104217

Dissemination Note Series

Romania: Toward a Low Carbon and Climate Resilient Economy

Urban Sector Analysis

Sector Overview

By European standards, Romania is a low urbanized country. There exists a rising trend towards suburbanization, however, that is not fully captured by Romania's urban statistics.

The country's urbanization rate of 55% has remained fairly constant over the past two decades, despite significant population migration out of the country, and a strong suburbanization trend in areas on the immediate outskirts of major cities.

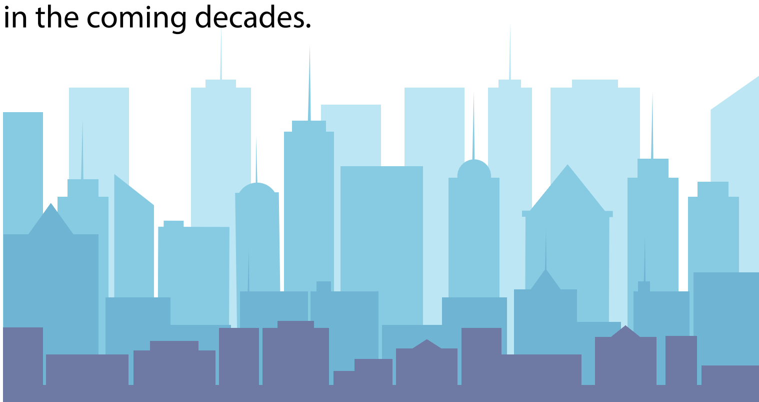
Because central government demographers still categorize some of these regions outside of the urban core as rural, this shift has not yet made its way into the official population statistics. If this were to happen, the urbanization rate could rise to 65%.

Key Findings

- A shift to a Low-Carbon development strategy in the Bucharest – Ilfov region has the potential to **reduce local greenhouse gas emissions 37% by 2050.**
- The Low-Carbon scenario foresees realistic policies that **foster dense development, coordinate land use and transit, spur** proactive local action to **reduce energy consumption in buildings and transport** and **change local solid waste practices,** and assume ambitious national initiatives to **promote clean power and cleaner vehicles.**
- Benefits are not limited to GHG emission reductions:
  - Local air quality would also improve thanks to **a 39% reduction in particulate matter** (PM10) and **35% reduction in nitrous oxide (NOx)** emissions associated with reduced energy use.
  - **Energy spending would be cut by $1.4 billion USD/year** in real terms.
  - **Thermal energy saving** alone would deliver **up to $632 million USD in savings,** mostly in reduced municipal budget expenditures.

Data limitations make it difficult to assess the contribution of cities to Romania's overall emission levels, and until now, regional Integrated Urban Development Plans (IUDP) have rarely focused explicitly on climate change considerations,

instead focusing primarily on local policy preferences and speaking in more familiar terms of transportation challenges or other environmentally-focused infrastructure, such as waste or water systems. There is a similar lack of understanding about how Romanian cities will be affected by climate change. Related planning activities have largely taken the form of local disaster plans, which are required by law, although the quality or breadth of these plans is unclear. One contributing factor is that little has been done to statistically "downscale" global climate models to provide a more granular, local picture of how the climate will change in Romanian cities in the coming decades.



There is, however, a rising interest in climate change mitigation and adaptation strategies among local governments across the country.

As of October 2015, there were 64 Romanian communities that had signed on to the European Commission's Covenant of Mayors program, an initiative aimed at promoting sustainable energy use in cities.

The Covenant program requires signatories to develop and implement a Sustainable Energy Action Plan (SEAP) within a year of signing on to the program. Together, these 64 communities collectively represent a population of roughly 5 million people, or 25% of Romania's population.

Methodology and Findings

The objective of the urban sector analysis was to provide insights to the Romanian Ministry of Environment, Waters and Forests (MEWF) on opportunities to change the trajectory of greenhouse gas emissions (GHG) in Romanian cities, using the Bucharest–Ilfov metropolitan region (BIMR) as an example.

With a population of 2.3 million, BIMR ranks 37th in size among all of the metropolitan regions in Europe, and like many of these regions, it has seen shifts in demographic and land use trends.

For example, while Bucharest's population has declined over the past two decades, Ilfov County—the nearly 1600km administrative district that completely envelops Bucharest—grew by 35% from 1992 to 2011, indicating a strong trend towards suburbanization and sprawl.

The urban sector analysis sought to capture the implications of these trends, using outputs from two models:

- the Rapid Assessment of City Emissions (RACE), a geospatial model that calculates transport and other energy demand based on population and land use patterns in a city;
- CURB (Climate Actions for Urban Sustainability), a scenario-planning tool that examines the impacts of more than 60 different discrete policy or technology interventions.

Of the three main sectors analyzed—buildings, transport and solid waste—buildings account for the largest share of energy consumption in Romania, and heating represents 57 percent of all energy use in buildings.

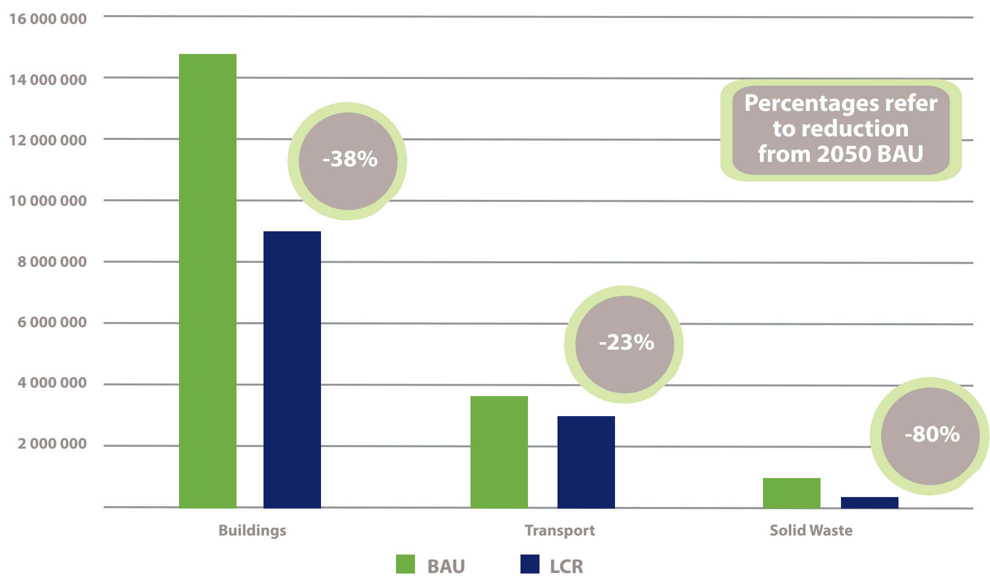
Per-capita consumption of electricity is low in Romania—the lowest in the EU—but significant growth is currently occurring, driven mainly by changes in residential- and commercial- sector thermal demand patterns as customers move away from their reliance on district heating systems.

Urban transport represents the second-largest source of GHG emissions in Romania.

Rising car ownership rates, although still low compared to the rest of the EU, are creating increasing congestion problems in the BIMR region. GHG emissions associated with municipal solid waste disposal total approximately 2 percent of

the country's overall emission portfolio; the majority result from Romania's overwhelming reliance on landfilling to dispose of organic material and other forms of solid waste. Landfills entomb this material, and as it decomposes it produces methane, a GHG with 25 times the heat-trapping potential of carbon dioxide.

Figure 1 Comparison of Buildings, Transport and Solid Waste Emissions in BAU and Low Carbon Scenarios (metric tons of CO2e) [Source: World Bank]



This analysis employed two scenarios: a Business-as-Usual (BAU) scenario, and a Low-Carbon Development (LC) pathway.

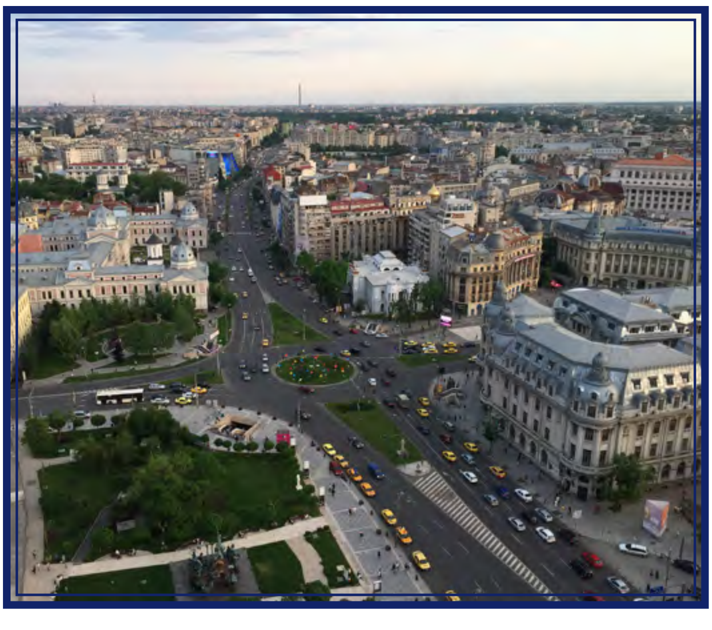
Under the BAU case current trends (with minor modifications) are projected out to 2050, while in the Low Carbon scenario the city/region takes proactive measures to promote smart urban development through a mixture of land-use planning and action to reduce emissions from buildings, transport and solid waste.

The BAU scenario presumes continued low-density development on the periphery of Bucharest, with a lack of integrated transport and land use planning leading to inefficient urban form.

While energy use and associated emissions continue to increase as a result, growth is fortuitously offset by a number of encouraging trends in transport and buildings that take place even in the absence of strong local action.

The BAU scenario assumes that the renovation rate of existing building stock continues at its current pace of 1% per year, with energy savings from building retrofits assumed at a conservative 15%.

Vehicle emission levels are expected to decline as consumers replace their old vehicles with newer, more efficient models compliant with EU performance standards.



The Low-Carbon Development scenario goes much further than this, prioritizing dense development; the coordination of land use and transit; proactive local action to reduce energy consumption in buildings and transport and change local solid waste practices; it also assumes ambitious national initiatives to promote clean power and cleaner vehicles.

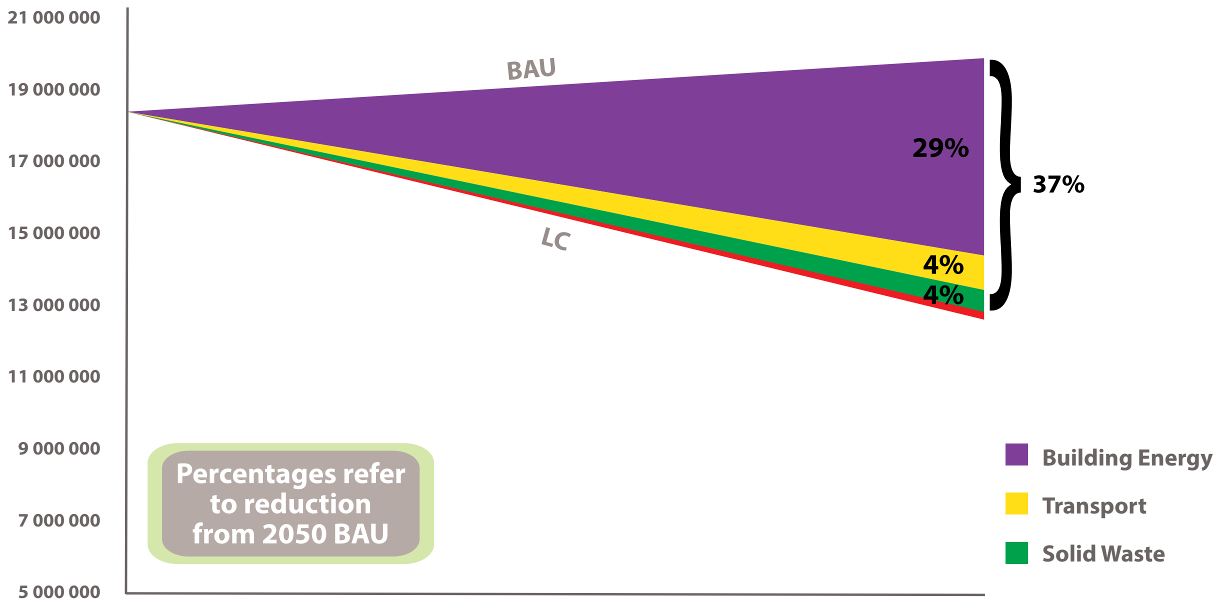
For example, although Romania has yet to achieve current EU energy efficiency targets for buildings, the low-carbon scenario assumes all new buildings reduce energy use by 45% compared to existing building stock. The LC Option halves the share of low-rise residential development by 2050, doubles the share of high-rise residential development, and more than doubles the amount of very high-density development occurring around the city.

The amount of medium-density development stays roughly the same under both scenarios. In addition to spatial development pattern changes, the low-carbon option assumes a suite of measures to reduce vehicle kilometers travelled, promote mode shift, and drive changes in vehicle stock and efficiency.

In the solid waste sector, an 80% reduction in emissions relative to BAU is achieved by assuming that Bucharest-Ilfov meets all current EU targets with regards to recycling and diversion of biodegradable waste.

Emission reductions are achieved through a combination of more aggressive composting efforts (we assumed 65% of food and yard waste is diverted, as per EU targets) and the capture of 100% of methane emissions from local landfills.

Figure 2: Carbon Emission Reductions under LC Scenario Relative to BAU, 2050 [Source: World Bank]



Adopting a LC scenario with proactive spatial planning leads to significant improvement in energy use, energy spending, and emissions—even though the gross building area remains the same as under the BAU option.

Carbon emissions decline by 37% relative to a Business-as-Usual pathway, with buildings-related energy use delivering three-quarters of that savings (Fig.2).

In the BAU scenario, overall energy use and associated emissions continue to increase out to 2050, but less rapidly than expected.

Energy demand continues to increase between 2014 and 2050 as a result of the demographic and spatial trends outlined above—including a 30% increase in population and building area—but carbon emissions grow much less rapidly (9%) over the same period. This is explained by the factors above. Lower than expected emission increases are no excuse for complacency, however.

In order to meet national and EU-wide emissions targets, more will have to be done at the local level to promote compact development.

The case for the LC scenario is even greater given that the impacts are not limited to global climate change.

Local air quality also improves, thanks to a 39% reduction in particulate matter (PM10) and 35% reduction in nitrous oxide (NOx) emissions. Reduced energy use achieved under the LC scenario cuts total energy spending by $1.4 billion USD per year in real terms.

Moreover, there are other benefits too. In the buildings sector alone, energy savings lead to a reduction in energy spending totaling $956 million USD per year by 2050. Significantly, thermal energy savings relative to the BAU scenario amount to as much as $632 million USD.

Given that retail prices for heating are set by the government, it is likely that most of these savings will accrue to the municipal budget—an important saving given the large burden of subsidizing thermal energy use in Bucharest.

There are also many types of interventions that can be taken in the context of adaptation to climate change.

Policies that steer new development to areas less likely to be in harm's way are important, as are policies or initiatives aimed at enhancing the physical robustness of vulnerable structures. Risk maps reflecting localized concerns—and based on the best information available on future climate impacts–can be helpful in guiding local policy-making and retrofit investments in infrastructure systems or private and public buildings.

More generally, it is important to ensure that local or national building codes affecting new construction represent the state-of-the-art subject to documented relevant modifications based on local flood hazard and seismic maps, etc. To ensure coherence in policies, investments, and actions, cities around Romania could undertake the development of risk-informed city-wide adaptation plans (including actions, timescales and budgets).

Cities may also wish to take other steps to use public education or eco-system based approaches to lessen the risks of climate-related hazards, including through investments in green infrastructure that can help cool a city or provide protection or relief during extreme weather events.

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