Revolutionizing Transportation Planning:
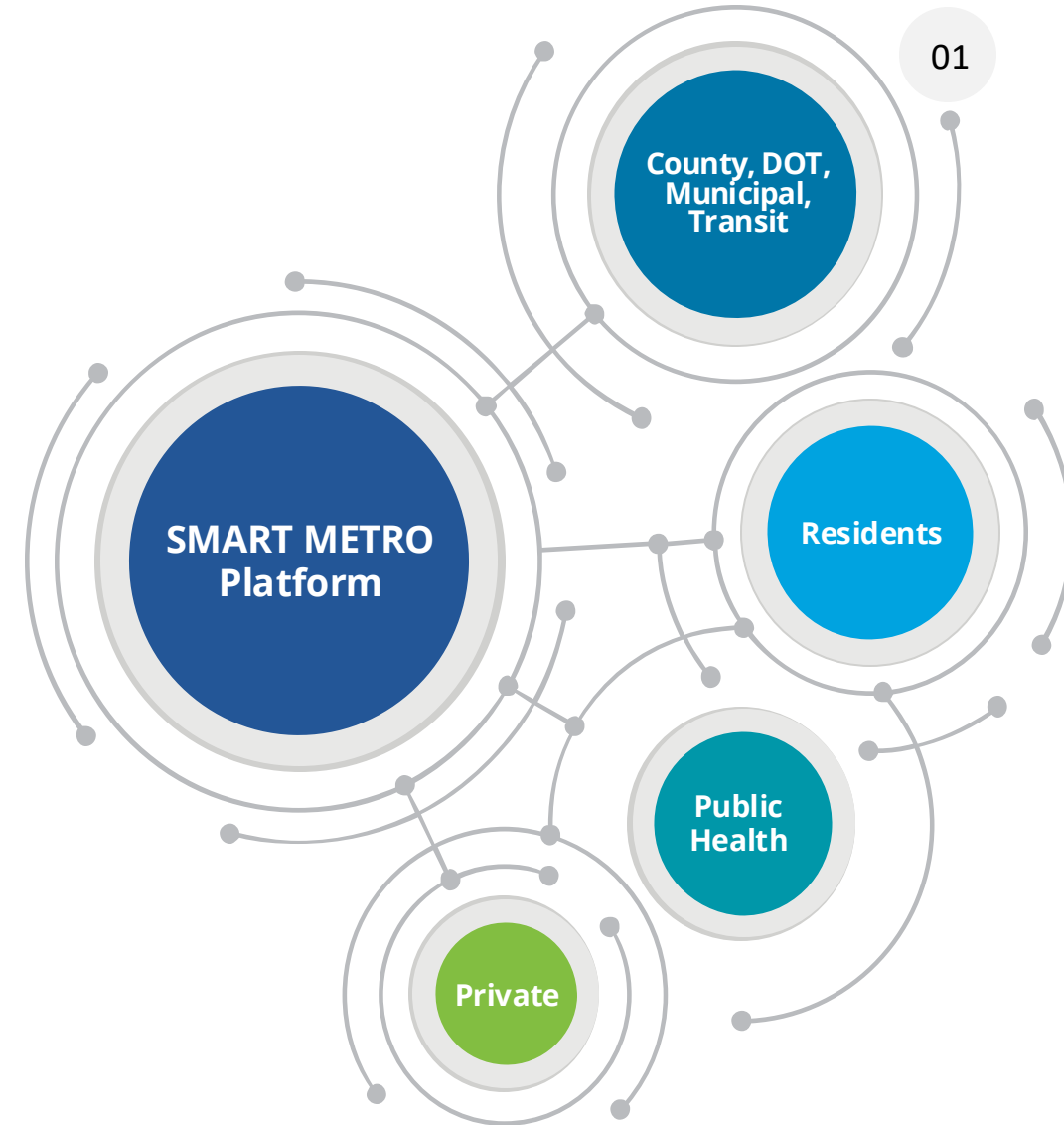A Hands-On AI Workshop
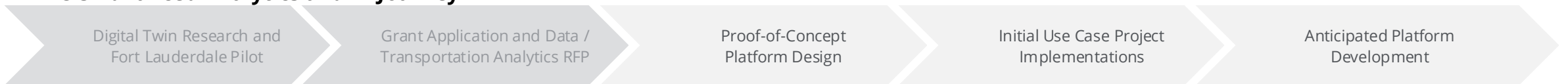
September 23, 2024

A Vision for the Future

Accelerating threats to **resiliency** and impacts of **congestion** and **population growth** pose risks for Broward County's welfare and economic growth.

Fragmented processes make it difficult to achieve collaborative and rapid decisions. **Siloed** data, **limited** models, and **disjointed** systems inhibit more data-driven planning and operations.

MPOs have a massive opportunity to evolve their current methods of operations and continuously provide "Planning as a Service" powered by AI.

County, DOT, Municipal, Transit

SMART METRO Platform

Residents

Public Health

Private

BMPO's Advanced Analytics and AI Journey

Digital Twin Research and Fort Lauderdale Pilot	Grant Application and Data / Transportation Analytics RFP	Proof-of-Concept Platform Design	Initial Use Case Project Implementations	Anticipated Platform Development
2020-2022	2023 – 2024	2024	2024 – 2025	2025

AMPO ANNUAL CONFERENCE 2024

Broward MPO
Metropolitan Planning Organization

Translating Vision to Solution: SMART METRO

BMPO is leading a coalition of private sector, regional and national governments, and academic organizations to apply best practices around data collaboration and digital twin technologies to improve transportation planning in the region.

DATA COLLABORATION

Harness cross-agency data and uncover regional insights with improved data sharing and access; enable new data sharing models

SCENARIO PLANNING
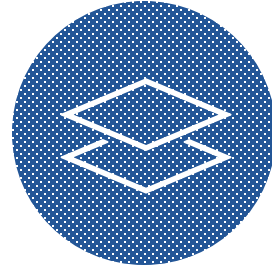
AI enabled planning to rapidly evaluate impacts of proposed project or policy according to climate and transportation performance metrics
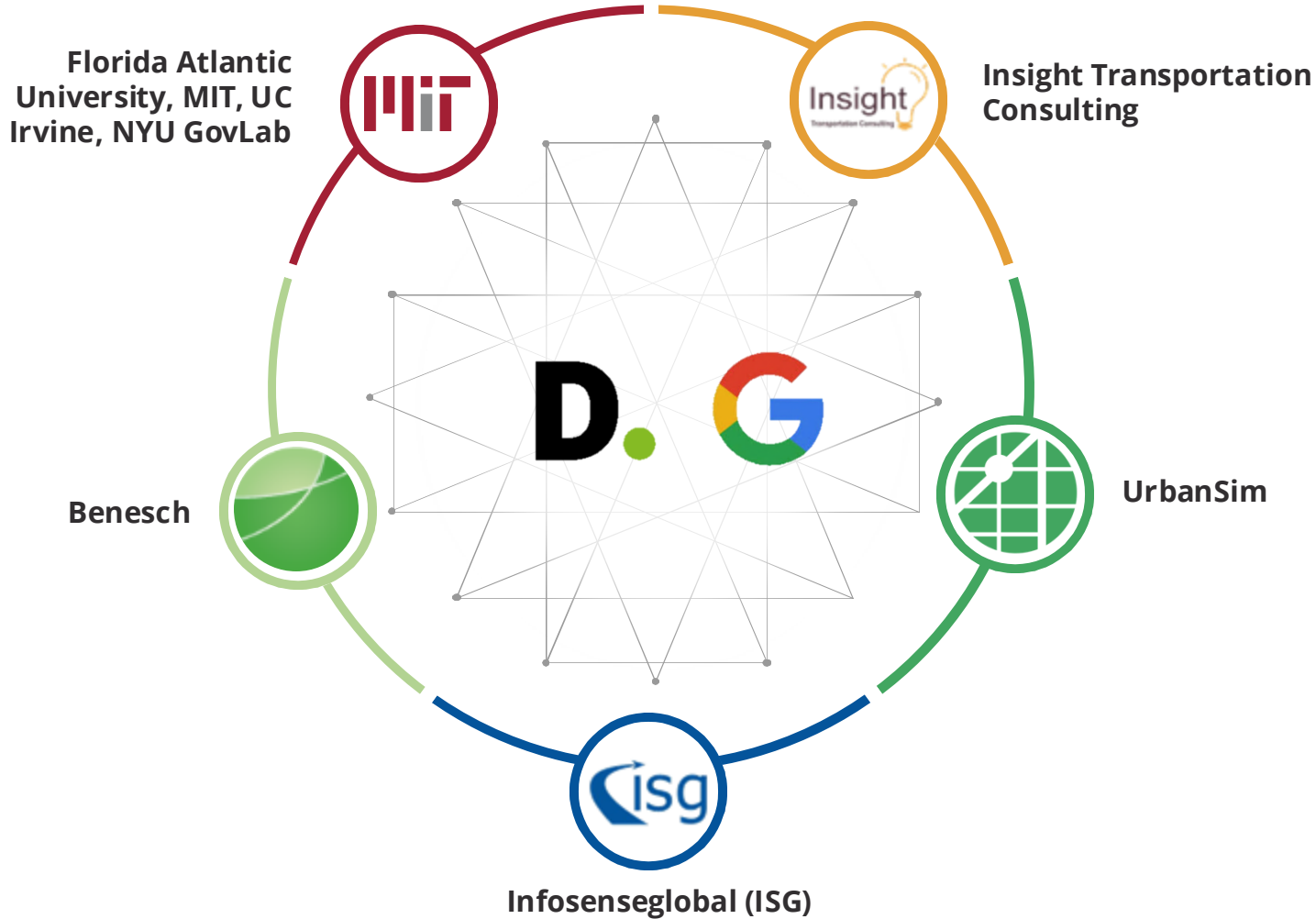
RENEWED REGIONAL GOVERNANCE

Unlock planning and operational siloes across regional landscape; overseen by group of regional leaders

The combined power of a digital twin, data collaborative, and regional governance structure **unlocks solutions to the most pressing issues – economic prosperity, equity, and resiliency**.

SMART METRO: Partner Team

Florida Atlantic University, MIT, UC Irvine, NYU GovLab

Insight Transportation Consulting

Benesch

UrbanSim

Infosenseglobal (ISG)

NYU, MIT and FAU

Unparalleled understanding of computational science, data science, and data collaboration.

- Data Governance (Advisory)
- Modeling Services (Modeling & Data Science)

Benesch

Dedicated to providing transportation planning, engineering, construction, and resilience services across the country.

- Planning Leadership (Governance Strategy)
- Geospatial Leadership (Platform Design)
- Data Analytics & Visualization (Platform Design)

Infosenseglobal (ISG)

Delivers advanced technology solutions backed by experienced support to businesses across the globe.

- General Governance (Advisory)

UrbanSim

Provides open-source simulation systems for land use, transportation, and environmental planning.

- Land Use Modeling (Advisory)
- Product Design (Platform Design)

Insight Transportation Consulting

Florida-based transportation modeling firm with experience in both regional and federal models.

- Travel Demand Modeling (Advisory)
- Modeling Services (Modeling & Data Science)

SMART METRO: Use Case Projects

The following interdisciplinary projects in Broward County will serve as proof-of-concept applications for the SMART METRO platform.

1 HISTORIC MIRAMAR REDEVELOPMENT
TRANSPORTATION & RESILIENCY IMPACTS

Miramar updated land use to accommodate higher density and planned **Miramar Innovation & Technology Village**.

The plan does not include transit upgrades to meet anticipated demand, so the City wants to understand impacts of **potential transportation** investments.

The platform will **help answer**:

- What transit options **best meet community** needs?
- What **complementary land use changes** should be adjacent?
- How will new infrastructure impact **flood risks**?

2 HOUSING COORDINATION PLAN
LAND-USE & TRANSPORTATION IMPACTS

BMPO is amending its LRTP to include a **Housing Coordination Plan**, as recommended under IIJA.

The plan aims to lend guidance for potential housing investments so that the County can understand areas to **prioritize transportation** investments.

The platform will **help answer**:

- Where are there **underutilized sites** along premium transit corridors?
- What are the most **"climate-aligned"** investments?
- What **transit options** best meet new housing needs?

Workshop Pillars & Objectives

1 AI Led Scenario Planning

How will it work?

What are SMART METRO's innovative AI and geospatial **technologies** and their practical **applications?**

2 Data Collaboration

How will BMPO share data?

Based on best practices, what framework and procedures ensure proper **data management?**

3 Operational Model

How will BMPO sustain it?

How should BMPO approach questions on **implementation, data**, and **management?**

LEARN

Gain insight into BMPO's SMART Grant project and the vision for this **new planning and monitoring** capability.

EXPERIENCE

See live **demonstrations** of key solution features – **Data Exchange, Analytics, and Simulation** – from subject matter experts.

COLLABORATE

Provide valuable **feedback and explore** how this technology can benefit **your communities** across the country.
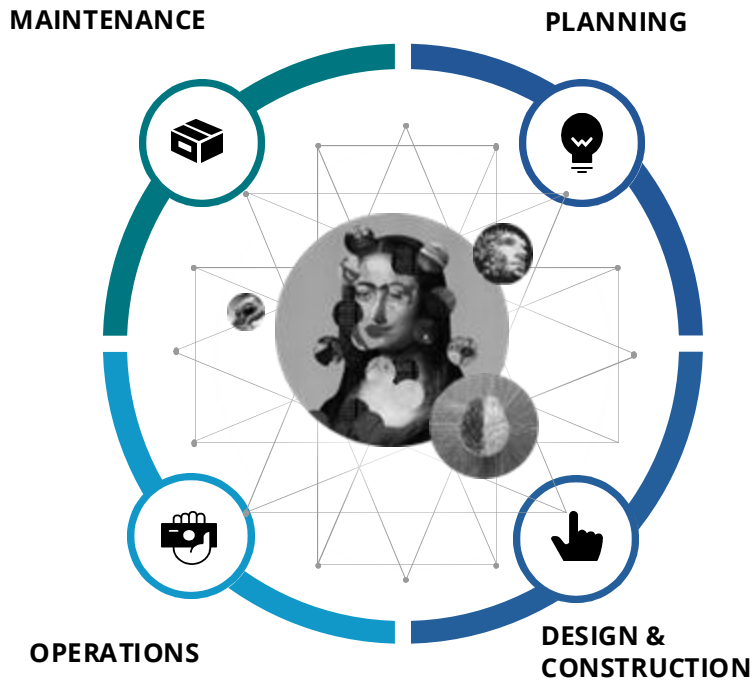
NETWORK

Connect with other MPO executives facing similar challenges and considering **solutions**.

AI in Transportation

AI can play a critical role in all aspects of transportation infrastructure planning and operations.

Transportation Infrastructure Lifecycle

MAINTENANCE

PLANNING

OPERATIONS

DESIGN & CONSTRUCTION

Deloitte's Classification of AI Methodologies

AUTOMATE
Intelligent Automation

Execute document review or data entry processes that require little human judgement

SIMULATE
Agent-Based Simulation

Simulate millions of travel decisions and trip patterns to evaluate impacts of projects and policies

INTERACT
Gen AI and Assistants

Engage with humans in real-time, enable two-way dialogue, reference authoritative sources for advanced recommendations

PREDICT
Predictive Analytics

Use traffic data to train machine learning models to anticipate future travel conditions and detect congestion

DETECT
Computer Vision

Analyze traffic patterns through analysis of CCTV streams or identify potential infrastructure defects via LIDAR scans

INTERPRET
Natural Language

Train algorithms to read department manuals, policy documents, and contracts and derive insights

CREATE
Gen AI

Create new content, including infrastructure plans, designs, and operational recommendations

Systems-of-Systems Approach

Experience —

Conversation / Data Visualization / UX

Intention —

Large Language Models

Analysis / Simulations — — — — — — — — — — — — — — — —

Descriptive | **Predictive** | **Scenario**

Activity —

Historic | **Forecasted** | **Real-Time**

Models —

Land Use Models | **Climate Models** | **Transport Models**

Network Maps — — — — — — — — — — — — — — — — — — —

Base Natural Environment
Base Land Use and Built Environment
Base Transportation Network

Data Sources —

Partner Data | **Agency Data** | **3rd Party Data** | **Public Data**

How Will it Work?

SMART METRO is a geospatial analytics platform with data exchange, analytics and modeling, and simulation capabilities to facilitate and streamline regional planning, bridge data silos, and catalyze public-private partnerships.

DATA EXCHANGE – WHAT IS
"What is and what has happened?"

ANALYTICS TOOLKIT – WHAT NEXT
"What could happen next?"

SIMULATION MODELS – WHAT IF
"What plan, project, or policy is most effective?"

FUNCTIONALITY

Data visualization and graphics

Geo. referenced information

Model Visualization

Create New Data

Customizable View

3D project renderings

Alternatives analysis

ANALYSIS

Variety of datasets accessible with natural language interface:

- Historical congestion patterns
- Historical traffic and incidents
- Real time traffic and congestion

Analytics toolkit to collaborate and accelerate analytics efforts on regional trends:

- Predict traffic bottlenecks and incidents
- Identify areas of increased utilization
- Forecast flood impacts

Suite of regional models to inform transportation, land use, and resiliency planning:

- Map future land uses
- Visualize proposed projects
- Analyze transportation impacts

EXAMPLE

Baseline inventory of California roadways and traffic incidents

Evaluate California traffic **congestion and safety** patterns before intervention

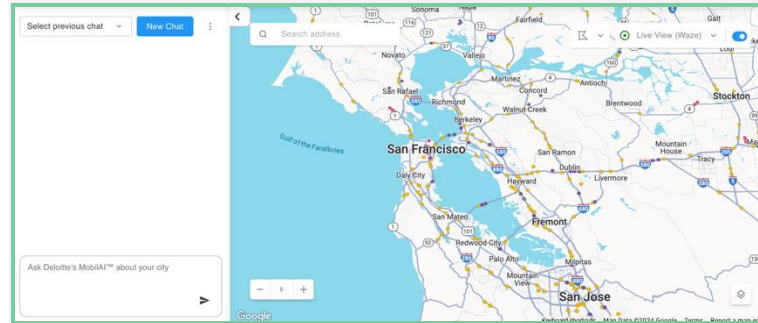Compare **land use scenarios** to determine which best serves San Francisco residents

AMPO ANNUAL CONFERENCE 2024

Broward MPO
Metropolitan Planning Organization

Vision Demonstration

1. **Observe** two demos

2. **Share** initial impressions

3. **Discuss** how it will work

## Data Exchange + Analytics Toolkit

Naveen Juvva

- Algorithms **learn patterns** from data to **generate new data** based on similar characteristics

- **LLMs trained** on billions of data points that interpret human language

- **Private Sector Data Sets:** Waze, Replica, Google

- **Broward / FL Data Sets:** TBD

- **Analytical Models:** Bottleneck detection, safety incident prediction, flood models, traffic routing

Simulation Models

Paul Waddell
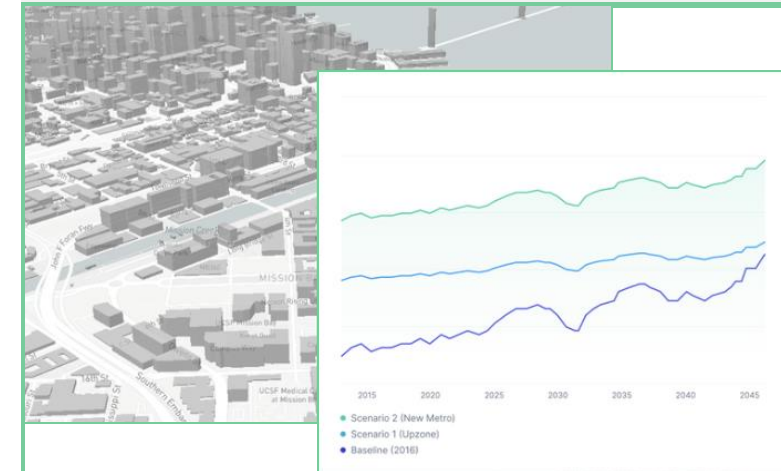
- Connect public data with platform **Data Library** and select zoning, policy, and **transportation levers**

- Run multiple scenarios on cloud and **compare**

- **Land Use:** UrbanSim

- **Transportation:** TBD

Please ask questions, but we request no photos.

Break

Return at 10:30

Data Governance, Trust & Collaboration

1. **Observe** overview

2. **Share** success stories + lessons earned

3. **Discuss** how BMPO will share data

The GovLab

Stefaan Verhulst

- Works with organizations to more openly, collaboratively, and **effectively make decisions**

- Supports data availability and use combined with new technology to **transform governance**

- Focuses on collaborative technologies and how to harness data to **advance public good**

SUCCESS STORIES

Narratives or case studies from your regions that highlight **data governance achievements** and positive outcomes
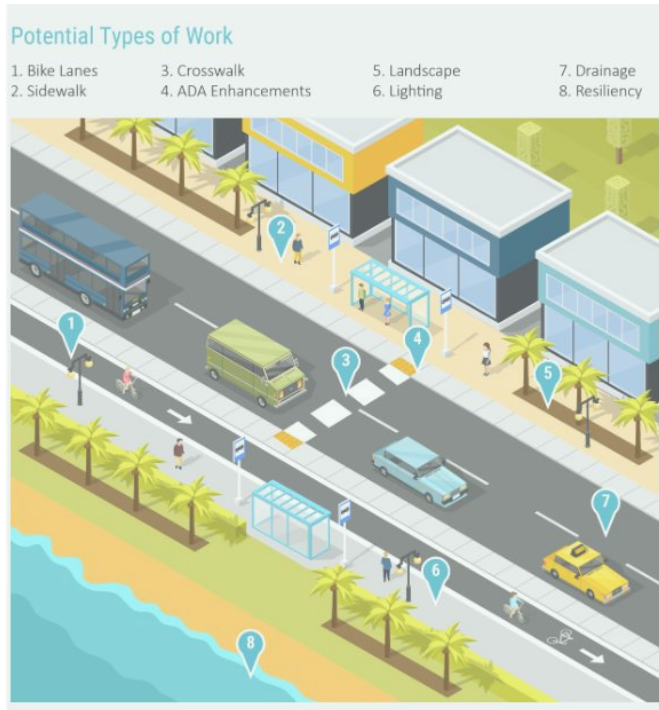
LESSONS LEARNED

Insights and knowledge gained on **what went well or what did not** go well after completing a data governance initiative

How Will BMPO Sustain it?

Fellow MPOs have stood up shared services under varying models. These three examples provide helpful understanding of possible approaches to technology implementation and data governance.

BMPO + MTECC	DVRPC + TRANSCOM	SANDAG + Services Bureau
Provides **engineering**, **procurement**, and **public involvement** support to small municipalities that administer federal aid or local projects	Secure **web portal** with data feeds that include real time traffic, real-time transit, weather, ITS assets, events / incidents for 16 transportation agencies	Consultation and **customized research** for regional local governments, nonmember governments, private organizations, and individuals on fee-for-service basis

Discussion

1. **Gather** with tables

2. **Share** perspectives on design decisions

3. **Discuss** how BMPO will sustain SMART METRO

Technology

Services | What services should the solution offer alongside SMART METRO?

O&M | Planning Support | Training | Other

Scope | What planning use cases should SMART METRO support ?

Long Range | Operations | Other

Governance

Geography | How broadly should the solution be deployed?

County | Region | State | Other

Data Collaboration | What governance approach will best facilitate data sharing across and among agencies?

Centralized | Federated | Other

Operational Model

Fees | How should SMART METRO users pay for platform access?

Subscription | Fee-for-Service | Other

Ownership | How should BMPO measure SMART METRO effectiveness and success?

Users | # Projects Evaluated | $ Economic Impact

Thank You!

SMART METRO aims to bring clarity, accountability, and efficiency to data management and transportation planning efforts as they relate to extreme weather and resiliency impacts. We need your help to make this platform a success.

Technology

- Platform must facilitate existing planning process but streamline analyses, data silos, and collaboration

- Rapid scenario analysis can visualize project impacts and drive data-driven decision-making

- Cannot forego thorough training and adoption

Data Governance

- Carefully design rules and standards that govern data collected on the platform

- Framework must align with business strategy

- Opportunity to improve effectiveness, agility and accountability of data management

Operational Model

- Illustrate design and structure of how data is stored, arranged, integrated, and used

- Effectively implement policies that oversee data requirements

- Ensure data access controls and coordinate data delivery

Stay Engaged

- BMPO will follow up individually as we continue platform design and development

- Look for invites to future workshops and working sessions

- Reply to attendee survey distributed via email