TPM Workshop

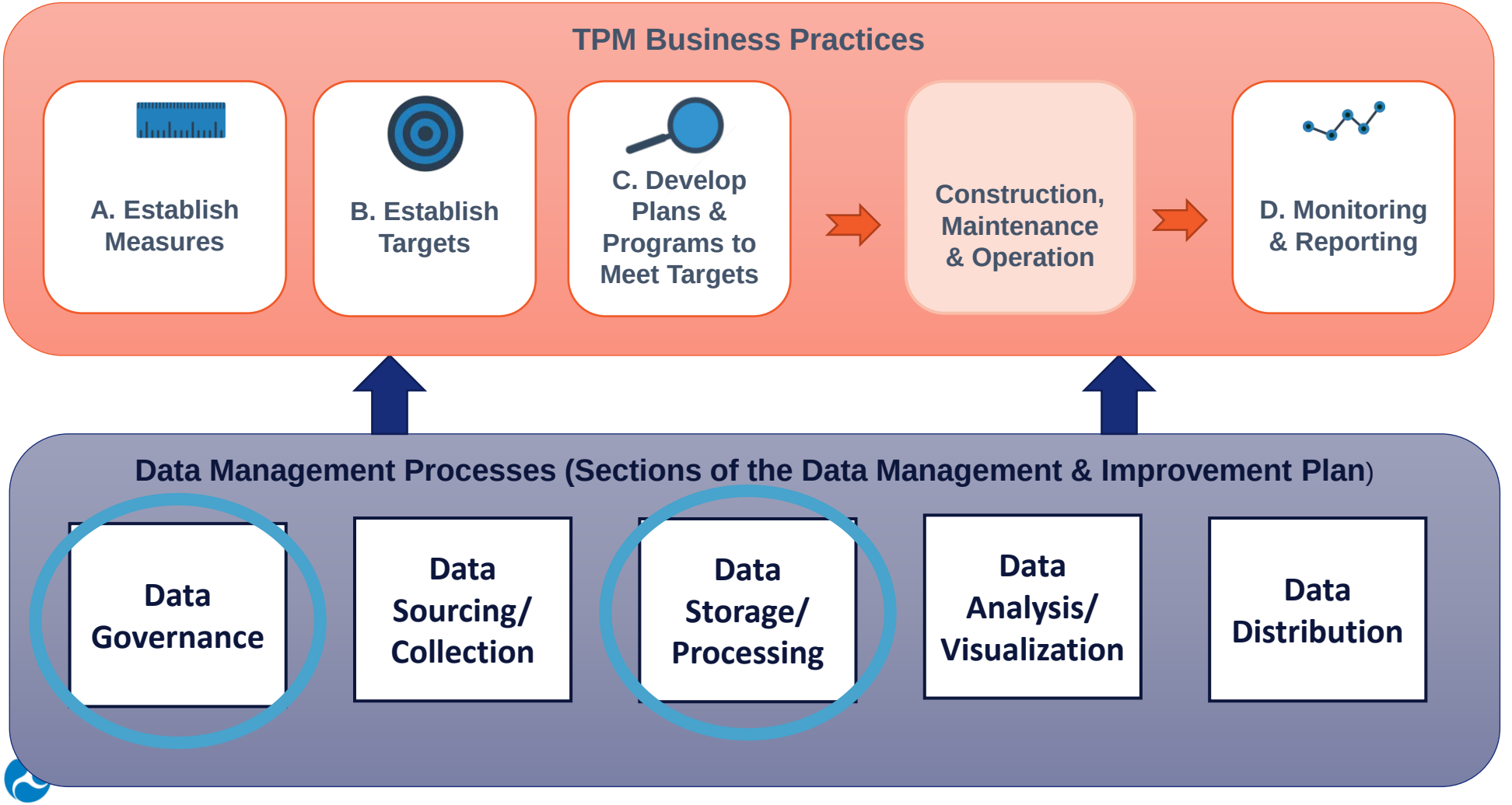
The Role of Data in TPM

Philadelphia, PA

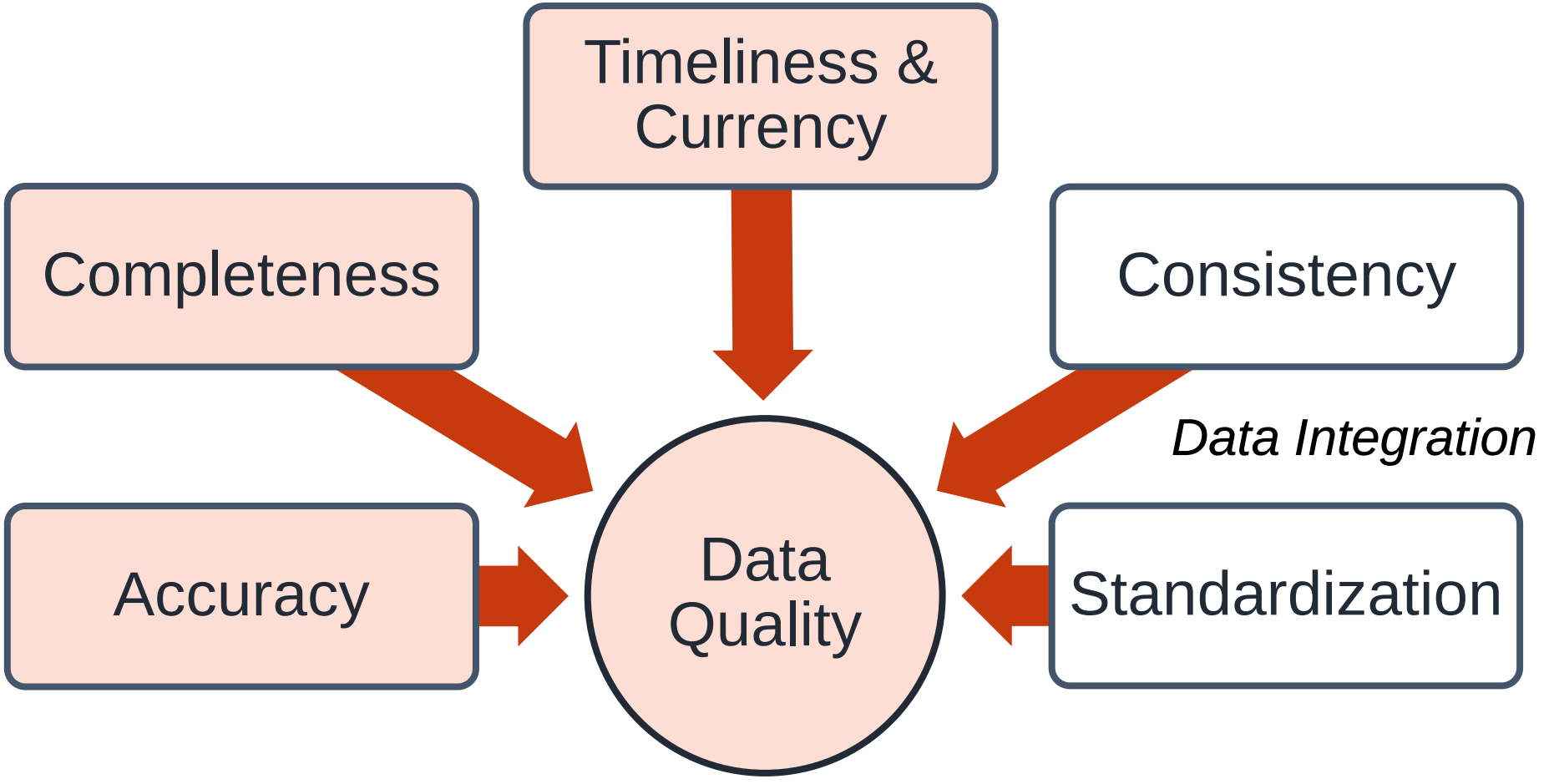
November 29 & 30, 2017

U.S. Department of Transportation
Federal Highway Administration

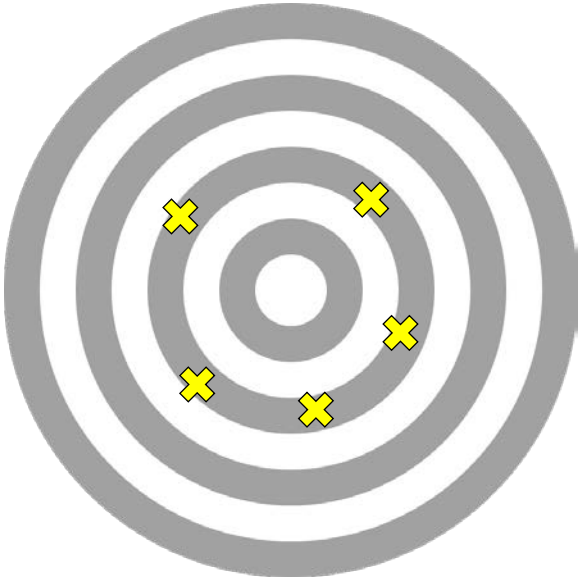
Data Management for TPM



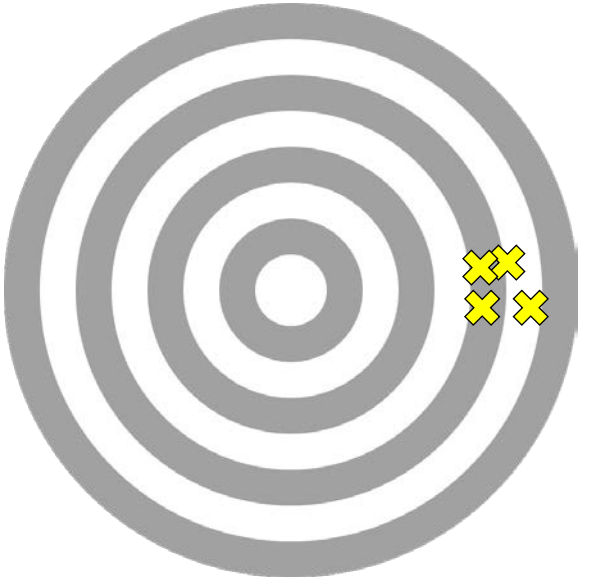
Components of Data Quality



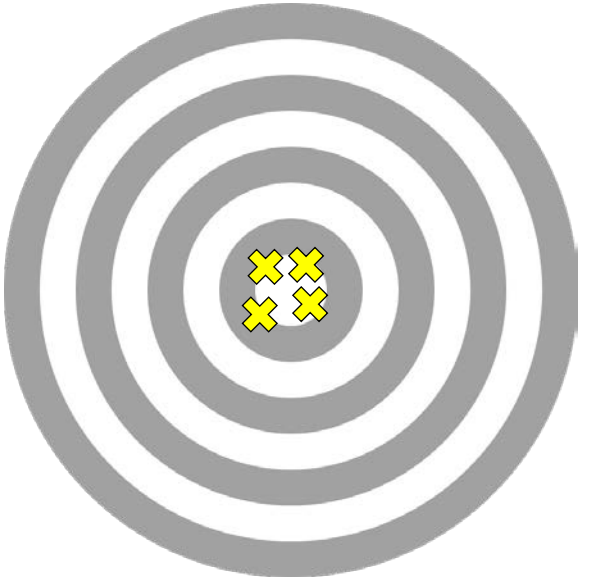
Accuracy vs. Precision



Accurate but not Precise



Precise but not Accurate

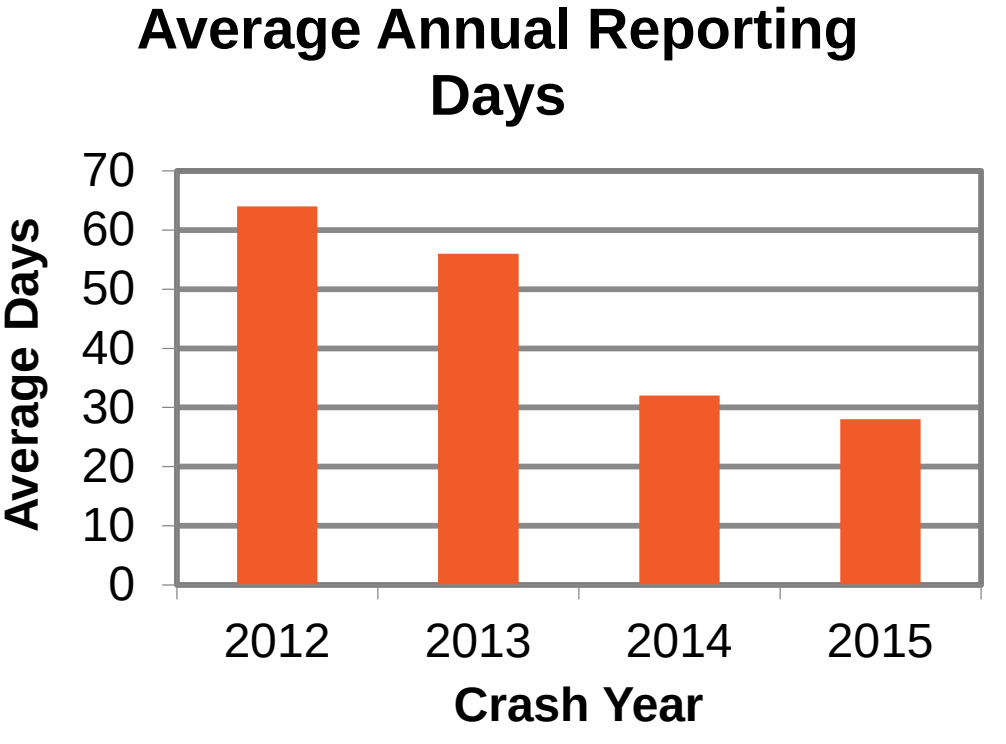


Accurate and Precise

Timeliness

Timeliness: Extent to which data are available *when expected*
Impacted by:

- Collection or update frequency
- Lag time between data collection and data availability – for processing and quality assurance (QA)



Data Integration

Combining data from multiple sources:

- Based on location
- Based on common IDs
- Based on common categories

Data Integration Challenges

- Skills/Information Technology (IT) staff constraints
- Hardware/software constraints
- Ambiguous data definitions
- Lack of documentation
- Lack of consistent linkage elements
- Multiple inconsistent data sources
- Poor data quality
- Limitations on use (e.g., commercial sources)
- Data owner willingness to share

Coordination in Data Collection

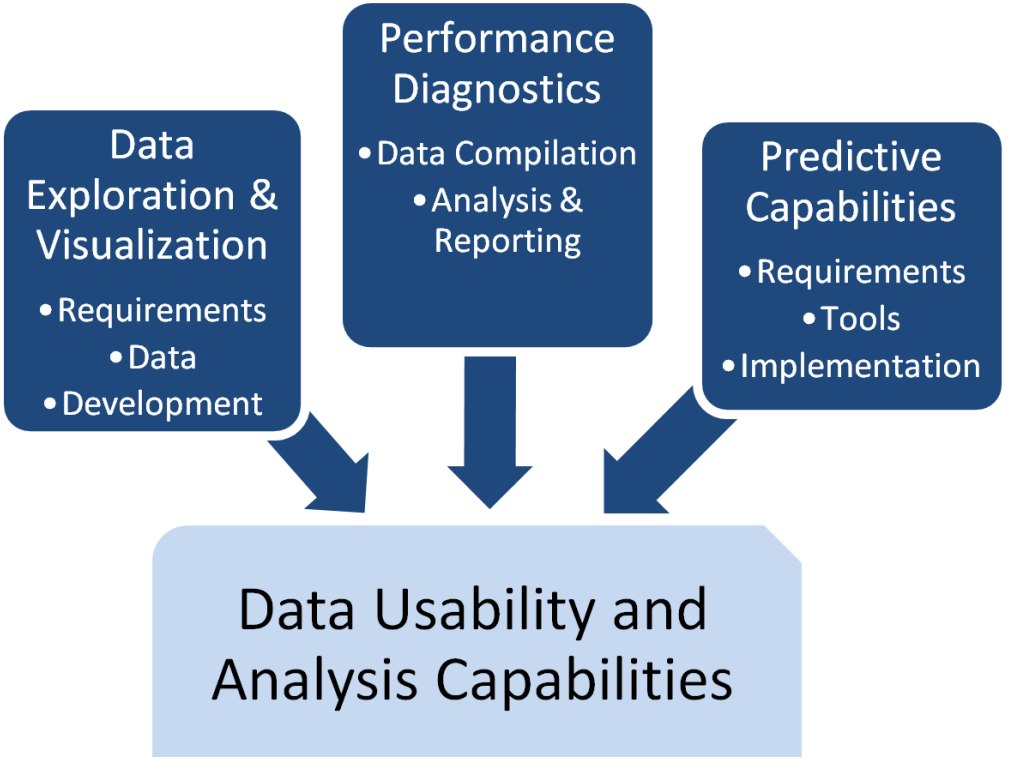
- Data sharing is crucial to obtaining a system-wide, multi-modal view of performance
- Requires mutual standards for consistency and quality
- Allows region to collect once, use often
- MPO or university partnerships

Data Usability and Analysis

- Data is not useful for TPM unless it can be analyzed
- Consider skills of staff in addition to data and analysis tools
- Collaborate with partner agencies for analysis
- Build on existing capabilities, and document them

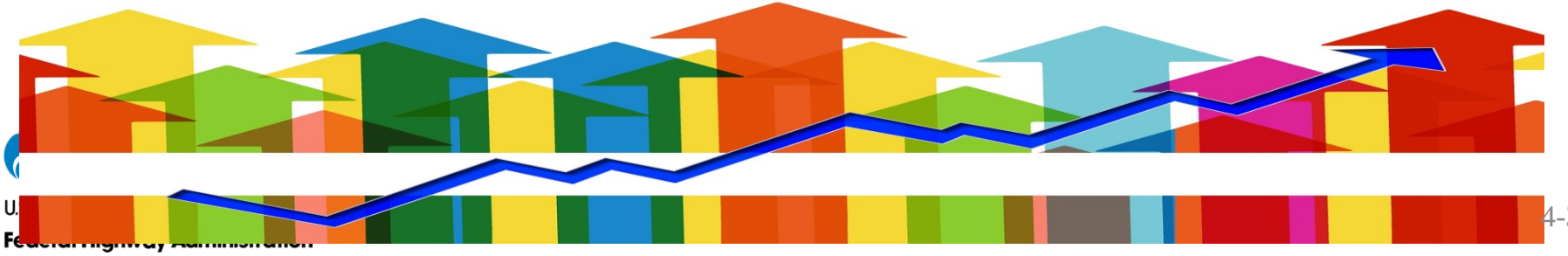
Data Usability and Analysis: Subcomponents

- D.1 Data Exploration and Visualization
- D.2 Performance Diagnostics
- D.3 Predictive Capabilities



Data and Analysis Tools

- Analysis of historical data to understand past and existing performance
- Forecasting tools to assess anticipated performance
- Economic analysis tools and management systems to support trade-off analysis



Trade-off Analysis

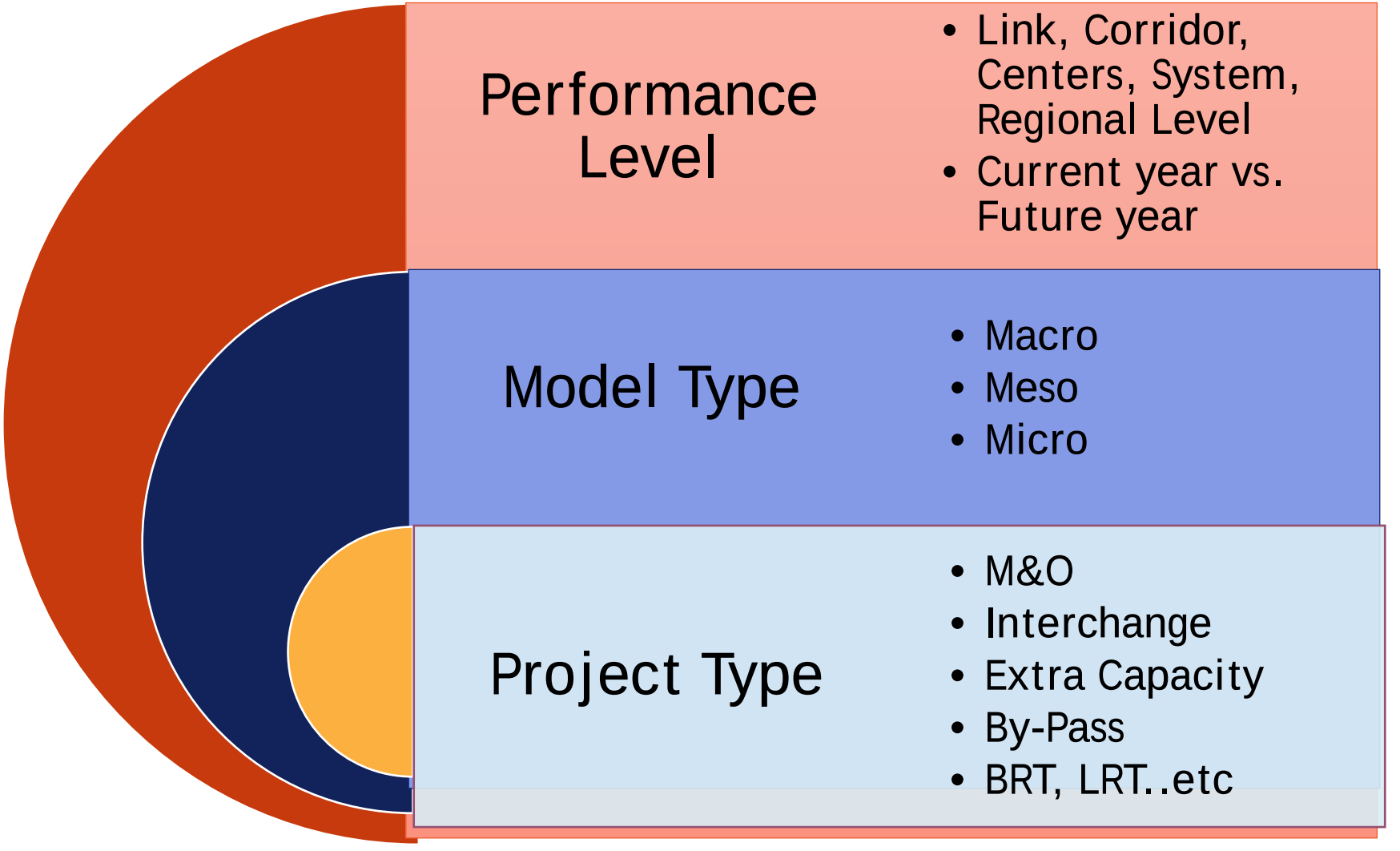
Decision makers need to decide which goals and objectives are most important using:

- Selection criteria that relate to goals and objectives
- Performance information
- Analysis of related issues such as equity
- Asset management approaches

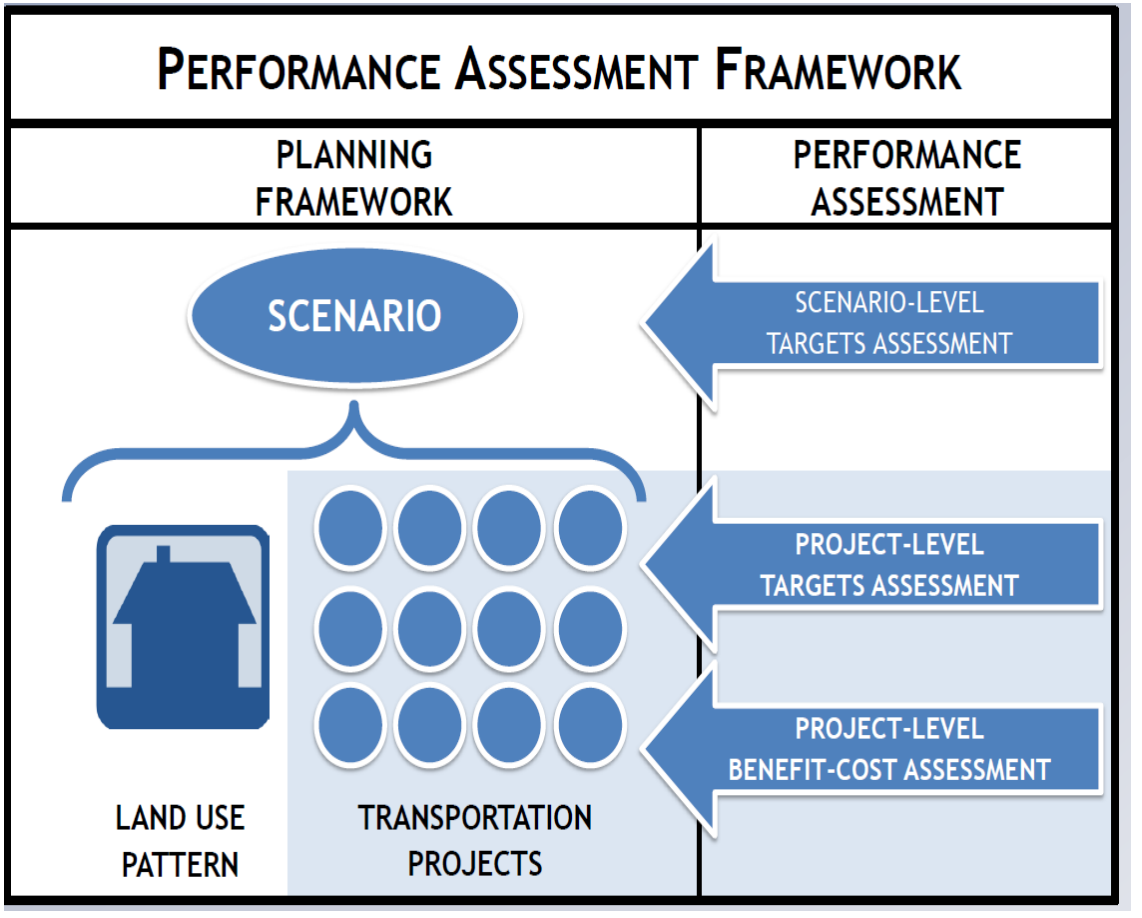
Scenario-Based Analysis in TPM

- Complements TPM and relies on analytical tools and methods throughout
- Identify various scenarios of strategy packages and analyze against a baseline projection
- Visualizes how strategies will help meet targets
- Highlights how other factors may affect the performance of the transportation system

Predictive Tools



Scenario/Project Based Modeling Approach



Summary of Travel Time Based 4 Measures

Measure	Applicability	If NPMRDS Used	Metrics to HPMS by 6/15/2018	State to Set Targets by 5/20/2018
Reliability – Interstate	Mainline Interstate	"All Vehicle", 15-minute	LOTTR (=80th TT/50th TT)	2-year, 4 -year
Reliability – Non-Interstate NHS	Mainline non-Interstate NHS	"All Vehicle", 15-minute	LOTTR (=80th TT/50th TT)	4-year
Freight	Mainline Interstate	"Truck" (use "All Vehicle" if "Truck" not available), 15-minute	TTTR = (95th TT/50th TT)	2-year, 4 -year
PHED	Mainline NHS in applicable Urbanized Area	"All Vehicle", 15-minute	Total PHED in person-hours	4-year

Model Metrics for PBPP: Florida

Measure	Travel Demand Model Role	Predictability	Priority
State of Good Repair			
Age of Transit Vehicles	None	No	Low
Number of vehicles greater than a defined criteria miles of service	Limited to mileage on model roadway system. No information on turnover.	No	Low
Overweight permits	None	No	Low
Number of violations of weight restrictions	None	No	Low
Mobility and Congestion			
Percent peak hour delay	Can provide directly	Can forecast - peak hour model required	High
Travel time between major points	Can provide directly	May require peak hour model May require transit model	High
Transit mode split	Can provide directly	Can forecast - requires mode choice model	High
Non-Single Occupancy Vehicle (SOV) mode share	Can provide directly	Can forecast - requires mode choice model/vehicle occupancy model	High
Available mode alternatives	Can provide accessibility to available modes on major routes	Can forecast accessibility to modes - may require additional network detail for local routes	High
Reliability	Can provide basic volume and speed inputs	Ability to predict accidents and incidents extremely limited beyond relating incident delay to speeds and volumes	High
Environment			
Noise Pollution	Contributes volumes/auto and truck split and speeds	Yes – volumes/ auto and truck split and speeds by facility	High
Billboards	None	No	Low
Mobile source greenhouse gas (GHG) emissions	Volumes, speeds/VMT, need more accurate vehicle distributions	Volumes, speeds/VMT, need more accurate vehicle distributions	High
Water runoff	Provide volumes, would need environmental GIS layers and possibly more detailed vehicle information.	Yes – volumes	Low
Impact on wildlife habitat	Limited – roadway footprint major impact. Need info on habitat	No	Low
Impervious service	Limited to representation of major roadway system. Local system not included.	GIS system better suited to task. Local roads not included.	Low
Use of biofuels/Fuel consumption	Limited to estimate of total VMT	Limited to estimate of total VMT	Low
Freight			
number of at-grade crossings	None	Possible	Medium to Low
Rail delay	None – specialized operations models needed	No	Low
Freight moved by truck Vs. rail	Need planning level freight mode choice model and freight data	Need planning level freight mode choice model and economic forecasts	Medium
Extent/Mileage of intermodal infrastructure	Can map, but GIS more appropriate	No – a planning input, GIS more appropriate tool.	Medium
Stakeholder satisfaction	None	No	High
Use of freight technologies	None	No	Low
Safety			
Accident rate	VMT by facility type	VMT by facility type (does not predict rate)	High
Livability			
Access to alternative modes	Can provide travel times to major transit lines	Can provide travel times to major transit lines	High
Public health	None	No	Medium
Per-capita roadway lane miles vs. bike lanes, trails	Can provide roadway lane miles	Can provide roadway lane miles	Medium