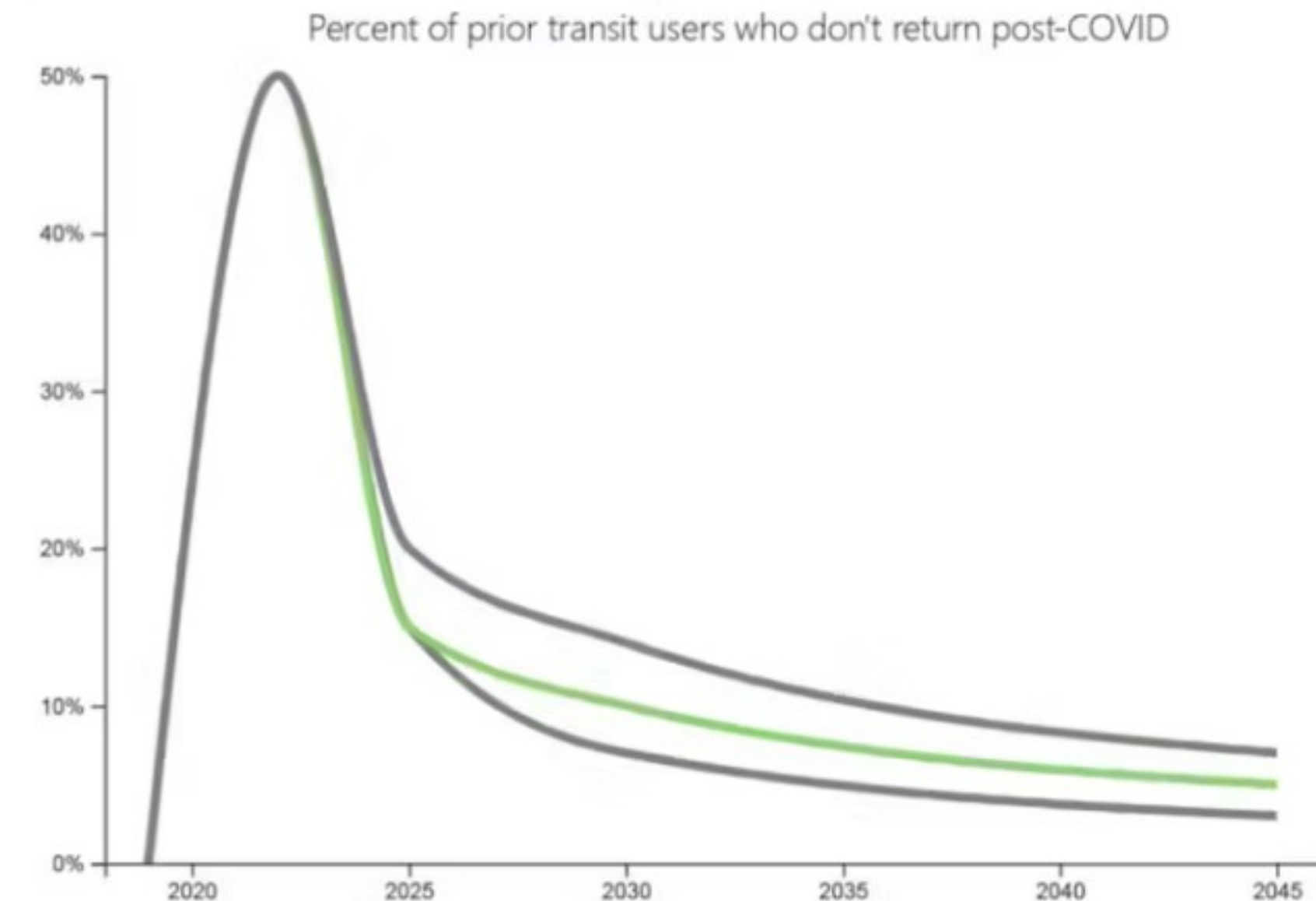
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Transformative Trends

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Transit ridership nationally was in steady decline even prior to COVID. Since COVID, health and safety concerns have affected travelers' willingness to return to transit. Concerns relate to both the increased risk of infection and security concerns for passengers on lightly occupied buses and bus stops. Regional and national surveys indicate that about 15% of prior transit users were reluctant to return even after COVID-19 risks subsided.



Quality of Life and Public Health

Health and Safety Concerns

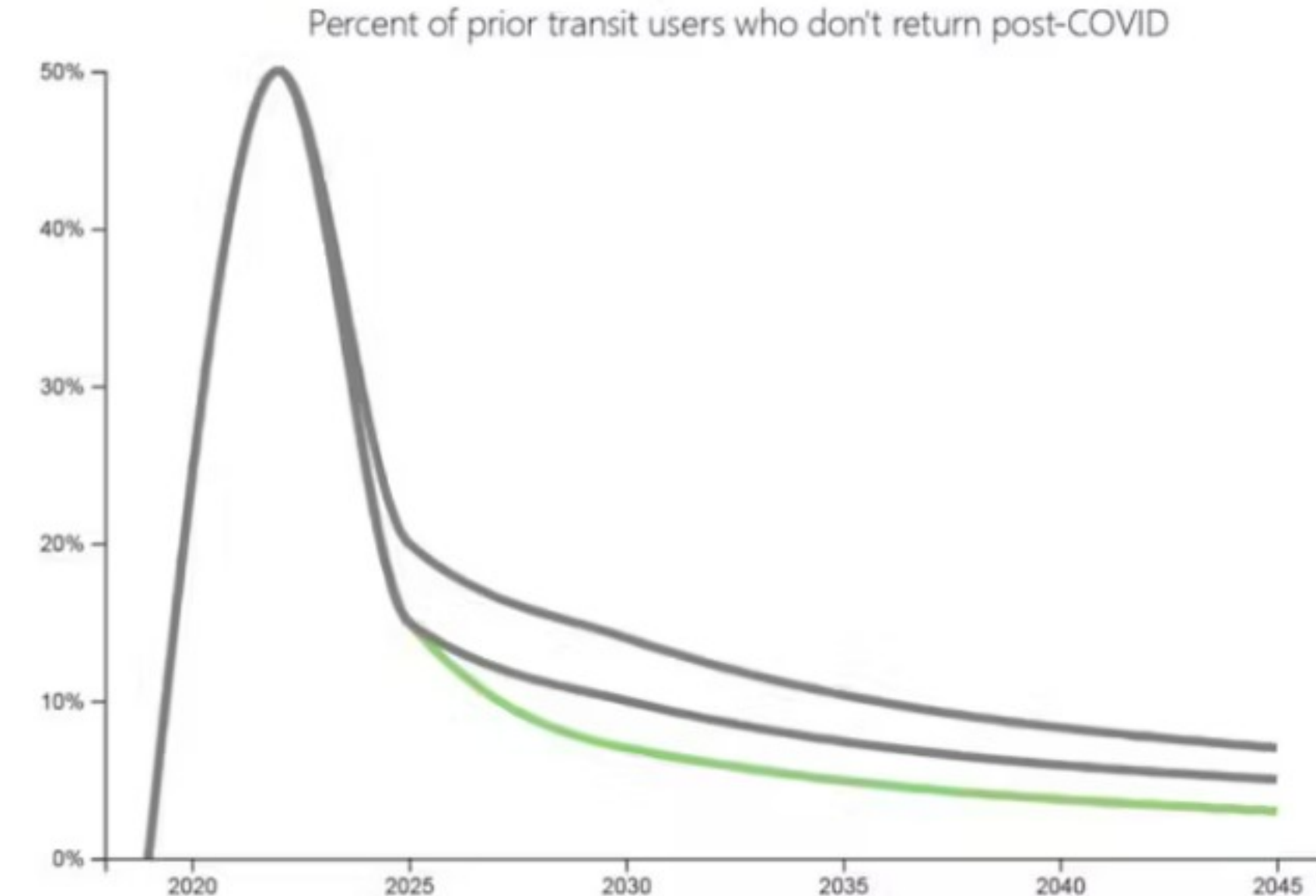
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Quality of Life and Public Health

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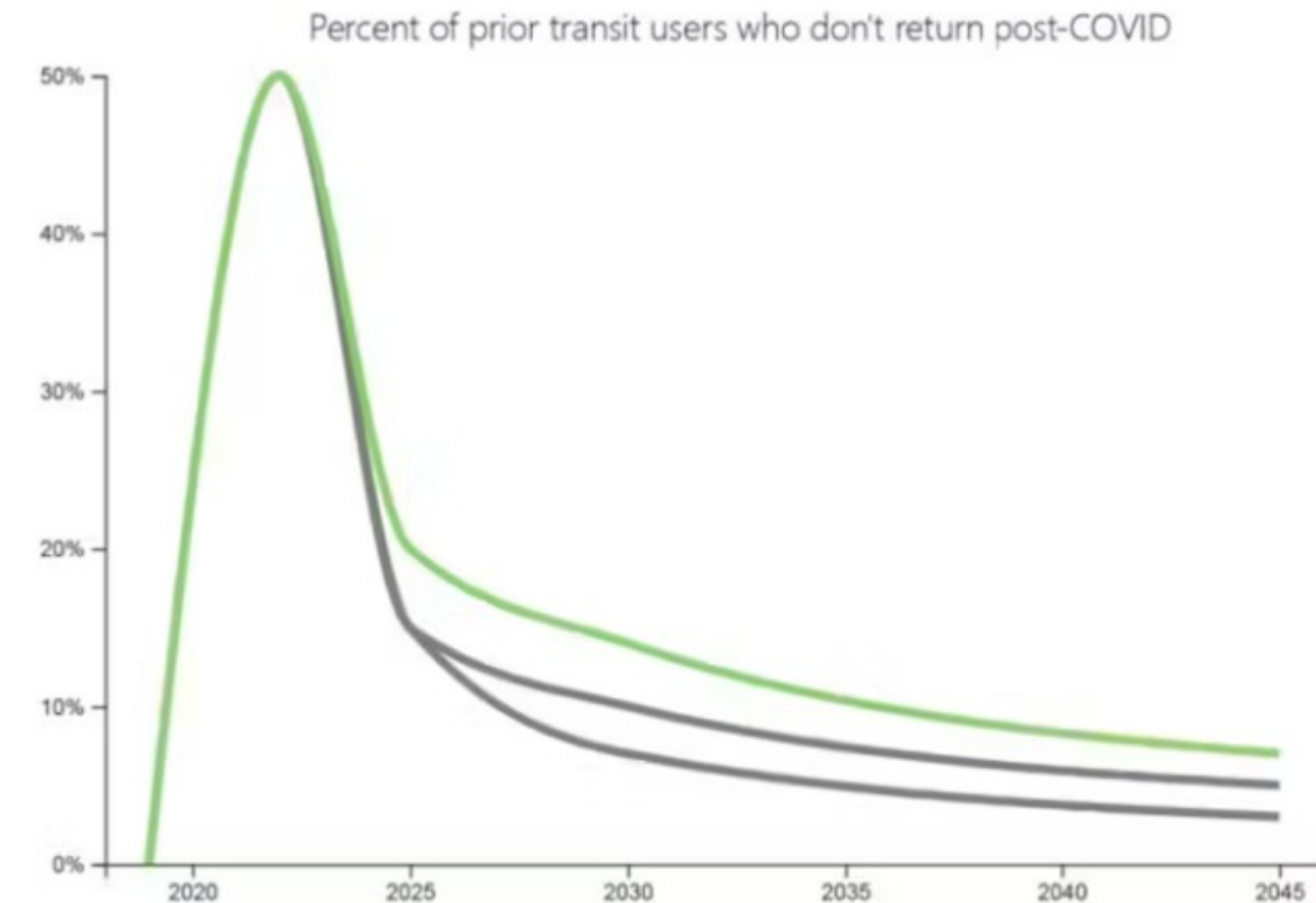
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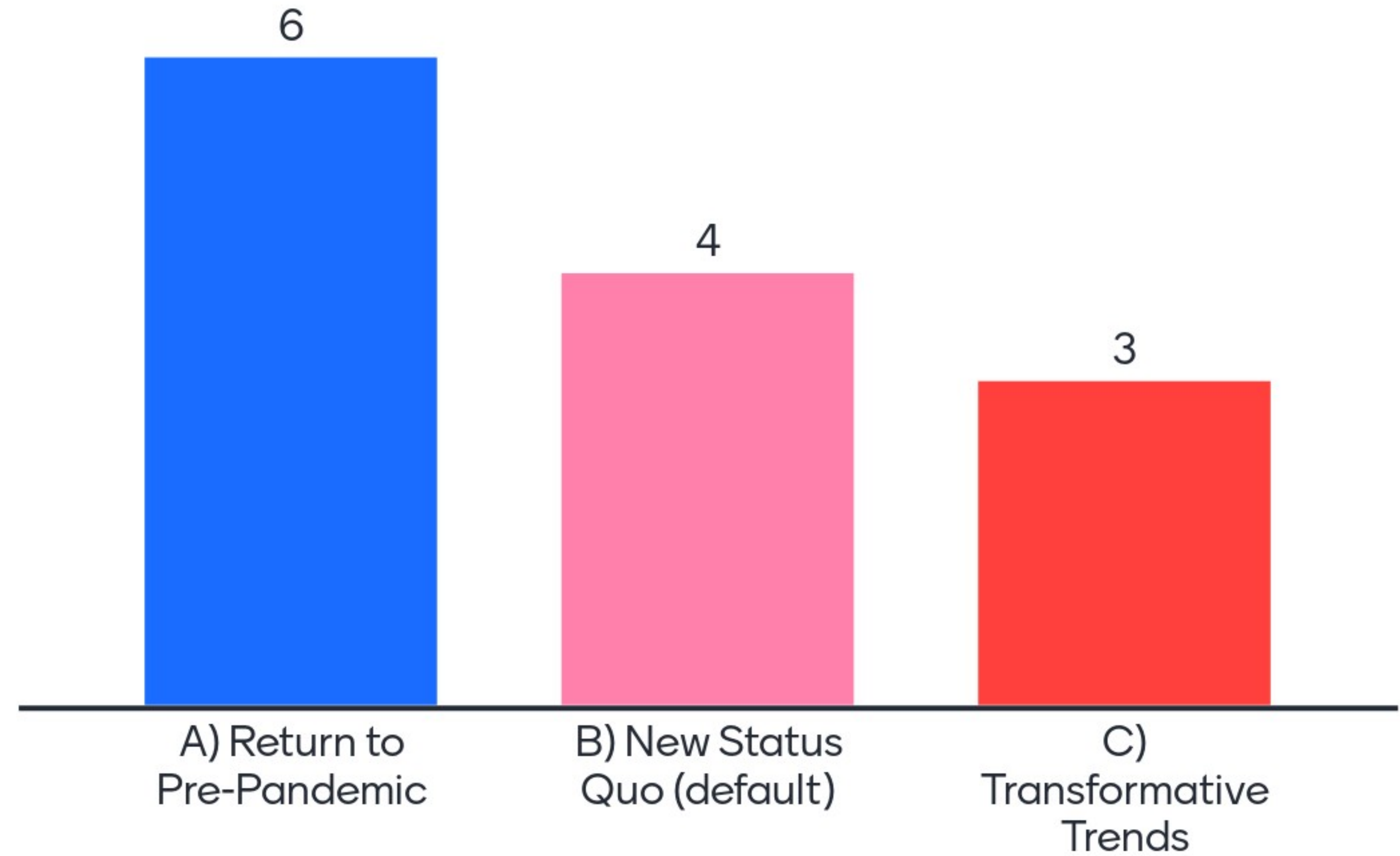
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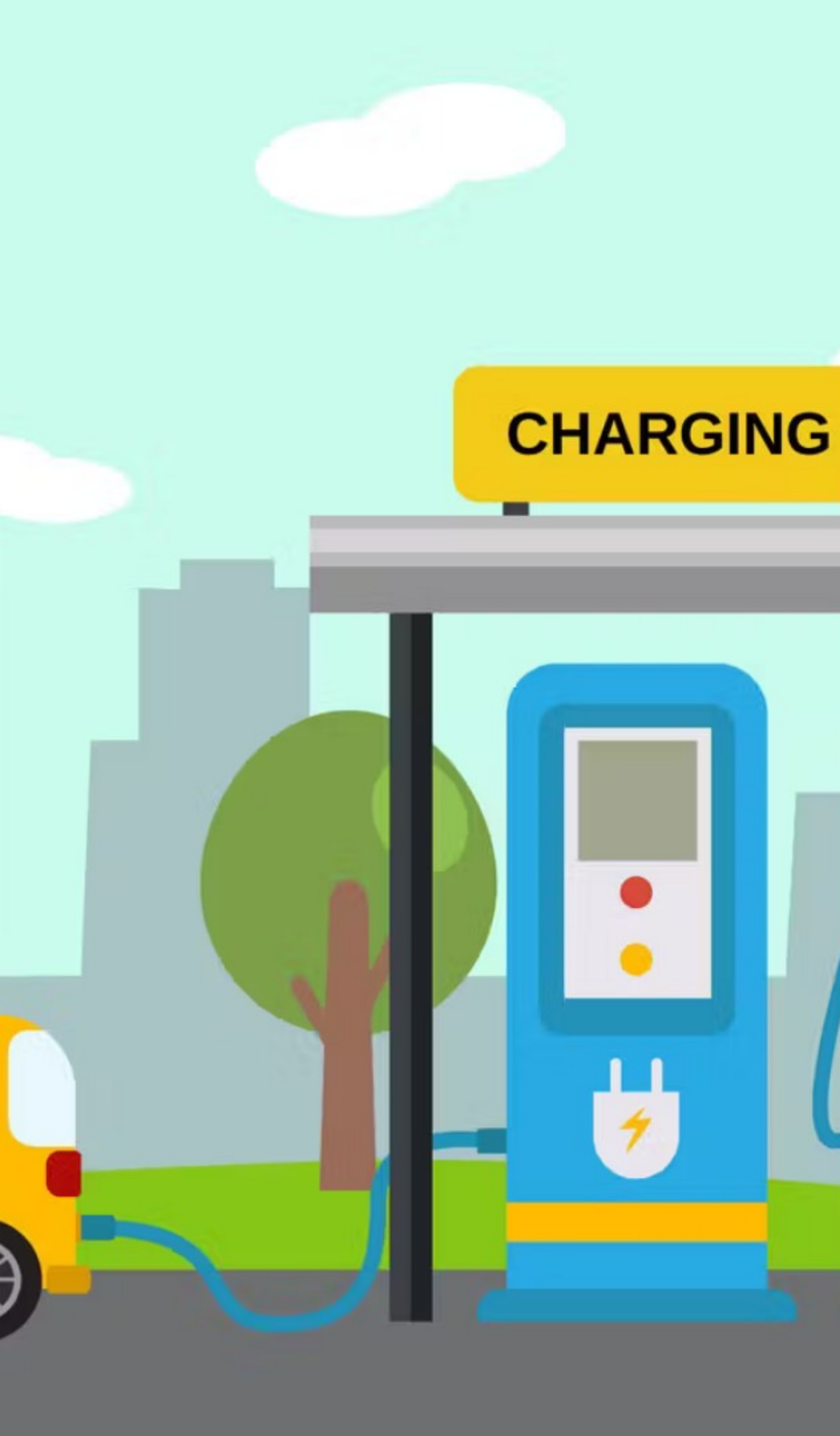
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4) Health and Safety Concerns





Technology

- 1) Electric Vehicle Adoption
- 2) Autonomous Vehicles



Quality of Life and Public Health

Electric Vehicle Adoption

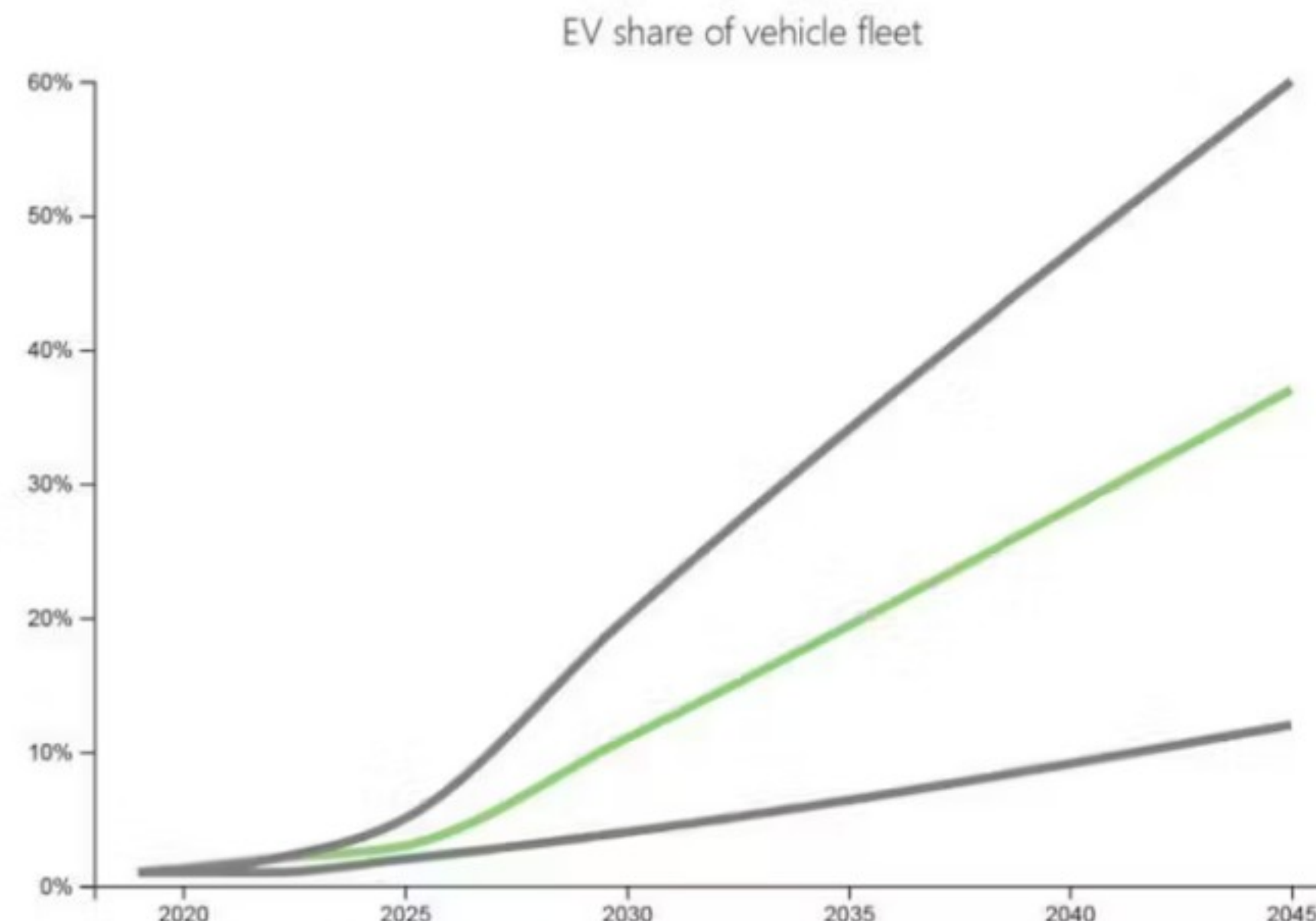
2019 Growth Rate
Continues

**Growth Constrained by
Charging Network
(default)**

Auto Manufacturers'
Forecast

Make Your Prediction

- ☐ 2019 Growth Rate Continues
- ☒ Growth Constrained by Charging Network (default)
- ☐ Auto Manufacturers' Forecast



The range of forecasts on EV fleet adoption is fairly broad. TrendLab+ considers EV adoption scenarios of 37% to 60% by 2045 or a "Return to Pre-Pandemic" growth rate scenario, of a 2045 share of 12%. The TrendLab+ analysis of GHG benefits takes into account that, nationally, 36% of the energy needed to power an EV car goes to mechanical inefficiencies and the power generation offered by the state's electric grid.



Quality of Life and Public Health

Electric Vehicle Adoption

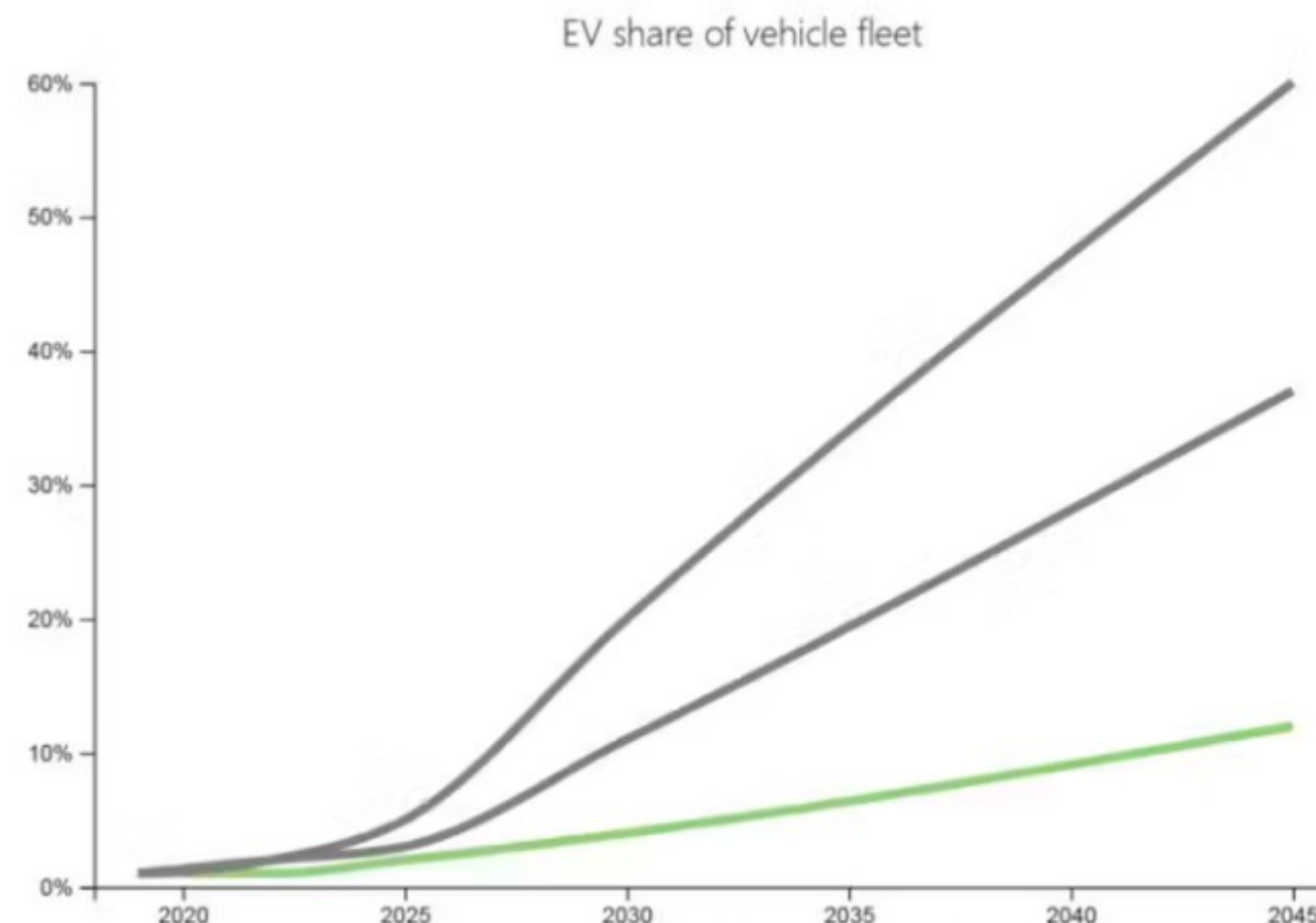
2019 Growth Rate Continues

Growth Constrained by Charging Network (default)

Auto Manufacturers' Forecast

Make Your Prediction

- ☒ 2019 Growth Rate Continues
- ☐ Growth Constrained by Charging Network (default)
- ☐ Auto Manufacturers' Forecast



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Quality of Life and Public Health

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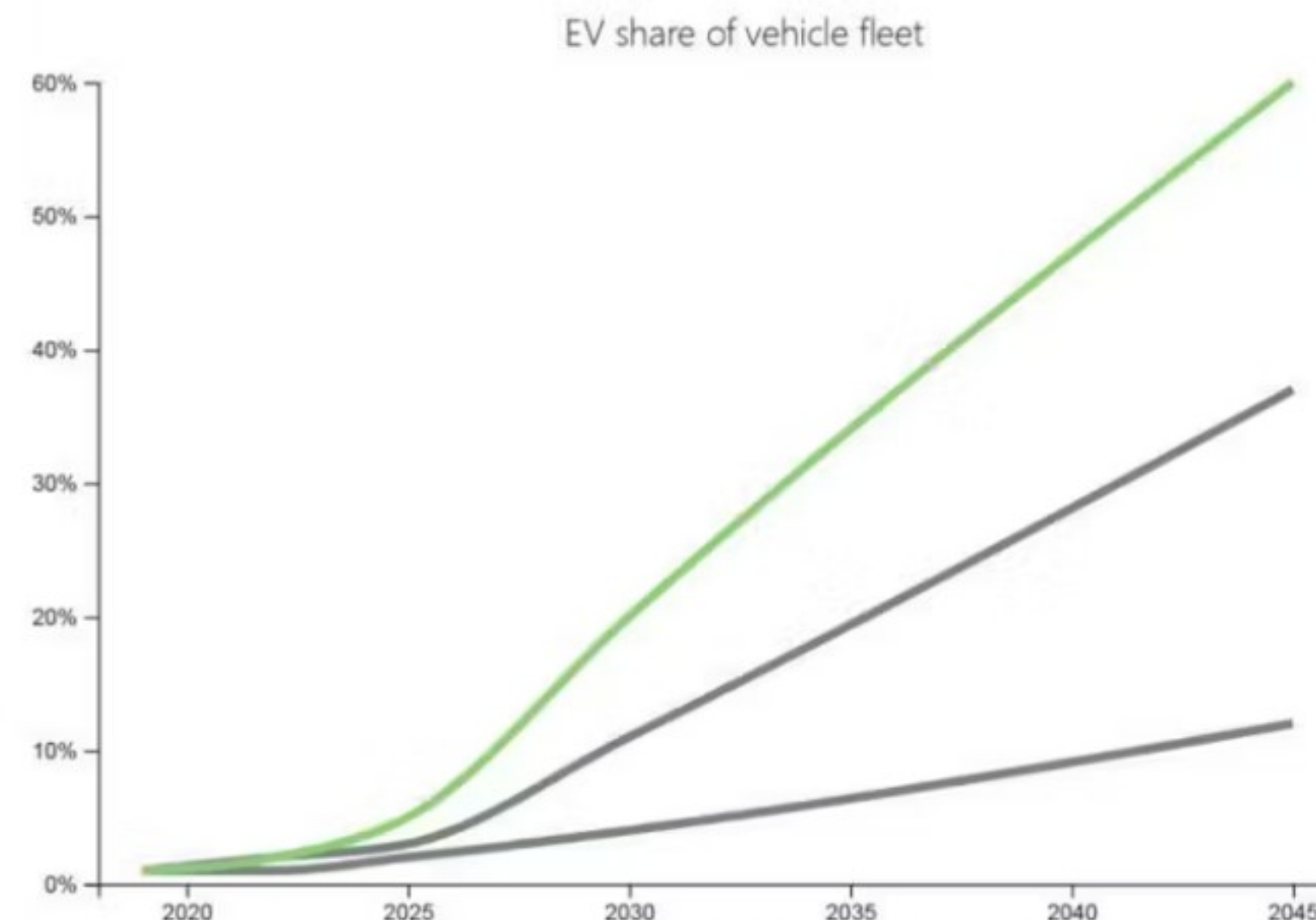
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**Auto Manufacturers'
Forecast**

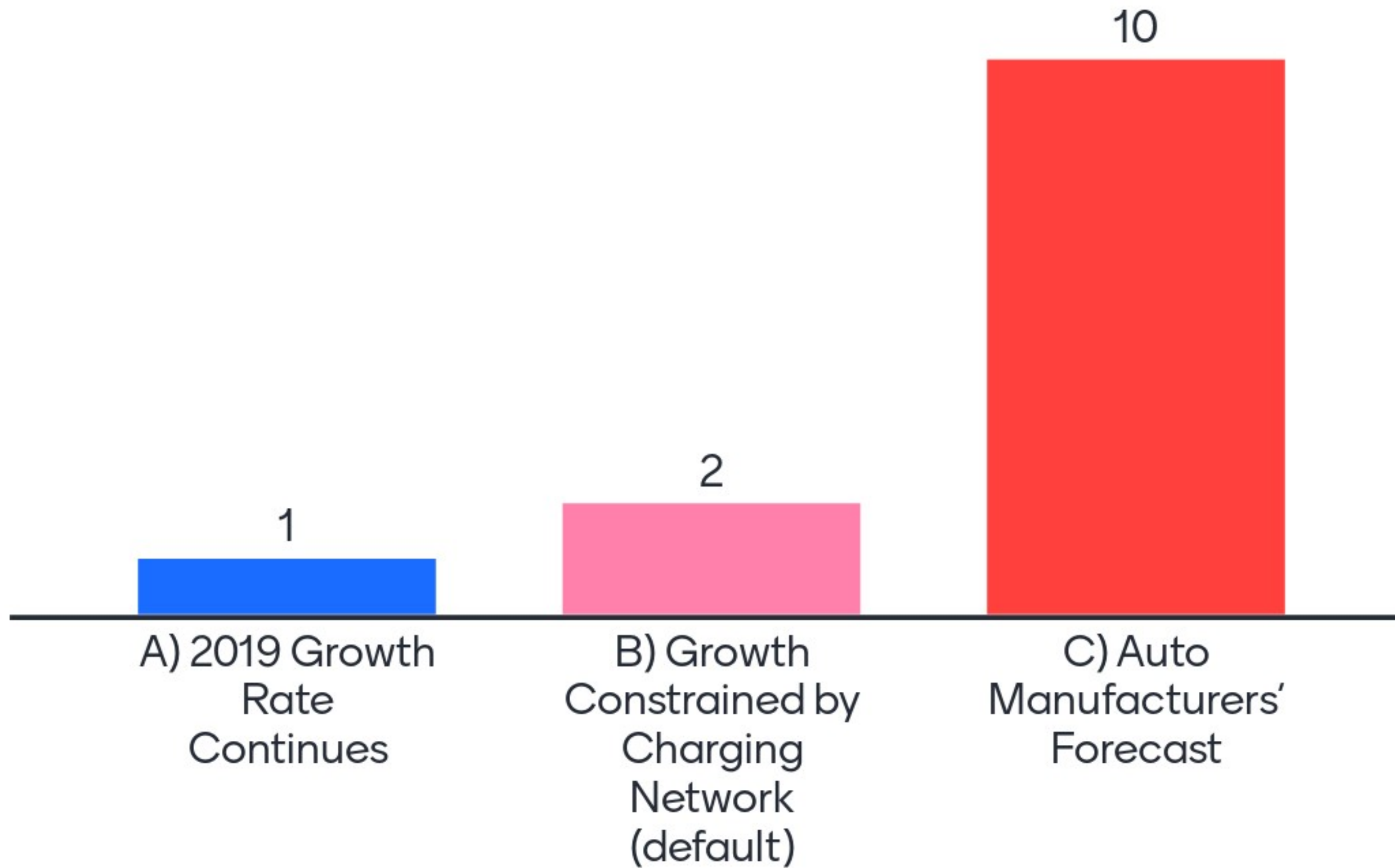
Make Your Prediction

- ☐ 2019 Growth Rate Continues
- ☐ Growth Constrained by Charging Network (default)
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1) Electric Vehicle Adoption





Quality of Life and Public Health

Autonomous Vehicles

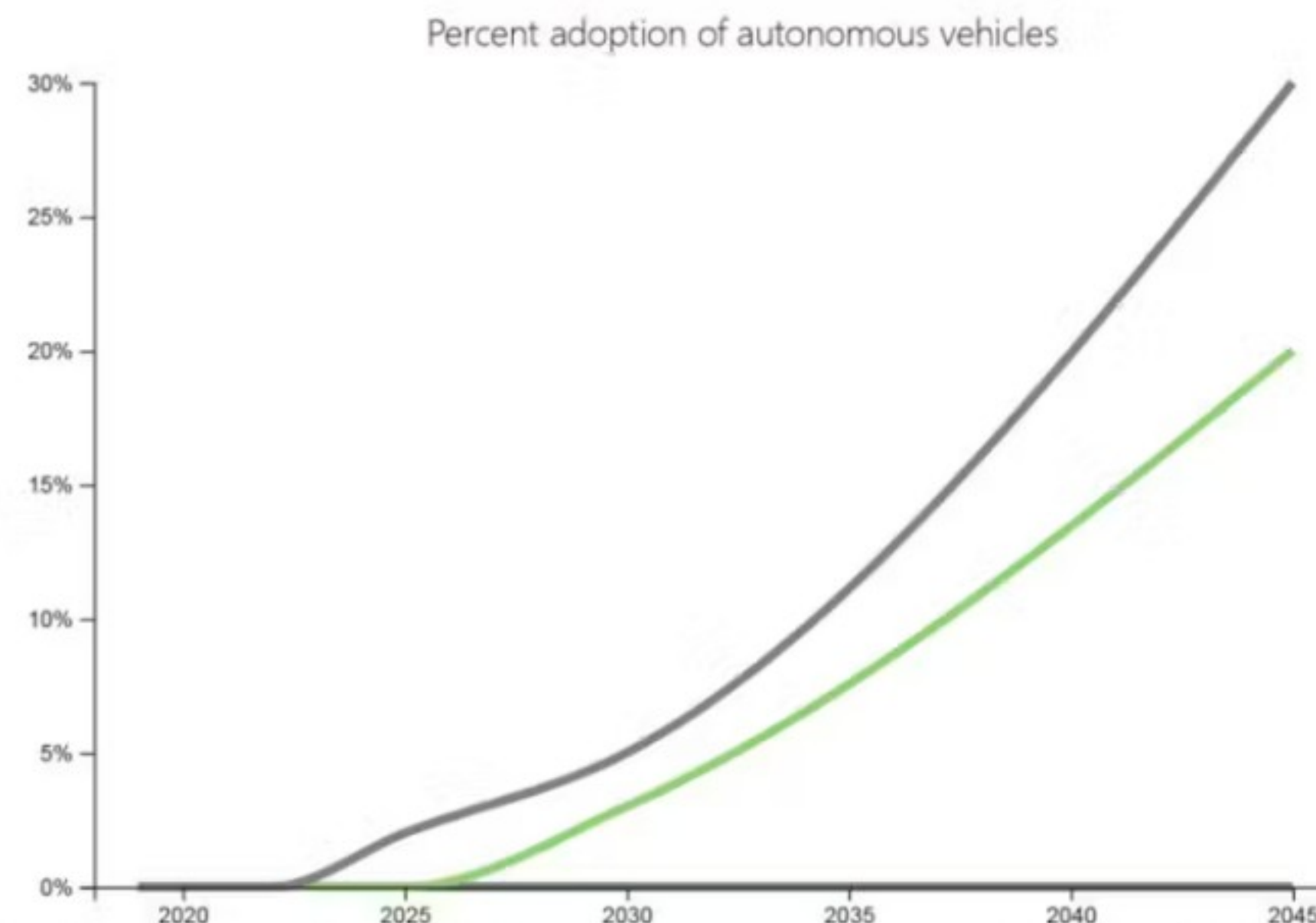
Availability more than 20 years away

20% of vehicles in service by 2045 (default)

30% of vehicles in service by 2045

Make Your Prediction

- ☐ Availability more than 20 years away
- ☒ 20% of vehicles in service by 2045 (default)
- ☐ 30% of vehicles in service by 2045



Widespread availability of highest-level autonomous vehicles (AVs) is probably at least ten years away. Depending on user assumptions, TrendLab+ estimates that up to 20% or 30% of vehicle travel in 2045 will be fully autonomous. Autonomous VMT will be about 15% higher than ordinary VMT. When AVs reach 100% adoption, forecasts suggest they may increase VMT per capita by 30% and decrease transit use by about 35%.



Quality of Life and Public Health

Autonomous Vehicles

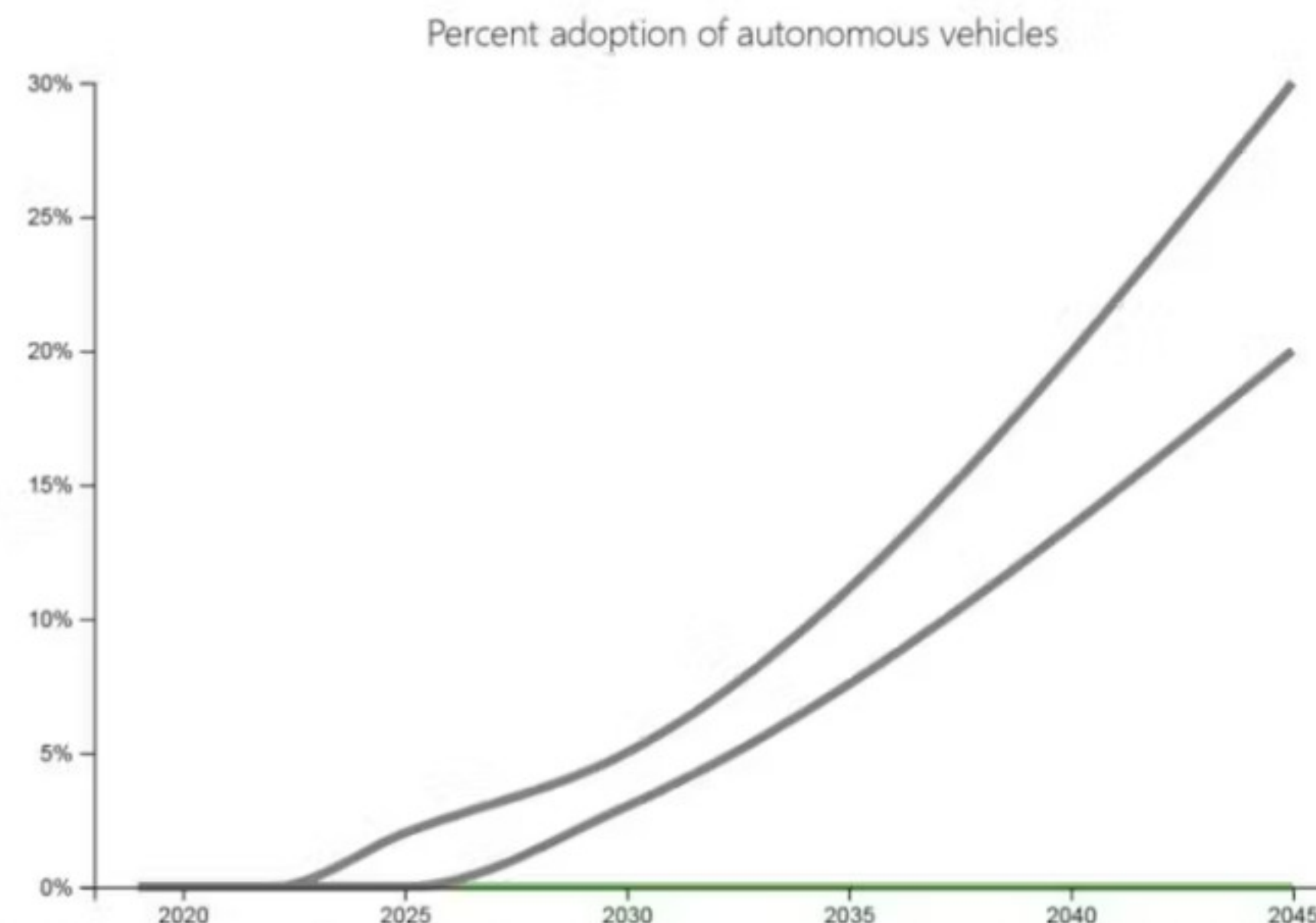
Availability more than 20 years away

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Make Your Prediction

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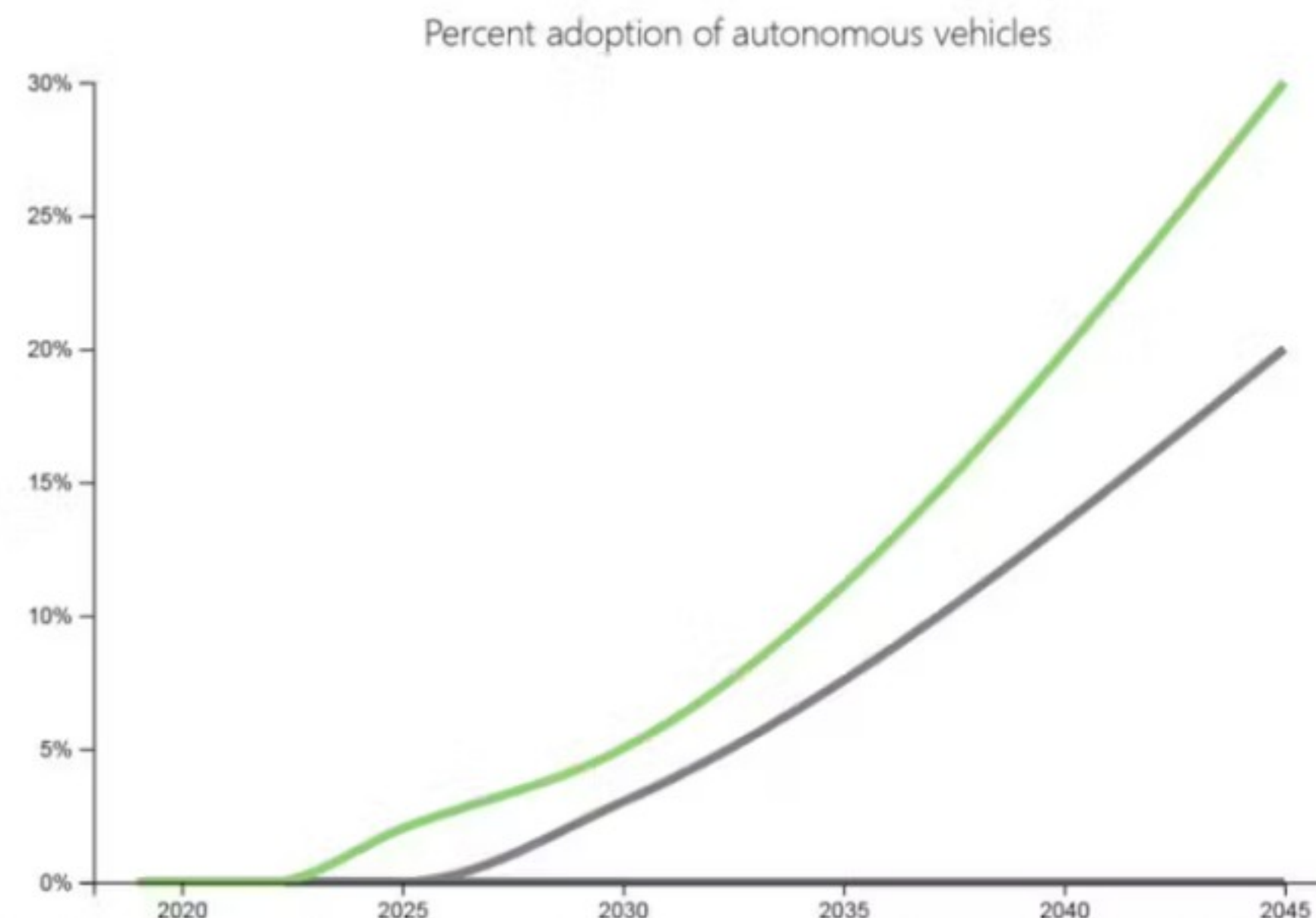
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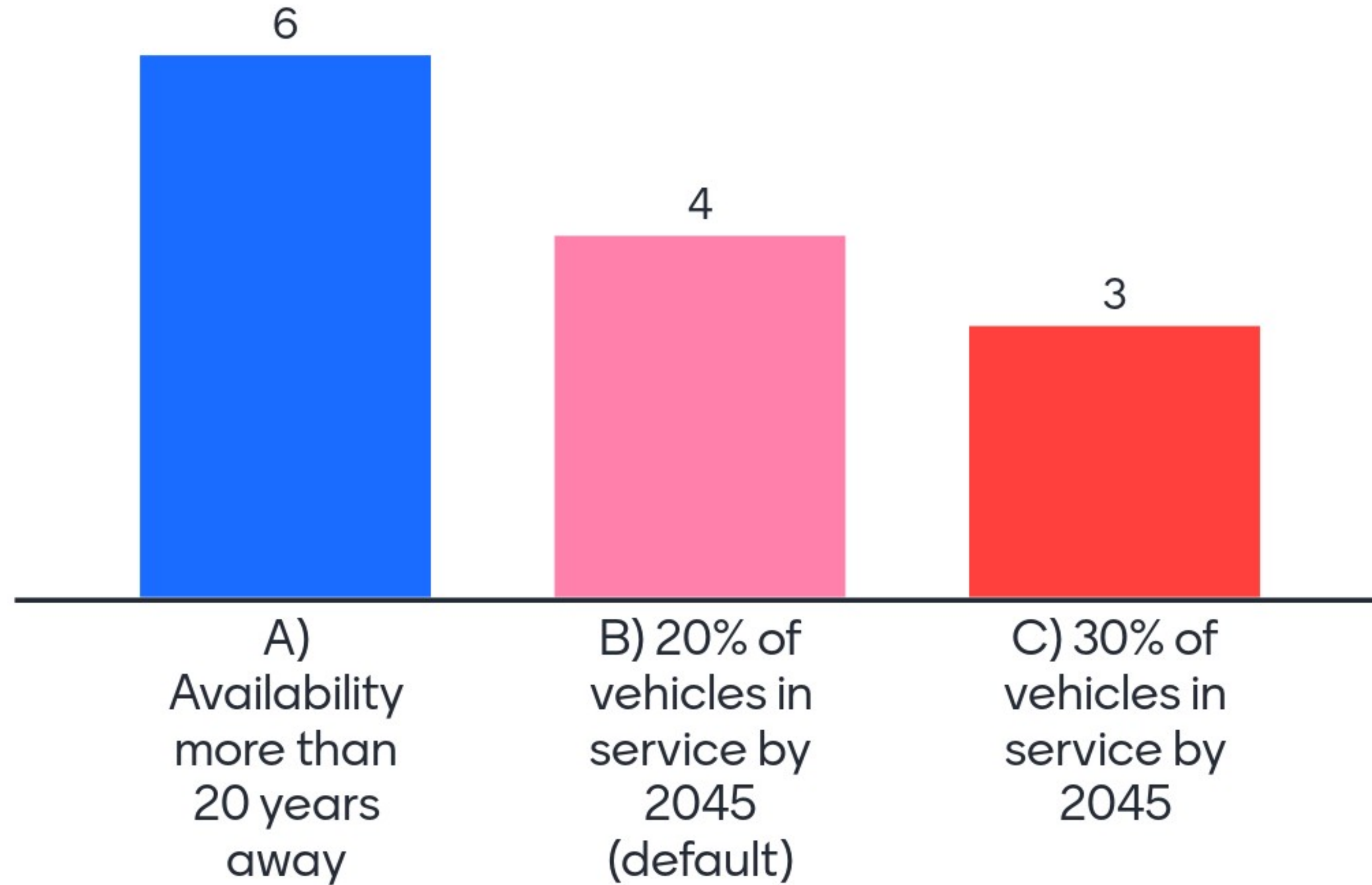
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2) Autonomous Vehicles



Performance Measures

Varying Analysis Trends:

- **VMT**
- **Transit Ridership/Farebox Revenue**
- **Greenhouse Gas Emission**
- **Fuel Tax Revenue**
- **AM/PM Peak Period Traffic**



Thank you!

We appreciate your participation!