massDOT Transportation Innovation CONFERENCE

Scenario Planning in *Beyond Mobility*, MassDOT's 2050 Statewide Long Range Transportation Plan

Derek Krevat

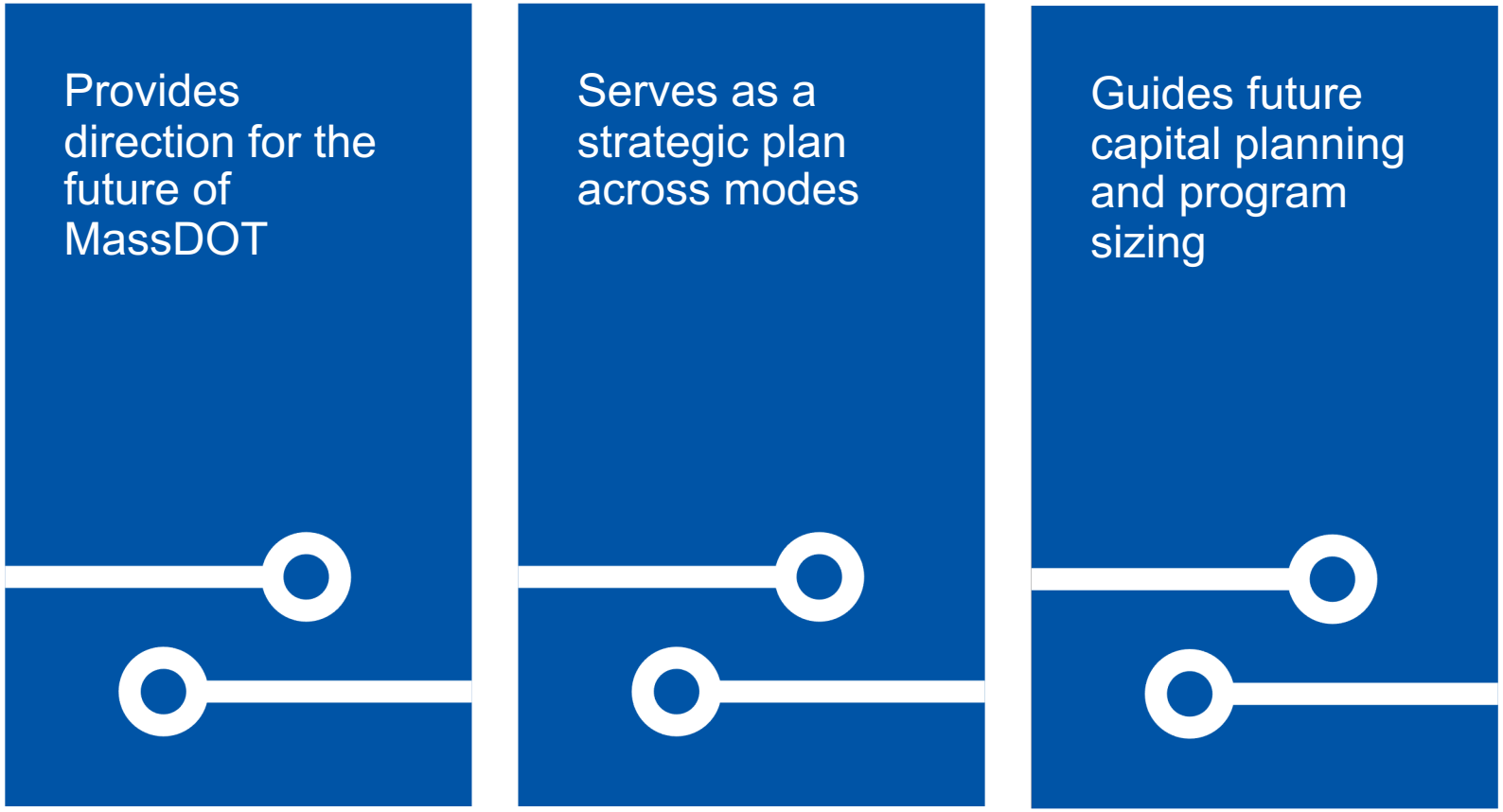
MassDOT Office of Transportation Planning

massDOT Massachusetts Department of Transportation

U.S. Department of Transportation Federal Highway Administration

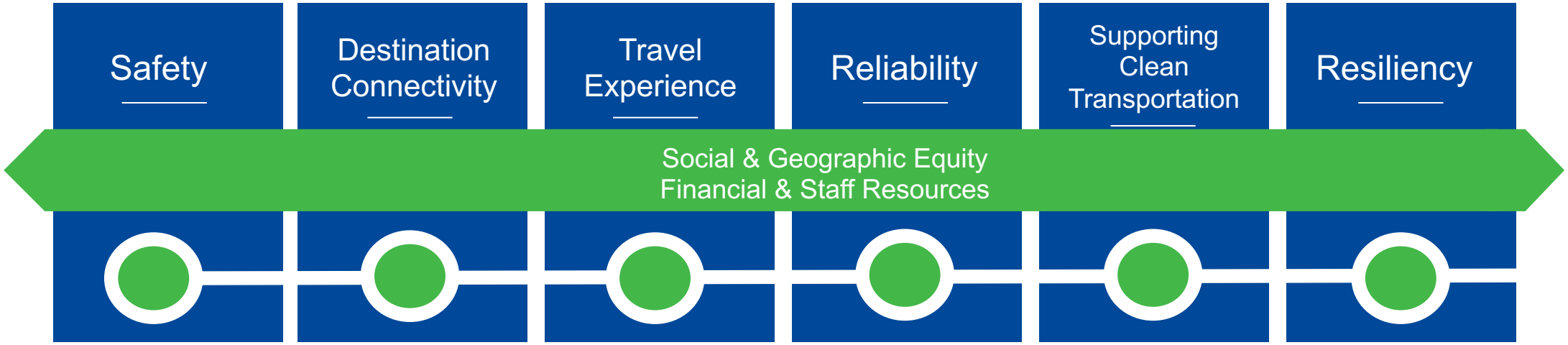
Beyond Mobility Purpose & Desired Outcomes

- **Beyond Mobility** is MassDOT's 2050 Statewide Long Range Transportation Plan, a Federally required plan.
- The plan will document the most **pressing transportation priorities** for Massachusetts to address between now and 2050.



Draft for policy development and discussion purposes only

Beyond Mobility Priority Areas



- Extensive public engagement (public surveys with over 3,500 responses as well as focus groups, stakeholder interviews, and workshops with a focus on EJ communities) identified the areas above as the most important priorities for MassDOT to address.
- The final Plan will be structured by these six priority areas. Each one will have a vision statement, values statements, and a set of problem statements.
- “Social & Geographic Equity” and “Financial & Staff Resources” are considered “cross-cutting themes” that underlie all six priority areas.

Draft for policy development and discussion purposes only

Scenario Development

- Scenario planning was undertaken to ensure that the final Beyond Mobility plan includes:
  - Resilient investment strategies that make sense across multiple futures
  - Trends and big ideas to monitor or learn more about in coordination with planning partners

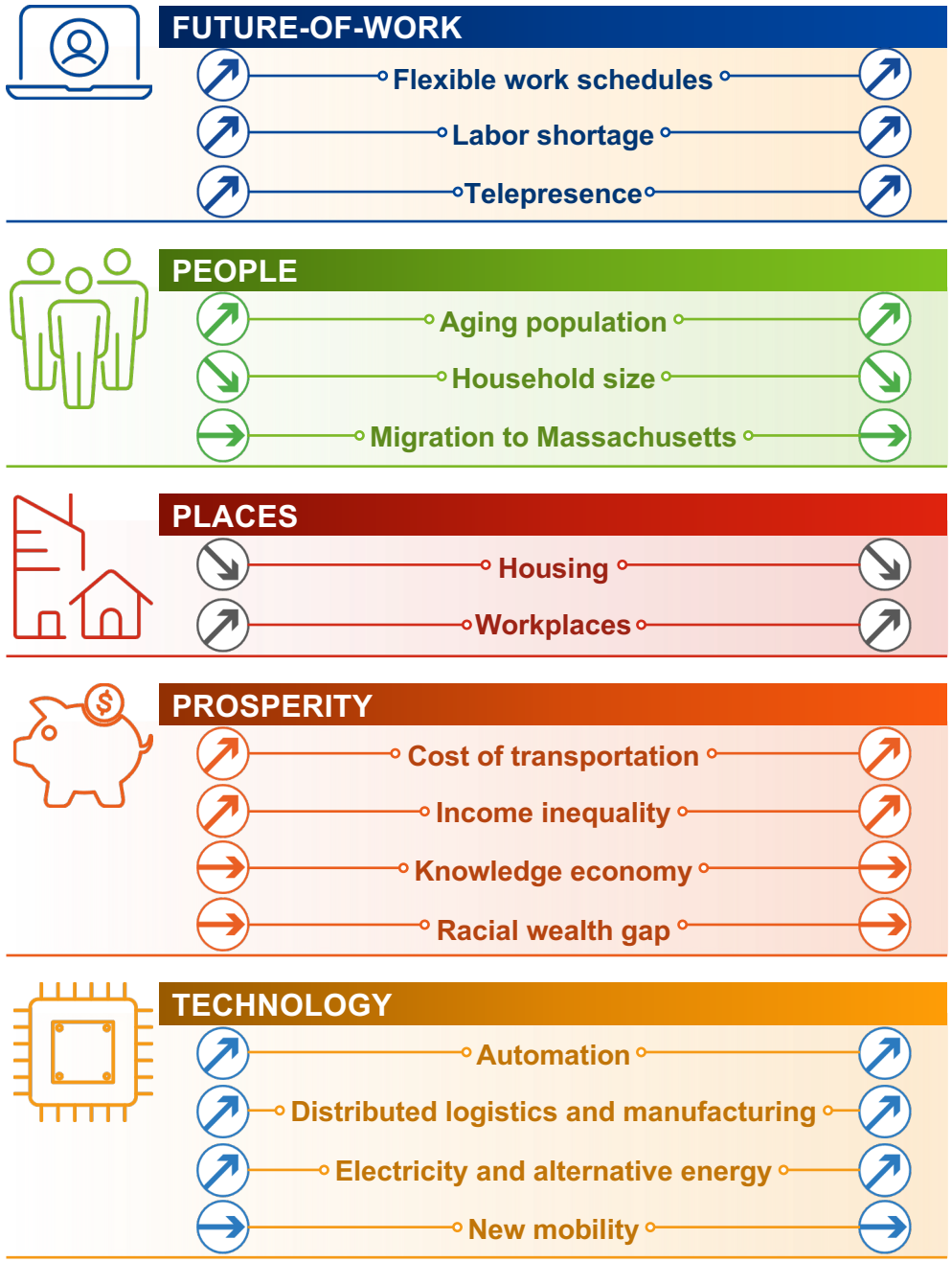
Scenarios Developed

- Three scenarios were developed for the Beyond Mobility planning process:
    - Ahead as Before
    - Hybrid and Diverse
    - Close and Connected

Variables Included in Scenarios

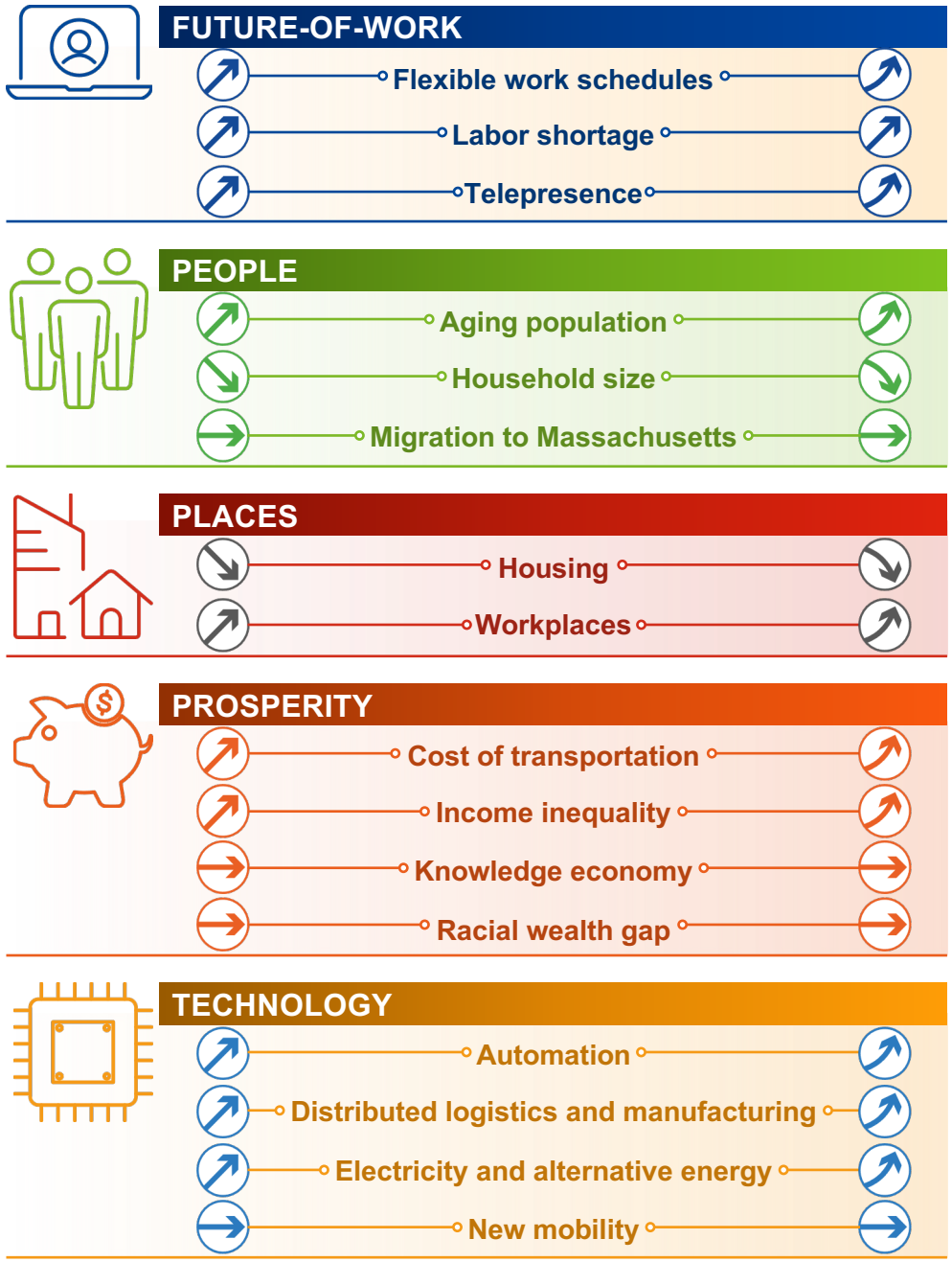
Trend	Variable
Climate Change	Sea Level Rise
	Extreme Temperatures and Energy Needs
	Severe Weather
Future-of-Work	Flexible Work Schedules
	Labor Shortage
	Telepresence
People	Aging Population
	Household Size
	Migration to Massachusetts
Places	Housing
	Workplaces

Trend	Variable
Prosperity	Cost of Transportation
	Income Inequality
	Knowledge Economy
	Racial Wealth Gap
Technology	Automation
	E-Commerce
	Electricity and Alternative Energy
	Freight
	New Mobility
	Cost of Transportation



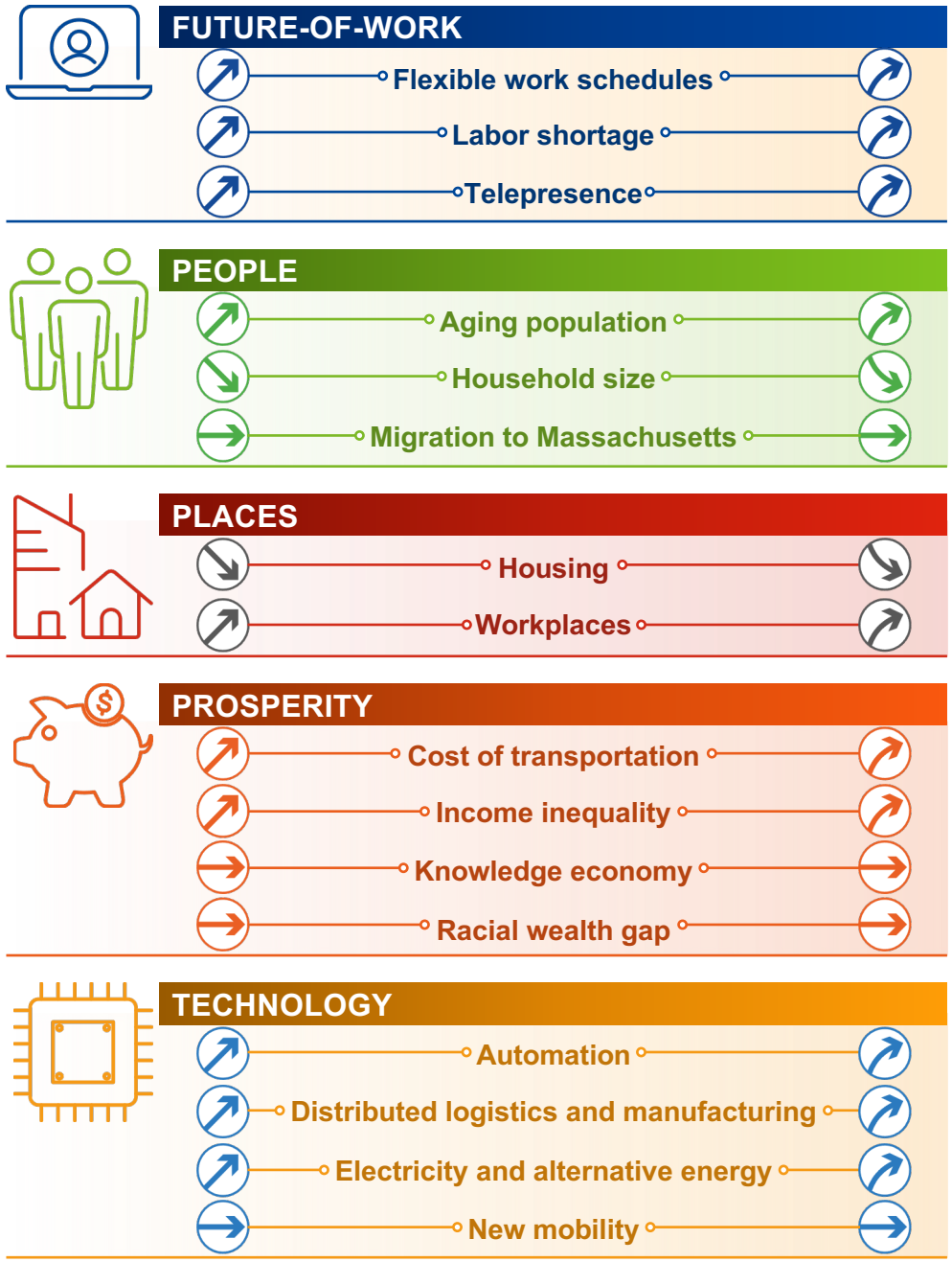
AHEAD AS BEFORE

- All 5–10-year trends from 2012-2022 maintain through 2050.
- Continued popularization of hybrid work models in industries where it is possible, with approximately 25% of working days being remote
- Much of the area's conventional office square footage is converted to or replaced by research labs and distribution centers for e-commerce.
- Housing prices continue to be high but do not experience exponential growth, as communities build a moderate number of new residences.
- Climate change has challenged the resiliency of some coastal and riverine infrastructure, but some mitigation has been accomplished using funding that formerly was spent on now-unnecessary snow and ice removal.



HYBRID AND DIVERSE

- Trends from 2012-2022 accelerate through 2050.
- 40% of workdays are remote, including the vast majority of those in white collar industries.
- Soaring housing prices have increased by more than 25%. As work-from-home has spread demand across the Commonwealth, the growth in housing prices and resulting displacement is significantly greater in some areas farther from Boston.
- Biotechnology explodes in Massachusetts, with laboratory facilities centered in mixed-use “villages” in inland areas of the Commonwealth. Co-working spaces are the only conventional offices that remain. Office buildings in many areas are replaced by a limited number of residential units.
- Summers have become hotter (26 more days per year over 90 degrees) and the whole year has become wetter (13% more precipitation in total, and over 20% in the winter).

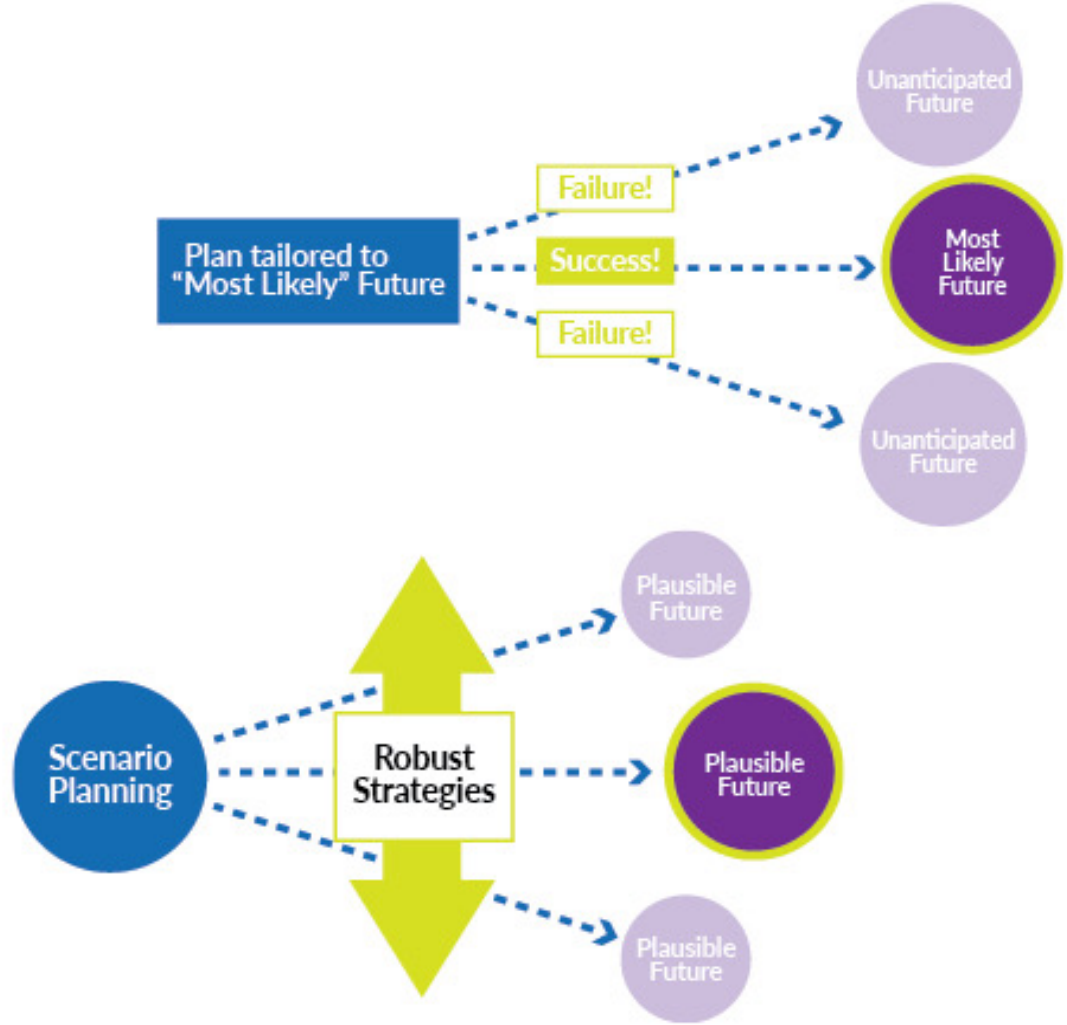


CLOSE AND CONNECTED

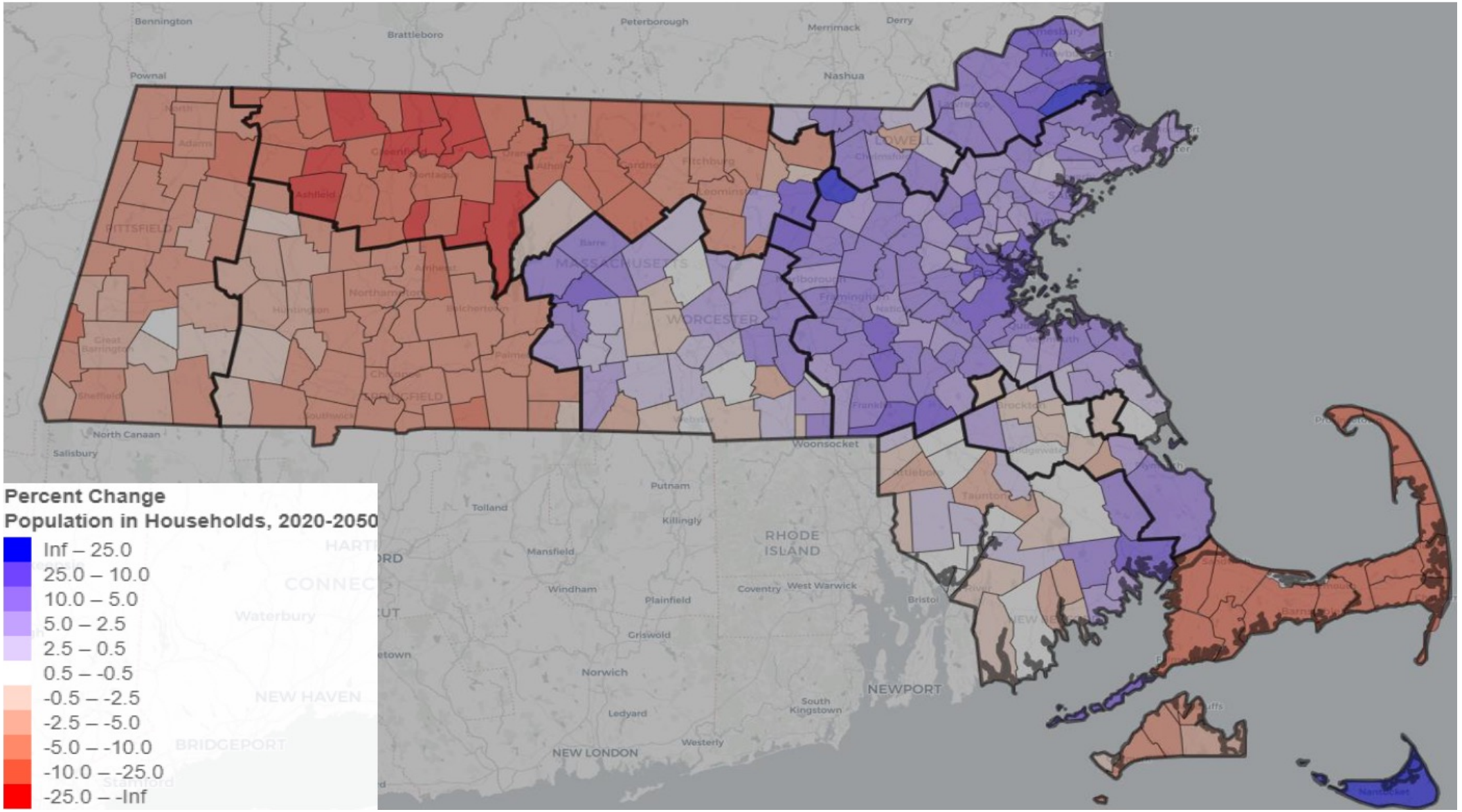
- All 5–10-year trends from 2012-2022 plateau or reverse through 2050.
- Workers return back to the traditional office through a combination of corporate pressure and desire to maintain a work-life balance. Approximately 15% of workdays are remote, resembling conditions before COVID-19.
- A plateaued knowledge economy emerges in Boston, Cambridge, and Somerville. As non-biotech high-tech companies are also seeking space close to these institutions, job density in Kendall Square, the Seaport, and Longwood continues to grow, taxing the transit system to those locations past its limits and generating demands for generational investment in rapid transit and bus services to reach these locations.
- Housing costs approximately plateau across the Commonwealth as a divided economy (knowledge inside I-495, industrial outside) spread demand for housing evenly.
- Historically marginalized residents are effectively priced outside of Route 128, becoming dependent on an under-supported Commuter Rail network to reach service jobs in the core.

Potential Applications of Scenarios
Developing Resilient Investment Strategies

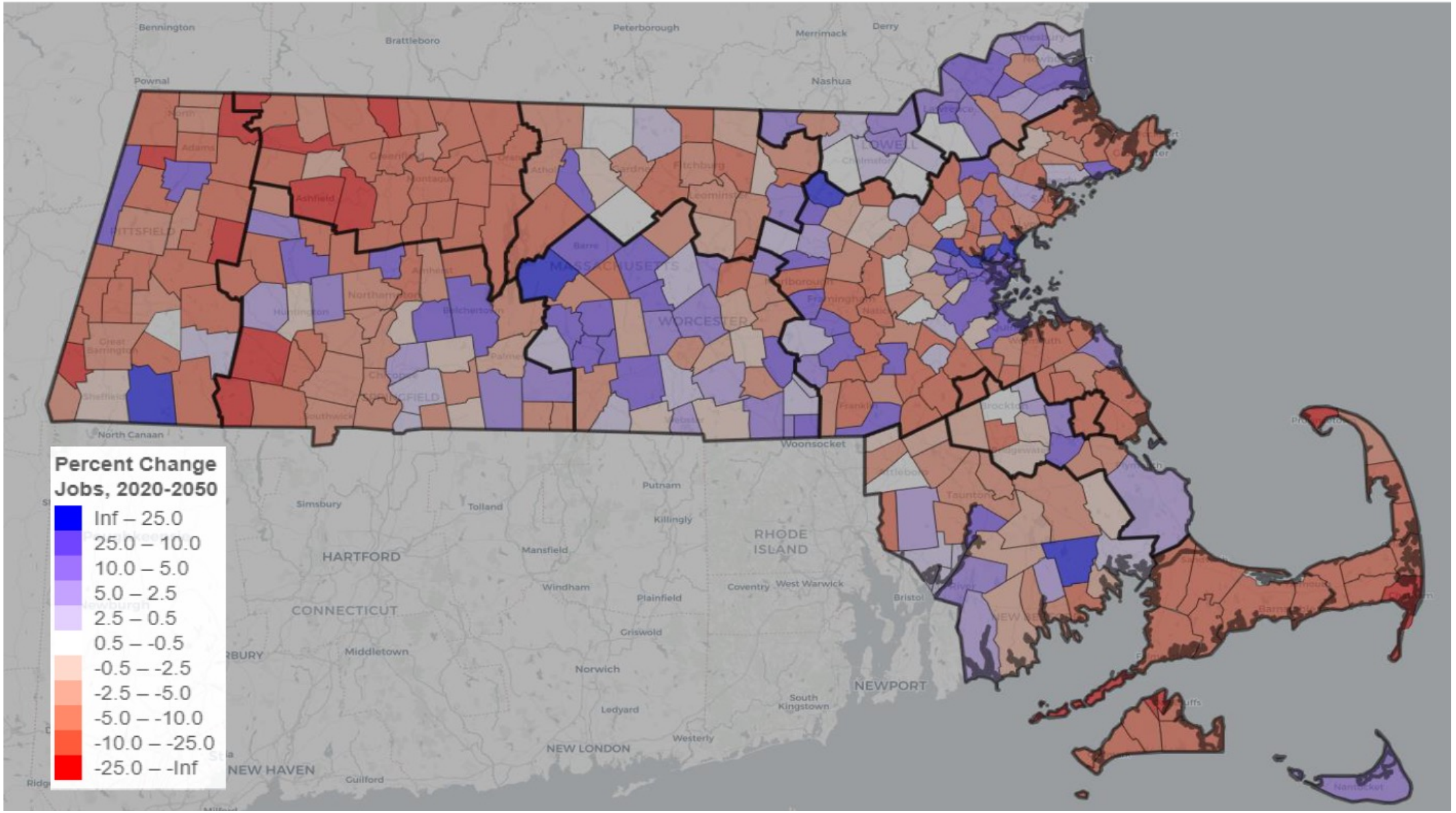
- All action items articulated in the final Beyond Mobility Plan will be appropriate regardless of which scenario occurs.



Examples of Specific Trends to Monitor
Socioeconomic Projections: Population



Examples of Specific Trends to Monitor
Socioeconomic Projections: Jobs



Potential Applications of Scenarios
Examples of Specific Trends to Monitor

- Integrating mass transit systems with on-demand mobility services using autonomous vehicles, especially if the autonomous vehicles are also low- or zero-emission, may hold promise for advancing multiple objectives, but significant technological and policy progress is needed to make this a reality.
- Projections show that anywhere from 19 to 75 percent of all vehicles on the road could feature Level Four automation (high automation, with full self-driving capabilities in most but not all scenarios) by 2040.