TRAFFIC FORECASTS — BUSINESS ANALYSIS

SNCF has developed the capacity to analyse and evaluate potential rail projects—assessing investments by carriers and analysing the business performance of railway companies and infrastructure managers.

Economic models and methods are an integral part of these reviews and analyses. They include:

- **Trend-based models:** These allow users to estimate traffic trends (excluding project impacts) based on assumptions about changes in the main variables shaping mobility.

  They measure traffic elasticity based on such explanatory variables as macro-economic environment, railway services/packages/products, and competition.

- **Traffic projection models:** These examine how demand for specific itineraries—short-, medium-, and long-term travel between defined points of departure/destination—shifts when there is a significant change in supply (when, for example, there is an influx of traffic from another source, or an induced rise or fall).

  SNCF has developed and maintains two separate traffic forecasting models—one for medium- and long-distance journeys, and the other for short- and medium-distance travel.

  Both models are based on generalized cost using a gravity-based approach, and incorporate trend-based models. For medium- and long-distance journeys, a time-price model predicts the trade-off that results as passenger choice shifts between air and train travel.

- **Traffic distribution model:** This shows the distribution of total rail traffic and revenue for each carrier and train for a given itinerary (departure/destination).

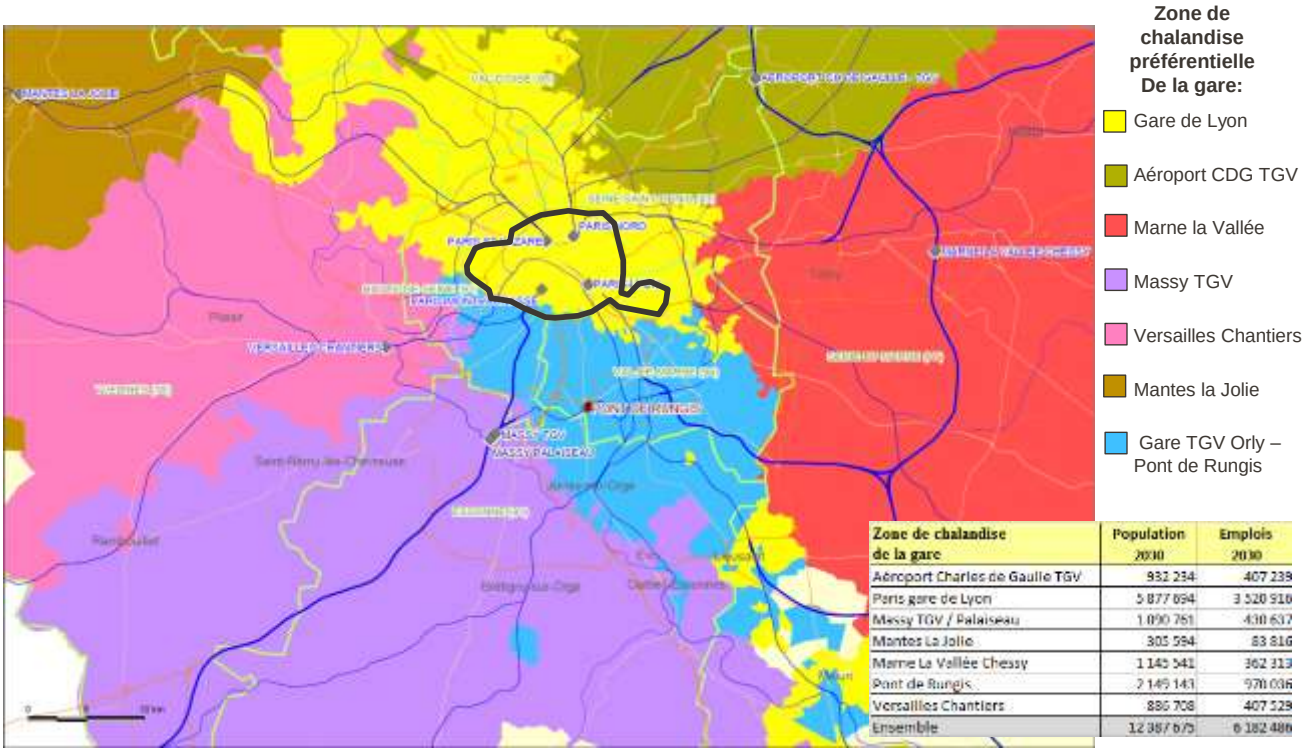
  SNCF has developed a distribution model that can be coupled with traffic forecasting models. This allows traffic estimates generated by traffic forecasting models to be assigned to the various carriers and trains.

- **Probabilization model for traffic and revenue forecasts:** This assesses the variability of results by point of origin/destination and accurately measures the risk for a given carrier of an infrastructure project or improvement in rail supply. It lets users take into account the uncertainty linked to explanatory variables (GDP or final household consumption expenditure, for example). A forecast's confidence intervals are calculated, as well as the probability of reaching a given traffic level through an improvement in rail supply.

- **Method for assessing whether to build a new station:** This determines whether adding a new station to an existing network (high-speed line or conventional line) is justified, and compares the advantages of potential sites for the carrier.

  It takes an integrated approach using both geomarketing and econometric models.

The map below illustrates preferential catchment areas for a potential TGV station on the Paris Region-Lyon line (Orly-Rungis site).



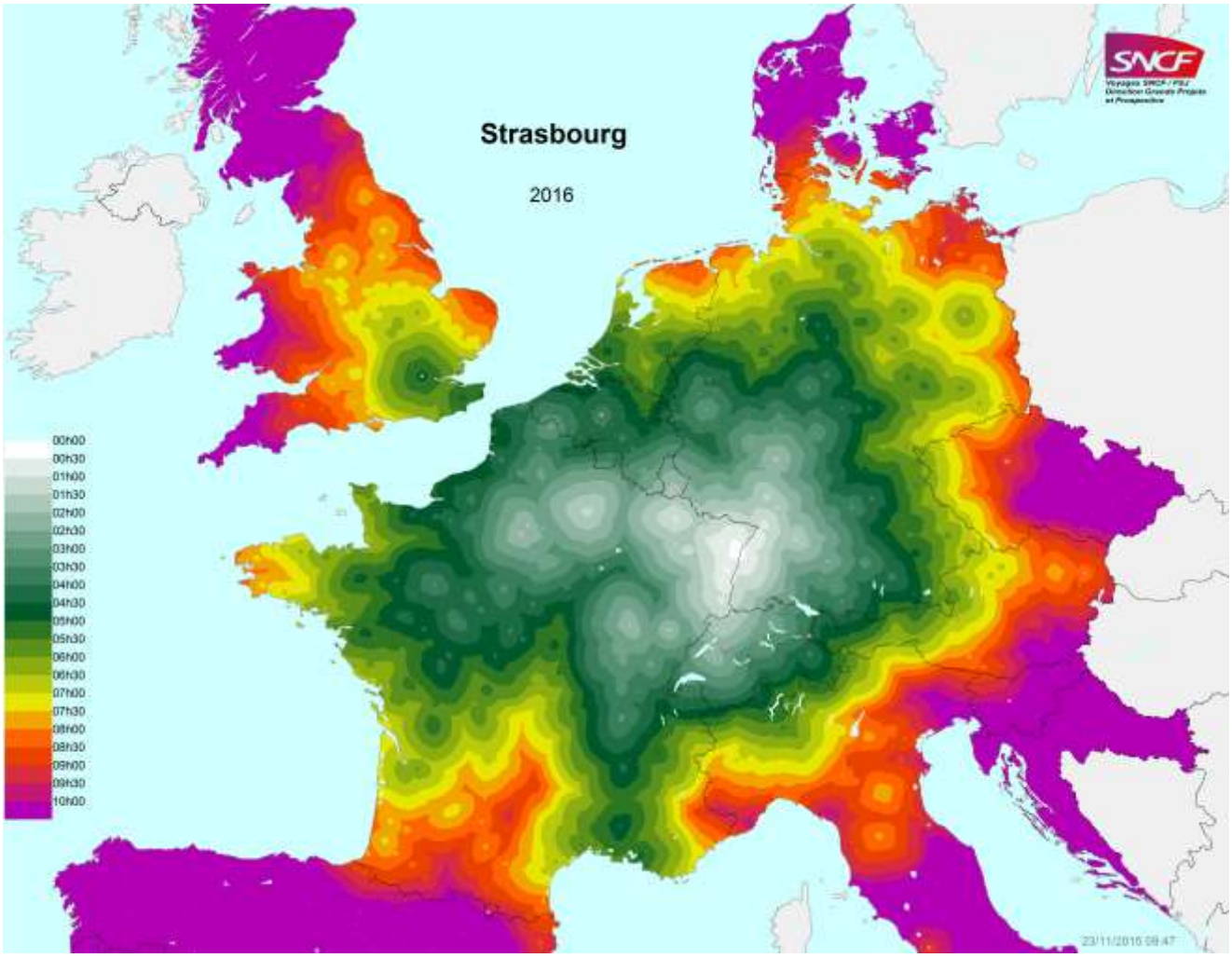
Zone de chalandise de la gare	Population 2030	Emplois 2030
Aéroport Charles de Gaulle TGV	932 234	407 239
Paris gare de Lyon	5 877 694	3 520 916
Massy TGV / Palaiseau	1 090 761	430 637
Mantes La Jolie	305 594	83 816
Marne La Vallée Chessy	1 145 541	362 313
Pont de Rungis	2 149 143	978 036
Versailles Chantiers	886 708	407 529
Ensemble	12 387 675	6 182 486

- **Financial evaluation model:** This assesses the appeal of a project that would significantly boost rail capacity for a carrier, calculating discounted net benefits and internal rate of return (IRR). The financial simulations it generates show the project's effect on net income and debt, year by year.

- **Model of maps showing regional access/suitability for high-speed rail service:**

  Combining isochrone maps with a database determines which regions/destinations are accessible by train within a defined travel time.

Example: European isochrone map showing rail travel time from Strasbourg in the second quarter of 2016:



Learn more:
"Grande Vitesse Ferroviaire" by Michel Leboeuf includes:

- Model of maps showing regional access for high-speed rail service:
  Isochrone maps p. 167
- Traffic forecasting model:
  SNCF econometric model: p. 350 and p. 354
- Probabilization model for traffic and revenue forecasts: p. 375