

## EXECUTIVE SUMMARY

Governments and entrepreneurs are investing in sustainable mobility systems that limit emissions, minimize the use of non-renewable resources and promote economic development. To gauge trends in various geographic and political environments, and to identify and study a broad range of systems and technologies, this paper is comprised of three case studies that present ideas, policies, and market dynamics that are driving investment in sustainable transportation projects in Tel-Aviv, Israel; Abu Dhabi, United Arab Emirates; and Pamplona, Spain. In addition to policy documents and primary sources, the case studies draw heavily upon personal interviews conducted with government officials, investors, corporate managers and civil society members during research trips to Israel, Abu Dhabi and Spain in January 2010.

Across cases, investment in sustainable mobility systems has been allocated to address three transportation-related problems:

- 1. Congestion** - Car culture has become widespread and people generally prefer using their cars to existing public transit options. Roadway infrastructure has not been improved to accommodate the increasing number of vehicles that utilize it. The economic cost of sitting in traffic is already significant; urbanization and population trends forebode more gridlock, and more lost productivity.
- 2. Oil Dependence** – Light duty vehicles (cars, SUVs, motorbikes) rely on oil for fuel, a finite resource whose price can swing wildly. Global demand for crude has reached new peaks and is forecasted to continue rising. Due to supply and demand trends, relying on a steady flow of cheap petroleum is increasingly risky; governments are seeking to insulate their economies from the effects of oil price shocks.
- 3. Air Pollution** – Automobile tailpipes emit NO<sub>x</sub>, SO<sub>x</sub> and particulates that have been linked to illness and death. In addition to the public health costs of treating people with respiratory illnesses like Asthma, CO<sub>2</sub> emissions that result from extracting, transporting and consuming petroleum and other fossil fuels contribute to global warming, which poses a daunting threat to humanity.

The case studies of Tel Aviv, Abu Dhabi and Pamplona provide in-depth analyses of specific sustainable transport projects, in addition to assessments of various related trends. Each offers insight into broad and circumstantial challenges being faced by local project developers, and considers constraints and opportunities that drive investment decisions. The initiatives that are analyzed include:

- 1. Bus Rapid Transit (BRT)** – By dedicating existing road infrastructure for public transportation, Israeli planners hope to convince commuters that taking the bus can be more efficient than driving a car. Dedicated lanes for buses enable frequent trips at regular intervals, and make public transport significantly more reliable. Providing further incentive, dedicated lanes for BRT usually monopolize road space, which congests car lanes and makes buses even more convenient.

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**2. Light Rail Transit (LRT)** – Surface level light trains provide seamless travel between and within population centers. They are electric powered and move quickly. Planners in Israel and Abu Dhabi hope that LRT networks will minimize the use of automobiles and reduce dependence on fossil fuels.

**3. Electric Vehicles (EVs)** – Electric vehicles eliminate the need to use gasoline and diesel to fuel private cars. Powered by battery packs, EVs do not release tailpipe emissions, which positively impacts air quality and public health. The Israeli government has instituted policies that encourage early adoption of EVs, and a widespread electric charging network will be available in Tel Aviv by 2012. Pamplona is also being outfitted with EV charging infrastructure.

**4. Personal Rapid Transit (PRT)** – PRT systems are comprised of automated, driverless pod cars that transport riders from origin to any destination in the network. PRT is an increasingly viable transport solution in a variety of local, airport and campus settings. The Government of Abu Dhabi has allocated funds for the development of an innovative PRT system to service Masdar City, a carbon-neutral and car-free community.

**5. Alternative Fuels** – In both Abu Dhabi and Pamplona, cleaner burning fuels such as biodiesel, compressed natural gas (CNG), and ultra low sulfur diesel (ULSD) are being used in buses and car fleets.

**6. Pedestrian Throughways and Bike Lanes** – In all three cities, planners and civil society advocates are encouraging investment in better pedestrian access, which includes bicycle lanes, walkways and cross walks.

Although unique circumstantial factors influence every investment decision, certain broad dynamics have catalyzed capital allocation to sustainable transportation projects in Tel Aviv, Abu Dhabi and Pamplona. To encourage efficient economic activity, planners are designing public transit systems that circumnavigate traffic jams and reduce the opportunity cost of congested roadways. Governments are also supporting the development of sustainable mobility systems to hedge against future oil supply disruptions. Due to negative health externalities, using gasoline and diesel fuel for transportation is much more costly than the price at the pump. Air pollution has been linked with respiratory illnesses like asthma, and government-led investment in sustainable mobility systems aims to reduce long-term public health costs.