Infrastructure and Energy Supply in Croatia

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Infrastructure is considered essential for the economic development of a region. A well-developed transportation and communication infrastructure reduces the effect of distance between regions, connects international markets at lower cost and makes it easier for workers to move across regions to the most suitable jobs. A reliable and robust electricity supply ensures that modern factories with sophisticated production technologies can work unimpeded.

Accession to the European Union provides opportunities for and poses challenges to the Croatian economy. Adequate infrastructure will be a crucial prerequisite for domestic firms to compete with European competitors and explore foreign markets.

Croatia's infrastructure: already competitive but strategic adjustments needed

Given Croatia's stage of economic development, an already well-developed and relatively competitive infrastructure is to be expected. Indeed, Croatia's infrastructure is competitive compared to that of its peer countries, but still lags behind most developed countries (see Figure 1i)).

While Croatia scores relatively high in the Global Competitive Index (CGI) for infrastructure (y-axis), only few peer countries have lower Total GCI scores (x-axis), indicating that Croatia's overall competitiveness is still relatively low. Clearly, Croatia's relatively weak overall competitiveness can hardly be attributed to an inadequate supply of infrastructure. Indeed, only 2.5 percent of the Global Competitiveness survey responses addressed infrastructure as an obstacle for doing business in Croatia (see Figure 1ii).

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The following sections discuss in more depth whether Croatia's infrastructure is already capable of providing the required supporting functions, and to which extent reforms seem necessary, focusing on three areas: first, transport infrastructure, a prerequisite for exploiting Croatia's strategically advantageous location. Second, broadband internet, as a general-purpose technology with strong impact on knowledge-intensive activities across all economic sectors. Finally, energy supply, as a crucial requirement for sophisticated production technologies and services.

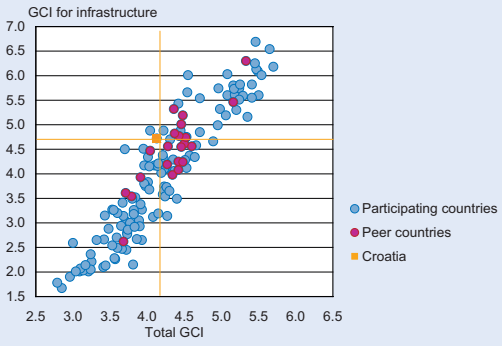
Transport infrastructure – focus on rail- and waterways needed

Croatia's location within Europe – with core transport corridors crossing the country and several seaports on the Adriatic coast – places it at a key node of the transport strategy of both the EU and neighboring

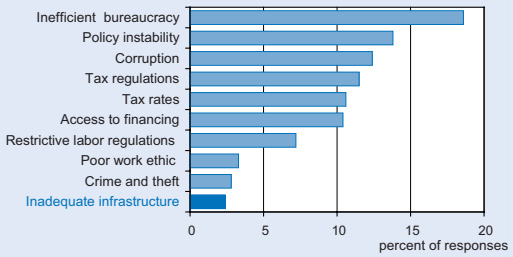
Figure 1

Croatia's infrastructure and general competitiveness

i) Total competitiveness vs. infrastructure



ii) Most problematic factors for doing business, 2015



The upper chart depicts the overall scores and scores for infrastructure of the Global Competitive Index (World Economic Forum) for the 144 participating countries, the peer group countries and Croatia.
The higher the score, the higher the competiveness of a country.

Sources: World Economic Forum (2014); own calculations.

countries. An efficient transport infrastructure will be crucial to exploit these geographic advantages. However, the competitiveness of the transport infrastructure varies heavily from mode to mode.

While the road transport network is already well developed and quite competitive, the railway sector clearly lacks competitiveness (World Economic Forum 2014; World Bank 2013). The share of single tracks and non-electrified tracks is still high, with few improvements in the past ten years (Croatian Bureau of Statistics 2014b). In consequence, travel times are very long, in particular if compared to road transport. Moreover, there is still no railway connection to Dubrovnik, Ploče and Istria (HŽ Infrastruktura 2014).

There are several seaports located along Croatia's mainland coast, with Rijeka and Ploče as the most important ports for freight, and Split, the most important for passengers. Rijeka and Ploče are strategically located next to main transport corridors. While major improvements have been made to some of them, further upgrades are still needed to make them truly competitive. This is particularly true for the port of Rijeka, given its strong competitors nearby.

Croatia has two main inland waterways: the Danube as an international transport corridor, and the far less important Sava (most-upstream port at Sisak). Transport volume via inland waterways is still very low; strong growth rates in recent years have been mainly driven by transit transport on the Danube (Croatian Bureau of Statistics 2014b). To fully realize the significant inland waterway transport potential, it is indispensable to connect the inland ports to the main transport corridors and improve international cooperation and coordination with neighboring countries.

Except for tourism, air transport does not play a significant role in the present Croatian transport sector. The competitiveness of Croatian airports is relatively low, their only advantage being that they do not face strong competition from other international airports.

Broadband internet – increasing internet usage remains the main challenge

Overall broadband internet accessibility is (almost) at the EU average, albeit with unequal coverage between regions, while that of high-speed Next-Generation-Access (NGA) lies still significantly below the average (European Commission 2014a and 2014b). Rural areas lack NGA entirely (European Commission 2014c).

Broadband penetration, in turn, is relatively low compared to both overall accessibility and the EU average, but has increased significantly in recent years and is already higher than in several advanced EU countries, such as Greece and Portugal. More than 60 percent of individuals in Croatia used the internet at least once a week in 2014 (compared to 32 percent in 2007), while the share of those who have never used the internet decreased from 56 percent in 2007 to less than 30 percent in 2014 (Croatian Bureau of Statistics 2014a). The usage of internet-related business by individuals is still relatively low, but Croatian enterprises seem to be eager to use online services and e-commerce. The usage of e-government services is still low, with only 25 percent of individuals using such services in 2013, one of the lowest rates in the EU. One of the main reasons may be the relatively low quality of digital public services: problems when using e-government websites (such as malfunctions or outdated information on public websites) and the lack of important online services are the main obstacles for stronger usage.

Fees for broadband internet access are relatively high (particularly for high-speed access). Besides high prices, a lack of digital skills seems to be the main obstacle for a more extensive usage of internet services: 60 percent of the Croatian population has no or only low digital skills (EU average: 47 percent – see Digital Agenda Scoreboard 2014).

Energy supply – relatively low consumption, but also low efficiency

Accession to the EU has brought both new challenges and opportunities to Croatia's energy policy. The commitment to the EU's 20-20-20 targets and enhanced competition with other European countries underscores the need for affordable and reliable energy sources. On the other hand, the EU membership opens opportunities for the development of a sustainable energy infrastructure through cooperation and EU funding.

The Croatian power system is relatively small. The domestic power plants have a total capacity of ap-

proximately 4,000 MW, compared to a peak demand of approximately 3,200 MW (European Commission 2014d). Although potentially self-sufficient, the high energy import shares indicate a relatively low level of efficiency in the domestic power system: obviously, importing energy is more (cost-)efficient than resorting to domestic production. In 2013, 52.3 percent of the gross inland energy consumption was covered by net imports. In addition, the share of transmission and distribution losses is one of the highest in Europe, lying 100 percent above the EU average. Insufficient transmission network capability could also limit the capacity for generation from renewable energy sources (RES).

The main energy sources in gross energy consumption are currently petroleum products, gas and RES (mainly hydropower). Croatia has significant RES potential, but its importance is still relatively low, despite the large hydropower plants. The transport sector is the main consumer, with 35 percent of final energy consumption (90 percent of which being accounted for by road transport). Residential accounts for 29 percent, industry for 19 percent, and services and other sectors for 16 percent of final energy consumption.

Electricity prices (after taxes) are below the EU average (ACER 2014), but in purchasing power parity terms they are about EU average for domestic consumers and above the average for industrial consumers. Although 100 percent of the population has access to electricity, consumer conditions in energy markets are quite unfavorable, for instance in terms of choice, ease of switching, and price comparison (ACER 2014).

Conclusion

Based on the foregoing, the following conclusions can be drawn to improve Croatia's infrastructure. Croatia ought to increase competition and market discipline in order to improve both consumer conditions and the competitiveness not only of infrastructure operators, but of all domestic firms. For this purpose, administrative burdens for business formation and new competitors should be reduced and the corporate governance of state-owned firms improved. The improvement of infrastructure's competitiveness will need substantial investments. Given the fiscal situation, the budgeting process should be reconsidered: subsidies to state-owned enterprises should be reduced and public investments should be optimized with respect to EU funding opportunities. The high indebtedness of state-owned companies is a burden for the operating business, in particular with respect to market liberalization or privatization. Independent of the fiscal situation, subsidies and government funds should not be granted to cover operating costs. High debts and operating losses indicate structural problems and should be countered by restructuring programs and a professionalization of the management.

The development of a sustainable infrastructure and efficient operators will also require a stable economic and political environment to attract know-how and investments from strategic partners. Given its geographically advantageous location, Croatia should *carefully prioritize traffic projects and policy* and focus on the strategic location of ports. For this purpose, intermodal transport should be promoted. This will require a further increase in competitiveness of ports and railways. Transport infrastructure policy should focus on quality instead of quantity and ensure an efficient flanking infrastructure.

Besides an improved transport network, transport policy must *ensure the sustainability and efficiency of transport sector operators*. The lack of competitiveness of its operators drives down the competitiveness of the entire transport sector. To increase competitiveness, the corporate governance of all operators (regardless of their ownership structure) should be streamlined and improved, all the way to the possible privatization of less strategic operators. Furthermore, costs must be closely monitored and the quality of the services raised to benchmark standards.

Significant improvements in broadband accessibility have already been made, but a *further increase in accessibility and speed of broadband internet is necessary* to strengthen Croatia's competitiveness, particularly as regards the accessibility to NGA technologies. The national reform program's objective to 'ensure the availability of broadband access under equal conditions throughout the whole Croatian territory' should be pursued with due attention to the costs and benefits of the technology employed and careful account of regional demand patterns. The extension of ultra-high-speed and NGA internet access should primarily focus on economic core regions, while mobile broadband should continue to be pursued as an efficient option to provide internet access in rural and inaccessible areas.

Since the positive economic effects of broadband internet access result from higher penetration rates (not accessibility *per se*) a further *reduction of obstacles to higher broadband penetration rates* is needed. International experience suggests that the main obstacles for broadband subscription in Croatia – high prices and low digital literacy – can be tackled in several ways: financial incentives for broadband subscriptions, awareness and training programs, and improved quality of e-government services.[1]

Croatia also needs to *secure a reliable and affordable energy supply*. The high share of energy imports indicates a low efficiency level of the domestic energy system. A main goal therefore should be to increase the efficiency of existing and future power generation and transformation. To this purpose, the decommissioning of power plants must be countered by an early and appropriate planning of replacements. Moreover, a further modernization of the electricity grid must also be pursued to decrease distribution and transmission losses and to accommodate increasing capacity needs resulting from higher shares of RES in energy production. In addition, Croatia should leverage its position as a member of the anticipated integrated European energy market to ensure access to reliable and affordable energy imports.

While Croatia's per capita energy consumption is already relatively low, in terms of energy consumption by unit of GDP Croatia ranks in the lower third of the EU, indicating significant potential to increase energy efficiency. Therefore, Croatia should *promote resource-efficient growth*. Energy efficiency should be enhanced in all relevant dimensions: energy production, distribution, and consumption. To ensure an efficient energy production and distribution, the technologies chosen should depend solely on their suitability (location of production and demand pattern) and cost-efficiency rather than on political or other reasons. A combination of technologies should be considered whenever portfolio effects can be expected, such as continuous production *via* combination of photovoltaic energy during the day and wind energy at night. Regarding energy consumption, all sectors have significant potential to increase energy efficiency, in particular the transport sector, a main energy consumer.

[1] An extensive survey of demand-side programs is provided by Hauge and Prieger (2009).

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