Transportation Economic Development Impact System (TREDIS) Cube Implementation

Ohio DOT Application presented at MOMO 2025

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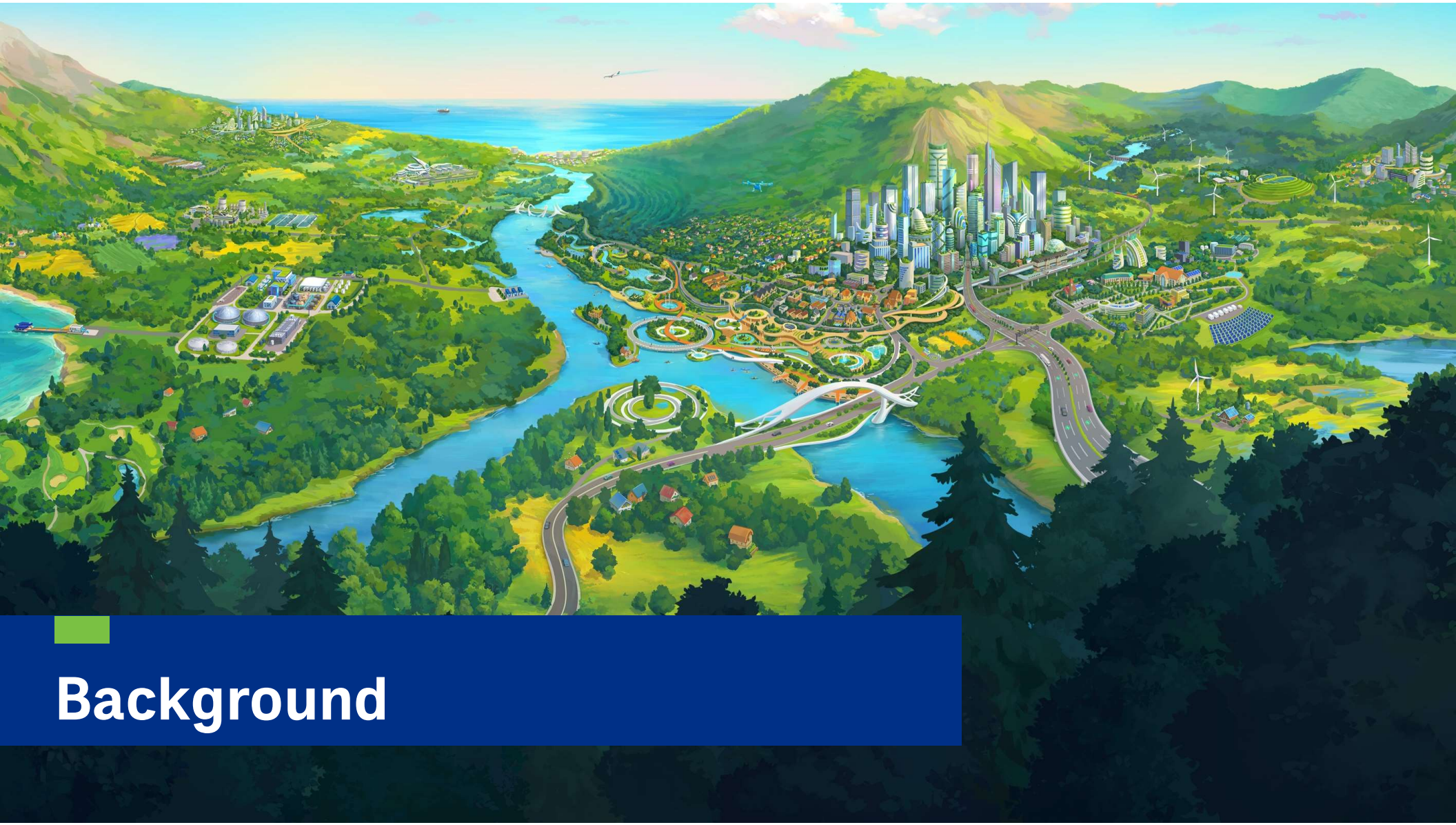
September 15, 2025

CDM Smith

Agenda

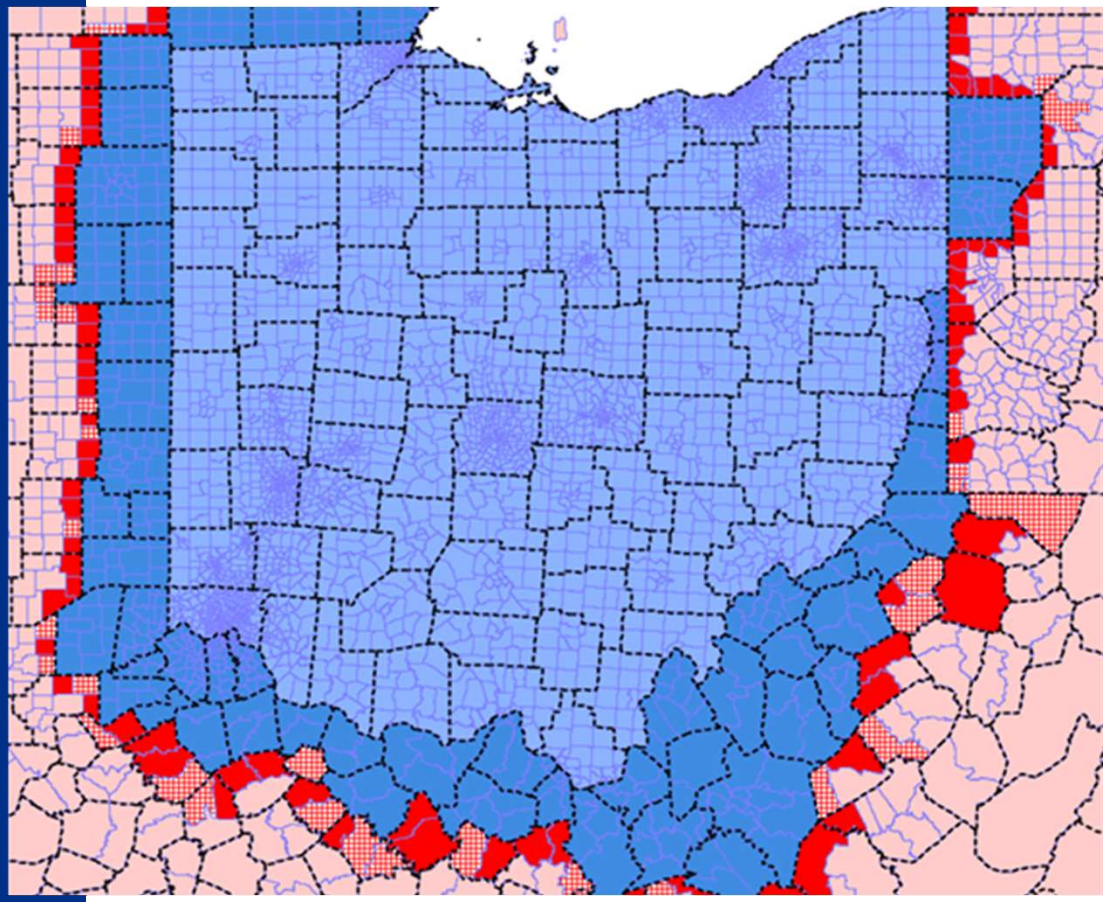
1. Background
2. Modeling Process
3. TREDIS Process
4. What's Next



Background

Ohio DOT SWM Features & Applications

- Ohio Statewide Model (SWM) Applications
  - Transportation Review Advisory Council (TRAC) Prioritization/TREDIS
  - Statewide plan
  - Traffic forecasting & corridor studies
  - Metropolitan Planning Organization (MPO) externals, truck flows, network
- SWM Features
  - Activity-based model
  - Developed in late 1990s
  - Uses CUBE for scripting and TransCAD for network
  - Uses conventional Ohio/Halo/National structure



Slide 4

SK1 Spell out acronym.
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Project Scope

- **Scope**
  - CDM Smith developed a Cube Application that takes the output assignment of selected scenarios and creates an input file for the Transportation Economic Impact System (TREDIS). The resulting output file is read into TREDIS to calculate both direct and indirect benefits.
  - The application can be run on outputs from the statewide models and MPO models.
- ODOT is transitioning from QEIM to TREDIS
- Compare No Build (NB) to Build with deltas at link basis for Ohio only
- ODOT will use this for TRAC projects every year (approximately 26 in 2024 and 25 in 2025)

Slide 5

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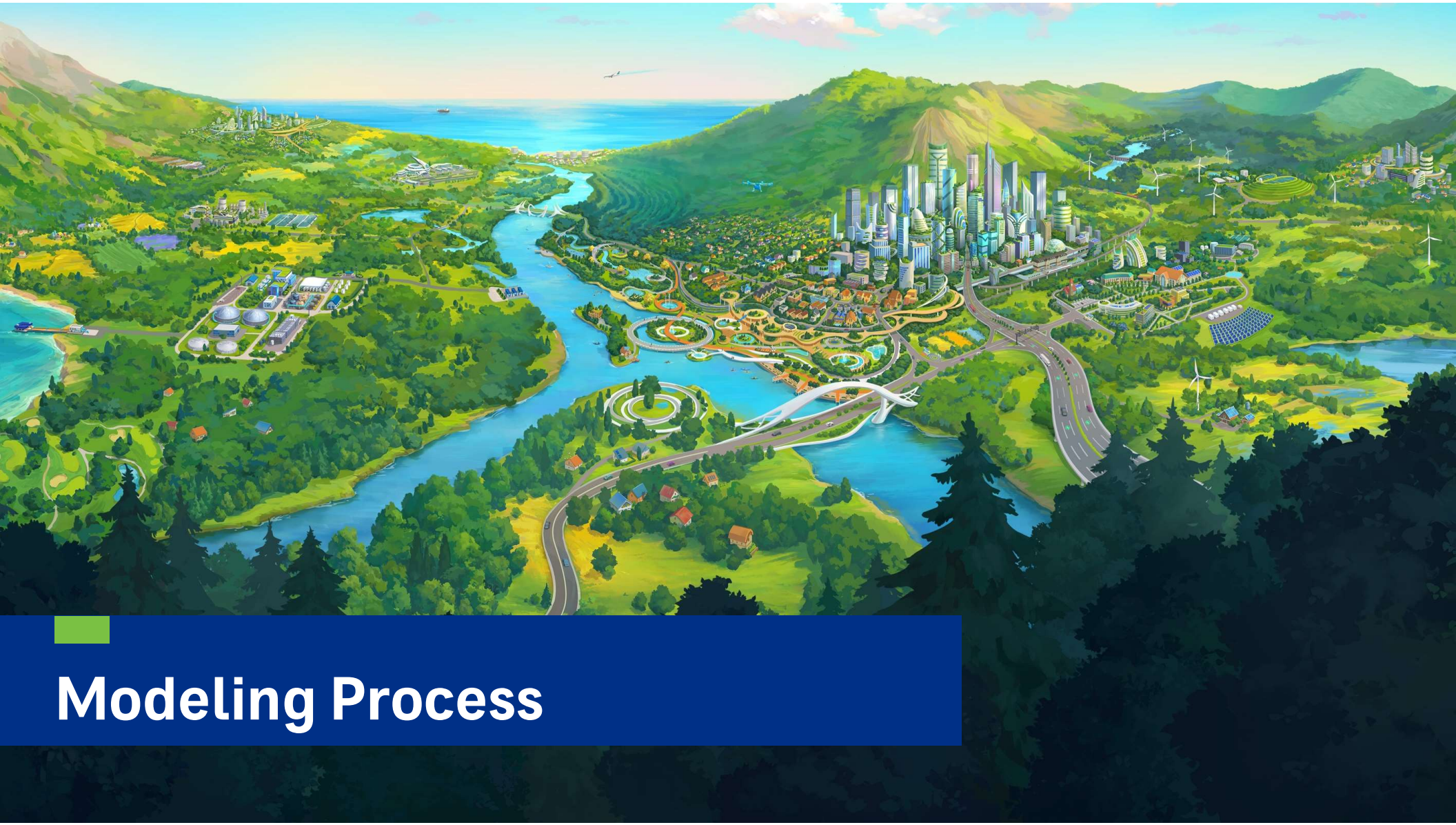
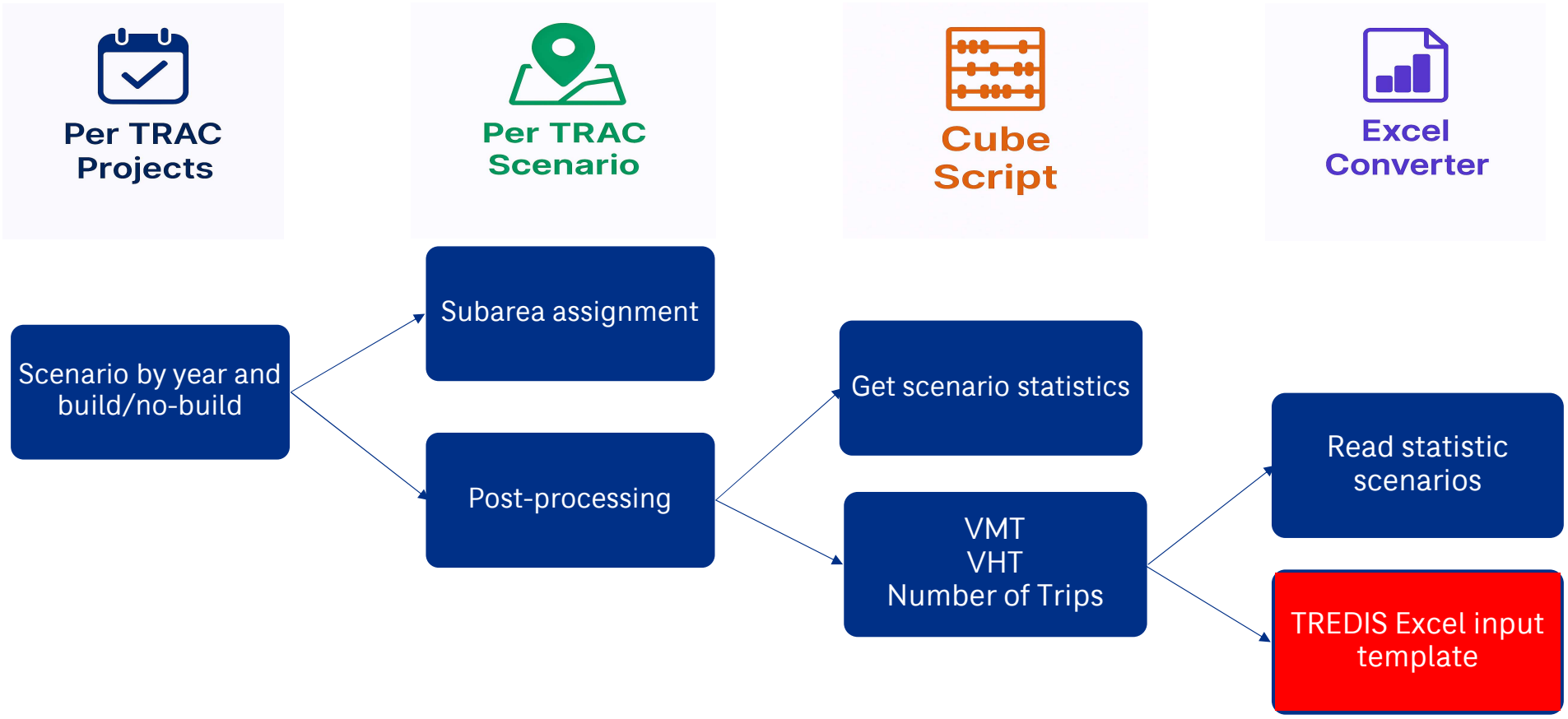


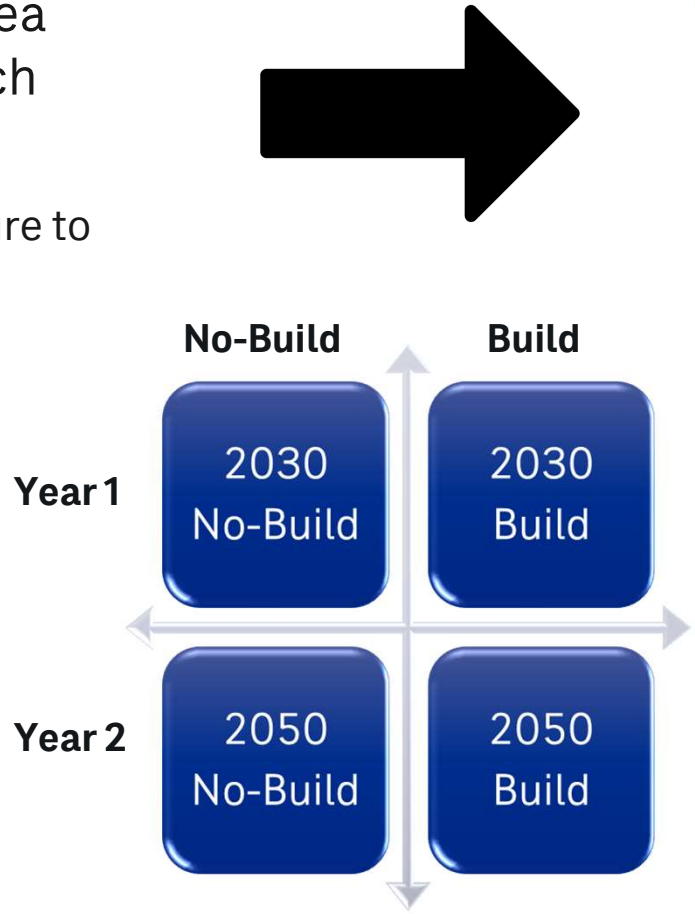
Modeling Process

Model Process Overview



Cube Script

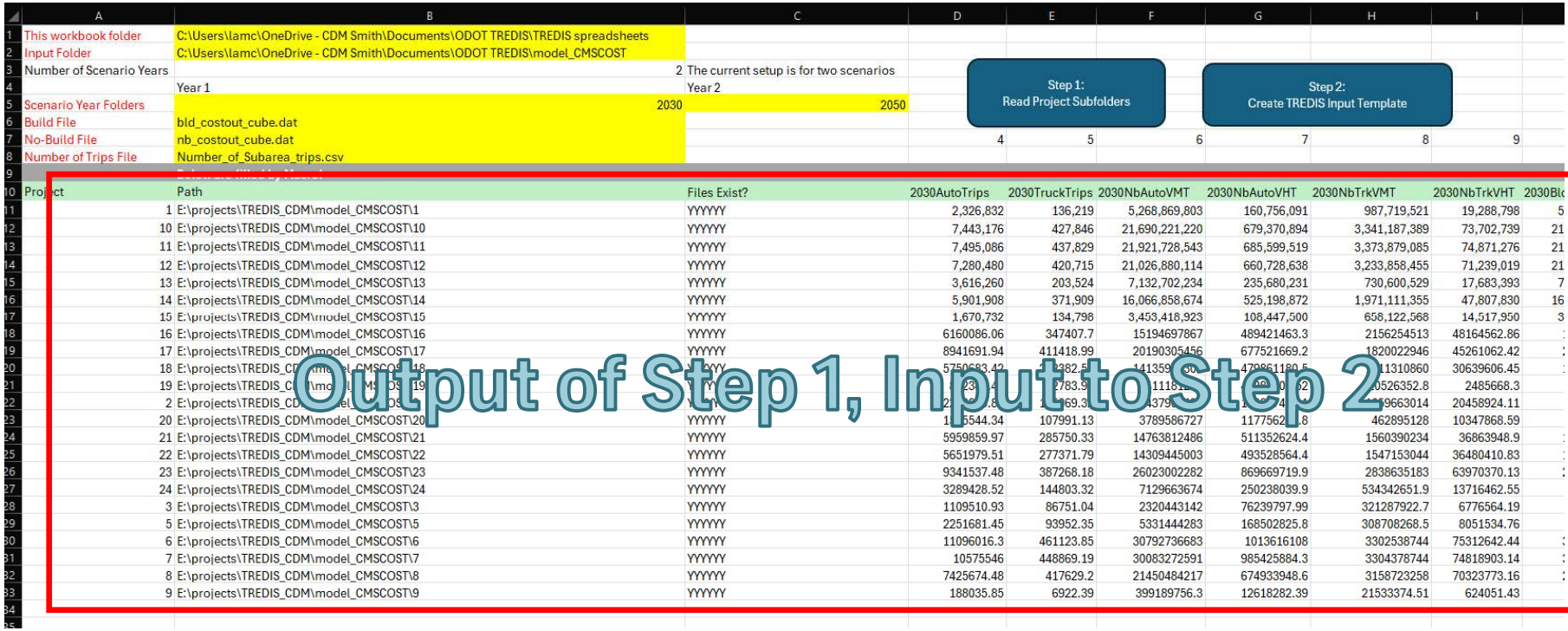
- TRAC runs 4 subarea assignment for each project
  - Established procedure to generate statistics



- Cube script to generate summary statistics for each project
  - Borrow post-processing procedure from TRAC
  - Consistent vehicle miles traveled (VMT) and vehicle hours traveled (VHT) between TRAC and TREDIS
  - Add steps to calculate number of trips from assigned networks

Excel Converter

- **Step 1**: Batch read each project statistics
- **Step 2:** Convert to TREDIS input format



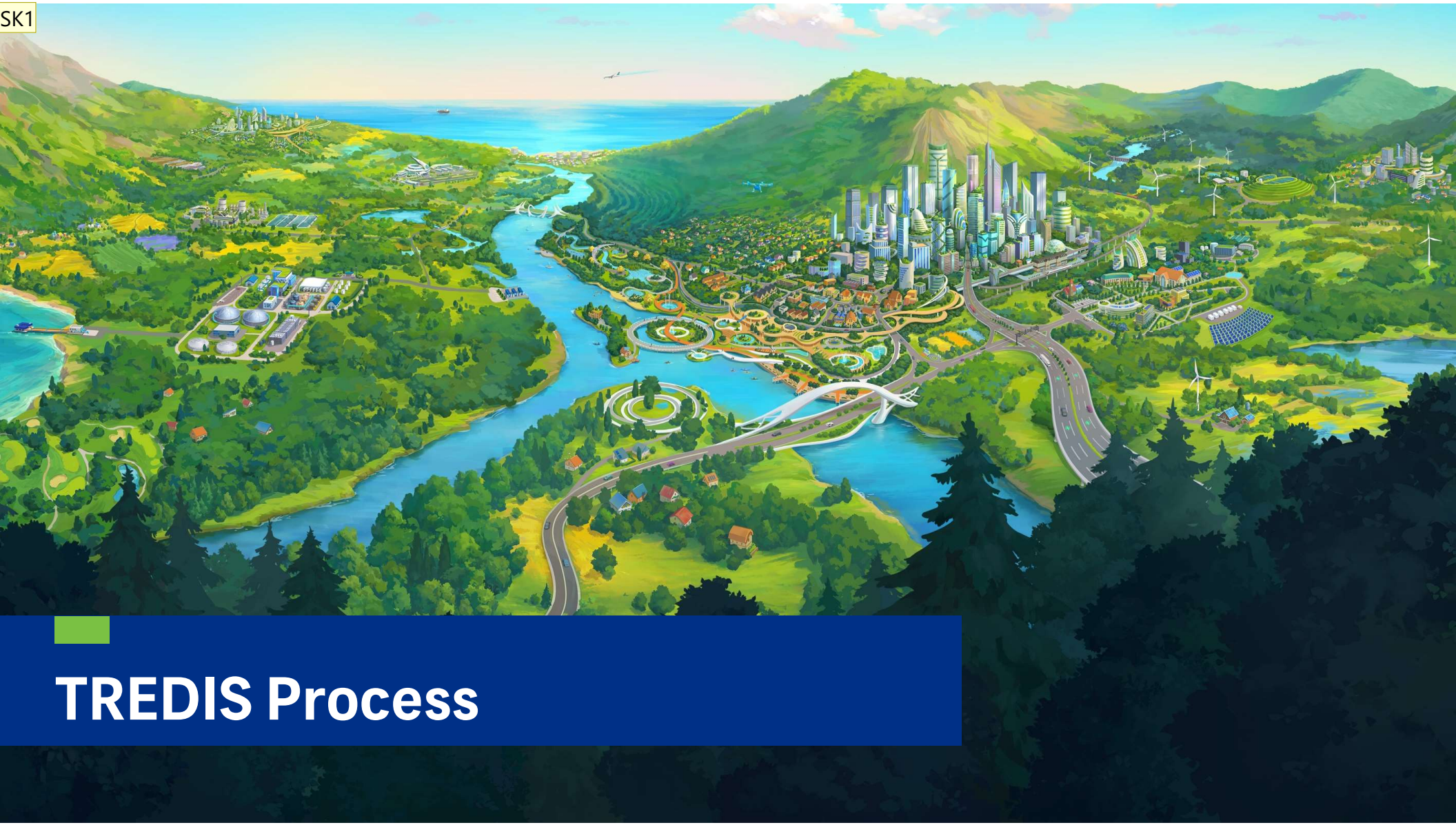
	A	B	C	D	E	F	G	H	I
1	This workbook folder	C:\Users\lamc\OneDrive - CDM Smith\Documents\ODOT TREDIS\TREDIS spreadsheets							
2	Input Folder	C:\Users\lamc\OneDrive - CDM Smith\Documents\ODOT TREDIS\model_CMSCOST							
3	Number of Scenario Years	2	The current setup is for two scenarios						
4		Year 1	Year 2						
5	Scenario Year Folders	2030	2050						
6	Build File	bld_costout_cube.dat							
7	No-Build File	nb_costout_cube.dat							
8	Number of Trips File	Number_of_Subarea_trips.csv							
9									
10	Project	Path	Files Exist?	2030AutoTrips	2030TruckTrips	2030NbAutoVMT	2030NbAutoVHT	2030NbTrkVMT	2030NbTrkVHT
11	1	E:\projects\TREDIS_CDM\model_CMSCOST\1	YYYYYY	2,326,832	136,219	5,268,869,803	160,756,091	987,719,521	19,288,798
12	10	E:\projects\TREDIS_CDM\model_CMSCOST\10	YYYYYY	7,443,176	427,846	21,690,221,220	679,370,894	3,341,187,389	73,702,739
13	11	E:\projects\TREDIS_CDM\model_CMSCOST\11	YYYYYY	7,495,086	437,829	21,921,728,543	685,599,519	3,373,879,085	74,871,276
14	12	E:\projects\TREDIS_CDM\model_CMSCOST\12	YYYYYY	7,280,480	420,715	21,026,880,114	660,728,638	3,233,858,455	71,239,019
15	13	E:\projects\TREDIS_CDM\model_CMSCOST\13	YYYYYY	3,616,260	203,524	7,132,702,234	235,680,231	730,600,529	17,683,393
16	14	E:\projects\TREDIS_CDM\model_CMSCOST\14	YYYYYY	5,901,908	371,909	16,066,858,674	525,198,872	1,971,111,355	47,807,830
17	15	E:\projects\TREDIS_CDM\model_CMSCOST\15	YYYYYY	1,670,732	134,798	3,453,418,923	108,447,500	658,122,568	14,517,950
18	16	E:\projects\TREDIS_CDM\model_CMSCOST\16	YYYYYY	6160086.06	347407.7	15194697867	489421463.3	2156254513	48164562.86
19	17	E:\projects\TREDIS_CDM\model_CMSCOST\17	YYYYYY	8941691.94	411418.99	20190305456	677521669.2	1820022946	45261062.42
20	18	E:\projects\TREDIS_CDM\model_CMSCOST\18	YYYYYY	5750683.42	382.5	141359	479861180.5	11310860	30639606.45
21	19	E:\projects\TREDIS_CDM\model_CMSCOST\19	YYYYYY	2	783.9	111		0526352.8	2485668.3
22	2	E:\projects\TREDIS_CDM\model_CMSCOST\2	YYYYYY	2	69.3	4379		9663014	20458924.11
23	20	E:\projects\TREDIS_CDM\model_CMSCOST\20	YYYYYY	1	107991.13	3789586727	1177562	462895128	10347868.59
24	21	E:\projects\TREDIS_CDM\model_CMSCOST\21	YYYYYY	5959859.97	285750.33	14763812486	511352624.4	1560390234	36863948.9
25	22	E:\projects\TREDIS_CDM\model_CMSCOST\22	YYYYYY	5651979.51	277371.79	14309445003	493528564.4	1547153044	36480410.83
26	23	E:\projects\TREDIS_CDM\model_CMSCOST\23	YYYYYY	9341537.48	387268.18	26023002282	869669719.9	2838635183	63970370.13
27	24	E:\projects\TREDIS_CDM\model_CMSCOST\24	YYYYYY	3289428.52	144803.32	7129663674	250238039.9	534342651.9	13716462.55
28	3	E:\projects\TREDIS_CDM\model_CMSCOST\3	YYYYYY	1109510.93	86751.04	2320443142	76239797.99	321287922.7	6776564.19
29	5	E:\projects\TREDIS_CDM\model_CMSCOST\5	YYYYYY	2251681.45	93952.35	5331444283	168502825.8	308708268.5	8051534.76
30	6	E:\projects\TREDIS_CDM\model_CMSCOST\6	YYYYYY	11096016.3	461123.85	30792736683	1013616108	3302538744	75312642.44
31	7	E:\projects\TREDIS_CDM\model_CMSCOST\7	YYYYYY	10575546	448869.19	30083272591	985425884.3	3304378744	74818903.14
32	8	E:\projects\TREDIS_CDM\model_CMSCOST\8	YYYYYY	7425674.48	417629.2	21450484217	674933948.6	3158723258	70323773.16
33	9	E:\projects\TREDIS_CDM\model_CMSCOST\9	YYYYYY	188035.85	6922.39	399189756.3	12618282.39	21533374.51	624051.43
34									

Step 1:
Read Project Subfolders

Step 2:
Create TREDIS Input Template

Output of Step 1, Input to Step 2

SK1



TREDIS Process

Slide 10

SK1 TREDIS is mentioned multiple times at the beginning of the presentation before it is explained. I recommend moving these slides up and explaining the process before expounding out you point.
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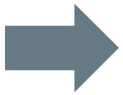
TREDIS Overview

- What is TREDIS (Transportation Economic Development Impact System)?
  - Online software
  - Translates transportation assumptions into economic impacts
  - Not an economic impact model directly; uses Impact Analysis for Planning (IMPLAN) as underlying input-output (I-O) economic model
  - Also includes BCA component (not employed herein)

Transportation Assumptions:

- Project definition
- Characteristics (location/timing/modes/VMT/VHT/etc.)
- Analysis parameters/default assumptions (e.g., value of travel time)



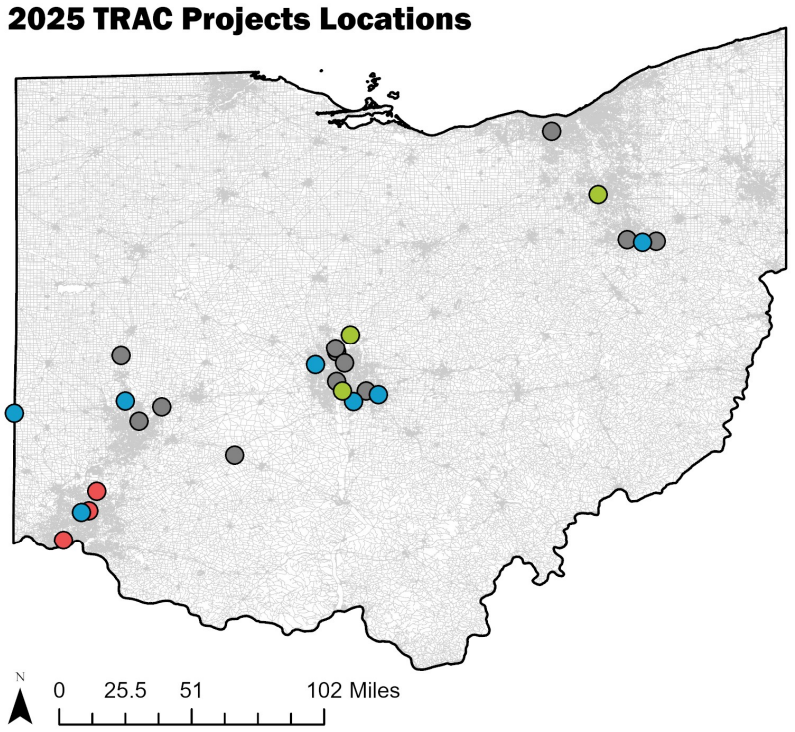
Economic Impacts:

- Measures: job, income, gross regional product (value-added)
- Timing (years and magnitude (jobs and dollars)

TREDIS for TRAC

- **Objective:** Identify future economic impacts (e.g., jobs) for proposed projects; rank via TRAC
- **Batch Processing:** Evaluate multiple projects simultaneously
- **ODOT TDM:** Coupled with statewide model and other ODOT models
  - Primary Inputs: VMT & VHT changes between build/no-build for two future years
- **TREDIS Input template:** Populate minimum needs for batch run
  - Project name (unique) and years (base and max 2055)
  - Modes: aggregate PCs and CVs
  - Geography: Ohio statewide economic region (all counties)
  - Time period: annual totals
  - Highway-based (not O/D) trips
  - VMT, and VHT by mode and base/future year

TRAC Projects for 2025



Legend

TRAC Project Tiers

- New Project
- Tier I
- Tier II
- Tier III

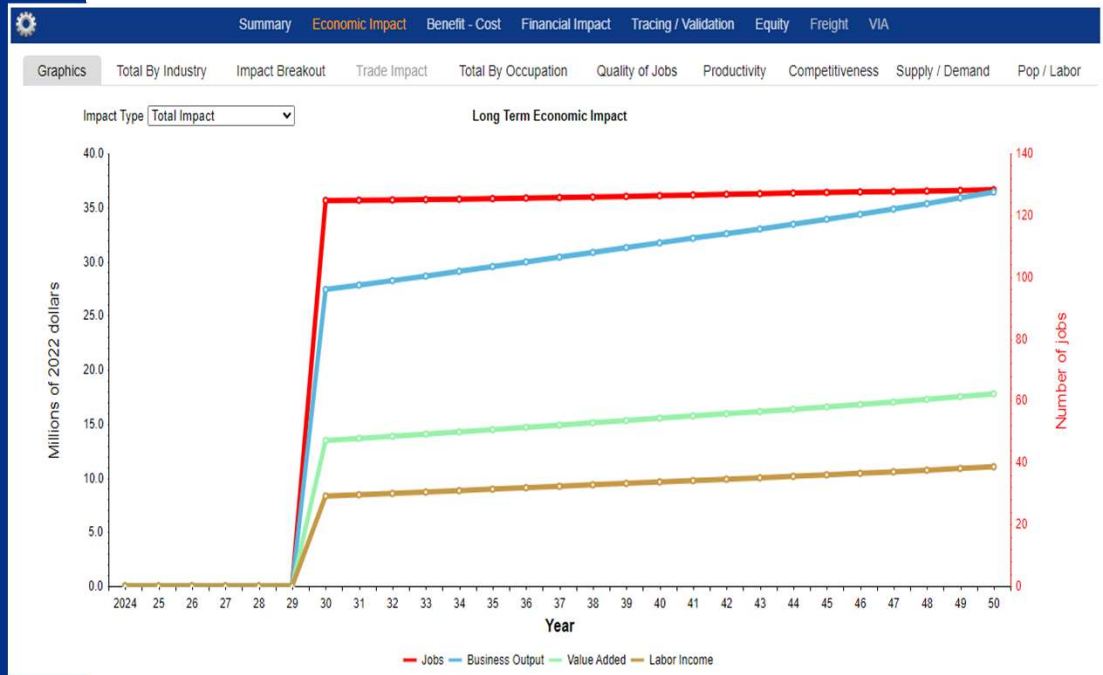
Tier I Funded for construction within the next 4 years.

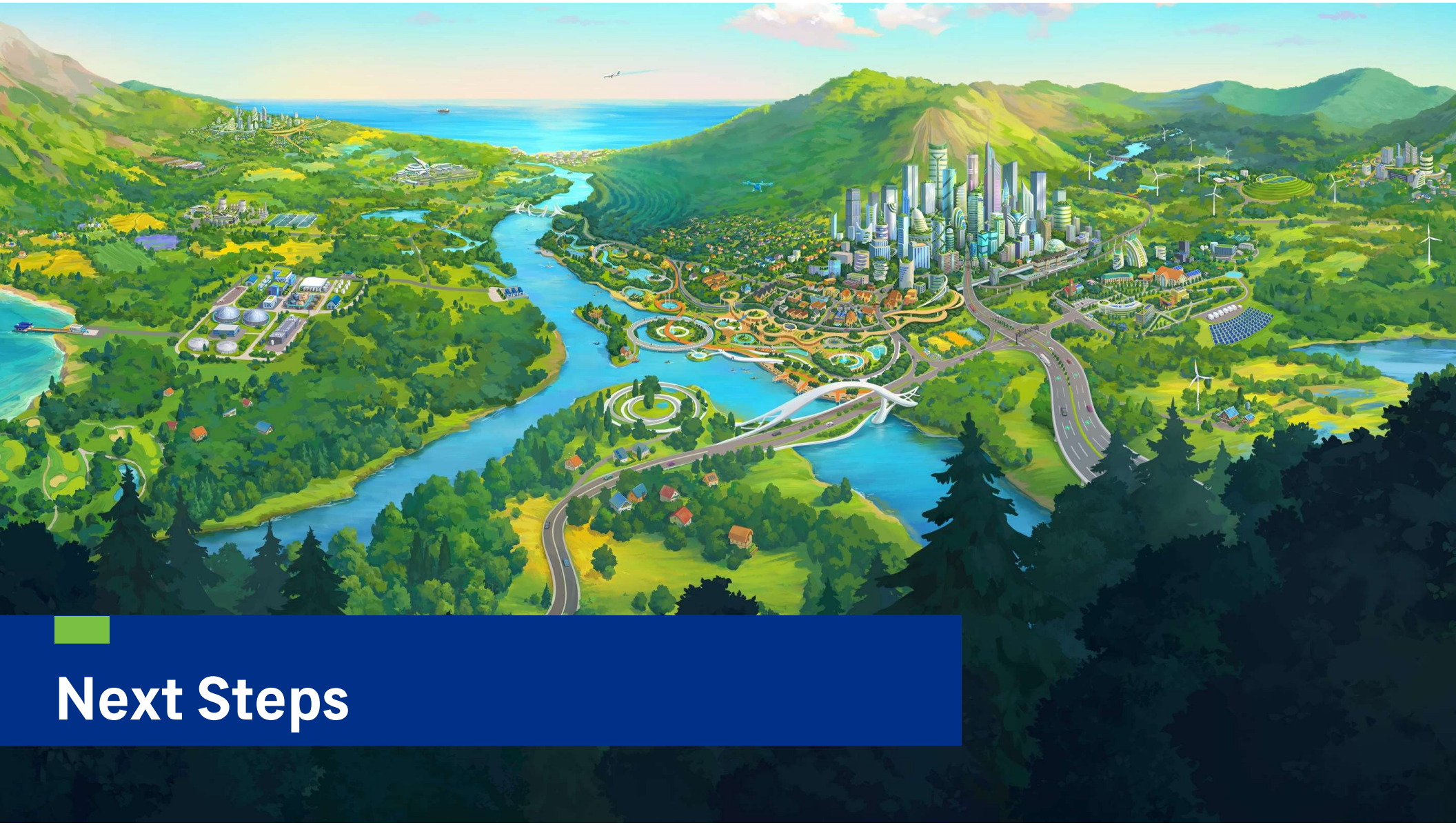
Tier II In development (design, environmental, or right-of-way); not yet funded for construction.

Tier III Future phases of multi-phase projects with earlier phases already funded

TREDIS Results

- Multidimensional
  - By project, year, variable, etc.
- Key for TRAC:
  - Jobs and gross state product (GSP)
- See example:
  - ~130 jobs/year (red line) and ~$15m/year in GSP (green line), recurring
- Many projects yield very small impacts (e.g., <10 jobs/year)
- Used in TRAC for relative project ranking, not for claiming absolute job impacts

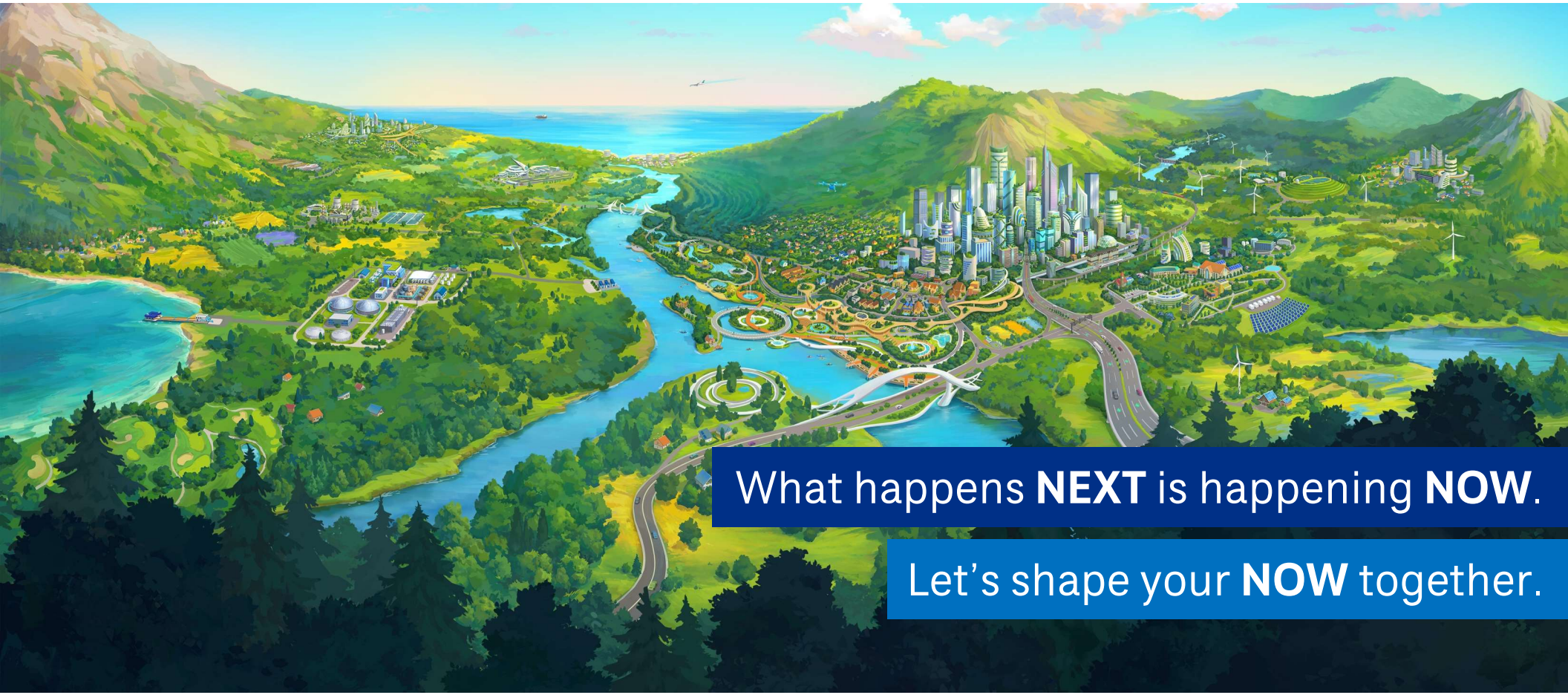




Next Steps

Next Steps

- 2025 Application Process
  - Create subareas to make model easier to handle
  - Run SWM models for desired scenarios by year and build condition to create TREDIS inputs
  - Run TREDIS
- Refine procedure
  - Look at what other states are doing
  - Compare to old methodology


What happens **NEXT** is happening **NOW**.
Let's shape your **NOW** together.

CDM Smith