

*working*  
**FUTURES<sup>1</sup> GROUP**

GREATER PHILADELPHIA

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Dialogue. Collaboration. Knowledge-sharing.

# Future Forces 2050 Working Group Meeting 3

# Agenda

- Recap of Meetings 1 & 2
- Forces Likelihood, Impact, Uncertainty, and Relationship Voting Results
- Axes of Uncertainty
- 2050 Scenarios
- Discussion on Background Forces and Wildcards
- Breakout Group Discussions
- Next Steps

# Future Forces 2050

- Step 1. Define Research Statement
- Step 2. Brainstorm Future Forces
- Step 3. Short Presentations on Future Forces with Highest Knowledge Gaps
- Step 4. Vote for Working List Forces Most Probable and Relevant to Research Statement
- Step 5. Vote on Impact and Uncertainty for Top 20 Voting List Forces (identified in Step 4)
- *Step 6. Use Impact-Uncertainty voting results to form axes of uncertainty.\**

*\*DVRPC staff-led steps.*

# Future Forces 2050

- *Step 7. Use axes of uncertainty to form scenarios.\**
- Step 8. Facilitated discussion of scenario implications.
- Step 9. Facilitated discussion on scenario recommendations.
- *Step 10. Model and develop scenario narratives.\**
- Step 11. Review draft report.
- Step 12. Publish final report and communicate key findings.

*\*DVRPC staff-led steps.*

# Final Research Statement

*Characterize and test uncertainty from societal, technological, economic, environmental, and political trends and forces in Greater Philadelphia between the present and 2050, which may:*

- *Pose new opportunities and risks;*
- *Affect predictability in regional demographics, economy, land use, infrastructure, and travel patterns; and*
- *Impact the region's ability to achieve its vision.*

# Future Forces

170 Brainstormed Forces



41 Nominated Forces



15 Working List Forces

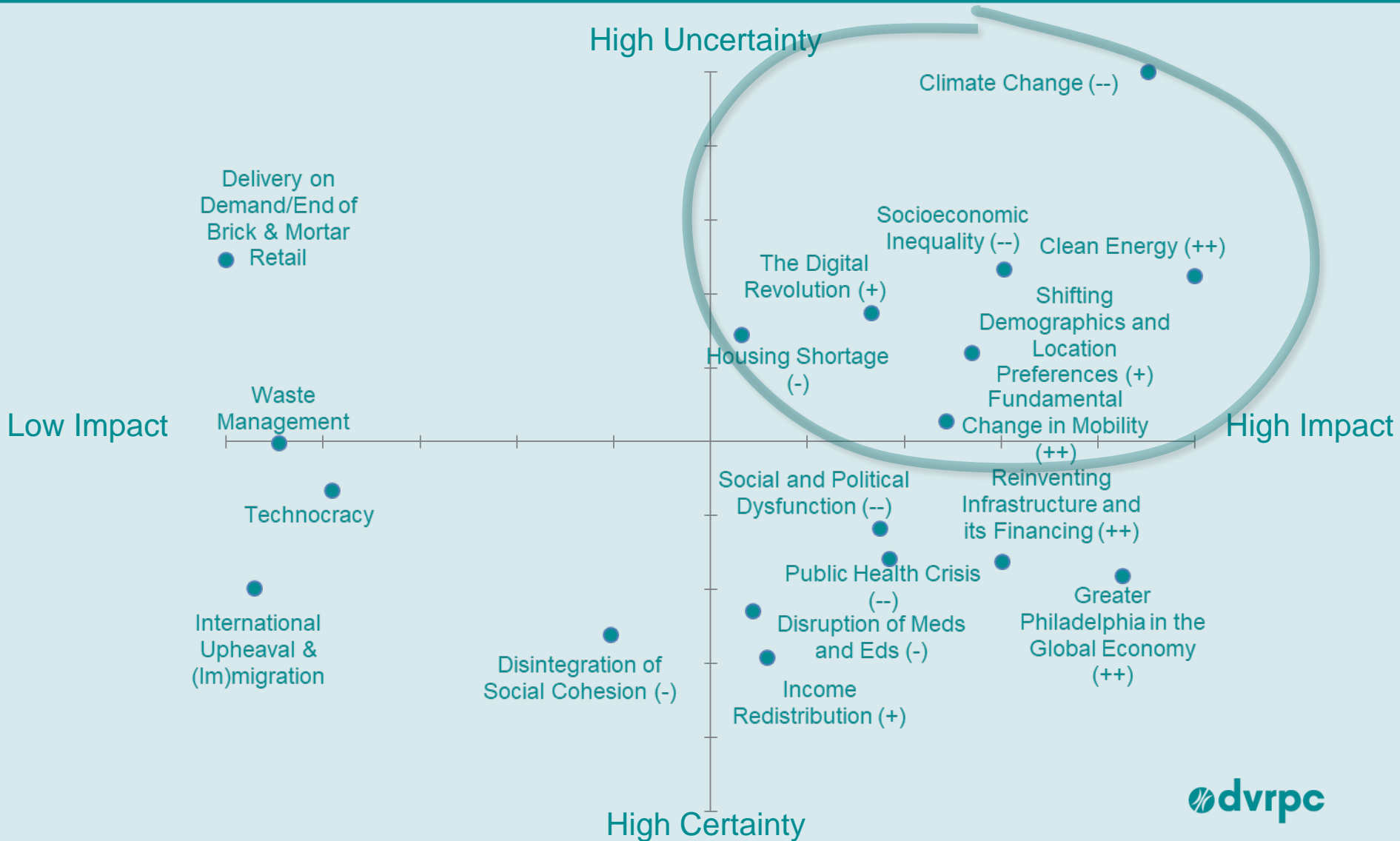


18 Voting List Forces

# 18 Voting List Forces

- Clean Energy
- Climate Change
- Delivery on Demand / End of Bricks & Mortar Retail
- The Digital Revolution
- Disintegration of Social Cohesion
- Disruption of Meds and Eds
- Fundamental Change in Mobility
- Greater Philadelphia in the Global Economy
- Housing Shortage
- Income Redistribution
- International Upheaval & (Im)Migration
- Public Health Crisis
- Reinventing Infrastructure and its Financing
- Shifting Demographics and Location Preferences
- Social & Political Dysfunction
- Socioeconomic Inequality
- Technocracy
- Waste Management

# Impact-Uncertainty





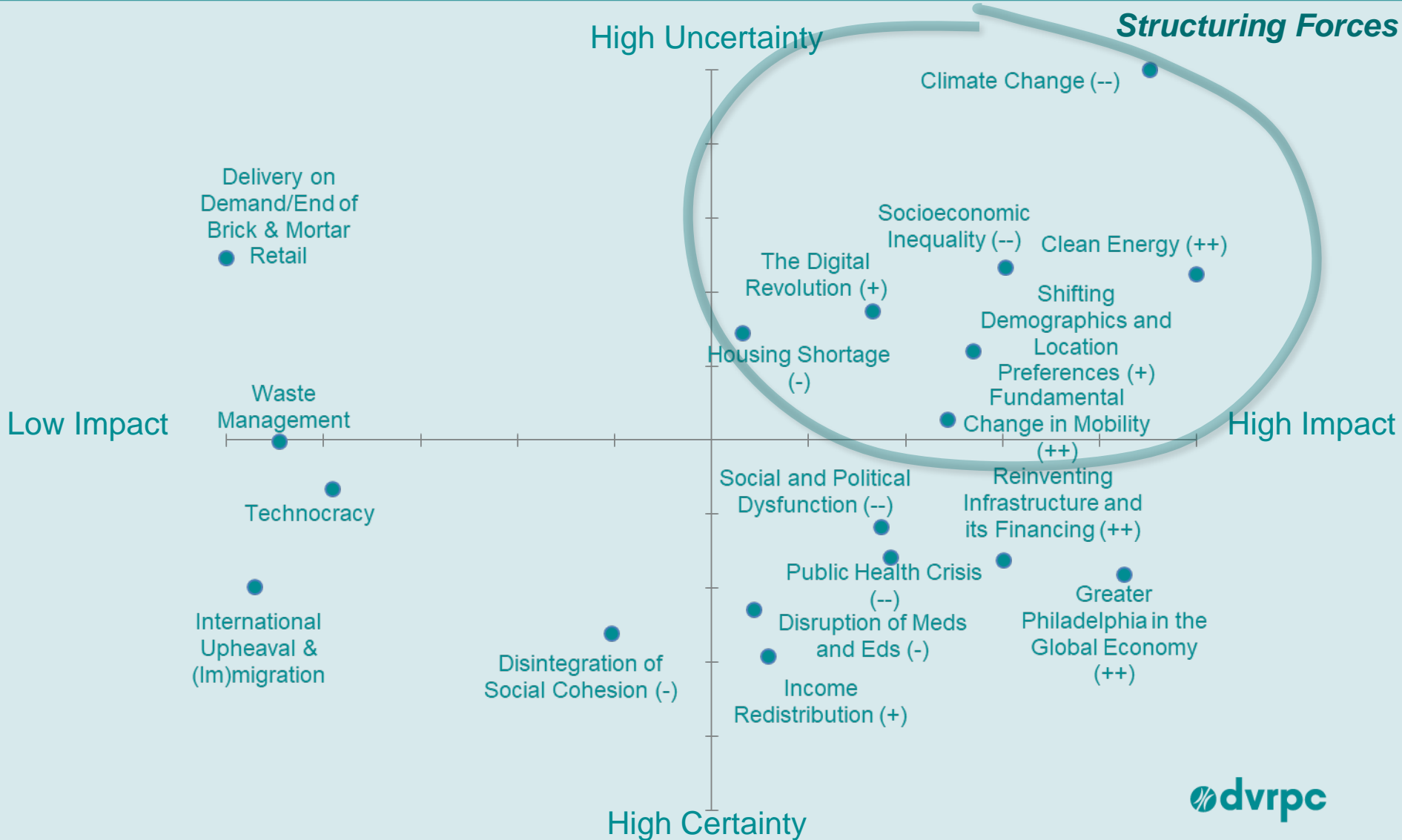
# Scenario Development Best Practices

- **Be plausible** – fall within the limits of what is reasonably expected to happen.
- **Structurally different** – take radically different paths in key aspects, not simply variations of a base case.
- **Logical consistency** – no internal inconsistencies that undermine credibility.
- **Have utility** – adhere to the decision focus and are useful in identifying strategic options.
- **Challenge conventional wisdom** – expand our horizons and broaden our definition of probability.

# Shifting from Forces to Scenarios

- Previous meetings focused on Forces
- Four years ago Scenarios were Forces
- This year “Scenario” means something different.
  - Broader
  - Composed of multiple forces
  - One force may play out differently in different scenarios

# Impact-Uncertainty



# Scenario-Structuring Forces

## High-Impact, High Uncertainty Forces

1. Climate Change
2. Socioeconomic Inequality
3. Digital Revolution
4. Clean Energy
5. Shifting Demographics & Location Preferences
6. Housing Shortage
7. Fundamental Change in Mobility

# Forming Axes of Uncertainty

Group 1    Digital Revolution | Fundamental Change in Mobility

Group 2    Climate Change | Clean Energy

Group 3    Socioeconomic Inequality | Housing Shortage | Shifting  
Demographics & Location Preferences

*What drives the uncertainty of these forces' potential outcomes?*

# Forming Axes of Uncertainty

Digital Revolution | Fundamental Change in Mobility

**Axis 1: Incremental vs. Transformative Technological Change**

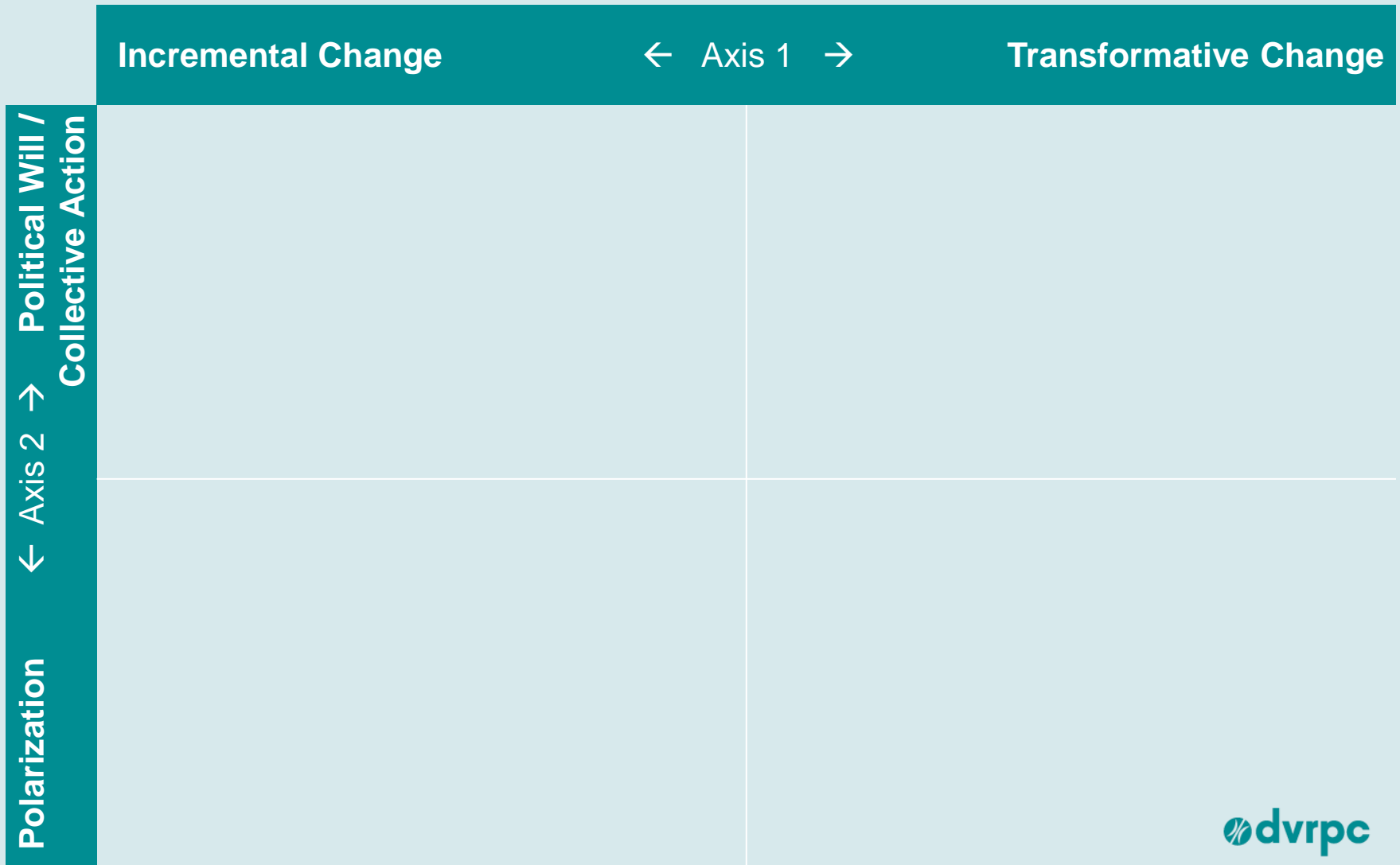
Climate Change | Clean Energy

**Axis 2: Political Will & Collective Action vs. Continued Polarization**

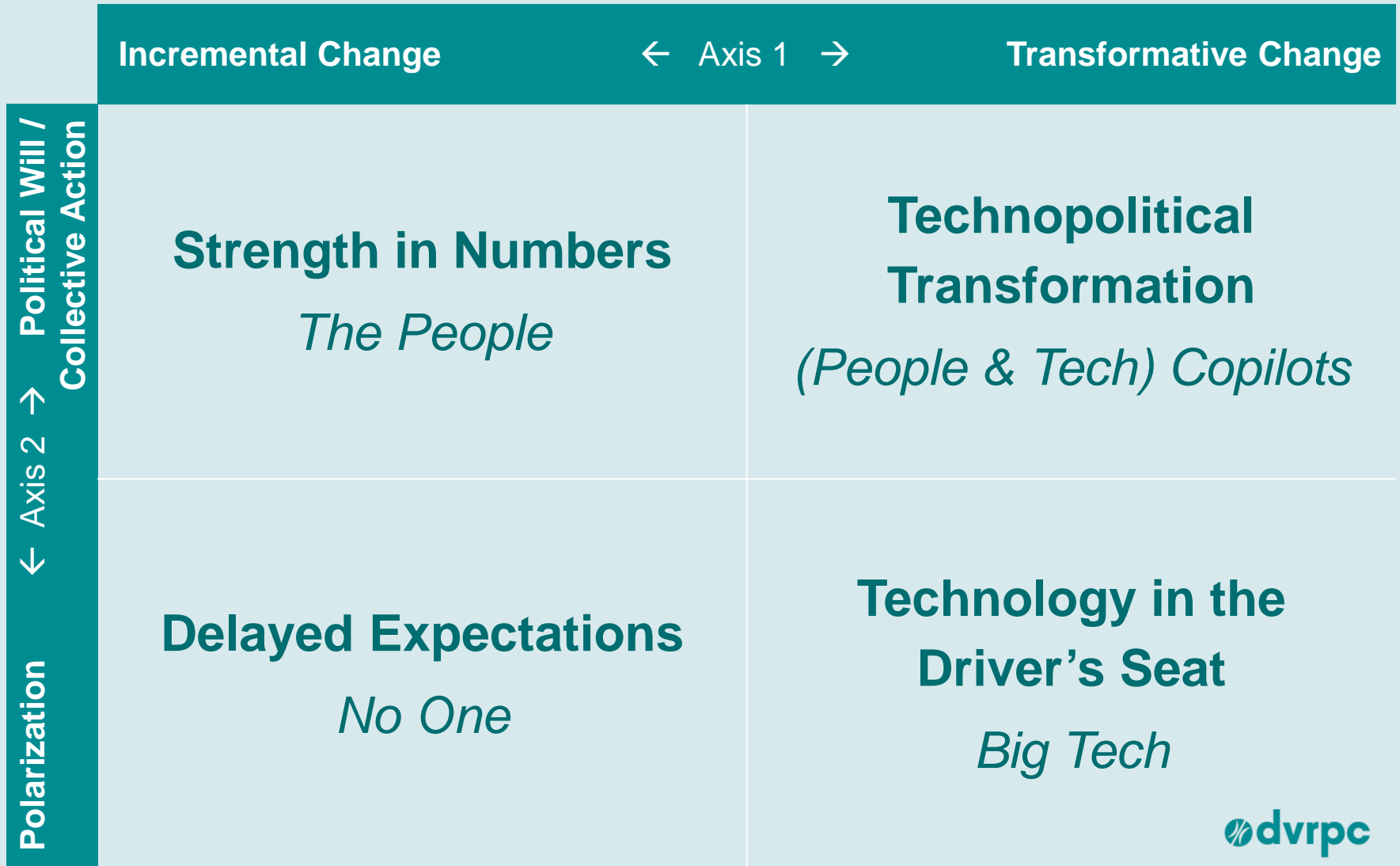
Socioeconomic Inequality | Housing Shortage | Shifting Demographics & Location Preferences

*What drives the uncertainty of these forces' potential outcomes?*

# Four Scenarios (Where Forces Play Out Differently)



# Who's Steering the Ship?





# Strength in Numbers *(The People)*

- Technological advances have rolled out slowly, as citizens have more say in the development and regulation of technology, their communities, the economy, and privacy.

**Political Will & Collective Action**  
+  
**Incremental Change**

# Technopolitical Transformation *(Copilots)*

- Technological advances are directed toward achieving major societal goals; rapid changes have made the world unrecognizable from conditions just three decades prior.
- Citizens have more say in the development and regulation of technology, their communities, the economy, and privacy.

**Political Will & Collective Action**  
+  
**Transformative Change**

# Delayed Expectations *(No one)*

- Long-anticipated technologies have been slow to rollout after hitting a few bumps in the road.
- Political uncertainty, slow innovation, and economic stagnation leads to aimless, sideways markets due to lack of direction.

**Polarization**  
**+**  
**Incremental Change**

# Technology in the Driver's Seat *(Big Tech)*

- Private market fills the void left from lack of political leadership.
- A handful of powerful monopolies have unprecedented control over technological development, the economy, and how communities grow and develop.
- Automation has upended work, transportation, and many other industries, leading to vast worker displacement; the world is unrecognizable from conditions just three decades prior.

**Polarization**  
+  
**Transformative Change**

# Thinking About Scenarios

- Use them as platforms, to understand how key issues could unfold differently between now and 2050
  - Inequality
  - Climate Change & Environment
  - Transportation Technology
  - Transportation Infrastructure & Financing
  - The Economy and Work
  - Development Patterns & Housing
  - Demographics & Health
- Consider everything that follows as a ‘first draft’
  - Revisions to come based on your input

# Background Forces

- International Upheaval & (Im)migration
- Delivery on Demand, End of Bricks and Mortar Retail

# Wildcard and Blind Spot Forces

## Wildcards

- Social and Political Dysfunction
- Greater Philadelphia (Grows) in the Global Economy
- Reinventing Infrastructure and its Financing
- Income Redistribution
- Public Health Crisis

## Potential Blind Spots

- Disruption of Eds and Meds
- Technocracy
- Waste Management
- Disintegration of Social Cohesion

# Putting the Pieces Together

## Four Scenarios, each with:

- Key focus areas (incorporated in all scenarios).
- Wild card and blind sport forces (some, not necessarily all, included in only one scenario, where there is a fit)
- Background forces (included in all scenarios, but not a focus since they don't differentiate or have a big impact)



# Ground Rules

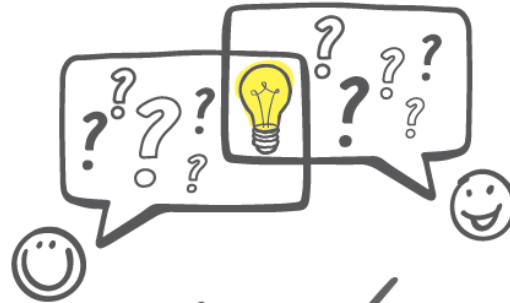
- Everyone will have a chance to speak.
- It's OK to disagree.
- Disagree with the idea, not the person.
- Do not interrupt each other.
- If you get stuck: park the issue so the process can keep moving.

# Breakout Group Discussion

1. What are the key implications for this scenario in terms of climate change, demographics, jobs and the economy, inequality, transportation technologies, infrastructure and funding for it, health, and others?
2. What doesn't change in this future?
3. What are the sources of conflict in this future?
4. Develop three news headlines for key stories in this future from different times between now and 2050.

# Next Steps

- DVRPC staff will summarize results from today's meeting and put on Futures Group page: <https://www.dvrpc.org/LongRangePlan/FuturesGroup/>
- **Meeting 4: Thursday, May 2, 2019.**
  - Focus on recommendations for each scenario.
- Please leave your nametags in the box.



*working*  
**FUTURES GROUP**

GREATER PHILADELPHIA

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## Memorandum 3

Post Meeting 2 Update

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# VOTING RESULTS & SCENARIOS

## Future Force Likelihood, Impact, Uncertainty, Relationships Voting

Following the second Futures Working Group meeting, participants were given the opportunity to vote on the Likelihood, Impact, Uncertainty, and Relationships for 18 voting list future forces. The 18 forces were identified over the course of the discussion in the first two meetings as having the greatest likelihood to bend current regional trends. These forces are:

- Clean Energy.
- Climate Change.
- Delivery on Demand / End of Bricks & Mortar Retail.
- The Digital Revolution.
- Disintegration of Social Cohesion.
- Disruption of Meds and Eds.
- Fundamental Change in Mobility.
- Greater Philadelphia in the Global Economy.
- Housing Shortage.
- Income Redistribution.
- International Upheaval & (Im)Migration.
- Public Health Crisis.
- Reinventing Infrastructure and its Financing.
- Shifting Demographics and Location Preferences.
- Social & Political Dysfunction.
- Socioeconomic Inequality.
- Technocracy.
- Waste Management.

To select which forces will be the most significant in the future, Working Group members used an online platform to vote on the likelihood that each force will actually happen, the potential impact if it does, and how certain or uncertain they were of those impacts. The voting platform was available for two weeks from March 18 to April 1, 2019. A total of 75 people voted. The results of voting on Impact-Likelihood and Impact-Uncertainty are illustrated in Figures 1 and 2 on the following page.

DVRPC staff first looked at a likelihood-impact matrix, similar to the previous Future Forces effort, to understand how to categorize the forces that aren't high-impact, high-uncertainty. Low-likelihood, low-impact future forces can be seen as either blind spots in the planning process (things that may be overlooked) or variations on a theme (things are repetitive with other forces). Wildcards are low-probability forces, but would have a high impact if they

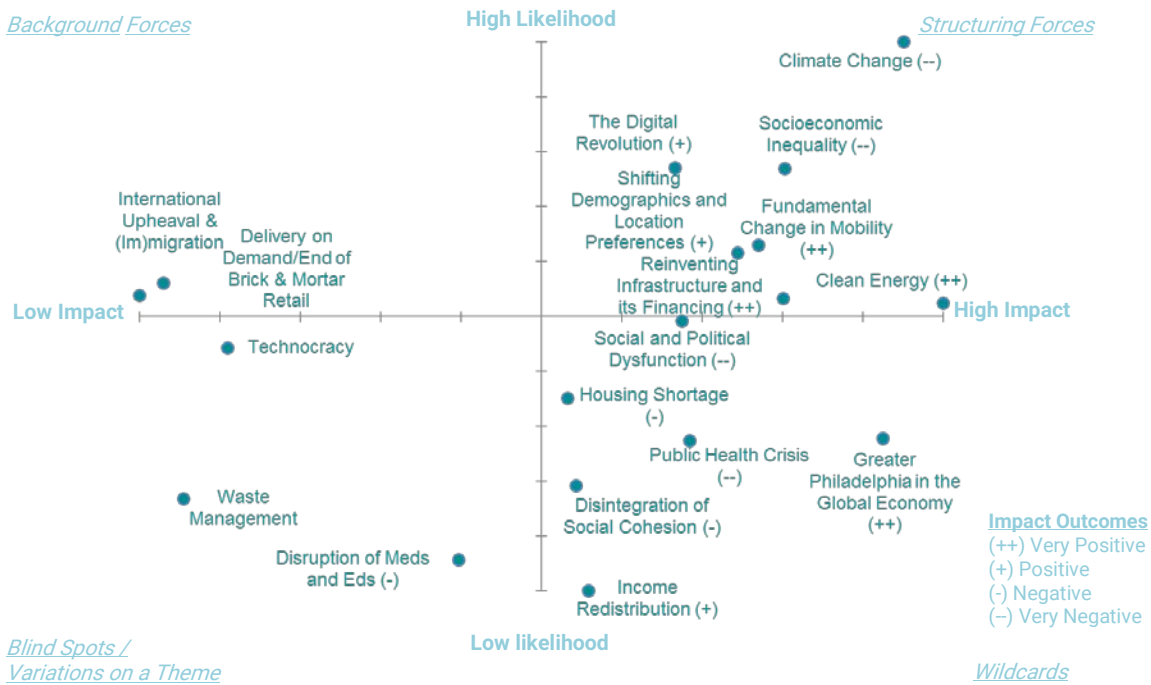
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The Delaware Valley Regional Planning Commission (DVRPC) fully complies with Title VI of the Civil Rights Act of 1964 and related nondiscrimination statutes in all activities. For more information, visit [www.dvrpc.org/GetInvolved/TitleVI](http://www.dvrpc.org/GetInvolved/TitleVI).

do occur. High-likelihood, low-impact forces are considered background forces that are generally included in all scenarios, unless they somehow contradict a scenario's internal logic.

**Figure 1: Impact-Likelihood Voting Results**



**Impact Framing Questions:** What are the top five future forces that you think will have most positive impact on the region? What are the top five future forces that you think will have the most negative impact on the region?

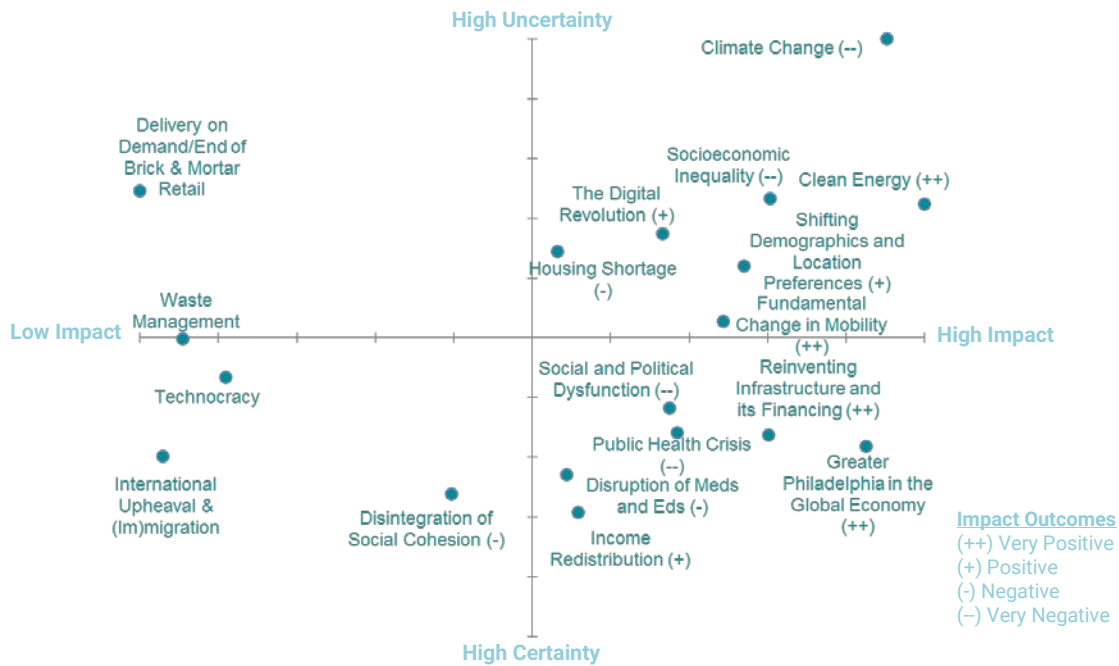
**Likelihood (or probability) Framing Questions:** What are the top five future forces that you think will be most likely to occur in Greater Philadelphia between 2019 and 2050? What are the top five future forces that you think will be least likely to occur in Greater Philadelphia between 2019 and 2050?

The second matrix, and the one that will be focused on more, compares impact and uncertainty (see Figure 2). Uncertainty suggests a force could yield different outcomes, while a more certain force is more likely to move in a specific direction. High-impact, high-uncertainty forces are used to create axes of uncertainty, which are then used to build the scenarios. Seven forces are identified as both high-impact and high uncertainty:

- Climate Change.
- Socioeconomic Inequality.
- Digital Revolution.
- Clean Energy.
- Shifting Demographics & Location Preferences.
- Housing Shortage.
- Fundamental Change in Mobility.

Table 1 reconciles each force based on likelihood, impact, and uncertainty. It lists the regional impact outcome of each force on a scale from very positive to very negative, as well as their corresponding force type: structuring, background, wildcard, and blind spot / variation-on-a-theme.

**Figure 2: Impact-Uncertainty Voting Results**



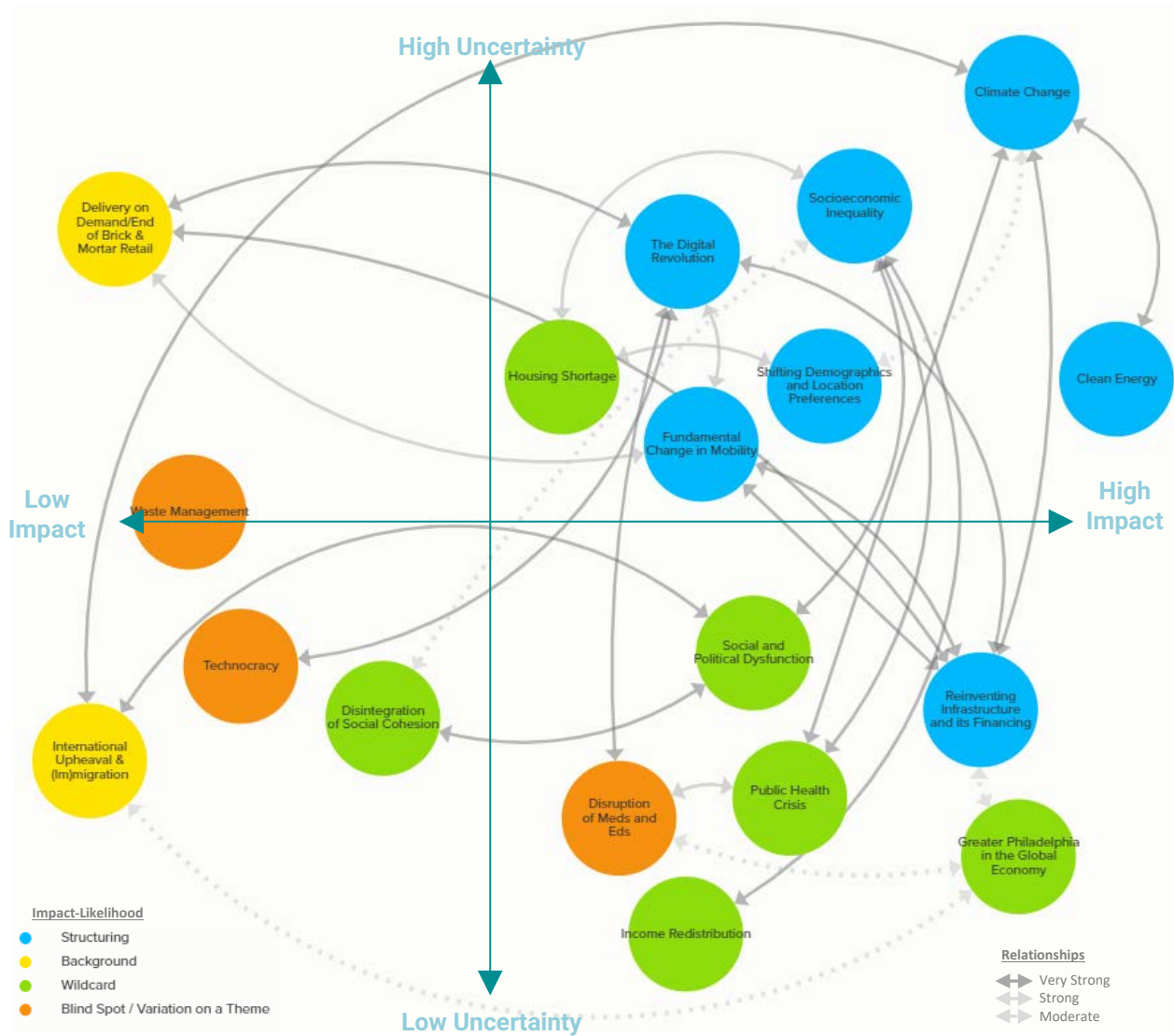
*Uncertainty Framing Questions: What are the top five future forces that you think have the most certain outcomes? What are the top five driving forces that you think have the least certain outcomes?*

**Table 1: Voting Summary Table**

Force	Likelihood	Impact	Uncertainty	Impact Outcome	Force Type
Clean Energy	Medium	High	High	Very Positive	Structuring
Climate Change	High	High	High	Very Negative	Structuring
Delivery on Demand/End of Brick & Mortar Retail	Medium	Low	High	Neutral	Background
The Digital Revolution	High	High	High	Positive	Structuring
Disintegration of Social Cohesion	Low	Medium	Low	Negative	Wildcard
Disruption of Meds and Eds	Low	Medium	Low	Negative	Blind Spot / Variation on a Theme
Fundamental Change in Mobility	Medium	High	Medium	Very Positive	Structuring
Greater Philadelphia in the Global Economy	Low	High	Low	Very Positive	Wildcard
Housing Shortage	Medium	Medium	Medium	Negative	Structuring
Income Redistribution	Low	Medium	Low	Positive	Wildcard
International Upheaval & (Im)migration	Medium	Low	Low	Neutral	Background
Public Health Crisis	Low	High	Low	Very Negative	Wildcard
Reinventing Infrastructure and its Financing	Medium	High	Low	Very Positive	Wildcard
Shifting Demographics and Location Preferences	Medium	High	Medium	Positive	Structuring
Social and Political Dysfunction	Medium	High	Low	Very Negative	Wildcard
Socioeconomic Inequality	High	High	High	Very Negative	Structuring
Technocracy	Medium	Low	Medium	Neutral	Blind Spot / Variation on a Theme
Waste Management	Low	Low	Medium	Neutral	Blind Spot / Variation on a Theme

The voting platform’s final question asked Working Group members to vote on the strongest relationships between pairs of forces. Figure 3 is a compilation of Figures 1 and 2, placing the 18 forces on impact and uncertainty axes, while color-coding them by impact-likelihood classification. It adds in the strength of the relationship between forces with lines of varying tones of grey. Where there are no lines between forces, the relationship identified was either very weak or non-existent.

Figure 1: Likelihood-Impact-Uncertainty & Relationships



*Relationship Framing Question: Identify the five pairs of forces with the strongest and most important relationships.*

## Forming Axes of Uncertainty and Scenarios

DVRPC staff used the seven high-impact and high uncertainty forces to form axes of uncertainty. These seven forces were initially grouped into three axes:

1. Climate Change and Clean Energy.
2. Digital Revolution and Fundamental Change in Mobility.
3. Socioeconomic Inequality, Housing Shortage, and Shifting Demographics & Location Preferences.

The Digital Revolution and Fundamental Change in Mobility suggest a range of futures based around either incremental or sustaining technological change versus disruptive or transformative change. The axes for climate change and clean energy, and socioeconomic inequality, housing shortage, and shifting demographics & location preferences were thought about as whether or not there will be political will to take collective action on dealing with these challenges, or if the polarized status quo would hold going forward.



Figure 4 illustrates the relationship between these axes, and identifies the four scenarios that result from their interplay. While the names for these scenarios are in draft form, their circumstances should remain consistent through the remaining steps of the scenario planning exercise.

**Figure 2: Four Scenarios Formed from Axes of Uncertainty**

		Incremental Change	← Axis 1 →	Transformative Change
Political Will / Collective Action → Axis 2 → ← Axis 2 ← Polarization	<b>Strength in Numbers</b> – Technological advances have rolled out slowly, as citizens have more say in the development and regulation of technology, their communities, the economy, and privacy.	<b>Technopolitical Transformation</b> – Technological advances are directed toward achieving major societal goals; rapid changes have made the world unrecognizable from conditions just three decades prior. Citizens have more say in the development and regulation of technology, their communities, the economy, and privacy.		
	<b>Delayed Expectations</b> – Long-anticipated technologies have been slow to rollout after hitting a few bumps in the road, including a long artificial intelligence (AI) winter. Political uncertainty, slow innovation, and economic stagnation leads to aimless, sideways markets due to lack of direction.	<b>Technology in the Driver’s Seat</b> – The private market fills the void left from lack of political leadership. A handful of powerful monopolies have unprecedented control over technological development, the economy, and how communities grow and develop. Automation has upended work, transportation, and many other industries, leading to vast worker displacement; the world is unrecognizable from conditions just three decades prior.		

These scenarios should be seen as platforms that help us understand how key issues could unfold differently between now and 2050. They will evolve as the discussion continues, particularly around the key issues that have been a large part of the Future Forces discussion to date (though the scenarios aren’t limited to just these issues) and are also drawn from the research statement:

- Inequality.
- Climate Change & Environment.
- Transportation Technology.
- Transportation Infrastructure and Financing.
- The Economy and Work.
- Development Patterns and Housing.
- Demographics & Health.

### Classifying the Rest of the Forces

The impact-likelihood voting was used to classify all other 11 forces that didn’t fit into the high-impact, high-uncertainty category. Background forces are high-likelihood, low-impact forces. They are generally included in all scenarios, unless they contradict the scenario’s logic. We can identify other background forces, but these aren’t things we will focus on. The voting identified two background forces:

- International Upheaval & (Im)migration.
- Delivery on Demand, End of Bricks and Mortar Retail.

Wildcards are low-probably, high-impact forces. So they may have a big effect, if they happen. They are things we may want to include in one scenario, where there is a logical fit, in order to further differentiate the scenarios. Potential wildcards include:

- Social and Political Dysfunction.
- Greater Philadelphia (Grows) in the Global Economy.

- Reinventing Infrastructure and its Financing.
- Income Redistribution.
- Public Health Crisis.

Variations-on-a-theme or blind spots are low-likelihood, low-impact forces. These are things that may be variations of other forces, but could alternatively be blind spots in the planning process. They could potentially be included in one scenario as well. Blind spots have a higher bar to hurdle than wildcards, as they need to show they aren't simply a variation of another force. Possible blind spots include:

- Technocracy.
- Waste Management.
- Disintegration of Social Cohesion.
- Disruption of Meds and Eds.

Putting it all together, the four scenarios include:

- Key focus issues (incorporated in all scenarios) – these are the topics we want see how the scenario logic causes to play out differently in the future.
- Wildcard and blind spot forces – some, but not necessarily all, may be included in one scenario's logic, where there is a fit.
- Background forces – use same logic in all scenarios (unless they somehow contradict it), but not a focus since they don't differentiate or have a major impact at the regional level.

## Next Steps

Below is a summary of the steps involved in the Future Forces 2050 Scenario Planning exercise, with completed tasks greyed out. Meetings 1 and 2 focused on Steps 1 through 4, steps 5 through 7 were completed offline after the second meeting.

- Step 1. Define Research Statement
- Step 2. Brainstorm Future Forces
- Step 3. Short Presentations on Future Forces with Highest Knowledge Gaps
- Step 4. Vote for Working List Forces Most Probable and Relevant to Research Statement
- Step 5. Vote on Impact and Uncertainty for Top 20 Voting List Forces (identified in Step 4)
- Step 6. Use Impact-Uncertainty voting results to form axes of uncertainty.\*
- Step 7. Use axes of uncertainty to form scenarios.\*
- Step 8. Facilitated discussion of scenario implications.
- Step 9. Facilitated discussion on scenario recommendations.
- Step 10. Model and develop scenario narratives.
- Step 11. Review draft report.
- Step 12. Publish final report and communicate key findings.

Meeting 3, scheduled for **Thursday, April 11, 2019** will focus on scenario implications.

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\* DVRPC staff-led steps.