



Western Cape
Government

BETTER TOGETHER.

WESTERN CAPE LAND USE AND TRANSPORT INTEGRATION MODEL

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OVERVIEW

- Historical Overview
- CUBE Software Suite
- Deployment Strategy
- Status Summary
- Anticipated Challenges
- Future Milestones

HISTORICAL OVERVIEW



Historical Overview

Generally sector departments approach is to appoint service providers with technical expertise to assist with the design of business processes and information systems and undertake technical work on an ad-hoc bases.

The outcome of this approach often leads to:

- All the operational work is outsourced
- Processes and systems are designed and built for specific use and time period:
 - ❖ Data validation is difficult
 - ❖ Obsolete on completion
 - ❖ Costly exercise
 - ❖ No data catalogue or meta data provided
 - ❖ Poor Data Quality Assurance provided

CUBE SOFTWARE SUITE



Cube Software Suite

- Developed by Citilabs – Provide software and modelling solutions
- Deployed on ArcGIS platform
- Data editing, management and spatial analyses are performed on ArcGIS platform
- Software suite deployed:
 - ❖ Cube Base – Developer interface for CUBE solution, Models, Data and ArcGIS platform. Design, build and calibrate models, simulations and scenarios.
 - ❖ CUBE Voyager – Tour based modelling of personal travel
 - ❖ CUBE Land – Land use/ economic forecasting modelling to determine the interaction between real estate markets and transportation systems
 - ❖ CUBE Cargo – Modelling of Goods Movement
 - ❖ CUBE Sugar – Interactive interface for model users to edit and map data trends

DEPLOYMENT STRATEGY



DEPLOYMENT STRATEGY

● Strategic Planning Tool – 20 to 30 year span

● Data Consumed:

- ❖ Snapshot of 2016 – Decision driven by Census data (update of 2011)
- ❖ Represent a typical week in March
- ❖ Citilabs identified and collected the relevant data sets – Based on global experience
- ❖ Derived datasets from where created from source data sets – process of scripting and manual editing
- ❖ Hosted in an Enterprise SDE
- ❖ Data sets contained in the models are encrypted

Three Year objective: WCLUTI

● Personal travel model (Cube Voyager)

- ❖ Tour- based model (newer generation)
- ❖ Input: demographic data, highway and Public Transport networks
- ❖ Output: origin/ destination trips, volumes by link/ line

● Land use model (Cube Land)

- ❖ Forecasts change in housing and employment by traffic analysis zone
- ❖ Applies economic principles of real estate market equilibrium
- ❖ Non-market – driven component treated externally

DEPLOYMENT STRATEGY

■ Goods movement (freight) model (Cube Cargo)

- ❖ Aggregate model based on commodity flows by goods category
- ❖ Truck, rail and water

THREE YEAR PROCESS

Model \ Year	Year 1 (2018-2019)	Year 2 (2019-2020)	Year 3 (2020-2021)
WCTM (Western Cape Transport Model) Personal Travel Model – Cube Voyager	v1.0	v2.0 Model refinement	v3.0 Model refinement
WCLM (Western Cape Land Model) Land Use Model – Cube Land	Pending funding v1.0*	*v1.0/v2.0 + Model refinement	v3.0 Model refinement
WCFM (Western Cape Freight Model) Freight Model – Cube Cargo	v1.0	v2.0 Model refinement	v3.0 Model refinement
WCLUTI Model (Integration)	Pending funding v1.0*	*v1.0/v2.0 + Model refinement	v3.0 Model refinement

STATUS SUMMARY

STATUS SUMMARY

● Personal travel model

❖ 100% complete excluding ...

- ❖ embedded public transport model validation
- ❖ Public cycling and walking data outstanding

● Goods movement (freight) model

❖ 100% complete excluding ...

- ❖ Logistics chain (origin/ destination) validation
- ❖ Hub (distribution centres, ports) validation

STATUS SUMMARY

● Land use model

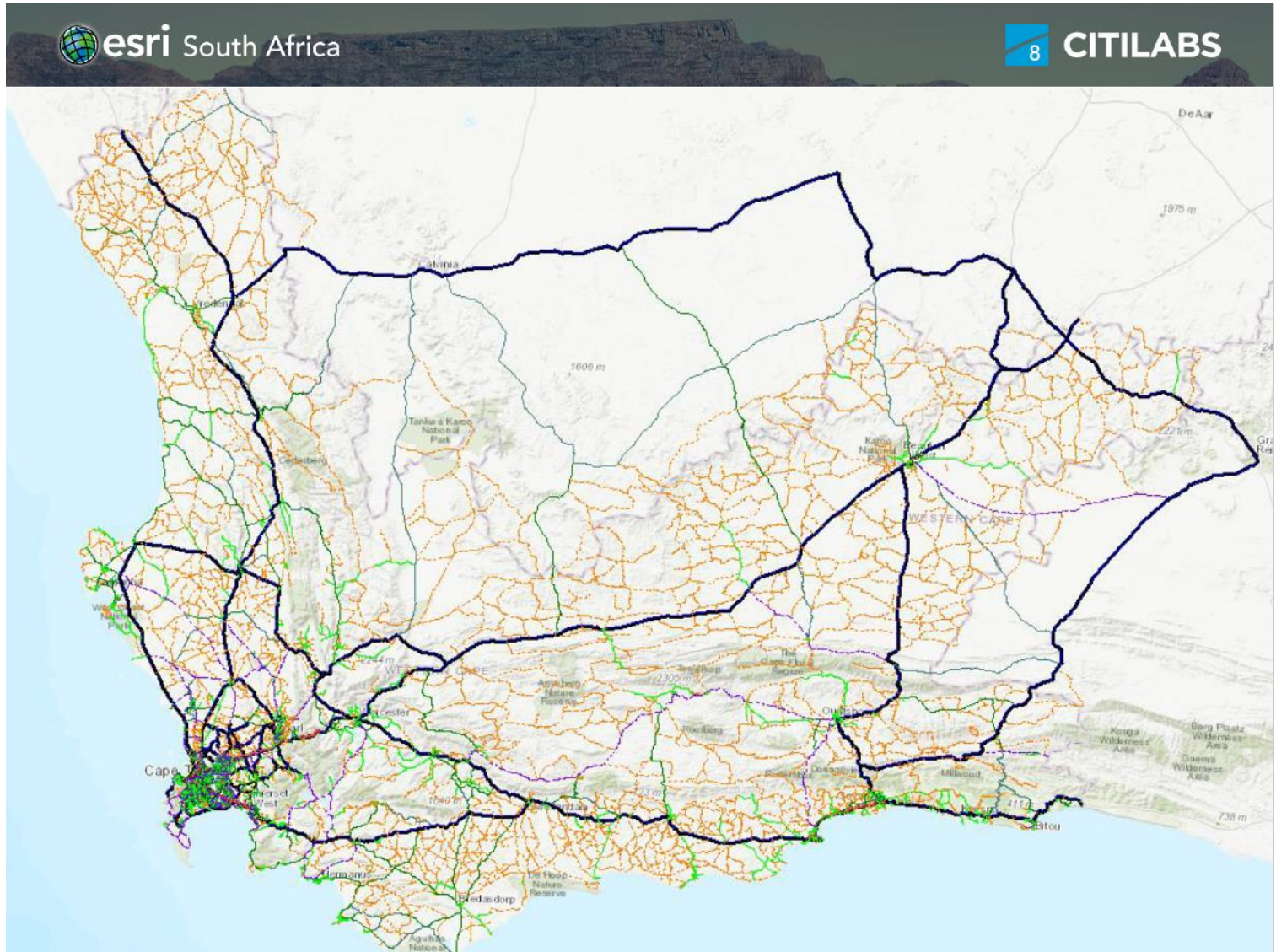
❖ 30% complete

- ❖ Demographic information
- ❖ Land use information

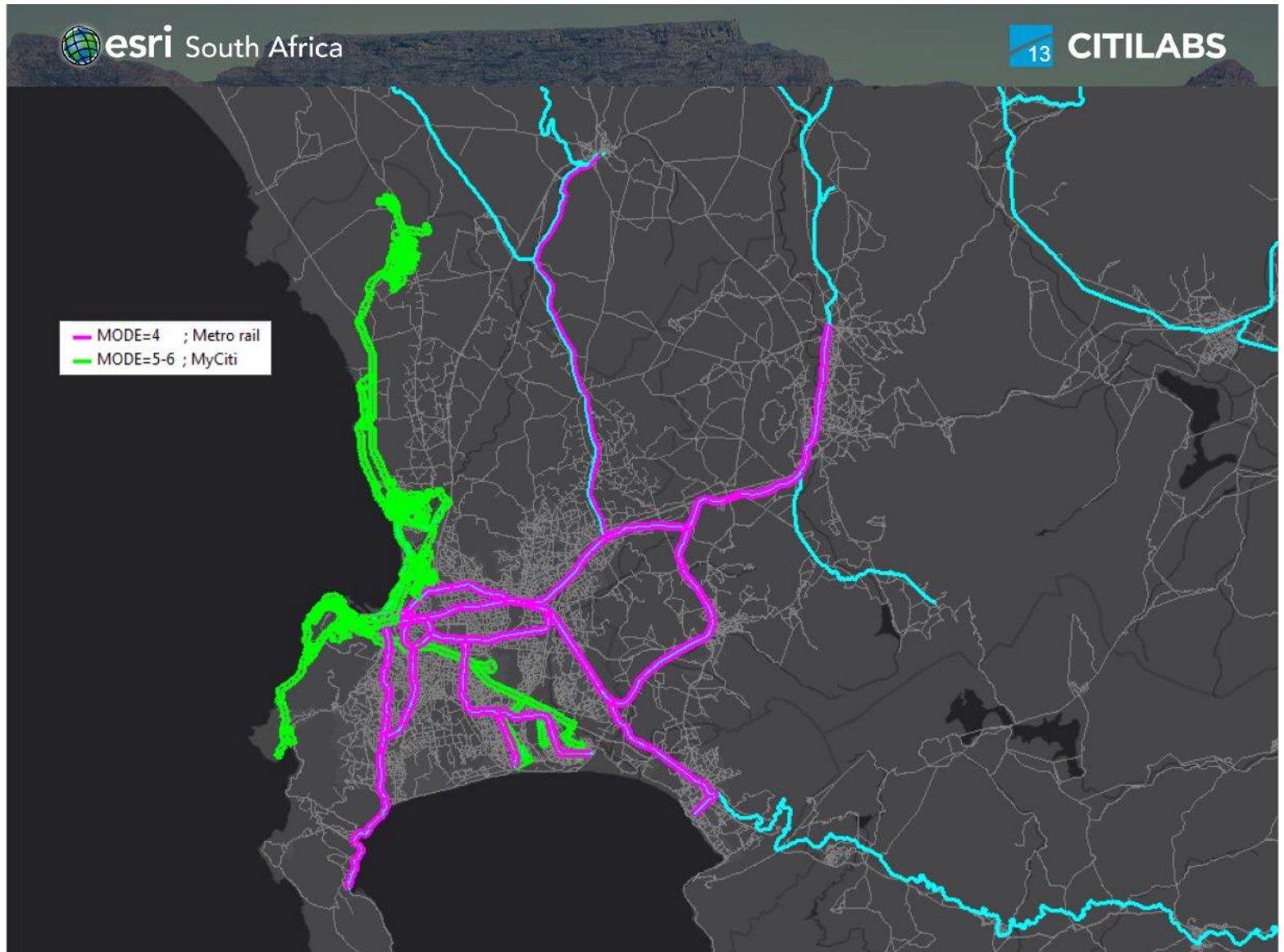
● LUTI model

❖ Data collection phase commenced in November 2018

WCTM – ROAD NETWORK MACRO LEVEL



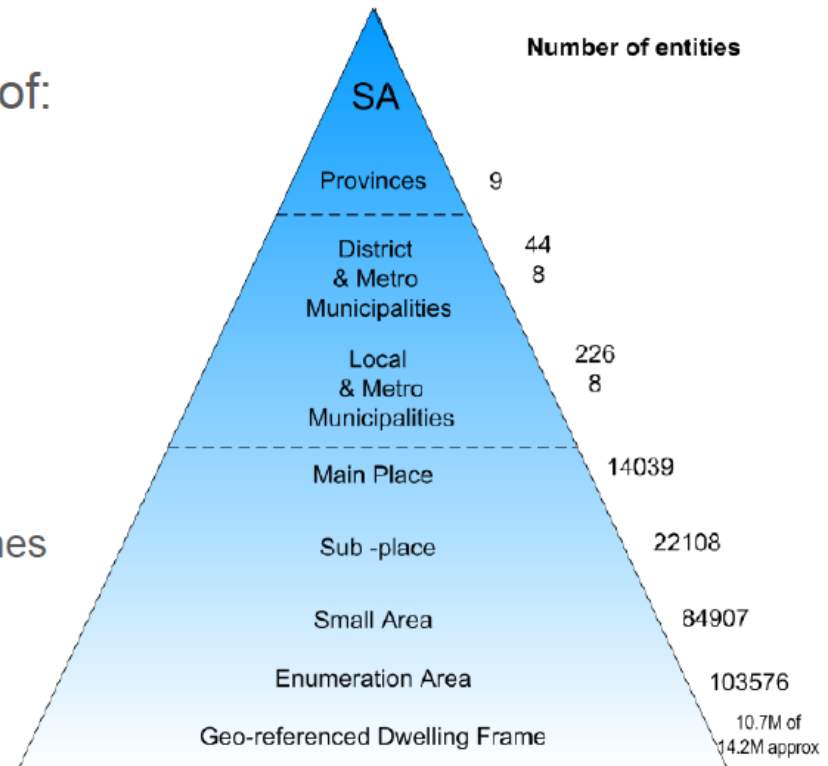
WCTM – PUBLIC TRANSPORT NETWORK MACRO LEVEL



DATA LEVEL – TRANSPORT AREA ZONES AGGREGATION

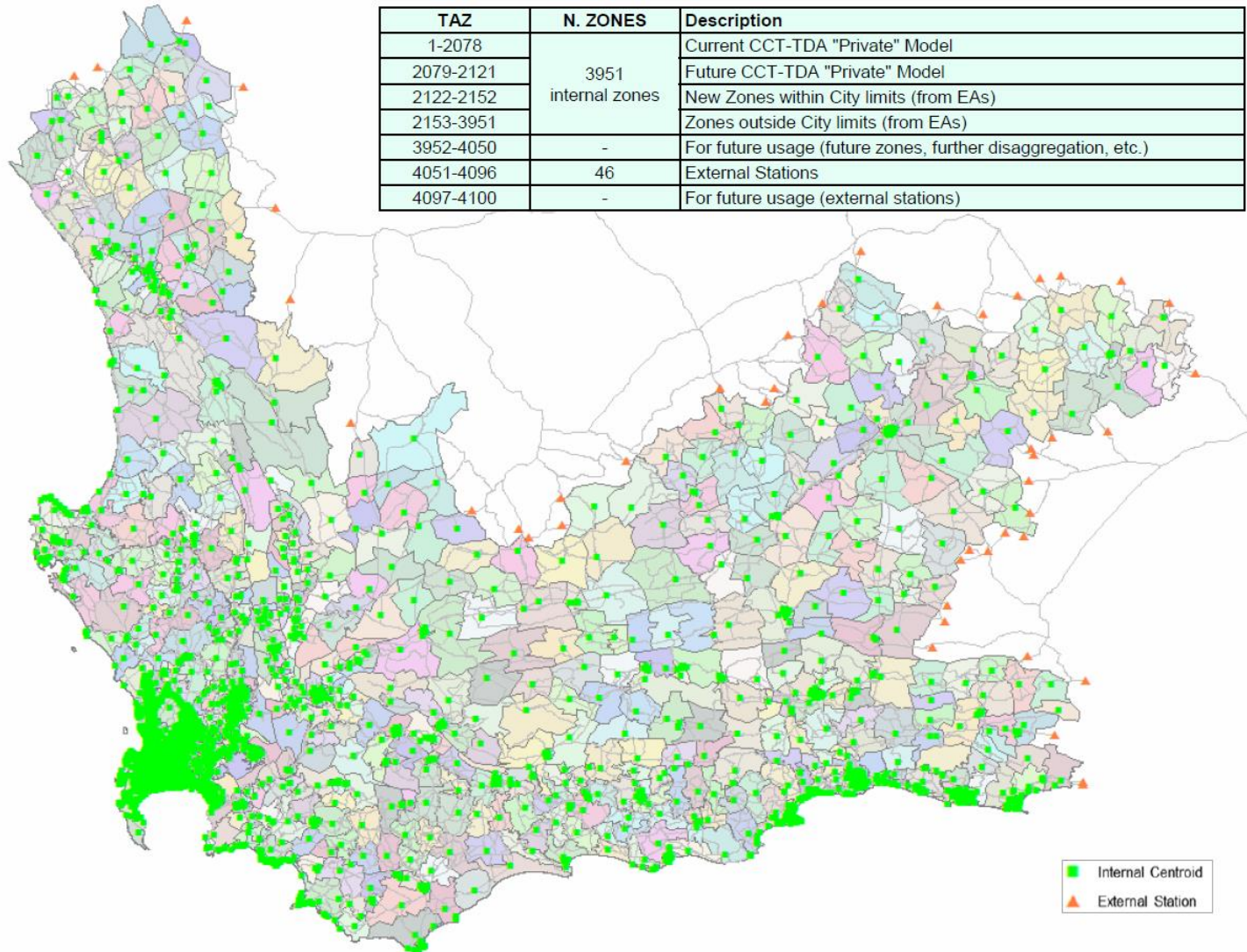
ZONES

- Zones developed as aggregation of:
 - ❖ EAs zones (StatsSA)
 - ❖ CCT-TDA "Private" Model Zones
- Total n. of zones = 3997
- Major steps underway:
 - ❖ It will be necessary to split certain zones during calibration



Source: StatsSA, Census 2011 Geography Metadata

DERIVED TRANSPORT AREA ZONES



ANTICIPATED CHALLENGES



ANTICIPATED CHALLENGES

CUBE suite of productions are designed for global consumption.

The global environment dictates the business norms and standards for IT systems including data management, platform interfaces etc.

This is a key challenge to the development of the model, its use and operation. The key challenges to address will be:

- Gaps and holes in the source datasets due to “no data” situation
- The hosting and sharing of source data by the custodians for the purpose of deriving sector specific datasets – general trend is to capture data for a specific purpose
- Derived/ aggregated datasets hosted and shared by custodians and vendors - impossible disaggregate without access to data sources
- Custodians who only have limited access (extracts) to their datasets – they don’t own it.
- Poor management of “Big Data” – e.g. daily/ hourly transport information
- Availability of “real time” data – fourth industrial revolution.
- Availability of data at “micro level” – e.g. traffic flows at intersection level
- Lack of in-house skills and expertise in the organisational structure

FUTURE MILESTONES



FUTURE MILESTONES

- WCTM model report back meeting on the **5th of March**

Completion of the Land model:

- Develop Rent-bid application (economic drivers for growth and development)
- Build future land use scenarios (growth and development over the next 20 years)

Build the LUTI model:

- Integrate the land use, transport and goods models

Thank you

Contact Us



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