



Aalto University  
School of Electrical  
Engineering

# Mobile Network Savings and Time Dependent Pricing

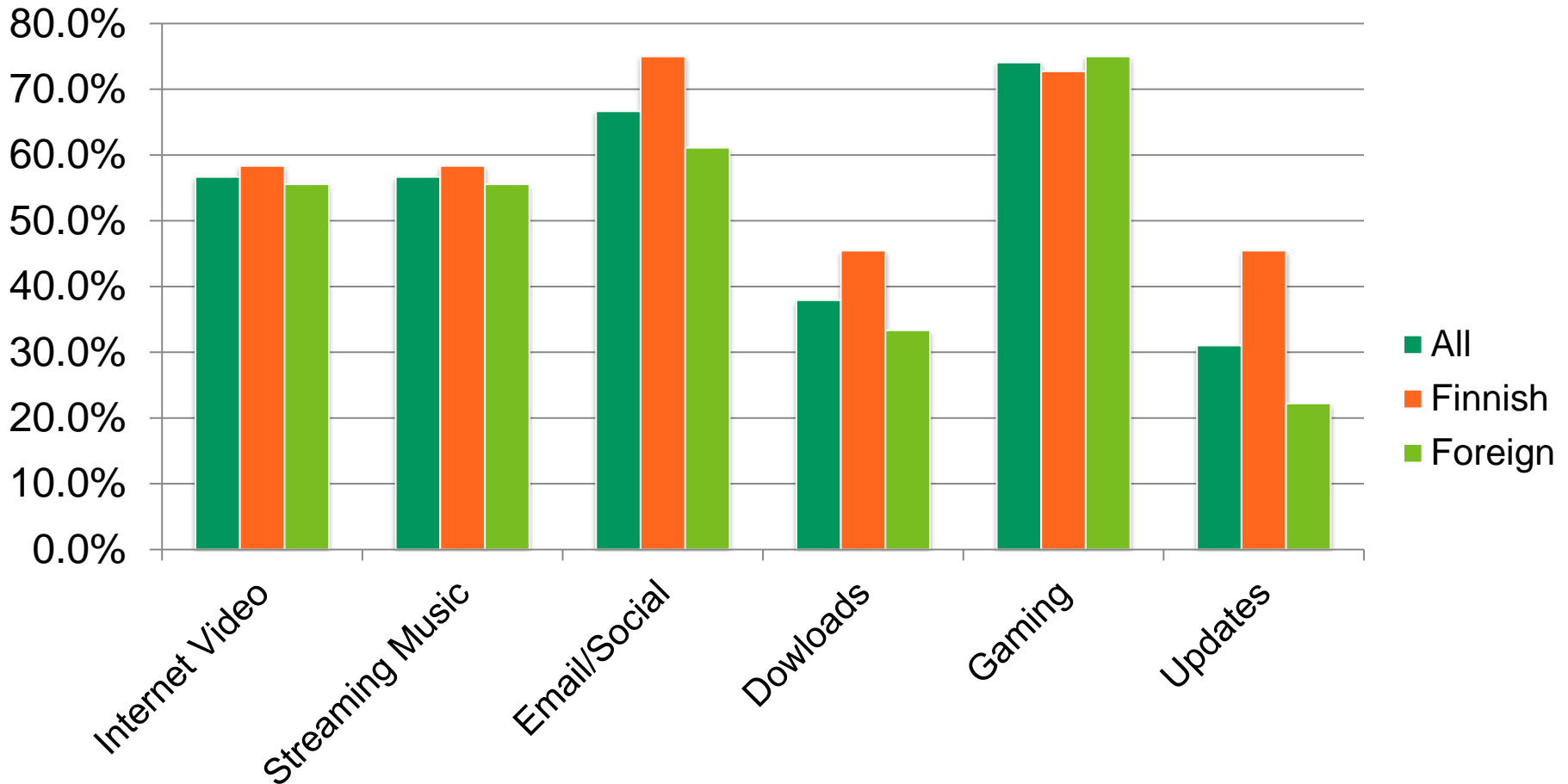
Benjamin Finley, MoMIE Seminar, 14.5.2013

# Time Dependent Pricing

- Shift Demand
  - Marginal choice theory (To delay or not to delay? That is the question)
  - Marginal utility = diminishing marginal utility + hyperbolic temporal discounting<sup>1</sup>
- Current Usage
  - fixed supply or capacity (in the short run)
  - high sunk costs
  - highly variable but predictable demand
  - perishable goods
  - low marginal costs up to the supply or capacity limit

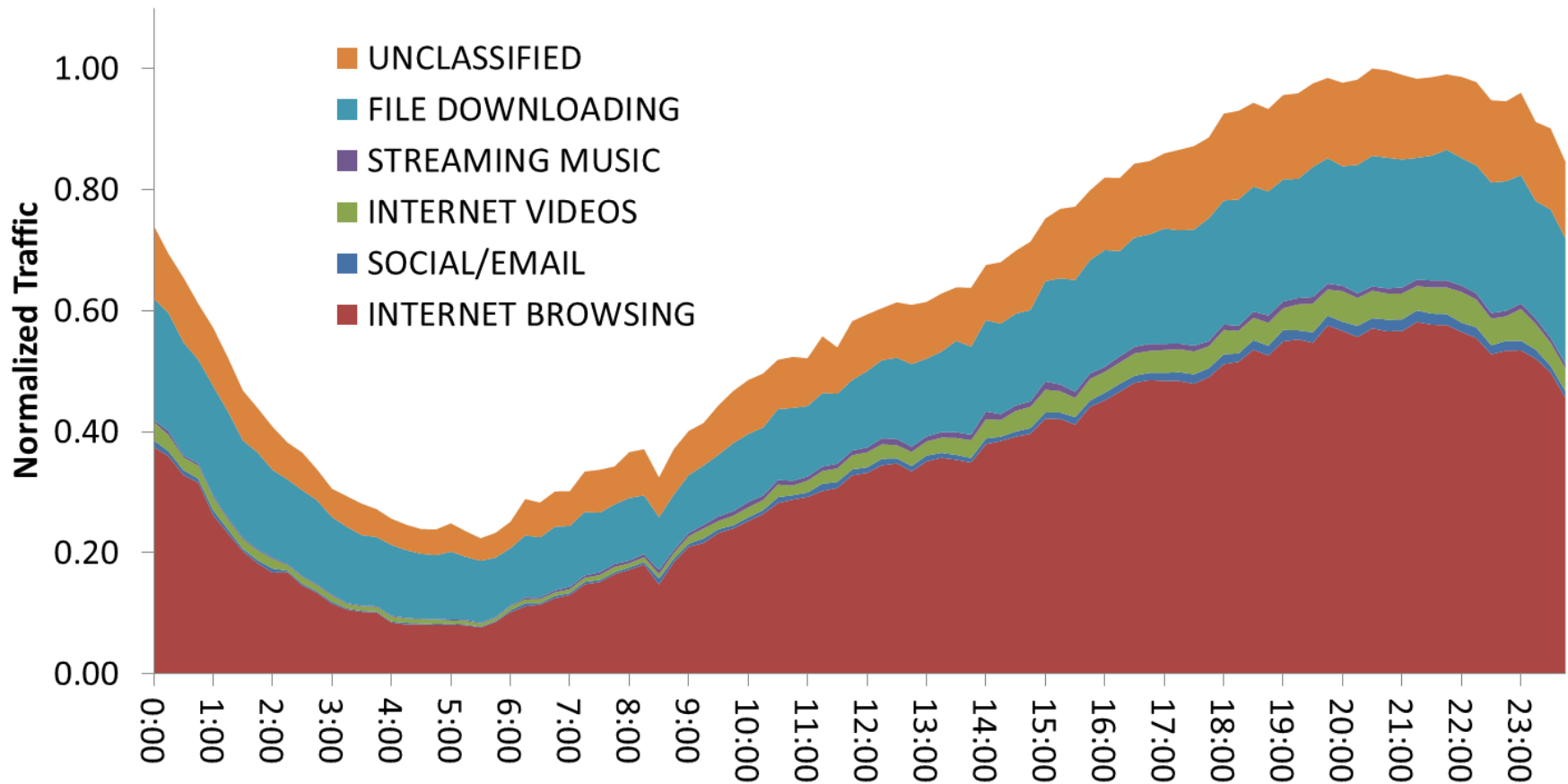
# Overall Time Sensitivity

Percentage of Surveyed Who Won't Delay Activity



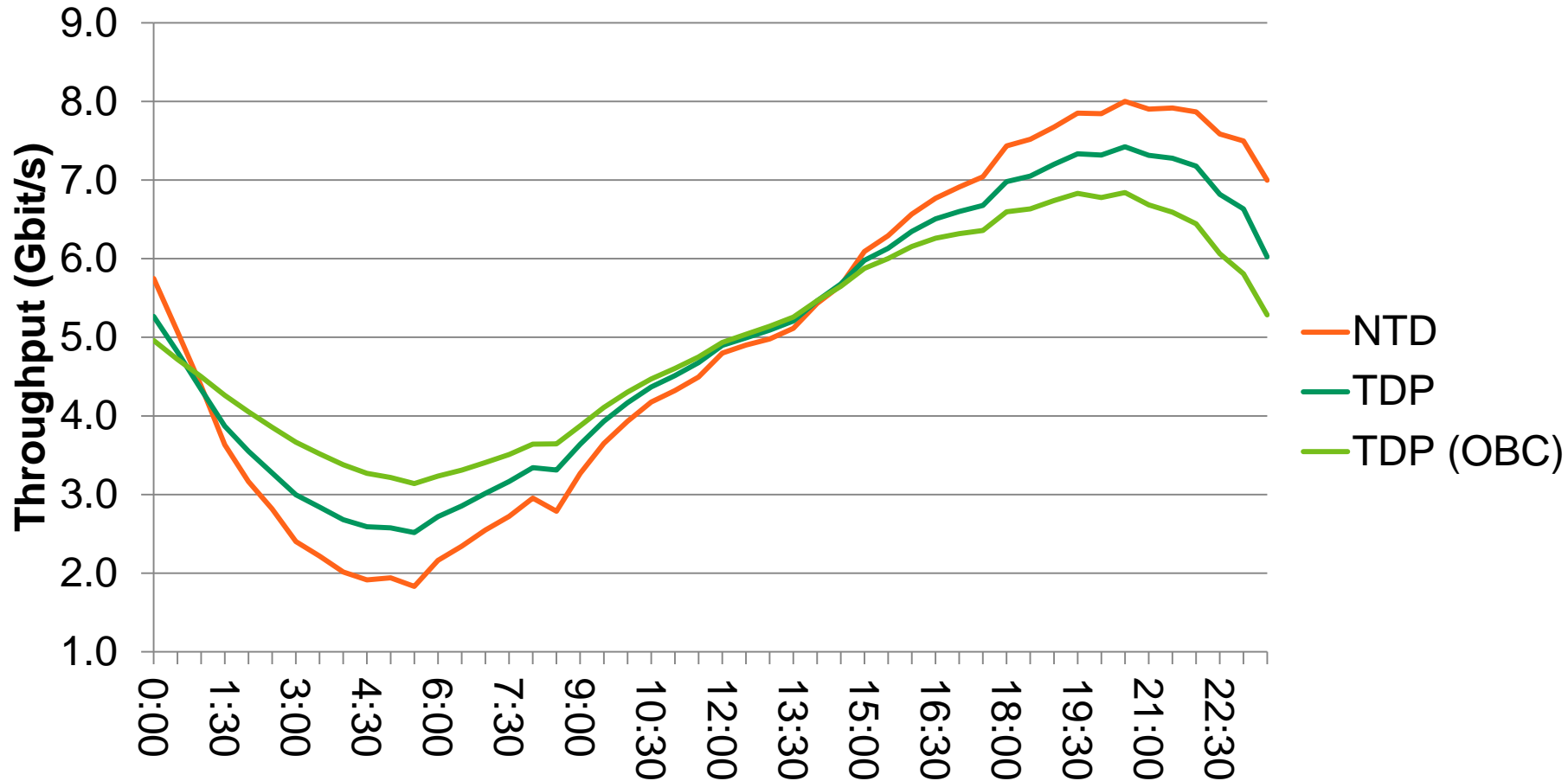
# Traffic By Category

Merged Normalized Daily Traffic of Several Finnish Mobile Network Operators



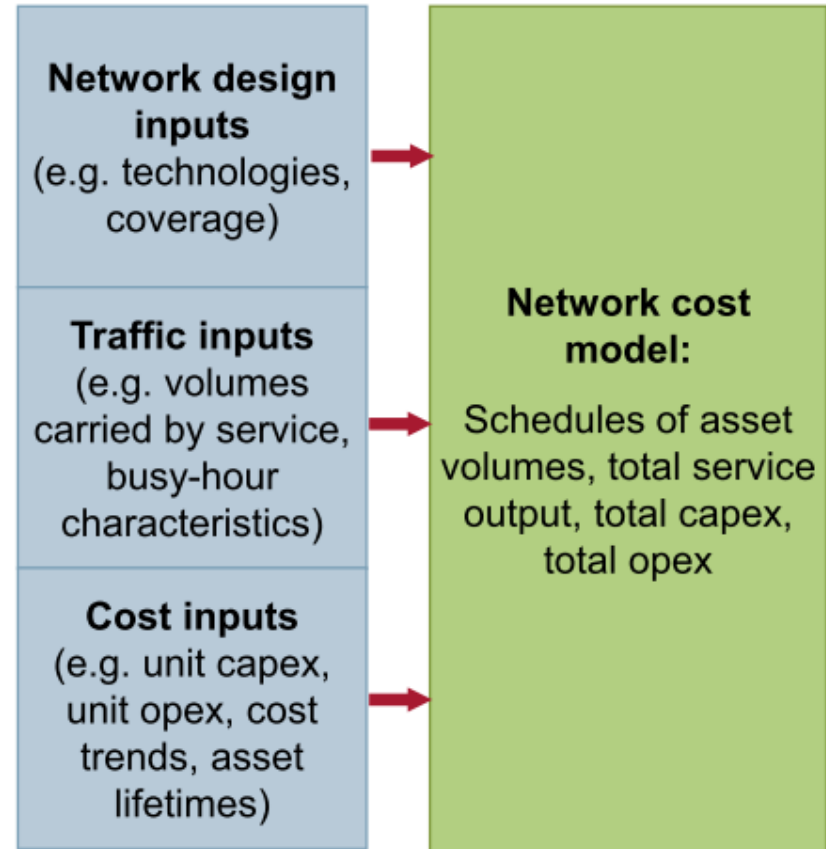
# Time Dependent Pricing Scenarios

## Comparison of Simulated TDPs and Measured NTD



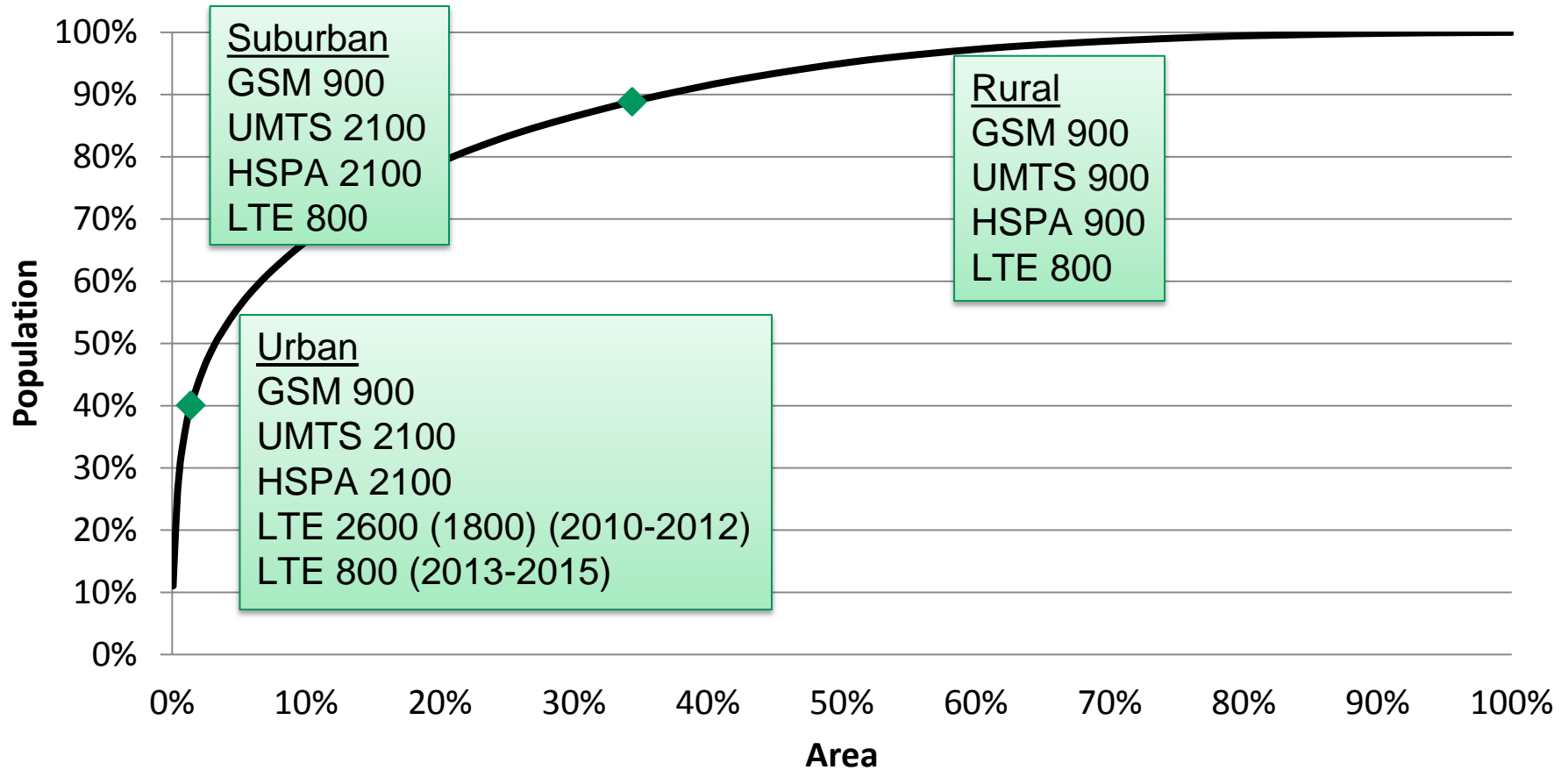
# Network Cost Models Scenarios

- Bottom up network cost models
  - National Regulator Provided<sup>1</sup>
  - Finland\*, Sweden, Portugal, France
  - Limitations
  - Example Assumptions

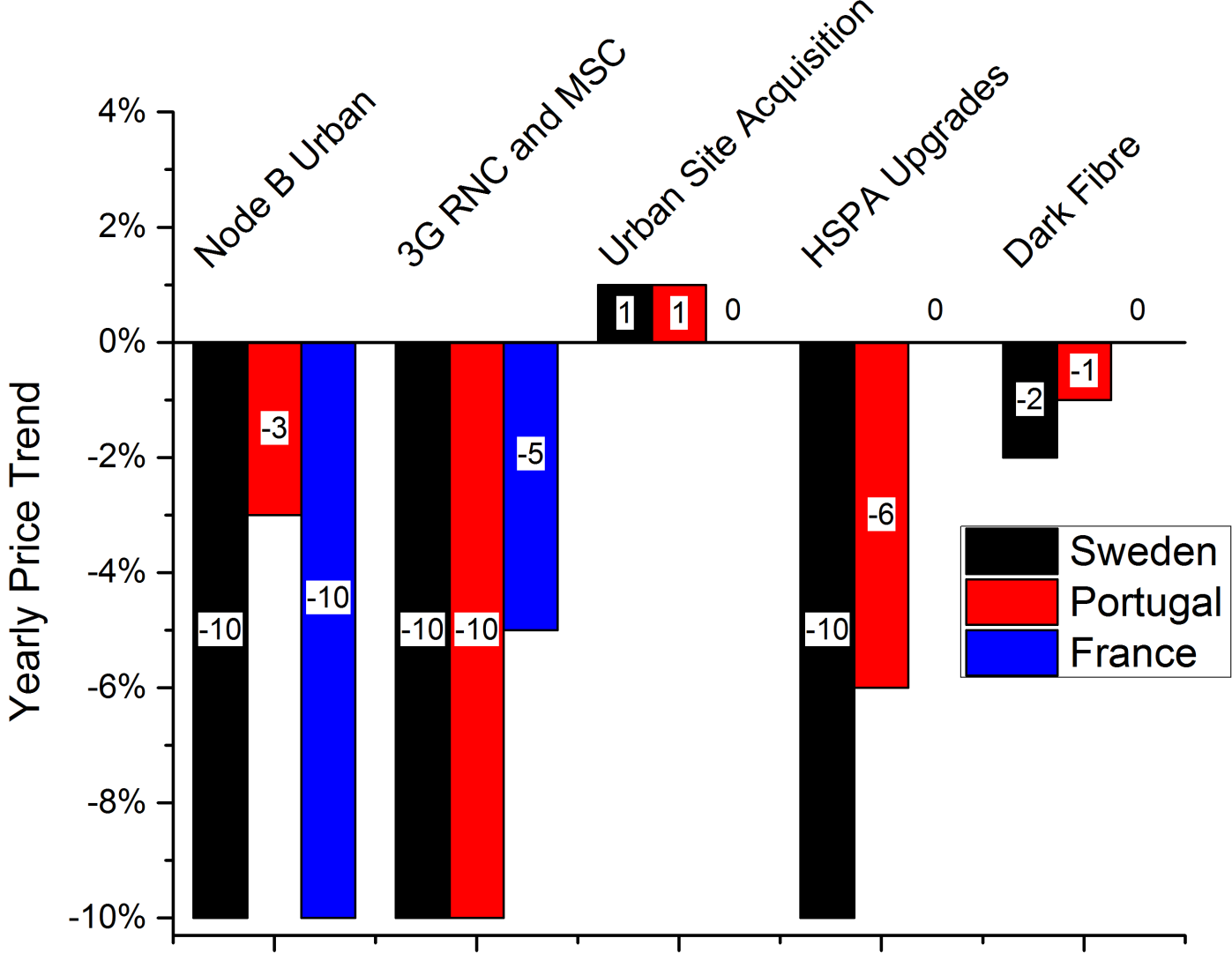


# Network Deployment Assumptions

## Finnish Population to Area Curve and Deployment Assumptions



# Network Equipment Price Trends



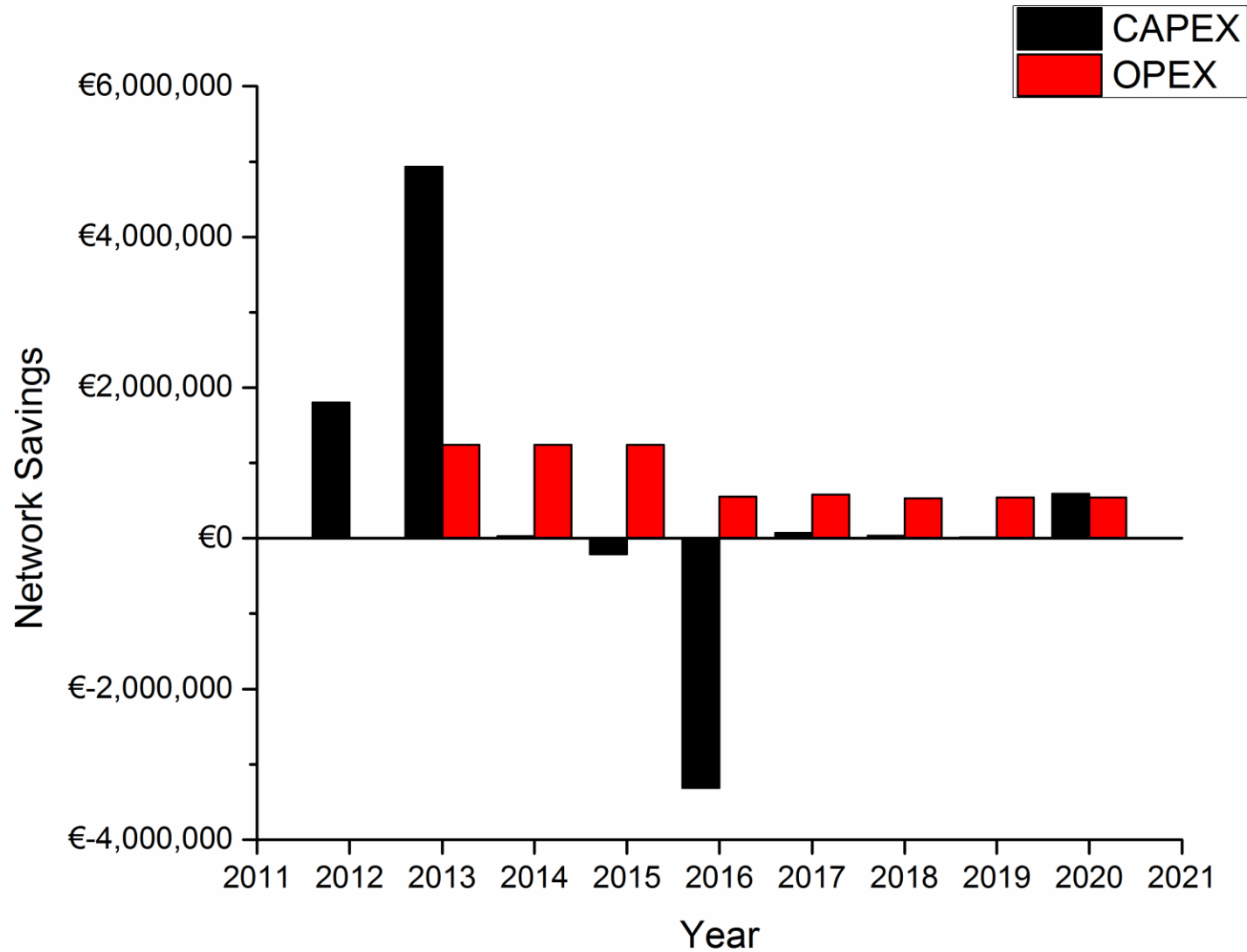
Source: Regulator bottom up LRIC models



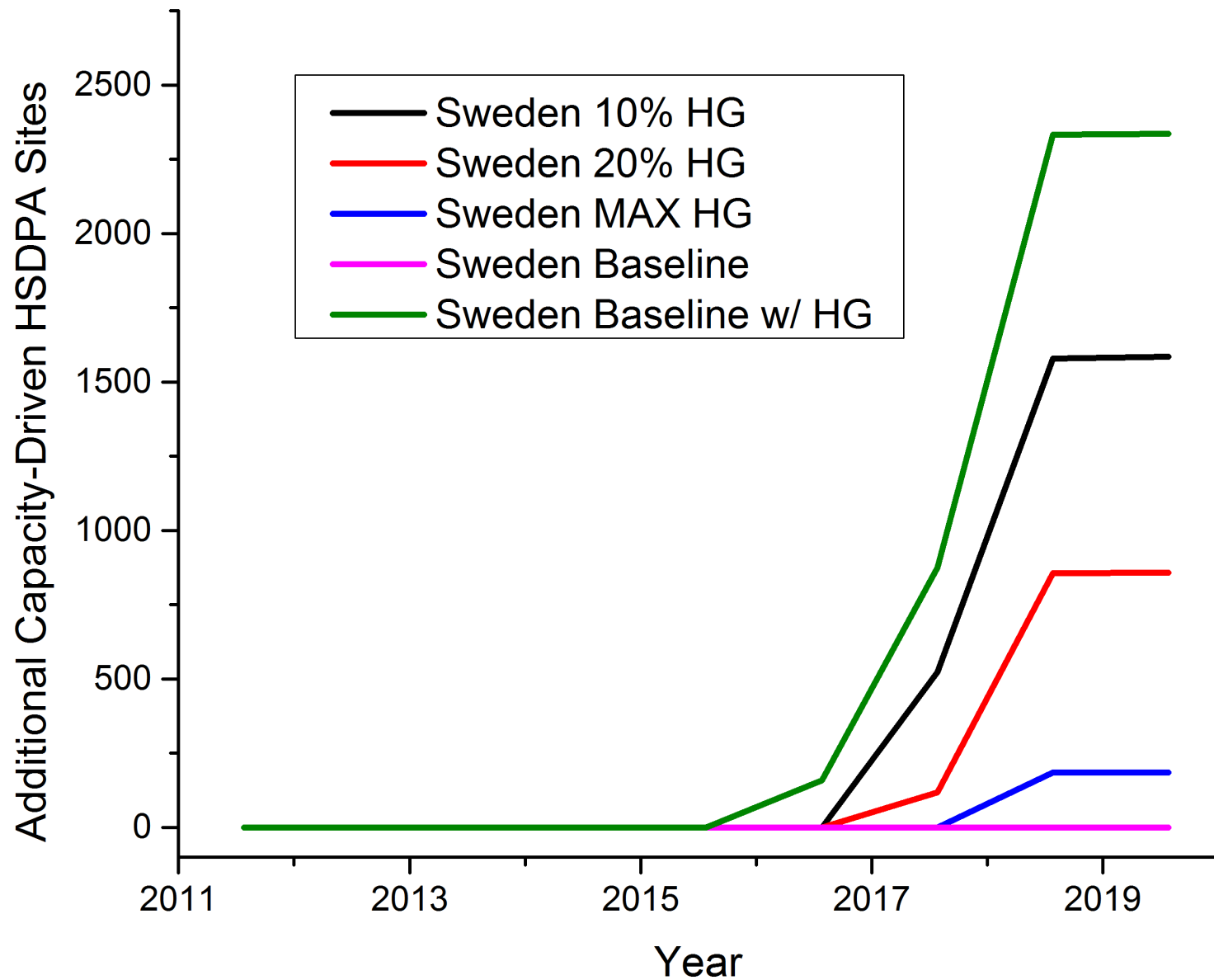
# Savings Results

- Savings from delaying network upgrades (equipment becomes cheaper over time)  
< 2% of Total OPEX and CAPEX
- Savings resulting from avoiding certain network equipment upgrades altogether  
< 2% of Total OPEX and CAPEX
- Savings resulting from slowing future capacity-driven site growth  
> ~5% of Total OPEX and CAPEX

# Savings from Delaying Upgrades



# Savings from Capacity-driven Site Growth



# Conclusions

- Shifting busy hour traffic through time dependent pricing
- Incentive costs vs. network savings
- How are the savings accumulated and why are they limited?
  - Network costs
  - Cost drivers
  - Network traffic
- Other time dependent pricing factors
  - Price sensitivity
  - Historical adoption problems
  - Technological advances