

# Network Design Model for Fuel Retail

## Motivation / Background

- > Fuel stations chain intending to expand: where to place new stations?
- > In Brazil, ethanol is competitive with gasoline:
  - 90% of new cars are Flex-Fuel
  - Drivers decide mostly based in price.
- > Fuels produced in different locations

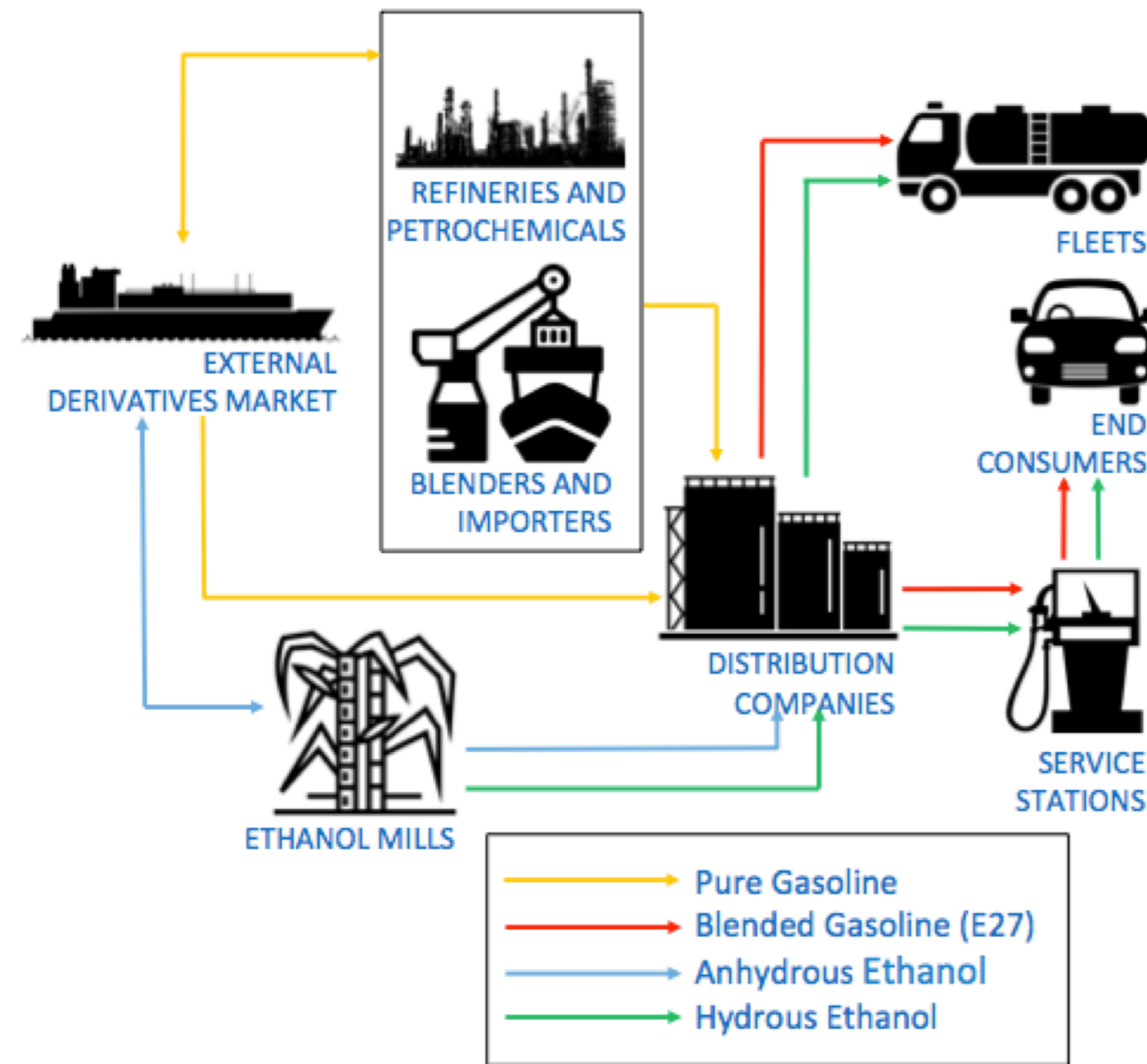


Image by Bocão News

## Key Question / Hypothesis

How can an expanding fueling station chain increase margins?

Locate new stations while considering the entire supply network for different fuels should reduce transportation costs and increase profit.

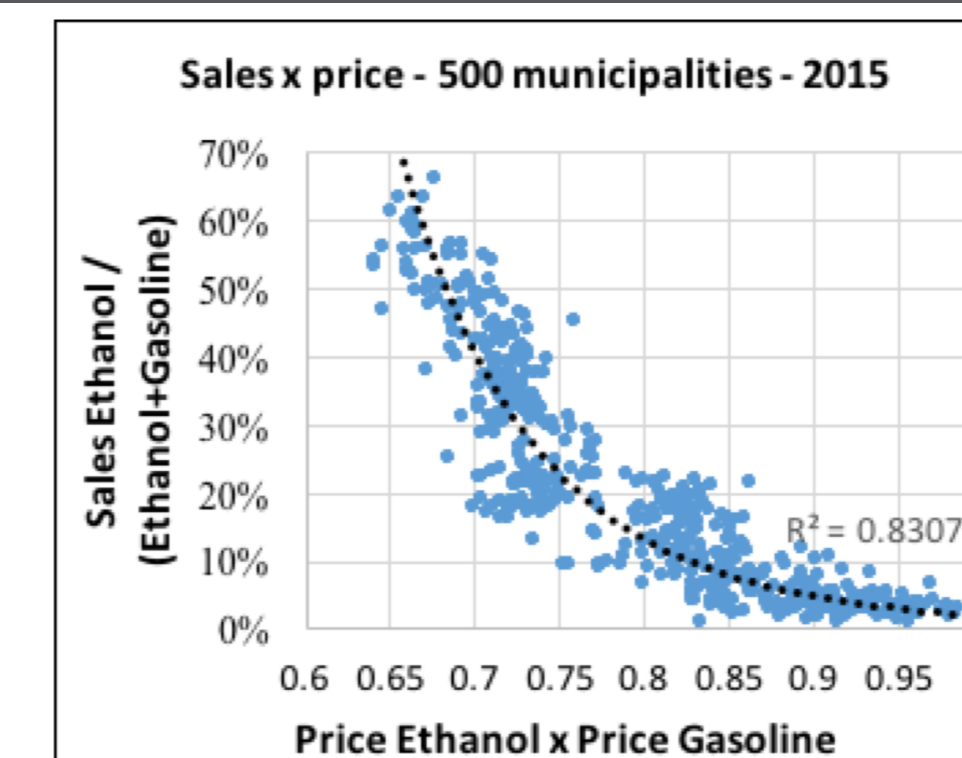
## Relevant Literature

Studies on:

- > Supply chain and distribution of petroleum products and biofuels;
- > Economics of fuel retail;
- > Fuel distribution modeling and optimization.

## The Problem

- > Price-sensitive customers;
- > Low profit margins (between 2-3%);
- > Transportation costs > retail margins;
- > Ethanol and petrol produced in different regions;
- > Distribution 100% by road.

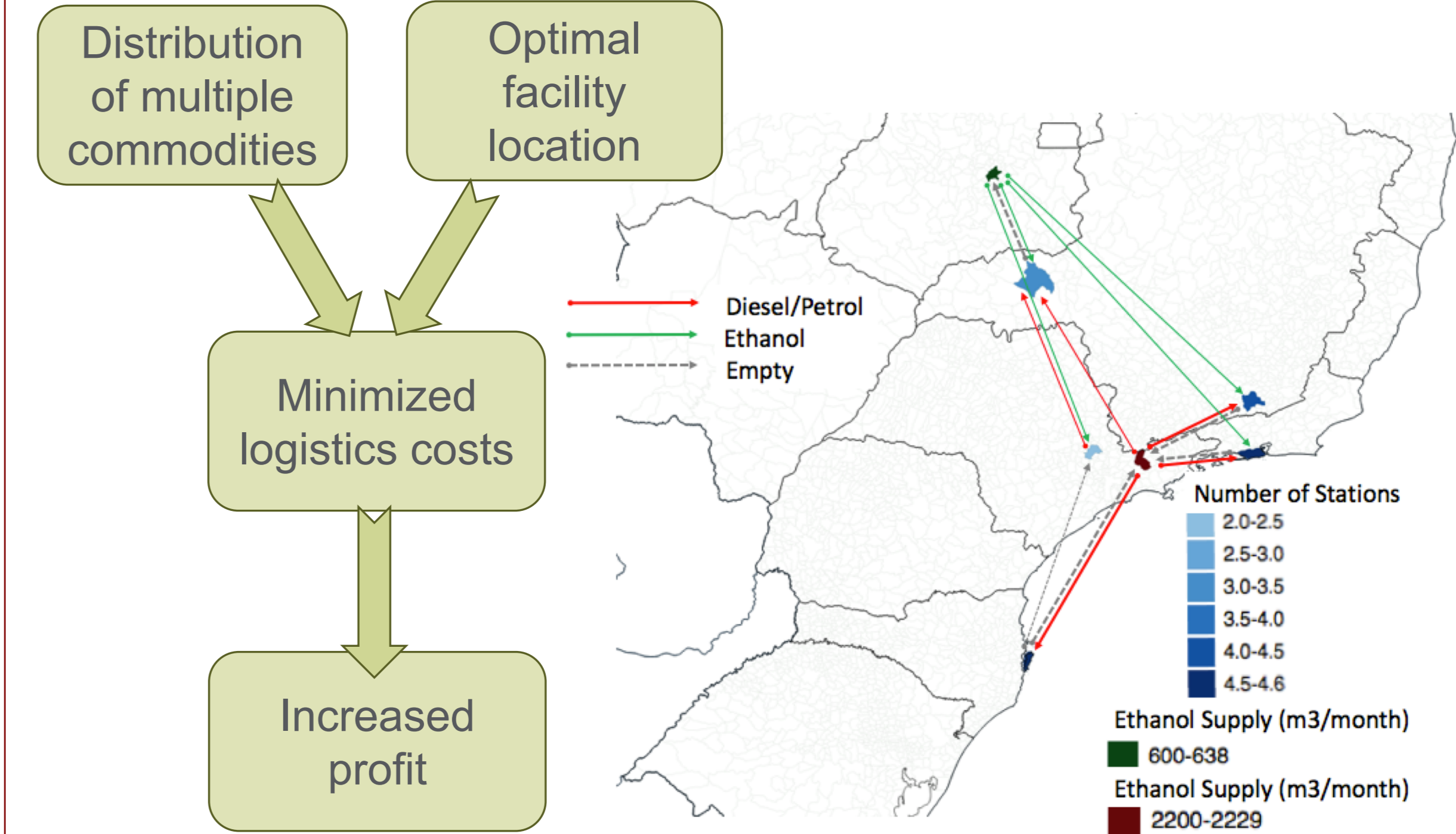


## Methodology

Supply Chain Network Design model:

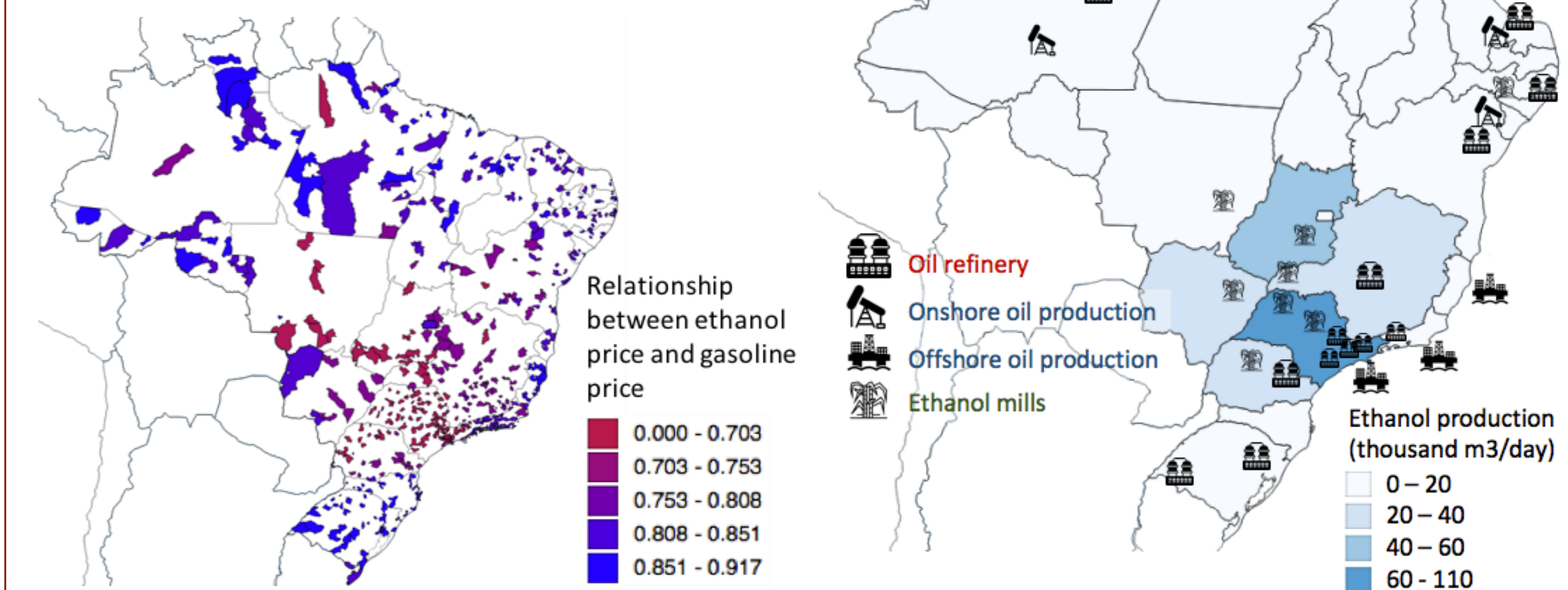
- > Mixed-Integer Linear Programming (MILP) optimization -> highest profit;
- > Data: fuel stations (sales data and finance) and Petroleum Agency;
- > Probabilistic iterations for robustness;
- > Scenario simulations to identify sensitivity.

## Initial Results



## Expected Contribution

- > Model the network;
- > Improve profitability.



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