Balkans Regional Infrastructure Program for Water and Transport

Development of an Intermodal Trade and Transport Facility for Matulji, Croatia
Feasibility Study

January 2003

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1. INTRODUCTION AND EXECUTIVE SUMMARY

1.1 Introduction

On June 10, 1999, more than forty partner countries and organizations signed the Stability Pact for South Eastern Europe in Cologne, Germany with the objective of strengthening the countries of South Eastern Europe "in their efforts to foster peace, democracy, respect for human rights, and economic prosperity in order to achieve stability in the whole region."

The United States Agency for International Development's (USAID's) Regional Infrastructure Program (RIP) for Water and Transport was developed as an important element of the U.S. Government's overall program of support for achieving Stability Pact objectives in the region. Booz Allen Hamilton has been retained by USAID to assist in this program by supporting specific efforts to improve the water and transportation infrastructure in the Balkans region. Booz Allen's current project is to analyze the feasibility of developing an intermodal trade and transport facility (ITTF) for truck and rail activities via a public-private partnership (PPP).

1.2 Executive Summary

The working hypothesis is that the ITTF would be located at one of two adjacent sites north of the town of Matulji, along the road between Rijeka and the Slovenian border (see Figure 1).

Booz Allen Hamilton, 2003

Figure 1: Regional Map

The ITTF would serve as a transportation hub for an adjacent industrial park. It could also serve as a point for customs to clear goods bound to or from Slovenia and the rest of the EU. Among these would be goods traveling to and from Trieste, which has emerged as Croatia's principal general cargo port. Unfortunately, an intermodal trade and transport facility at either of these sites is not feasible at this time. Both sites are characterized by extremely difficult topography and lack direct road and rail access.

There may however be long term potential for an ITTF in the general area once a new highway is built and if an appropriate site is developed by the government. The likeliest scenario for success is one in which the ITTF would serve one or more large customers in the new industrial park or enterprise zone. It would be most viable financially as a container transfer facility for intermodal trains, with an adjacent truck transshipment and warehouse. The ITTF warehouse could also serve as a bonded warehouse and incorporate forwarding and customs brokerage activities. We envision that the ITTF site would be government owned - like a port or free trade zone - with some activities performed by government and others by the private sector under concession or lease type agreements. Our proposed division of activities is shown in Table 1:

Activity	Builder	Facility Size (m²)	Construction cost (US$)	Pro forma Internal Rate of Return
Site preparation, utilities, paving and lighting of parking area	Government	149,600	5,500,000	NA
Warehouse building	Private, 15-year concession	16,625	10,700,000	25.4%
Forwarders and customs brokers offices		1,210		
Rail intermodal terminal		39,600		

Booz Allen Hamilton, 2003

Table 1: Division of Activities

Analysis of our concept in subsequent sections determined the following:

The site must first be fully provided with access roads, electrical power, water, communications, paved parking areas, lighting, rail lines and other typical features by government authorities. A private firm could not assume this burden and create a financially viable operation. The warehouse, office, and rail intermodal services portion of the ITTF could then be built and financed by a private operator. The facility will accept local trucks, possibly from regional agricultural producers or other local export industries, and reload their cargoes into long-distance highway vehicles. This is a somewhat labor-intensive, low margin activity that by itself is unlikely to be economically attractive to a private operator. Ancillary services, such as bonded storage,

forwarding, or driver amenities would have to provide additional revenues. If demand exists, potentially the most profitable is the rail intermodal terminal, which is very highly automated facility with low construction and operating costs.

The ITTF warehouse could attract three types of users. First, it would serve those customers with small volumes or those lacking good access for heavy trucks, such as local agricultural producers seeking to consolidate and broker their loads for export. Second, depending upon location, it could serve as a center from which to unload heavy vehicles as they approach Rijeka's urban core, transferring cargo to smaller vehicles better able to negotiate central city streets. As such, this could be part of a larger redevelopment plan for the city center. Finally, the ITTF could attract customers wishing to keep merchandise in bond before customs formalities are completed either when entering the EU in Slovenia or when entering Croatia.

Given the current state of agricultural exports in the region, and the fact that downtown Rijeka redevelopment is in the conceptual planning stages, this latter activity is much more likely, at least in the early stages of the project. But over the longer term, as Croatia joins the EU and the need for bonded warehousing on the Slovenian border diminishes radically, some other customer base would be required.

This could be local agricultural producers around Matulji who have seen their export production revitalized as part of some regional improvement scheme, long distance transporters mandated to unload before reaching Rijeka's urban core, or both. In our model (see Figure 2), the ITTF warehouse begins handling about 16 thousand trucks per year and rises to 32 thousand by year 15. It is important to note that this activity in isolation will not produce an acceptable rate of return on the facility.

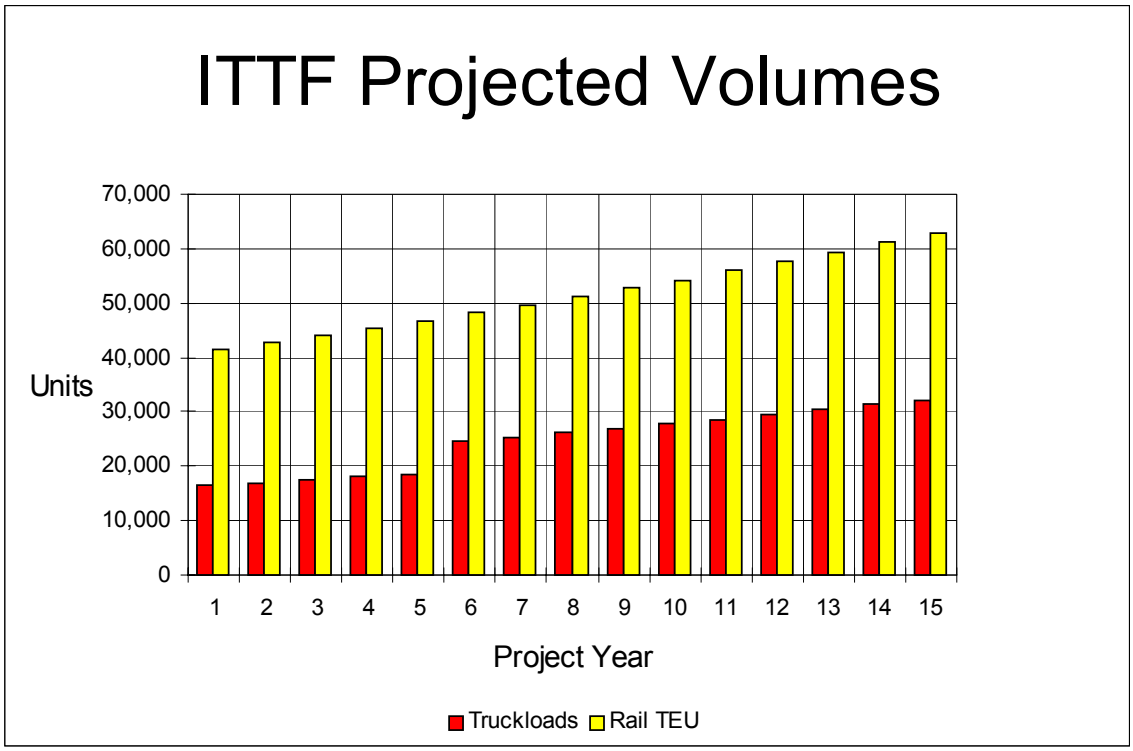

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Figure 2: ITTF Projected Volumes

Services other than loading and unloading trucks are what make the warehouse component of the ITTF financially viable - such as leasing of office space, brokerage, bonded warehousing, repackaging or re-labeling, or other activities. This means that our financial analysis is reasonably duplicative of experiences in the private regional facilities visited as part of our study, where such ancillary activities produce a significant source of revenue.

The ITTF intermodal rail terminal would be a simple operation, consisting of three loading tracks each 600 meters long, surrounded by pavement, where containers or similar unitized cargo would be lifted by crane on or off of specialized railcars. It would be supported by three tracks for storage and shunting adjacent to the main line. In our model, it would begin handling about 42 thousand twenty foot equivalent (TEU) units of standard ISO containers. It would grow to about 63 thousand TEU per year by year 15 at the end of the analysis period. ***Because it is relatively inexpensive to build and highly automated in its operation, a well utilized ITTF intermodal rail terminal would be attractive in itself or might cross-subsidize the ITTF warehouse in a combined facility.***

While theoretically attractive, the rail component assumes demand that today does not exist. It could however be induced by new industrial activity. A successful ITTF intermodal terminal would probably serve one or more large customers running dedicated trains to a few destinations within Europe. Examples might be a new auto component

manufacturer in Matulji serving distant assembly plants, a shuttle train of refrigerated containers laden with locally produced agricultural goods that are loaded at the nearby ITTF warehouse, or similar movements. Any ITTF will be strongly oriented toward trucks until efficient transcontinental intermodal rail service becomes a reality for Croatia. But successful intermodal trains elsewhere in the region, notably in Slovenia, make this a strategy worthy of more detailed consideration. We recommend that the ITTF site should have main line rail access and have sufficient land available for an intermodal rail component.

We urge that another feasibility study be undertaken once the new highway is built and regional industry continues to grow. However our preliminary study has resulted in the following general conclusions:

• The ITTF warehouse will not be financially viable only by loading and unloading vehicles, but rather should be developed as a multi-purpose facility with a variety of value-added services.

• The ITTF rail intermodal terminal is potentially a good source of revenue when and if regional rail service improves and might conceivably function on its own as a viable facility.

• If conditions in the Matulji area remain unchanged, the ITTF could be located closer to central Rijeka, in which case its purpose would be to keep heavy trucks out of the urban core.

2. BACKGROUND

2.1 Introduction

Before its independence, Croatia was among the most prosperous and industrialized area of Yugoslavia, with a per capita output one-third above the Yugoslav average, and the City of Rijeka was a thriving area with robust tourism, industry and trade. Today, Croatia faces considerable economic problems as a result of:

• The legacy of communist economic management;

• Damage to bridges, factories, power lines, buildings, and houses caused by battles to oust the occupying Serb armies from its territory;

• The large refugee and displaced population, both Croatian and Bosnian, and disruption of economic ties.

The Croatian economy emerged from a recession in 2000 as a result of a renewed increase in tourism. Today, the key challenge in Croatia is to stabilize its industrial base while growing tourism and trade. Nowhere is this more evident than in Rijeka, where tourism, industry and trade form the basis of the City's economy. While Rijeka shares the challenges that the rest of Croatia is facing, it is also facing several challenges of its own:

Geography: Rijeka occupies a thin strip of land between the Adriatic Sea and the mountains. The City's mountainous, rocky terrain makes investment in transport infrastructure very expensive.

Decentralization: After Croatia gained its independence, the Government passed legislation decentralizing responsibility for service provision to local authorities. As a result, thirteen municipalities that were formerly part of the City of Rijeka were annexed. However, many of these are too small to provide services in an efficient and affordable manner, and they lack the capacity to undertake integrated urban planning. As a result, the City of Rijeka has been negotiating with a number of the surrounding communities to bundle public services within the RMR.

Lack of control over strategic assets: The economy in Rijeka is driven by industrial activity and tourism, with much of this activity dependent upon strategic infrastructure such as the Port of Rijeka and Rijeka Airport. However, the City is only a minority shareholder in the Port and the Airport, and thus lacks decision-making power with respect to those assets.

2.2 Transport and Development Strategies

Rijeka is pursuing an appropriately diversified development strategy. It is attempting to regain its historic position as a major tourist destination by building a cruise ship terminal and multi-use waterfront facilities, which would involve displacement of some older marine cargo structures. A free trade agreement currently being negotiated between

Serbia and Croatia would result in Serbia's use of the Port of Rijeka as its main international port, with goods granted duty free status as "In Transit." As a result, growth in trade to and from Serbia will contribute to the demand for port services and to overall growth in the economy of the RMR. The city has a plan to redevelop the urban margins of the Rjecina River, using land currently occupied by an abandoned paper mill and various other industrial activities.

The riverfront would become a mixed-use, tourist-oriented area, complete with shaded walks along the river's edge. The city also plans to encourage growth in the hotel and tour industries. Each of these plans will tend to discourage the movement of heavy trucks in the urban core. At the same time, a growing RMR will require greater freight movements of all types to sustain its growing population and new economic activities. As industry moves from Rijeka's urban core, and as the economy continues to grow, new industrial activities will need to be planned in surrounding areas.

A divided highway will be built approximately along the alignment of the existing road linking Rijeka, Matulji, and Slovenia. The RMR has begun discussing the concept of an industrial park to be located somewhere between the town of Matulji and the Slovenian border along the new highway. It is assumed that the industrial zone would also have rail access. An ITTF would serve as the transportation hub of this new zone. The precise location and extent of the industrial park remains to be decided, but two sites in the general area were suggested for evaluation.

The nature of modern logistics systems strongly suggests that an ITTF have the lowest possible capital and operating costs in order to be competitive. This requirement has guided us in our assessment. Success generally presupposes a site with very low development costs, good access to road networks and possibly other modes (railways, ports, airports, etc.), and one that is close to major traffic flows, requiring a minimum of diversion from established transport patterns. Site selection therefore becomes critical to our study.

3. STUDY OVERVIEW

3.1 Objectives of the Study

This RIP project aims to provide, through the development of an ITTF, a commercial transportation hub for the now rural area between suburban Rijeka and the Slovenian border. An expected increase in truck traffic once Slovenia joins the EU makes such an installation potentially more attractive. In addition, given the need to relocate Autotrolej's bus depot (i.e. the municipal Mass-transit company) outside of downtown Rijeka, the project considers the feasibility of co-locating this facility with the ITTF.

3.2 Scope of Work

The primary objective of this activity will be to assess the technical and financial feasibility of an ITTF at specified sites near the Slovenian border and at other locales. In order to meet these objectives, the Booz Allen Team carried out the following tasks: 1) Project future demand and revenues for/from ITTF services; and 2) Estimate investment costs for an ITTF Phase I development plan.

3.3 Report Organization

This report contains our assessment of the current and projected demand for transportation services in the RMR, identification of the potential lines of service and revenues from services that could be provided at the ITTF, our conclusions regarding the most appropriate and economically sound service offerings, and our recommendations for the structure of the PPP arrangement for development of the ITTF. It is organized in the following manner:

1. Introduction and Executive Summary
2. Background
3. Study Overview (this section)
4. Socioeconomic Overview
5. International Trade Flows and Projections
6. Demand for an ITTF Facility
7. Site Selection
8. Facility Concept and Cost
9. Options for the Public-Private Partnership
10. Study Conclusions

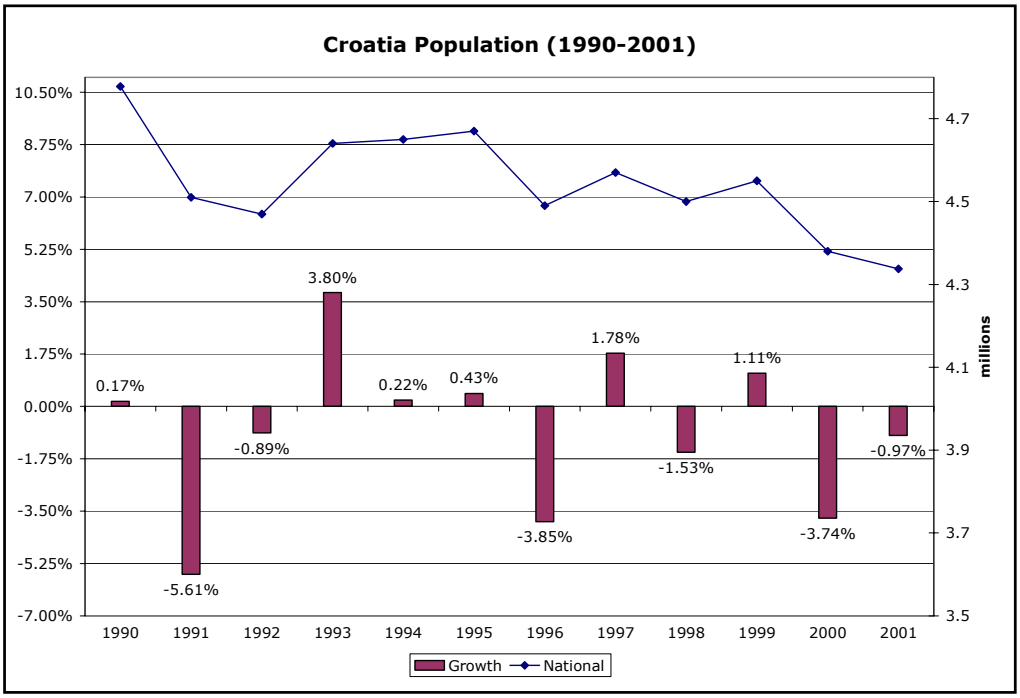
The views expressed within this report are those of the consultants and are based on information gained through interviews and documentation. We are grateful to the individuals that generously provided their time and information during our field visits.

4. SOCIOECONOMIC OVERVIEW

4.1 Population Trends

4.1.1 Population - Historic

The 1991-95 war caused substantial social turmoil in Croatia and the surrounding region and, as a result, the nation's population has been subject to large swings. At the onset of the war in 1991-92 there was a mass exodus to the west resulting in a population drop of over 5.6%. In 1993, however, as war broke out in neighboring countries, an influx of refugees lifted the population by 3.8%. Following a military offensive in 1995, the population again declined by over 3.8%. A steady stream of migration to and from Croatia, as refugees return to their homes in the region, has been the main determinant of recent population swings. Demographic trends, however, have also had an impact. A steady decline in the birth rate to below 11 per 1,000 in the first half of the 1990s (see Figure 3), in conjunction with an increase in the death rate to just over 11 per 1,000, has meant a negative trend in natural population growth.[1]



Booz Allen Hamilton, 2003

Figure 3: Croatia Population (1990 – 2001)

[1] Projections for population, GDP, GDP per capita, and trade are based on a linear extrapolation (moving average) of past performance, taking into account the regional economic environment, as well as forecasts by the Economist Intelligence Unit (EIU). Data sources include the IMF's International Financial Statistics (IFS), the World Bank's World Development Indicators (WDI), the EIU, and field research, including the Croatia Country Report from the Ministry of the Economy, INFO 2001 from the Port Authority of Rijeka, the Stability Pact from Promet Kamiona.

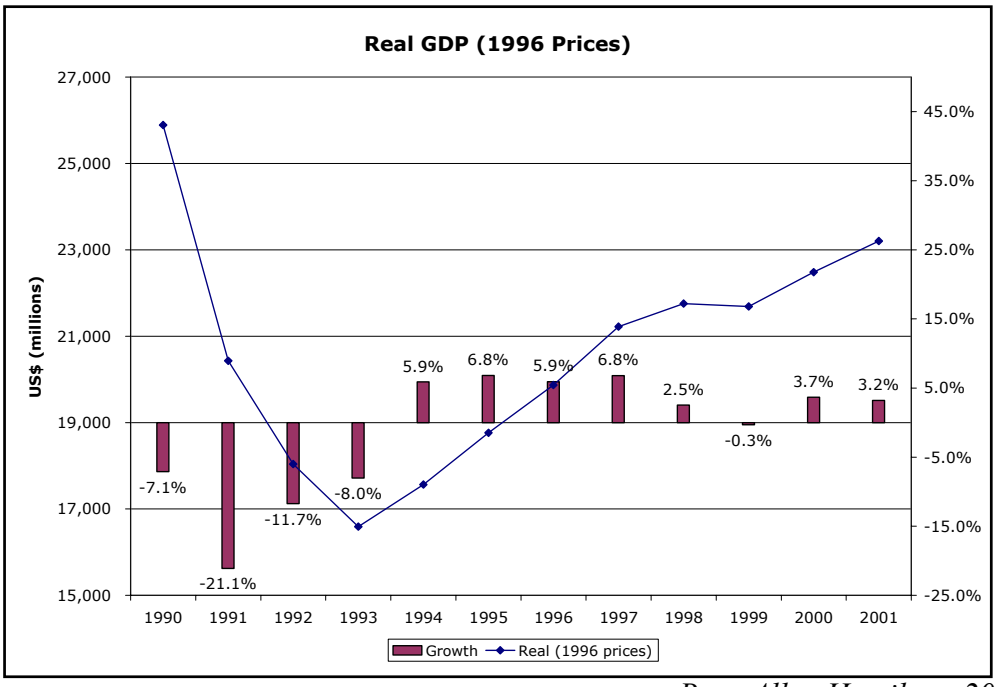
4.1.2 Population - Projected

Population is expected to decline slightly (-0.97% growth) during the next several years in light of the decline in birth rates and the increase in death rates recorded over the past five years. This downward trend is expected to reverse and by 2007 population is expected to grow by 1%, accelerating to 1.5% growth in 2010. The county of Primorsko-Goranska is projected to grow at about 1% a year based on its yearly average of 0.97% over the last 5 years.

4.2 Gross Domestic Product

4.2.1 GDP - Historic

Since the end of the war, Croatia's gross domestic product (GDP) has increased in real terms by an average of 4.1% per year, from US$18.8 billion in 1995 to US$23.2 billion in 2001 (1996 dollars). GDP per capita has increased by an average of 5.2% since the end of the war, from US$5,236 in 1995 to US$6,993 in 2001. Figure 4, below, depicts GDP growth for the years 1990 to 2001.



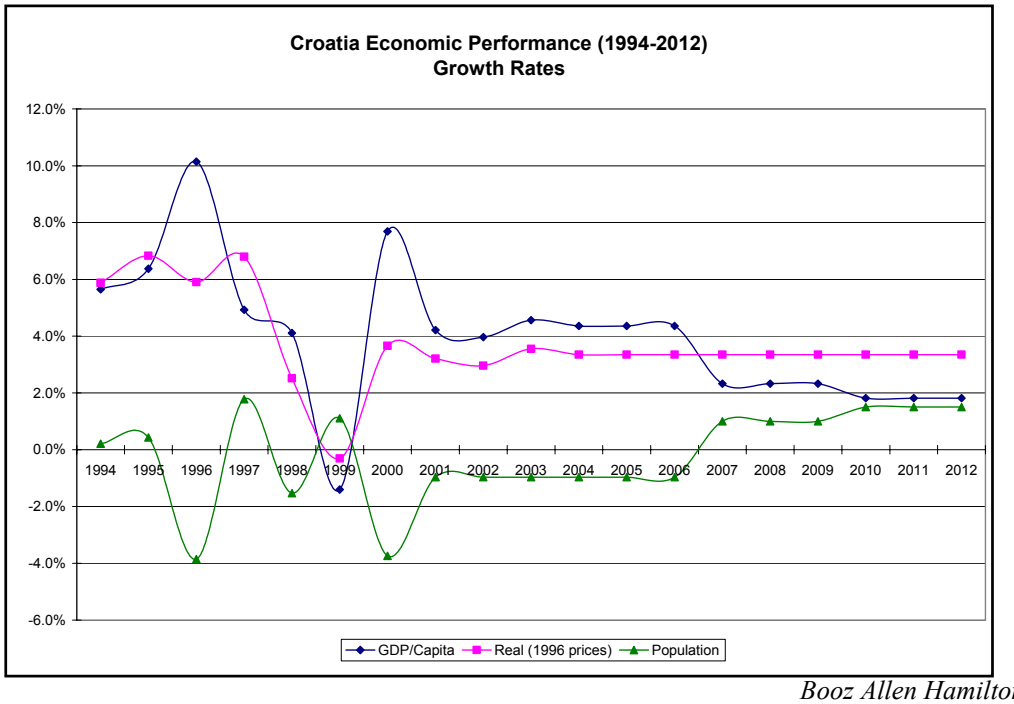
Booz Allen Hamilton, 20003

Figure 4: Real GDP (1996 Prices)

4.2.2. GDP - Projected

According to the Economist Intelligence Unit (EIU), GDP for 2002 is expected to increase by 3% in real terms. The EIU expects GDP per capita to increase by 4.0% at end-2002. Real GDP growth forecasts for 2002 and 2003 are 3.0% and 3.6%

respectively. Further growth rates are assumed to be in line with the previous four years' average growth rate of 3.3%. In 2012, real GDP in constant 1996 dollars is forecasted to grow by 43.4% from the 2001 level. Real GDP per capita, based on the above forecasts of population growth and real GDP growth, will increase by 4.0% in 2002 and 4.6% in 2003. By 2012 it will have grown by 39.7% from its 2001 value. Figure 5 summarizes trends described above.



Booz Allen Hamilton, 2003

Figure 5: Croatia Projected Economic Growth Rates

4.3 Trade in Croatia

4.3.1 Trade - Historic

Trade in goods is a significant component of the Croatian economy, equivalent to 60% of GDP in 1999 according to the World Bank. Croatia's main trading partners are EU members (Italy, Germany, and Austria), Bosnia and Herzegovina, Slovenia, and Russia (for oil imports). The country's main exports include transport equipment, textiles and clothes and chemicals. Main imports include transport equipment, chemicals and man-made fibers, machinery, and equipment, electrical and optical equipment and crude oil and gas. Over the past three years, total freight passing through Croatia has averaged 58.5 million tons, with the primary modes of transport being road, rail, and ocean shipping.

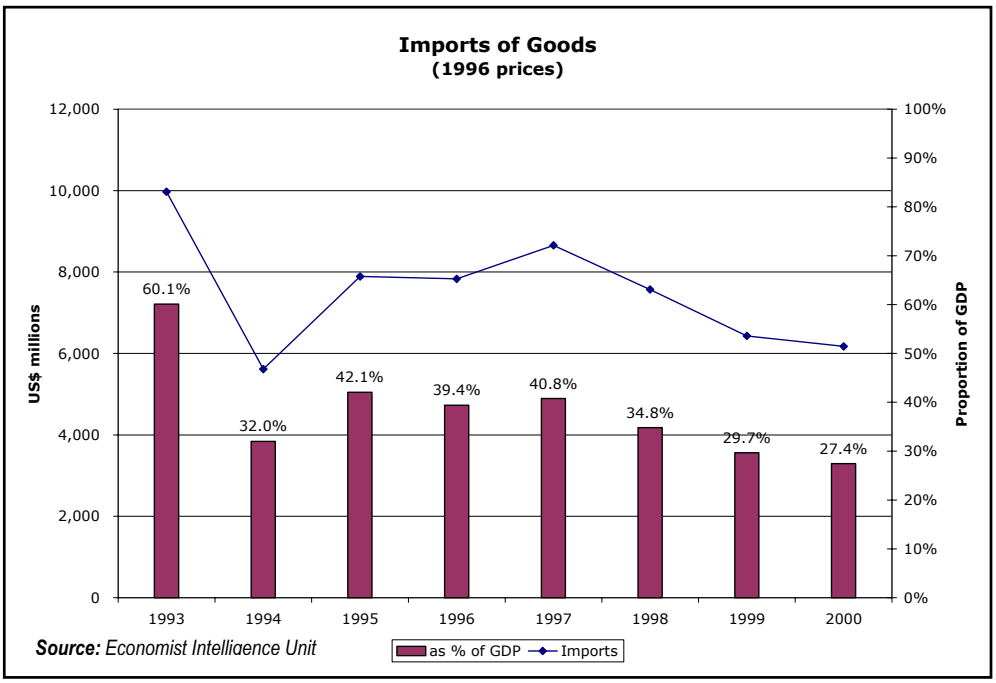
Trade traffic in the county of Primorsko-Goranska has experienced a resurgence after having fallen significantly during the conflicts of the 1990s. In terms of TEUs, total container traffic grew by 12.7% in 2000, the first year of positive growth since 1991. The average decrease in the five-year period prior to 2000 was 20.6%. Despite a slight

upward trend following the end of the war, the trade of goods has steadily declined over the last decade. Both exports and imports of goods have decreased since 1996 at an average rate of 4.6% and 4.4%, respectively.

As a proportion of GDP, goods trade has also been declining. In 1995, exports reached the equivalent of 24.7% of real GDP while imports were 42.1% (see Figure 6 and 7). In 2000 these proportions were down significantly to 16.1% and 27.5%, respectively. It is important to note that only goods (measured as f.o.b. and c.i.f.) are included, not services.

The projections for the study cover up to 2012. The projections are for international trade flows by means of truck and rail transport. The projections are measured in tons and twenty-foot equivalents (TEUs) for the main commodities groups of liquid, bulk, and container.

The balance of trade in goods has seen positive growth since 1998 (see Figure 8, below). Yearly average growth for the three-year period until 2000 was 18.6%, indicating an acceleration from the previous three-year average decline of 73.0%. As a proportion of real GDP, the deficit in goods trade has declined from 17.4% in 1995 to 11.3% in 2000. Total trade in goods has been on a downward trend since 1995. A large increase of 24.7% in 1995 was mainly the result of the end of the war and the beginning of normalized trading.



Booz Allen Hamilton, 2003

Figure 6: Imports of Goods (1996 Prices)

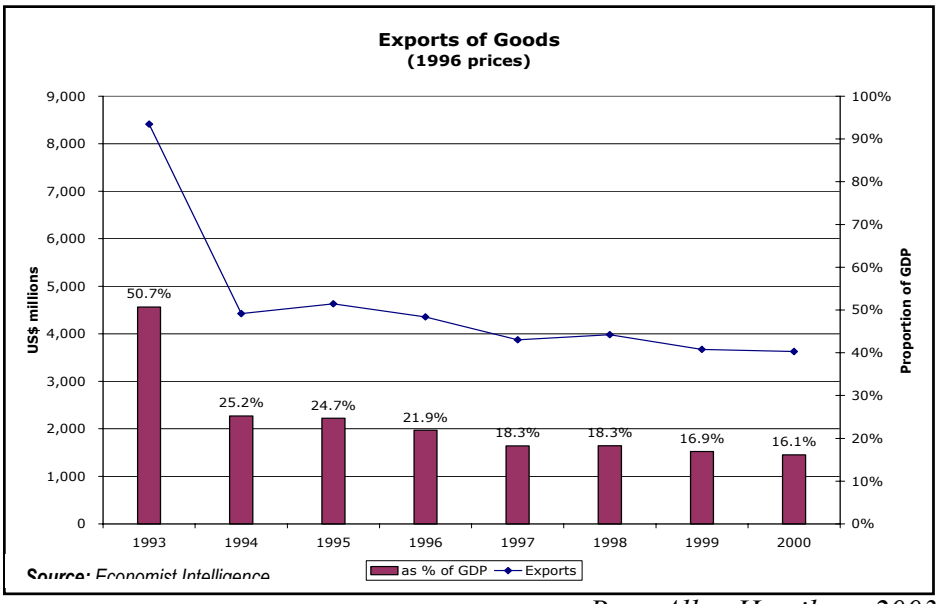


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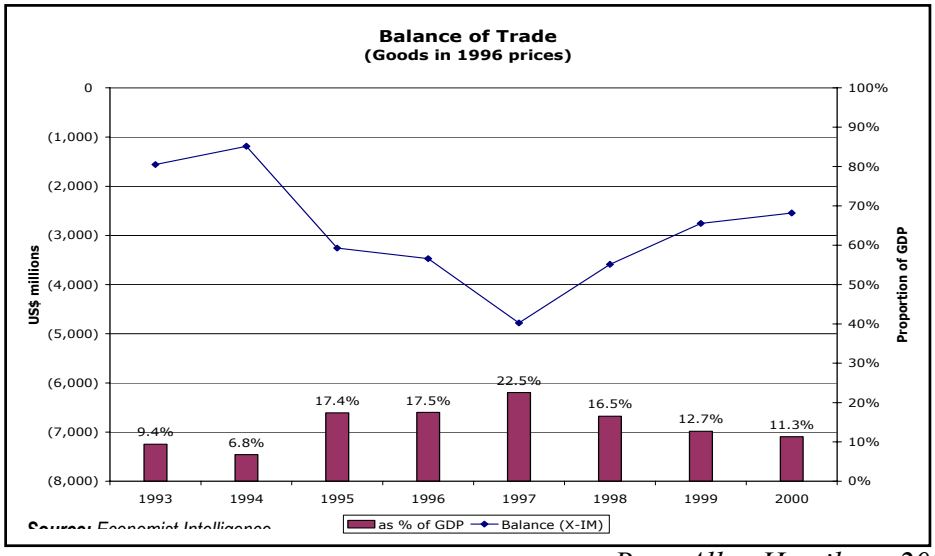
Figure 7: Exports of Goods (1996) Prices)



Booz Allen Hamilton, 2003

Figure 8: Balance of Trade (1996 Prices)

4.3.2 Trade Outlook

It is estimated that Croatia's international trade flows will increase by a yearly average of 1.9%, reaching $12.2 billion by 2012. Truck (overland) trade in the county of Primorsko-Goranska, which includes Rijeka trade flows, will increase by 8.5% yearly and reach 363,223 trucks by 2012. Imports will grow faster than exports increasing by 3.0% and

2.3% respectively. The real volume of trade is probably higher than indicated by official records, considering the large size of unrecorded flows towards Bosnia and Herzegovina and under-estimated values for customs duties and excise taxes. Trade is expected to pick up with the recovery of Croatia's main trading partners in the European Union and as consumer demand increases in the wake of economic stability and reform. Growth in the tourism sector is also expected to boost trade.

Approximately 55% of Croatia's total international trade is with countries of the European Union. In 2000, the latest year for which data is available, 54.5% of Croatia's exports went to EU countries and 55.6% of its imports came from EU countries. It is estimated that Rijeka's imports will grow faster than the national average due to Rijeka's growing economy, especially in the tourism, industry and trade sectors. This will result in increased trade with the EU, and particularly an increase in imports to Rijeka.

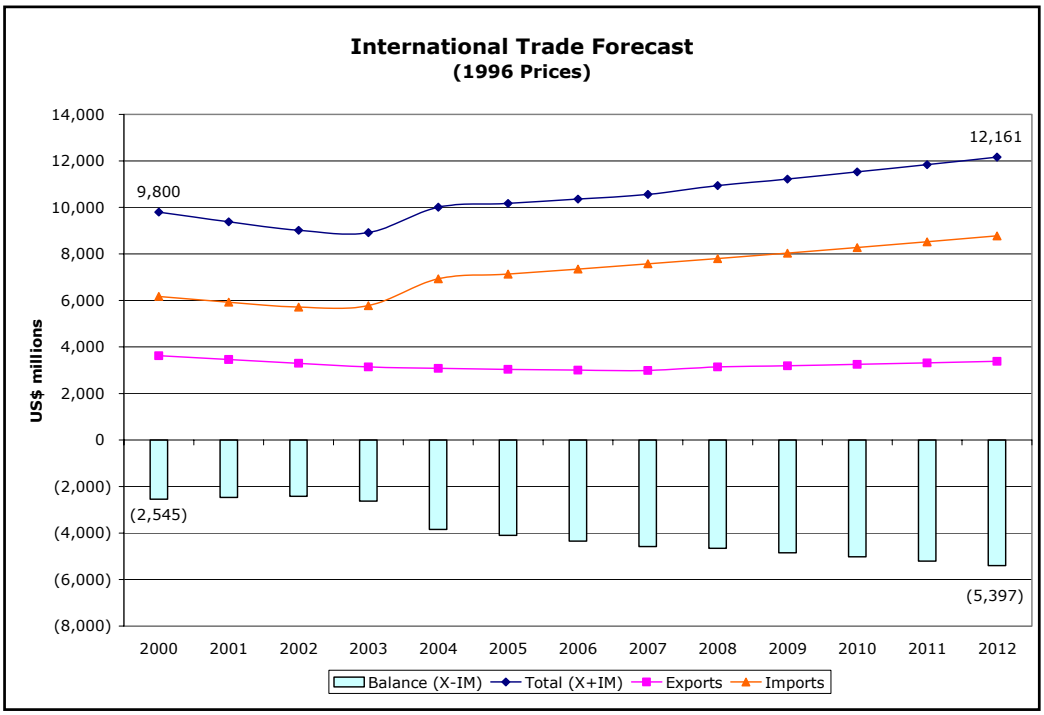
It is estimated that truck transportation of imports will grow in proportion to overall imports. However, when Croatia joins the EU, over half of the demand for customs clearance will cease. Croatia's accession to the European Union (EU) is at least 5 years away according to most government authorities, and the county's Chamber of Commerce estimates that accession may take somewhat longer. The Chamber's main concern centers on the recent war and its impact on the country's ability to quickly implement economic reforms. Delayed economic reform, coupled with the EU's problems assimilating new members may further extend the accession timeframe. The EU may also delay Croatia's acceptance until budgetary difficulties resulting from potential new members' lower incomes are resolved.

Presently, Serbia and Croatia are finalizing a free trade agreement. Serbia will use the Port of Rijeka as its main international port and will be granted duty free status as "In Transit". According to the county's Chamber of Commerce, the agreement is to be signed in the latter half of 2002. A delegation from Serbia has been in Rijeka negotiating the agreement, and a delegation from the Port Authority of Rijeka will be going to Belgrade shortly. According to the Chamber, Serbia is expected to have slow economic growth, resulting in a lag time of 2 to 3 years before there is significant growth in its exports and imports. Grain exports from Serbia are expected to be the first goods to benefit from this agreement. A new highway that is due to be completed by 2004 will link Macedonia to Croatia. The Croatian segment of the highway is already completed, but the segment that passes through Serbia is in disrepair.

4.4 Trade Forecast

Developing accurate growth forecasts for Rijeka is difficult due to the paucity of available trade data during the war years. Typically, projections regarding growth trends would be extrapolated from historical data but the validity of trade data collected prior to and during the war years is questionable and does not accurately represent the current political and economic climate. Data compiled in the years since the war's end is not sufficient to accurately predict future trends. As a result, the forecasts presented in this report are based on a combination of analyses from before, during and after the war, as well as the current political and economic situation.

As a result of our analysis (see Figure 9), we believe there will be a gradual recovery in the trade of goods, which will result in an increasing goods trade deficit. This deficit may be interpreted in a variety of ways. It could signal the transformation of Croatia's economy to a service-driven one, in which case the trade gap would be considered sustainable from an economic standpoint. Or, it could be the product of an overall deterioration in the trade outlook, which would call into question Croatia's ability to compete in the world economy. In our estimation, the goods trade deficit reflects increases in tourism and other service related industries, and therefore is a sign of the specialization of Croatia's economy. As such, the goods trade deficit will be offset by a surplus in the balance of service trade.



Booz Allen Hamilton, 2003

Figure 9: International Trade Forecast for Croatia 2000-2012 (1996 Prices)

With its strategy of export-led growth, Croatia will be limited by its current trade and transport links. The waiting time for trucks at Croatian border crossings was between one and four hours in 1999. Small and medium sized enterprises therefore face excess costs related to trade and transport services that are unreliable and unpredictable, and as a result, Croatia's economy is less internationally competitive. It is in this context that the ITTF is being planned.

Based on the data available, we estimate that total trade of goods will continue on a downward trend, decreasing by 3.1% on average until 2003, after which we expect total trade of goods to grow by 12.2%. Subsequent growth rates will remain in the range of 1.6 to 3.6%. By 2012, total trade is expected to be 24.1% higher than in 2000. Trade

balance in goods will decrease significantly, with the deficit increasing by 112.1% between 2000 and 2012.

In 2000, exports of goods were equivalent to 16.1% of GDP, down from 25.2% in 1994. Following several years of declining goods trade (to the exclusion of services), exports of goods (f.o.b.) are expected to continue to drop by an average of 4.6% per year until 2003, when Croatia's major trading partners in Europe are expected to undergo an economic recovery. In the period between 2004 and 2008, exports will reverse their declining trend, reaching positive growth in 2008 with the expected accession of Croatia to the EU. This will be stimulated in large part by growth in EU member countries and the reorganization of Croatia's business sector to a more export-oriented framework.

Imports of goods will more quickly recover lost ground, thanks in large part to the resumed growth of GDP, GDP per capita, and tourism (by increasing the demand for goods). In 2002, imports of goods will continue the decline of previous years and continue to fall by 4.0%. However, starting in 2002, the rate of decrease will slow down by 0.5% per year until it reaches positive growth in 2003 of 1.0%. Import growth will remain in line with tourism and GDP per capita growth forecasts in the 2004-2012 period, growing at a fixed rate of 3.0% per year.

5. INTERNATIONAL TRADE FLOWS AND PROJECTIONS

5.1 Introduction

The flow of trade within Croatia, and between Croatia and other countries, is highly dependent on Croatia's distribution system and the legal framework that governs it. The legal framework is comprised primarily of the Law on Trade, and various customs and tax laws. The Law on Trade regulates the activities of wholesalers and retailers. Stringent customs and tax administration have reduced the illegal imports and unlicensed business activities which flourished after the country's independence.

Wholesalers operate as a distribution intermediary to retailers. For the most part, the wholesale sector is completely privatized. Some wholesalers specialize in particular sectors such as pharmaceuticals or medical supplies/equipment. Restructuring of the retail segment also occurred as retail chains were privatized and acquired by larger groups and new private retailers emerged on the market. Retail is now dominated by private companies such as Getro, Konzum (Agrokor), Diona (Globus Holding) and Prehrana (Brodokomerc). Foreign retailers (Bila, DM, Merkur, Mercatone, Euroviba, Metro, Ikea, etc.) have started to enter the market as well, creating more competition. Some wholesalers have ventured into the retail sector as well. The retail sector also includes kiosks, small shops and open markets. In Croatia, there are an estimated 7,500 retail outlets. Larger wholesalers or even retailers having a presence in Rijeka may be potential investors or tenants of a future ITTF. Should the decision be taken to pursue development of an ITTF, these possibilities should be investigated as part of a comprehensive feasibility study.

5.2 Description of Trade by Mode

Trade flows into and out of the RMR occur via truck, ship, rail, and air. The following section provides additional information about these flows, by mode. Our ability to analyze and draw conclusions relating to trade flows by mode is restricted due to the lack of and unreliability of trade data during the conflict ridden 1990's, and the difficulty of translating the data relating to the pre-war Yugoslav economy to the post-war Croatian economy. Because we cannot (due to lack of data) use trend or regression analysis in our analytical approach, we have instead assumed that the share of trade by mode as a percentage of overall trade will remain the same over time. As such, our assumption is that growth in traffic by mode will be driven by absolute growth in traffic itself, rather than growth in individual modes.

5.2.1 Truck Trade - Historic

Road transport of freight into and out of the RMR occurs primarily via trucks owned by private trucking companies, both Croatian and international. Truck transport in the RMR is on the rise - in 2000, the number of vehicles registered to transport goods was 113,134, an increase of 6,500 vehicles since 1998. The total tonnage of container trucks has also increased—in 1999 and 2000 tonnage grew by 9.2% and 22.0%, respectively. This is in

stark contrast to the period from 1995-1998, when total tonnage decreased by an annual average of 23.4%.

The trend in growth of transport of freight via roads in Primorsko-Goranska county mirrors that in Rijeka. The number of trucks transporting containers throughout the county declined during the period from 1995-1998 (in this case, by an average of 13.2% per year). Similarly, truck transport in the county experienced a resurgence beginning in 1999, increasing by 5.3%. We expect that the number of trucks transporting goods in the county of Primorsko-Goranska will continue to grow at the same rate as national cross-border traffic. Thus, by 2012 the number of trucks importing, exporting, and in transit in the county of Primorsko-Goranska will increase by 143.8% over 2001 to 363,223.

Cross-border traffic has also been on the rise. Following the breakup of Yugoslavia and the war in Croatia, new border crossings and corresponding border posts were created with temporary barracks and bridges, however these temporary solutions led to long waiting times at border crossings, a concrete manifestation of inefficiency in trade-related services. In the EU, customs administrations are required to keep 90% of vehicles waiting no more than 20 minutes, or about 40 minutes to cross both sides of a border point. Given that waiting time at Croatian border crossings is typically between one and four hours, the World Bank estimates that by reducing waiting time to EU standards, vehicles entering Croatia will realize transport cost savings in excess of US$11.3 million per year. These savings are expected to lead, in the medium term, to a significant increase in trade volumes. The Customs Directorate of the Republic of Croatia (CDRC) has modernized over 30 of its 60 major border stations in recent years. As expected, traffic flows have surged and are expected to grow further as Bosnia and Herzegovina recover economically.

The pace of growth in cross border trade is also quickening, with the number of vehicles conducting cross border trade of goods increasing by 7.5% to 1.7 million in 1999 and growing by an additional 20% in 2000 to 2 million vehicles. The total tonnage of cross-border traffic has also increased significantly. In 1999 and 2000, tonnage increased by 16.3% and 16.4% respectively, ending 2000 with 21.9 million tons transported across the national border. Although official data is not available, local sources confirm a corresponding increase in terms of twenty-foot equivalent units (TEUs).

In 2001, 149,016 trucks passed through the Rijeka Customs office. Customs clearance in Rijeka is divided between the Rijeka Road Terminal and the Port of Rijeka, with approximately half the trucks going to each. Trucks are directed to either of the two according to size, with the larger and heavier vehicles using the Rijeka Road Terminal. Table 2, below, provides information on the freight flows cleared through Rijeka's Customs Office.

Type of Trade	Number of Trucks	Tonnage	No. of Empty Trucks
Imports	68,063	544,483	17,319
Exports	66,726		26,977
In transit	14,227	228,500	724
Total	149,016	772,983	45,020

Booz Allen Hamilton, 2003

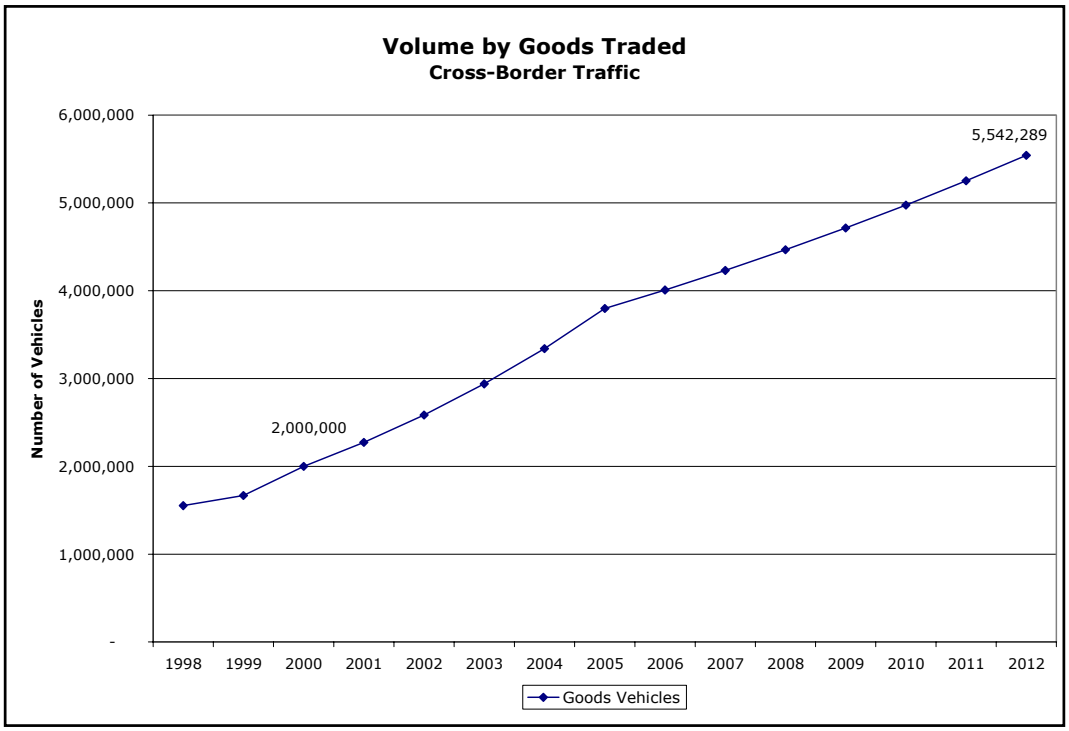
Table 2: Freight Flows through Rijeka's Customs Office

The Rijeka Road Terminal provides facilities for a portion of this traffic. Rijeka Promet owns the terminal and the company's Road Terminals Division manages the terminal. According to Rijeka Promet, 90% of the vehicles using the Rijeka Road Terminal are importing to Primorsko-Goranska county and the remaining 10% are in transit. The terminal provides parking for heavy vehicles that must obtain customs clearance for importation as well as vehicles carrying cargo that is in transit from other countries that are importing or exporting through the Port of Rijeka. Rijeka Promet also provides office space for the customs authorities and rents office space to service providers (such as shipping and forwarding agents). In 2001, the Rijeka Road Terminal handled 33,000 of the trucks classified as imports and in transit, up from 30,000 in 2000. Rijeka Promet estimates that 36,000 trucks will pass through their terminal in 2002. This represents a relatively steady growth rate of 10%.

According to Rijeka Promet, the Terminal's gross income for 2001 was US$375,000 (HRK 3 million), including rental income of US$42,000. Rijeka Promet's direct costs, including loan repayments, were US$312,000 (HRK 2.5 million). The Terminal operation ended 2001 with a net profit of US$62,500 (HRK 500,000).

5.2.2 Truck Trade – Projected

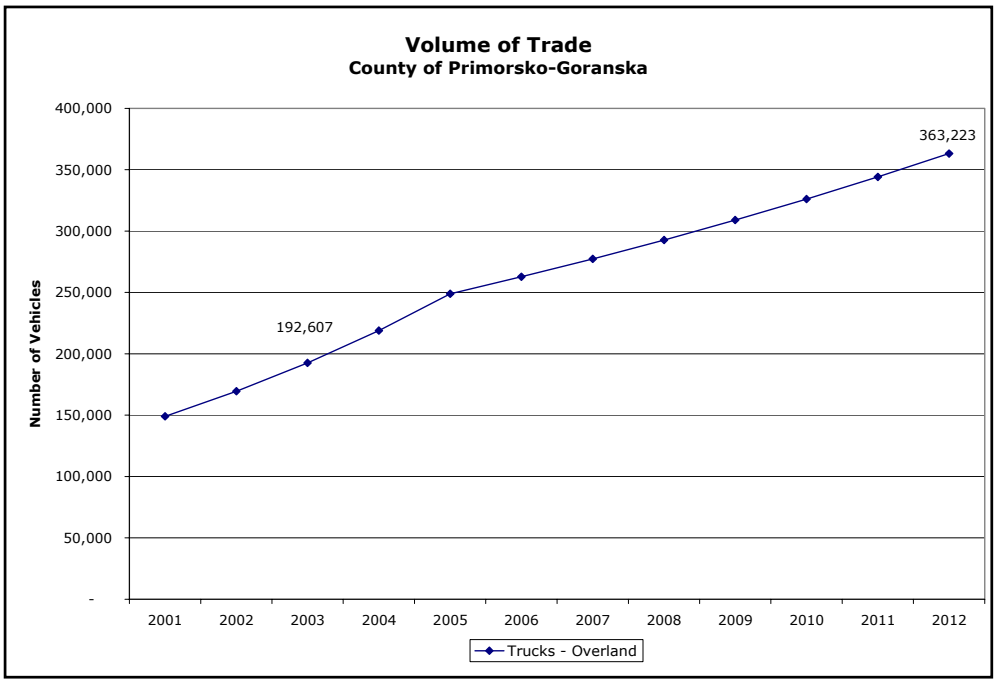
The volume of freight in Croatia has been increasing significantly in the past few years in light of the expansion of the EU, the re-opening of the Serbian market, and greater domestic stability (see Figure 10). We have estimated the rate of growth based on the average rate of change between 1998 and 2000. This should hold true given recent significant investments in transport infrastructure both by the private and public sectors, including heavy investment currently being made in highways, including in the corridors between Zagreb and Rijeka, and Rijeka and the south. This should further increase truck traffic because it will increase the competitiveness of the mode due to reduced travel times. Accordingly we project cross border traffic will grow at an annual rate of 13.7% until 2005 before settling at the same growth rate as nominal GDP (5.5%). By 2012, cross border traffic is forecasted to have grown by 177.1% to 5.5 million vehicles.



Booz Allen Hamilton, 2003

Figure 10: Volume of Goods Traded in Cross-Border Traffic

In 2001, overland trucks in the county of Primorsko-Goranska reached 149,016. Historical data is unavailable, making it impossible to estimate future growth in trucks traffic, though local sources report that traffic had decreased significantly during the war. We estimate that import traffic in the county will grow in parallel to total Cross Border Traffic, or 10% a year until 2005 and 5.5% afterwards. Therefore, by 2012, total truck traffic in the county should reach 363,223 trucks (see Figure 11).



Booz Allen Hamilton, 2003

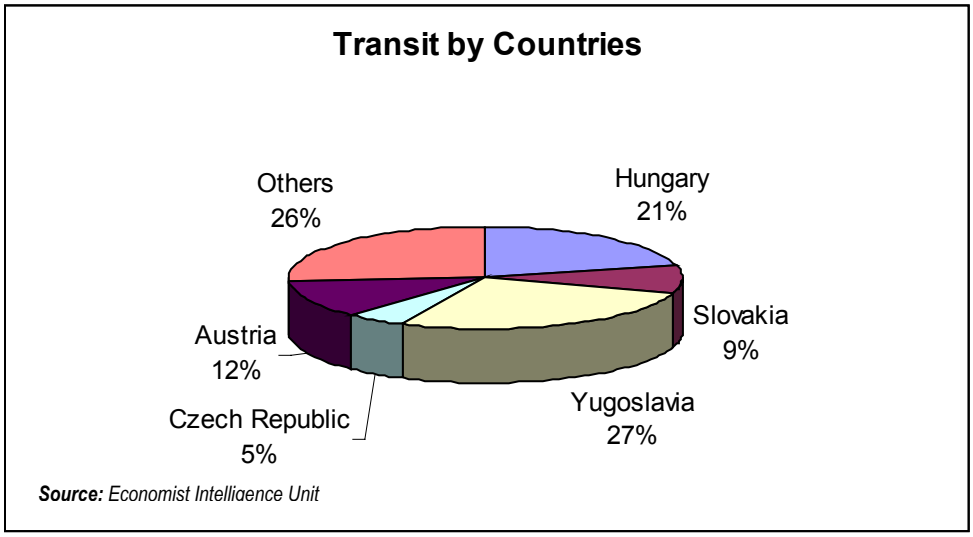
Figure 11: Volume of Trade, county of Primorsko-Goranska

5.3 Shipping Trade

As the nations of Southeastern Europe continue their economic development, new trade and transport patterns are arising. In Croatia, as elsewhere, we see evidence of this. Local ports are slowly recovering traffic that was lost during the years of conflict, however they face competition from ports in nearby EU nations such as Italy that are becoming regional load centers for Croatia. Major seaports in Croatia are in Rijeka and Bakar. Rijeka is the largest Croatian port but suffered considerable business loss to Koper (Slovenia) during the war period. Today, the Port of Rijeka continues to stagnate and is grappling with financial difficulties, and the Port's cargo volume is only 25 to 35% of pre-war levels.

The Port of Rijeka is located in Kvarner Bay in the northern Adriatic Sea. The Port, which is owned by the Government of Croatia, is spread over five basins: Rijeka, Sušak, Bakar, Raša, Omišalj, and the warehouse complex in Škrljevo. The total surface area amounts to about 2 million m² with 39 berths, 7,183 meters of operational quay, 362,000 m² of covered warehousing, 725,000 m³ warehousing area for oil, and silo capacity of 57,000 tons. There are 42 quay cranes, 2 container bridge cranes, and 4 ship loaders (two at the Rijeka silo, and two at Bakar basin). The Port of Rijeka Authority oversees the management of the Port, while the majority of port stevedore services are provided under a concession contract by the local firm Luka Rijeka d.d.

The Port of Rijeka is of key strategic importance to Croatia's trade and transportation system. It connects northern and southern Croatia, and is a gateway between the Adriatic Sea and Europe for both cargo and passengers. The Port is also particularly important for goods destined for Hungary, Slovakia, the Czech Republic, Austria, Slovenia, and Bosnia and Herzegovina (see Figure 12).



Booz Allen Hamilton, 2003

Figure 12: Rijeka Port Transit by Countries

5.3.1 Port Traffic - Historic

In 2000, the Port of Rijeka handled 8.8 million tons of cargo. Of this, 75% either originated in Croatia or was destined for Croatian markets. The remaining 25% were products in transit. Liquid cargo represented the largest share of operations and was equivalent to 71% of total tonnage in 2000 (some 6.3 million tons). Dry cargo accounted for the remaining 21% of total tonnage. Dry cargo is comprised of bulk cargo (63% of all dry cargo in 2000), timber (6%), and general cargo (31%). General cargo may be subdivided between containerized and non-containerized cargo. Growth in the general cargo market segment will tend to increase container traffic in and out of Rijeka either via truck or rail.

There are new investments in the offing to increase the Port's capacity, including plans by the Government of Hungary to invest in a new grain storage facility for Hungarian grain exports. It is not yet known if any export grains may be containerized.

The Port's container terminal began operations in 1978, and presently has a static capacity of 5,000 TEUs (twenty-foot equivalent units) and 80,000 TEU annually. Port container throughput increased from 6,756 in 1999 to 11,901 in 2001. In terms of TEUs, there was an increase from 10,134 to 17,852 during the same period, representing growth of 76% in just two years.

At the same time, the much larger Port of Trieste in northeastern Italy, which in 2001 handled just over 200,000 TEUs, has emerged as a load center for the northern Balkan region. In 2000 and 2001, Trieste handled roughly the same number of containers for Croatia as did the Port of Rijeka, virtually all of them moving by truck.

In addition to well-developed infrastructure, Trieste has the advantage of attracting significantly more shipping lines serving many more destinations than is currently the case at Rijeka.

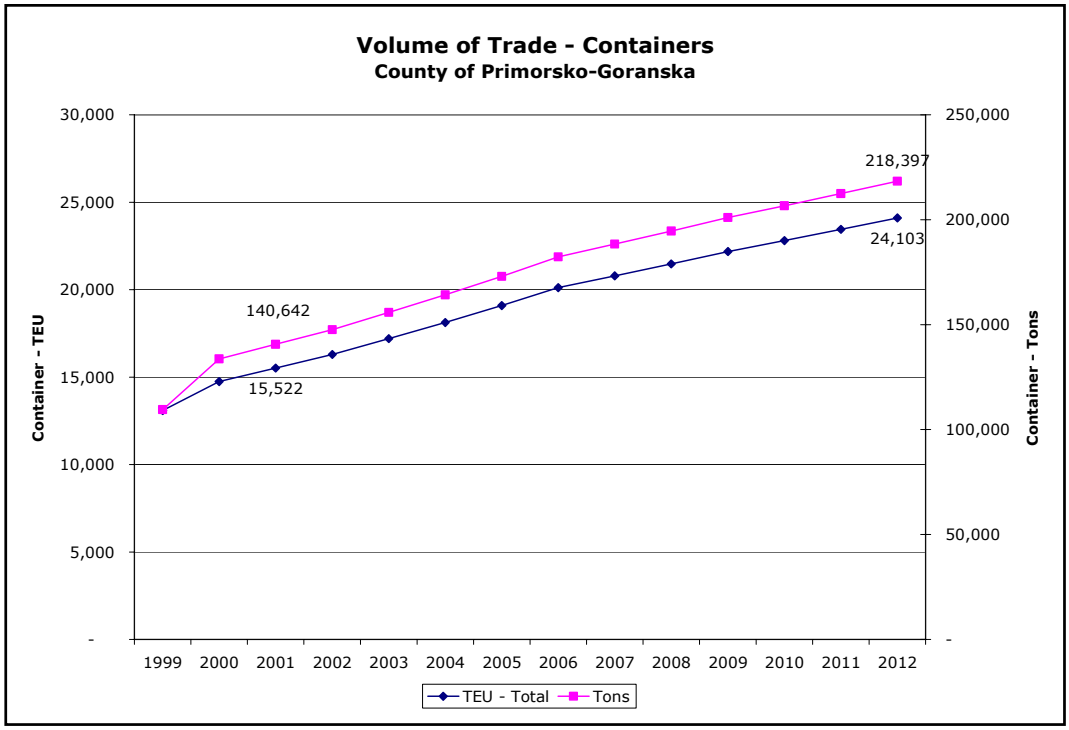
5.3.2 Port Traffic - Projected

The Port of Rijeka is part of the Northern Adriatic League, which includes Koper and Trieste. The strategic agreement apparently divides cargo among the ports and controls inter-port competition. Thus Rijeka attempts to gain traffic from other sources. Under this agreement, Rijeka is part of the hinterland of Trieste, extending from the eastern Po Valley to Slovenia and Northern Croatia, all of which is served by truck. To grow maritime traffic, Rijeka has focused on two weekly feeder services to and from Gioia Tauro, a massive transshipment port in Reggio Calabria on the Straits of Messina that handled some 2.6 million TEU in 2000. Gioia Tauro is a maritime hub for all of southern Europe and provides access to even more vessels and destinations than does Trieste.

Such relationships with other ports and shipping lines may be important to the future development of the ITTF. They suggest that global steamship lines – even those not calling at Rijeka – may be prospective investors or operators in the ITTF, considering it the end of a spoke from a hub like Trieste or Gioia Tauro.

The volume of containers in the county is expected to grow in line with the growth of economic activity in the region, as measured by GDP. By 2012 the volume of total trade in containers will have increased by 63.4% from the 2000 level to 24,103 TEUs or 218,397 tons (see Figure 13).

Conservatively, we assume that the containerized proportion of total volume of trade will not increase, but rather remain stable. Lack of long-term data has produced this very conservative estimate. A more definitive forecast may be made once regional transport trends and costs are better known.



Booz Allen Hamilton, 2003

Figure 13: Containers, county of Primorska-Goranska

5.4 Rail Trade

In mid-2001 the Croatian railway network (Hrvatske Zeljeznice, or HZ) included 2,726 kms of standard gauge track, with 197 km electrified at 3000V and 1,031 km at 25kV 50Hz. After the war, HZ has concentrated on rebuilding infrastructure and rehabilitating locomotives and rolling stock. In 1999, the World Bank provided a loan for modernization of the Croatian Railways. To be completed June, 2003, it will include renewal of 220 km of track, rehabilitation of 40 locomotives, rehabilitation of 120 coaches, conversion of 100 freight wagons, and implementation of environmental protection measures. Over the course of the project, measures will be taken to restructure the HZ labor force, commercialize the activities of Croatian Railways, and restructure and gradually privatize subsidiaries.

In 2001 HZ began the thyristorization of 12 ASEA 1141.2 Class locomotives permitting a maximum speed of about 140 km/hr mainly on the Zagreb - Vinkovci line hauling IC trains. The modernized locomotives are also equipped with electrodynamic brakes and updated cab displays. In June 2001 the through train service between Zagreb and Sarajevo was restored. The line between Vlinja and Martin Brod in Bosnia had been reopened, but there still was no through service between Bihac and Knin. The year also saw the reconstruction of the Vinkovci-Osijek line that had been damaged by war. These reconstruction programs are likely to involve a large portion of HZ's resources in the near future.

The greatest recovery, in terms of volume of trade since the war, has been in freight transport. In 1999, total TEUs carried by rail increased by 54.1% after suffering significant declines of 37.0% in 1996 and 46.9% in 1998 (the only years for which official data is available).

A future ITTF would most likely handle international container rail freight. Future rail freight levels are difficult to predict. According to the Union of International Rail-Road, combined company volumes in Europe were as shown in Table 3.

Company	**Country**	**2000**	**2001**	**%**
Adria Kombi	Slovenia	45,607	47,812	4.8%
Bohemiakombi	Czech Rep.	135,739	109,229	-19.5%
Bayrische Trailerzug	Germany	40,841	41,602	1.9%
Cemat	Italy	343,609	366,744	6.7%
Combiberia	Spain	30,227	26,839	-11.2%
Crokombi	*Croatia*	*4,612*	*4,241*	*-8.0%*
CTL	UK	60,759	32,368	-46.7%
Hungarokombi	Hungary	142,094	153,169	7.8%
Hupac	Switzerland	531,438	514,089	-3.3%
KombiDan	Denmark	12,475	14,288	14.5%
Kombiverkehr	Germany	862,121	857,424	-0.5%
Novatrans	France	177,730	167,360	-5.8%
Ökombi	Austria	342,169	381,779	11.6%
Polkombi	Poland	26,098	10,513	-59.7%
Rocombi	Romania	725	501	-30.8%
SweKombi	Sweden	17,234	18,547	7.6%
Trailstar	Holland	60,663	73,048	20.4%
TRW	Belgium	132,818	139,794	5.3%
Number of TEU		**2,966,956**	**2,959,348**	**-0.3%**

Booz Allen Hamilton, 2003

Table 3: Croatia and Current European Intermodal traffic by Country

5.5 Air Cargo

The Rijeka Airport (identification code RJK) is owned primarily by the Government of Croatia (50%) with Primorska-Goranska County, the City of Rijeka, and four to six smaller, nearby cities as minority shareholders. The airport is managed by an operating company with a professional Director and a company Assembly chaired by the Minister of Transportation.

The Rijeka Airport lies a short 50 km from the present border of the European Union, with major European destinations in easy reach (it is 400 km from Munich, 414 km from Rome, 420 km from Milan, 430 km from Budapest, 520 km from Zurich, 800 km from

Berlin, 1,000 km from Paris, 1,060 km from Amsterdam, and 1,280 km from London). Croatia has an open sky policy with Europe, but requires permits for cabotage. Currently, the airport is serviced by a number of charter companies with connecting flights to such cities as London, Dubrovnik, Vilnius, et cetera.

The assets of the airport are valued at 40 million DM (715 million KN or 86.8 million USD), however due to neglect during the Yugoslavian war, the airport has become unviable as a self-sustaining commercial operation and traffic has dramatically decreased. There have been no significant investments in the Rijeka Airport in the last ten years, and according to the information obtained in our meetings, there are no immediate planned investments. The only proposal we are aware of for development of the airport is that put forward by Rijeka Promet as a result of its airport feasibility study.

5.6 Conclusions

Trade via truck and ship represents the majority of traffic that could be handled by an ITTF in the RMR. In terms of truck traffic, there is strong potential in the medium term for an ITTF to service the increase in cross-border traffic and customs clearance needs that are expected to arise as a result of Slovenia's accession to the EU. However, this line of business will not be sustainable in the longer term, when Croatia itself will join the EU and customs clearance functions between Croatia and the EU countries will be eliminated.

On the other hand, there seems to be strong potential, both immediately and continuing into the future, for a facility to handle transloading from larger, longer-haul vehicles, to smaller vehicles that would distribute freight within the City of Rijeka. This business line implies a warehousing operation rather than the broader array of services that would be required for customs clearance and cross-border traffic. As a result, the two business lines have vastly different requirements in terms of their infrastructure as well as their location.

Currently, the flow of trade to and from ships is being handled within the Port of Rijeka. While this arrangement is suboptimal in terms of its effect on traffic and congestion in the city center, it is unlikely to change in the short term unless driven by legislation governing the access of larger vehicles to the downtown area. The situation is also complicated by the fact that the Port is controlled by the national government and the CDRC, while the ITTF is a project of the City of Rijeka.

6. DEMAND FOR AN ITTF FACILITY

6.1 Introduction

The ITTF can have multiple roles. The installation can transfer cargo between modes and vehicle types allowing industry to more efficiently receive and distribute goods. For a municipal government, it can help keep heavy vehicles out of an urban area as a means of implementing traffic and environmental regulations. It can serve as a point for customs clearance or other government inspections. It can form a remote storage and processing area for a port unable to grow. It may allow a port to develop tourist or other non-cargo facilities on scarce waterfront land while still serving its traditional cargo customers.

An intermodal terminal can also serve as a stimulus to regional growth, forming part of an industrial park or zone. Industries requiring high volumes of widely sourced components, such as auto assembly plants, are often located close to intermodal facilities. While our brief investigation did not uncover such activity, it should be noted that construction may serve as an inducement to such industries considering locating in the area. Warehouses often serve as centers of value added activity in addition to loading and unloading of cargo vehicles. Value added services range from repackaging or labeling to component assembly. These services often have higher profit margins than traditional warehousing.

But intermodal transport has some disadvantages in comparison to direct movements over a single mode. In transferring between a highway and local delivery truck, there are costs in unloading, loading, and delay that are not present in direct movement between origin and destination using a single vehicle. An intermodal terminal must also be well located with respect to the traffic patterns of its customers. Use of the terminal should not involve increased vehicle cycle times that create higher transportation costs and lower equipment utilization rates in comparison to established transport patterns. And a shipper will usually elect to use direct transport in a single vehicle between origin and destination when ever possible. Anything else represents an additional cost in terms of handling, delay, or both. Therefore there must be a compelling reason to introduce an additional cost element – an intermodal terminal - in to the freight transport system.

Assuming growth and adequate demand, an intermodal terminal will be commercially successful only if it can somehow decrease total logistics costs for its users, even though its operations represent an additional cost for the system. Or put another way, the intermodal terminal must allow its user access to multiple transport modes in such a manner as to somehow decrease system costs overall. Successful intermodal facilities must therefore be very efficient and low cost, and able to survive in a low-margin, highly competitive environment. In planning such an installation, it is necessary to develop a good understanding of local demand, transport costs, and movement patterns in order to optimize the location, size, and capital costs of the facility. The location should have good access to major transport networks, and site development costs should be low.

6.2 Demand Findings

The results of our preliminary investigation of demand for transport services in the greater Rijeka area can be summarized in Table 4.

Intermodal terminal activity	Current regional demand	Attractiveness to private investors
Air cargo	Very low	Very low
Ship-rail	Very low	Very low
Truck-rail	Very low	Very low
Truck transloading warehouse	Moderate	Moderate
Ancillary (e.g. customs and forwarding, value added warehouse services, fuel, restaurants)	Moderate	Moderate
Bus maintenance facility	Moderate	Unknown

Booz Allen Hamilton, 2003

Table 4: Demand for Transport Services in the Rijeka area

Our industry interviews and subsequent analysis revealed only demand for truck related services. Air cargo and ship-rail are not considered further in our analysis. Truck-rail, while not important today, is considered a future possibility for several reasons. It is possible that demand for a rail intermodal terminal at the ITTF will be generated by one or more large shippers having dedicated container trains exclusively for their products. This is a common scenario elsewhere and regional examples include new block trains between the port of Koper and Budapest run by Intercontainer - Interfrigo and auto parts moving from Ljubljana to Paris La Chapelle on behalf of the Slovenian auto component maker Revoz. Intermodal rail is a long-term possibility for the ITTF, especially if it is located adjacent to an industrial park

6.3 Potential Service Offerings of an ITTF

6.3.1 Truck Transloading

Interviews uncovered demand for this activity, though its precise nature remains to be determined. The facility could serve for transshipment between highway and local delivery vehicles, repackaging, and short-term storage. The installation should permit direct movement between warehouse floor and vehicles using forklifts. This is normally accomplished by raising the warehouse floor to a standard height roughly equivalent to the bed of most highway truck trailers. The warehouse may also be equipped with ramps allowing small delivery vehicles direct access to the warehouse floor for very small shipments. We judge both of these features necessary for an effective intermodal facility.

6.3.2 Warehousing

Being on the Slovenian border, the ITTF could serve as a storage center for commodities entering the EU, and as a collection and distribution point for commodities leaving the

EU. This could be bonded warehousing, where commodities are kept awaiting customs and other clearances, chilled or frozen storage, re-packing or labeling, and similar activities. We assume that Croatia will enter the EU within a decade. At that point, demand for bonded warehousing will fall off. Many facilities in Italy and elsewhere closed virtually overnight as the EU expanded. Thus it appears important that over the longer term, the warehouse develop some other traffic base if it is to serve as an engine of local economic development.

6.3.3 Value Added Logistics Services

The facility could serve as a center for customs and brokerage activities. These normally involve a relatively small (under 50 people) office space for industry and government personnel close to the truck working area. Customs clearance could be performed in the facility or remotely in an adjacent structure.

While most such facilities are located at border crossings, they can be placed well within a nation, with cargo in a secure manner between the border and the clearance facility. Customs clearance is normally done by government officials located in a larger, general purpose warehouse facility. In other words, the customs clearance procedure follows the cargo. Cargo handling does not gravitate to where customs clearance procedures are undertaken, rather, customs clearance is a service performed wherever the cargo is handled. Our preliminary analysis ascertained that demand exists for this type of service. We caution, however, that current customs clearance procedures could become markedly more efficient at existing installations.

6.3.4. Rail Intermodal Terminal

A terminal may also transfer cargo between highway and rail, usually in containers. It is an option for shippers who may elect direct transport by truck, direct transport by rail (where still possible) or some combination of both modes, using an intermodal terminal to make the connection. Why incur the costs of making the connection? Unit transport costs of efficient rail shipments are theoretically much lower than unit costs of trucking. Therefore users of an efficient intermodal system should be able to incur the cost of an intermodal terminal and – since unit costs of rail can be very low – still have lower costs overall than when using direct truck.

Such a scheme presupposes a highly efficient rail system, one having not only low unit costs but also consistent and reliable transit times nearly equal to those of trucks on competing routes. The rail systems of southeastern Europe do not now have such levels of performance. Therefore, a rail intermodal terminal is not a competitive option today. But it may be a possibility that should be considered as Croatian State Railways and its regional partners continue to improve. And given the lower unit costs of such an efficient rail system, a private truck-rail intermodal terminal can often successfully compete, especially for primary commodities and semi-manufactured goods having low time sensitivities, like construction materials and lumber. Demand for such commodities

should increase as Croatia rebuilds and grows. Successes elsewhere in the world led us to consider a rail intermodal terminal component in the following sections.

This is an activity separate from the warehousing described above and need not be done in the same location. A rail intermodal terminal is simply a large paved area containing long parallel rail tracks with sufficient space between them to permit large highway trucks to maneuver alongside. Cargoes, most likely containers, are moved between trucks and rail wagons by overhead cranes or other lifting devices. The most likely activity would be container trains moving between large industrial customers. Another opportunity may be unitized commodities like newsprint rolls, steel coils and similar commodities that can also be handled in the same manner as containers. A final possibility is providing an area where bulk commodities can be transferred directly between rail wagons and trucks. These could include grains or other processed agricultural commodities, fertilizer, plastic pellets, and similar commodities. The possibilities mentioned here should not be taken as concrete opportunities, but rather simply as indications of likely traffic types that often move by truck/rail combinations elsewhere.

6.3.5. Bus Depot

One possible user of the intermodal facility was identified in Autotrolej, the Rijeka municipal bus company. Autotrolej would like to move its maintenance facilities from central Rijeka to someplace outside the urban core. Autotrolej currently plans to centralize its maintenance facilities. These might include a light and heavy maintenance shop, a body repair and paint facility, a bus wash area, offices, and parking. Most intermodal cargo terminals are dedicated facilities, that is, they move only cargo and have no other functions. In part this is due to the demands that two such intensive users of road infrastructure would have on the local environment; city planners usually attempt to locate such installations where impacts will be minimized. Thus Autotrolej is probably not an ideal co-operator in a freight intermodal terminal and is not considered further in our study.

6.4 Conclusions

Our data collection and subsequent analysis revealed demand for truck based services only at this time, along with a longer-term possibility for rail intermodal transport. An ITTF located between Matulji and the border could conservatively hope to capture about 15 – 20 percent of all Croatia - Slovenia trans-border truck traffic. This is because it would face extraordinary competitive pressures, largely from warehouses on less costly and more easily developed land. Our working assumption is that higher-margin activities will be of prime importance in determining the attractiveness of the facility to a private operator.

7. SITE SELECTION

7.1 ITTF Siting Criteria

An intermodal terminal must be located and built in a manner that minimizes total logistics costs in a competitive environment. This usually means that freight terminals are built on relatively low value land that also has low site development costs. A new freight terminal should also be located on a site that causes minimal disruption to freight route patterns. Highway trucks for example should not have to divert too much from established or likely future routes in order to reach the terminal, or to experience traffic congestion as they do so, thereby increasing total logistics costs. And local delivery trucks should not have to make lengthy trips to terminal sites that are too remote from the urban or industrial centers, decreasing the utilization of the local truck fleet and thereby increasing total logistics costs. Finally, the site should be capacious enough to support ancillary services that may be as or more profitable than the freight handling itself. Any new terminal placed at a site that does not satisfy these requirements will probably not be able to compete against existing installations with already amortized infrastructure or against new terminals in better locations.

Many of the same freight terminal feasibility criteria described above also apply in the case of a bus terminal. A bus maintenance facility should ideally be located in an area where transit of buses between it and the route network is minimized. In other words, it should be relatively close to Rijeka in order to minimize non-revenue trip length. It should be in an appropriately zoned area, with very good road and highway access having a minimum of highway congestion, especially during "off-service" times when buses are starting or ending their daily runs. Based on our experience with other transportation terminals, we have developed several general criteria for evaluating possible sites. These are summarized in Table 5.

Site Selection Criteria	Importance to project feasibility
Availability of land(properly zoned)	Very high
Adequate land parcel size	Very high
Low site development costs	Very high
Proximity to users (e.g. industry)	High
Access to highways and arterial roads	High
Access to main rail lines	Low
Access to other modes (sea air)	Low

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Table 5: Evaluation Criteria for Site Selection

Detailed origin, destination, and routing information on cargo movements in the RMR were unavailable to the team. As a result, it is difficult to precisely pinpoint where the

ITTF should be located. However, if the ITTF must be located near Rijeka, where road access is good, and where site development costs are minimal, it could be located: 1) Just outside the urban core on the road to the Slovenian border; 2) On the road to Zagreb; 3) somewhere convenient to the Port; or 4) somewhere convenient to all of these.

7.2 Site Evaluations

Guided by the above criteria, the team considered several sites in the greater Rijeka area. These are shown in Figure 14 and each is described in the following subsections.

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Figure 14: ITTF Candidate Sites

7.2.1 RZ Miklavje and RZ Brgud

We compared RZ Milklavje and RZ Brgud to the site selection criteria and presented our findings in Table 6.

Site Selection Criteria	Importance to project feasibility	Does site meet criteria?
Availability of land (properly zoned)	Very high	Yes
Adequate land parcel size	Very high	Yes
Low site development costs	Very high	No
Proximity to users (e.g. industry)	High	No

Site Selection Criteria	Importance to project feasibility	Does site meet criteria?
Access to highways and arterial roads	High	Yes
Access to main rail lines	Low	Yes
Access to other modes (sea air)	Low	No

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Table 6: Comparison of RZ Miklavje and RZ Brgud with Site Selection Criteria

These adjacent sites were analyzed during a brief field inspection. The sites are heavily wooded and in very rough terrain. Rocky gullies are common, with depths of about 10 meters and widths of 20-50 meters. Leveling this ground would pose serious challenges. Blasting would be required in many places. A very preliminary cost calculation for clearing, leveling, and paving a 10-hectare site produced a value of nearly US$28 million. This was based on estimations of topography and geologic structure; a fuller investigation with appropriate topographic and geotechnical information is required to produce an accurate number for planning purposes. The sites lack roads, rail, water and power. They are near roads and adjacent to a main rail line, though there is no connecting infrastructure. A high-tension power line runs close to the sites, but would require a substation to produce usable power. If a proposed highway to the border is built, there may be opportunities to improve these sites as part of some local development initiative. At that time, further analysis may be conducted to ascertain whether these locales may serve as intermodal terminals.

7.2.2 Skrljevo Free Trade Zone

The Skrljevo Free Trade Zone was designed by Yugoslav authorities as an inland warehouse for goods to and from non-aligned nations transiting Rijeka, Bakar, and other area ports. It is approximately 10 km from the Port of Rijeka and the city center and some 3 km distant from the port of Bakar. Our comparative study between Skrljevo and the site selection criteria is summarized in Table 7.

Site Selection Criteria	Importance to project feasibility	Does site meet criteria?
Availability of land (properly zoned)	Very high	Yes
Adequate land parcel size	Very high	Yes
Low site development costs	Very high	Yes
Proximity to users (e.g. industry)	High	Somewhat
Access to highways and arterial roads	High	Yes
Access to main rail lines	Low	Yes
Access to other modes (sea air)	Low	No

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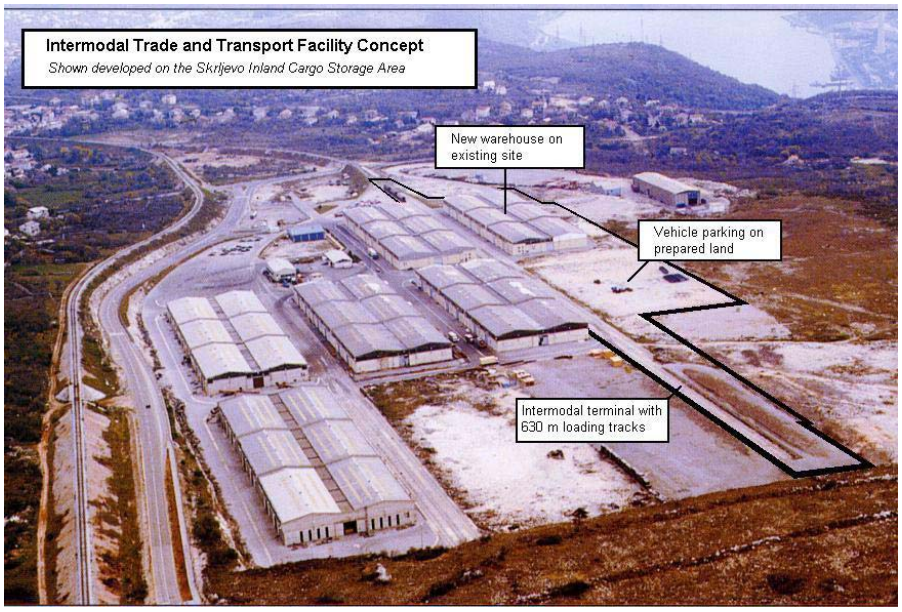
Table 7: Comparison of Skriljevo Free Trade Zone with Site Selection Criteria

The Free Trade Zone is operated by the Port of Rijeka Authority. The complex covers 541,000 m². The facility has 44,000 m² of covered storage in five warehouses with good truck and rail access. The warehouses were designed for rail transloading however and do not have raised floors. They are thus not able to conveniently accommodate loading and unloading of trucks with forklifts. Export wood is handled in two warehouses and autos are stored in an open lot. This appears to form the principal activity. The Free Trade Zone has low occupancy and several warehouses are completely vacant. Reasons for this are not clearly understood and should be explored further.
Figure 15 shows the ITTF concept if implemented at Skrljevo FTZ.



Booz Allen Hamilton, 2003

Figure 15: Hypothetical ITTF at Skrljevo FTZ

From a physical and construction cost standpoint, vacant land on the Skrljevo Free Trade Zone is the most attractive for an intermodal terminal and other industrial activities. It may, however, be too distant from established traffic patterns to be cost effective in serving the downtown area. This can only be established through a comprehensive traffic analysis.

The site occupied by the currently vacant Warehouse 2 at the Skrljevo FTZ meets the general criteria of proximity to Rijeka, with good road access, and low site development costs, although like the other warehouses in the Free Trade Zone it was apparently designed for rail or rail to truck transloading with handtrucks. These do not permit efficient cross-dock activity using forklifts in the manner of more modern warehouses. Our initial investigation indicates that retrofitting the existing Free Trade Zone warehouses is not feasible and that new construction is necessary. This preliminary

analysis employs generalized cost estimates based on values obtained from similar projects and upon brief site visits.

Based upon preliminary capital and operating cost estimates, direct operating costs of a new warehouse facility built at the Skrljevo Free Trade Zone handling about 100 trucks per day would be on the order of US$30-40 per loaded or unloaded vehicle, excluding lease or other land rental payments, taxes, and other fees. A rail intermodal terminal at the same location handling two 40-wagon container trains per week, inbound or outbound, would have a direct facility operating cost of about US$30-50 per container, exclusive of storage, rail shunting, or other charges. While it is not currently known if these values are competitive with existing or planned private facilities, they suggest that such facilities may be feasible based upon our experiences elsewhere.

7.2.3 Other Sites - "Autotrolej" and Grobinko Field

Other sites – such as "Autotrolej" and Grobinko Field – may also have low development and operating costs. These sites are described respectively in Tables 8 and 9.

The Rijeka municipal bus operator (Autotrolej) has evaluated an 8-hectare site for a large bus maintenance facility. A field inspection revealed that the land is inhabited with small houses and farm plots. It is not clear if the land is zoned for industrial use. If not, this may complicate efforts to obtain the land. The Autotrolej site is not considered further in this analysis. It is however close to major highways and arterial roadways and somewhat west of the urban core. It should be considered in a more detailed assessment.

Autotrolej Site:

Site Selection Criteria	Importance to project feasibility	Does site meet criteria?
Availability of land (properly zoned)	Very high	Unknown
Adequate land parcel size	Very high	Yes
Low site development costs	Very high	Probably
Proximity to users (e.g. industry)	High	Yes
Access to highways and arterial roads	High	Yes
Access to main rail lines	Low	Yes
Access to other modes (sea air)	Low	No

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Table 8: Comparison of Autotrolej with Site Selection Criteria

Grobinko Field is a general aviation airport located adjacent to the main highway linking Rijeka with Zagreb. The region surrounding Grobinko Field may be suitable for development of an intermodal terminal. Being adjacent to an active runway, there will be restrictions on height and facility location. Grobinko Field should be revisited as a

candidate site if it is determined that aviation regulations permit such an installation. Grobinko Field is not considered further in this analysis.

Grobinko Field:

Site Selection Criteria	Importance to project feasibility	Does site meet criteria?
Availability of land (properly zoned)	Very high	Unknown
Adequate land parcel size	Very high	Yes
Low site development costs	Very high	Yes
Proximity to users (e.g. industry)	High	No
Access to highways and arterial roads	High	Yes
Access to main rail lines	Low	No
Access to other modes (sea air)	Low	No

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Table 9: Comparison of Grobinko with Site Selection Criteria

7.3 Conclusions

The primary sites near Matulji are currently not suited for an ITTF without extensive development and construction of a highway and direct rail access. At that time, a re-evaluation of the ITTF concept should be made. An ITTF type installation may be built at several other locations, but these would be developed in order to accomplish other goals, such as reducing heavy truck traffic within central Rijeka.

8. FACILITY CONCEPT AND COST

8.1 Concept

As shown in Figure 16, the site is developed as four elements; these are a gate/office structure, a warehouse, a rail intermodal terminal, and vehicle parking with associated traffic lanes. A concept sketch is shown here. Principal attributes of the ITTF concept are as follows:

The total area is approximately 150,000 m². Traffic would enter and leave through a gate structure, with attached customs and other governmental agencies, plus offices for forwarders and brokers or other ancillary services.

The Gate and Office complex is approximately 2,000 m² of which approximately 1,200 m² is office space. Traffic flow would be largely unidirectional, inbound through the gate complex, where vehicles would be processed inbound, onward to the Warehouse, the short-term parking area, or the Rail Intermodal Terminal. Exiting traffic would proceed back toward the Gate along the opposite side of the Warehouse. An exception would be within the Rail Intermodal Terminal, where trucks pulling ISO containers and other units could align themselves in either direction parallel to the rail cars, enabling containers to be loaded on wagons with doors facing together, for example, or to offload from a wagon a container with its door pointing in either direction.

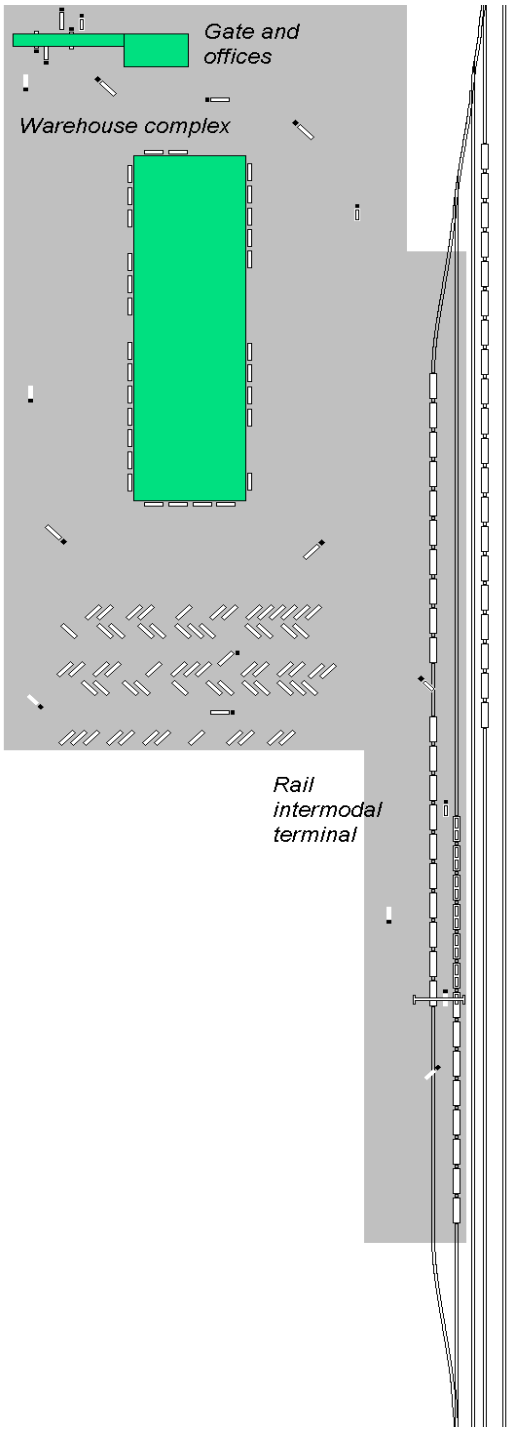

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Figure 16: ITTF Concept

The Warehouse is approximately 16,625 m² (332 by 50 meters) and 15 meters high and capable of handling 38 heavy trucks via longitudinal handling on all four sides. It would be equipped with an interior rack system for storing palletized cargo and be equipped with cold storage. It would be separated into three bays, connected by fire doors.

The parking area is shown with 100 parking spaces for full sized truck-trailer combinations. In practice, there is room for almost double this amount, for example in angled parking along the facility side where traffic enters the gate, as well as along one margin of the Rail Intermodal Terminal.

The Rail Intermodal Terminal portion is approximately 39,600 m² of paved area adjacent to the HZ main line and consists of four tracks. These include 2 loading tracks, each approximately 530 meters in length, capable of accommodating 25 wagons each plus locomotives, probably spotted in two rakes with adequate crossings at predetermined points for vehicles. There are 2 storage tracks with an approximate total length of 1,100 meters and 1 running track of approximately 850 meters. With leads and switches, the total track within the ITTF rail component is about 3,600 meters. ISO containers and similar units would be handled by a rubber-tired overhead crane.

8.2 Capital and Operating Cost Assumptions

We have developed notional estimates to capital and operating cost assumptions based on local values and experience elsewhere. It should be noted that we consider these to be somewhat conservative values in most cases. Construction costs for both the Warehouse and Rail Intermodal Terminal are described below.

8.2.1 Warehouse, Gate and Parking Areas

Our Operating and Cost assumptions are summarized in Table 10. The warehouse construction values expressed as construction costs per square meter may appear high. This is because we assume a 15-meter high structure equipped with an internal rack system able to accommodate and quickly retrieve stacked cargo on pallets, plus about 20 percent of the interior area devoted to cold or chilled storage. The warehouse would be completely climate controlled and have an adequate fire suppression system throughout compliant with typical EU region requirements.

Capital Expenditures	Private	Government
Site prep grading paving @ US$50/m2		5,500,000
Construction costs warehouse@ US$400/m2	6,650,000	
Warehouse offices @ US$400/m2	484,000	
Subtotal	7,134,000	
Engineering design const mgmt. at 15% of capex	1,070,100	
Subtotal	8,204,100	
Contingency at 15%	1,230,615	
Total capitalized value	**US$ 9,434,715**	**US$ 5,500,000**

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Table 10: Capital and Operating Cost Assumptions

8.2.2 Rail Intermodal Terminal

Table 11 shows approximate capital costs for the Rail Intermodal Terminal component.

Capital Expenditures	Private	Government
Site prep grading paving @ US$50/m2		1,980,000
Track @ $190000/km	685,064	
Switches @ US$30000 per switch	240,000	
Crossings @ US$70000 per installation	210,000	
Subtotal	$1,135,064	
Engineering design const mgmt. at 15% of capex	170,260	
Subtotal	$1,305,324	
Contingency at 15%	195,799	
Total capitalized value	**US$ 1,501,122**	**US$ 1,980,000**

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Table 11: Capital Costs for the Rail Intermodal Terminal Component

Due to its simplicity - basically rail tracks within a paved area, capital costs are significantly lower than for the warehouse. There are eight manual track switches and three "crossings", hard rubberized matting surrounding the tracks at three places and similar to the materials used when tracks cross a city street, enabling trucks to easily circulate within the Rail Intermodal Terminal.

8.3 Revenues and Operating Costs

Principal revenue and cost categories are defined below with values as in the first year of operation. Building operating costs are estimates based upon experience elsewhere. Labor and mobile equipment costs are estimates based on local salaries and operating expenses.

8.3.1 Warehouse

Primary Revenues
US dollars per truck loaded or unloaded:, **$70**

Shifts per day	1	2	3
Totals per yr	**US$ 576,234**	**US$ 1,152,467**	**US$ 1,728,701**

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Table 12: Primary Revenues

Other Revenues
Value added/truckload **$50**

Shifts	**1**	**2**	**3**
% affect:	**50%**	**50%**	**50%**
Trucks/yr	4,116	8,232	12,348
Subtotal	$205,798	$411,595	$617,393
Office rental	1,105,023	1,105,023	1,105,023
Total Other Rv	**US$ 1,310,821**	**US$ 1,516,618**	**US$ 1,722,416**

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Table 13: Other Revenues

Building Annual Operating Costs

Category	**Totals**
Building rent percent of capex 10%	943,472
Building maintenance percent of capex 0.5%	47,174
Building insurance percent of capex 0.5%	47,174
Building electric percent of capex 0.3%	23,587
Total	**US$ 1,061,405**

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Table 14: Annual Operating Costs

Labor and Mobile Equipment Costs

Category	No.	Per position	1 shift	2 shifts	3 shifts
Whse workers	10	6500	65000	130000	195000
Forklift drivers	28	7500	211678	423355	635033
Mechanics	2	8000	16000	32000	48000
Clerical	6	7000	42000	84000	126000
Supervisors	3	11000	33000	66000	99000
Hostlers	2	13000	26000	52000	78000
Total			**US$ 393678**	**US$ 787355**	**US$ 1181033**

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Table 15: Labor and Mobile Equipment Costs

Forklift ops plus M&R/ yr	1 shift	2 shifts	3 shifts
Total	**US$ 59,270**	**US$ 118,539**	**US$ 177,809**

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Table 16: Forklift Operations, Maintenance and Repair Costs per year

8.3.2 Rail Intermodal Terminal

Performance criteria

All COFC or swap bodies, no TOFC, no end ramping
Wagons per train (SNGSS): 40
TEU/wagon 2
TEU per train, 80% load factor: 64
Lift and gate charges/box: US$80

Facility Utilization

Trains/day:	**0.5**	**1**	**1.5**	**2**	**2.5**
Wagons per day	20	40	60	80	100
Boxes/day @1.3 boxes/TEU	32	64	96	128	160
Stacker lifts per hr	15	15	15	15	15
Stacker hrs/oper day	2.3	4.7	7.0	9.4	11.7
Operating days/yr	250	250	250	250	250
Boxes/yr	8,000	16,000	24,000	32,000	40,000
TEU/yr	6,154	12,308	18,462	24,615	30,769
Annual revenue lift charges:	**US$ 640,000**	**US$ 1,280,000**	**US$ 1,920,000**	**US$ 2,560,000**	**US $3,200,000**

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Table 17: Facility Annual Revenues

Facility Annual Operating Costs

Category	Totals
Facility rent percent of capex 10%	150,112
Facility maintenance percent of capex 0.5%	7,506
Facility insurance percent of capex 0.5%	7,506
Facility electric percent of capex 0.3%	3,753
Total	**US$ 168,876**

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Table 18: Facility Annual Operating Costs

Labor Costs per Shift

Category	No.	Total
Ramp supervisor @ 23K/yr	1	23,000
Crane operator @ 13K/yr	2	26,000
Ramp clerk/verifier/ground man @ 7K/yr	1	7,000
Hostler driver @13K/yr	1	13,000
Total salaries:		**US$ 69,000**
Annualized overhead crane costs		**US$ 80,000**
Annualized hostler tractor costs (2 tractors)		**US$ 60,000**

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Table 19: Labor Costs per Shift

8.4 Financial Assumptions

We conservatively assume no tax or other credits for such an investment, though this is often extended in cases where national or municipal governments are seeking to promote investment. Working capital is a estimated value based on experience elsewhere. Results are shown below.

Investment characteristics
Investment $10,935,837
Tax Credit -$0
Net Investment $10,935,837
Working Cap $2,750,000
Initial Investment $13,685,837

We assume that the ITTF will be located in a free trade zone or similar environment where the 10 percent national corporate income tax qualification will apply. We have assumed an additional local or municipal income tax of 7 percent, which our research indicates is a fairly standard value throughout Croatia.

Further, we assume an annual "rent" or lease payable to government or perhaps to a private developer, arbitrarily set at 10 percent of warehouse structure and rail intermodal terminal capital value. We assume fairly standard discount rates, although we are cognizant that these may change given Croatia's rapidly developing and changing economy:

Discount rate and cost of borrowing
1. Discount rate 10%
2a. Beta 0.9
  b. Riskless rate 8.00%
  c. Market risk premium 5.50%
  d. Debt Ratio 30.00%
  e. Cost of Borrowing 9.00%
Discount rate used 10.00%
Principal financial indicators of the Base Case project are shown below, with more detailed year-by-year summary tables following.

Analysis summary
Net Present Value $37,303,951
Internal Rate of Return 25.38%
Return on Capital 46.16%
This may be an attractive proposition to a private operator. However, we should bear in mind that this is not what we judge as the most likely scenario for the Matulji region - it is rather, descriptive of the volumes and productivity required for success. Values for individual years over the project's 15-year lifetime are summarized in Table 20:

	2005	2006	2007	2008	2009
Revenues	5,229,085	5,385,958	5,547,537	5,713,963	5,885,382
-Var. Expenses	1,283,771	377,876	377,876	377,876	377,876
- Fixed Expenses	1,230,282	1,269,651	1,310,280	1,352,208	1,395,479
EBITDA	3,620,927	3,738,431	3,859,381	3,983,878	4,112,026
- Depreciation	656,150	656,150	656,150	656,150	656,150
EBIT	2,964,777	3,082,281	3,203,231	3,327,728	3,455,876
-Tax	504,012	523,988	544,549	565,714	587,499
EBIT(1-t)	2,460,765	2,558,293	2,658,681	2,762,014	2,868,377
+ Depreciation	656,150	656,150	656,150	656,150	656,150
- ? Work. Cap	(658,366)	(595,617)	722,997	66,570	68,568
NATCF	3,775,281	3,810,060	2,591,834	3,351,594	3,455,960
Discount Factor	1.100000	1.210000	1.331000	1.464100	1.610510
Discounted CF	3,432,074	3,148,810	1,947,283	2,289,184	2,145,879

	2010	2011	2012	2013	2014
Revenues	6,418,858	6,611,424	6,809,767	7,014,060	7,224,481
-Var. Expenses	377,876	377,876	377,876	377,876	377,876
- Fixed Expenses	1,440,134	1,486,219	1,533,778	1,582,859	1,633,510
EBITDA	4,600,848	4,747,329	4,898,113	5,053,325	5,213,095
- Depreciation	656,150	656,150	656,150	656,150	656,150
EBIT	3,944,697	4,091,179	4,241,962	4,397,175	4,556,945
-Tax	670,599	695,500	721,134	747,520	774,681
EBIT(1-t)	3,274,099	3,395,678	3,520,829	3,649,655	3,782,264
+ Depreciation	656,150	656,150	656,150	656,150	656,150
- ? Work. Cap	213,391	77,026	79,337	81,717	84,169
NATCF	3,716,858	3,974,802	4,097,642	4,224,088	4,354,246
Discount Factor	1.771561	1.948717	2.143589	2.357948	2.593742
Discounted CF	2,098,070	2,039,702	1,911,580	1,791,426	1,678,750

	2015	2016	2017	2018	2019
Revenues	7,441,216	7,664,452	7,894,386	8,131,218	8,375,154
-Var. Expenses	377,876	377,876	377,876	377,876	377,876
- Fixed Expenses	1,685,782	1,739,727	1,795,399	1,852,852	1,912,143
EBITDA	5,377,557	5,546,849	5,721,111	5,900,490	6,085,135
- Depreciation	656,150	656,150	656,150	656,150	656,150
EBIT	4,721,407	4,890,698	5,064,961	5,244,340	5,428,985
-Tax	802,639	831,419	861,043	891,538	922,927
EBIT(1-t)	3,918,768	4,059,280	4,203,917	4,352,802	4,506,057
+ Depreciation	656,150	656,150	656,150	656,150	656,150
- ? Work. Cap	(798,158)	956,170	722,997	66,570	68,568
NATCF	5,373,076	5,311,047	4,137,070	4,942,382	5,093,640
Discount Factor	2.853117	3.138428	3.452271	3.797498	4.177248
Discounted CF	5,373,076	5,311,047	4,137,070	4,942,382	6,187,224

Booz Allen Hamilton, 2003

Table 20: Financial Analysis of the Project's 15-year Lifetime

8.5 Sensitivity Analysis

A sensitivity analysis was performed for both the warehouse and rail terminal components of the ITTF. This determined that the ITTF warehouse must depend on many ancillary

activities in addition to truck loading and unloading if it is to be attractive to a private operator. The ITTF rail facility, being less capital-intensive and more highly automated, could potentially have a much higher rate of return if adequate demand is present. It could also be developed separately, entirely as a private operation. Also, the rail facility could cross-subsidize the warehouse facility. For the ITTF warehouse, principal variables included:

1. Site being developed by government, with private operator building the structures, versus the private operator developing the entire site.
2. Changes in warehouse productivity (trucks loaded and unloaded per hour)
3. Effects on profitability of leasing office space to brokers and forwarders
4. Various hypothetical activities within the warehouse, such as bonded or cold storage, re-packing, re-labeling, etc.

8.5.1 Warehouse

The sensitivity analysis on the warehouse component shows that transloading activity (simply loading or unloading trucks) is insufficient to make the facility attractive to a private operator, even if the government develops the site. It also illustrates that the financial values are extremely sensitive to warehouse productivity, e.g., the rate at which an individual truck is loaded or unloaded. In Tables 21 and 22, we examine the impact of site development costs being assumed entirely by the private operator, versus when site development is undertaken by the government.

1. Truck loading and unloading only, no ancillary revenue activities

1A. Site preparation and warehouse building undertaken by private operator

Average time per truck in hours:	**2**
Net present value:	US$ 13,519,486
Internal rate of return:	-0.17%
Return on capital:	3.67%

Booz Allen Hamilton, 2003

Table 21: Private Sector Investment in Site Preparation and Warehouse Development -no ancillary revenue activities

1B. Site preparation undertaken by government, warehouse building by private operator

Average time per truck in hours:	**2**	**3**
Net present value:	US$ 20434756	US$ 8326585
Internal rate of return:	13.32%	-0.49%
Return on capital:	25.68%	3.54%

Booz Allen Hamilton, 2003

Table 22: Government Investment in Site Preparation –no ancillary revenue activities

When combined with some ancillary revenues, in this case some 1,210 m² of office space leased to brokers and forwarders, the profitability situation improves markedly, though still not sufficient to interest a private operator at this location. Results of this are shown in Tables 23 and 24.

2. Truck loading and unloading, offices leased to third party forwarders and brokers

2A. Site preparation and warehouse building undertaken by private operator

Average time per truck in hours:	**2**	**3**
Net present value:	US$ 22,206,739	US$ 10,098,568
Internal rate of return:	6.78%	-3.76%
Return on capital:	12.80%	0.30%

Booz Allen Hamilton, 2003

Table 23: Private Sector Investment in Site preparation and Warehouse Development–third party forwarders and brokers

2B. Site preparation undertaken by government, warehouse building by private operator

Average time per truck in hours:	**2**	**3**	**4**
Net present value:	US$ 29,122,009	US$ 17,013,839	US$ 10,959,753
Internal rate of return:	21.07%	10.76%	3.64%
Return on capital:	41.85%	19.71%	8.64%

Booz Allen Hamilton, 2003

Table 24: Government Investment in Site Development- third party forwarders and brokers

The analysis indicates that the warehouse profitability does increase as ancillary activities are added. However, truck-handling productivity is still extremely important to overall profitability. A two-hour truck "turnaround" time is actually quite rapid, and this particular

concept may only be attractive in the case of high value cargo, such as air express packages, unrealistic in our circumstances. Tables 25 and 26 examine the effect of added ancillary services.

3. Truck loading and unloading, offices leased to third party forwarders and brokers, ancillary services used by 25% of trucks at $50 per truck

3A. Site preparation and warehouse building undertaken by private operator

Average time per truck in hours:	2	3
Net present value:	US$ 28693259	US$ 14422915
Internal rate of return:	10.82%	0.72%
Return on capital:	19.50%	4.77%

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Table 25: Private Sector Investment in Site Preparation and Warehouse Development –third party forwarders and brokers, ancillary services (25% trucks)

3B. Site preparation undertaken by government, warehouse building by private operator

Average time per truck in hours:	2	3	4
Net present value:	US$ 35,608,529	US$ 21,338,185	US$ 14,203,013
Internal rate of return:	25.58%	14.84%	7.73%
Return on capital:	53.70%	27.61%	14.57%

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Table 26: Government Investment in Site Development - third party forwarders and brokers, ancillary services (25% trucks)

These ancillary services must not be labor-intensive. They should be performed using automated processes, using semi-skilled warehouse labor. Examples might include re-packing or re-labeling, chilled or cold storage, or bonded warehousing. The larger issue with the values in the above table is still the insufficiently attractive financial indicators and the continuing need for unrealistically high truck load and unload productivity. The next iteration has 50 percent of trucks using such ancillary services at US$50 per truck. This illustrates a modest improvement, but still leaves the overall warehouse concept not attractive to a private operator (see Tables 27 and 28).

4. Truck loading and unloading, offices leased to third party forwarders and brokers, ancillary services used by 50% of trucks at $50 per truck

4A. Site preparation and warehouse building undertaken by private operator

Average time per truck in hours:	2	3
Net present value:	US$ 35179779	US$ 18747262
Internal rate of return:	14.33%	4.30%
Return on capital:	26.19%	9.23%

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Table 27: Private Sector Investment in Site Preparation and Warehouse Development – third party forwarders and brokers, ancillary services (50% trucks)

4B. Site preparation undertaken by government, warehouse building by private operator

Average time per truck in hours:	2	3	4	5	6
Net present value:	US$ 42095049	US$ 25662532	US$ 17446273	US$ 12516518	US$ 9230015
Internal rate of return:	29.70%	18.44%	11.20%	5.70%	1.07%
Return on capital:	65.56%	35.52%	20.50%	11.48%	5.48%

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Table 28: Government Investment in Site Development - third party forwarders and brokers, ancillary services (50% trucks)

As indicated above, an attractive rate of return will be very difficult to achieve simply on the basis of truck loading and unloading, even with significant ancillary services, unless truck load and unload productivity is unrealistically high.

8.5.2. Rail Intermodal Terminal

The rail facility in contrast is able to produce an attractive rate of return - assuming of course that volume exists - due to the fact that it is much less capital intensive and much more highly automated. If volumes were very high, it could in its entirety be privately financed. It would probably then depend for its traffic on one large customer - an auto assembly plant, for example - or a few large customers in an adjacent industrial park. We examined as before a totally private facility versus one in which the government assumed responsibility for site development (see Tables 29 and 30).

Container / wagon loading and unloading only, no ancillary revenue activities

A. Site preparation and rail infrastructure undertaken by private operator

Wagons per day in year 1	**100**	**80**	**60**
Net present value:	US$ 19,863,160	US$ 14,234,036	US$ 9,106,092
Facility internal rate of return:	35.17%	25.59%	16.66%
Return on capital:	72.41%	48.83%	29.90%

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Table 29: Private Sector Investment in Rail Infrastructure and Site Preparation – no ancillary revenue activities

B. Site preparation undertaken by government, rail infrastructure by private operator

Wagons per day in year 1	**100**	**80**	**60**	**40**	**20**
Net present value:	US$ 24,588,569	US$ 18,959,445	US$ 13,330,321	US$ 7,701,197	US$ 2,072,073
Facility internal rate of return:	87.74%	71.53%	53.79%	33.21%	2.81%
Return on capital:	266.90%	202.18%	137.47%	72.75%	8.04%

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Table 30: Government Investment in Site Preparation – no ancillary revenue activities

The relatively good financial values in this portion of the sensitivity analysis led to an examination of a possible combined facility, in which the rail terminal could cross-subsidize the warehouse portion of the ITTF.

8.5.3. Combined Warehouse / Rail Intermodal Facility

Tables 31 and 32 demonstrate that a combined facility must have its site developed by government, some degree of ancillary services in its warehouse, in this case leased office space, and an efficient and relatively high volume rail intermodal terminal in order to attract a private operator.

1. Truck / rail wagon loading and unloading only, no ancillary revenue activities

1A. All site preparation and warehouse and rail infrastructure undertaken by private operator.

Avg hrs truck per load/unload year 1	**6**	**6**
Wagons per day in year 1	**100**	**80**
Net present value:	US$ 18,140,315	US$ 12,511,191
Facility internal rate of return:	0.78%	-4.20%
Return on capital:	4.40%	-0.27%

Booz Allen Hamilton, 2003

Table 31: Private Sector Investment in Site Preparation, Rail Infrastructure and Warehouse – no ancillary revenue activities

1B. Site preparation undertaken by government, warehouse and rail infrastructure by private operator

Avg hrs truck per load/unload year 1	**6**	**6**	**6**	**6**	**6**
Wagons per day in year 1	**100**	**80**	**60**	**40**	**20**
Net present value:	US$ 29,780,994	US$ 24,151,870	US$ 18,522,746	US$ 12,893,622	US$ 7,264,498
Facility internal rate of return:	19.76%	15.14%	9.90%	3.57%	-5.30%
Return on capital:	34.28%	25.40%	16.51%	7.63%	-1.25%

Booz Allen Hamilton, 2003

Table 32: Government Investment in Site Preparation – no ancillary revenue activities

2. Truck / rail wagon loading and unloading, offices leased to third party brokers and forwarders

Tables 33 and 34 demonstrate that an attractive rate of return can only occur with a very high level of rail activity.

As the degree of ancillary services grows, the financial ratios improve further.

2A. All site preparation and warehouse and rail infrastructure undertaken by private operator

Avg hrs truck per load/unload year 1	**6**	**6**
Wagons per day in year 1	**100**	**80**
Net present value:	US$ 26,937,498	US$ 21,308,374
Facility internal rate of return:	6.85%	3.16%
Return on capital:	11.72%	7.06%

Booz Allen Hamilton, 2003

Table 33: Private Sector Investment in Site Preparation, Warehouse and Rail Infrastructure – Third party brokers and forwarders

2B. Site preparation undertaken by government, warehouse and rail infrastructure by private operator

Avg hrs truck per load/unload year 1	**6**	**6**	**6**	**6**	**6**
Wagons per day in year 1	**100**	**80**	**60**	**40**	**20**
Net present value:	US$ 38,578,177	US$ 32,949,053	US$ 27,319,929	US$ 21,690,805	US$ 16,061,681
Facility internal rate of return:	26.54%	22.49%	18.09%	13.20%	7.49%
Return on capital:	48.22%	39.34%	30.46%	21.58%	12.69%

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Table 34: Government Investment in Site Preparation - Third party brokers and forwarders

3. Truck / rail wagon loading and unloading, offices leased to third party brokers and forwarders, ancillary facilities used by 25% of trucks at $50 per truck

Tables 35 and 36 show ancillary services used by 25% of trucks at US$50 per truck.

3A. All site preparation and warehouse and rail infrastructure undertaken by private operator

Avg hrs truck per load/unload year 1	**6**	**6**
Wagons per day in year 1	**100**	**80**
Net present value:	US$ 29,114,947	US$ 23,485,823
Facility internal rate of return:	8.11%	4.63%
Return on capital:	13.51%	8.85%

Booz Allen Hamilton, 2003

Table 35: Private Sector Investment in Site Preparation, Warehouse and Rail Infrastructure – ancillary facilities (25% trucks)

3B. Site preparation undertaken by government, warehouse and rail infrastructure by private operator

Avg hrs truck per load/unload year 1	**6**	**6**	**6**	**6**	**6**
Wagons per day in year 1	**100**	**80**	**60**	**40**	**20**
Net present value:	US$ 40,755,626	US$ 35,126,502	US$ 29,497,378	US$ 23,868,254	US$ 18,239,130
Facility internal rate of return:	27.90%	23.96%	19.72%	15.05%	9.74%
Return on capital:	51.64%	42.75%	33.87%	24.99%	16.10%

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Table 36: Government Investment in Site Development – ancillary facilities (25% trucks)

Tables 37 and 38 show ancillary services used by 50 percent of all trucks at $50 per truck.

4. Truck / rail wagon loading and unloading, offices leased to third party brokers and forwarders, ancillary facilities used by 50% of trucks at $50 per truck

4A. All site preparation and warehouse and rail infrastructure undertaken by private operator

Avg hrs truck per load/unload year 1	**6**	**6**
Wagons per day in year 1	**100**	**80**
Net present value:	US$ 35,179,779	US$ 18,747,262
Facility internal rate of return:	14.33%	4.30%
Return on capital:	26.19%	9.23%

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Table 37: Private Sector Investment in Site Preparation, Warehouse and Rail Infrastructure – ancillary facilities (50% trucks)

4B. Site preparation undertaken by government, warehouse and rail infrastructure by private operator

Avg hrs truck per load/unload year 1	**6**	**6**	**6**	**6**	**6**
Wagons per day in year 1	**100**	**80**	**60**	**40**	**20**
Net present value:	US$ 42,933,075	US$ 37,303,951	US$ 31,674,827	US$ 26,045,703	US$ 20,416,579
Facility internal rate of return:	29.23%	25.38%	21.28%	16.81%	11.80%
Return on capital:	55.05%	46.16%	37.28%	28.40%	19.51%

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Table 38: Government Investment in Site Development – ancillary facilities (50% trucks)

8.6 Conclusions

It is unlikely that the warehouse will in itself be attractive without a high degree of ancillary services, be they brokerage, value added services within the warehouse, or rail intermodal activity. In this sense our model outputs mirror the experiences of similar transportation complexes in Northern Italy and elsewhere throughout the region. Defining these ancillary services more precisely, which can take many forms, including driver hotel accommodations, vehicle repair, and other services, should be the subject of more detailed analysis. This assessment is hypothetical, based solely upon typical values interpreted through a standard, commonly accepted accounting methodology. Conclusions should be

refined during a more definitive feasibility study once the highway is built and the nature of nearby industrial development is more precisely defined.

9. OPTIONS FOR THE PUBLIC-PRIVATE PARTNERSHIP

9.1 Introduction

An intermodal terminal, especially one that provides ancillary services or that forms the centerpiece of an industrial park, may have important multiplier effects for the surrounding community. And as previously mentioned, the facility may also serve important social goals in reducing urban truck traffic and vehicular pollution. So the ITTF may – like many public port or airport developments worldwide – be planned and have initial site preparation funded by government, with private concessionaires building and operating the various facilities. Typically, the government would take on the commercial risk, while the private operator would take on the operational risk. Cities in developing and transition economies typically devote between 15 and 25% of their annual expenditures to their transport systems. Cities such as Rijeka, where there are tight budgetary constraints and significant investment required to fuel city growth, are facing increasing difficulties in funding transport expenditures, and are looking towards the private sector for investment in the sector.

Public-private partnerships (PPP) are an effective model to enhance transport efficiency by marrying private investment and operational expertise with public governance. Successful PPPs are those that allow the private sector to operate efficiently while ensuring that the public sector exercises good governance. This requires a careful definition of roles for public authorities and private operators, and allocation of risks between the two.

9.2 Options for PSP

The possibilities for private sector participation in the ITTF may be classified into one of the following three categories:

The City government develops and retains ownership of the ITTF and issues contracts under which the private sector provides operational services. These contracts, which are the least intensive forms of private participation, include service contracts and management contracts.

The City government develops one or more sites, builds facilities, and offers them in under contract to a private operator or to a consortium of transport companies. This category includes lease arrangements.

The City government develops one or more sites, providing utilities and access roads, while a private entity builds a transport facility atop the site. This could occur via a concession or BOT arrangement.

Some combination of the above approaches at different sites (such as for a truck terminal and a separate intermodal rail terminal). Each of these options is discussed in more detail below.

9.2.1 Service and Management Contracts

Under a service contract, the government contracts with a private company to provide a specific service, such as transloading. Service contracts are usually most suitable where the service can be clearly defined in the contract, the level of demand is reasonably certain, and the quality of service can be monitored easily. Service contracts do not result in the transfer of responsibility for service provision from the public to the private sector and the transfer of risk, which is normally restricted to operating decisions, is limited. Equally, service contracts do not involve any sale of the assets.

The key advantage of this form of contracting-out is the cost reduction achieved by competitive tendering. The contractor has responsibility for providing the service at the agreed price and has, therefore, a powerful incentive to introduce private sector management skills. Another advantage of this option is the speed with which it can be implemented. The main drawback is that under a service contract, the private partner is not providing any investment capital. In addition, decisions on which services are to be contracted-out and general corporate policy remain in the public sector, and gains in improved management and cost effectiveness may be limited.

This option would involve the extension of the contracting-out principle to all the ITTF's activities. Although responsibility for service provision still remains in the public sector, management control and authority is transferred to the contractor, who bears the financial risk of operating the ITTF. Again, management contracts do not involve the sale of assets to the private sector. Although the contract will specify whether the private sector operator is responsible for major repairs or capital investment, the public authority will normally be responsible for all major improvements required to meet increased demand and maintain quality service provision at the ITTF. Although responsibility for most funding is retained in the public sector, decisions concerning service levels and priorities can be made on a more commercial basis.

The key advantage of this option is that many of the operational gains that result from private sector management can be made without transferring the assets to the private sector. Similar to service contracting, a major drawback is that the private contractor does not make any significant capital investment. In addition, the task of developing the contract can be onerous. A number of issues must be covered by the contract, including responsibility for employing the labor force. In the event that staff remains employed by the public sector, the opportunity to restructure the enterprise may be restricted.

If, on the other hand, the management company takes over the employment contracts of the work force, then industrial relations difficulties may develop.

9.2.2. Lease Arrangements

Under this arrangement, which is quite commonly used for facilities such as ITTFs, the initial establishment of the system is financed by the public authority and contracted to a private company for operation and maintenance. Several common leasing arrangements can be made if the City of Rijeka elects to develop the land for the ITT F and then let the

property or facility in concession to a private operator. Below is a listing of the most common types of leases for cargo facilities. Each has pluses and minuses, and each may be appropriate in differing situations. When a lease is subject to re-negotiation, its character may change from one type to another.

As the name implies, a flat rate lease requires a specific amount of compensation for a specified time period (e.g., $50,000 per hectare annually for 5 years) and is relatively simple to administer. The basis for compensation is determined by a formula that theoretically allows the lessor to recover site capital and other development costs within a specified time period. Depending on how the lease is negotiated, and the competitiveness of the environment – namely, whether the operator is entertaining offers from other municipalities or ports seeking to build their own ITTF's - the formula may or may not cover these costs fully. The flat rate lease provides the greatest incentive to the ITTF lessee to put as much cargo as possible through the terminal. While the simplest form of lease to manage, it provides the greatest opportunity for the municipality to inadvertently subsidize the ITTF if appropriate revenue levels are not chosen during negotiations. In the transport sector, especially in the marine and intermodal environment, the flat rate lease of a cargo terminal tends to be the most non-remunerative to the municipality or port. It can be appropriate if revenue maximization is not the primary aim, but rather if the operation is seen as also accomplishing an important social goal (e.g., job creation or removal of heavy trucks from city streets).

The min-max lease contains an established compensation to the municipality, like the flat rate lease, but also some mechanism by which additional compensation may be paid depending on volume and operator revenue, until some limiting value is reached and the lessee is freed from further payments for the remainder of the year. As in the case of the flat rate lease, the minimum payment is determined by a formula that theoretically allows the lessor to recover capital and other development costs within a specified time period. For example, the ITTF lessee might agree to pay the municipality 100% of all its revenues on cargo until paying the municipality $x million, after which the lessee remits 75% of the charges until paying the lessor an annual maximum of $x+y million, at which point obligations cease for the remainder of the year. The min-max lease provides a means by which the lessor can share some of the benefits of increased cargo activity while still limiting its own risk through the use of a guaranteed minimum compensation level.

A shared revenue lease is similar to the min-max lease except that it has no maximum compensation ceiling. After a series of payments, the lessor and lessee begin to share the revenue from cargo movement. Usually, the municipal lessor will receive a decreasing proportion of cargo revenue with increasing volume. For example, the ITTF lessee might agree to pay the municipality 100% of all its revenues on cargo until paying the municipality $q million as a minimum, after which the lessee remits 75% of the charges until paying the lessor $q+v million, and after that only remits 50% of the charges to the municipality on all cargo for the remainder of the period. The shared revenue lease is a method for both parties to share the risks of low traffic periods while also sharing the rewards of large volume increases. It gives an incentive to both parties to increase cargo

throughput and perhaps to engage in joint marketing efforts. Shared revenue leases have proven most attractive when cargo volumes are large and growing, such as at major metropolitan centers and ports, and where risks of downturns are slight.

All of the above lease types, but especially the min-max and shared revenue leases, depend on the lessor developing an accurate understanding of the market and of regional competition in transport services. And both the min-max and shared revenue leases require some kind of auditing function on the part of the lessor – in order to determine lessee cargo revenues, numbers of trucks or containers moving through the gate, tonnage, or similar values used in computing compensation. Since intermodal transport is generally a low margin activity, leases must be constructed with care in order to be win-win situations for both parties.

9.3 Concessions and BOTs

This option involves the private sector operator in the construction of the ITTF, as well as its operation and maintenance. The operator finances the capital expenditure and the working capital costs. A concession contract is typically valid for twenty-five to thirty years so that the operator may recover the capital costs invested. The City of Rijeka may contribute to the capital investment cost, in which case a portion of the ITTF's revenues would be transferred to the City to service loans raised to finance the investment.

Responsibility for service provision under a concession is transferred to the private sector. The private sector operator also bears the financial risk in constructing the ITTF as well as the risk in operating and maintaining it. Although the private sector operator is responsible for providing the assets, they remain in public ownership.

A key advantage of the concession arrangement is that it provides incentives to the operator to achieve improved levels of efficiency and effectiveness and transfers a high level of risk for service provision from the public to the private sector. Key drawbacks include the complexity of the contract required to regulate the operator's activities and the risk that the operator will only invest in new assets where it expects payback within the remaining period of the contract.

9.4 Allocating Risk in PSPs

All public-private partnerships involve a certain degree of risk. From the standpoint of the private operator, each risk that they are being asked to assume represents a potential cost. Because private operators will measure the attractiveness of a PPP in terms of its potential financial rate of return, certain risks will reduce the attractiveness of PPPs and will therefore discourage the private sector from bidding on them or will reduce the value of bids (See Figure 18).

The key to a successful PPP is in allocating risks to that party most able to manage them. That is to say, a private operator will perceive a risk that is out of its control as more potentially costly than one it is able to manage, and will reflect those potential costs in its bid. In economic and financial terms therefore, it does not make sense to ask the private operator to take on risks over which it has little or no control. Figure 17 depicts the

options for PSP as described in the previous section. As we move along this "continuum" of PSP from service contracting to management contracts, and leases, to concessions, BOTs, and BOOs, the private operator must take on more responsibility and more risks. There are several types of risk that must be managed under PSP. Each of these is described in more detail below, along with the causes and possible strategies for managing the risk.

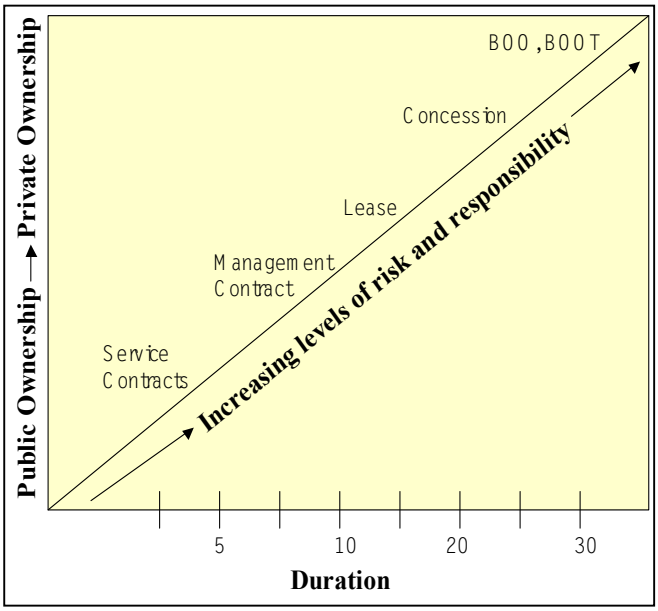

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Figure 17: PSPs and Risk

Design and development risk: An example of a design and development risk would be a design flaw in a warehousing facility within the ITTF. If the problem is the result of a design flaw in the tender documents upon which the private operator bid, then an appropriate risk management strategy would be for government to provide a remedy or compensate the project company. If due to contractor fault, then the private operator should provide the remedy or pay damages. Design and development risk is greatest in PPP arrangements, such as concessions, BOTs, and BOOs, which require the construction of new assets.

Construction risk: Possible construction risks include cost overruns, delays in completion, and failure to meet performance tests or code requirements at completion. If the problem is the result of poor project management by the private operator, strategies for managing the risk include offering the private operator a fixed price, lump sum contract (in which case, the problems must be resolved without any additional remuneration to the operator), including provisions for liquidated damages in the contract, and requiring the operator to take out insurance that would cover any additional costs associated with construction risks. If the problem is due to changes in law, force majeure, increased taxes, or delays in government approvals, the contractor should have business interruption insurance that it can draw on for compensation. Similarly to design

and development risk, construction risk is greatest in forms of PPP that involve the construction of new assets.

Operating risk: There are a variety of possible operating risks such as operating cost overruns, failures to obtain approvals or consents and other risks specific to ITT Fs including: Geographic changes in industrial activity: The rationale for an intermodal terminal may be undermined by moves to suburban locations. For example, we may consider a major department store located in the urban core. Logistics costs or regulatory considerations may require it to keep a fleet of small urban delivery vehicles shuttling to and from the intermodal terminal. However, in its strategic planning the department store may elect to move its facility to a suburban location where heavy trucks may serve it directly from the highway. In such cases, the intermodal terminal will continue to be attractive only if business activity in the urban core continues to grow and is not diverted to suburban locales. These changes must be anticipated in the site selection process.
Major changes in regional freight transport patterns: We assume that the major highways of today will be the major highways of tomorrow. In the case of a rail intermodal terminal, we assume that an efficient Croatian rail network is linked to other efficient rail networks throughout the region.

Developments not only within the RMR, but also within Europe may well determine the success of the ITTF. Strategies for managing this risk include careful research during the site selection process, and by selecting a private operator that has strong regional networks or alliances.

Industry competition: The operator of the ITTF must consider regional competitors. A large multinational transport firm may not consider its facility as an independent profit center. Instead, it may operate an intermodal terminal in competition with the ITTF at break-even or at a slight loss in order to funnel long-distance traffic into a larger network. These factors must be considered in planning and siting the ITTF. To keep abreast of industry competition, the operator of the ITTF must strive consistently to be as efficient and low-cost as possible, and therefore to develop the facility in a manner that requires the lowest possible site development and construction costs.

Financial risk: Possible financial risks include currency devaluation or nonconvertibility, and fluctuations in interest rates. Devaluation or nonconvertibility is only risky to the degree that the currency in which revenues are collected differs from the currency in which loans must be repaid. To protect against devaluations, hedging facilities can be included in the security package, and government can require that loans be made in the same currency that revenue is received. To protect against nonconvertibility, government can guarantee the availability, convertibility, and transferability of currency (in which case, cooperation of the Ministry of Finance would be required). To protect against fluctuations in interest rates, hedging facilities can be employed and/or the operator or government can negotiate fixed rate loans.

Force majeure risk: Examples of force majeure include floods, riots, strikes, and wars. In most cases, neither the public nor the private parties to a contract can control force

majeure risks. As a result, a common risk management strategy is for the private operator to purchase insurance to cover these risks. However, there are also cases where government provides guarantees to cover force majeure. In either case, it is important to ensure that force majeure is carefully defined within the contract.

Political risk: Political risks include expropriation, breach of contract, failure to provide approvals, et cetera. If government defaults on its obligations, the private operator should be able to terminate the contract and receive liquidated damages. However, to minimize political risk, any required approvals should be treated as conditions precedent to the arrangement and therefore obtained in advance. Another strategy for dealing with political risk is for the private operator to take out political risk insurance.

Legal and regulatory risk: Legal and regulatory risks include changes in law, customs practices, or environmental standards. For example:

Changes in urban traffic regulations or congestion pricing schemes: The City may implement regulations designed to keep trucks out of the urban core and adopt a congestion-pricing scheme for heavy vehicles. Truckers and others concerned about higher transport costs may lobby to reverse these policies, possibly leading to lower revenues for the ITTF.

Changes in customs, phytosanitary or other border regulations: The necessity of compliance with customs and other inspections may vanish with entry into the EU or with the adoption of other arrangements that allow transit traffic to proceed in bond essentially without inspection. In the case of truck terminals within the EU, changed customs regulations in the 1990's caused some terminals specializing in customs activities to close virtually overnight.

Strategies for managing legal and regulatory risks include “change of law” clauses that enable the private operator’s contract to be adjusted to reflect the new laws or regulations or extended to reflect a more lengthy period required to achieve the original internal rate of return of the project.

Insurance: Insurance risk is the result of uninsured loss or damage to project facilities. This risk can easily be avoided through careful stipulation in the contract of the types of insurance that must be purchased by the private operator.

Environmental: Environmental risks are those which result in contamination or damage to the environment. In the case of an ITTF, these may include hazardous cargo transport, chemical or fuel spills, and improper treatment or disposal of sewage or runoff. Any PPP contract should require that the private operator indemnify government for any contamination that is caused by the private operator, with damages being paid by the operator’s insurance policy. If contamination is due to a pre-existing environmental liability, government should be required to clean it up or pay compensation.

The degree of project risk will depend upon the scope of services to be offered by the ITTF (see Table 39). Customs facilities are relatively simple to construct, normally involving only covered parking and some small office structures. They are also simple to operate. Most risk is connected with possible changes in legal or other regulatory changes affecting demand for the service. Truck-truck installations are somewhat more complex to build and the handling of cargoes and heavy vehicles increases operational and environmental risk. Truck-rail installations share many attributes with truck installations, though they are dependent upon the efficiencies and commercial attractiveness of distant rail networks. Intermodal terminals that function as transport facilities for large adjacent industries have much the same risk patterns as truck-truck or truck-rail installations, with possible added environmental risk depending on the nature of the industrial process. Chemical plants, for example, may have high associated transport and handling risks. A bus depot will contain a variety of industrial processes that are not present in the other activity types. These may include paint and body shops, which tend to generate industrial pollutants, and machine shops and similar hazardous operations. The degree of risk to be assumed by each partner – public and private – will depend both on the choices with respect to risk allocation in the contract and on the form of PPP. For example, if a BOT is selected as the preferred option for the PPP, then the private operator will by definition be assuming greater design and development and construction risk than if it were entering into a management contract.

Risk Category	Customs	Truck-truck	Truck-rail	Industrial park	Bus Depot
Design and development	Low	Low	Low	Low	Medium
Construction	Low	Medium	Medium	Medium	Medium
Operating risk	Low	Medium	Medium	Medium	Low
Financial risk	Low	Medium	Medium	Medium	Low
Force majeure risk	Low	Low	Medium	Medium	Low
Political risk	Medium	Low	Medium	Medium	Low
Legal and regulatory risk	Low	Medium	Medium	Medium	Medium
Insurance	Low	Medium	Medium	Medium	Medium
Environmental	Low	Medium	Medium	High	High

Booz Allen Hamilton, 2003

Table 39: Degree of Risk according to Scope of Services

9.5 Conclusion

Once a decision has been made regarding the mix of service offerings and the option of PPP for the ITTF, the next step is to issue a public notice of tender requesting expressions of interest (EOIs) from potential investors or private operators. This notice should be published in the international and domestic press to formally announce the opening of the tender process for the ITTF. The notice should be designed to meet the strictest international securities and foreign investment offering laws.

The notice will ensure the privatization process is initiated in a professional, legal and transparent manner in the investment community. It also serves to widely publicize the tender and demonstrate the serious intent of the City of Rijeka to conduct the tender process in a highly professional manner. The notice would be for open international tender and should include an outline of all necessary procedures for foreign and domestic investors to receive the official Tender Documents.

To generate interest in the tender process among qualified investors, the City of Rijeka should consider developing an information memorandum (IM). The IM provides potential investors with a detailed factual overview of the project, including financial projections and relevant laws and regulations. It is legally required that no projections or suppositions be made in this document. The IM will protect the City at a later stage during the transaction closing process by supplying much of the information required by the investor and thus preventing investors from claiming that they did not have knowledge of certain circumstances during the bid or negotiation phases. Our experience in many transactions shows that much of the work in the closing of a transaction could be done more efficiently if an IM has been properly researched, assessed and written. Investors also appreciate a full IM, as it enables them to quickly assess the potential merits of a project from their home offices.

The IM will also set out the following:

- The type of transaction completed
- The format
- Minimum conditions and procedures for bidding
- General transaction structure parameters
- Acceptable forms of payment (including the conditions under which debt conversion will be allowed) and
- The other terms and conditions

10. STUDY CONCLUSIONS

In summary, the ultimate structure of the ITTF cannot be known without knowing the nature of the industries that will be developed in the Matulji area. We urge that another feasibility study be undertaken once the new highway is built and regional industry continues to grow. However our preliminary study has resulted in the following general conclusions:

The ITTF warehouse will not be financially viable only by loading and unloading vehicles. Instead, ancillary services such as bonded warehousing, commodity brokerage, and forwarding will be more important. This is consonant with experience elsewhere and makes it likely that the ITTF warehouse will function initially to clear goods moving to and from the EU and later to smaller shippers not having these capabilities in-house.

The ITTF rail intermodal terminal is potentially a good source of revenue and might function on its own as a viable facility. But it would need to draw traffic from industrial facilities as yet unbuilt and requires a massive improvement in the levels of service of regional railways. A rail terminal could also serve as a hub and an attractant for new regional industries as part of a comprehensive development plan.

If conditions in the Matulji area remain unchanged, the ITTF could be located closer to central Rijeka, in which case its purpose would be to keep heavy trucks out of the urban core. The ITTF would then serve to transship loads between highway and local trucks, in addition to being a transport center for nearby industrial activity. The ITTF would help to ease heavy vehicle traffic in the urban core and thus contribute to its development as a tourist and residential center.

Each of the above situations would be similar to those in many inland ports, free trade zones, or other industrial developments in the EU or North America; the government would develop the sites, provide basic infrastructure, and lease the sites to private companies. Even though we judge the ITTF to be attractive to a private operator, it will be functioning in a highly competitive environment, one with an abundance of transport options available to shippers.