

Micro and Macro Modelling of Cold Start Emissions from Road Traffic: A Case Study in Athens

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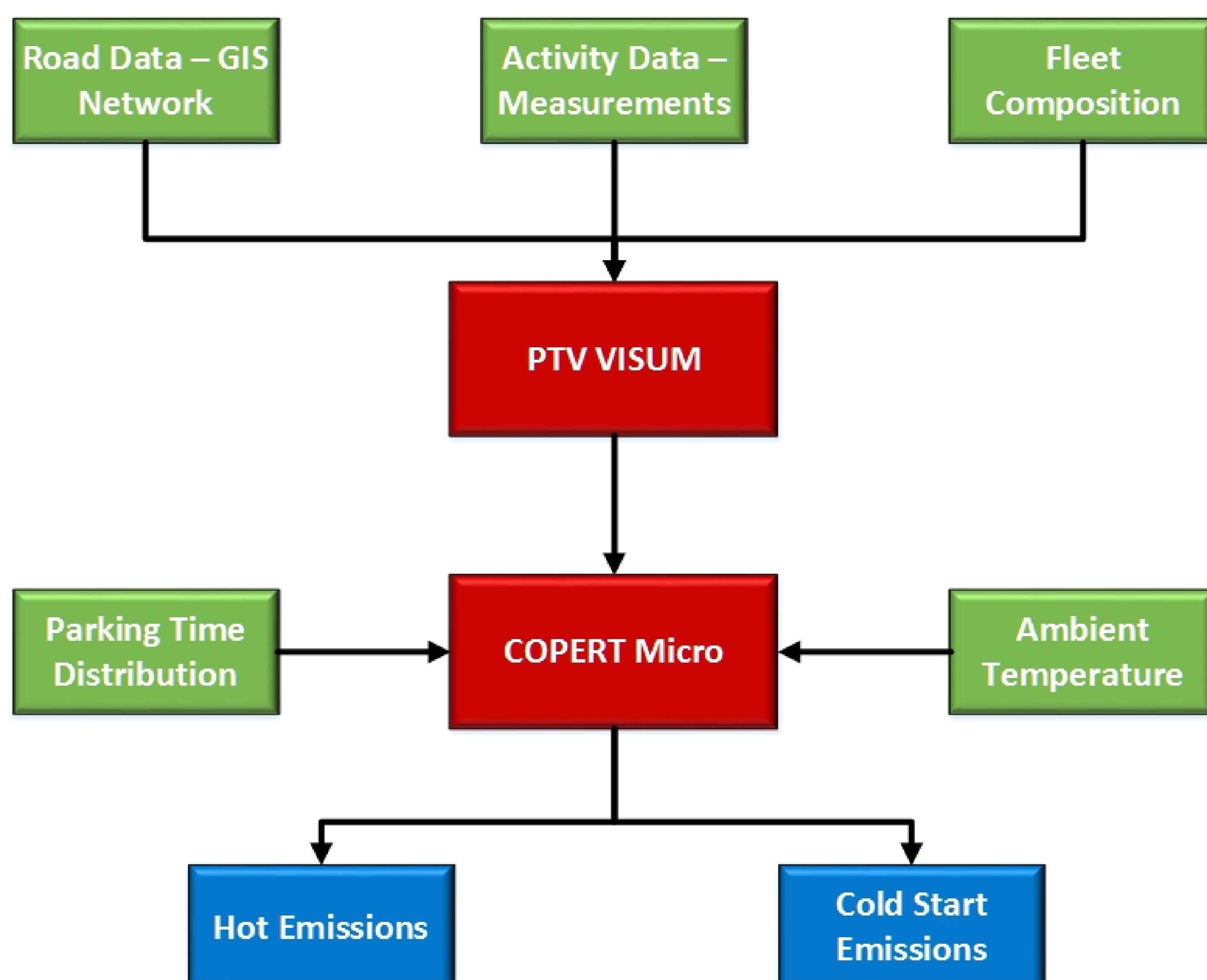
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Introduction

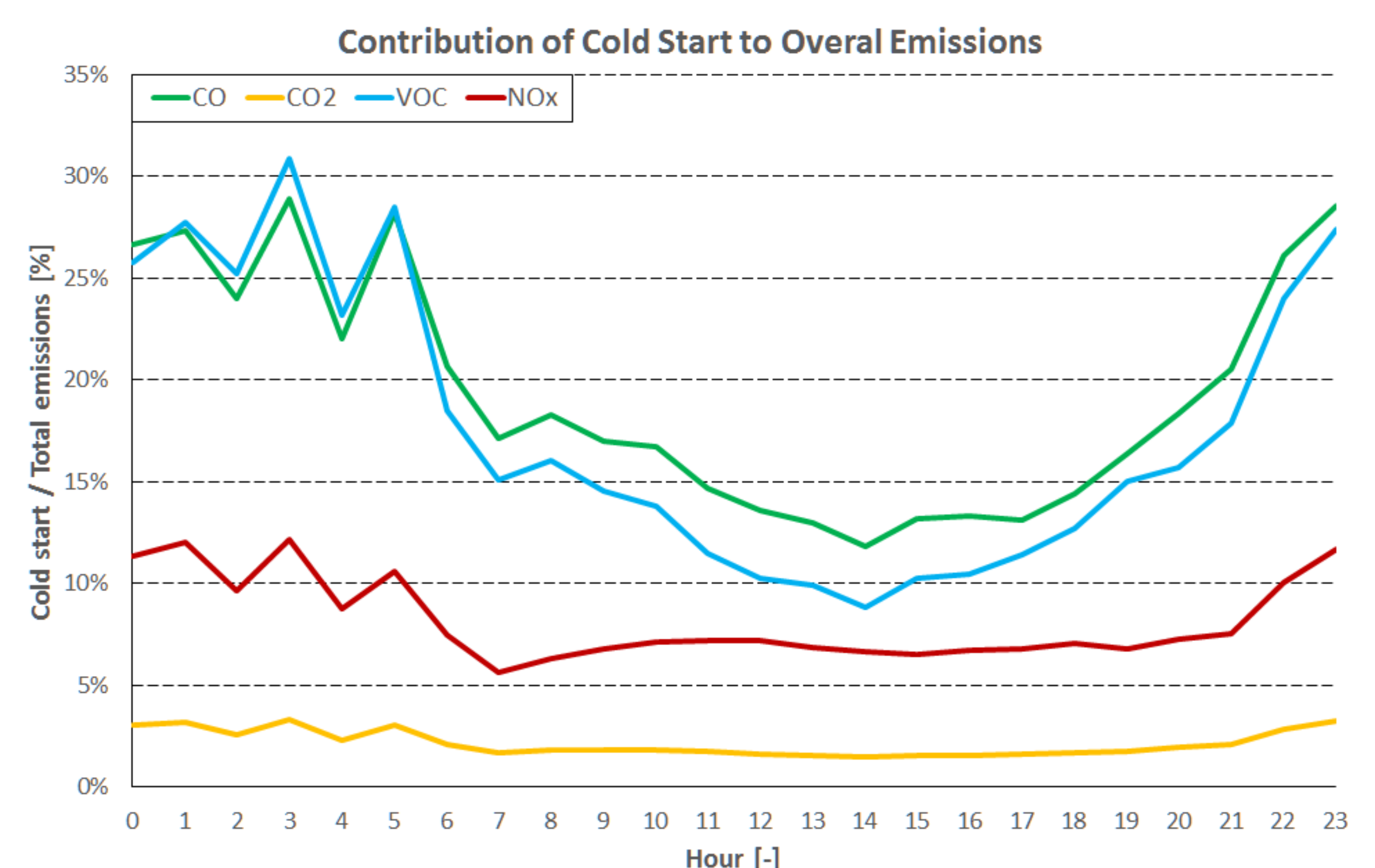
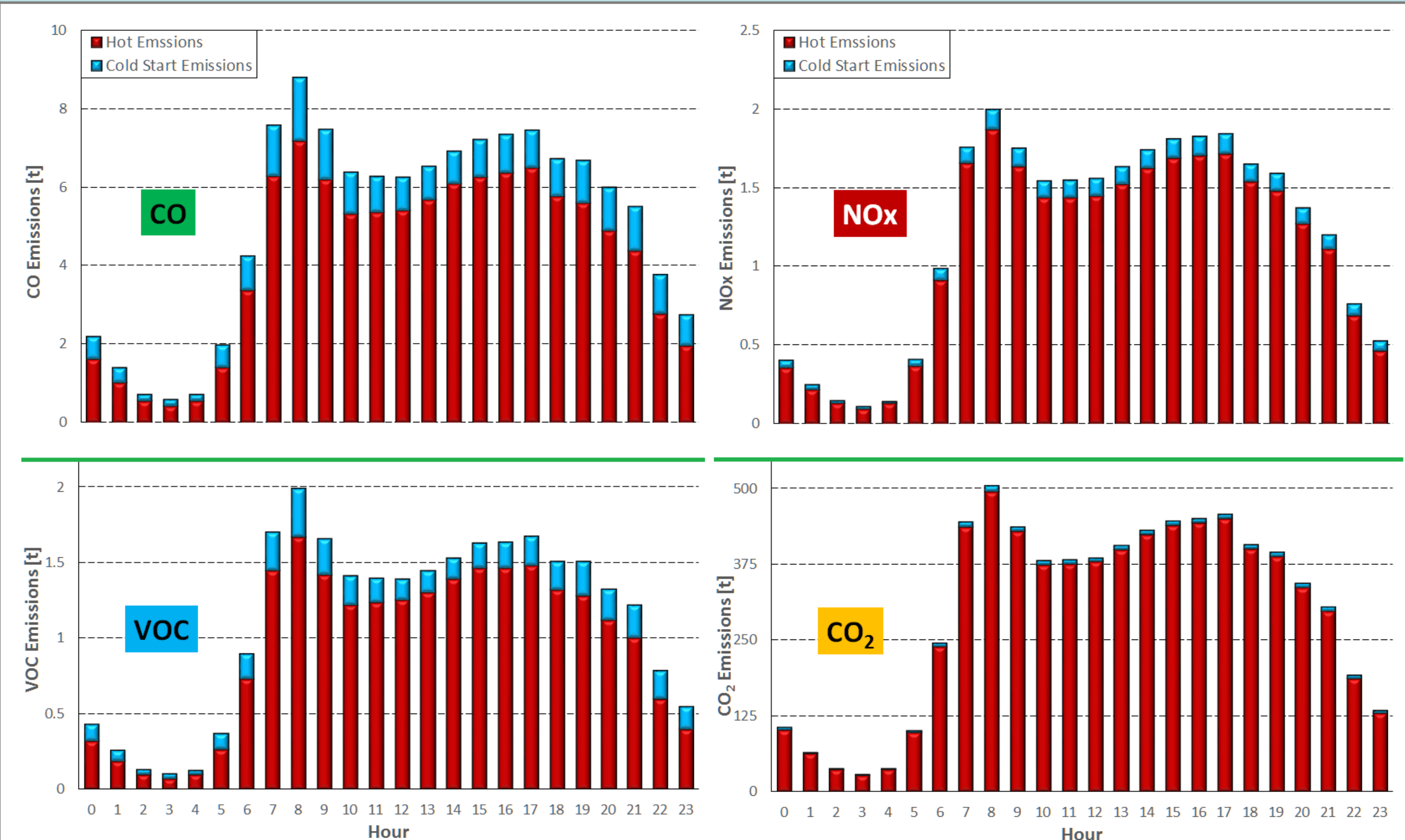
- ❖ During cold-start, the exhaust emissions of regulated pollutants are high, since the engine, catalyst and drive train of the vehicle have not reached their regular operating temperatures.
- ❖ Considering that passenger cars are a major contributor to transport emissions we tried to quantify the impact of cold start emissions on micro (per traffic link) and macro level (entire city), using measured traffic data and applying traffic and emissions modelling.
- ❖ This study aims to quantify the contribution of cold start emissions on the overall road transport emissions in the road network of Athens, Greece.

Methodology



- ❖ Athens network used: 81880 links and 36725 nodes.
- ❖ The demand side comprised of 24 hourly Origin-Destination (OD) matrices which were corrected using hourly volume data measured by 557 inductive loop detectors installed across the city.
- ❖ The output traffic data from PTV VISUM (traffic volume, average speed and vehicle fleet composition per link), along with the trip length distribution, ambient temperature and parking time distribution of the entire city were inserted to COPERT Micro.
- ❖ COPERT Micro calculated both hot and cold start emissions per traffic link following an approach that combines COPERT 4 and ARTEMIS project, respectively.

Results



Conclusions

- ❖ 18% and 15% of the daily total CO and VOC road transport emissions in Athens are due to cold start, whereas the corresponding percentage for NOx and CO₂ emissions is 7% and 2% respectively.
- ❖ In specific traffic links, which are closer to locations where the majority of trips start, the contribution of cold start emissions is dominant, thus significantly affecting local air quality.
- ❖ Specific cold start allocation modelling activities to road networks have to be developed to correctly allocate the cold start impact, in particular for local hot-spots.

More Info:

1. Samaras, Z., Moussiopoulos, N., Douros, I., Samaras, C. et al., 2012, Transport Emissions and their Impact on Air Quality in Athens: A Case Study in the Framework of TRANSPHORM, 19th International Transport and Air Pollution Conference, Thessaloniki, Greece.
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