

Public transport integration in Thessaloniki, Greece: Planning a new transit network

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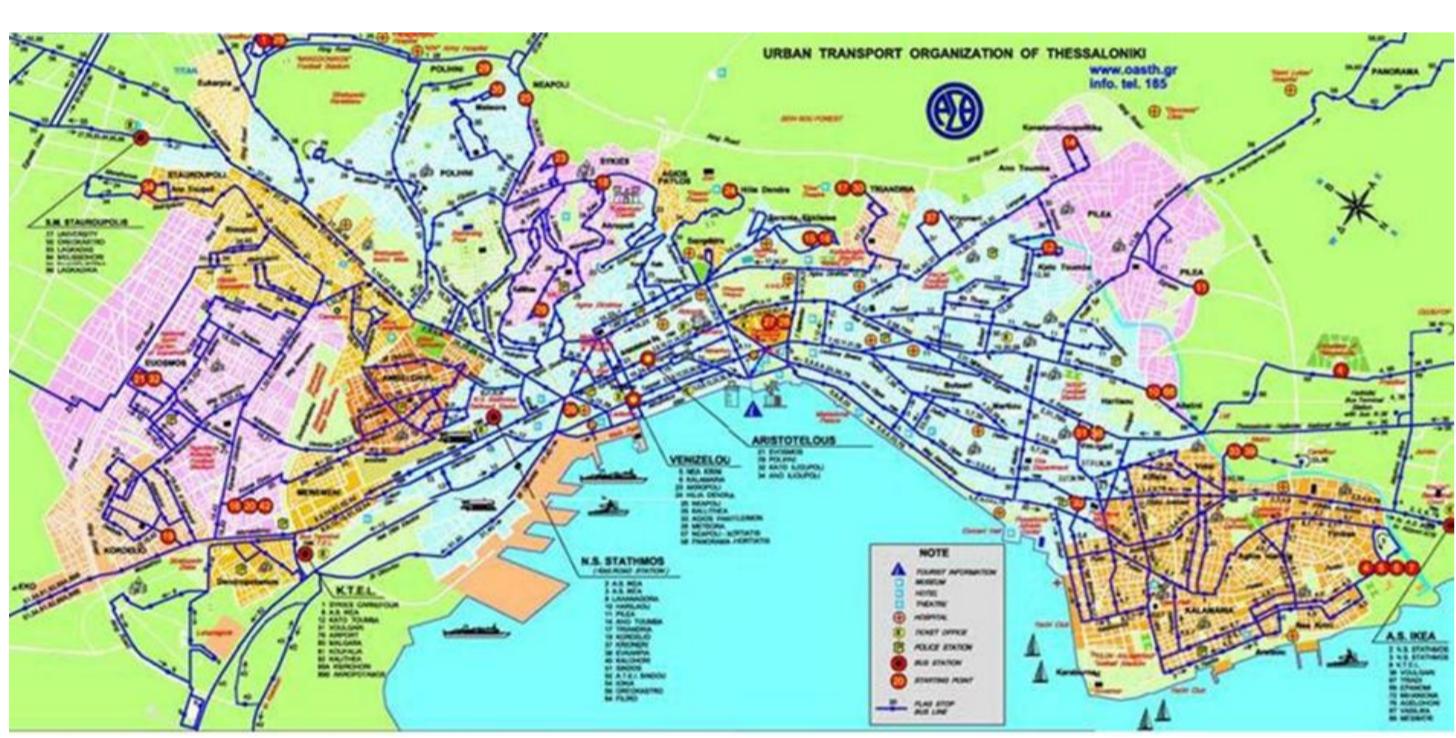
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Motivation and Introduction

In Thessaloniki, Greece a new metro system is currently under construction transforming the present *bus-only* system to a *bimodal* network operated by *multiple* agencies (OASTH, ATTIKO METRO).

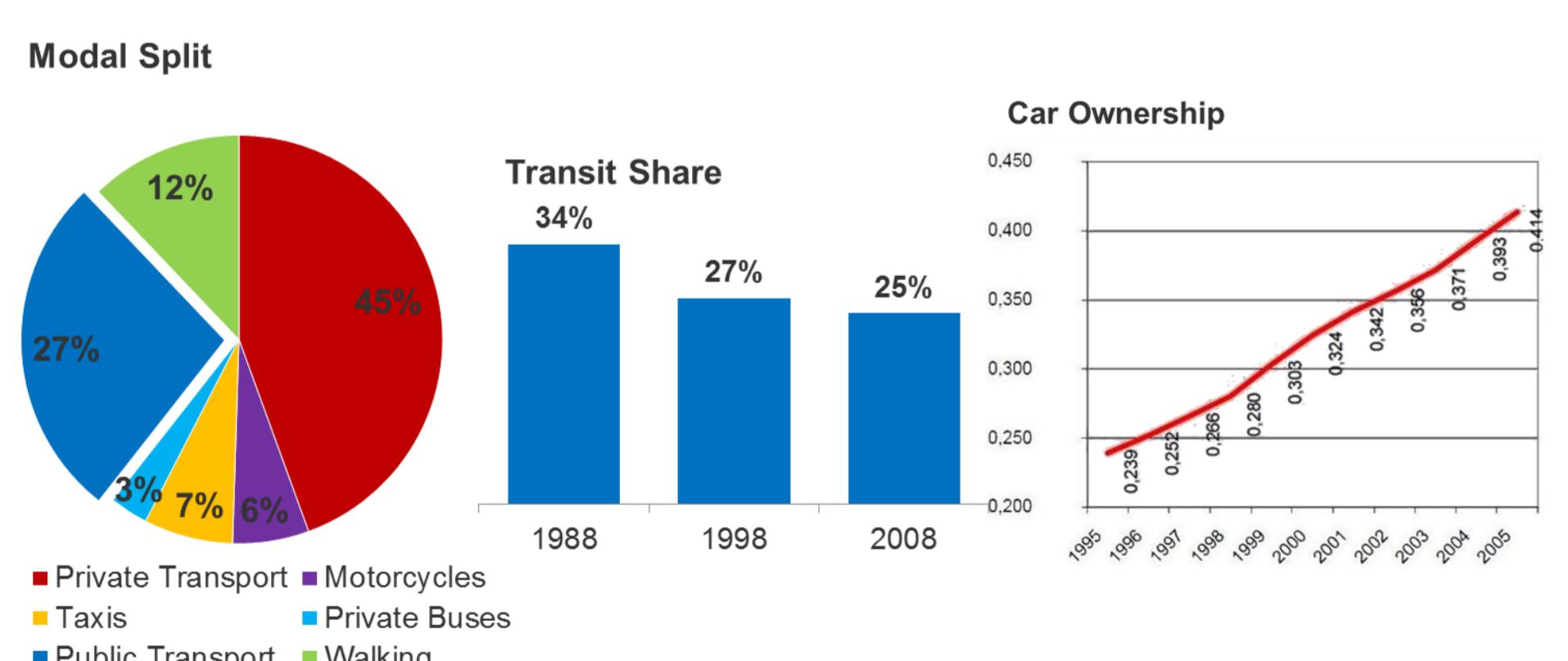


The new metro system, by Attiko Metro S.A.



The current bus system by OASTH

The declining transit share, the high car dependency and the introduction of rapid transit reveal the necessity of *public transport integration* in order to unify the modes, improve quality and attract ridership. This will allow passengers to perceive the system as one, offering "seamless" journeys of minimum interruption.



Integration is a multi-level measure, required when *physical change* takes place (introduction of new modes, lines and routes), *multiple operators* are involved and/or *performance optimization* is desired. In the case of Thessaloniki, all factors are observed.

Operational integration	Physical integration	Organizational integration
<ul style="list-style-type: none"> Layout Schedules Transfers Information Fares Tickets 	<ul style="list-style-type: none"> Location of stations Design of stations Access to the transit facilities Control of vehicle movement 	<ul style="list-style-type: none"> Common tariffs Common tariffs and coordinated services Full cooperation and integration

The 3 levels of integration

Methodology and Process

In Thessaloniki, the first step is ensuring *layout integration* and the *design of a new bus system* integrated to the metro. After carrying out a literature review, the city's boundary-conditions and the current transit system are *analyzed*, areas of concern are *identified* and measures are *proposed* to improve the current layout integration and plan in detail the new bus system.

Analysis of boundary conditions

- Topology:** the urban structure is constrained by the Thermaic Gulf and a mountainous terrain.
- Population:** 2nd largest Greek city (1 006 730 inh. in the metropolitan area).
- Infrastructure:** ring roads and main arterials follow the city's structure.
- Economy and land use:** major economic, industrial, commercial and political center.

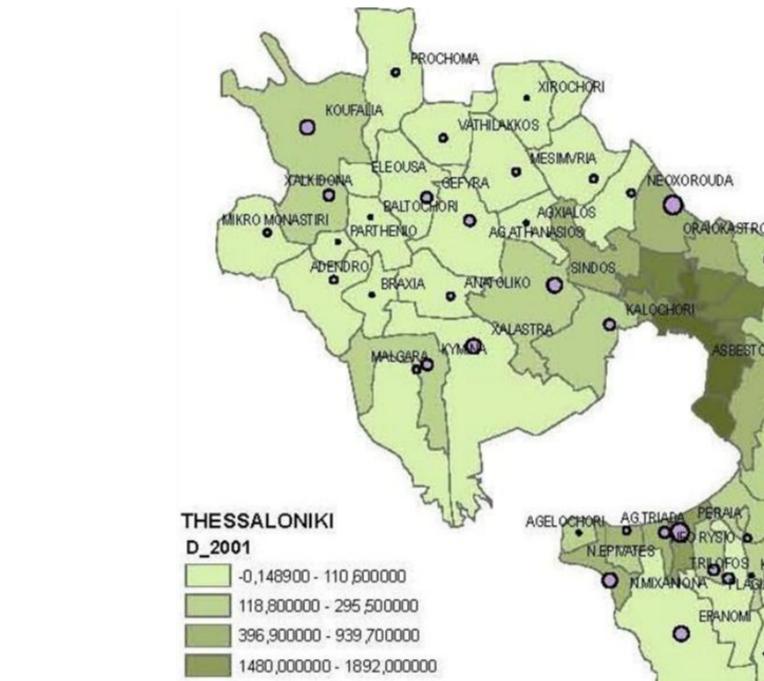
Municipality of Thessaloniki: 322,240 inh.
Urban Area: 790,825 inh.
Metropolitan Area: 1,006,730 inh.



Terrain



Road network



Population density

Analysis of current transit layout integration

- Travel Demand:** ~2 000 000 trips/day, 25% in the city center, 94 500 cars in peak hour
70% increase in private traffic; vehicle occupancy 1,1 pers./ veh.

Transit service analysis

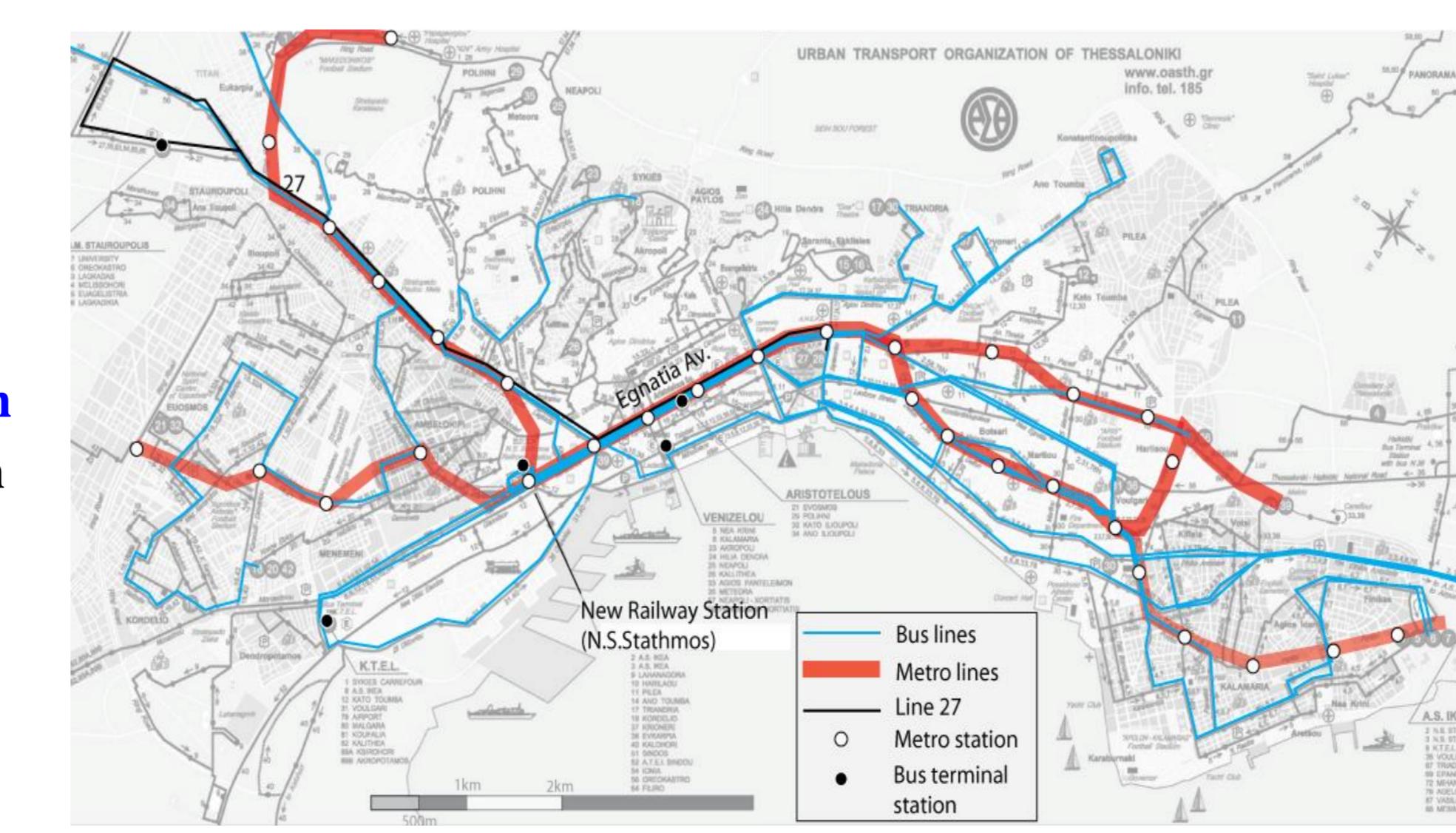
Metro
• Attiko Metro S.A.
• 18 driverless vehicles (<i>Phase 1</i>)
• Phase 1: 1 line (<i>extensions in Ph. 2 + 3</i>)
• 450 pas./veh.
• 12 stations (+22 in <i>Ph. 2 + 3</i>)
• 9,6 km (31,6 km after <i>Ph. 3</i>)

Bus
• OASTH
• 604 buses
• 75 routes
• 180 000 000 pax/year
• 2 000 stops
• 970 000km

- Form and Connectivity:** linear development of the bus system, with *radial* and *diametrical* connections, *long detours* and travel times, *limited intra- and interconnectivity*
- Area coverage:** acceptable, in general, but with excessive overlapping

Areas of concern

- No **hierarchical structure** for the transit network
- No clear **roles** and objectives for the modes
- Excessive **duplication** of lines
- Parallel operation and **competition**
- Radial structure with **saturation** in central trunk section
- Insufficient **connections and availability** in certain areas
- Insufficient **intermodal interchanging points**

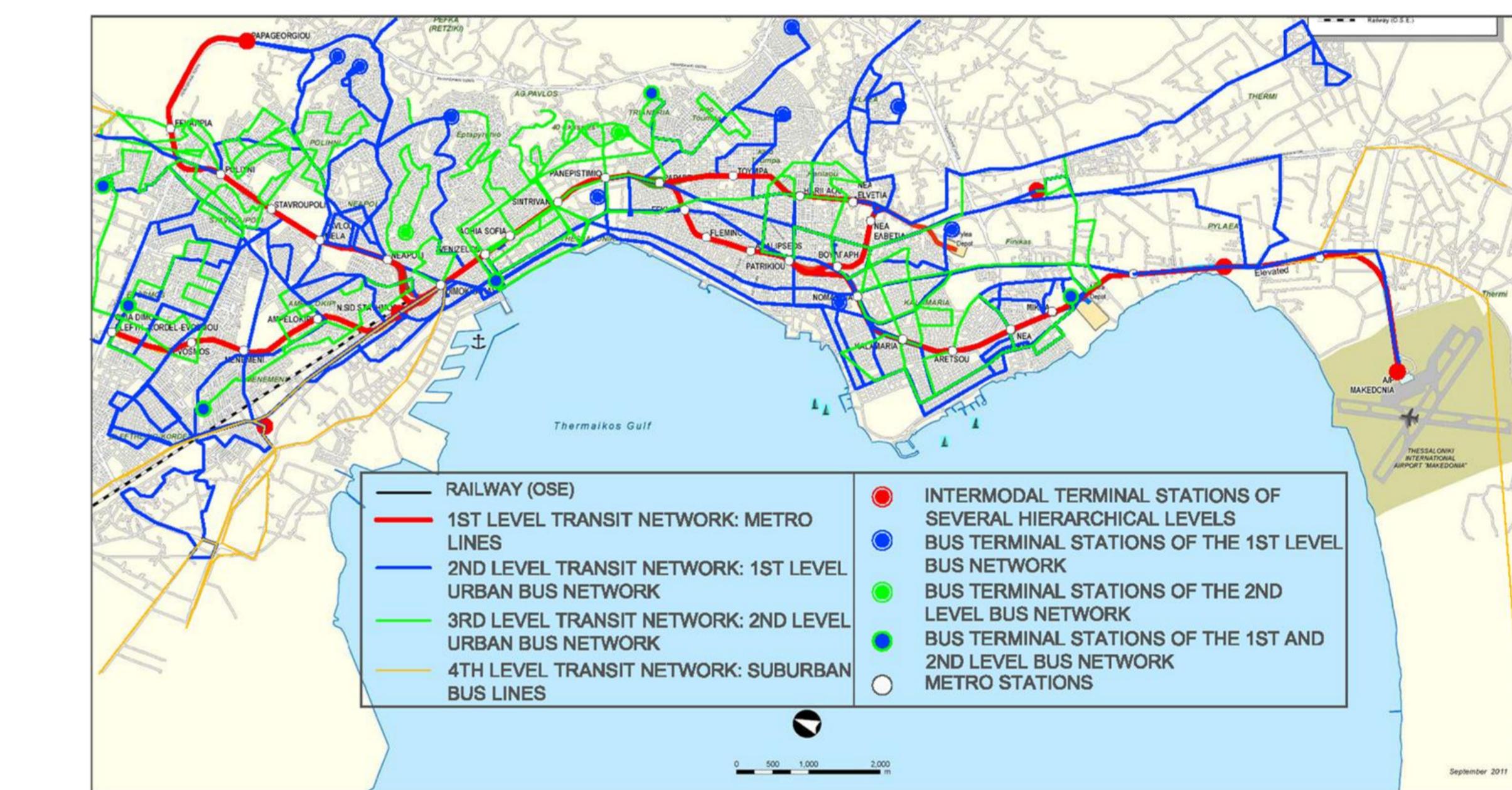


The current transit network

Results: Designing a new transit network

Planning Process

- Determine clear roles for each transit mode
- Follow the Development Axes of the Urban Structure
- Clear hierarchy (*Fishbone* structure with 3 levels: trunk, branches, feeders)
- Adequate coverage, as well as intra- and interconnections among the transit levels
- Follow road network for speed and convenience
- Improve Level Of Service
- Detailed rerouting and improving of individual lines



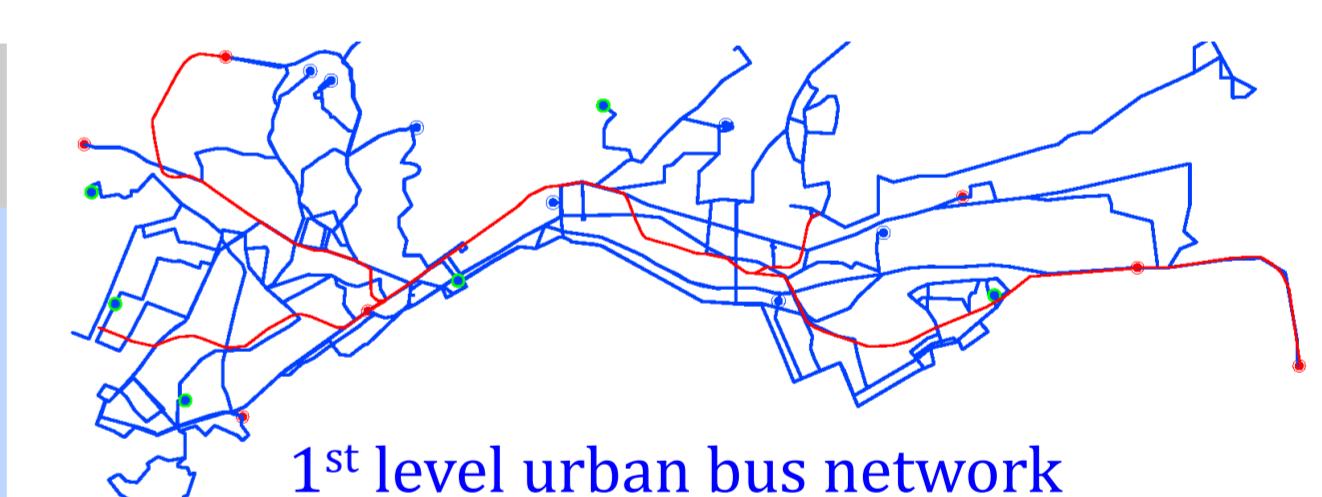
The new transit network in Thessaloniki

1st urban bus network: Metro-Bus

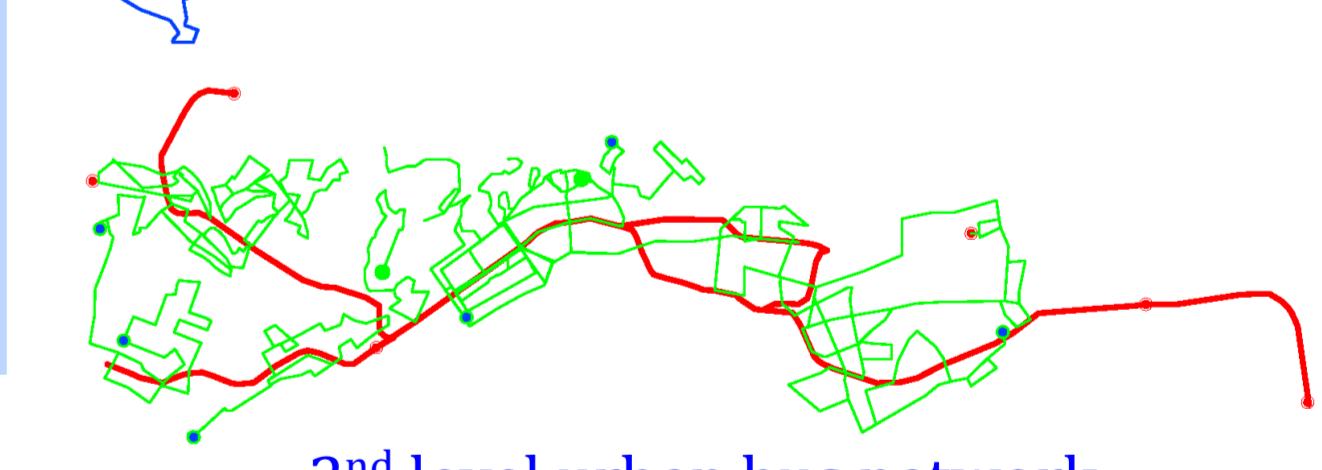
- Branches
- 23 open lines intersecting/ terminating at metro lines
- On main roads with articulated buses
- High speed and frequency (5-15 min)

2nd urban bus network: Neighborhood-Bus

- Feeders
- 18 loop lines connecting with higher levels at least once
- On narrow streets with single buses
- Lower speed and frequency (10-20 min)



1st level urban bus network



2nd level urban bus network

Conclusions

- Introduction of rapid transit represents a golden opportunity to steer the city's mobility into a more sustainable path. However, it must be implemented in coordination and *full cooperation* with the current transit modes and not competitively to or independently of them.
- Clear roles, structure and form of the network is crucial.*
- Simplicity and clarity:* often, transfers are more attractive than complicated and long routes.
- More analytical data, algorithms and models required for more accurate planning; bottleneck and weakness analysis.
- Integration is a *multi-level* process; as fundamental as it is, the layout is only the first step.
- Cooperation between operators* is a prerequisite for the success of public transport integration
- Integration requires *clear and ambitious goals* allowing flexibility due to the complexity of different interests and stakeholders.
- Transit integration is part of a set of strategies that aim to achieve a shift towards more balanced *modal share*. Integration is one measure of a broad strategy: complementary measures are required (prioritization of public transport, parking management, etc.)
- Integration should transform transit from captive- to chosen-alternative.**

