TruckEL

Empowering the future of sustainable logistics

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Teun & Gilles

AGENDA

01 THE BUSINESS CASE

02 OUR PRODUCT

03 THE VALUE

01

THE BUSINESS CASE

UPCOMING ENVIRONMENTAL REGULATIONS

2023

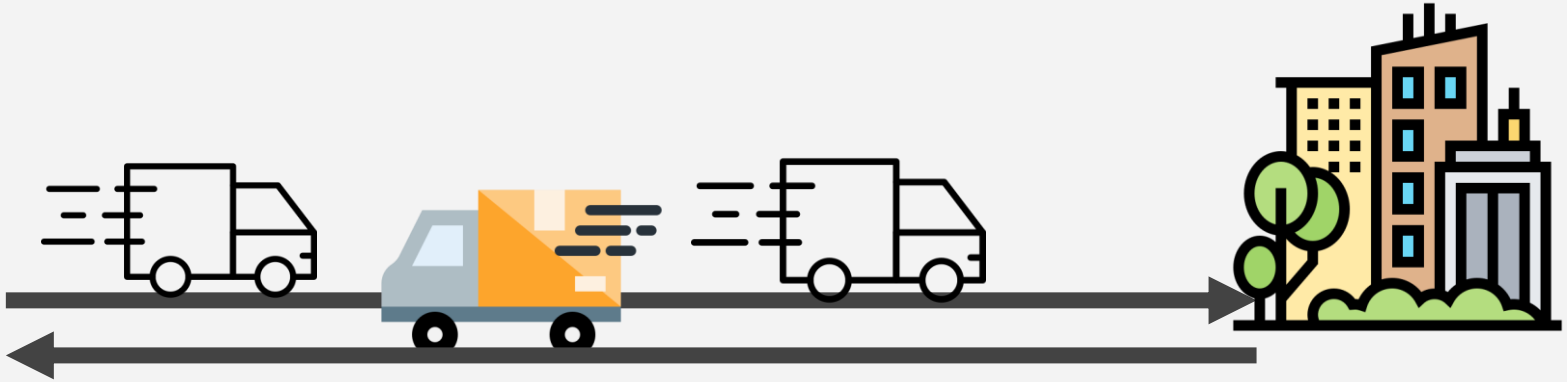
2025

Activation of new
Zero Emissions Zones with
exceptions

2030

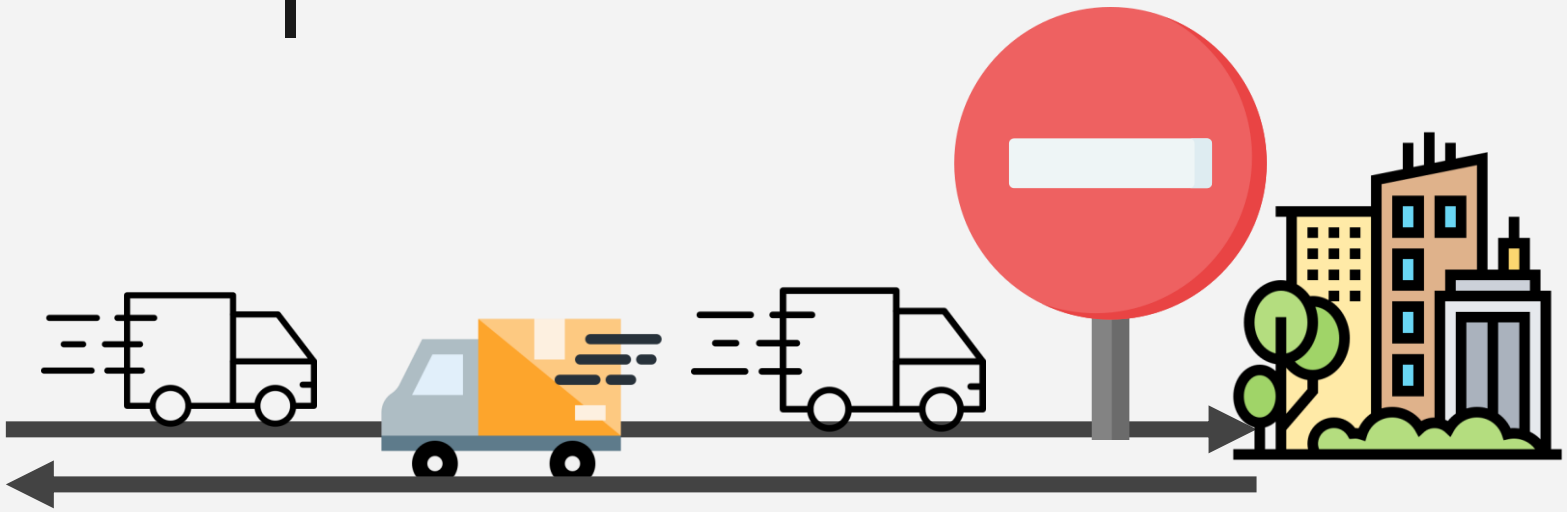
No non-electric vehicles
allowed within ZE-Zones

UPCOMING ENVIRONMENTAL REGULATIONS



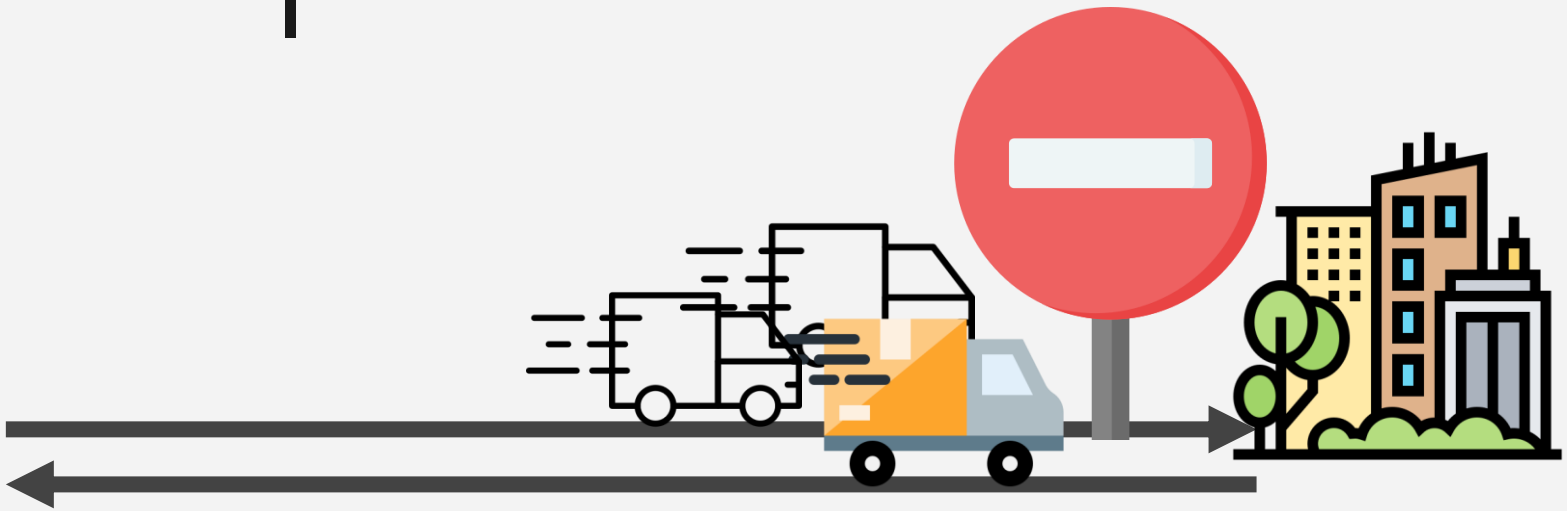
UPCOMING ENVIRONMENTAL REGULATIONS

2030



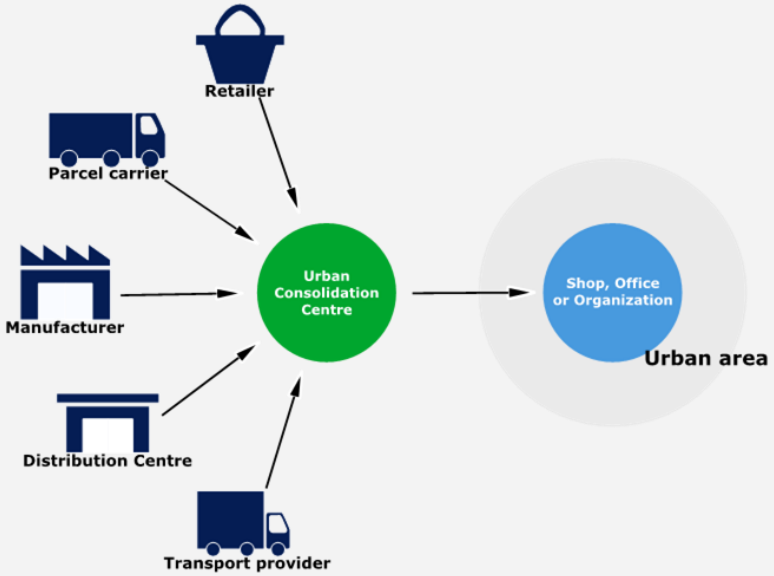
UPCOMING ENVIRONMENTAL REGULATIONS

2030



OUR STAKEHOLDER

Goederen Hubs



OUR STAKEHOLDER

Goederen Hubs

Opportunities

- 2025 regulations
- Already environmentally focused

Challenges

- Realistic costs
- When to transition?

OUR STAKEHOLDER

HOW MIGHT WE

help **UCC** locations prepare for the transition into **electric** last-mile deliveries emerging in the **future**?

02

OUR PRODUCT

TruckEL

KPI'S

Logistic Demand

Predicted logistic demand (m3) of Maastricht for a specific year

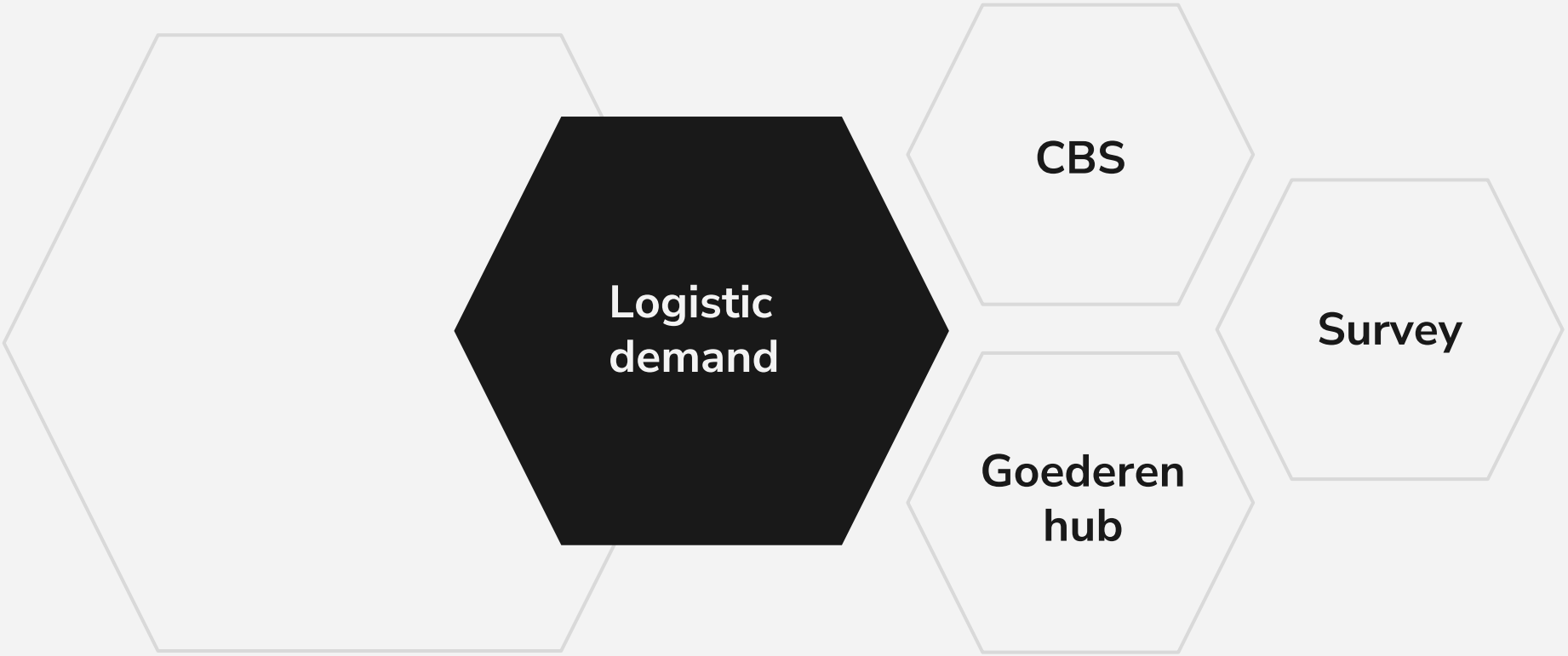
Vehicle Demand

Predicted number of required trucks for a specific year

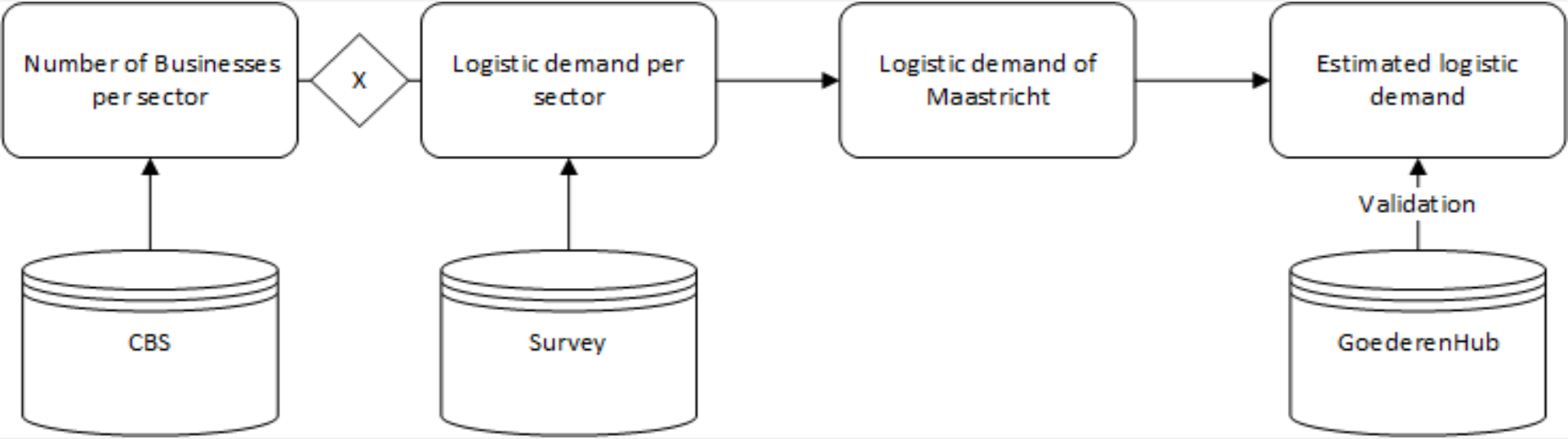
Energy Demand

Predicted electric load in a year

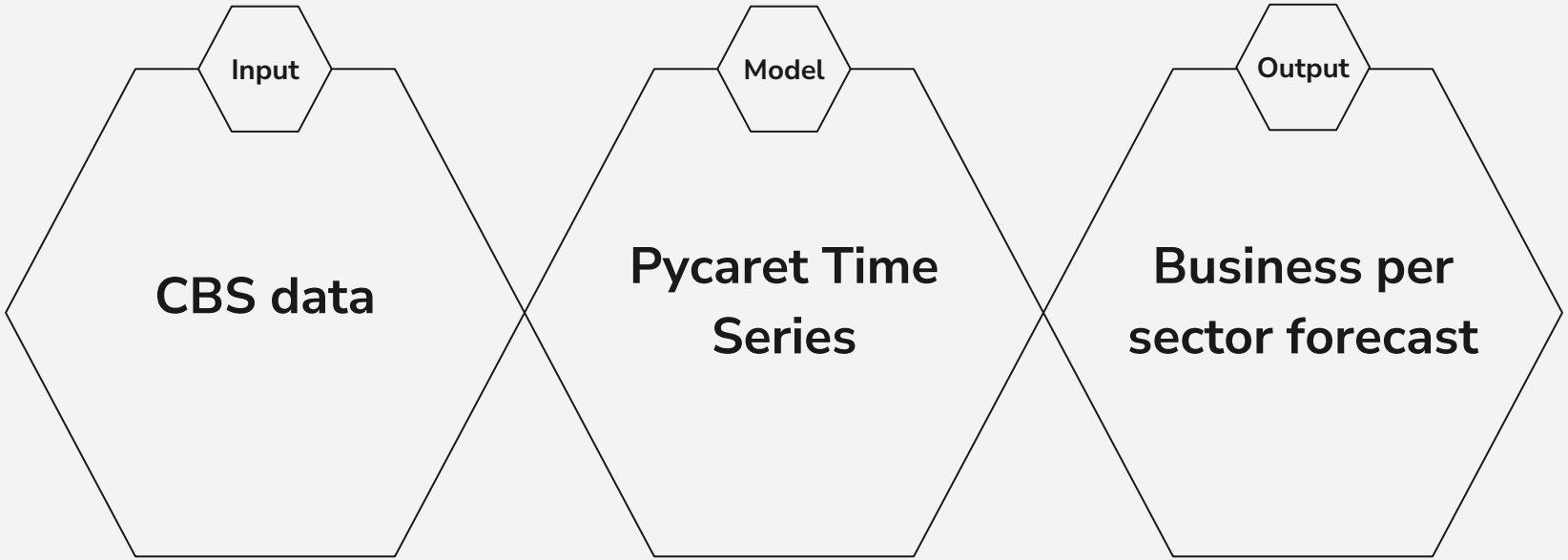
DATA



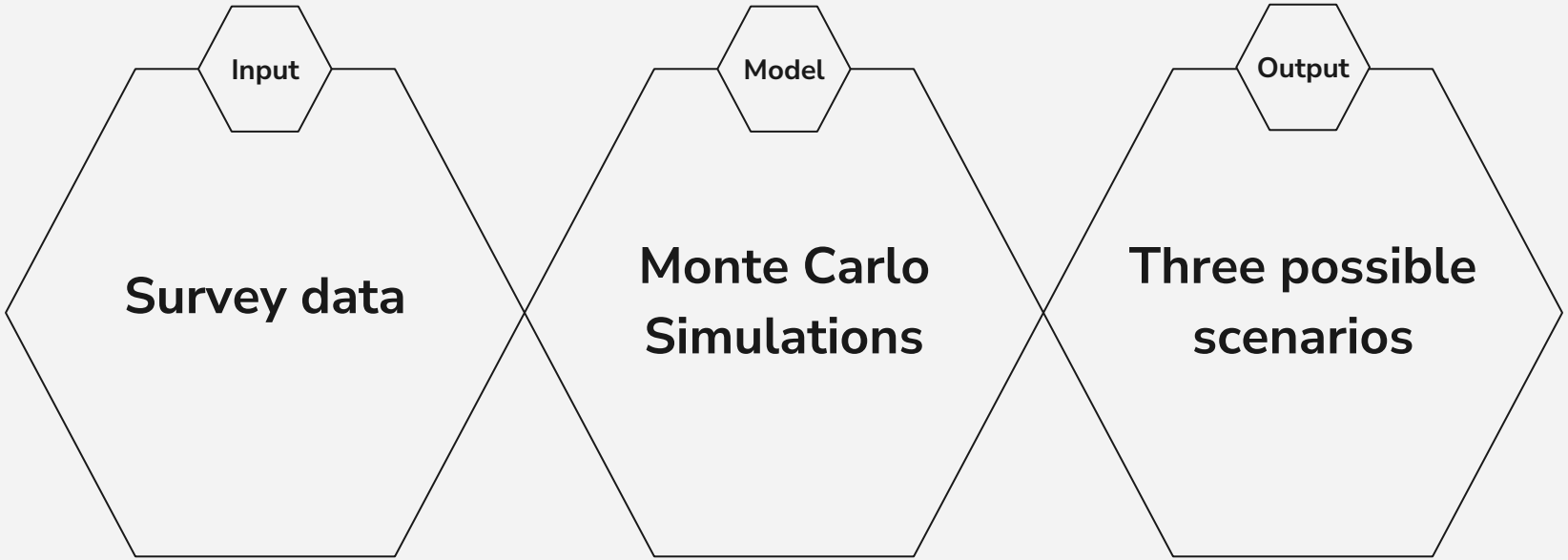
DATA


Number of Businesses per sector
X
Logistic demand per sector
Logistic demand of Maastricht
Estimated logistic demand
Validation
CBS
Survey
GoederenHub

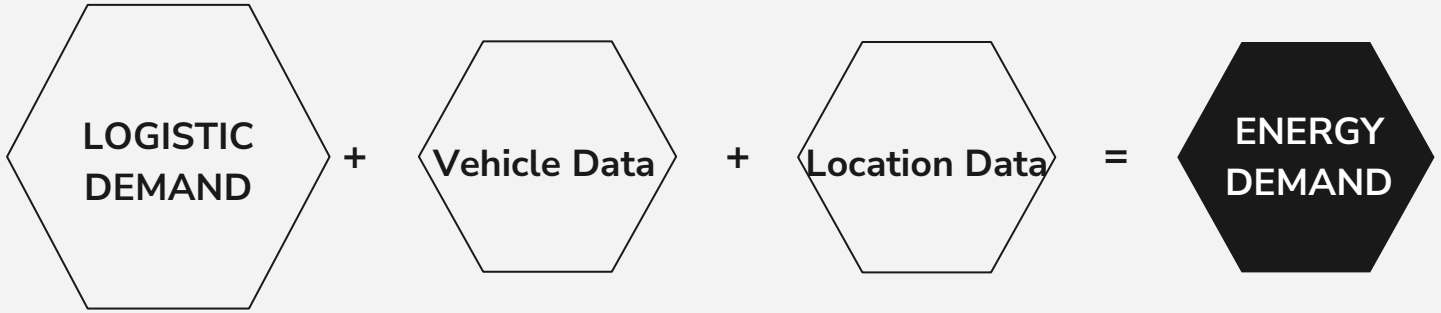
FORECASTING THE NUMBER OF BUSINESSES



SCENARIO CREATION



LOGISTIC INTO ENERGY DEMAND



Number of EUR-pallets

Electric Vehicle Specifications

Urban Area Specifications

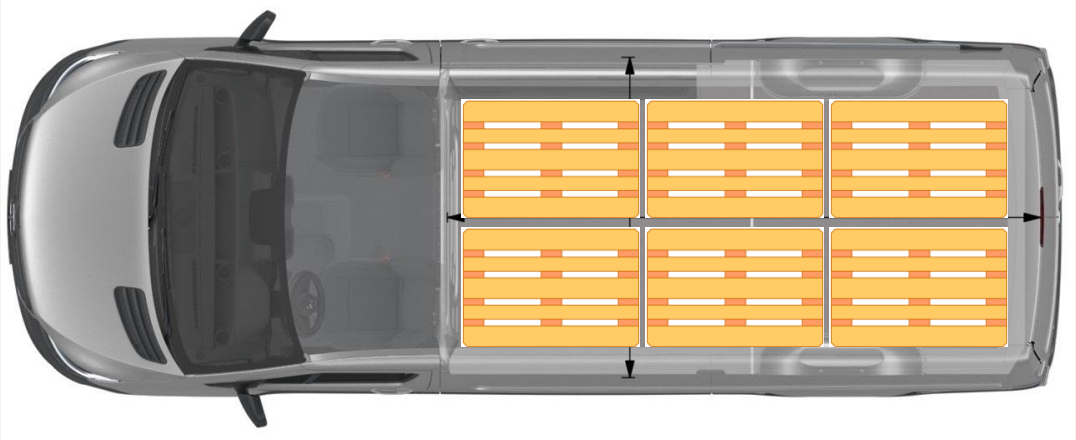
Energy Consumption of the logistic demand in kWh

VEHICLE SPECIFICATIONS

RANGE

VOLUME

BATTERY POWER

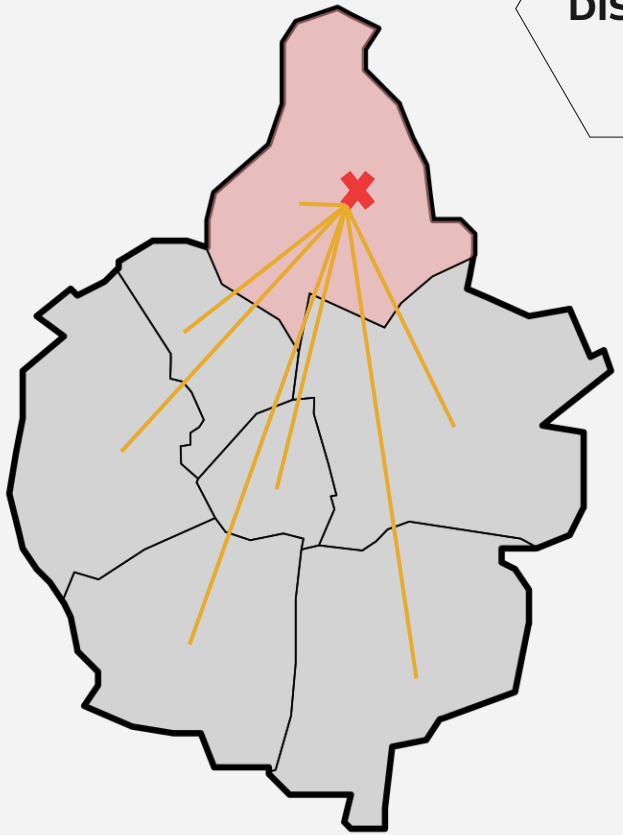


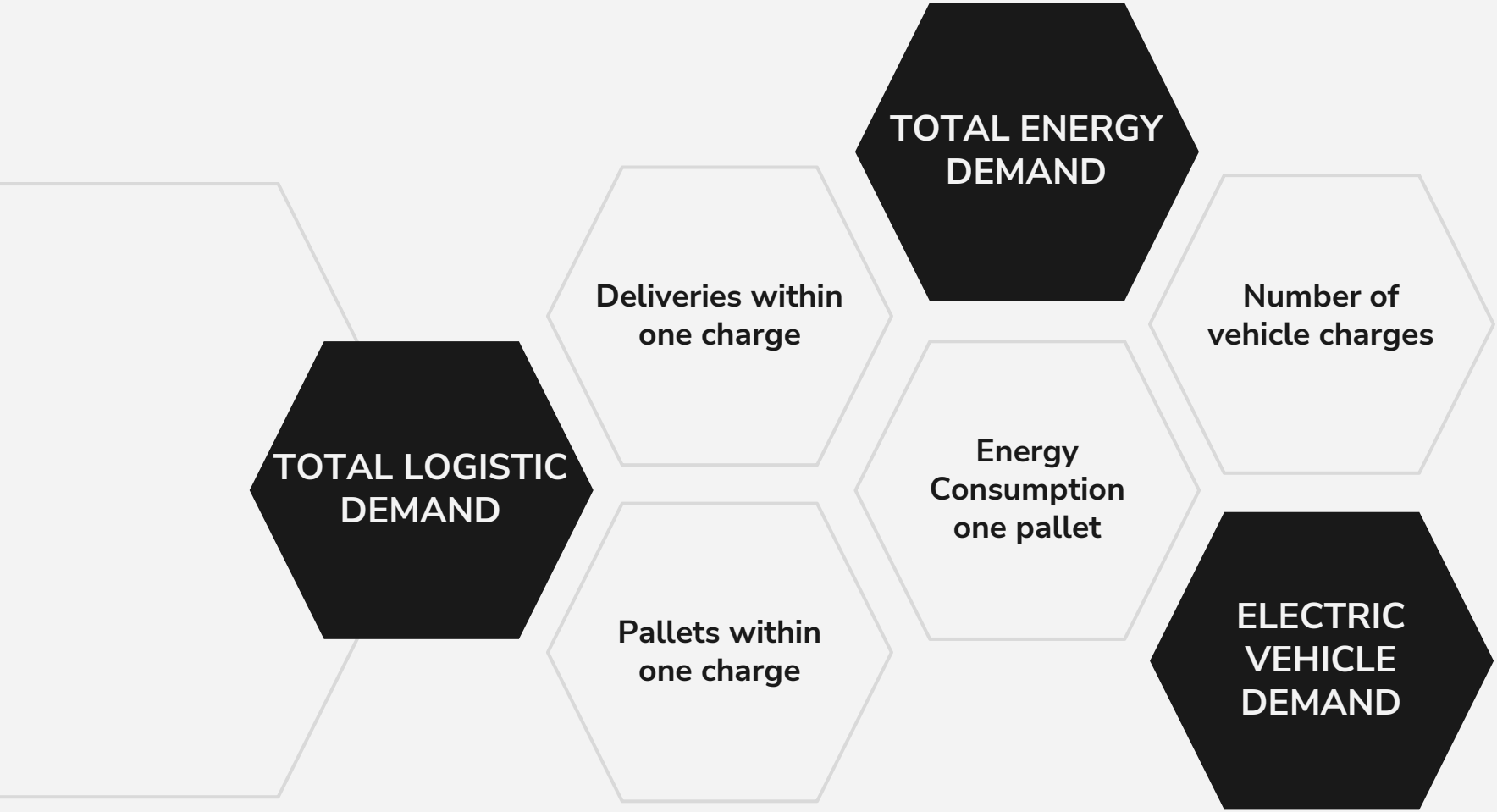
DELIVERIES

DISTANCE

STORY

A **full vehicle** departs from location to distribute all pallets. The vehicle **comes back empty** and will get new pallets loaded. The vehicle range lasts a maximum of one full working day and will get **charged at night**.




TOTAL ENERGY DEMAND
Deliveries within one charge
Number of vehicle charges
TOTAL LOGISTIC DEMAND
Energy Consumption one pallet
Pallets within one charge
ELECTRIC VEHICLE DEMAND

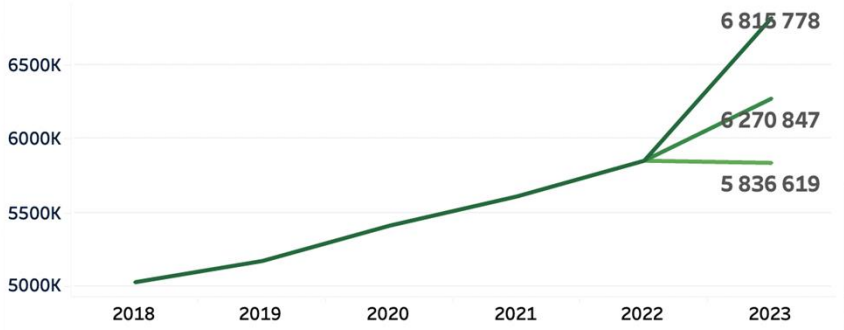
TruckEL

Average Estimate

Low Estimate

High Estimate

MAASTRICHT PREDICTED LOGISTIC DEMAND OVER TIME



MONTHLY-LEVEL PREDICTIONS

Overall number of EUR pallets	Overall required number of vehicles	Overall energy consumption in kWh
522,571	511	602,719

MONTHLY MARKET SHARE PREDICTIONS

Number of EUR palletes	Required number of vehicles	Energy Consumption in kWh
5,226	5	6,027

Vehicle type:

eSprinter

Business sector:

- [x] (All)
- [x] BFNijverheidEnEnergie
- [x] GIHandelEnHoreca
- [x] HJVervoerInformatieEnC...
- [x] KLFinancieleDienstenOnr...
- [x] MNZakelijkeDienstverlen...
- [x] RUCultuurRecreatieOver...

Average Delivery Distance:

8,86

Expected market share:

1,00%

03

THE VALUE

VALUE PROPOSITION

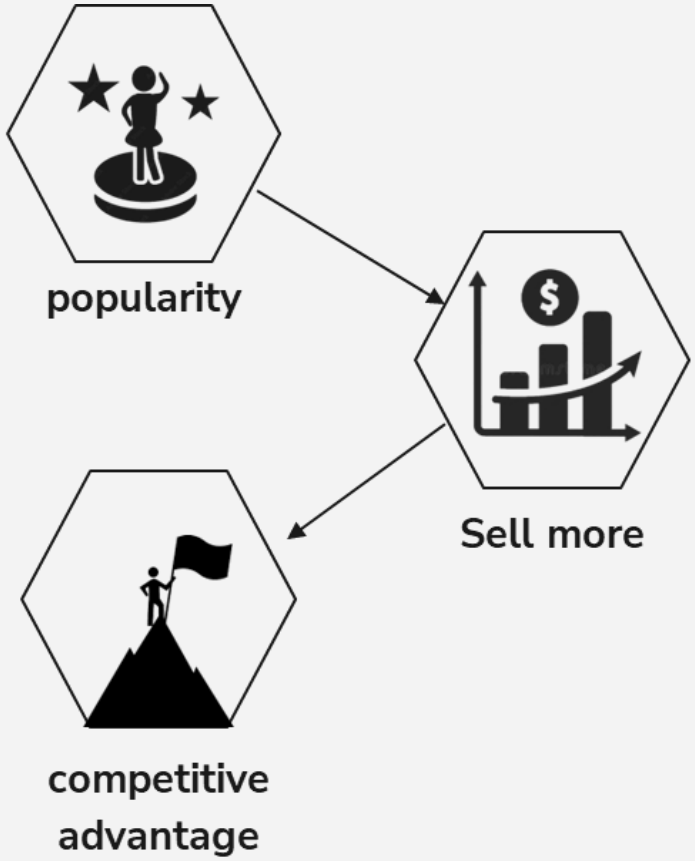
KPIs

personal ization

Logistic demand estimations

VALUE PROPOSITION

BUSINESS IMPLICATIONS



Thank You!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Appendix

Time Series model selection

Model	MASE	RMSSE	MAE	RMSE	MAPE	SMAPE
Orthogonal Matching Pursuit w/ Cond. Deseasonalize & Detrending	0.1960	0.1844	9.0582	9.0582	0.0056	0.0055
Decision Tree w/ Cond. Deseasonalize & Detrending	0.1966	0.1851	9.1389	9.1389	0.0056	0.0056
AdaBoost w/ Cond. Deseasonalize & Detrending	0.2375	0.2236	11.0556	11.0556	0.0068	0.0068
Gradient Boosting w/ Cond. Deseasonalize & Detrending	0.2696	0.2531	12.3191	12.3191	0.0075	0.0075

What does it all mean?

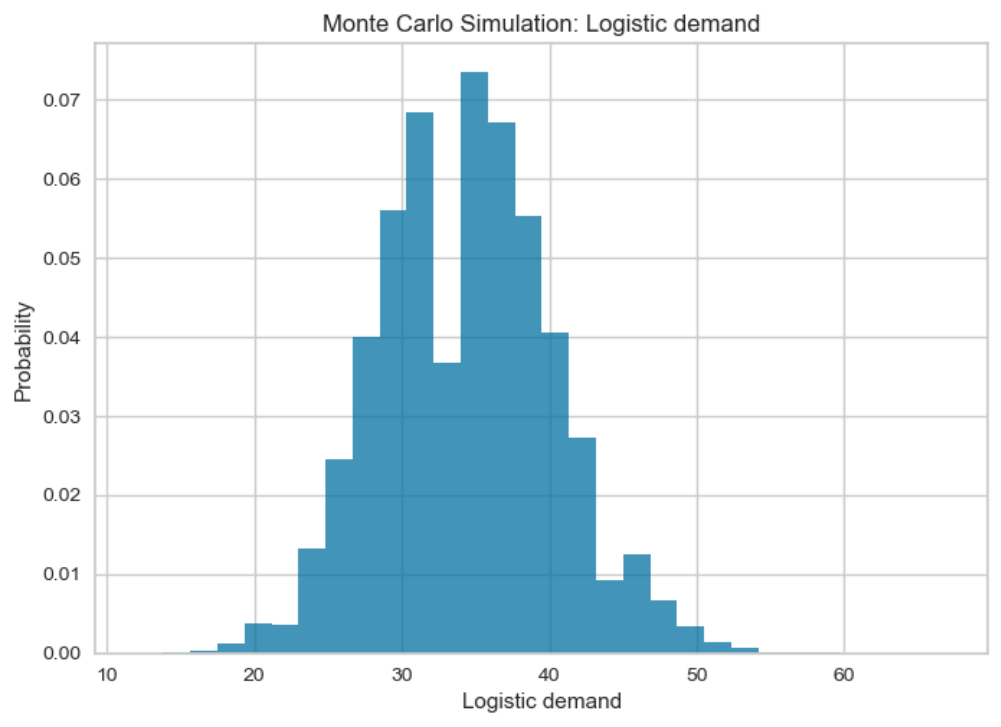
Model	Meaning
Orthogonal Matching Pursuit w/ Cond. Deseasonalize & Detrending	Iteratively select the most correlated predictor to the response variable, sensitive to the amount of predictors to be selected
Decision Tree w/ Cond. Deseasonalize & Detrending	Decision tree, might be less accurate
AdaBoost w/ Cond. Deseasonalize & Detrending	Combination of decision trees, sensitive to outlier data
Gradient Boosting w/ Cond. Deseasonalize & Detrending	Combination of decision trees, prone to overfitting

What does it all mean?

Abbreviation	Metric
MASE	Mean Absolute Scaled Error, compare the result to that of a naïve forecasting approach
RMSSE	Root Mean Squared Scaled Error, compare the result to that of a naïve forecasting approach
MAE	Mean Absolute Error
RMSE	Root Mean Squared Error
MAPE	Mean Absolute Percentage Error, metric based on relative error
SMAPE	Symmetric Mean Absolute Percentage Error, metric based on relative error

Scenario creation for amount of pallets

Scenario outcomes		
1	Good scenario	46
2	Average scenario	30
3	Bad scenario	22



Model output

Business sector	Yearly pallets	Predicted Businesses	Predicted Demand	Year	scenario
MNZakelijkeDienstverlening	7.820.238.096	1110	8.680.464.287	2023	Average

TRANSLATION FROM LOGISTIC TO ENERGY TO VEHICLE DEMAND