LOMÉ–OUAGADOUGOU TRANSPORT CORRIDOR LOGISTICS ANALYSIS

Using FastPath

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Using FastPath

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ACRONYMS AND CODES

AfDB	African Development Bank
ASYCUDA	Automated Systems for Customs Data
BOAD	Banque Ouest Africaine de Développement
Boborinter	Gare routière internationale de marchandises de Bobo Dioulasso (Port Sec)
CBC	Burkina Shippers' Council
CCIA-BF	Chambre de Commerce, d'Industrie et d'Artisanat de Burkina Faso
CEPS	
CFA	Communauté Financière d'Afrique
CGTR	Confédération Générale des Transporteurs Routiers
CIF	Cost, Insurance, Freight
ECOWAS	Economic Community of West African Countries
EU	European Union
FOB	Free on Board
GPS	Global Positioning System
GPRS	General Packet Radio Service
GPRTU	Ghana Public Road Transport Union
IATA	International Air Traffic Association
ICT	Intermodal Container Terminal
IRTG	Improved Road Transport Governance
ISRT	Convention A/P.4/5/82 relating to Inter-State Road Transit of Goods (ECOWAS)
N/A	not applicable
OTRAF	Organisation des Transporteurs Routiers du Faso
Ouagarinter	Gare Routière Internationale d'Ougadougou
Ro-Ro	Roll-on, roll-off
RRTC	Reduced Road Transport Costs
SOFITEX	Societé Burkinabe des Fibres Textiles
TEU	twenty-foot equivalent unit
UEMOA	Union Economique et Monétaire Ouest-Africaine
UNCTAD	United Nations Conference on Trade and Development
UNTR	Union Nationale des Transporteurs Routiers
XOF	CFA franc, the common currency in UEMOA member countries

ABSTRACT

At the request of USAID/West Africa, the Worldwide Support for Trade Capacity Building project (TCBoost) collaborated with the West Africa Trade Hub on developing a comprehensive analysis of the transport corridor between Lomé, Togo, and Ouagadougou, Burkina Faso. The TCBoost team used FastPath, a transport corridor diagnostic tool developed jointly by Nathan Associates Inc. and USAID, to assess the variables of cost, time, and reliability of the port, road network, and border posts along the corridor. Comparing performance to international standards, logistics scores were generated for individual corridor links and nodes as well as for the corridor overall.

Three scenarios were analyzed to ensure that the direction of trade (inbound or outbound) and the type of cargo (containerized or noncontainerized) were factored into the analysis. Corridor performance was also compared with the performance of comparable developing-country corridors previously analyzed with FastPath. The TCBoost analysis recommends several courses of action to improve corridor performance—from relatively low-cost policy actions to major investments in upgrading port infrastructure. In some cases, further collaboration between TCBoost, the West Africa Trade Hub, USAID/West Africa, and the governments of Togo and Burkina Faso may be required.

EXECUTIVE SUMMARY

The USAID-funded West Africa Trade Hub Reduced Road Transport Costs (RRTC) initiative is researching and evaluating the logistics on a number of West African corridors and will recommend ways to improve efficiency. The West Africa Trade Hub corridor research started with the Tema (Ghana) to Ouagadougou (Burkina Faso) corridor; this analysis concerns the second of the three corridors—Lomé (Togo) to Ouagadougou (Burkina Faso)—following the original Tema–Ouagadougou corridor.

At the request of USAID/West Africa, the Worldwide Support for Trade Capacity Building (TCBoost) project collaborated with the West Africa Trade Hub on pioneering an approach to transport corridor analysis that leverages the best elements of the RRTC methodology with those of FastPath, a transport logistics diagnostic tool that Nathan Associates developed with USAID funding. USAID/West Africa also expressed interest in using FastPath to learn more about how specific infrastructure deficiencies as well as processes and procedures increase costs so that recommendations for reducing costs can be developed.

The FastPath model assesses the variables of cost, time, and reliability of infrastructure along a corridor in a consistent and replicable fashion. Each variable is itself an indicator of performance, and the three variables together are used to generate a summary performance measure, or logistics score. For the Lomé–Ouagadougou corridor, the TCBoost team assessed Lomé port, the road network between Lomé and Ouagadougou, and the border crossings at Cinkassé (Togo) and Bittou (Burkina Faso).

DESCRIPTION OF THE LOMÉ–OUAGADOUGOU CORRIDOR

The Lomé–Ouagadougou corridor serves the import-export flows between landlocked Burkina Faso and Togo, and in particular with the port of Lomé. The port of Lomé is a 14m and 16m draft multipurpose port that handles some 1,200 ships per year. A steady increase in total port traffic was recorded between 2003 and 2009; traffic increased from 4.5 million tons to over 7.3 million tons, an increase of 62 percent over that period or an average of 10 percent per year. The port has received very few modifications since it was built in 1968 and the traffic increase is constraining the operational capacity of the port. Piers are operating near 90 percent of their capacity. International experience suggests that occupancy rates this high usually result in substantial ship waiting time and low productivity.

The road from Lomé to Ouagadougou is 928 km that runs along an area predominantly flat and with some low-hills with a mix of fair and poor condition, particularly in Togo, but generally in fair to good condition in Burkina Faso.

The border post infrastructure in both Cinkassé (Togo) and Bittou (Burkina Faso) is simple. A new border post, Ouaga 2000, has been built in Cinkassé under the initiative of the UEMOA. This post operates under the scheme of juxtaposed control, meaning that entry cargo is controlled by authorities of the entry country but not by those of the exit one, but authorities of both countries are present at the border post. There is some resistance of the transporters to use it given the rise of the fees that they usually pay.

Lomé port handled approximately 7.3 million tons of cargo in 2009 (including 260,000 TEU); on average, 42 percent was transit cargo destined primarily to Burkina Faso and Mali. The majority of transit traffic volume to Burkina Faso was handled in containers (87,369 TEUs) with a small volume of 302,000 tons of conventional cargo. The entire volume of conventional cargo was imports while container volumes accounted for 90 percent for imports with the remaining volume handled as exports. Import containers can be sent to their final destination in one of two ways: either in its container directly, or stripped for onward shipment by truck. The additional handling for stripping increases the cost and the risk of breakage and loss and potentially compromises the bonded status of transit cargo. The West Africa Trade Hub and corridor stakeholders suggested that about 70 percent of the inbound containers are stripped at the port before undertaking the transit process. In the outbound direction (Burkina Faso to Togo), also only 30 percent is transported in containers. The remaining 70 percent is transported as noncontainerized cargo and consolidated before it is transferred to the port.

ANALYSIS

Given these characteristics of transit cargo, three scenarios were created to analyze corridor performance: (1) inbound containerized; (2) outbound containerized and (3) inbound noncontainerized. The scenarios were created using data provided by the West Africa Trade Hub, as well as other stakeholders during the TCBoost field visit to Togo and Burkina Faso. For each scenario, logistics scores were generated for each infrastructure component (port, roads, border post), as well as for the corridor overall. Logistics scores are computed by comparing the performance of a component of the transport/logistics chain to international standards and rating it as good, fair, poor, or very poor. This rating is then converted to a numeric score (80 for good, 60 for fair, 40 for poor, and 20 for very poor). Then the scores for price, time, and reliability are averaged to get the total score for a component.

These scores are then given a time-weighted average to compute the subchain total, with reliability treated as variance with a special calculation of the subchain total. A logistics score between 70 and 80 indicates that time, cost, and reliability in the total supply chain are efficient and competitive according to global standards. Reliability is measured in terms of average transit time, which accounts for 90 percent of the variation in transit times.

Scenario 1(inbound containerized). Overall corridor performance for Scenario 1 received a logistics score of 62, which is characterized as fair.

Table E-1
Logistics Scores for Inbound Containerized Cargo, Scenario 1

	TEU/Year	Average Price per TEU	Average Time	Reliability	Logistic Score	Rating
Total Chain	78,632	$3,329	572.0 hours	96%	62	Fair
LOGISTICS SUBCHAINS						
Direct Containers	23,590	$3,606	566.9 hours	97%	61	Fair
Stripped Containers	55,042	$3,211	573.9 hours	96%	62	Fair
Node	**Logistics Score**	**Rating**	**Link**		**Logistic Score**	**Rating**
Port of Lomé	56	Fair-Poor	Port of Lomé–Terminal du Sahel		50	Fair-Poor
Terminal du Sahel	40	Poor	Terminal du Sahel–Anie		67	Fair-Good
Anie	N/A	–	Anie–Sokodé		63	Fair
Sokode	N/A	–	Sokodé–Kara		47	Poor-Fair
Kara	N/A	–	Kara–Andjidé		63	Fair
Andjidé	N/A	–	Andjidé–Cinkassé		63	Fair
Cinkassé	77	Good	Cinkassé–Bittou		73	Good-Fair
Bittou	68	Fair-Good	Bittou–Tenkodogo		73	Good-Fair
Tenkodogo	N/A	–	Tenkodogo–Ouagarinter		67	Fair-Good
Ouagarinter	27	Very Poor				

Source: Nathan Associates analysis

Port performance. In Scenario 1, Lomé port earned a logistics score of 56 (out of 80), which is in the fair-poor range for international ports. A breakdown of performance by component at the port shows the yard operations with a score of 30 which is very poor due to high handling charges and excessive dwell time, although the dwell time is not as long as other West Africa region ports. Another component with a low score is Customs with 43, which is poor due to long clearance time, long storage periods and high official and unofficial rates. Average waiting time at the channel (23 hours) and berth operations time (19 hours) are relatively high although these are lower than times observed in other West Africa region ports. This long time is a reflection of the congested environment of the port. Actually, it has been indicated that container berths are operating near at 90 percent of their capacity.

Road performance. Surface transport for inbound traffic has an intermediate fair rating with road travel time rated as good in many sections, particularly in Burkina Faso, and fair in others. Reliability for road transit time is rated fair in the majority of the segments and good in others. Nevertheless, price in the majority of the road segments with an average of US$1.9 per TEU-km is rated poor (e.g., high unit costs per TEU-km). This is due to several factors, including the fact that there is lack of backhaul cargo for the returning trip and hence most of the trucks return empty, the relatively older trucks used for this corridor (and in the majority of West Africa corridors), and the condition of some road links. Inbound prices normally incorporate associated expenses for the empty return trip. This seems to be a constant practice in the majority of countries in Africa and in other regions of the world where trade imbalance, due to little export

volumes, is experienced. This is particularly detrimental for landlocked countries where travel distances tend to be longer than for coastal countries. The average speed of 36 km/h up to the border is relatively low, but the average delay time is acceptable.

Border post performance. The border posts at Cinkassé and Bittou received a score of 77 and 68 respectively which is considered good. Transit goods entering Burkina Faso, however, are cleared at Ouagarinter (*Gare Routière Internationale d'Ouagadougou*), a Customs facility in Ouagadougou. The logistics score for Ouagarinter is 27 (very-poor), and an adjusted "combined" logistics score for Customs clearance at Bittou-Ouagarinter would be 33 (poor to very poor). The weighted average cost per container to cross the Cinkassé and Bittou-Ouagarinter border for inbound traffic at US$1,075 is significantly higher than for selected comparison corridors.

Scenario 2 (outbound containerized). Overall corridor performance received a logistics score of 64, which is characterized as fair.

Table E-2
Logistics Scores for Outbound Containerized Cargo, Scenario 2

	TEU/Year	Average Price per TEU	Average Time	Reliability	Logistic Score	Rating
Total Chain	8,737	$2,221	91.0 hours	101%	63	Fair
LOGISTICS SUBCHAINS						
Direct Containers	2,621	$2,160	86.0 hours	107%	66	Fair-Good
Consolidated Containers	6,116	$2,247	93.0 hours	99%	62	Fair
Node	**Logistic Score**	**Rating**	**Link**		**Logistic Score**	**Rating**
Ouagarinter	57	Fair	Ouagarinter - Tenkodogo		73	Good-Fair
Tenkodogo	N/A	–	Tenkodogo - Bittou		73	Good-Fair
Bittou	70	Good-Fair	Bittou - Cinkassé		73	Good-Fair
Cinkassé	47	Poor-Fair	Cinkassé - Andjidé		70	Fair-Good
Andjidé	N/A	–	Andjidé - Kara		70	Fair-Good
Kara	N/A	–	Kara - Sokodé		53	Fair-Poor
Sokodé	N/A	–	Sokodé - Anie		70	Fair-Good
Anie	N/A	–	Anie - Terminal du Sahel		73	Good-Fair
Terminal du Sahel	N/A	–	Terminal du Sahel - Port of Lomé		63	Fair
Port of Lomé	67	Fair-Good				

Source: Nathan Associates analysis

Port performance. The port has a better logistics score than the inbound direction with a total score of 67 (out of 80), which is in the fair-good range for international ports. The improvements in the score compared with the inbound direction are due to better performance in the channel waiting time, as well as a reduction in time for yard operations. Nevertheless, the costs for yard operations still continue to be expensive.

Road performance. Road transport time and delays are similar to those in the inbound direction but prices are considerably lower given that backhaul is likely. The road transport logistics score for the outbound direction is rated fair-good compared with international standards, except for two segments rated poor.

Border post performance. Transit outbound operations begin at Ouagarinter with a score of with a score of 57 (fair). The border post at Bittou received a score of 70 (fair-good), but the adjusted logistics score for Customs clearance combining Ouagarinter-Bittou in this direction is 40 (poor). The border post at Cinkassé received a score of 47 (poor-fair). In Cinkassé, the outbound direction has a lower score than in the inbound direction due to official Customs rates.

Scenario 3 (inbound noncontainerized). Handling of noncontainerized cargo at the port varies according to the type of cargo and equipment used. Therefore establishing a standard measure for performance and comparing it among different subchains is difficult. Logistics scores are not generated for noncontainerized cargo, but the results for time, cost, and reliability for each subcomponent and the overall subchain can be presented. This is summarized in Table E-3.

Table E-3

Performance of Main Subcomponents of Inbound Noncontainerized Transit Traffic (Scenario 3)

Component	Official Costs (US$/ton)	Unofficial Costs (US$/ton)	Time (hours)	Reliability (%)
Average channel operations	0.21	–	132.0	65.2
Average unloading at berth	1.59	–	96.0	68.8
Total yard handling	2.51	1.3	120.0	58.3
Customs	5.00		24.0	100.0
Transit yard	1.10	0.27	36.0	56.0
Road transport	97.95	4.20	25.5	Varies by segment
Border crossing at Cinkasse	0.45	0.22	1.2	54.0
Border crossing at Bittou	3.00	0.33	3.5	66.0
Ouagarinter	13.65	3.58	25.1	68.0

** The percent of average transit time that would include 90% of shipments.*

The performance of the Lomé–Ouagadougou corridor for noncontainerized cargo is compared to three other corridors where FastPath data for noncontainerized cargo is available: the Tema–Ouagadougou corridor, Lagos-Kano corridor in Nigeria and the Maputo-Nelspruit corridor in South Africa and Mozambique. Information for Lagos and Maputo is presented only as a performance benchmark, while Tema is an alternative option for Burkinabe shippers.

Port performance. Lomé port rates much worse in waiting time for a berth, average unloading time, and customs costs than Tema port. Total handling costs, customs time and dwell time are, however, lower in Lomé. The average channel waiting time is considerably high indicating a congested environment for noncontainerized cargo. Berthing time is average compared to West African regional ports but significantly higher than Maputo. Customs cost is relatively high compared with Tema while Customs time at 24 hours seems to be a variable that varies among all compared ports, with Lomé lower than Tema. The average dwell time for Lomé is among the

lowest at 6 days for imports. However, the reliability (variation in transit and dwell time in the port) is about average.

Road performance. The average cost per ton-km for noncontainerized freight in the Lomé–Ouagadougou at US$0.11 is higher than in other West Africa regional corridors. Travel time or speed is the same as road transport for containerized freight where the performance in Togo is worse than in Burkina Faso. The average speed of 36 km/h is slower than Tema–Ouagadougou and half that of the Maputo corridor. Experiencing a delay of 1.1 hours is acceptable.

Border post performance. The average cost to cross the Togo-Burkina Faso border at US$21.2 per ton is lower higher than for Tema–Ouagadougou, but it is twice the cost than for the Maputo corridor. The clearance time for Lomé–Ouagadougou at 29.8 hours is lower than Tema–Ouagadougou.

INTERPRETATION

Table E-4 summarizes how the performance of the Lomé -Ouagadougou transport corridor compares to other transport corridors in the developing world.

Table E-4

Comparison of Corridor Performance - Logistics Scores for Containerized Freight

Logistics Component	Lomé–Ouagadougou	Tema–Ouagadougou	Laem Chabang-Vientiane	Dacca-Chittagong (a)	Durban–Nelspruit (a),(b)	Maputo–Nelspruit
INBOUND						
Entire logistics chain	62	53	64	59	63	62
Port	56	55	55	49	60	51
Road transport	60	55	70	58	65	51
Border post 1	70 (Togo)	73 (Ghana)	67 (Thailand)	n/a	n/a	73 (Mozambique)
Border post 2	33 (Burkina) c	20 (Burkina) d	63 (Laos)	n/a	n/a	73 (South Africa)
OUTBOUND						
Entire logistics chain	63	65	66	54	68	60
Port	67	72	65	52	70	57
Road transport	67	70	70	58	65	51
Border post 1	40 (Burkina)	53 (Burkina)	63 (Laos)	n/a	n/a	63 (South Africa)
Border post 2	47 (Togo)	53 (Ghana)	67 (Thailand)	n/a	n/a	67 (Mozambique)

Notes: Overall logistics score does not include border post node scores
Estimated from partial data in Maputo Corridor analysis

The Lomé–Ouagadougou corridor's overall logistics score is higher than Tema–Ouagadougou's score and average than the other corridors in the inbound direction. In the outbound direction, Lomé–Ouagadougou has a lower overall score than Tema–Ouagadougou and outperforms Dacca-Chittagong and Maputo corridors.

On the basis of our analysis of the time, cost, and reliability of the Lomé -Ouagadougou corridor performance, the TCBoost team identified several potential interventions that can improve performance and raise logistics scores for the corridor. These interventions are presented in Table E-5. To help corridor stakeholders prioritize corridor interventions, the team used FastPath's cost-benefit analysis tool. The full details of assumptions can be found in Appendix E.

Table E-5

Summary of Improvement Evaluations

Improvement Action	Estimated Investment	Present Value of Benefits	Infrastructure User's Estimated Savings / TEU		Cargo Owners Estimated Savings /TEU		Evaluation of Investment
			In	Out	In	Out	
Improving ship-to-yard transfer	$9 million	$8.1 million	$18	$8	$9	$4	Not feasible if only transit cargo is analyzed. Feasible if all cargo at the port is included.
Implementation of a port management information system	$1.5 million	$8.9 million	$20	$20	$10	$10	Feasible
Implementation of a truck appointment system at Lomé Port	$0.8 million	$8.9 million	$20	$20	$10	$10	Feasible
Implementation of an electronic transit service	$8.5 million	$53.9 million	$130	N/A	$65	N/A	Highly feasible
National and regional strategies to develop the transport system	$5.0 million	$58.9 million	$24	$82	$15	$72	Feasible
Development of a city beltway around Lomé	$110 million	$3.9 million	$8	$8	$4	$4	Not feasible
Adaptation of road design standards to cargo corridor	Varies by project	Varies by project	$42	$42	$21	$21	Varies by project
Development of a bilateral logistics strategy in Burkina Faso and Togo	$1.5 million	Unknown but outcome would contribute with value creation, growth and employment generation					Long-term benefits

Improving ship-yard transfer operations. The stevedoring companies use different yards assigned to their exclusive use. The yards are not well positioned for quick transfer of cargo to and from the quays. With the condition of the roads and the location of the yards, the terminal tractors rotations are unnecessarily long. With the removal of warehouses and properly assigning yards to the terminals they serve, the transfer time cycles will be reduced.

- Estimated cost: $9 million

- Estimated benefit over 20-year period (present value): $8.1 million if only transit cargo is considered but benefits are higher when considering all cargo throughput.

Implementation of a port management information system. Most of the operations involved in ship loading and unloading are carried out with "paper and pencil". This leads to lengthy operations and is prone to "human errors". Planning ship loading and unloading operations using a specially conceived information system package can lead to deterministic operations, reducing human errors and idle times, while keeping an easy traceability of the operations. A similar situation is experienced at the yard. There is no software management systems used to manage the Yard Operations. The implementation of a Port Management System will greatly help to plan berth and yard operations, better manage the transfer of cargo from ship to yards, manage the capacity of the yard, and manage the assignment of resources for the yard activities. The system could be the same or compatible with that envisioned for the operations in any of the expansion projects. The system will not only benefit transit cargo but also all cargo handled by the port.

- Estimated cost: $1.5 million
- Estimated benefit over 20-year period (present value): $8.9 million considering transit cargo and $24.9 million for the entire throughput.

Implementation of a truck appointment system at the port of Lomé. Trucks arriving at the Port of Lomé usually park outside the port waiting for their turn – under the "waiting list" system. This generates congestion at the port entrance, reduces the road capacity and represents a high opportunity cost for the transporter. The implementation of a truck appointment system that sets a specific date and time for the transporters to deliver or pick-up cargo avoiding congestions at the port entrance.

- Estimated cost: $0.8 million
- Estimated benefit over 20-year period (present value): $8.9 million

Implementation of an electronic transit tracking system. The customs corridor system for transit goods, "Solidarité sur la mer" was put in place in order to avoid the fraud and to guarantee the security of such goods. In spite of the expected benefits of the initial system, it needs to evolve towards automation since it currently creates substantial delays that serve against the sustainability of the transport sector and increase the price that final consumers pay for imported goods.

- Estimated cost: $8.5 million
- Estimated benefit over 20-year period (present value): $53.9 million

Strategies to develop the road transport system. Road transport services in the corridor are very weak. The service is limited to transport services as opposed to logistics services, vehicles are in disrepair or are very old and the levels of maintenance are very low. This situation was observed during the field visit. Nonexistent road barriers, low diversification of services, poor demand and regional quotas are presumed to be among the causes of the problem. A strategy must be developed at the regional level in order to promote the growth of this important sector than can generate a substantial contribution to the GDP and so generate employment requiring

low qualification. This strategy must be comprehensive and include proposals to overcome constraint and generate sustained growth.

- Estimated cost: $5 million
- Estimated benefit over 20-year period (present value): $59 million

Development of a city beltway around *Lomé***.** Most of the traffic leaving the port and heading into Northern Togo and into Burkina Faso must go through town, adding congestion to city roads and delays to cargo transport. Because of the specific characteristics of the road system and the lack of a good traffic organization, transit vehicles and local traffic comingle creating traffic bottlenecks within the city. Building a beltway around the city, and particularly a segment linking the port to roads going to the north of the city to channel the transit traffic, will help resolve this problem.

- Estimated cost: $110 million
- Estimated benefit over 20-year period (present value): $3.9 million. This improvement is not feasible.

Adaptation of road design standards to cargo corridor. The condition of the road along the corridor is highly variable. This reflects the existence of a maintenance management system not fully operational. Cargo trucks usually cross urban centers either with some risk of accidents or causing congestion. Finally, there are no service centers to satisfy the needs of long-distance trips (resting areas, restaurants, communication centers, on the spot maintenance, etc.). The definition of a "cargo network" is essential to promote a uniform level of maintenance and standard of services along the corridor

- Estimated cost: will vary depending on the improvement
- Estimated benefit over 20-year period (present value): will vary depending on the improvement

Development of a bilateral logistics strategy for Burkina Faso and Togo. Burkina Faso and Togo suffer from inefficiencies affecting the quality and diversification of logistics services and/or the competitiveness of their exports. Burkina Faso could benefit from defining a strategy aimed at generating logistics solutions adapted to their plans to diversify exports, and even to concentrate some type of cargo in existing logistics infrastructure (Ouagarinter et Boborinter, in Ouagadougou et Bobo Dioulasso, respectively). Togo has advantages to become a logistics hub for part of the sub-region if it generates the quality of services adapted to the market requirements that corresponds more to their relative advantages. Such a strategy would generate recommendations encompassed with the needs of the productive sector and would give a framework to the set of solutions aimed at trade facilitation. The benefit of this measure is a long term one. By developing a nation-wide strategy to develop logistics and distribution services, new services are expected to emerge that will contribute with value creation – and then growth – and with employment generation.

CONCLUSION

The first two recommendations (improving ship to yard operations and implementing a Port Management Information System) are partial improvements that could be undertaken before a

larger port expansion program that is already under discussion with the private sector and the Port of Lomé. These partial improvements are feasible considering that the total volume of containers handled at the port and other cargoes (not only transit) would benefit from them. If implemented, these improvements will complement any of the two expansion projects.

The implementation of a truck appointment system is also feasible and will not only decongest roads near the port but also will allow the port authority to create a database of the trucking sector with detailed information of the fleet serving the port. This recommendation may need complementary actions to provide truckers with a staging area where they could wait until their appointment to enter the port.

The implementation of an electronic transit service is highly feasible and could be implemented on a regional basis with neighboring countries. It is a project that could be developed and operated under a PPP scheme, ensuring long-term sustainability.

The improvements associated with the strategy to develop the road transport sector may have not only positive results but also potentially negative results for some in the trucking industry. The implications of these strategies in a liberalized environment should be analyzed carefully and winners and losers identified.

The development of the beltway around the city is the most expensive improvement and the impact of the benefits is small compared with the amount of the investment. This improvement may have other economic incentives but would require a more detailed analysis of the benefits.

The other two improvements (adaptation of road design standards and the development of a bilateral logistics strategy for Burkina Faso and Togo) are in principle feasible but the benefits will vary depending on the solutions identified and their impact on the segment of the corridor. The logistics strategy would bring benefits to the sector in the long term and the implementing activities would likely be low-cost policy actions.

All these potential improvements appear desirable but need further investigation to verify their potential.

1. INTRODUCTION

BACKGROUND

The USAID-funded West Africa Trade Hub (WA Trade Hub) Reduced Road Transport Costs (RRTC) initiative researches and evaluates the logistics environment on a number of West African corridors and recommends ways to improve their efficiency. The WA Trade Hub and the Worldwide Support for Trade Capacity Building (TCBoost) collaborated on an assessment of the Tema–Ouagadougou Transport Corridor in 2009 and 2010 and had interesting results, presented in two reports—Transport and Logistics Cost on the Tema–Ouagadougou Corridor and West Africa Transport Logistics Analysis Using FastPath: Tema–Ouagadougou Corridor. As a result, USAID/West Africa requested that the programs continue collaborating on analysis of other West Africa transport corridors using the best elements of the RRTC and FastPath methodologies.

The RRTC methodology was developed by Carana Corporation (the implementer of the West Africa Trade Hub) for use in Latin America. It examines the costs of exporting, from the point of loading goods at an inland location to the point of departure of the ships carrying the goods to market, and compares them with developing-country norms. The West Africa Trade Hub also uses this methodology for imports. The methodology consists of tabulating costs along chosen value chains, breaking the costs down into formal and informal and public and private sector, and establishing the weak links in the chain relative to global norms. The study determines the most serious deviations from the norms and identifies the causes: corruption, logistical mismanagement, red tape, poor infrastructure, weak institutions, poor coordination, or other reasons.

West Africa Trade Hub Technical Report No. 47, Transport and Logistics Costs on the Lomé–Ouagadougou Corridor, and the RRTC analysis detailed the institutional arrangements, procedures, and activities related to transportation along the corridor and the logistics costs for both imports and exports. The report shed light on many procedural bottlenecks.

This report complements the RRTC analysis by assessing the state of the infrastructure (ports, roads, border crossings), as well as the general condition of the environment influencing road capacity and consequently, general transport costs. The methodology used makes possible a comparison of the performance of the Lomé–Ouagadougou corridor with that of other corridors in West Africa, throughout the continent, or throughout the world.

USAID/West Africa also expressed interest in using FastPath to learn more about how the infrastructure, processes, and procedures at Lomé port increase shipping costs so that recommendations for reducing costs can be made.

Transport and logistics costs and steps referred to in this and the West Africa Trade Hub's analyses are only part of the activities along a logistics chain. In fact, they refer only to transport and logistics activities that take place in the African continental segment of the chain (maritime segment is excluded as well as the segment on the other side of the chain) and they only incorporate direct costs: transport costs, handling on the transport segment, and documentation.

This report reflects the collaboration between the West Africa Trade Hub and TCBoost on developing a comprehensive diagnostic for the Lomé–Ouagadougou Corridor. The TCBoost team would like to thank the West Africa Trade Hub for its assistance in developing a joint work plan and providing and collecting data for FastPath.

OBJECTIVE

The objective of this report is to present an analysis of Lomé–Ouagadougou corridor performance using FastPath. The report also aims to demonstrate how the FastPath methodology can complement the RRTC methodology to deliver an easily replicable and comprehensive corridor diagnostic to inform discussions with stakeholders and help determine the highest priorities for technical assistance.

FASTPATH

FastPath, developed by Nathan Associates Inc., is a model for assessing performance along a transport corridor in a consistent and easily replicable fashion. The model focuses mainly on infrastructure—also referred to as the transport logistics chain. The main variables measured are cost, time, and reliability; the three variables are used to generate a summary performance measure, or logistics score. The flexibility of the FastPath software allows the user to break down the infrastructure components of the transport logistics chain into nodes and links and measure the three variables (cost, time, and reliability) for each component (e.g., port, road, border post).

The model allows the analysis, by commodity type and mode of transportation (road, rail, inland waterways, and coastal), of corridors serving a single port. Containers are used as the main unit of measurement for both imports and exports. Each corridor analysis is called a scenario and given a scenario name. Improvements to FastPath following recommendations received from other donors, including the World Bank, have resulted in the enhanced version 1.2, with improved data for border posts and road performance.

Upon finalization of the data input process, the performance data for a scenario are compared with international norms and a logistics score for each component of the corridor is created. Bar charts show the contribution of each mode to the overall price or time in the corridor and in comparison to international norms. The economic importance of the corridor is calculated in terms of the value of freight traversing it and the total logistics price paid by shippers for the freight. All scenario data are stored in the model's database.

When the base case describing current conditions is created for a given corridor, the user can create several alternative scenarios with potential performance improvements. The tool compares the base case price and time bar charts with the ideal case and with the alternative scenarios. Furthermore, a cost-benefit analysis module compares the benefits of the improvements with the costs of the improvements (as estimated by the user). The cost-benefit framework enables the

user to project future traffic and determine the benefits expected from a particular improvement and net present value and economic internal rate of return for the improvement.

In the next chapter, we describe the Lomé–Ouagadougou base case scenarios as defined by the FastPath analysis and the logistics scores for the entire corridor and each subcomponent.

2. CORRIDOR DESCRIPTION

The Lomé–Ouagadougou transport corridor consists of the port of Lomé, the Terminal du Sahel, the road going north connecting the port with the border posts at Cinkassé (Togo) and Bittou (Burkina Faso), and the road linking the Bittou border post to Ouagadougou.

Between Lomé and Ouagadougou is a 928-km road corridor in an area that is predominantly flat but with some low hills. The zone is scarcely populated, and low-density agriculture, nature parks and reserves, and forests are prevalent. Towns along the corridor are mostly small to medium size, with the exception of the cities—Lomé, Atakpame, Kara, Sokodé in Togo, and Bittou, Koupela and Ouagadougou in Burkina Faso (see Table 2-1).

Table 2-1

Population of Main Cities on Lomé– Ouagadougou Corridor

Togo		Burkina Faso	
City	Population[a]	City	Population[b]
Lomé	1,008,000	Ouagadougou	1,475,223
Sokodé	111,200	Tenkodogo	44,491
Kara	104,900	Koupela	28,151
Atakpamé	77,300	Bittou	20,118
Dapaong	53,600	Manga	19,860

[a]2007 estimate
[b]2006 estimates
Source: U.S Department of States Web Site and www.CityPopulation.de

As a result of this low population density, the corridor has low traffic volume, with the exception of the road network in larger cities and some towns, where intense commercial activity takes place and where trucks stop just beside the travel lanes. Because bypasses do not exist, long-distance freight traffic mixes with urban traffic in main cities and towns. In Ouagadougou, municipal regulations limit heavy-truck traffic during some periods of the day, as discussed later in this report.

The corridor is served by the Port of Lomé, which is well served by shipping lines, both regular lines and tramping.

PORT OF LOMÉ

The Port of Lomé handles some 1,200 ships per year ranging from small to large ships, and from regular to tramping lines. Table 2-2 summarizes the ships of interest to our analysis that called on the Port of Lomé in 2009.

Table 2-2

Ships handled by the Port of Lomé in 2009

Type of Ship	Number of Vessels	Net Cargo (ton)	Type of Merchandise
Diverse Cargo	134	760,474	Conventional
Fishing	44	540	Conventional
Bulk Grains	12	81,279	Dry Bulk
Reefer	27	26,612	Conventional
Bulk Iron ore	36	1,555,379	Dry Bulk
Petro tankers	110	862,910	Liquid Bulk
Container	569	3,696,585	Container
Ro-ro	178	164,361	Conventional
Other tankers	3	12,331	Liquid Bulk
Bitumen	23	154,516	Conventional
All others	13	-	Other (n/a)
Total	1,166	7,326,128	

Source : Port Autonome de Lomé

Shipping Lines

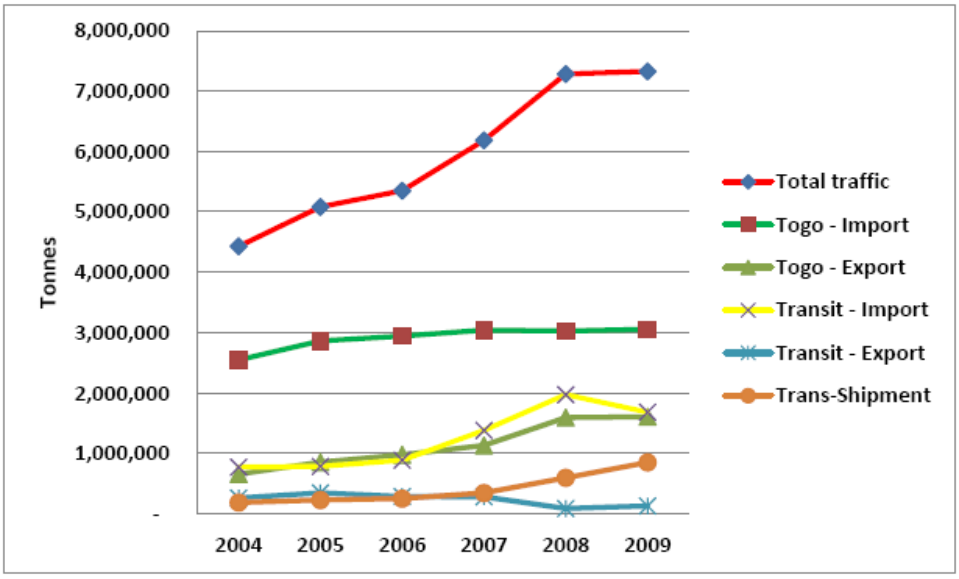
The regular shipping lines calling at Lomé Port are container ships and ro-ro ships. These are flag ships operated by companies such as Maersk, CMA-CGM, DELMAS, MSC, PIL, and Grimaldi. Most of the other lines operating at the Port of Lomé are tramping lines freighted for the transport of conventional and bulk cargo.

Cargo Volume

Total traffic handled at the Port of Lomé recorded a steady increase during the period of 2004 to 2008, from 4.5 million tons to over 7 million tons, an increase of 35.7 percent (see Figure 2-1).

The main exports are agricultural commodities such as cotton, cocoa, oil cakes for animal feed, beans, and teak wood. Imports are mostly foodstuff such as rice, sugar, and wheat, as well as gypsum, clinker, building materials, fertilizers, hydrocarbons, vehicles, and textiles.

Figure 2-1
Port of Lomé Total Cargo Volume



Source: West Africa Trade Hub from Port Autonome de Lomé

The cargo handled at the port can be broken down into the following modes of transportation: in containers (46 percent), in dry bulk (23 percent), in liquid bulk (18 percent), and general/breakbulk (13 percent). By 2009, the port handled 51 percent of total cargo in containers (see Table 2-3). Furthermore, analysis of transit cargo data shows an increase of transit volumes from 2004 through 2008 and a slight decline in 2009 (see Table 2-4).

Table 2-3
Cargo Volumes Handled by Lomé Port by Handling Mode

Import and Export	2007		2008		2009	
	'000 Tons	%	'000 Tons	%	'000 Tons	%
Total Bulk (Liquid and Dry)	2,535	41%	3,117	43%	2,529	35%
Containers	2,844	46%	3,483	48%	3,770	51%
Conventional	804	13%	680	9%	1,027	14%
Total in 1,000 tons	6,184	100%	7,280	100%	7,326	100%

Source : Port Autonome de Lomé

Table 2-4
Transit Traffic Volume at Lomé Port (Tons), 2004–2009

2004	2005	2006	2007	2008	2009
1,035,635	1,132,132	1,175,946	1,664,968	2,061,295	1,814,093

Source : Port Autonome de Lomé

Container Traffic

Container traffic recorded an increase of 56.1 percent from 2003 to 2009—166,441 TEU to 260,027 TEU. In terms of net weight, growth was close to threefold. Table 2-5 shows historic

throughput volumes. The following factors contributed to the increase of traffic and throughput at the Port of Lomé:

- Political and civil unrest in Ivory Coast, resulting in the rerouting of transit cargo from Abidjan Port to neighboring ports
- Containerization (more cargo being shipped in containers)
- Commercial growth in Togo and in the sub-Saharan countries

Table 2-5
Volume Throughput at Port of Lomé, 2003–2009 (TEU)

Year	Throughput (Tons)	Throughput (TEU)	Transit Import/Export	Percentage of Transit Cargo
2003	1,447,325	166,441	20,472	12.3 %
2004	1,991,183	184,998	24,974	13.5 %
2005	2,309,683	203,372	29,692	14.6 %
2006	1,978,948	215,892	33,895	15.7 %
2007	2,825,071	237,891	41,393	17.4 %
2008	2,860,161	219,080	35,437	16.2 %
2009	3,025,898	260,027	35,980	13.8 %

Source : Port Autonome de Lomé

According to shipper's councils and handling companies, 60 percent to 70 percent of transit containers are stripped at the port and the contents trucked as break bulk because:

- Transporters can fit more break-bulk cargo on a truck than containerized cargo
- Fees paid at road checkpoints (official and unofficial) are considerably higher per unit transported, and
- Container demurrage charges/deposit tends to be too high.

General/Breakbulk Cargo

Conventional traffic made up 14 percent of total cargo in 2009[1] and 13 percent in 2007. This category is composed of ro-ro traffic, break-bulk bagged goods, and packaged goods and machinery.

Liquid and Dry Bulk Traffic

Dry and liquid bulk made up 35 percent of total traffic in 2009, 43 percent in 2008, and 41 percent in 2007. Liquid bulk consists mainly of petroleum products and dry bulk consists of agricultural products and construction materials such as clinker and powder cement.

[1] Port Autonome de Lomé

Port and Logistics Infrastructure

The Port of Lomé was built in 1968 and has undergone few modifications or extensions. It has the following facilities:

- Harbor, channel, and one main entrance
- Two finger piers (pier 1 and pier 2)
- Fishing port
- Pier alongside the east water breaker
- Warehouses and yards.

Figure 2-2 shows an aerial view of the facilities that comprise the port.

Figure 2-2
Port of Lomé Layout and Different Cargo Terminals

Source : Google Earth

Harbor and Entrance Channel

At 14 m and 16 m draft, the Port of Lomé offers convenient and safe facilities for anchorage in the harbor and entrance to the port. Given the political stability and safety in and around the Port of Lomé, it is a safe harbor for many ships traveling along the West African coast.

Docks

For the purpose of analysis, the berths of the main port of Lomé are divided into five sections (see Table 2-6).

Table 2-6
Lome´Port Infrastructure and Berthing Facilities

Designation	Capacity	Specialties	Dimension width/length (m)	Depth (m)
Pier 1	4 berths	Conventional goods	72/366.5	9.5 (3 berths), 7(1 berth)
Pier 2	2 berths (#5&6)	Container terminal	140/250	11 and 12
Oil Berth	1 berth	Hydrocarbons	250	13.5
Ore Dock	1 berth	Ores	210	11.5
Fishing harbor	6 to 9 trawlers	Fish	60	4.5
Port Basin	81 ha	Maneuvering	950/1,720	16+

Source: www.togoport.tg

Pier 1. With a length of 366 meters, Pier 1 has 4 berths dedicated to conventionally transported cargo, (ro-ro) and break-bulk vessels (bagged imports) and multipurpose vessels.

Pier 2. Pier 2 has two berths and is dedicated to containerized cargo. This port section is under the concession of two stevedoring companies, SE2M and Manuport. These berths have the deepest depth in the port (11 and 12 meters). Pier 2 handles 90 percent of container traffic.

Bulk terminal. the other berths are dedicated to liquid and dry bulk (oil, iron ore, cement and clinker).

Fishing terminal. The fishing terminal is not considered in this analysis.

Pier 3 Terminal. This is a project in the study phase. A quay with berthing facilities for container ships will be built between the fishing terminal and Pier 2.

Yards

There are several yards in the port of Lomé. Some are part of the terminals inside the port and some are outside the port, yet linked to the port as extensions to it.

P1 TP. Pier 1, despite its narrow width, has its own yard with inbound and outbound traffic, both guarded. The yard is used for unloading ships and loading trucks with break-bulk and conventional cargo (bagged goods) and dry bulk such as wheat and other grains. This is a no-parking zone for any vehicle not involved in ship unloading.

P2 TP. Pier 2 receives ship-discharged containers from imports and transshipment and stages containers ready for loading as exports and empties. This yard can hold up to 1,000 TEU or two average container shiploads. Containers unloaded or ready for loading onto ships remain no longer than 3 days in this yard. The P2 TP yard is shared by the two stevedoring companies operating on the container ships, SE2M and Manuport. Only the equipment belonging to these stevedores (mobile harbor cranes, reach stackers, and terminal trucks) are allowed in this yard. The only activities performed in this yard are container movements (entrance, load, unload, shifting, and removal).

Container Terminal Yard. The Container Terminal Yard takes up 200,000 sq. m. It is managed by SE2M for storing import and export containers. When customs clearance formalities have been completed, stevedores move containers to TP3 or *Le Terminal du Sahel* for cargo unstuffing (removal from the container) if the cargo is to be loaded onto multiaxle trucks heading north. Conversely, when the container ship is ready for loading empties or full containers meant for export, the stevedore moves them from the container yard to the P2 TP in preparation for loading onto the ship.

TP1 Yard. This space is located within the boundaries of the port. This is a vital space joining the different zones of the port, linking Pier 1, Pier 2, the warehouses, the container terminal and the TP2 yard. It measures about 15,000 sq. m. and is for trucks admitted inside the port and temporary parking for trucks headed to the Sahel countries. Trucks from Mali and Burkina Faso gather in this yard while waiting to be loaded with cargo heading north in convoy. Although trucks must be parked somewhere, TP1 yard may not be the best place for them because they add congestion and confusion to port traffic.

TP2 Yard. TP2 Yard has 50,000 sq. m. assigned for empty containers for re-export. Empty containers are returned from the local market or from the Free Trade Market and Terminal du Sahel after having been emptied of cargo. The empty containers are handled by the stevedores SE2M and Manuport. They are checked out to customers in preparation for export of goods, or readied for shipment as empty containers.

TP3 Yard. The TP3 Yard is also called *Terminal du Sahel*. It is where cargo heading for Sahel countries (Niger, Burkina Faso, Mali, and Central African Republic) is staged. When transit merchandise—containerized and break-bulk cargo—has cleared port customs, it is sent to TP3 for processing. There, if container is stripped, Customs scans the merchandise in the container and the customer empties the container while two customs agents and other authorities observe the process and carry out monitoring. Interviews conducted by the West Africa Trade Hub found that for stripped cargo there is no security belt to actually guarantee arrival of transit cargo to final destination. Cargo is consolidated in 45-ton trucks before the trucks are checked out of the Terminal du Sahel and head for Burkina Faso or Mali in convoys with escorts. Convoys leaving Lomé are usually composed of 50 to 75 trucks. The system creates delay as trucks wait for the convoy to be assembled (see Exhibit 2-1).

Exhibit 2-1

Solidarité sur la Mer

In 1994 the Lomé Port Authority created a convoy system called *Solidarité sur la Mer* for cargo transported by road to Sahel countries. The system organizes convoys under customs and police escort for cargo going to the landlocked countries of Burkina Faso, Mali, and Niger. Convoys leave three times a week: Tuesday, Thursday, Saturday. The: system is designed to offer the following advantages

- Security for drivers and goods
- Transport facilitation
- Elimination of bribes and informal fees
- Improved transit transport time and reduced transit costs.

Source: Port of Lomé. www.togoport.net

The Terminal du Sahel doesn't have facilities to provide additional services to cargo such as storage or even electricity for refrigerated containers; this limits the type of cargo that can go to

Burkina Faso (and other Sahel countries) from Port of Lomé. There is no weighbridge in the terminal and the Port of Lomé does not have responsibility for monitoring the weight of trucks leaving the port, which seems to be a weakness in the regulations.[2] Indeed, the West Africa Trade Hub reported that only 20-30 percent of transit cargo is transported in containers while the rest is stripped and transported as noncontainerized. As a result, a substantial proportion of trucks leave the terminal overweight, given that the road transport rate is determined by weight and not by trip, which encourages the driver to load the truck to the maximum to optimize the trip, evidently at the expense of the service life of the truck and the road. Overloading, combined with a lack of maintenance, is probably one of the causes of the relatively high number of broken-down trucks observed during the field visit. Recently, the control exerted in Burkina Faso over excess weight seems to limit the overweight to the "economic" limit that is imposed by a fine: 12,000 CFA per ton this year (approximately US$25) and climbing to 24,000 CFA (US$50) and 60,000 CFA (US$120) later.

Other Yards. There are several yards adjacent to the Port of Lomé, providing vital space for storing cargo headed to the local market and for transit to Sahel countries. Most of these yards such as MADT (Magasins et Aires de Dépôt et de Transit) are under Customs control. In MADT, cargo can be stored up to 6 months (4 months import period plus 2 months leniency). After 6 months, Customs can declare cargo illegally stored and destroy or sell it. Transit cargo gets free storage for up to 25 days and normally does not incur storage charges.

Warehouses

Warehousing areas occupy 110,000 sq. m. inside the port. The multitude of warehouses at the Port of Lomé gives the port a tremendous advantage in achieving its ambition to be a gateway port for Sahel countries. There are warehouses on Pier 1 and in the area between the container terminal and TP2. These are *Entrepôts* A through F, managed by the Lomé Port Authority (*Port Autonome de Lomé*). In addition to these, several warehouses (*entrepôts*) are assigned to Sahel countries (Mali, Burkina Faso, Niger), to facilitate the transit and storage of their merchandise:

- Four transit warehouses of 7,500 sq. m. each
- Two 10,000-sq. m. warehouses belonging to the Togolese Chamber of Commerce
- One 5,000-sq. m. transit warehouse for Niger
- One 5,000-sq. m. transit warehouse for Mali

Two 5,000-sq. m. transit warehouses for Burkina Faso.

The port also offers more than 200,000 sq. m. of open space inside port boundaries for storage for Sahel countries. A 3-hectare parking lot inside the port has been set aside for secondhand vehicles as well.

The costs and tariffs for storing cargo in the warehouses have a similar structure as those for the use of the yards.

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[2] This seems to be common in West Africa. In Tema, the port does not want to commit to controlling the weight of trucks leaving the port because such an obligation could slow port operations.

Port Inner Roads

The port utility roads connect the main gate to the terminals, the piers, the yards and parks, and port warehouses. These roads are heavily used and often in disrepair, and traffic is jammed by trucks coming to load break-bulk and conventional import commodities offloaded from ships or ready to be loaded for export. The inner port roads are often congested with trucks parked alongside or maneuvering among container-handling equipment. Passenger cars can get trapped for hours waiting for roads to clear. In our observations, no attempts have been made to regulate or organize traffic on these inner roads and no agents are assigned to port traffic and security.

Gates

There are two commercial gates to the port: the main gate, at the main entrance, on the west side of the port, and the northeast gate, near the industrial park and activity zone east of Lomé City. The northeast gate is not open for daily business but is used occasionally for special convoys or when necessity arises. The main gate is used for all commercial and administrative traffic. Lomé Port Authority has its administrative buildings near the main gate where Customs and other agencies and security carry out their duties. The processes taking place at the gate crossing (in or out) are described in more detail later in this report.

It was reported that since the adoption of the International Ships and Port Facilities Security (ISPS) Code, security controls have intensified and the entry and exit of people and vehicles are monitored more systematically. Access to the port is controlled by the military and the national police (*gendarmerie nationale*), while the security of the port perimeter is provided by port personnel.

Port Services

Port services to the shipping industry include services at the anchorage areas, harbor master services such as tugs and pilotage, and mooring, berthing and ship cargo handling.

Anchorage

Lomé Port offers secure facilities for anchoring ships while they await admission into the port, weather a storm, or simply replenish their stores. The Lomé Port Authority regulates traffic, organizes ship movement and all navigation using radar, beacons, and mooring buoys. It has a vessel traffic system that enables the surveillance and monitoring of the waterways and maritime traffic and the securing of the port's marine perimeter.

The Port Authority provides towing service with equipment that includes three tugboats, life-saving rocket boats, and two palatines. It also has three firefighting trucks. The Port Authority earns revenue from anchored ships headed for Lomé or on their way to another destination.

Piloting and Mooring

The Port Authority harbor master provides tugboats and a captain to berth ships of at least 1,250 cu. m. Two tugboats are automatically assigned to escort or tow ships entering or exiting the port. Ship docking is done by a crew of port workers. With its fleet of tugboats aging, the port has acquired a new 4,500-horsepower tugboat from Holland's Damen Shipyards. With this new addition, the Port of Lomé owns five tugboats.

Ship Visits by the Authorities

When ships are berthed and docked, visits by the authorities begin: phytosanitary, police, customs, and others. The authorities do not coordinate the timing of their visits to vessels. Each operates on its own schedule, often involving more manpower than necessary, often causing disruption and wasted time to ship personnel and operations.

Ship Cargo Handling

The Port of Lomé is a multipurpose port handling all types of ships, including container ships, bulk vessels (grains and mineral bulk), vehicle vessels (ro-ro), conventional vessels (general cargo and break bulk), liquid bulk, and fishing ships.

Three stevedoring companies operate at the Port of Lomé, handling containerized, bulk and conventional (break bulk and general) cargo. These include the Bolloré group, managing the Société d'Entreprise de Manutention Maritime (SE2M) and the Société d'Entreprise de Moyens et de Manutention Maritime (SE3M), Manuport, mainly owned by the GETMA-Necotrans Group, and the Port Authority of Lomé.

Container Handling

Two operators have a 10-year concession to handle container ships calling on the Port of Lomé: Getma (Manuport) and Bolloré (SE2M). Each operator disposes of its own container handling equipment to handle the ships of its customers. Pier 2 is shared by the two stevedores

Manuport handles the ships that belong to Getma and others. Its market share in container handling at the Port of Lomé is close to 40 percent. Manuport uses two mobile harbor cranes to load and unload containers from ships and four reach stackers for land and yard operations.

SE2M (Bolloré) also operates container ships. Its market share in container handling at the Port of Lomé is about 60 percent. SE2M uses three mobile harbor cranes to load and unload containers from ships, and eight reach stackers for land and yard operations.

Containers are stored temporarily in the yard of Pier 2 or in the container terminal before customs processing and haulage to the appropriate yard. The dwell time for containers was 12 to 13 days in 2008 but had climbed to 17 days in 2009, and to 21 days in 2010, causing much congestion and operational difficulties at the port. This dwell time is due partly to lengthy customs procedures and customs' lack of screening and safety equipment such as scanners.

Some shipping lines note poor productivity and equipment downtime at Lomé Port and fault the stevedores and the port authority for not using reliable software to manage ship handling (call scheduling and preparing for operations), which leads to wasted time and resources.

General Cargo and Ro-Ro Ship Handling

General cargo and the ro-ro ships use Pier 1 and Pier 2, according to berthing space availability. Services are provided by the following stevedoring companies:

- SE3M (Bolloré)
- Manuport

Bagged and palletized goods are unloaded directly onto trucks for storage in port warehouses, or customs-bonded yards such as the used-car yard.

Here too, shipping lines note a lack of adequate equipment for loading and unloading ships, the length of operations, and stevedores' lack of adequate information systems to operate ships.

Dry Bulk Cargo Loading

Dry bulk cargo arrives mainly in tramping ships, which usually dock at Pier 1. Because of the equipment and the process used for ship operations, ship loading and unloading tend to be slow, and ships occupy the berth for several days. This causes congestion for ships waiting at anchorage.

Dry bulk ships carry cargo such as clinker, cement, iron ore, coal, and wheat and other grain cereals. Ship handling for loading and unloading cargo is done by the Port Authority of Lomé ship operations teams using ship means and land equipment.

Because there is no adequate space or silo for storing these goods in the port, dry bulk cargo is unloaded directly from ships onto trucks organized by importers. Cargo is cleared through main port gate and directed to special areas outside the port or to customers' sites where silos and yards are used to store the goods or consolidate them for land transport to the countries of the Sahel.

Liquid Bulk Cargo Loading

This business is mainly handled by tramp ships. Liquid bulk ships carry hydrocarbons and petroleum products. Ships dock at the petroleum and bulk pier near the fishing port. The Port Authority of Lomé handles liquid bulk ships. Hydrocarbon products are unloaded into pipelines taking the liquids to nearby tank farms for local and regional distribution.

Yard Operations

Yard operations are all the activities in and around the port that deal with cargo movement to the temporary and final destinations from the quay.

Shore-to-Yard Transfers

When cargo is offloaded from a ship, it has to be moved to a temporary space for customs clearance. Containers are stored temporarily in the yard on Pier 2 before being moved to the container terminal or external yards under customs control.

The shore-to-yard movement of cargo transfers and intermediate shifting within the port are handled by stevedores operating under concession. Reach stackers and terminal tractors are used for handling containers and cargo.

Yard-to-Gate Transfer

When cargo has been cleared by Customs, it is moved to the gate for processing to its intermediate (transit) or final destination (domestic). There are four authorities at the gate: (1) port security, (2) police, (3) customs agents, and (4) the military or gendarmerie.

Unofficial fees are levied on truck drivers and customs clearing agents during gate processing by customs and security agents.

For containers, the cost of transferring is included in the rate charged to unload, move, and transfer the container to its final yard outside the port—the duty free zone yard for local sales or to the Terminal du Sahel for unstuffing and consolidation before road transport to Burkina Faso or Mali.

Gate-to-Yard Transfer

Gate-to-yard transfers are incurred when exports or empty containers are returned for re-export. Customs procedures are in force for exports of goods, the majority of which (90 percent) come from Burkina Faso, or for re-export of empty containers.

Cargo to be loaded onto ships for export or re-export comes from the gate directly to the staging area. In that case, customs procedures and clearances have been worked out before the cargo enters the port.

Customs Control at Port Gates

Customs procedures implemented at the gate depend on direction (import for domestic use, export from domestic origin, inbound in transit, outbound in transit), type (containerized, break bulk, dry bulk, liquid bulk), and origin and destination of the cargo:

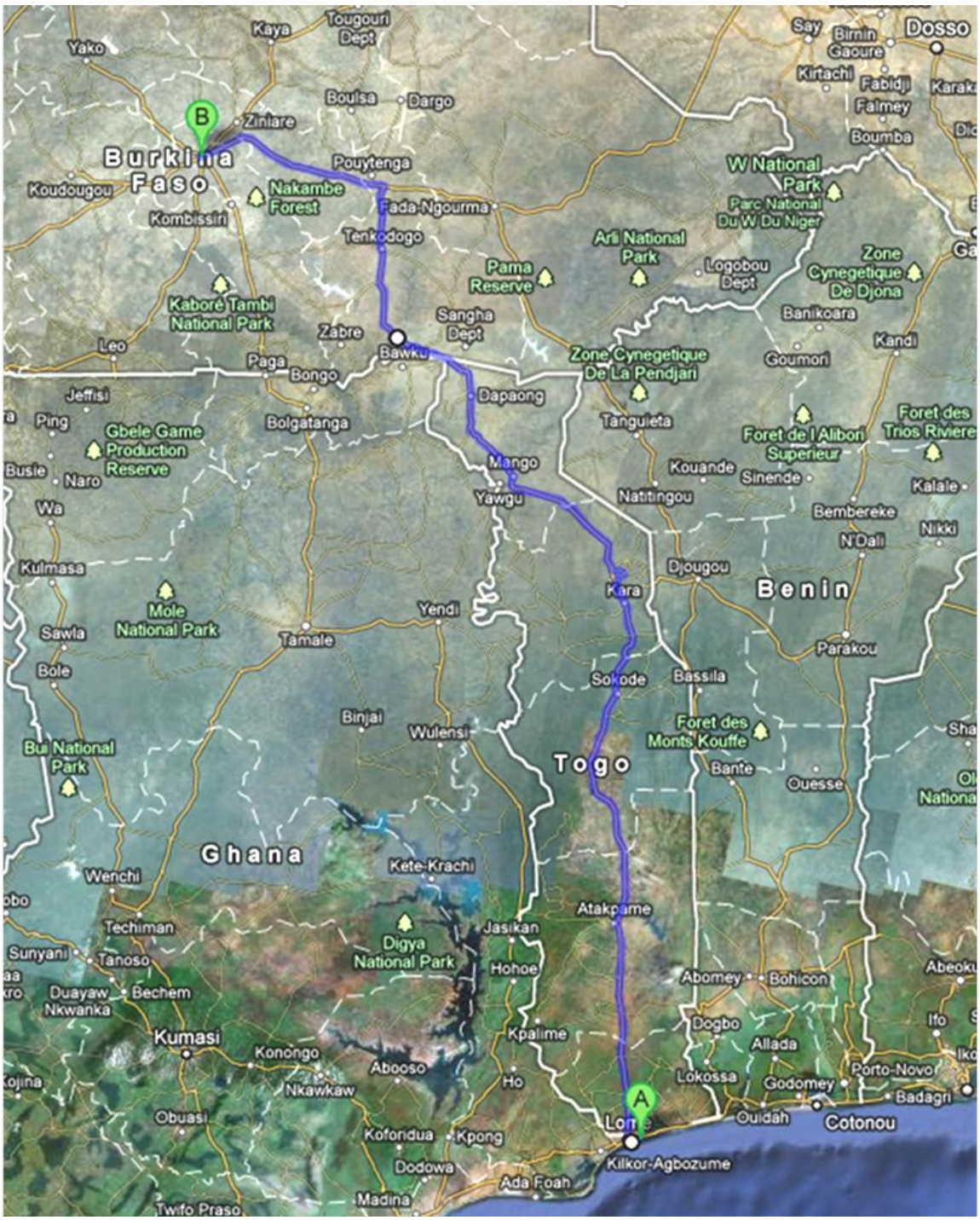
Road Infrastructure

The road from Lomé to Ouagadougou is about 928 km (see Figure 2-2). According to our observations, the condition of the road is mixed—fair through poor; with a few severely damaged segments. In general, the road is better maintained in Burkina Faso than in Togo.[3] Road conditions vary more widely in Togo than in Burkina Faso, from very good to very poor; some segments were recently maintained and in good condition but some sections were in very poor condition, which disrupts the flow of traffic. In Togo on the northern part of the corridor, as the terrain becomes uneven, the condition of the road worsens and the speed of trucks reduces drastically. Some road segments may be scheduled for maintenance, and some work was already under way during the field visit at the end of 2010.

[3] Togo had not implemented the UEMOA axle weight limits when the Trade Hub gathered data October–December 2009. USAID West Africa Trade Hub, Transport and Logistics Costs on the Lomé-Ouagadougou Corridor, 2010.

Figure 2-3

Map of Road Route Lomé–Ouagadougou



Source: Google Maps

Recently the government has focused road maintenance on the urban network in Lomé, in particular around the port. A city bypass exiting the port and avoiding city traffic is planned. The Terminal du Sahel, a parking lot and rest stop for truck drivers, has been created at the north exit of Lomé with capacity for 180 trucks, a restaurant, a mosque, a motel, and a service station.

In Burkina Faso, several measures adopted in recent years have improved the quality of infrastructure: implementation of a load control program; a maintenance fund, although it covers only 70 percent of needs; US$20 million investment in improving the main road network from a World Bank loan implemented by the Ministry of Infrastructure.

Sixteen broken-down trucks were observed between Lomé and the border with Burkina Faso during the two-day field visit—an average of one damaged vehicle every 40 km. Because the field visit began on Wednesday, and the convoys had left Lomé on Tuesday, this average may have been higher the day before. The cause for this rate of breakdowns appears to be a lack of maintenance. Only one accident was observed, and it was a single-vehicle accident caused by excess load. The axle load permitted on this corridor is substantially lower than in Ghana and higher in Togo than in Burkina Faso.

In general, the greatest reason for delay along the road, besides the poor condition of certain road segments, is slow traffic near towns and villages, where commercial activity is intense. Customs, police, and other authorities' roadblocks were not found to be numerous during the field visit, perhaps because the convoy had left the day before.

Several truck parking lots exist along the corridor. Some allow drivers to sleep for a very low fee. Truck drivers regularly stop there to rest—a convenient and advisable practice on long-distance trips. Integrated truck services such as rest areas with lodging, restaurants, lodging, maintenance shops, etc., however, are almost nonexistent.

Next we present a detailed analysis of the main sections of the corridor:

- Port of Lomé–Terminal du Sahel 13 km
- Terminal du Sahel–Cinkassé (Senkanse) 630 km
- Cinkassé–Ouagadougou 285 km

Port of Lomé–Terminal du Sahel

This first segment connects the Port of Lomé with the Terminal du Sahel (13 km), the parking lot in which truckers wait for a Customs escort to organize a convoy of transit trucks to Ouagadougou. Arriving trucks park in roads outside the terminal and wait for cargo to be allocated through the Terminal du Sahel waiting list system (See Exhibit 2-2).

Exhibit 2-2

Waiting List System

Transport at the port is organized by transport associations that oversee the national quotas for truck drivers: two-thirds for Burkinabe trucks and one-third for Togolese trucks. Each country's transporters draw up a list of available trucks and submit it to their association. Truck drivers go to country's truckers' association to get loading tickets and be put on waiting lists numbered by order of arrival. Whatever the country of registration of the truck, the driver chosen for a load pays fees to the transporters' associations and drivers' unions from both countries for managing the quota allocation and for assistance when travelling along the corridor.

Source: Adapted from the report "Transport and Logistics Costs on the Lomé-Ouagadougou Corridor", elaborated by the West Africa Trade Hub Technical Report #26. 2011

In practice, the waiting list applies only to small trucks, for which the measure was designed; in many cases, other interests prevail and both the client and the forwarder can choose the transporter/truck of their preference. The waiting list system does not work and there are discussions to eliminate it considering that it does not seem to have a favorable impact on the price or the quality of the transport services provided.

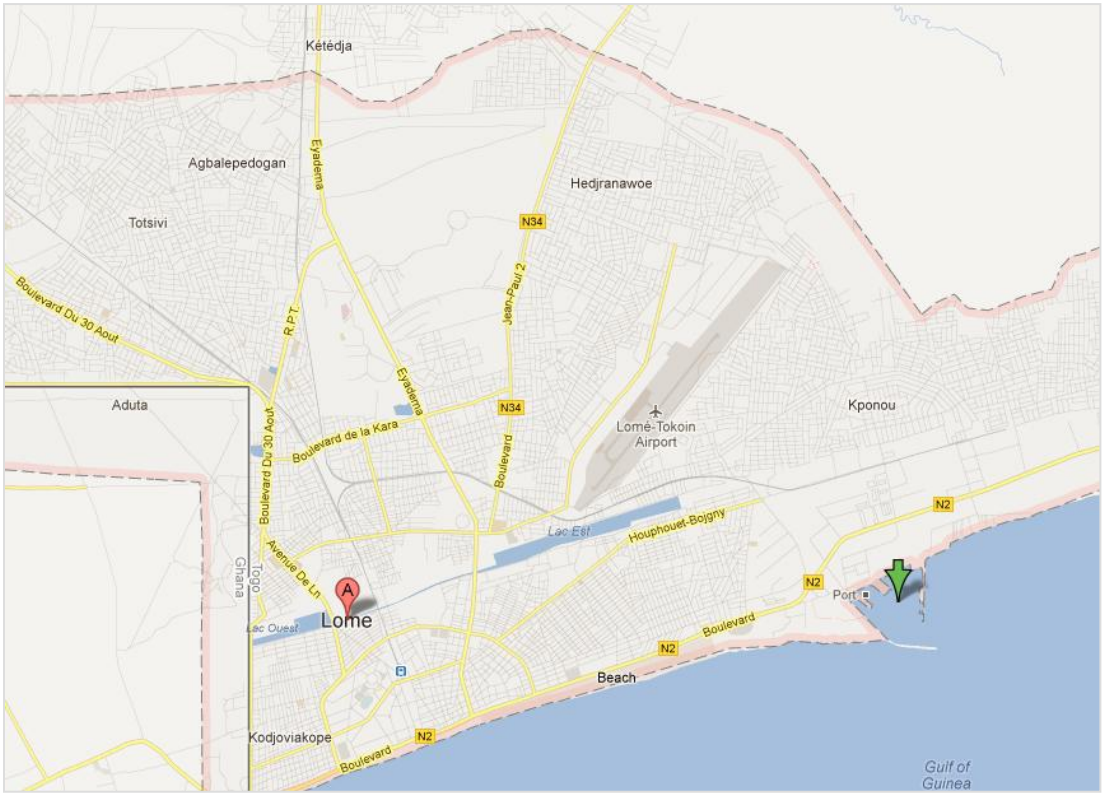
Two major roads lead to the Port of Lomé:

- The major road going along the seashore, Beach Boulevard, runs east to west and leads to the port. This is a wide, nicely paved, well-lit road leading from the border with Ghana to the entrance of the port; it bypasses the port to the north and continues east.
- The major north-south roads are the Boulevard du 30 Août and Eyadema, both leading to Beach Boulevard and the port on the western side of town. With side city roads, they constitute the secondary roads. Important secondary roads such as Houphouet-Boigny Boulevard and the old rail connection run parallel to Beach Boulevard across town from east to west to connect the port with the Eyadema route to the north.

Most port traffic heading north or arriving to the port takes theses two roads to secondary cross-town roads and the Beach Boulevard. The heavy commercial traffic from the north mingles with heavy city traffic, creating constant traffic jams in and around the city. As a result, the roads are in a constant state of disrepair. This is a major problem for both the city and the port. Figure 2-4 shows how these roads cross through the middle of the town to and from the port.

Figure 2-4

Main Roads Leading to Lomé



Source : Google Maps

The access road to the port is in excellent condition—maintenance works ended in August 2010. The most popular route between the port and the terminal includes paved and dirt road segments, in fair to poor condition, and highly congested because of high volume and pedestrians and motorcycles in the traffic mix; trucks can spend 1 hour covering the 13 kilometers between the port and the Terminal du Sahel. Alternative streets in the local network are in very poor condition because of regular flooding and trucks' using them to avoid traffic; and in some places traffic is virtually at a standstill.

Terminal du Sahel–Cinkassé (Senkanse)

From the Terminal du Sahel to the border with Burkina Faso (630 km), the road is a combination of good/fair condition and narrow. Numerous towns and small villages are located along the road, which has no access control, which means that trucks must go slowly because pedestrians, motorcycles and animals cross the road wherever they wish. This situation is especially intense in bigger towns and cities such as Notsé, Tsétvie and Atakpamé, given the commercial activity that takes place just along the road.

Road conditions on the Togo segment are better near Lomé and up to Atakpamé but deteriorate quickly, especially on hilly and mountainous segments. In some places, trucks must slow to 10–20 kph. Maintenance needs to be improved on some road segments because poor road conditions shorten the operating life of vehicles. This kind of work is usually part of road rehabilitation projects financed by multilateral financial institutions. Standards should be kept similar for the entire length of the corridor.

Following the requirements of *Solidarité sur la mer*, convoys are formed in the Terminal du Sahel to travel to Ouagarinter in Ouagadougou. The Customs official accompanying the convoy usually travels with a trucker at the end of the convoy, and this escort does not keep trucks ahead in the convoy from being stopped along the road. When trucks arrive at the border they all have to wait for the Customs official to begin transit procedures. Discussions are taking place to see whether a GPS tracking system, similar to that adopted in Ghana, can be implemented along this corridor to eliminate Customs convoys. Adopting this technology will eliminate the need for escorts—and related payment—and therefore also the restriction on the days of the week that trucks can leave for Ouagadougou.

A new border post, Ouaga 2000 in Cinkassé, has been built under concession through an UEMOA initiative. This post operates as a one-stop border control, which means that entry cargo is controlled by authorities of the entry country but not by authorities of the exit country, although authorities from both countries are present at the post. The project has several phases, the second including the development of areas for logistics operations. It seems that there is some resistance from truckers to use it given that the use of the facilities could represent a rise of the fees associated with the use of facilities at the border that they usually pay.

A road project financed by the Société Chinoise de Ponts et Chaussées includes the rehabilitation of 6.6 km of the corridor between Tandjouaré and Cinkassé. This also includes a bypass of 4 km at Cinkassé, which will also improve travel times in this section of the corridor.

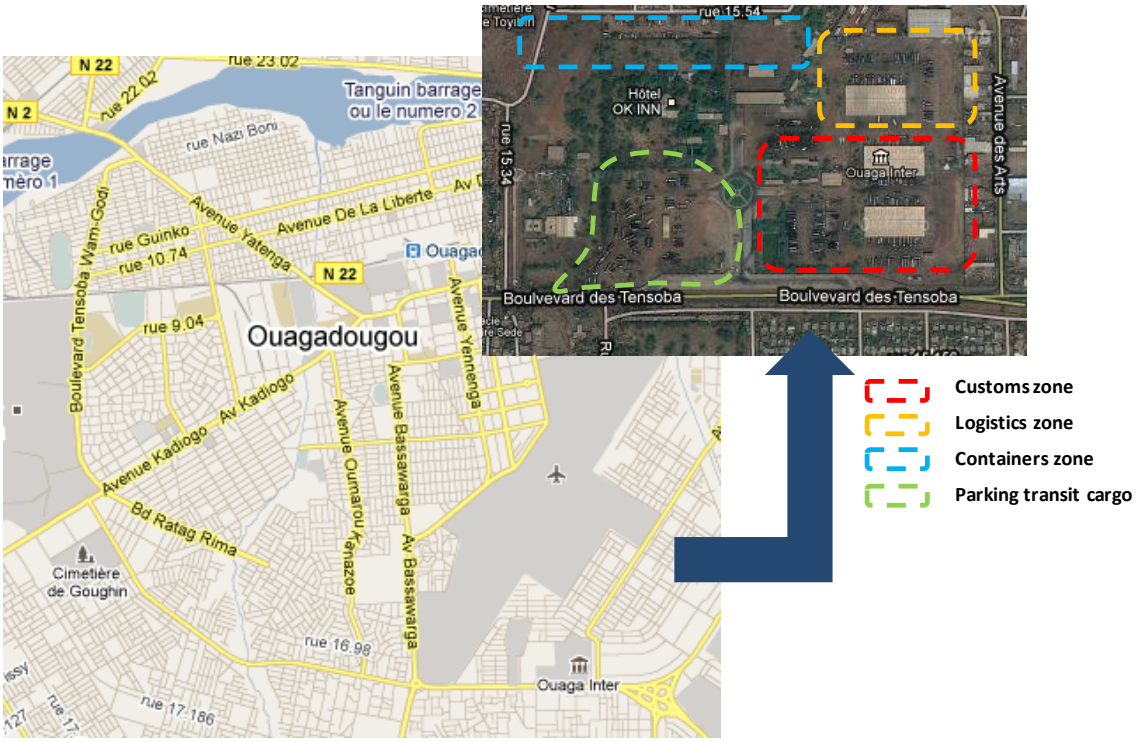
Cinkassé–Ouagadougou

Between Cinkassé and Ouagadougou, 285 km, the corridor has more or less the same characteristics as northern Togo: low density, small towns, some of which with commercial activity along the road, flat to low hills. The condition of the road is rather good in general—better than on Togo's segment of the corridor.

In Ouagadougou, trucks encounter congestion. All import cargo entering Burkina Faso from Togo must be proceed to Ouagarinter, a Customs clearing facility. Ouagarinter, is located in a peripheral avenue and has good capacity. Trucks enter the terminal even if they are in transit to other countries, in which case they stay in the parking lot to get authorization to continue the transit journey. Figure 2-5 illustrates how Ouagarinter is organized and the location and layout of Ouagarinter in Ouagadougou.

Figure 2-5

Ouagarinter Location and Layout



Source: Google Maps

ROAD CONDITIONS

Based on observations made during the field visit, Table 2-7 presents the main characteristics of the three road sections described above.

Table 2-7

Road Inventory for the Lomé–Ouagadougou Corridor

Section/Segment	Distance (Km)	Cumulative	Terrain	Condition	Towns on the Road	Comments
A. Port of Lomé–Terminal du Sahel	**13**					
Segment 1	7	7	Flat	Fair		
Segment 2	6	13	Flat	Poor		Dirt road. Very congested.
B. Terminal du Sahel–Cinkassé	**630**					
Terminal du Sahel–Atakpamé	**139**	No. of accidents observed: 1 - No. of broken-down vehicles observed: 3 - No. of checkpoints observed: 6				
Lomé–Tsétvie	16	29	Flat	Good	2	Fairly congested
Tsétvie–Agbelouvé	27	56	Hilly	Good	0	Fairly congested
Agbelouvé–Notsé	31	87	Hilly	Fair	1	Congested in Notsé. Port of Lomé's truck parking in Notsé
Notsé–Atakpamé	65	152	Hilly	Good	4	Congested in Atakpamé
Atakpamé–Kara	**249**	No. of accidents observed: 0 - No. of broken-down vehicles observed : 10 - No. of checkpoints observed during the field visit: 0				
Atakpamé–Anie	22	174	Hilly	Fair	6	
Anie–Blitta	79	253	Hilly	Fair	0	Very congested
Blitta–Soutoube	29	282	Flat-hilly	Fair	1	
Soutoube–Sokode	46	328	Hilly	Fair	3	Congested, commercial activity
Sokode–Kara	73	401	Mountainous	Poor	2	Slow circulation
Kara–Cinkassé	**242**					
Kara–Andjidé	57	458	Flat-Hilly	Poor 74% Good 26%	3	Slow circulation
Andjidé - Mango	75	533	Flat	Very Poor	4	
Mango - Dapaong	75	608	Flat	Very Poor	1	Slow circulation around Tandjouare
Dapaong-Cinkassé	35	643	Flat	Very poor	1	
C. Cinkassé–Ouagadougou	**285**					
Cinkassé–Koupéla	**144**	No. of accidents observed: 0 - No. of broken-down vehicles observed: 1. No. of checkpoints observed: 3				
Cinkassé–Bittou	37	680	Flat	Fair	0	
Bittou–Tenkodogo	62	742	Flat	Fair	2	
Tenkodogo–Koupéla	45	787	Flat	Good	3	
Koupéla–Ouagadougou (Ouagarinter)	**141**	928	Flat	Good	5	Intense commercial activity entering Ouagadougou

Source: Consultant elaboration based on field observation

Some segments have similar characteristics—terrain type, road surface condition, and road level of congestion. Therefore, for our FastPath analysis we divided the corridor into nine road links and 10 nodes, presented in Table 2-8. The subdivision of the road links was determined based on the physical characteristics of the road (terrain, road surface condition, traffic congestion). These characteristics have an impact on the travel speed, waiting time along the route and operational cost of the vehicles. With these characteristics, FastPath establishes a road factor that is used to estimate operational costs per segment. We describe the implications of this factor in Section 3.

Table 2-8

Lomé–Ouagadougou Corridor FastPath Road Link Characteristics

Link	Length (km)	Terrain	Surface Conditions	Congestion	FastPath Road Factor
Port of Lomé–Terminal du Sahel	13	Flat	Poor	Heavy	2.2
Terminal du Sahel–Anie	161	Hilly	Good	Heavy	2.4
Anie–Sokodé	154	Hilly	Fair	Heavy	2.6
Sokodé–Kara	73	Mountainous	Poor	Heavy	3.7
Kara–Andjidé	57	Flat-Hilly	Fair	Heavy	2.3
Andjidé–Cinkassé	185	Flat	Very poor	Light	1.3
Cinkassé–Bittou	37	Flat	Fair	Light	1.1
Bittou–Tenkodogo	62	Flat	Fair	Light	1.1
Tenkodogo–Ouagarinter	186	Flat	Good	Light	1.0

Source: Consultant elaboration based on field observation

IMPORT AND EXPORT PROCEDURES IN THE CORRIDOR

Import and export procedures in the corridor, time and delays, and official and unofficial costs incurred have been analyzed and validated by the West Africa Trade Hub team.

Our analysis, therefore, takes this information as input for our assessment. In this section we summarize relevant aspects influencing the transport and logistics system's analysis, taken from the study Transport and Logistics Costs on the Lomé–Ouagadougou Corridor.[4] The summary deals with procedures that take place when a truck leaves the port and enters the Terminal du Sahel parking lot.

Appendix B presents a summary of the different steps, costs and times identified by the West Africa Trade Hub and Appendix C describes the methodology and definitions also used by the West Africa Trade Hub.

SCENARIOS FOR FASTPATH ANALYSIS

Port performance varies according to the direction of cargo (inbound or outbound) and whether cargo is containerized or noncontainerized, so we created three FastPath scenarios to assess performance:

[4] West Africa Trade Hub Technical Report No. 47. USAID January 2012

1. Inbound containerized
2. Outbound containerized
3. Inbound noncontainerized

As in other West African corridors, the majority of transit cargo (70 percent) is transported outside containers in both directions because this practice reduces the risk of incurring costs associated with container demurrage. To account for the time and cost incurred during the stripping (inbound) and consolidation (outbound) of containers, the two containerized scenarios (Scenarios 1 and 2) have two different subchains named "containers direct", and "stripped containers" or "consolidated containers" depending the direction of the trade. Stripped containers mean that cargo is "stripped" out of the container and transported as loose cargo. Similarly, consolidated containers means that cargo is transported loose before it is consolidated at the port for export processing. A detailed description and analysis of each scenario is presented in Chapter 3.

SUMMARY STATISTICS FOR CORRIDOR PERFORMANCE

Tables 2-9 through 2-11 summarize the cost, time, and reliability of the Lomé–Ouagadougou Corridor's transport/logistics chain from a shipper's point of view for the three transit traffic scenarios. These tables also show global standards. Costs have been broken down into official and unofficial, in accordance with the information provided by the West Africa Trade Hub.

Table 2-9

Scenario 1—Performance of Main Subcomponents of Inbound Containerized Transit Traffic

Component	Cost (US$/TEU)			Time (hours)		Reliability*	
	Official	Unofficial	Norm Range	Total	Norm Range	%	Norm Range
Av. channel operations	9.05	–	5–15	23.0	1–15	58.7	5–40
Av. unloading at berth	19.15	–	10–50	19.0	4–8	63.2	5–50
Total yard handling and storage	380.36	26.09	30–145	319.0	10–35	46.7	5–40
Customs	124.01	55.37	15–55	87.0	24–60	52.9	5–40
Stripping process	167.21	35.46	–	7.0	–	21.0	–
Port Gate	–	10.06		2.0		50.0	5-100
Transit yard (Terminal du Sahel)	44.00	11.00	–	36.0	–	56.0	–
Road transport direct containers	1,720.33	24.00	50–160	25.48	15–23	Varies by segment	5–100
Road transport stripped containers	1,457.83						
Border crossing at Cinkassé	18.00	8.86	5–15	1.17	1–3	54.0	5–100
Border crossing at Bittou	120.03	11.07	5–15	3.55	1–3	66.0	5–100
Ouagarinter direct containers	872.51	142.85	30–100	25.08	2–6	68.0	5–40
Ouagarinter stripped containers	545.81						

** The percent of average transit time that would include 90 percent of shipments.*

Table 2-10

Scenario 2—Performance of Main Subcomponents of Outbound Containerized Transit Traffic

Component	Cost (US$/TEU)			Time (hours)		Reliability*	
	Official	Unofficial	Norm Range	Total	Norm Range	%	Norm Range
Ouagarinter	165.00	2.21	30–100	2.0	2–6	100.0	5–40
Border crossing at Bittou	44.00	11.00	5–15	0.58	1–3	28.4	5–100
Border crossing at Cinkassé	314.59	13.29	5–15	0.75	1–3	16.7	5–100
Road transport	1,112.00	23.21	50–160	25.48	15–23	Varies by segment	5–100
Customs at Lomé port	49.88	27.44	15–55	5.33	24–60	117.5	5–90
Consolidation	86.50	–	–	7.0	–	21.4	–
Total yard handling/storage	355.00	16.00	30–145	3.25	10–35	213.1	5–40
Av. loading at berth**	19.15	–	10–50	19.0	4–8	63.2	5–50
Av. channel operations	9.05	–	5–15	4.0	1–15	50.0	5–40

** The percent of average transit time that would include 90 percent of shipments.*
*** Average unloading time per container is half the average time for ship unloading.*

Table 2-11

Scenario 3—Performance of Main Subcomponents of Inbound Noncontainerized Transit Traffic

Component	Official Cost (US$/ton)	Unofficial Cost (US$/ton)	Time (hours)	Reliability* (%)
Av. channel operations	0.21	–	132.0	65.2
Av. unloading at berth	1.59	–	96.0	68.8
Total yard handling	2.51	1.3	120.0	58.3
Customs **	5.00		24.0	100.0
Transit yard (Terminal du Sahel)	1.10	0.27	36.0	56.0
Road transport	97.95	4.20	25.48	Varies by segment
Border crossing at Cinkassé	0.45	0.22	1.17	54.0
Border crossing at Bittou	3.00	0.33	3.55	66.0
Ouagarinter	13.65	3.58	25.08	68.0

** The percent of average transit time that would include 90 percent of shipments.*
***Customs costs vary considerably according to nature of cargo. We used a representative cost for the purpose of the analysis.*

The containerized cargo scenarios (Scenarios 1 and 2) have been assigned logistics scores. This score is computed by comparing the performance of a component of the transport/logistics chain and rating it as good, fair, poor, or very poor, according to international standards. This rating is then converted to a numeric score (80 for good, 60 for fair, 40 for poor, and 20 for very poor). Then the scores for price, time, and reliability are averaged to get the total score for a component.

These scores are then given a time-weighted average to compute the subchain total, with reliability treated as variance with a special calculation of the subchain total. If there is more than one subchain in a chain, the scores of the subchains are averaged to compute the chain total. The logistics scores for Scenarios 1 and 2 are presented in Tables 2-12 and 2-13, respectively. A logistics score between 70 and 80 indicates that time, cost, and reliability in the total supply chain are efficient and competitive according to global standards. Reliability is measured in terms of average transit time, which accounts for 90 percent of the variation in transit times for different shipments. This reliability measure reflects the extent to which transit time can be predicted by shippers.[5]

The scenario for noncontainerized cargo (Scenario 3) does not feature logistics scores. Handling of noncontainerized cargo at the port varies according to the type of cargo and the equipment used; therefore establishing a standard measure for performance and comparing it among different subchains is difficult. Consequently, logistics scores are not generated for noncontainerized cargo, but the results for time, cost, and reliability for each subcomponent and the overall subchain can be derived and analyzed.

Table 2-12

Scenario 1, Logistics Scores for Inbound Containerized Cargo,

	TEU/Year	Average Price per TEU	Average Time	Reliability	Logistic Score	Rating
Total Chain	78,632	$3,329	572.0 hours	96%	62	Fair
LOGISTICS SUBCHAINS						
Direct Containers	23,590	$3,606	566.9 hours	97%	61	Fair
Stripped Containers	55,042	$3,211	573.9 hours	96%	62	Fair
Node	**Logistics Score**	**Rating**	**Link**		**Logistic Score**	**Rating**
Port of Lomé	56	Fair-Poor	Port of Lomé–Terminal du Sahel		50	Fair-Poor
Terminal du Sahel	40	Poor	Terminal du Sahel–Anie		67	Fair-Good
Anie	N/A	–	Anie–Sokodé		63	Fair
Sokode	N/A	–	Sokodé–Kara		47	Poor-Fair
Kara	N/A	–	Kara–Andjidé		63	Fair
Andjidé	N/A	–	Andjidé–Cinkassé		63	Fair
Cinkassé	77	Good	Cinkassé–Bittou		73	Good-Fair
Bittou	68	Fair-Good	Bittou–Tenkodogo		73	Good-Fair
Tenkodogo	N/A	–	Tenkodogo–Ouagarinter		67	Fair-Good
Ouagarinter	27	Very Poor				

[5] For typical transport and logistics activities, a score of less than 40 percent is very predictable ("good" reliability), 45–80 percent is relatively predictable (fair reliability), 90–150 percent is somewhat unpredictable (poor reliability), and more than 150 percent is considered highly unpredictable (very poor reliability). For shorter activities these thresholds are higher.

Table 2-13

Logistics Scores for Outbound Containerized Cargo, Scenario 2

	TEU/Year	Average Price per TEU	Average Time	Reliability	Logistic Score	Rating
Total Chain	8,737	$2,221	91.0 hours	101%	63	Fair
LOGISTICS SUBCHAINS						
Direct Containers	2,621	$2,160	86.0 hours	107%	66	Fair-Good
Consolidated Containers	6,116	$2,247	93.0 hours	99%	62	Fair
Node	**Logistic Score**	**Rating**	**Link**		**Logistic Score**	**Rating**
Ouagarinter	57	Fair	Ouagarinter - Tenkodogo		73	Good-Fair
Tenkodogo	N/A	–	Tenkodogo - Bittou		73	Good-Fair
Bittou	70	Good-Fair	Bittou - Cinkassé		73	Good-Fair
Cinkassé	47	Poor-Fair	Cinkassé - Andjidé		70	Fair-Good
Andjidé	N/A	–	Andjidé - Kara		70	Fair-Good
Kara	N/A	–	Kara - Sokodé		53	Fair-Poor
Sokodé	N/A	–	Sokodé - Anie		70	Fair-Good
Anie	N/A	–	Anie - Terminal du Sahel		73	Good-Fair
Terminal du Sahel	N/A	–	Terminal du Sahel - Port of Lomé		63	Fair
Port of Lomé	67	Fair-Good				

Source: Nathan Associates analysis

In the next chapter, we explain in more detail how FastPath was used to model the scenarios and how the logistics scores for each scenario were generated.

3. CORRIDOR ANALYSIS

The analysis of corridor performance was carried out using FastPath. In this chapter we describe the FastPath model and introduce the results that will be interpreted in Chapter 4. This analysis was conducted, for the most part, with data collected by the West Africa Trade Hub in the context of the RRTC analysis. Consequently, in some cases, we needed to reorganize the data provided by the West Africa Trade Hub and other sources to adapt them to the variables used by FastPath. This is particularly relevant to data on transit traffic volume, containerized vs. noncontainerized cargo, trade composition distribution, TEU/container ratio, and informal payments. We also needed to set assumptions about the characteristics of certain infrastructure components. We incorporated into the FastPath model several assumptions on data input, ensuring that our analysis considered the most relevant characteristics and particularities encountered along the Lomé–Ouagadougou corridor.

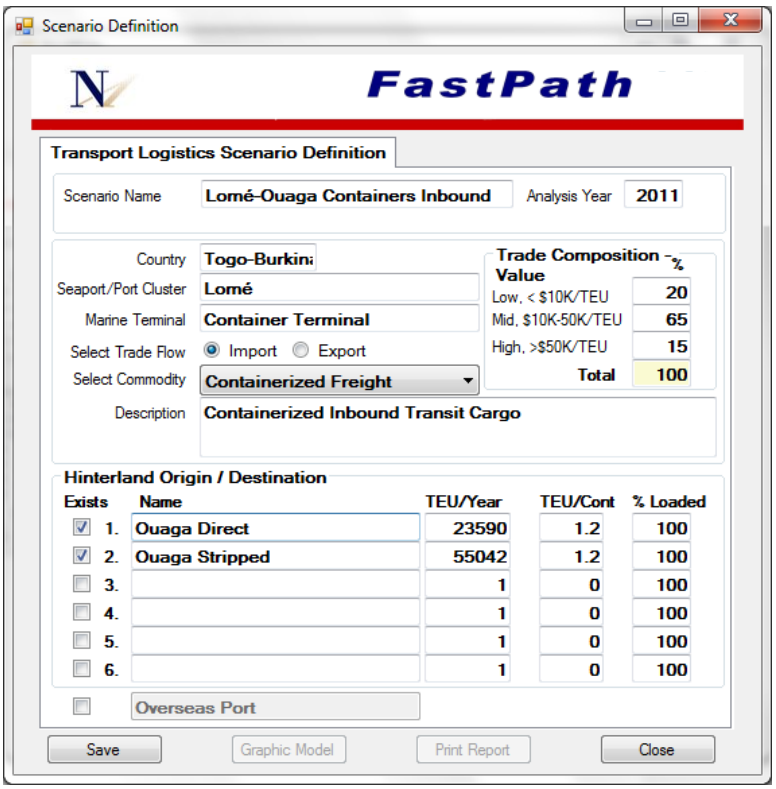
SCENARIO 1: INBOUND (TOGO TO BURKINA FASO) CONTAINERIZED TRANSIT TRAFFIC

The network for this scenario begins at the container terminal managed by SE2M and Manuport as the entry node to the corridor and ends at Ouagadougou as the hinterland destination node. All import cargo from Lomé entering Burkina Faso must be cleared in Ouagarinter, with a few exceptions where temporary storage and clearance are authorized at bonded facilities of authorized freight forwarders. Our analysis includes only Ouagarinter. For simplification in FastPath, two hinterland nodes and associated transport subchains were created to differentiate cargo transported directly in containers from cargo stripped out of the containers because the time, delays, and cost of handling each type of cargo are different. Also, the land transport for trucks carrying the cargo stripped from containers is slightly cheaper than trucks carrying full containers; the West Africa Trade Hub indicated that this could be explained in part because truckers do not want to be held responsible for the container, encouraging shippers to strip the cargo, as well as the expectation that additional cargo can be loaded in the truck if it is transported outside the container. In addition, a container handling fee is charged in Ouagarinter which is not charged for trucks with “stripped” cargo. All other characteristics along the corridor for both subchains remain constant. In both subchains the Customs process starts at the border, where cargo is entered into the Customs system, but the actual clearing is done in Ouagarinter.

Figure 3-1 shows the major characteristics of containerized cargo coming into Burkina Faso on the Lomé–Ouagadougou corridor. The estimated number of containers handled in this direction in 2009 accounted for about 78,632 TEU. Of this total, about 70 percent of containers were stripped and the goods transferred to trucks.

Figure 3-1

Transit Flows Included in the FastPath Inbound Containerized Scenario (Scenario 1)

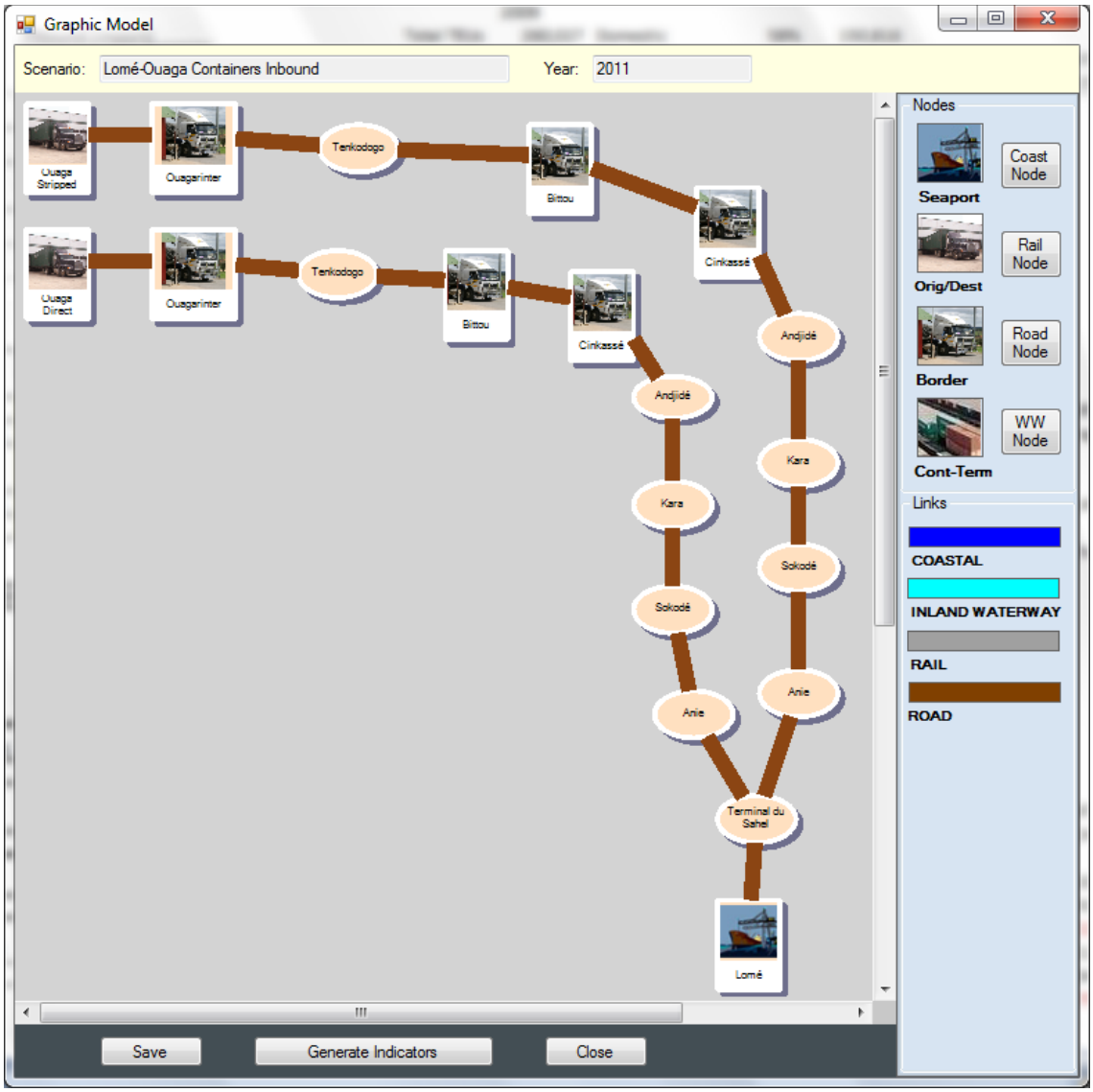


Source: Nathan Associates analysis

Figure 3-2 presents a graphic model of the two subchains for fully containerized and stripped cargo. Although the road characteristics are the same for both subchains, additional cost and time are associated with stripping, and as explained earlier, a lower transport cost per unit in the same subchain. The stripping process increases the cost and the risk of breakage and loss and potentially compromises the bonded status of transit cargo. It also promotes the overloading of trucks to save on fixed costs per unit transported, resulting in damage to the road infrastructure. Nevertheless, this seems to be the preferred option for transporting transit cargo in West Africa.

Figure 3-2

FastPath Schematic Representation of Lomé–Ouagadougou Corridor for Subchains of Containerized Inbound Transit Traffic



Source: Nathan Associates analysis

Port Performance

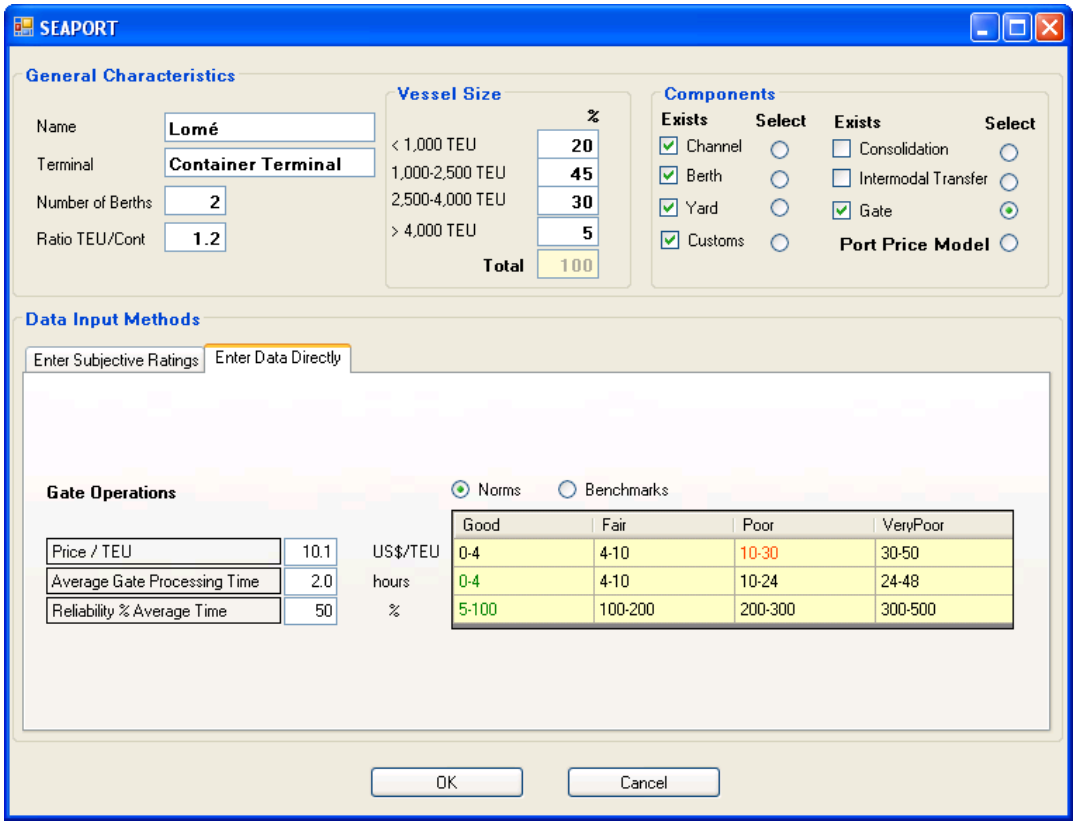
When the graphic model of the corridor has been created, the data for corridor nodes and links (e.g., ports, road segments, border crossings, Customs) is input for each subchain. The data required for seaport nodes include time, cost, and reliability for operations at the channel, berth, yard, Customs and terminal gate. Data for the channel, berth, yard, and gate operations were collected directly from the container terminal operators (SE2M and Manuport). Information for Customs was derived from the detailed information collected by the West Africa Trade Hub.

Each component of the port under analysis requires a data entry screen. Figure 3-3, for example, shows the data entry screen for gate operations. Each data entry screen has two parts: top and bottom. The top requires general information about the characteristics of the seaport, and the bottom is for specific information for each subcomponent. On the bottom right, the norms from

the FastPath database are shown; these are used to generate the logistics score for the subcomponent. Although for gate processing no official payment is required, an unofficial payment of US$10.1 per TEU is required, which falls into the range of poor performance. The processing time is 2, hours which is a good according to global standards. The percentage reliability of the transfer average time is 50 percent, which is also considered good.

Figure 3-3

FastPath Data Entry Screen for Gate Operations

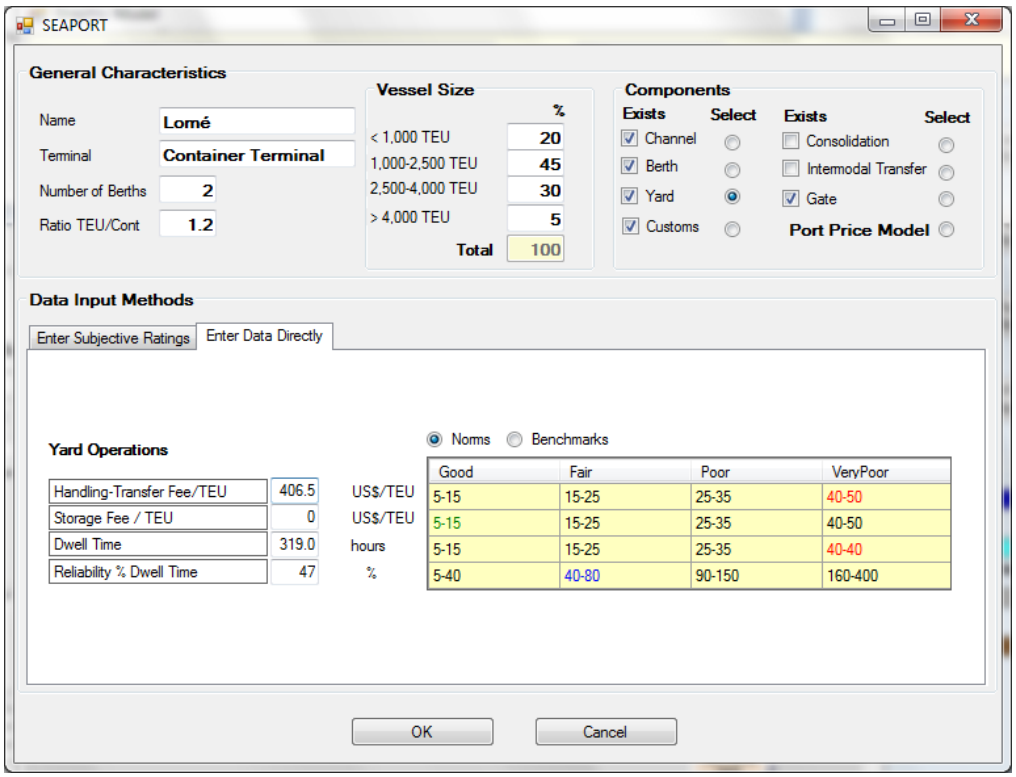


Source: Nathan Associates analysis

Similar screens are used for the other components of the seaport, including berth, yard, Customs and gate processes. Figure 3-4 presents the data entry screen for the yard operations showing handling and transfer fees, storage fees, dwell time, and the reliability of dwell time. The handling and transfer fees cover the transfer of containers from quayside to the main yard, shipping line charges (release), and forwarder fees. Storage charges are zero because transit cargo remains at the port less than the free storage period of 25 days. The data for time, cost, and reliability for containerized inbound transit cargo were presented in Table 2-10.

Figure 3-4

FastPath Data Entry Screen for Yard Operations



Source: Nathan Associates analysis

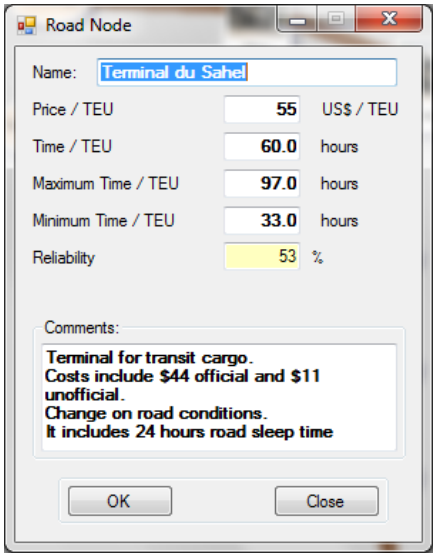
Road Performance

After entering the information for the seaport, we entered the data for the other corridor components. Nevertheless, following the specific characteristics of the West Africa region, this is done separately for direct containerized and stripped subchains. All transit cargo leaving the port must go to the transit yard or Terminal du Sahel before proceeding to its final destination. Conceived as a customs operational corridor, *Solidarité sur la mer* generates delays because it depends on the availability of Customs officers. Trucks spend an average of 36 hours in the transit yard waiting for the formation of the transit convoy. The maximum waiting time is 3 days or 72 hours. A $44 charge for the use of these facilities is paid at the port. An unofficial payment of about $11 is also incurred. We incorporated this information into the model using a transit node (see Figure 3-5).

For FastPath modeling purposes, we included rest time for truck drivers in this node to account for the time in which the truck is not moving and cargo is at rest. After discussions with corridor users we estimated rest time at 3 nights (24 hours total) for reaching Ouagadougou.

Figure 3-5

FastPath Data Entry Screen for Terminal du Sahel

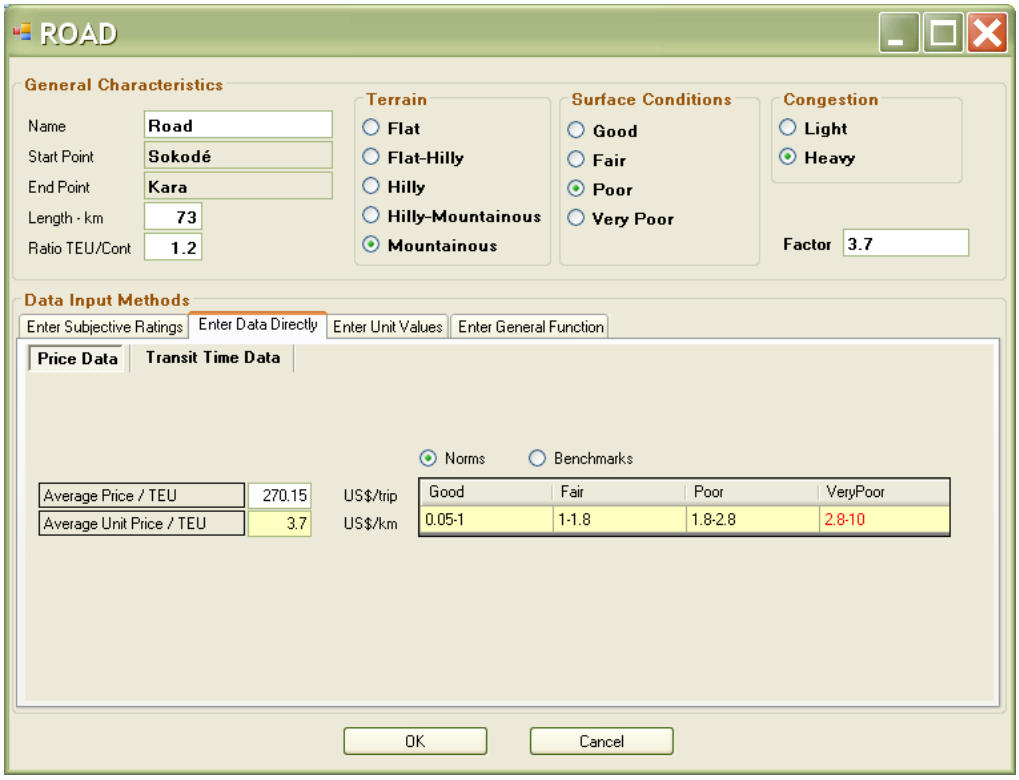


Source: Nathan Associates analysis

Table 2-8 presented the characteristics of the road segments that configured the road component analysis, and Table 2-9 included the segments reorganized for the FastPath analysis. Each road segment had a data entry screen for entering the characteristics of the segment. Figure 3-6 presents the segment connecting the towns of Sokodé with Kara.

Figure 3-6

FastPath Price Data Entry Screen for the Sokodé–Kara Road Segment



Source: Nathan Associates analysis

Like the seaport data entry screen, the road segment screen has two parts: the top for general information and the bottom for price data. According to the data obtained from the West Africa Trade Hub, inbound trucking rates for containers from Lomé to Ouagadougou are US$2,122 for a 20-foot container and US$3,127 for a 40-foot container (US$1,563.5 per TEU). Some trucks can carry two 20-foot containers together, and the combined rate would be US$3,143 (US$1,571.5 per TEU)).

There is also an unofficial payment of US$149 per truck. With the information on the number of 20-foot and 40-foot transit containers that passed through Lomé port destined to Burkina Faso, we established an average weighted transport cost for containers of US$1,752 per TEU from Lomé to Ouagadougou. The weighted average takes into consideration not only the number of 20-foot and 40-foot containers but also how 20-foot containers are transported in terms of units per truck, i.e., one or two containers per truck. After discussions with corridor users, we assumed for our calculations that all 40-foot containers are transported by one truck, half of the 20-foot containers are transported two units per truck, and the remaining half are transported one per truck.

A similar analysis was undertaken for stripped containers. Truckers encourage the stripping practice by charging less for stripped containers cargo. The average weighted transport price for stripped containers is US$1,482 per trip or on average US$270 less than containerized cargo. Stripped containers, however, undergo an additional activity—the un-stuffing of the container—at a fee of US$221 for a 20-foot container or US$332 for a 40-foot container, for an average weighted fee of US$167 per TEU. In addition, there is an unofficial fee of US$35.46 charged per TEU associated with the stripping.

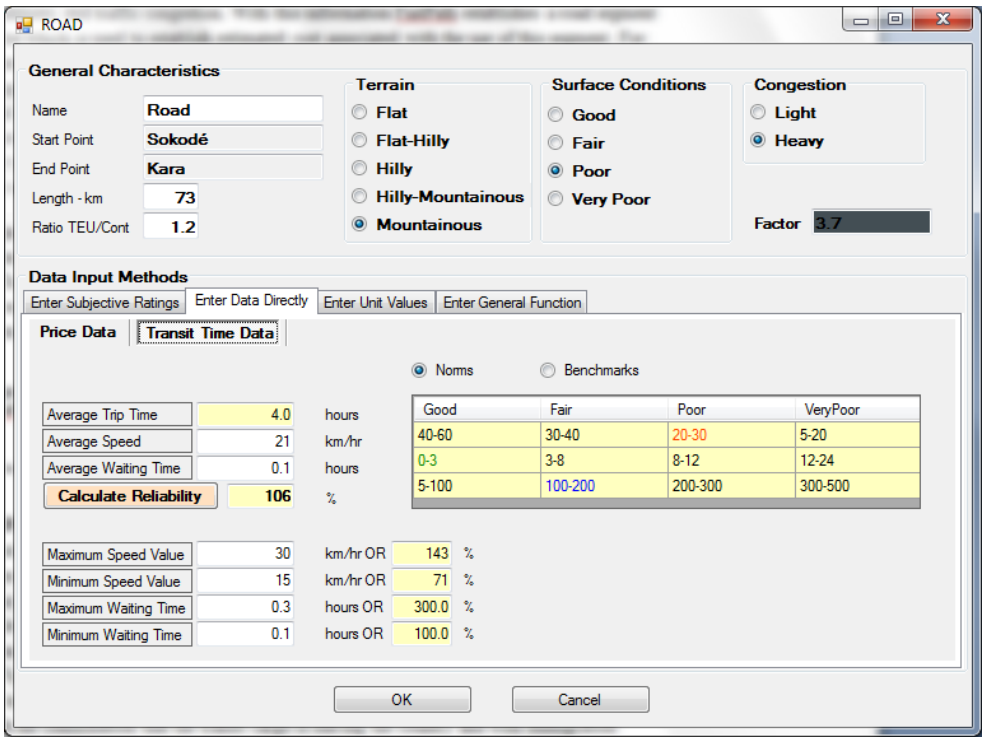
Unofficial charges vary per trip but on average account for US$36 per truck for the entire trip. This amount is already included in the price that the trucker charges the shipper. The average weighted amount per TEU is therefore US$24.

The total road transport cost must be broken down by segment. The physical characteristics of each segment, including the terrain type, road surface conditions, and traffic congestion, were presented in Table 2-8. With this information FastPath establishes a road segment factor that is used to set estimated costs. For example, given the conditions of mountainous terrain, poor surface condition, and heavy congestion along the Sokodé–Kara segment, the road segment factor is 3.7. With the total length of the segment, the road segment factor, and the total road transport cost, we established an average price of US$270.15 per TEU for direct containers. The unit price per TEU-km is US$3.70 (with a segment distance of 73 km)— which is considered a very poor range for price. A similar procedure is used to determine the average price for each road segment along each subchain (direct and stripped containers) and for the entire corridor.

Figure 3-7 presents the transit time data screen for the Sokodé–Kara road segment. The information entered into the model was based on the average travel time collected during the field visit to the corridor and cross-checked with interviews with cargo owners and truck drivers. For this link, the average trip time is about 4 hours and average waiting time of 0.1 hour (6 minutes). The average speed for this segment is therefore 21 km per hour. Similar screens are filled for all the road components of each subchain.

Figure 3-7

FastPath Transit Time Data Entry Screen for the Sokodé–Kara Road Segment



Source: Nathan Associates analysis

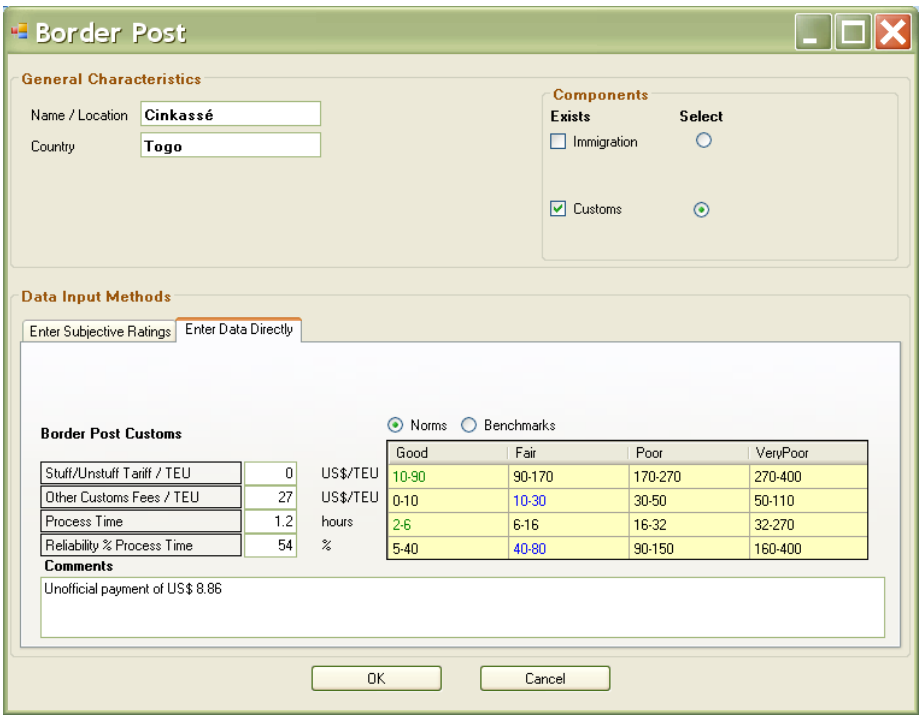
Border Post and Customs Performance

Besides the Customs processing for transit cargo at Lomé port, Customs interventions take place at three other places on the corridor: at the Cinkassé (Togo) and Bittou (Burkina Faso) border posts, and at Ouagarinter. The West Africa Trade Hub collected details on the time, costs, and delays experienced in the different processes undertaken in each border post. This information was the basis for the data entered into FastPath. Figure 3-8 shows the information associated with the border operations at Cinkassé for inbound transit cargo. Operations at Cinkassé for Burkina-bound cargo are mainly to confirm that the transit cargo is leaving the country and to conduct immigration procedures for trucks and truckers.

Costs incurred at Cinkassé for Burkina-bound cargo include US$18 per TEU, of which US$8.86 is an unofficial payment. The clearance process takes 1.2 hours on average, with average delays of about 2.25 hours—for reliability of 54 percent. Performance for price, time, and reliability falls in the ranges of fair and good (see Figure 3-8).

Figure 3-8

FastPath Data Entry Screen for Cinkassé Border Post Inbound Operations



Source: Nathan Associates analysis

Figures 3-9 and 3-10 show the operations at Bittou border post. Figure 3-9 presents the information associated with the pre-Customs declaration for cargo processing and Figure 3-10 shows the information related to immigration of truckers and vehicles. Pre-Customs declarations are entered into the system at this point, but the majority of goods have to be cleared in Ouagarinter. Customs operations at Bittou cost US$86 (US$80 of official costs for transit formalities, and US$6 unofficial costs). Immigration processes require a driver payment of US$40 for border entry/exit plus an additional US$5 unofficial payment. Total average time for customs and immigration combined is about 3.6 hours, and the maximum time is 7.7 hours, giving a reliability of 66 percent.

Figure 3-9

FastPath Data Entry Screen for Bittou Border Post Inbound Operations - Customs

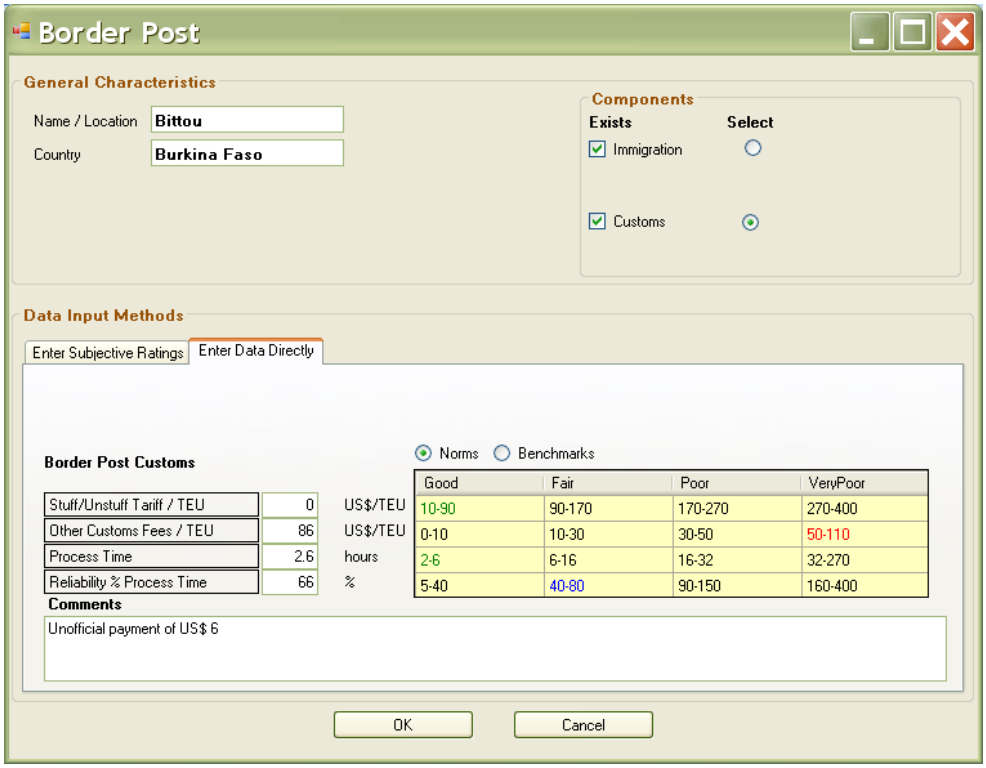


Figure 3-10

FastPath Data Entry Screen for Bittou Border Post Inbound Operations - Immigration

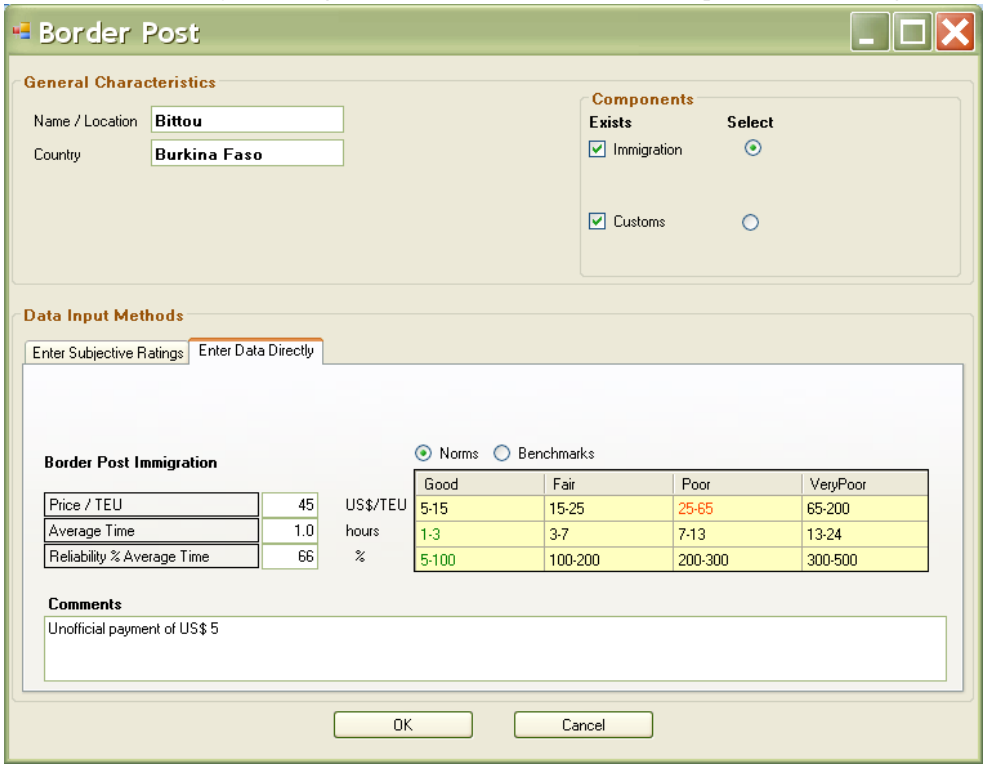
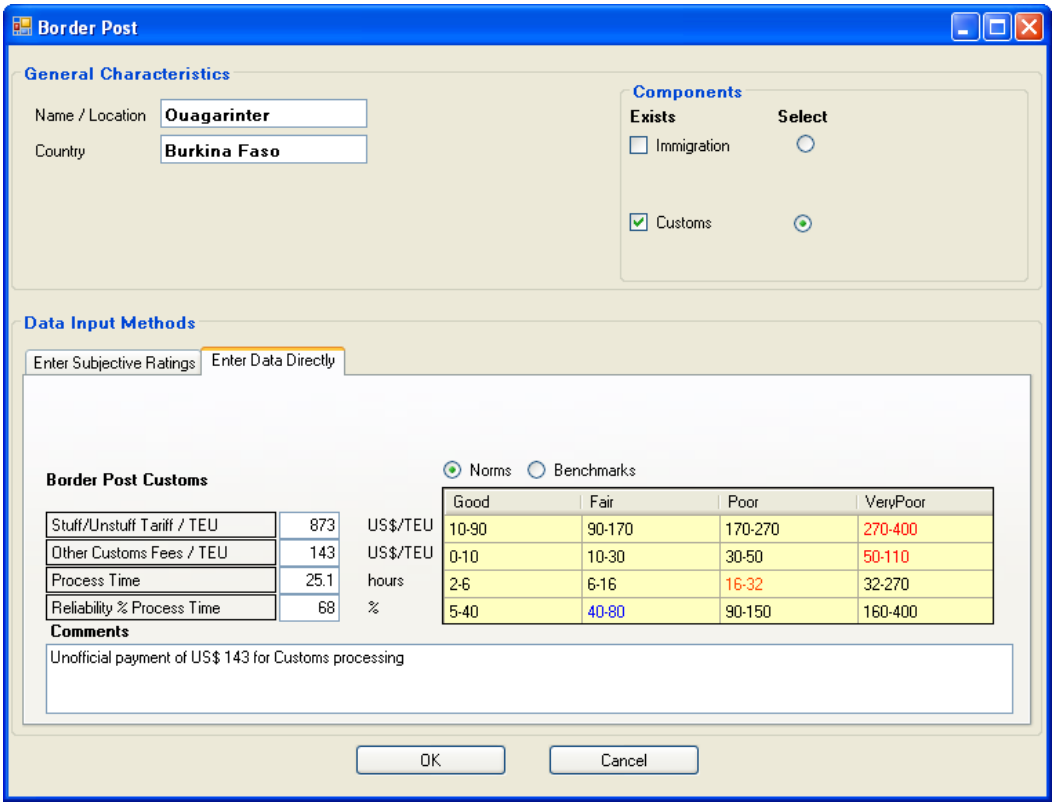


Figure 3-11 shows the Customs data entry screen for Ouagarinter. The West Africa Trade Hub Draft Report explains in detail the processes conducted in Ouagarinter, which account for US$1,016 (US$873 official and US$143 unofficial) for containers, 25.1 hours (about a day and one hour) processing time, and reliability of 68 percent. The official price in Ouagarinter includes a charge of US$326.7for container handling. For stripped cargo, this fee does not apply, resulting in a lower charge per TEU. The performance of this node on price is very poor; on time, poor; and on reliability, fair. Nevertheless, performance improved over the previous year.

Figure 3-11

FastPath Data Entry Screen for Ouagarinter Customs Operations



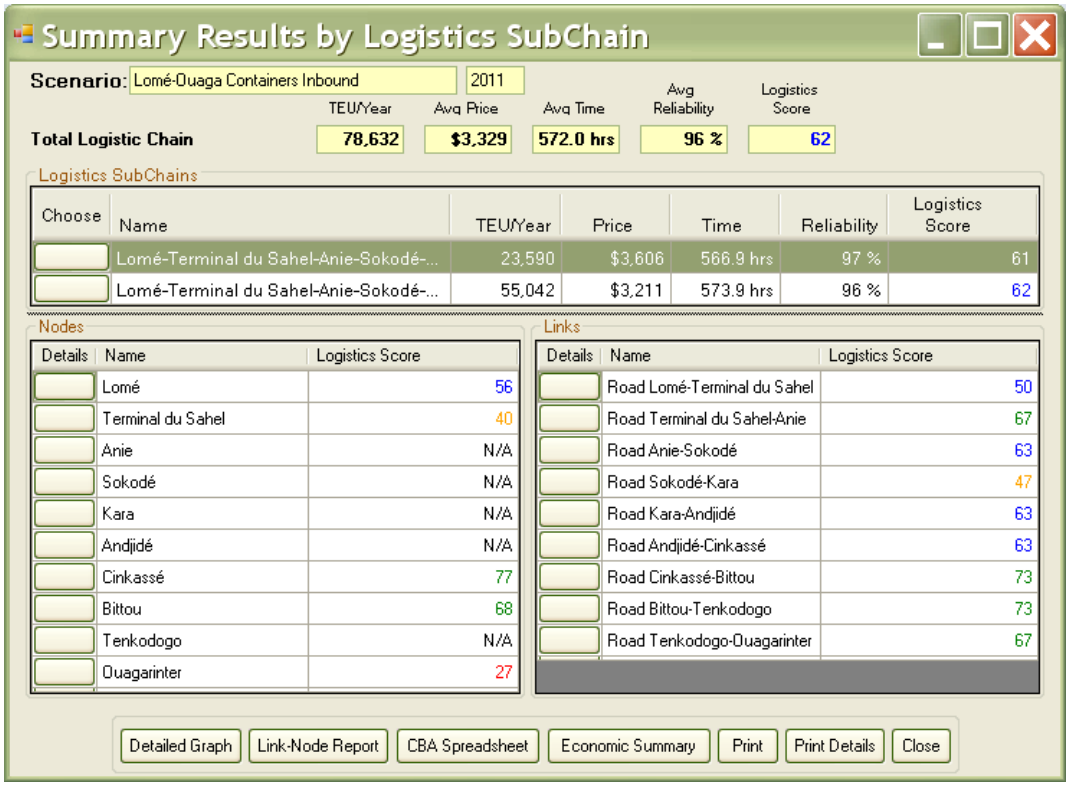
Source: Nathan Associates analysis

Logistics Scores

When all the information has been input into the model, FastPath generates indicators that summarize all data (price, time, and reliability) by each subchain (direct and stripped) and for the total logistics chain. For containerized freight, FastPath also calculates an overall logistics efficiency score ranging from between 20 (very poor) to 80 (good). Figure 3-12 presents the results for the entire logistics chain in the upper side of the figure, then it shows the performance of each subchain and the bottom shows a further breakdown of the performance for the different components of the subchains, in this case the direct containerized subchain. Figure 3-13 presents an additional level of detail of the logistics scores for the performance at the Port of Lomé.

Figure 3-12

FastPath Summary Output Screen for Direct Containerized Inbound Traffic



Summary Results by Logistics SubChain

Scenario: Lomé-Ouaga Containers Inbound | 2011

	TEU/Year	Avg Price	Avg Time	Avg Reliability	Logistics Score
Total Logistic Chain	78,632	$3,329	572.0 hrs	96 %	62

Logistics SubChains

Choose	Name	TEU/Year	Price	Time	Reliability	Logistics Score
	Lomé-Terminal du Sahel-Anie-Sokodé-...	23,590	$3,606	566.9 hrs	97 %	61
	Lomé-Terminal du Sahel-Anie-Sokodé-...	55,042	$3,211	573.9 hrs	96 %	62

Nodes

Details	Name	Logistics Score
	Lomé	56
	Terminal du Sahel	40
	Anie	N/A
	Sokodé	N/A
	Kara	N/A
	Andjidé	N/A
	Cinkassé	77
	Bittou	68
	Tenkodogo	N/A
	Ouagarinter	27

Links

Details	Name	Logistics Score
	Road Lomé-Terminal du Sahel	50
	Road Terminal du Sahel-Anie	67
	Road Anie-Sokodé	63
	Road Sokodé-Kara	47
	Road Kara-Andjidé	63
	Road Andjidé-Cinkassé	63
	Road Cinkassé-Bittou	73
	Road Bittou-Tenkodogo	73
	Road Tenkodogo-Ouagarinter	67

Detailed Graph | Link-Node Report | CBA Spreadsheet | Economic Summary | Print | Print Details | Close

Source: Nathan Associates analysis

Figure 3-13

FastPath Lomé Port Performance for Containerized Inbound Traffic

Lomé

Price	Time	Reliability	Logistics Score
$624	450.0 h	121 %	56

Components

Component Name	Price	Time	Reliability	Score
Berth	$19	19.0 hrs	63 %	67
Channel	$9	23.0 hrs	59 %	73
Customs	$179	87.0 hrs	53 %	43
Gate	$10	2.0 hrs	50 %	67
Yard	$407	319.0 hrs	47 %	30

Source: Nathan Associates analysis

Analysis of Logistics Scores

As mentioned at the end of Chapter 2, logistics scores are based on a comparison of the performance of the particular component with international norms. Using the values from the operations at the gate presented in Figure 3-13, Table 3-1 shows how the logistics score is generated. The performance of each component in terms of time, cost, and reliability is assigned a score in accordance with the associated rating—80 for good, 60 for fair, 40 for poor and 20 for very poor. Then the component logistics score is determined as the average score of the three variables (time, cost, and reliability).

Table 3-1
Calculation of Logistics Scores for Gate Operations

Variable	Value/TEU	Norm Range	Rating	Score
Price per TEU	$10.1	0–4	Poor	40
Average Gate Processing Time	2.0 hours	0–4	Good	80
Reliability % Average Time	50 %	50–100	Good	80
			Component Logistics Score	67

Similar calculations are made for each component of the logistics chain. The overall efficiency score for a logistics subchain is calculated as a weighted average of the individual logistics scores of the elements of that subchain. The weighting factor is the time taken at each step.

A quick review of the logistics scores generated for the containerized inbound scenario and presented in Figure 3-12 show that the road segments connecting the port of Lomé with the Terminal du Sahel, Sokodé with Kara, Kara with Andjidé, and Andjidé with Cinkassé have the lowest scores. Cost is the variable that lowers all road link scores. The performance at Ouagarinter is poor (27), with most variables earning low scores. The port also shows poor performance at the yard (30) and at Customs (43). We present a more detailed interpretation of these results in Chapter 4.

SCENARIO 2: CONTAINERIZED OUTBOUND TRANSIT TRAFFIC (BURKINA FASO TO TOGO)

The Lomé–Ouagadougou transport corridor has less transit cargo volume in the outbound direction (Burkina Faso to Togo) than the inbound. In 2009 all outbound transit cargo handled through Lomé—approximately 8,737 TEU—was exported in containers. Assuming the same distribution as for inbound cargo between containerized and loose cargo, approximately 2,621 TEU was transported in containers from Ouagadougou to Lomé and 6,116 TEU was transported as loose cargo to Lomé and consolidated in containers at the shipping line yard. Cargo requiring consolidation needs additional time and incurs additional charges before entering the port, if compared with cargo arriving in containers from Ouagadougou.

Trucks bringing loose cargo from Ouagadougou to be consolidated in Lomé carry an average volume equivalent to two 20-foot container loads. Therefore, the charges that apply to a truck are accounted for in the equivalent charge for two 20-foot containers (2 TEU). Unlike for inbound cargo, for which trucks sometimes carry one or two 20-foot containers, in the outbound direction cargo owners tend to use bigger trucks to save on fixed costs. In determining the total TEU cost for outbound traffic and given that all cargo is handled at the port in containers, it is assumed that SE2M or Manuport handles the container using the container terminal where all cargo is loaded onto ships. Therefore, the charges at the port used in the FastPath model are those associated with the SE2M or Manuport terminals. Figures 3-14 and 3-15 present the characteristics of the outbound flows and the schematic representation of the corridor for containerized outbound cargo, respectively.

Figure 3-14

Characteristics of the Containerized Cargo Included in the FastPath Outbound Transit Scenario

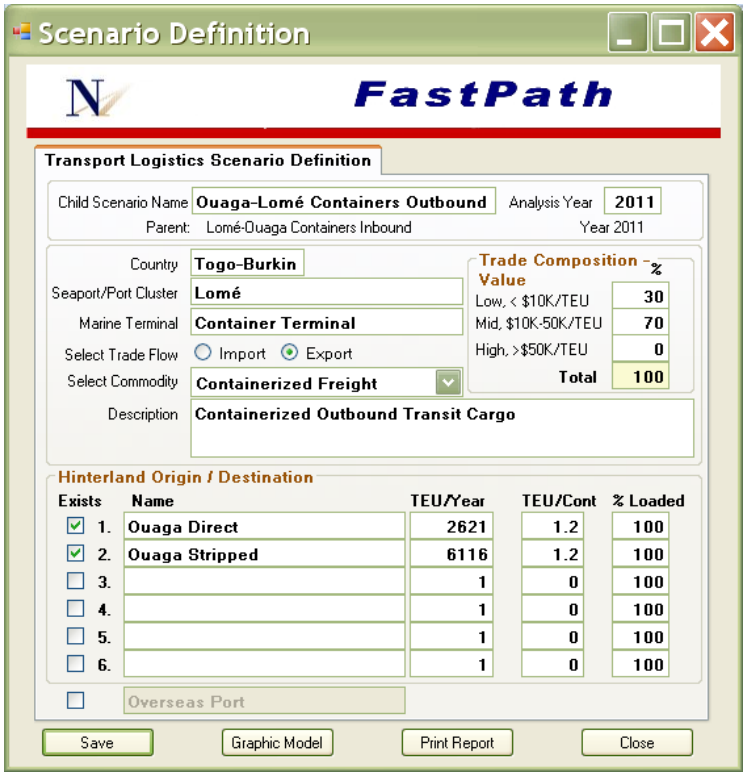
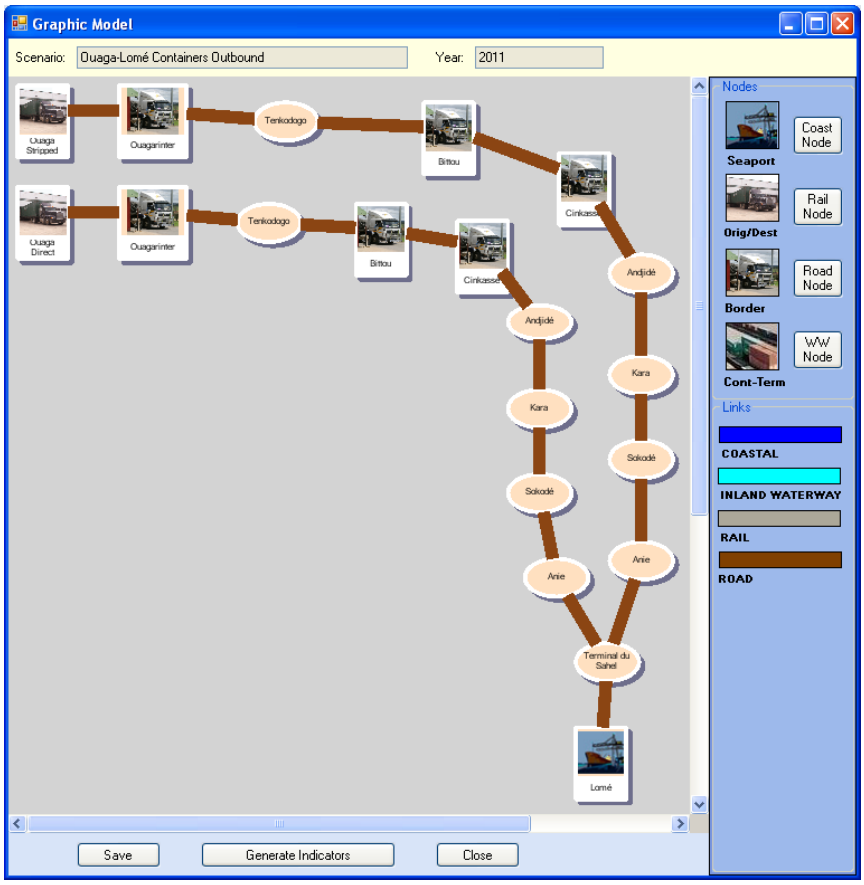


Figure 3-15

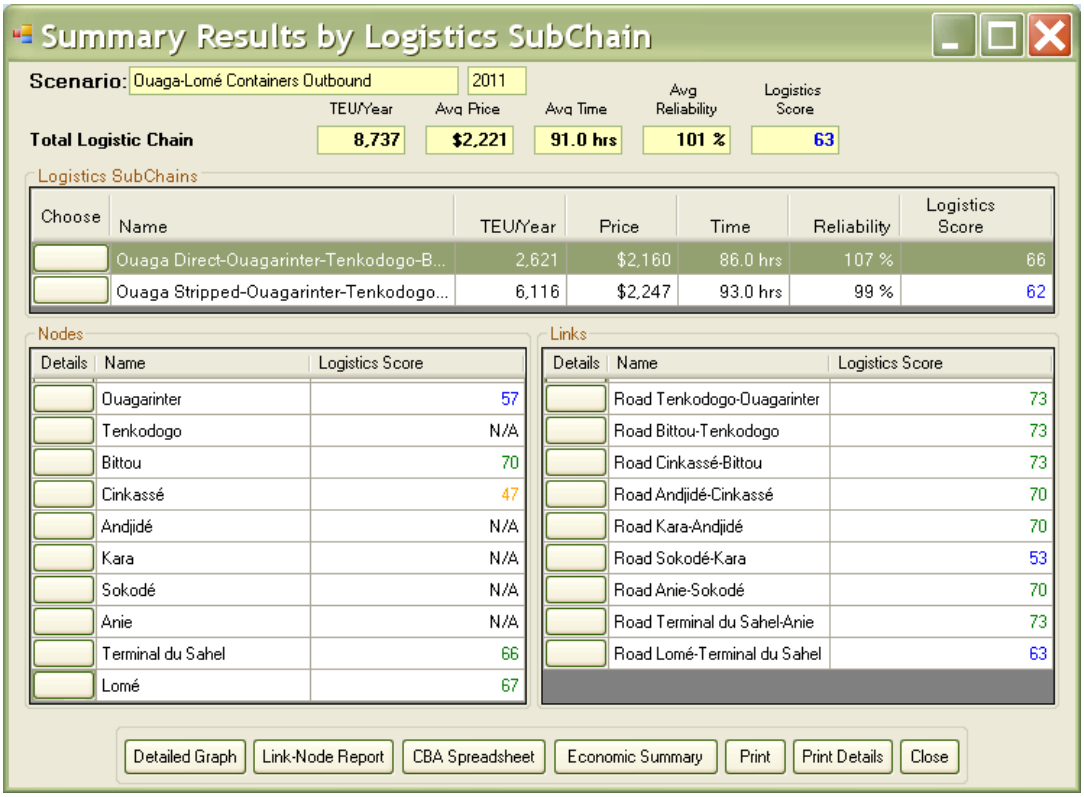
FastPath Schematic Representation for Outbound Containerized Transit Cargo



Logistics scores for this scenario were generated following the same procedure described in the inbound direction. Figures 3-16 and 3-17 present the most relevant results for the outbound containerized scenario.

Figure 3-16

FastPath Summary Output Screen for Lomé–Ouagadougou Direct Outbound Traffic



Summary Results by Logistics SubChain

Scenario: Ouaga-Lomé Containers Outbound 2011

	TEU/Year	Avg Price	Avg Time	Avg Reliability	Logistics Score
Total Logistic Chain	8,737	$2,221	91.0 hrs	101 %	63

Logistics SubChains

Choose	Name	TEU/Year	Price	Time	Reliability	Logistics Score
	Ouaga Direct-Ouagarinter-Tenkodogo-B...	2,621	$2,160	86.0 hrs	107 %	66
	Ouaga Stripped-Ouagarinter-Tenkodogo...	6,116	$2,247	93.0 hrs	99 %	62

Nodes

Details	Name	Logistics Score
	Ouagarinter	57
	Tenkodogo	N/A
	Bittou	70
	Cinkassé	47
	Andjidé	N/A
	Kara	N/A
	Sokodé	N/A
	Anie	N/A
	Terminal du Sahel	66
	Lomé	67

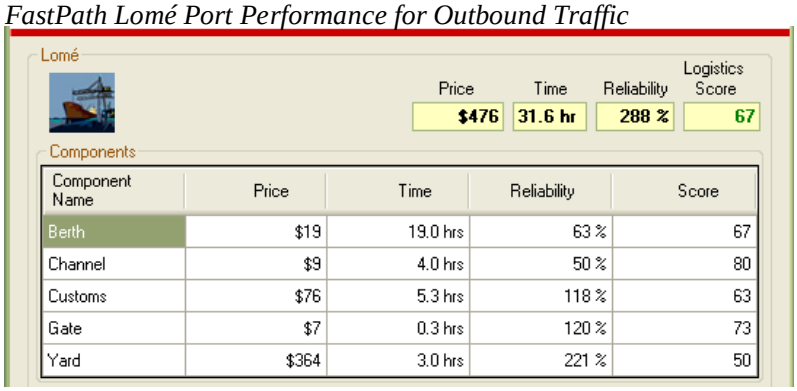
Links

Details	Name	Logistics Score
	Road Tenkodogo-Ouagarinter	73
	Road Bittou-Tenkodogo	73
	Road Cinkassé-Bittou	73
	Road Andjidé-Cinkassé	70
	Road Kara-Andjidé	70
	Road Sokodé-Kara	53
	Road Anie-Sokodé	70
	Road Terminal du Sahel-Anie	73
	Road Lomé-Terminal du Sahel	63

Detailed Graph | Link-Node Report | CBA Spreadsheet | Economic Summary | Print | Print Details | Close

Figure 3-17

FastPath Lomé Port Performance for Outbound Traffic



Lomé

Price	Time	Reliability	Logistics Score
$476	31.6 hr	288 %	67

Components

Component Name	Price	Time	Reliability	Score
Berth	$19	19.0 hrs	63 %	67
Channel	$9	4.0 hrs	50 %	80
Customs	$76	5.3 hrs	118 %	63
Gate	$7	0.3 hrs	120 %	73
Yard	$364	3.0 hrs	221 %	50

The performance in the containerized outbound scenario suggests that outbound corridor performance is better than inbound. This is common in corridors serving import-oriented countries. The node with the lowest score is Customs in Cinkassé (47), which is low because of the cost of preparation of transit documents. The superior performance of road links compared with the inbound is due to lower transport costs in the outbound direction. Handling charges at

the port are higher than international norms resulting in a fair-poor score of 50 at yard operations. Also berth productivity is low, resulting in a fair-good score of 67 for berth operations.

SCENARIO 3: INBOUND NONCONTAINERIZED TRANSIT TRAFFIC (TOGO TO BURKINA FASO)

Although the majority of cargo arriving at Lomé for transport to Burkina Faso is containerized, some products arrive as bulk or breakbulk, such as bagged cargo that gets to the port without using containers (e.g., sugar, rice, and other commodities). Breakbulk handling at the port is different from container handling, requiring different equipment and storage, and therefore has different associated times and costs. We therefore generated a different scenario to assess breakbulk cargo.

Because handling noncontainerized cargo is so different from handling containerized cargo, ports tend to have separate terminals to handle it. Lomé is no exception: Breakbulk cargo is handled at the multipurpose berths in Pier 1. Sporadically, depending on availability, conventional and ro-ro ships are also served in Pier 2. The east water breaker has a berth arranged to handle dry bulk vessels, particularly those carrying gypsum, clinker, and fertilizers.

Charges at the port for unloading general cargo are based on either direct handling, transfer to trucks, or indirect transfer, in which cargo is stored at the port temporarily before it is transferred onto trucks. For our analysis, we assume that all general cargo is unloaded directly onto trucks.

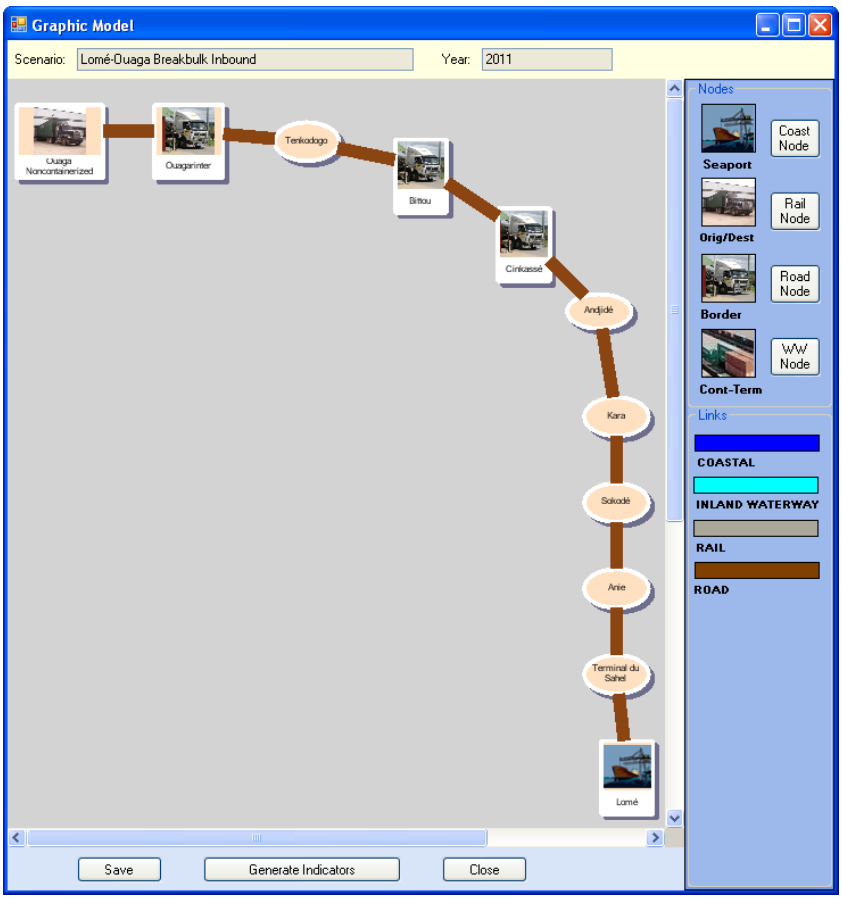
The estimated volume of breakbulk transit cargo destined to Burkina Faso from Lomé Port during the period of evaluation was close to 302,000 tons. Figure 3-18 presents the principal characteristics of the noncontainerized (breakbulk) inbound flows. Figure 3-19 shows the schematic representation of the corridor for noncontainerized freight.

Figure 3-18

Transit Flows Included in the FastPath Inbound Noncontainerized (Breakbulk) Scenario

Figure 3-19

FastPath Schematic Representation for Inbound Noncontainerized (Breakbulk) Transit Cargo

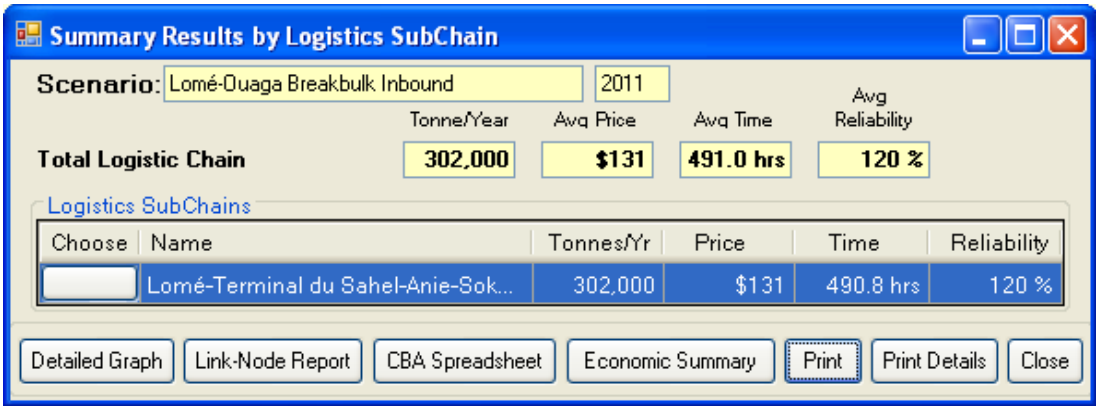


Source: Nathan Associates analysis

The data for time, cost, and reliability for noncontainerized cargo were incorporated into the model, and performance indicators were generated following the same procedures as for containerized cargo. The average trucking rate for cargo going to Burkina Faso is approximately US$97.95 per ton. Unofficial payments reported include about US$36 per trip, or about US$0.9 per ton. Data for road transport time and reliability are the same as for containerized freight. Figure 3-20 presents the results for noncontainerized inbound cargo.

Figure 3-20

FastPath Summary Output Screen for Lomé–Ouagadougou Inbound Noncontainerized Traffic



SUMMARY

Table 3-2 summarizes the time, cost, reliability, logistics score, and performance rating for all three scenarios generated for the Lomé–Ouagadougou corridor.

Table 3-2

Time, Cost, Reliability and Logistics Score for Lomé–Ouagadougou Corridor

Component	Performance Measure					
	TEU/Year*	Avg. Price	Av. Time	Reliability	Logistics Score	Rating
CONTAINERIZED INBOUND TRANSIT TRAFFIC(SCENARIO 1)						
Direct Containers	23,590	$3,606	566.9 hours	97%	61	Fair
Stripped Containers	55,042	$3,211	573.9 hours	96%	62	Fair
Total Chain	**78,632**	**$3,329**	**572.0 hours**	**96%**	**62**	**Fair**
CONTAINERIZED OUTBOUND TRANSIT TRAFFIC (SCENARIO 2)						
Direct Containers	2,621	$2,160	86.0 hours	107%	66	Fair-Good
Consolidated Containers	6,116	$2,247	93.0 hours	99%	62	Fair
Total Chain	**8,737**	**$2,221**	**91.0 hours**	**101%**	**63**	**Fair**
NONCONTAINERIZED INBOUND TRANSIT TRAFFIC*(SCENARIO 3)						
Total Chain	302,000 Ton	US$131/Ton	491.0 hours	120.0%	N/A	N/A

Performance based on 2009 data

We also attempted to gauge the value of trade flows as a percentage of Burkina Faso's GDP for each scenario using FastPath's economic importance estimation tool. This tool also measures the relative significance of logistics costs in trade value. These estimates were derived by entering data on transit traffic volume, trade composition distribution, and TEU/container ratio into FastPath.

Scenario 1—Containerized Inbound Transit Traffic (Togo to Burkina Faso)

The Burkinabe transit containers on this transport logistics chain accounted for 78,632 TEU, with an estimated total transport logistics chain value of US$262 million, or 3.0 percent of Burkina Faso's GDP. Furthermore, the estimated value of trade flows accounted for $3.1 billion, representing about 37 percent of Burkina Faso's GDP (2009). This scenario accounts for both containerized and stripped transit cargo.

Scenario 2—Containerized Outbound Transit Traffic (Burkina Faso to Togo)

Economic activity in this direction is small compared with containerized inbound activity(about 10 percent), with an estimated 8,300 TEU and an estimated total logistics chain value of US$16.6 million, or 0.19 percent of Burkina Faso's GDP. In addition, the estimated value of trade flows

accounted for US$233 million, which is about 2.7 percent of Burkina Faso's GDP. This scenario accounts for both containers coming from Ouagadougou and loose cargo consolidated at the port.

Scenario 3—Noncontainerized Inbound Transit Traffic (Togo to Burkina Faso)

The total volume of noncontainerized transit cargo along the Lomé–Ouagadougou Corridor in 2009 reached nearly 302,000 tons. The estimated total value of goods transported in this logistics chain was US$42 million, and the estimated value of trade flows was US$477 million, or 0.5 percent and 5.9 percent of Burkina Faso's GDP, respectively.

4. INTERPRETATION OF RESULTS

A key feature of a FastPath analysis is the comparison of corridor performance to international norms and benchmarks. FastPath generates diagnostic bar charts from the data entered for each scenario and the norms from the database The price bar chart breaks down price by mode on the left side and compares it with a case with only good performance on the right. A similar bar chart is generated for transit times, including waiting times. With this information, transport corridor stakeholders can develop action plans for improving corridor performance.

Transport logistics chains are composed of similar sets of activities, regardless of where in the world they occur. To appreciate the performance of the Lomé–Ouagadougou corridor we benchmark it against other transport corridors in West Africa and against transport corridors in other regions. In this chapter we compare the Lomé–Ouagadougou corridor to corridors that have been the subject of FastPath analysis in previous years:

- **Tema–Ouagadougou Corridor (2008).** In 2009 Nathan Associates, in collaboration with the West Africa Trade Hub, conducted a FastPath analysis of the Tema–Ouagadougou corridor. The analysis included an assessment of the performance of major transport infrastructure, including the port of Tema, the road connecting Tema with Ouagadougou, the border posts of Paga in Ghana and Dakola in Burkina Faso, and the Customs clearing facility in Ouagarinter. Comparing data between the Tema–Ouagadougou and Lomé–Ouagadougou corridors will allow Burkinabe shippers to evaluate alternative options for maritime access for goods.
- **Lagos-Kano-Jibiya Corridor (2009).** Supporting the Global Food Security Response program to increase agricultural productivity, expand market supply, and remove constraints to the transport and distribution of food in Nigeria, Nathan Associates conducted a FastPath assessment of the corridor linking the port of Lagos with the city of Kano in the northern region of the country. Although this corridor was a national corridor and therefore does not have border post components, it will provide comparable information for performance of the port, customs, and roads.
- **Southern Africa (2007).** In 2007, Nathan Associates conducted a FastPath analysis of the Maputo Corridor in Southern Africa—between the port of Maputo (Mozambique) and the inland depot of Nelspruit (South Africa), as well as between the port of Durban (South Africa) and Nelspruit. Comparing data for Southern and West Africa has strategic importance for West Africa to understand its competition.

- **Association of Southeast Asian Nations (ASEAN) (2006)**
  - **Vientiane (Laos) to Laem Chabang (Thailand)—**Like Burkina Faso, Laos is a landlocked country that depends on the ports of neighboring countries. The transit route with the highest cargo volume is via the port of Laem Chabang, Thailand. This is a road-and-rail corridor that suffers from a number of impediments at border crossings.
  - **Danang Port (Vietnam) to Mukdaharn (Thailand) via Sawanakhet (Laos).** This road corridor crosses three countries. Although the road has been upgraded, constraints on corridor efficiency remain. This corridor has always been considered to have high transit potential.
- **Bangladesh (2007).** The Dacca-Chittagong corridor in Bangladesh has been selected as a basis of comparison because it is a relatively poor performer in the Asia region.

Finally, we also recommend concrete steps for improving Lomé–Ouagadougou corridor performance, analyzing the costs and benefits in order to make recommendations.

LOMÉ–OUAGADOUGOU CORRIDOR PERFORMANCE AND INTERNATIONAL NORMS

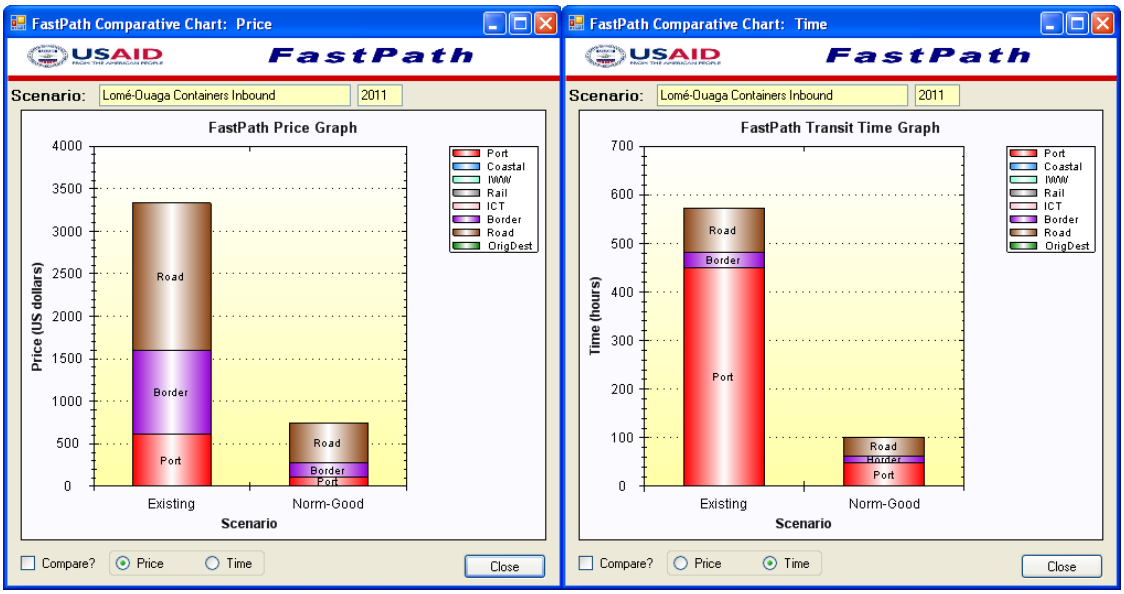
In this section we present the performance of the Lomé–Ouagadougou corridor for containerized cargo. Each scenario is compared with the ideal situation (in which all variables perform with a value rated good).

Scenario 1: Containerized Inbound Transit Traffic (Togo to Burkina Faso)

Figure 4-1 shows the performance in time and cost of inbound containerized traffic, comparing the performance with internationally accepted norms for good performance. The price graph (right) shows the high costs for all components of the corridor, but especially for road transport, while time graph (left), total time at port represents almost 80 percent of the total time incurred along the transport chain.

Figure 4-1

FastPath Price and Time Comparison for Lomé–Ouagadougou Containerized Inbound Transit Traffic



Source: Nathan Associates analysis

Port Performance

The port earned a logistics score of 56 (out of 80), which is in the fair-poor range for international ports. Average waiting time at the channel (23 hours) and berth operations time (19 hours) are high compared to the benchmarks, although lower than times in other West Africa region ports. This long time is a reflection of the congested port environment and the port's growing popularity. Container berths are operating at nearly 90 percent capacity. The lengthiness of the time it takes for ship operations could be because of inadequate equipment for loading and unloading ships, inadequate information systems for scheduling ship operations, and a lack of preparation of stevedoring operators to handle arriving ships.

Yard operations at the port earned a score of 30, which is very poor; this score is due to high handling charges and excessive dwell time, although the dwell time is not as long as in other West Africa region ports. Internal utility roads are congested and there is lack of traffic control and means for a quick, efficient transfer. Yards are not optimally located to serve ships docked at piers or for the quick transfer of cargo. The means made available to handle land operations are insufficient and there is no information system for cargo handling or for coordinating government authorities' ship visits, which also takes too long. There are also problems with pilots not being well trained and unavailability of tugboats because of a lack of maintenance.

Customs at Lomé Port also scored low (43), which is poor, due to long clearance times, long storage periods, and high official and unofficial rates. There are lengthy and costly customs procedures for clearing or admitting cargo, the Asycuda++ system is not used efficiently, probably because of a lack of training. Customs officers are often free to interpret regulations, and the Customs Code dates back to 1966 and has many loopholes. A Customs Code from 2006 is still not being applied, and the valuation system from COTECNA sometimes leads to disagreement with Customs. COTECNA is a private operator of the Customs scanner system.

Table 4-1 compares the performance of Lomé Port with selected ports for containerized imports. In average unloading time Lomé lags considerably behind the selected ports outside West Africa, including Chittagong, a relatively poor performer in Asia, but performs similarly to the three regional ports. Total port handling costs and Customs costs are high even when compared with other regional ports, although Lomé did not have a port surcharge in 2009. Average Customs time and total dwell time, however, are low compared with other ports.

Road Performance

Surface transport for inbound traffic (see Figure 3-12) on the Lomé–Ouagadougou corridor achieved an intermediate-fair rating, with road travel time rated good in many sections, particularly in Burkina Faso, and fair in others. Reliability for road transit time is rated fair on the majority of segments and good in others. Price on the majority of road segments, however, is rated poor (i.e., high unit costs per TEU-km). This is due to several factors, including a lack of backhaul cargo for the return trip, the age of trucks, and the condition of some road links. Inbound prices usually include expenses associated with an empty return trip—a common practice in countries with low export volumes. These costs hit landlocked countries especially hard.

The average cost per container-km in the Lomé–Ouagadougou corridor up to the Togo border of Cinkassé, shown in Table 4-2, is lower than other West Africa comparators but high compared with costs in other regions of the world. In addition to the factors cited above, low truck productivity and unreliable queuing systems at the port to assign cargo to trucking companies contribute to the high prices on the Lomé–Ouagadougou corridor. All these factors, however, present opportunities for improvement.

The average speed of 36 km/h (up to the border) is low and compares with the average speed on Dacca–Chittagong, also a poor performer. It is slightly lower than that experienced on Tema-Paga (Ghanaian border post with Burkina Faso) but is better than in Nigeria, which is a very poor performer. Average delays are shorter than for other corridors. The reliability measure is about the same as for most African corridors in the table. The overall logistics score is 57, which is close to a fair rating—close to Dacca–Chittagong and Tema–Ouagadougou. Road conditions in Togo are considerably worse than in Burkina Faso.

Table 4-1

Port Performance in Selected Corridors for Containerized Imports

Port Component	Lomé–Ouagadougou, Lomé Port	Tema–Ouagadougou, Tema Port	Lagos–Kano, Lagos	Danang–Mukdahorn, Danang	Dacca–Chittagong, Chittagong	Durban–Nelspruit, Durban	Maputo–Nelspruit, Maputo
Av. channel wait time	23 hrs	41 hrs	118 hrs	N/A	30 hrs	4 hrs	8 hrs
Av. unloading time at berth*	19 hrs	20.5 hrs	27.5 hrs	12 hrs	16 hrs	8 hrs	16 hrs
Total port handling costs	US$416	US$492***	US$686***	US$107	US$302***	US$750	US$350
Stripping costs	US$203	US$108	n/a	n/a	n/a	n/a	n/a
Stripping time	7 hrs	8 hrs	n/a	n/a	n/a	n/a	n/a
Customs costs	US$179	US$129	US$280	US$462	US$294	–	US$285
Customs time	87 hrs	56 hrs	289 hrs	24 hrs	48 hrs	16 hrs	24 hrs
Average dwell time (including Customs)	17 days****	17 days****	20 days	3 days	12 days	3 days (est.)	3 days
Unofficial costs (%)	17%	7.8%	10% (est.)	5% (est.)	15%	5% (est.)	10% (est.)
Reliability**	121%	93%	113%	125%	45%	100% (est.)	268%
Logistics score	56	55	49	55	49	60	51

** Average unloading time per container is half the average time for ship berthing time.*
*** The percent of average transit time that would include 90% of shipments.*
**** Including a port surcharge for delays to ships in channel ($140 for Tema, 132 for Lagos and $190 for Chittagong).*
*****Dwell time for inbound transit cargo*

Table 4-2

Comparison of Inbound Road Transport Performance in Selected Corridors for Containerized Freight

Performance Component	Lomé–Ouagadougou	Tema–Ouagadougou	Lagos- Kano	Laem Chabang-Vientiane	Dacca-Chittagong	Durban-Nelspruit	Maputo-Nelspruit
	Lomé–Togo Border	Tema–Ghana Border	Lagos–Kano	Laem Chabang–Thai Border	Dacca–Chittagong	Durban–Nelspruit	Maputo–Mozambique Border
Average cost per TEU-km	US$1.9	US$2.4	US$2.5	US$1.2	US$1.2	US$2.0	US$2.5**
Average speed	36 kph	40 kph	20 kph	51 kph	35 kph	100 kph	60 kph
Average delay time	1.5 hrs	4 hrs	30 hrs	1 hr	1 hr	2 hrs	1 hr
Unofficial costs (%)	5.4%	1.0%	10% (est.)	10% (est.)	15%	5% (est.)	10% (est.)
Reliability*	94%	110%	100%	29%	83%	100% (est.)	105%
Logistics score	60	55	39	70	58	65	51

** The percent of average transit time that would include 90% of shipments.*
*** Very short haul distance (60km). This drops to $2 per TEU-km for longer distances*

Border Post Performance

Inbound operations at the border post are assessed separately for Cinkassé and Bittou. The score of 77 at Cinkassé is good. Performance at Bittou in Burkina Faso is fair-good, at a score of 68. Activities performed at the border do not include customs clearance, only a review of immigration documents, a preliminary review of Customs documents, and the input of import data into the customs system. All import cargo to Burkina Faso must proceed to Ouagarinter, the customs facility in Ouagadougou, to undergo Customs clearance. Therefore, to compare performance of customs clearance with other corridors' border posts, time and cost must be adjusted, taking into consideration that the process starts in Bittou and continues to Ouagarinter. The adjustment combines the operations of each node, adding the time, cost, and reliability variables. The combined results and logistics scores are presented in Table 4-3.

Table 4-3

Customs Clearance and Border Post Operations Adjusted for Bittou-Ouagarinter, Inbound Direction

Component	Price (US$/TEU)	Price Score	Time (Hours)	Time Score	Reliability %	Reliability score	Logistics Score
Ouagarinter+Bittou	916	20	28.7	40	115	40	33

The combined performance is poor to very poor, with a logistics score of 33. The price per TEU is high even though it does not include a second guarantee fund charge equivalent to 0.25 percent of the value of the goods paid when entering Burkina Faso. Because this charge varies according to the value of the products being imported, it is not included in our calculations. The average time for customs clearance combining Bittou and Ouagarinter rates poor, with about 1.5 days (assuming 8 working hours per day); reliability for this time is also poor, with a value of 115 percent.[6]

The average cost per container to cross the Togo-Burkina Faso border for inbound traffic shown in Table 4-4 is significantly higher than for the comparison corridors, even when compared with a similar operation for the Tema–Ouagadougou corridor. The average cost takes into consideration that customs operations in Burkina Faso are performed partially at the border post (Bittou) and later at Ouagarinter.

[6] Reliability is the percent of average transit time that would include 90 percent of shipments. As noted previously, "good" reliability would be in the range of 0-40 percent. The time required for clearing goods at Ouagarinter varies between 25 and 35 hours—the reason for the poor performance.

Table 4-4

Comparison of Border Post Performance in Selected Corridors for Inbound Containerized Freight

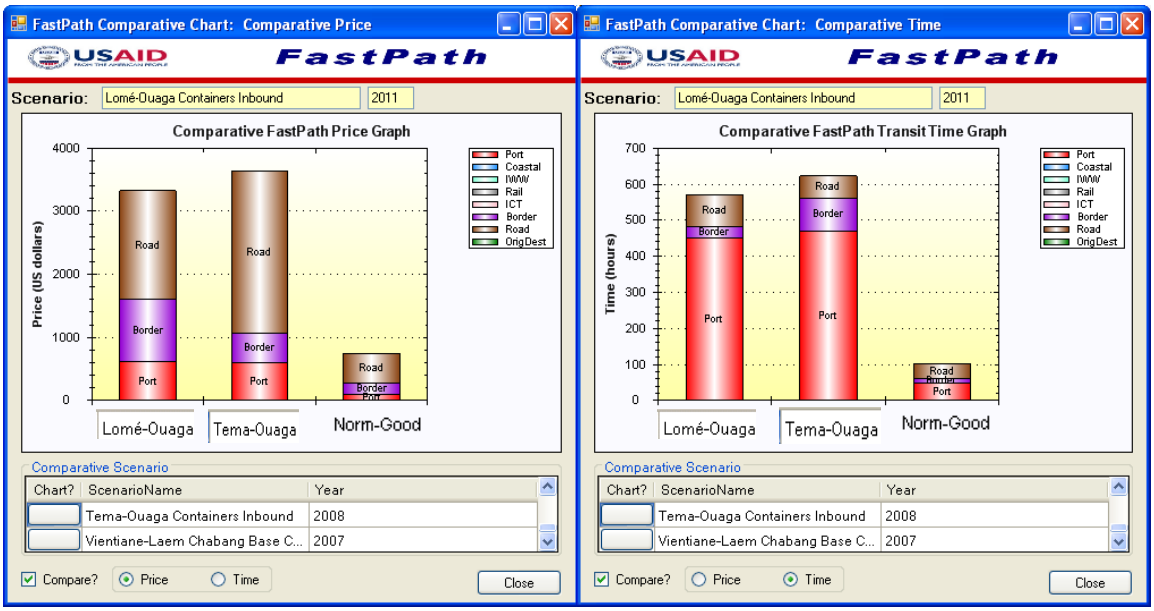
Performance Component	Lomé–Ouagadougou	Tema–Ouagadougou	Laem Chabang–Vientiane	Maputo–Nelspruit
Average cost per container*	US$943	US$457	US$180	US$200
Average transit time*	29.9 hrs	90.7 hrs	3 hrs	4 hrs
Unofficial costs (%)*	15%	25%	20% (est.)	10% (est.)
Reliability*	127%	250%	125%	56%
Logistics score border post 1, inbound	70 (Togo)	73 (Ghana)	67 (Thailand)	73 (Mozambique)
Logistics score border post 2, inbound	33 (Burkina Faso)	20 (Burkina Faso)	63 (Laos)	73 (South Africa)

Note: To compare customs operations with those on other corridors where goods are cleared at the border, operations at Bittou and Ouagarinter were combined, as they were for Dakola and Ouagarinter on the Tema-Ouagadougou corridor.
** Figures include border posts on each side of border for official and unofficial costs and are weighted average for direct and stripped containers*
*** The percent of average transit time that would include 90 percent of shipments.*

Figure 4-2 shows a comparison of inbound containerized cargo on the Lomé–Ouagadougou and Tema–Ouagadougou corridors and good performance on all components for cost and time. The information is from 2011 for Lomé–Ouagadougou and from 2008 for Tema–Ouagadougou; although changes in the performance of the Tema–Ouagadougou corridor have occurred since, the comparison provides interesting information. Burkinabe shippers experience better performance in terms of price when using the Lomé–Ouagadougou corridor, particularly due to road charges, and also it is a better option in terms of time, mainly because of a slighter shorter time spent in Lomé Port and in Customs procedures along the logistics chain. According to statistics on cargo handled in each port, volumes handled at Lomé outweighs those of Tema confirming that Burkinabe shippers prefer using Lomé–Ouagadougou corridor as it is a better option. Language similarities may also play an important role—Ghana is not a francophone country—as does the less-restrictive regulatory enforcement in Togo.

Figure 4-2

FastPath Comparison of Performance of Lomé–Ouagadougou and Tema–Ouagadougou Corridors for Inbound Containerized Transit Traffic

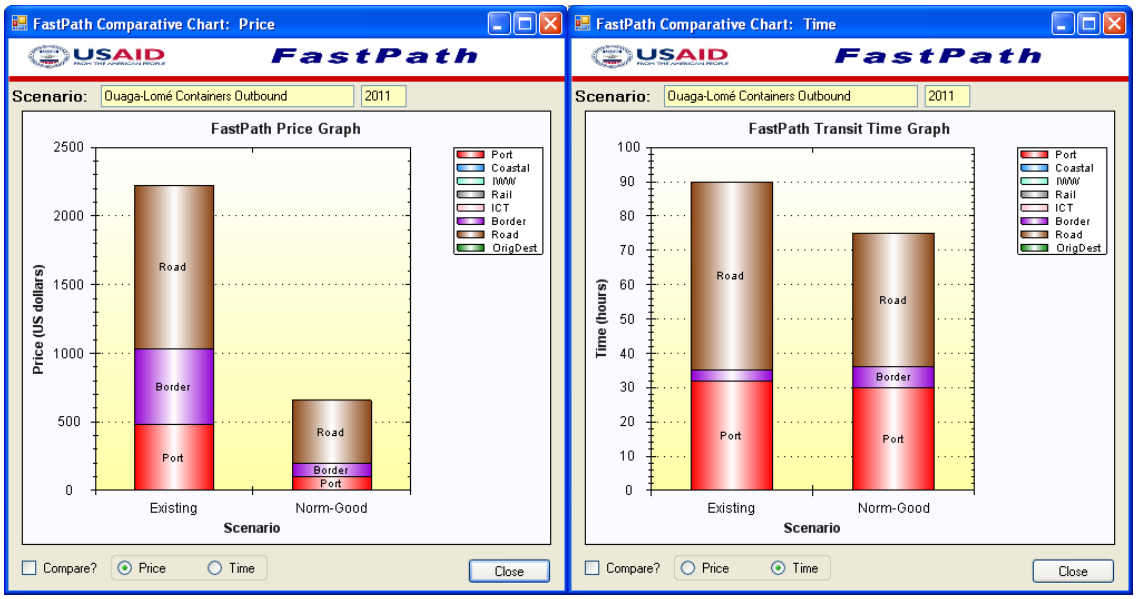


Scenario 2: Outbound Containerized Transit Traffic (Burkina Faso to Togo)

Figure 4-3 shows the performance in time and cost of the outbound transit traffic compared to global norms for good performance. While price is still high for port, border customs, and road transport outbound, it is considerably lower than in the inbound direction. The time chart also shows good performance for all three components (port, border customs and road performance).

Figure 4-3

FastPath Price and Time Comparison for Outbound Containerized Transit Traffic



Source: Nathan Associates analysis

The port has a better logistics score—67 (out of 80)—than on the inbound direction, which is in the fair-good range for international ports. The better score is due to shorter yard and Customs operations time; costs for yard operations are still high.

Table 4-5 compares the performance of Lomé port with other ports for containerized exports. Lomé port lags considerably behind non–West African ports in average loading time at berth but better than the average in West Africa. Total handling costs in this direction are on the low side when compared with those of all ports. Customs cost and time are also on the low side compared with others, except Tema and Chittagong.

Road performance. Road transport time and delays are similar to those in the inbound direction but prices are considerably lower given that backhaul is likely. The road transport logistics score for the outbound direction is rated "fair-good" compared with international standards, except for two segments rated "poor."

Border post performance. Border-crossing activities in Burkina Faso combine those at Ouagarinter with those at Bittou. Table 4-6 presents the adjusted scores for customs clearance in Burkina Faso and Table 4-7 shows the combined scores for the Togo-Burkina Faso border.

Table 4-5

Comparison of Port Performance in Selected Corridors for Containerized Exports

Port Component	Lomé–Ouagadougou	Tema–Ouagadougou	Lagos–Kano	Laem Chabang–Vientiane	Dacca–Chittagong	Durban–Nelspruit	Maputo–Nelspruit
	Lomé Port	Tema Port	Lagos	Laem Chabang	Chittagong	Durban	Maputo
Average loading time at berth	19 hrs	20.5 hrs	27.5 hrs	8 hrs	16 hrs	8 hrs	8 hrs
Total port handling costs	US$371	US$349*	US$599*	US$70	US$390*	US$750	US$350
Consolidation costs	US$86	US$55.96	n/a	n/a	n/a	n/a	n/a
Consolidation time	7 hrs	6 hrs	n/a	n/a	n/a	n/a	n/a
Customs costs	US$77	US$4.5	US$210	US$180	US$60	–	US$146
Customs time	5.3 hrs	3.5 hrs	24 hrs	3 hrs**	24 hrs	4 hrs	6 hrs
Average dwell time (including customs but not consolidation)	1 days	1.5 days	6 days	3.5 days	2.5 days	1.5 days	1.5 days
Unofficial costs (%)	4.5%	2.9%	10% (est.)	10% (est.)	15%	5%(est)	10% (est.)
Reliability***	288%	58%	136%	125%	45%	100% (est.)	268%
Logistics score	67	72	48	65	52	60	51

** Including a port surcharge for delays to ships in channel ($140 for Tema, $132 for Lagos and $190 for Chittagong).*
*** Inland customs facility*
**** The percent of average transit time that would include 90 percent of shipments.*

Table 4-6

Customs Clearance and Border Post Operations Adjusted for Ouagarinter-Bittou, Outbound Direction

Component	Price (US$/TEU)	Price Score	Time (Hours)	Time Score	Reliability %	Reliability score	Logistics Score
Ouagarinter+Bittou	222	20	2.6	80	297	20	40

Table 4-7

Comparison of Border Post Performance in Selected Corridors for Outbound Containerized Freight

Performance Component	Lomé -Ouagadougou	Tema–Ouagadougou	Laem Chabang–Vientiane	Maputo–Nelspruit
Average cost per container *	US$382	US$389	US$180	US$200
Average transit time *	1.3 hrs	10.3 hrs	3 hrs	8 hrs
Unofficial costs (%) *	6.8%	11%	20% (est.)	10% (est.)
Reliability**	166%	186%	125%	77%
Logistics score for border post 1, outbound	40 (Burkina Faso)	53 (Burkina Faso)	63 (Laos)	63 (South Africa)
Logistics score for border post 2, outbound	47 (Togo)	53 (Ghana)	67 (Thailand)	67 (Mozambique)

Note: To compare customs operations with those on other corridors where goods are cleared at the border, operations at Bittou and Ouagarinter were combined, as they were for Dakola and Ouagarinter on the Tema-Ouagadougou corridor.
** Figures include border posts on each side of border.*
*** The percent of average transit time that would include 90 percent of shipments.*

Figure 4-4 shows a comparison of outbound containerized cargo for the Lomé–Ouagadougou corridor, the Tema–Ouagadougou corridor, and good performance in all components, for cost and time. In the outbound direction, the Tema–Ouagadougou corridor performs better in terms of price while time wise both corridors perform practically the same with some differences between corridor components but the same overall time. Given the cargo volumes handled in each corridor, Burkinabe shippers use the Lomé Ouagadougou as their preferred option.

Figure 4-4

Corridor Performance Comparison Lomé–Ouagadougou and Tema–Ouagadougou for Containerized Outbound Transit Traffic

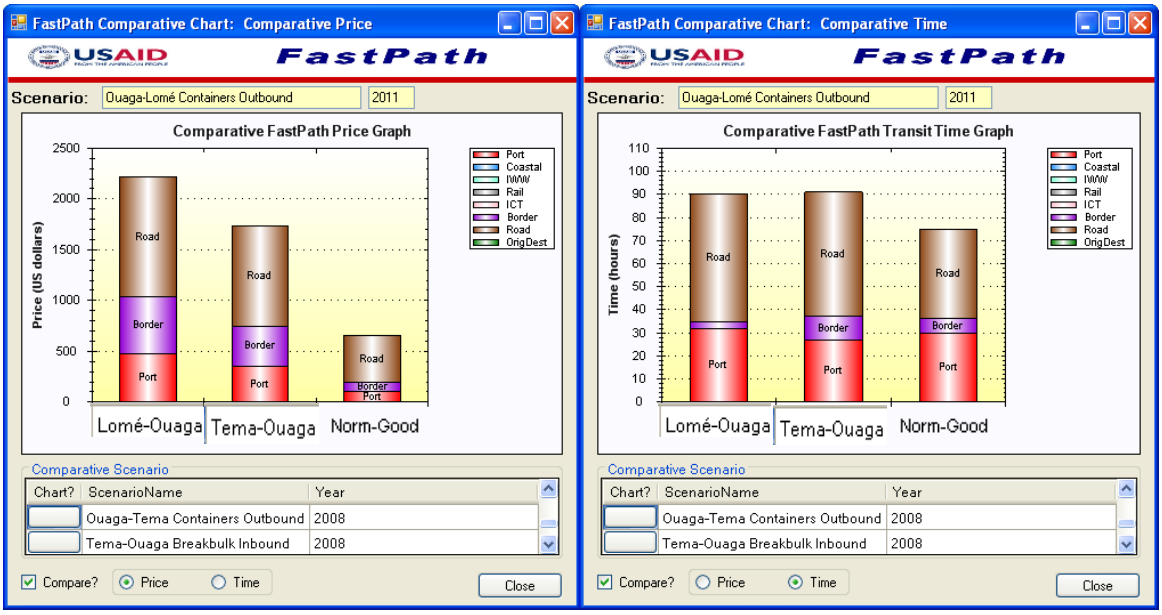


Table 4-8 summarizes how Lomé–Ouagadougou transport corridor performs on containerized freight (inbound and outbound) compared to other transport corridors. Lomé–Ouagadougou scores lower than other corridors, although it is a better option for Burkinabe importers than the Tema–Ouagadougou corridor. For exporters, the Tema–Ouagadougou corridor is a better option primarily because of the better performance of the port

Table 4-8

Comparison of Logistics Scores for Containerized Freight on Six Corridors

Logistics Component	Lomé–Ouagadougou	Tema–Ouagadougou	Laem Chabang–Vientiane	Dacca–Chittagong[a]	Durban–Nelspruit[a,b]	Maputo–Nelspruit
INBOUND						
Entire logistics chain	62	53	64	59	63	62
Port	56	55	55	49	60	51
Road transport	60	55	70	58	65	51
Border post 1	70 (Togo)	73 (Ghana)	67 (Thailand)	n/a	n/a	73 (Mozambique)
Border post 2	33 (Burkina) c	20 (Burkina) d	63 (Laos)	n/a	n/a	73 (South Africa)
OUTBOUND						
Entire logistics chain	63	65	66	54	68	60
Port	67	72	65	52	70	57
Road transport	67	70	70	58	65	51
Border post 1	40 (Burkina)	53 (Burkina)	63 (Laos)	n/a	n/a	63 (South Africa)
Border post 2	47 (Togo)	53 (Ghana)	67 (Thailand)	n/a	n/a	67 (Mozambique)

Note:

a Overall logistics score does not include border post node scores

b Estimated from partial data in Maputo Corridor analysis

c In order to compare the Customs operations with other corridors where clearance is undertaken at the border, the border post in Burkina Faso was combined for the operations at Bitou and Ouagarinter

d In order to compare the Customs operations with other corridors where clearance is undertaken at the border, the border post in Burkina Faso was combined for the operations at Dakola and Ouagarinter

Scenario 3: Inbound Noncontainerized Transit Traffic (Togo to Burkina Faso)

Table 4-9 presents the performance characteristics of the components that constitute the logistics chain for noncontainerized transit cargo. General, or break-bulk, cargo arriving at Lomé port is handled at the multipurpose facilities in Pier 1.

Table 4-9

Performance of Main Subcomponents of Noncontainerized Transit Traffic

Component	Official Costs (US$/ton)	Unofficial Costs (US$/ton)	Time (hours)	Reliability (%)
Average channel operations	0.21	–	132.0	65.2
Average unloading at berth	1.59	–	96.0	68.8
Total yard handling	2.51	1.3	120.0	58.3
Customs	5.00		24.0	100.0
Transit yard	1.10	0.27	36.0	56.0
Road transport	97.95	4.20	25.5	Varies by segment
Border crossing at Cinkasse	0.45	0.22	1.2	54.0
Border crossing at Bittou	3.00	0.33	3.5	66.0
Ouagarinter	13.65	3.58	25.1	68.0

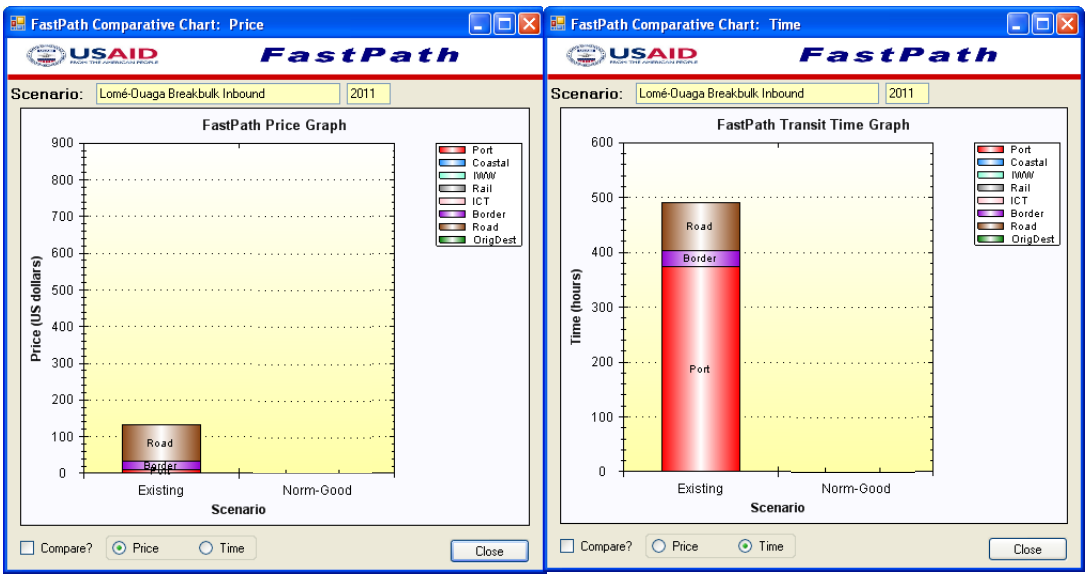
Performance based on 2009 data
** The percent of average transit time that would include 90 percent of shipments.*

Because handling of noncontainerized cargo at the port varies according to the type of cargo and equipment used, establishing a standard measure for performance comparison among different transport logistics subchains handling noncontainerized cargo is difficult. Logistics scores are not generated for noncontainerized cargo; price and time for road transport along the corridor are the same as for containerized stripped cargo. Figure 4-5 shows the performance in price and time for noncontainerized traffic in values per ton.

The performance of the Lomé–Ouagadougou corridor for noncontainerized cargo is compared to three other corridors where FastPath data for noncontainerized cargo are available: Tema–Ouagadougou, Lagos–Kano in Nigeria, and Maputo–Nelspruit in Mozambique. Only inbound freight flows are considered, as explained in Chapter 3. Information for Lagos and Maputo is presented only as a performance benchmark, while Tema is an alternative option for Burkinabe shippers.

Figure 4-5

FastPath *Price and Time Comparison Graphics for Inbound Noncontainerized Transit Traffic*



Port performance. Table 4-10 compares Lomé port to the ports of Tema, Lagos, and Maputo for noncontainerized imports. Lomé port rates much worse in waiting time for a berth and in average unloading time than Tema and Maputo (although better then Lagos). Total handling costs for imports, however, are lower in Lomé while average customs costs are slightly above Tema and Lagos. Average channel waiting time is high, indicating congestion. Berthing time is average compared to West African regional ports but significantly higher than at Maputo. Customs cost is high compared with the cost at Tema, while time spent on customs, at 24 hours, varies, with Lomé lower than Tema. The average dwell time for Lomé is among the lowest, at six days, and reliability (variation in transit and dwell time in the port) is about average.

Table 4-10

Comparison of Port Performance in Selected Corridors for Noncontainerized Imports

Port Component	Lomé–Ouagadougou Lomé Port	Tema–Ouagadougou Tema Port	Lagos–Kano Lagos	Maputo–Nelspruit Maputo
Average channel wait time	132 hrs	48 hrs	240 hr	8 hrs
Average unloading time at berth	96 hrs	78 hrs	124 hr	24 hrs
Total port handling costs/ton	US$4.31	US$10.62	US$22.95	US$29
Customs costs/ton	US$6.3	US$4.89	US$4.19	US$22
Customs time	24 hr	56 hrs	3 hr	48 hrs
Average dwell time (including customs)	6 days	17 days	21 days	6 days
Unofficial costs (%)	–	12%	–	10% (est.)
Reliability*	125%	94%	129%	300%

** The percent of average transit time that would include 90 percent of shipments.*

Road performance. The average cost per ton-km for noncontainerized freight in the Lomé–Ouagadougou corridor is higher than in other West African corridors (see Table 4-11). The

Maputo corridor road is a much shorter distance (60 km), which raises the price. Travel time or speed is the same as for containerized freight, for which performance in Togolese territory is slower than in Burkina Faso. The average speed of 36 km per hour is slower than on Tema–Ouagadougou and half that of Maputo corridor. A delay of 1.1 hours is considered acceptable.

Table 4-11

Comparison of Road Transport Performance in Selected Corridors for Noncontainerized Freight

Performance Component	Lomé–Ouagadougou	Tema–Ouagadougou	Lagos–Kano	Maputo–Nelspruit
	Lomé–Togo Border	Tema–Ghana Border	Lagos–Kano	Maputo–Mozambique Border
Average cost per ton-km	US$0.11	US$0.07	US$0.08	US$0.13**
Average speed	36 kph	40 kph	20 kph	60 km/h
Average delay time	1.5 hrs	4 hrs	30 hrs***	1 hr
Unofficial costs (%)	4.3%	1.5%	n/a	10% (est.)
Reliability*	105%	110%	100%	105%

** The percent of average transit time that would include 90 percent of shipments.*
*** Very short haul distance (60km). This drops to $0.10 perTEU-km for longer distances.*

Border post performance. The average cost per ton to cross the Togo–Burkina Faso border is a bit lower than for Tema–Ouagadougou, and significantly higher than for the Maputo–Nelspruit corridor because clearance operations are not undertaken at the border but in Ouagarinter (see Table 4-12). Therefore, the variables in Ouagarinter are added to the border post operations. Customs time for Lomé–Ouagadougou is lower than Tema–Ouagadougou although the information of the latter corresponds to 2008 and improvements related to time reduction have been achieved in Ouagarinter recently.

Table 4-12

Comparison of Border Post Performance in Selected Corridors for Noncontainerized Freight

Performance Component**	Lomé -Ouagadougou	Tema–Ouagadougou	Maputo-Nelspruit
Av. Cost per Ton	US$21.2	US$23.22	US$10
Av. Customs Time	29.8 hrs	90.7 hrs	4 hrs
Unofficial costs (%)	22%	25%	10% (est.)
Reliability*	181%	250%	56%

** The percent of average transit time that would include 90 percent of shipments.*
*** Numbers include border posts on each side of border.*

Conclusions about Performance

On the one hand, the performance of the Lomé–Ouagadougou corridor lags significantly behind other developing country corridors used for comparison here with respect to

- Ship waiting time in the port;
- Average unloading and loading times in the port;
- Terminal handling charges;
- Share of inbound containers stripped before trip to final destination and consequent low containerization rate;
- Cost of road transport, particularly in the inbound direction;
- Performance of the border post in Burkina Faso (in two steps—at the border and at Ouagarinter), which is not a disadvantage compared with Tema–Ouagadougou, but different than other transit countries, perhaps due to the low volume of cargo transiting through each border stop; and
- Average speed of road transport, particularly on segments in Togo.

On the other hand, the Lomé–Ouagadougou corridor compares favorably with other corridors in

- Average speed of road transport in Burkina Faso;
- Customs clearing time at Lomé port in the outbound direction;
- Average cargo dwell time in the outbound direction; and
- Border post costs and transit time in Togo (Cinkassé) in the inbound direction.

For other aspects of performance, such as reliability, the Lomé–Ouagadougou corridor is about average compared with other corridors.

5. RECOMMENDATIONS AND CONCLUSIONS

With the information derived from FastPath, the operational review undertaken during the field visit to the Lomé–Ouagadougou corridor, we have identified potential improvements to improve performance along the corridor. Potential improvements are organized in two sections: operations inside the port and operations outside the port. Some improvements will benefit not only transit cargo but all cargo handled at the port. The improvemetns are summarized in Table 5-1 and described in more detail below.

Table 5-1

Summary of Improvement Evaluations

Improvement Action	Estimated Investment	Present Value of Benefits	Infrastructure User's Estimated Savings / TEU		Cargo Owners Estimated Savings /TEU		Evaluation of Investment
			In	Out	In	Out	
Improving ship-to-yard transfer	$9 million	$8.1 million	$18	$8	$9	$4	Not feasible if only transit cargo is analyzed. Feasible if all cargo at the port is included.
Implementation of a port management information system	$1.5 million	$8.9 million	$20	$20	$10	$10	Feasible
Implementation of a truck appointment system at Lomé Port	$0.8 million	$8.9 million	$20	$20	$10	$10	Feasible
Implementation of an electronic transit service	$8.5 million	$53.9 million	$130	N/A	$65	N/A	Highly feasible
National and regional strategies to develop the transport system	$5.0 million	$58.9 million	$24	$82	$15	$72	Feasible
Development of a city beltway around Lomé	$110 million	$3.9 million	$8	$8	$4	$4	Not feasible
Adaptation of road design standards to cargo corridor	Varies by project	Varies by project	$42	$42	$21	$21	Varies by project
Development of a bilateral logistics strategy in Burkina Faso and Togo	$1.5 million	Unknown but outcome would contribute with value creation, growth and employment generation					Long-term benefits

The term "infrastructure users" in Table 5-1 refers to transport service providers, i.e., shipping lines, port operators, freight forwarders, and trucking companies. Estimated savings for infrastructure users and cargo owners are derived from the FastPath analysis approach presented later in this chapter. For example, regarding the implementation of the electronic transit system, an estimated reduction of 1.5 days waiting time for trucks is achieved at the Terminal du Sahel plus another hour along the corridor. This reduction improves truck productivity and reduces operating expenses to trucking companies, which could pass a percentage of the savings to shippers.

COST-BENEFIT ANALYSIS AND FASTPATH

FastPath allows the user to compare the costs of two scenarios in a spreadsheet. For example, the user creates an improvement scenario with reduced costs to shippers and then uses the FastPath cost-benefit analysis function to create a spreadsheet with cost data from the two scenarios, which calculates the cost savings in the base year. Assumptions in the spreadsheet allow the user to set growth rates for cost savings and to input investment costs for making the improvement. The spreadsheet then calculates the net present value to the shippers of the improvement for the life of the project.

This basic calculation with cost savings can be supplemented with other benefits and costs. For example, if freight time savings are expected to generate inventory cost savings, these can be added to the spreadsheet after it is saved to another location for project analysis. In this way all costs and benefits are accounted for. For the purpose of our analysis, we assume an average inventory value per container of $57,500 and interest rate of 12 percent for assessing freight time savings. The estimates of benefits and costs given below are order-of-magnitude estimates; these estimates should be refined following a more detailed evaluation of the feasibility of the improvements identified below.

IMPROVEMENTS IN THE PORT

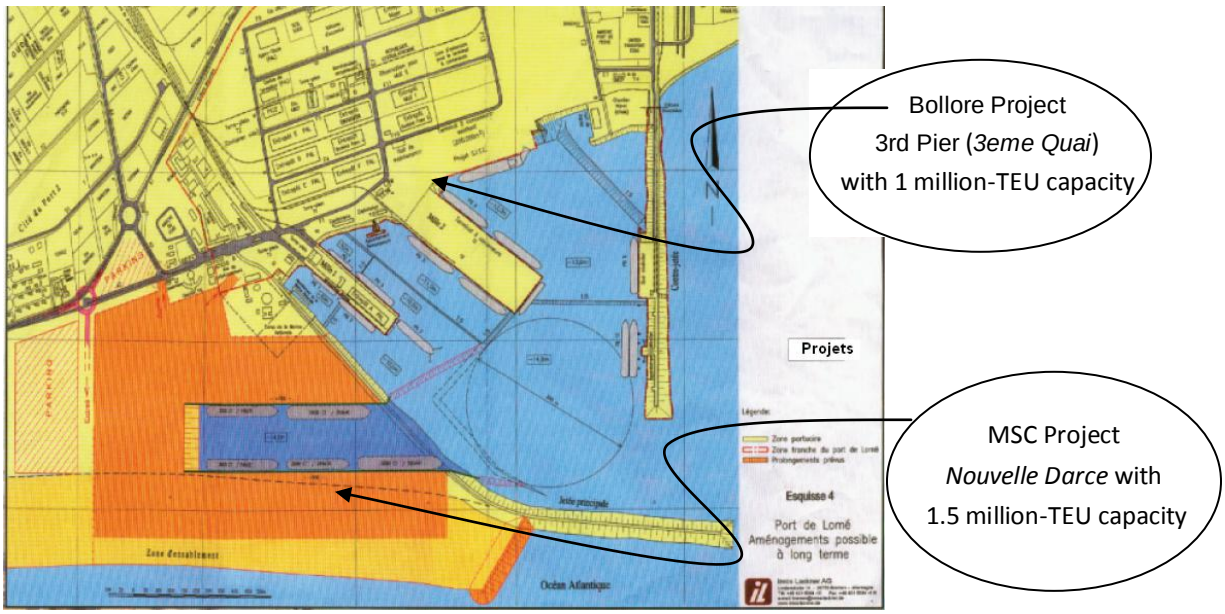
Port Infrastructure and Layout

The Port Authority of Lomé is already holding discussions with two private operators for the construction of facilities with adequate capacity to grow containerized cargo (see Figure 5-1).

The two potential projects under review are the MSC-Getma container terminal, which calls for the construction of a 1,500-meter quay terminal able to handle up to 1.5 million TEU for an estimated investment of US$300 million, and the Bolloré project, which would develop a Third Pier with 500-meter-long quays able to handle up to 1 million TEU for an estimated investment of US$160 million. With the capacity to be provided by these two projects, the port will be able to handle up to 2.5 million TEU while freeing capacity for other types of cargo by allowing Pier 2 to be used for other general cargo ships.

Figure 5-1

Port Layout with the Proposed Projects



Source: Port Authority of Lomé

The FastPath analysis confirmed that water-side operations at the port with the current facilities are not adequate for the number of vessels and volume of cargo handled. Operations on the land side are also inefficient, and the traffic in and around the port shows that much congestion is due to a lack of organization and control and in the way the port operates. The following issues have the greatest negative impact on port performance:

- Anchorage time in the bay increasing
- Limited berthing space and long berthing time. There are few berthing and docking spaces on Pier 1 and Pier 2 for ships calling on Lomé Port.
- Lack of appropriate equipment to load and unload ships
- Limited yard capacity to receive cargo
- Inadequate in-port road infrastructure
- Lack of information systems for scheduling ship operations and handling cargo at the yard
- Lack of resources for speedy transfers to the yards
- Yards not optimally located for quick and fluid transfers of cargo

Most of these issues will be addressed and probably solved as a result of the planned expansion. Nevertheless, some could be addressed temporarily before implementation of the other two projects. Improvements must be analyzed in conjunction with the other two projects to ensure they are compatible and investment is not wasted. We analyzed three potential solutions that could improve terminal operations.

Improving Ship-to-Yard Transfer

Different stevedoring companies use different yards. Yards are not well positioned for quick transfer of cargo to and from the quays. In addition most port intramural superstructures such as warehouses were built for break-bulk, bagged cargo. The trend toward containerization and storing break-bulk outside the port makes the removal of most warehouses inside the port possible, which would free up space for receiving cargo. In addition, the roads inside the port linking the port yards and piers are in bad condition, requiring constant surface reconditioning. These roads should be reconstructed from the base because most maintenance is resurfacing—temporary fixes.

Another way to improve ship-to-yard transfer is to shorten terminal tractor rotation. With the removal of warehouses and assigning the new created yard space to terminal quays located nearby, transfer time cycles will be reduced. Also many stevedoring companies have not invested in adequate equipment for transferring cargo and containers to storage yards, creating bottlenecks and congestion around the quays. Adding tractors and trailers will improve the flow of traffic and operating space on the quays and around ships.

Removal of warehouses will cost about US$250,000 and the construction of yards about US$3 million and will yield nearly 10 hectares of yard space. The project will take 12 months to complete. Rebuilding the roads will require fundamental civil works that could take 5 months and cost US$5 million. Terminal tractors and trucks, with appropriate trailers, cost on average US$75,000 each. A more detailed study is required to identify the number of tractor-trailers needed, but the total investment for 10 units would be US$750,000.

In total, this improvement would require US$9 million and would reduce the ship-handling operations cycle time by 15 percent (close to 3 hours) while increasing berth availability, reducing ship waiting time at anchor by 20 percent, or about 5 hours. Total savings in time with this improvement therefore would be 8 hours for the current number of vessels. This improvement will complement any port expansion project; indeed, it will require an expansion in the number of berths in the near future to capitalize on the savings. Based on vessel operating costs analyzed in other FastPath projects, the average vessel operational costs for a 2,000-TEU vessel are in the range of $2,000 per hour. A reduction of 8 hours handling approximately 1,000 TEU per call (500 TEU in each direction), will result in savings to shipping lines equivalent to about $18 per TEU, which would represent savings of $9 per TEU for shippers.

The improvement of berth-to-yard transfer operations could be implemented in 2013, with savings for the first year of operations (2014) of about US$1 million. If no other port expansion project is implemented, the potential growth rate for savings would be reached in two years, since port will reach capacity. The present value of benefits would be about $8.1 million, with a 9 percent growth rate of benefits for the two years (same as the growth rate of container traffic) and a 12 percent discount rate. The net present value of this improvement would be -$0.8 million, indicating that the project is not feasible. (See Tables E1a and E1b in Appendix E for details). However, if one of the expansion projects is undertaken, the capacity of the port increases and the growth rate for benefits also increases. If we assume the same growth rate until 2025 (10 more years), total savings would be US$12.5 million and the net present value US$3.2 million (See Tables E1c and E1d in Appendix E for details).

Also, for the feasibility analysis of this improvement, we should take into consideration that the benefits will not only accrue to transit cargo on the Lomé–Ouagadougou corridor but for all cargo moved through the port. With this consideration, assuming the limit for cargo growth of maximum two years (no additional port expansion project is implemented) and the same discount rate, total savings for 2014 would be US$3.3 million for a total present value of savings of US$26.6 million and net present value of US$15.8 million. This improvement is therefore feasible.

Implementation of a Port Management Information System

Most operations involved in ship loading and unloading are planned with paper and pencil. This leads to lengthy operations prone to human error. Planning ship loading and unloading using a special information system can lead to consistent and systematic operations, reducing human errors and idle times and keeping traceability of operations. A similar situation exists in the yard—there is no software management system to manage operations.

The implementation of a port management system will help to plan berth and yard operations, manage the transfer of cargo from ship to yard, manage the capacity of the yard, and manage the assignment of resources for yard activities. The system could be the same or compatible with that envisioned for operations of any of the expansion projects. The system will not only benefit transit cargo but also all cargo handled by the port.

The cost of the systems and the implementation would be approximately US$1.5 million and it could take between 12 months for the installation completion and for the port staff to become fluent in its use.

Total savings in time with this improvement could be in the range of 10 hours distributed among all port operations, including berth, yard transfer, storage, customs inspection, and gate operation. This would represent savings of about US$20 per TEU to infrastructure users and about US$10 for shippers.

Although improvement will benefit all cargo, for our analysis we analyze only transit cargo. If the project is implemented in 2013, the savings for the first year of operations (2014) will represent US$1.1 million in savings to shippers. Assuming that the potential growth for savings would be reached in two years (if no other project expansion is actually implemented), the present value of benefits would be about $8.9 million with a 9 percent growth rate of benefits (same as the growth rate of container traffic) and a 12 percent discount rate. The net present value of this improvement would be $6.6 million (See Tables E2a and E2b in Appendix E for details). Additional benefits would accrue if all cargo is analyzed—a net present value of US$24.9 million.

Implementation of a Truck Appointment System at Lomé Port

Trucks arriving at Lomé Port usually park outside the port waiting for their turn. This generates congestion at the port entrance, reduces road capacity, and represents a high opportunity cost for the transporter. The implementation of a truck appointment system would communicate to transporters the date and time they are expected to enter the port to deliver or pick up cargo. Transporters receive the appointment on their mobile phones. This system implies the existence

of official records of transporters at the regional level and could promote the gradual formalization of supply.

The components of this improvement include:

- Design and implementation of a database of official transporters based on the records of transporters associations
- Design of an appointment system managed by the Port of Lomé

Implementation of communication tools by GSM and web applications.

The investment cost of developing such a system could be about US$800,000. The port of Lomé would be responsible for its implementation with the participation of the transporters' associations. Payments that transporters make to these associations can contribute to cover operational costs. The time required for implementation has been broken down into the following steps:

- Fundraising—6 months
- Development of the solution: 6 months
- Implementation of the solution.

After discussions with truckers, we estimated that congestion generates waiting times of about 4 hours under the waiting list system. The implementation of the truck appointment system could reduce the waiting time to almost zero, improving truck productivity. This will result in savings to truckers of about US$20 per trip and potential savings to shippers of US$10 per trip.

The truck appointment system will benefit all cargo moved through the port, not only transit cargo, but for our analysis we analyze only transit cargo. If the project is implemented in 2013, in the first year of operations (2014) it will create US$ 1.1 million in savings to shippers. Assuming that the potential growth for savings would be reached in two years (if no other project expansion is actually implemented), the present value of benefits would be about $8.9 million with a 9 percent growth rate of benefits (same as the growth rate of container traffic) and a 12 percent discount rate. The net present value of this improvement would be $7.3 million (See Tables E3a and E3b in Appendix E for details).

IMPROVEMENTS OUTSIDE THE PORT

Implementation of an Electronic Transit Tracking System

The customs corridor system for transit goods, *Solidarité sur la mer*, was put in place to avoid fraud and guarantee the security of transit goods but it creates substantial delays that hurt the transport sector and raises the prices that consumers pay for imported goods. This system is antiquated and should be replaced with satellite tracking that relies less on the presence of Customs officers. With an electronic service Customs can implement a risk management system with progressive transition to ex-post-documentary inspections. In considering an alternative, the electronic transit tracking system that Ghana has begun implementing should be high on the list of possibilities (see Exhibit 5-1 for a description of the system).

Exhibit 5-1
New GCMS Transit Module, Ghana

An enhanced Transit Cargo Module has been developed to integrate transit operations in GCNet/GCMS. The module, implemented in September 2006 for transactions using the Tema-Paga route, has the following features:

- It captures and processes transit declarations.
- Transit bonds are processed and issued electronically.
- It monitors and controls movement of transit goods.
- Transit insurance bonds are automatically released or discharged.

The project has two phases:

Phase 1

- Development and deployment of the Transit Cargo Module in GCMS
- Registration of foreign importers and vehicles used to transport transit consignments
- Connection of designated intervening stations to GCNet/GCMS
- Application of secure seals to containers and open trucks by Customs Excise and Preventing System.
- Installation of closed-circuit television surveillance systems at entry, intermediate and exit stations.
- Posting of transit information to secure website for access by neighboring counties. Registered declarants will also be able to track their consignments.
- Restricted use of escorts.

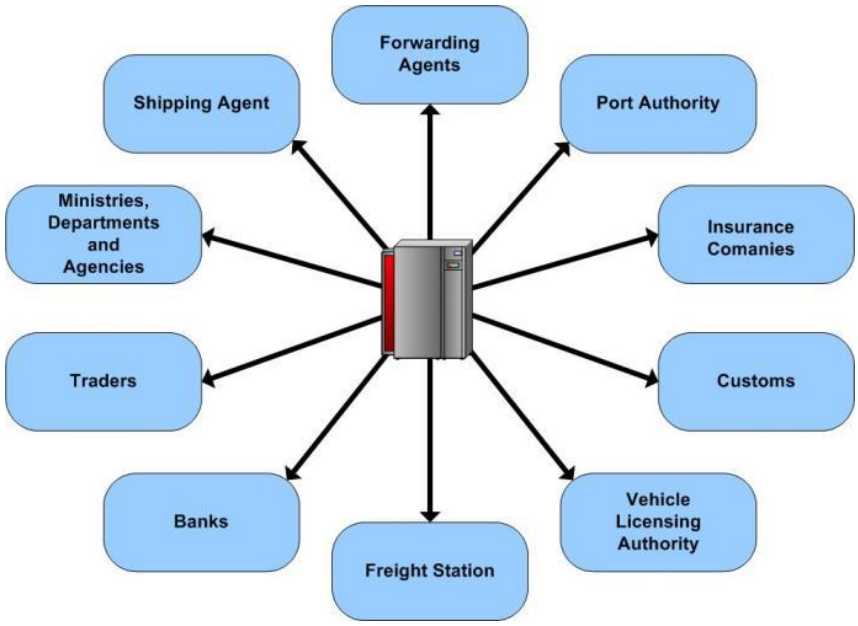
Phase 2

- Integration of electronic cargo tracking systems.
- Provision of weighbridge facilities to ensure vehicles conform to axle load specifications and also monitor weight of cargo as it moves along the route.
- Eventual phasing out of escorts in view of the introduction of customs seals and electronic tracking security systems.

Source: http://www.ghanacustoms.gov.gh

This service is based on a combination of a customs single window and GPS tracking. The project is a public-private partnership, with customs' contribution financed by the World Bank. Such a project requires a communications platform established for the various systems of the port, customs, truck companies, and others. Figure 5-2 shows the components of Ghana's GMCS Transit Module.

Figure 5-2
GMCS Transit Module Components



Source: Ghana Community Network Services Ltd

The preinvestment phase would cost US$500,000. The investment costs are variable, depending on the technology and the capabilities of the system, but could be estimated at US$8.0 million. For example, a tracking system such as the one implemented in Ghana requires advanced technology and provides immediate information about transit cargo. Another option is a tracking system similar to those used by mail couriers such as FedEx or DHL in which instant information is not available but certain parameters are met. This is the transit system being piloted in some countries in Central America, which requires a smaller investment but higher operational costs. We estimate an average operating cost per TEU of US$20.

A political and institutional feasibility study for West Africa's adopting the same type of system might determine if such a system and its benefits could be extended to neighboring countries in West Africa.

We estimate that fundraising would take about 12 months; and assessment, project concept, and PPP arrangements would take about 24 months. Full implementation would therefore take about 3 years, depending on the degree of customs automation.

Implementing such a system will benefit both truckers and shippers through a reduction in waiting time for the formation of transit convoys—which is 1.5 days at Lomé port or Terminal du Sahel. If this waiting time is eliminated, the total trip time will be reduced and the productivity of the trucks will increase. We also estimate the system will reduce travel time on the road by 1.5 hours, enabling more trips per year and therefore higher income, and with fixed cost remaining constant, higher profits for truckers. Calculations of estimated additional revenues are presented in Appendix D. Benefits to truckers from this improvement are estimated at US$170 per trip, minus US$40 to cover operational costs (US$20 per TEU and assuming a fully loaded, 2-TEU truck per trip). After covering operational expenses, savings to shippers may total US$65 per TEU.

This improvement will benefit only transit cargo. If the project is implemented beginning in 2013, it is expected to be fully operational in 2016. Savings to shippers for the first year of operations (2016) will amount to US$7.2 million. Assuming that the potential growth for savings will have been reached by 2015 (if there is no further project expansion), the present value of benefits would be about $53.9 million, with a 9 percent growth rate of benefits (same as the growth rate of container traffic) and a 12 percent discount rate. The net present value of this improvement would be $40.5 million (see Tables E3a and E3b in Appendix E for details).

Strategy to Develop the Road Transport Sector

Road transport services in the corridor, and in general in the West Africa region, are weak. As we saw during our field visit, vehicles are obsolete and poorly maintained. Constant customs and police roadblocks, low cargo demand, regional quotas, and other issues are among the causes of the problem. A regional strategy is needed to promote the growth of this sector, which can make a substantial contribution to GDP and generate low-skilled jobs. Such a strategy will help identify potential improvements at a national, and perhaps, regional levels and quantify the effects the improvements will have, including how this could affect other sectors of the economy. The strategy should include

- Design and implementation of incentives for sector formalization with control measures, and ways to improve transport network efficiency
- Incentives aimed at keeping cargo in containers as long as possible
- Design and implementation of the legal and institutional framework, perhaps deregulation of the transport sector

The strategy development phase would require about US$ 5 million at the regional level. The establishment of the institutional framework for the implementation of the strategy will require the participation of ministries of infrastructure and transport. Also the ministry of commerce should be involved in the development of the strategy with the participation of the private sector. The setting-up of a coordination committee with participants from both the public and private sector is recommended.

The time required for preparing such a strategy has been broken down as follows:

- Development of a national strategy for the development of transport and logistics services—6 months
- Fundraising for the design of detailed measures—6 months
- Studies aimed at the design of specific measures—12 months
- Implementation of solutions—24 months.

In the short term, the implementation of some regional measures can be implemented at a national or corridor level strategy and this will contribute to the reduction of delays caused by broken vehicles along the corridor and the cost of these delays, reduction of the difference between transport costs of containerized and loose/breakbulk cargo, elimination of stripping practices, among others. In the long term, the main benefit of these measures is to contribute to the strength of the sector.

It is estimated that savings of up to two hours in each direction could be achieved by the reduction of delays resulting in additional income to truckers of US$19 and potential savings to shippers of US$9 per trip.

Also, if the use of containers is promoted instead of "penalized" this could represent savings of approximately US$ 260 per trip on transport costs for cargo that currently goes to Burkina containerized, and about US$ 203 and US$ 86 per TEU if stripping and consolidation practices are no longer needed for inbound and outbound transit cargo. This also saves 7 hours (for stripped cargo only) for the stripping the container. However, an additional cost of about US$ 300 per TEU charged at Ouagarinter must be considered for the concept of container handling for containerized cargo. Adding the savings and the additional costs for the total transit volumes handled at Lomé, the consolidated result for the system would represent average savings of US$ 6 for inbound cargo and savings of $63 for outbound cargo if the use of container is promoted.

The development of national and regional strategies for the road transport system will benefit not only transit cargo but the entire transport sector. However, for the purpose of our analysis, we estimated only the benefits associated with transit cargo. If the development of the strategy starts in 2013, results for the implementation of solutions could begin in 2016. Savings for the first year

of operations will total about US$7.9 million for shippers. Assuming that the potential growth for savings will have been reached by 2015 (meaning that no other expansion projects are implemented at the Port of Lomé and port reaches capacity), savings will occur only for the actual cargo volumes that the port can handle. The present value of benefits would be about $59 million with a 9 percent growth rate of benefits (same as the growth rate of container traffic) and a 12 percent discount rate. The net present value of this improvement would be $48 million (see Tables E5a and E5b in Appendix E for details)

Development of a City Beltway around Lomé

Most traffic leaving the port for the north and Burkina Faso must go through town, adding congestion to city roads and delays to the transport of cargo. Because of the characteristics of the road system and the lack of traffic organization, transit vehicles and local traffic comingle, creating traffic bottlenecks in the city. Building a beltway around the city, and particularly a segment linking the port to roads going to the north to channel transit traffic, would help solve this problem. The road work would take about two years to complete and cost an estimated US$110 million. The benefits of this improvement would be experienced not only by truck operators but also by other road users.

Data that we collected show that the average time crossing the city on the 13-km link to the Terminal du Sahel is about 1 hour. If a city beltway is constructed, speed on this segment could increase to 50 km per hour, for a reduction of 35 minutes. This reduction in time would increase the productivity of trucks, resulting in savings for truckers of US$8 per trip or US$4 for shippers. These savings would not be sufficient to recover the investment for a project of this magnitude, even if all traffic serving the port is considered. Considering only transit cargo and no expansion of the port, the present value of benefits would be about $3.9 million for a 20-year period and the investment would not be recovered. (See Tables E6a and E6b in Appendix E for details.)

Nevertheless, not only transit cargo would benefit from this improvement but also domestic cargo, as well as other vehicles that move around the city and, considering the scale of the project, the improvement would bring other economic benefits to the city and the region. The project, however, is not feasible if looked at exclusively from the port cargo performance viewpoint.

Adaptation of Road Design Standards on Cargo Corridor

The condition of the road along the corridor is highly variable, reflecting a weak maintenance management system. Furthermore, service centers to meet the needs of long-distance truckers (rest areas, restaurants, communication centers, vehicle maintenance) are lacking. A cargo network must be defined to promote uniformity of maintenance and services along the corridor, including common design standards and criteria for the solution for crossing urban areas (such as building bypasses or posting better signage), and for service centers for truckers.

Such an improvement project would have the following components:

- Definition of cargo corridors
- Definition of criteria and standards applicable to:

- Road design standards, shoulders in urban centers,
- Service centers and facilities for transporters
- Implementation of management system to maintain minimum maintenance standards
- Design of typical facilities and other standards

The diagnosis, definition and detailed design will require US$300,000–500,000. Implementation will depend on the results of the diagnosis, progress on ongoing projects, and the scope of a pilot phase. If recommended adjustments can be made by current projects and absorbed into their project costs, any additional cost would be minimal. If not, implementation could add up to US$150,000 to US$250,000 per km of road.

The institutional framework for this improvement will require the participation of ministries of infrastructure and transport in Togo and Burkina Faso and municipalities of large urban areas. The time required has been broken down as follows:

- Fundraising—6 months
- Assessment and definition of the cargo network—6 months
- Design of standards and facilities—8 months
- Legal support for establishing rules and standards
- Implementation of pilot cases

This improvement will increase the speed on various sections of the road, reducing the total travel time by as much as 4 hours in each direction. Potential savings to truckers and shippers are estimated at US$42 and US$21 respectively.

A more detailed analysis of the actual projects would be needed to determine the feasibility of this improvement.

Development of a Bilateral Logistics Strategy for Burkina Faso and Togo

Burkina Faso and Togo suffer from inefficiencies affecting the quality and variety of logistics services and/or the competitiveness of their exports. Burkina Faso could benefit from defining a strategy for generating logistics solutions to facilitate diversification of exports. Actual logistics infrastructure, i.e. Ouagarinter and Boborinter, in Ouagadougou and Bobo Dioulasso, could be used for the implementation of value added logistics solutions. Togo could become a logistics hub for the subregion if it can capitalize on its competitive advantages to raise the quality of services to meet market requirements (i.e., geographical location, language, natural physical conditions of the port, and others). Such a strategy would include recommendations for the needs of the productive sector and would give a framework to solutions aimed at trade facilitation.

This suggested improvement consists of the design of bilateral strategy to develop logistics services in Burkina Faso and Togo to further promote the use of the Lomé-Ouagadougou corridor. Estimated cost for this activity is US$ 1.5 million.

Ideally a bilateral logistics committee or a “Corridor Management Group” would be formed with representatives from the ministries of infrastructure, transport, production, and agriculture, as

well as from customs, importers, producers, exporters, and logistics service providers of each country. The timing of implementation steps are as follows:

- Fundraising—6 months
- Definition of scope and responsibilities of the committee—6 months
- Execution of the Strategy—8 months

The benefit of this measure is long term. By developing a strategy for developing logistics and distribution services, new services are expected to emerge that will contribute with value creation, growth, and over time, job creation.

CONCLUSIONS

These eight suggested improvements have varying potential and investment requirements (refer back to Table 5-1 for a summary of the benefits, costs, and feasibility of each).

The first two recommended improvements (improving ship-to-yard operations and the implementation of a port management information system) could be undertaken before the port expansion program that being discussed with the private sector and the Port of Lomé. They are feasible and would complement either of the two expansion projects under consideration.

The implementation of a truck appointment system is also feasible and will not only decongest roads near the port but also will allow the port authority to create a database of the trucking sector with detailed information of the fleet serving the port. This recommendation may need complementary actions to provide truckers with a staging area where they could wait until their appointment to enter the port.

The implementation of an electronic transit service is highly feasible and could be implemented on a regional basis with neighboring countries. It is a project that could be developed and operated under a PPP scheme, ensuring long-term sustainability.

The improvements associated with the strategy to develop the road transport sector may have not only positive results but also potentially negative results for some in the trucking industry. The implications of these strategies in a liberalized environment should be analyzed carefully and winners and losers identified.

The development of the beltway around the city is the most expensive improvement and the impact of the benefits is small compared with the amount of the investment. This improvement may have other economic incentives but would require a more detailed analysis of the benefits.

The other two improvements (adaptation of road design standards and the development of a bilateral logistics strategy for Burkina Faso and Togo) are in principle feasible but the benefits will vary depending on the solutions identified and their impact on the segment of the corridor. The logistics strategy would bring benefits to the sector in the long term and the implementing activities would likely be low-cost policy actions.

All these potential improvements, except the Lomé beltway, appear desirable but need further investigation to verify their potential.

APPENDIX A. DATA DEFINITIONS

There are several variables that are used to measure the performance of a logistics system, where each variable can be understood in a different manner by several stakeholders involved in the system. To avoid confusion among participants in the interpretation of results, below we present the definition of the major variables used by FastPath during the performance analysis.

Base case. Scenario describing an existing situation

Benchmarks. Performance measures representing best practice or typical developed country operations

Dwell time. Total time spent by a container in a facility such as a port.

Hinterland node. An origin or destination of container traffic inland from a seaport

Improved scenario. Scenario representing a package of improvements

Intermodal container terminal. A terminal where containers can switch between two modes, usually rail and road. An ICT can have several components (e.g., storage, Customs, drayage).

Link. An element of a logistics chain that has a physical length (e.g., road link, rail link)

Logistics chain. A series of transportation/operational links and nodes through which a container travels from seaport to its inland destination

Logistics score. Performance measure between 20 and 80 representing logistics efficiency

Node. An element of a logistics chain that exists in one location (e.g., seaport, intermodal container terminal)

Norms. Performance measures representing typical values in developing countries ordered in terms of good, fair, poor, and very poor

Price. A logistics performance indicator, usually total price per container paid by the shipper for transiting a link or a node in a logistics chain

Reliability. A performance indicator, defined here as the percent of average time accounting for 90 percent of actual times incurred

Scenario. A detailed description of a logistics chain with traffic data and performance measures

Seaport/terminal. Combination of a seaport and a container terminal that can have several components (e.g., channel, berth, intermodal transfer, Customs)

Subchain. Part of a logistics chain connecting a seaport to a hinterland origin or destination

Transit time. A logistics performance indicator representing the time to pass through a link or a node in a logistics chain, excluding waiting time

Unit value. The value of a performance indicator such price or speed for one unit (e.g., container-kilometer or km/h)

Waiting time. A performance indicator representing time for a container not spent in process

APPENDIX B. SUMMARY OF TRANSPORT AND LOGISTICS PROCEDURES

IMPORT PROCEDURES

Segment	Procedure	Description	Costs		Time	
			Formal	Informal	Real	Delay
A. PORT OF LOME–TERMINAL DU SAHEL						
A1	Transport allocation	• Bid loads: Importer or freight forwarder chooses a transporter • Small loads: transport is allocated following 2/3-1/3 rule for Burkinabe and Togolese trucks. • CBC oversees compliance; freight forwarder must give bill of lading to CBC to obtain freight declaration. • Driver	• Driver pays to UNATROT, OTRAF, URT, UCRB (Burkina Faso drivers) • Fees differ depending on nationality of driver and truck • Fee to enter port • Fee to break the line (transporter), payments to OTRAF or UNATROT (30 percent of the total)			
A2a	Loading truck with stripped containers	• Containers are stripped for loading cargo onto truck. Usually two 20-ft. containers are loaded in one truck • Rate is by weight and drivers tend to overload the truck • Declaration influences the tariff—the higher the duty, the higher the price	transport tariff	Unofficial payments to police, customs, and gendarmes		
A2b	Loading truck with containers	• Container is loaded on truck. • Declaration influences the tariff: the higher the duty, the higher the price		Unofficial payments to police, customs and gendarmes		
A2c	Loading truck with bulk cargo	• Truck is loaded. Because rate is by weight, drivers tend to overload the truck • The declaration influences the tariff, the higher the duty, the higher the price		Unofficial payments to police, customs and gendarmes		
A3	Transport to Terminal du Sahel	• Truck goes to Terminal du Sahel • Customs gives truck a sticker that includes it in a customs-escorted convoy to border post.	• Payments to get escort for the goods in transit to customs • Wait till to the departure of the next convoy	Payments to customs to leave without escort		

Segment	Procedure	Description	Costs		Time	
			Formal	Informal	Real	Delay
B. TERMINAL DU SAHEL–CINKASSE (SENKANSSA) / BITTOU						
B1	Leaving the terminal	• Truck leaves Terminal du Sahel between 2 and 4 p.m. • Officially, departures are on Tuesday, Thursday, and Saturday, but in practice, escorts leave twice a week		• Unofficial call-up fee to customs • Unofficial payments to transport unions for assistance		• Waiting for convoys to be arranged • Cancelation of departures if the driver does not want to pay an unofficial escort-waiver
B2	Transport segment	• Driver heads toward border in convoy • Escort usually travels after the last vehicle has left. • Presence of customs does not keep authorities at checkpoints from asking for unofficial payments.	Tolls	• Payments at checkpoints • Number of checkpoints has declined, presumably thanks to West Africa Trade Hub's awareness effort.	24 hours (or about three working days)	• Broken-down vehicles • Checkpoints (average of 49 min in the corridor)
B3	Border procedures at Cinkasse, Togo	• Hours: 7–12h and 14–17:30h, 7/7 • Checking of ISRT card • Verification of transit-declaration documents and digitization of details • Physical inspection of cargo and truck • Forwarders enter the date in ASYCUDA	• Overtime pay for authorities on holidays • Fees to register ISRT card	• Informal payments to broker in the border to accelerate the process (intermediary between drivers and forwarders) • Payments to customs and police	1.5 hour	• Average delay 6.5 h • Waiting for customs escort to arrive to the border • 45 min from opening time to actual start due to lack of availability of documents • Interrupted Internet connection • Time spent in negotiating the bribe • Waiting to get money to pay bribes
B4	Border procedures at Bittou, Burkina Faso	• Hours: 7:30–14h and 15–18h, 7/7 • Pre-customs declaration for cargo of up to XOF 500,000 (USD 1,107) • Clearance must be undertaken by freight forwarder • Issuance of a second ISRT card	• Fees for ISRT card • Fees paid by forwarder to customs officials for escort from Bittou to Ouagadougou • Official overtime but paid because customs receives documents in a short timeframe • Official overtime during	Unofficial payments from freight forwarders to customs officers	5-7 hours	• 12 hours • Absence of customs harmonization between Togolese and Burkinabe customs • Customs only accept documents between 7-8am • Slow procedures: few

Segment	Procedure	Description	Costs		Time	
			Formal	Informal	Real	Delay
			weekends and holidays			personnel, power cuts • 30 minutes delay for start processing applications • Delays of 16 to 24 hours to have customs escort if the clearances is given after 14:00
C. CINKASSÉ-BITTOU–OUAGADOUGOU						
C1	Transport segment	Truck leaves when the laissez-passer has been issued and customs escort fee paid.	• Road tolls • Weighbridge fees • Laissez-passer	Unofficial payments from drivers to officials (police, gendarmes, customs)	4-6 hours	30 minutes waiting time when stopped in checkpoints
C2	Customs clearing procedures at Ouagarinter, Burkina Faso	• Clearance procedures at Ouagarinter. Hours: Monday to Friday, 8:30–12h and 15-17h The escort agent gives all the documents to a customs-house agent: ISRT, packing list, bill of lading, certificates, others Some cargo needs inspection and the issuance of the inspection certificate, tasks that are performed by Cotecna Inspection S.A.	• Customs' fees for the clearing process • Legal overtime to customs paid by forwarders • Extra time paid to transporters if goods remain in truck for more than 3 days • Guarantee-fund premium (never reimbursed, goes to CCI Burkina Faso) • Cargo insurance mandatory in Burkina Faso, even if goods are already insured	• Informal payments to customs to speed up the inspection process, paid by the forwarder • Informal payments to customs escort agents, paid by the forwarder	24 hours (or 3 working days) to 48 hours (6 working days)	• Up to 5 more days (or 24 h) in some cases due to customs inspection, when needed (red channel). • Cargo is usually inspected abroad by Cotecna; its local office issues inspection certificate in 1–3 working days (it could be requested when the goods reach the border). In addition, since February 2008 Cotecna must inspect all goods below US$3 million, which takes 4 working days, or 32h. • Other causes: few computers, only one customs cashier, unavailability of customs officers.

Source: Transport and Logistics costs on the Lomé–Ouagadougou corridor. West Africa Trade Hub Technical Report # 26. USAID. December 2010

EXPORT PROCEDURES

Segment	Procedure	Description	Costs		Time (hours)	
			Formal	Informal	Real	Delay
A OUAGARINTER – CINKASSÉ/BITTOU						
A1	Customs export procedures at Ouagarinter, Burkina Faso	• Customs officials clear shipment • Cargo is loaded in containers (usually 20-ft.) or break bulk	• Customs fee and legal overtime fee • Forwarding fees	Informal payments to customs agents	2 hours	• 3h • Unavailability of customs officers • ASYCUDA network connection problems • Unavailability of computers
A2	Transport to the border	• The market is not regulated, not quota exists • Only Togolese and Burkinabe transporters can take cargo to the Port of Lomé • For cotton, SOFITEX negotiates a reference rate, the others are fixed on the spot market • SOFITEX usually pays 2 months after the trip	• Transport tariff • (4-5 percent less expensive if transported as break bulk) • The tariff varies if negotiated directly between the exporter and the transporter or if the deal is made through a shipping agency (100-500 USD more expensive in this later option) • The fee varies depending on the commodity • Transport broker's fees (optional) • Cargo insurance for the road trip	Informal payments to police, customs, gendarmes and transport unions	184 hours up to Lomé	Delays at checkpoints (1.5h)
A3	Customs procedures at Bittou	• Hours 7:30–14h and 15–18h, Monday to Friday, and 9–14h on weekends and holidays • Forwarders enter declaration • *Fond de garantie routier* has to be paid at the border	• Formal overtime customs fees (always) • *Fond de garantie routier*	Informal payments to police	1.5 hours	• 1.5 hours • Unavailability of customs officers, power cuts and problems with Internet connection

Segment	Procedure	Description	Costs		Time (hours)	
			Formal	Informal	Real	Delay
A4	Customs procedures at Cinkassé	• Hours 7–12h and 14–17:30h, 7/7 • Export declaration using ASYCUDA • Physical inspection of goods to verify registration • No escorts accompany trucks to Lomé, even when the southbound trip is included in the tariff paid to *Solidarité sur la Mer.*	Customs fees	Informal payments to customs	1 hours	0.5 hours
B CINKASSÉ/BITTOU – PORT OF LOMÉ						
B1	Transport to Port of Lomé			Informal payments to police, customs, gendarmes	Included in segment A2	0.5 hours
B2	Offloading of cargo		• Customs fees • Forwarding fees	Informal payments to customs		

Source: Transport and Logistics costs on the Lomé–Ouagadougou corridor. West Africa Trade Hub Technical Report # 26. USAID. December 2010

APPENDIX C. WEST AFRICA TRADE HUB METHODOLOGY

This section summarizes the methodology and definitions that the West Africa Trade Hub team used in the report "Transport and Logistics Costs on the Lomé–Ouagadougou Corridor"[7]

As said in the introduction, it is worth noting that transport & logistics cost and steps referred to in this study – as well as on the West Africa Trade Hub's one – are only a part of the whole set of logistics activities along a logistics chain. In fact, they refer to transport & logistics activities that take place in the international transport segment of the chain, and concern only direct costs: only transport costs, handling along the transport segment of the logistics chain, and documentation. This is in part due to: a) logistics chains are very short and make very limited use of added-value logistics services; b) logistics services that take place so far in public infrastructure are very limited – only some storage in Ouagarinter –; c) the study deals with extra-costs that public services and infrastructure cause on logistics chain, not with the performance of chosen logistics chains.

Costs

- Formal costs: All receipted costs
- Informal costs: All un-receipted costs
- Trucking costs: All formal and informal charges associated with the organization of trucking, and the price of the trucking journey
- Customs processing costs: All formal and informal charges payable to customs authorities and other government agencies at the port, at borders and at the point of departure (exports) or destination (imports), as well as the fee for the bond required by the Togolese and Burkinabe customs for all goods transiting through Togo (commonly referred to as the "guarantee " premium)
- Forwarding costs: all formal and informal costs payable to forwarders for clearing goods and organizing transport
- Duties and Taxes: customs duties and taxes

[7] West Africa Trade Hub Technical Report # 26. USAID. December 2010

- Opportunity costs: The cost of capital locked up while goods are transported or, in the case of trucks owners, when trucks are being unnecessarily delayed.

Exchange rate:

The exchange rate used for this study was based on an average rate of 1.00 USD = XOF 451.53

Choice of studied commodities:

Cargo was chosen based on their relative contribution to total trade along the corridor over the past several years.

- For imports: edible oils, sugar, textiles and rice
- For exports: shea nuts, sesame seeds and cashews

Standard time, delays and uncertainty:

- Standard time: respondents were asked to give the average time spent on an activity, considering that procedures took place normally
- Delays: respondents were asked the average lag experienced beyond what they considered justifiable
- Final data: West Africa Trade Hub team determined a final average based on the origin of the information, unweighted means, and the team members' own experience. These data were validated at several workshops
- Driving time: 8 hours

Customs duties and taxes:

The analysis excludes duties and customs taxes since they are not part of the transport and logistics costs.

APPENDIX D. ESTIMATION OF COST SAVINGS TO USERS

Based on the results presented in Chapters 3 and 4, we know that the road trip from Lomé to Ouagadougou takes in average 25.5 hours. Therefore, the road trip will require an average of two overnight stays. Assuming an average night-time stop of 10 hours each, the adjusted time would be 44.5 hours. If we then add the time associated with waiting at the Terminal du Sahel, border crossing time, and country clearance time in Ouagarinter, the total time incurred by a truck for cargo delivery is approximately 111 hours. If we then take into consideration the time of the return trip, the total time spent by a trucker in a round-trip journey from cargo pick-up to cargo delivery and return to Lomé is approximately 158 hours. With these figures, a truck on this route will be able to make about 20 round trips per year assuming a conservative estimation of truck availability of 289 days per year (truck requires maintenance during 1 week every 3 months and truck does not travel on Sundays).

It is also known that the average price per truck load (2 TEU) is US$2,946 (estimated cost considering a combination of direct containers and stripped cargo but also a combination of the number of TEUs carried per truck) and the travel distance is 928 km. Previous road transport industry studies in West Africa[8],[9] show a different distribution of variable costs, fixed costs, and profitability in West African corridors, depending on several factors, including the specific corridor, type and size of truck, and level of professionalism of trucking companies (formal vs. informal). For our analysis, we used a distribution of the transport price of 49 percent for variable costs, 22 percent for fixed costs, and 29 percent profitability. With this information, one can estimate the variable cost to be US$1,429 per trip or US$1.54 per km, fixed costs are US$650 per trip or US$0.7 per km, and profitability is US$868 per trip or US$5.49 per hour using the 158 hours per trip.

With the above information, we could estimate the additional income that a trucker would make if the round trip is reduced. For example, for the implementation of an electronic transit service, the round trip would be reduced an average of 1.5 days (36 hours) plus 1.5 hours along the road, allowing the trucker to undertake almost 26 round trips per year (additional 6 round trips per

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[8]Terevaninthorn, S. and Raballand, G (2009). Transport Prices and Costs in Africa: A Review of the International Corridors. The World Bank.

[9] West Africa Trade Hub Technical Report No. 32, *Trucking to West Africa's Landlocked Countries: Market Structure and Conduct*. United States Agency for International Development (USAID).

year). Considering that fixed costs remain constant per year, these 6 extra trips would result in additional revenue of US$8,810 per year, or an average of US$340 per trip.

These calculations assume that the trucker is actually able to undertake the additional trips. The actual business environment in West Africa indicates that there is seasonality, and trucking services exceed transport demand approximately half of the year. Therefore, truckers will not be able to make the additional trips during peak season when demand is higher than truck availability. A conservative estimate would result in 50 percent of the additional revenues estimated above, or US$170.

In a competitive environment, truck operators would be in position to transfer part of the additional income to their clients as a reduction in transport rates. One can assume that the trucker will share 50 percent of the additional income, thus reducing transport rates, resulting in savings to shippers of US$85 per trip.

Similar calculations are made for other improvements assessed by FastPath.

APPENDIX E. COST-BENEFIT ANALYSIS TABLES

Table E1a. Evaluation of Ship-to-Yard Transfer Operations Improvement for Inbound Containerized Cargo
FastPath
Summary Comparative Investment Evaluation Form

Base Scenario Name:	Lomé-Ouaga Containers Inbound			
Improved Scenario Name:	Ship-Yard Transfer Operations Improvement		**Year:**	2013

Performance Indicator	Base	Improved	Difference	
1. Unit Transport Price to Shipper	$3,329	$3,320	$9	
2. Av. Transit Time for Trip	572	564	8	hours
3. Reliability (% of mean time)	101	100	1	%
4. Total Containers Per Year	110,995	110,995	0	
5. Total Logistics Cost	$369,503,970	$368,505,011	$998,959	
6. Investment Costs for Improvements (US$)	N/A	$9,000,000	N/A	
7. Discounted Cost Savings for Shippers (US$)	N/A	N/A	$8,052,949	
8. Net Present Value (US$) (discounted savings - costs)			($845,581)	

Data input by user
Data imported from database
Numbers calculated in spreadsheet

Table E1b. Evaluation of Ship-to-Yard Transfer Operations Improvement for Inbound Containerized Cargo
FastPath
Cost-Benefit Analysis Sheet

Base Scenario Name:	Lomé-Ouaga Containers Inbound		
Improved Scenario Name:	Ship-Yard Transfer Operations Improvement	**Year:**	2013

Assumptions:

Investment Year:	2013
Opening year:	2014
Base Case Total Shipper Price	$369,503,970
Improved Total Shipper Price	$368,505,011
Total Shipper Savings	$998,959
Growth Rate of Savings (%/yr)	9%
Year of Maximum Savings:	2015
Discount Rate (%)	12%

Annual Costs and Savings

Year	Investment	Savings	Net Savings
2013	$9,000,000		-$9,000,000
2014		$998,959	$998,959
2015		$1,088,866	$1,088,866
2016		$1,088,866	$1,088,866
2017		$1,088,866	$1,088,866
2018		$1,088,866	$1,088,866
2019		$1,088,866	$1,088,866
2020		$1,088,866	$1,088,866
2021		$1,088,866	$1,088,866
2022		$1,088,866	$1,088,866
2023		$1,088,866	$1,088,866
2024		$1,088,866	$1,088,866
2025		$1,088,866	$1,088,866
2026		$1,088,866	$1,088,866
2027		$1,088,866	$1,088,866
2028		$1,088,866	$1,088,866
2029		$1,088,866	$1,088,866
2030		$1,088,866	$1,088,866
2031		$1,088,866	$1,088,866
2032		$1,088,866	$1,088,866
2033		$1,088,866	$1,088,866
Net Present Value:		$8,052,949	($845,581)

Data Input by user on this sheet
Data Imported from database
Data calculated by spreadsheet

Table E1c. Evaluation of Ship-to-Yard Transfer Operations Improvement for Inbound Containerized Cargo
FastPath
Summary Comparative Investment Evaluation Form

Base Scenario Name:	Lomé-Ouaga Containers Inbound			
Improved Scenario Name:	Ship-Yard Transfer Operations Improvement		**Year:**	2013

Performance Indicator	Base	Improved	Difference	
1. Unit Transport Price to Shipper	$3,329	$3,320	$9	
2. Av. Transit Time for Trip	572	564	8	hours
3. Reliability (% of mean time)	101	100	1	%
4. Total Containers Per Year	110,995	110,995	0	
5. Total Logistics Cost	$369,503,970	$368,505,011	$998,959	
6. Investment Costs for Improvements (US$)	N/A	$9,000,000	N/A	
7. Discounted Cost Savings for Shippers (US$)	N/A	N/A	$12,545,788	
8. Net Present Value (US$) (discounted savings - costs)			$3,165,882	

Data input by user
Data imported from database
Numbers calculated in spreadsheet

Table E1d. Evaluation of Ship-to-Yard Transfer Operations Improvement for Inbound Containerized Cargo
FastPath
Cost-Benefit Analysis Sheet

Base Scenario Name:	Lomé-Ouaga Containers Inbound		
Improved Scenario Name:	Ship-Yard Transfer Operations Improvement	**Year:**	2013

Assumptions:

Investment Year:	2013
Opening year:	2014
Base Case Total Shipper Price	$369,503,970
Improved Total Shipper Price	$368,505,011
Total Shipper Savings	$998,959
Growth Rate of Savings (%/yr)	9%
Year of Maximum Savings:	2025
Discount Rate (%)	12%

Annual Costs and Savings

Year	Investment	Savings	Net Savings
2013	$9,000,000		-$9,000,000
2014		$998,959	$998,959
2015		$1,088,866	$1,088,866
2016		$1,186,864	$1,186,864
2017		$1,293,682	$1,293,682
2018		$1,410,113	$1,410,113
2019		$1,537,023	$1,537,023
2020		$1,675,355	$1,675,355
2021		$1,826,137	$1,826,137
2022		$1,990,489	$1,990,489
2023		$2,169,633	$2,169,633
2024		$2,364,900	$2,364,900
2025		$2,577,741	$2,577,741
2026		$2,577,741	$2,577,741
2027		$2,577,741	$2,577,741
2028		$2,577,741	$2,577,741
2029		$2,577,741	$2,577,741
2030		$2,577,741	$2,577,741
2031		$2,577,741	$2,577,741
2032		$2,577,741	$2,577,741
2033		$2,577,741	$2,577,741
Net Present Value:		$12,545,788	$3,165,882

Data Input by user on this sheet
Data Imported from database
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Table E2a. Evaluation of Port Management Information System
FastPath
Summary Comparative Investment Evaluation Form

Base Scenario Name:	Lomé-Ouaga Containers Inbound			
Improved Scenario Name:	Implementation of a Port Management Information System		**Year:**	2013

Performance Indicator	Base	Improved	Difference	
1. Unit Transport Price to Shipper	$3,329	$3,319	$10	
2. Av. Transit Time for Trip	572	562	10	hours
3. Reliability (% of mean time)	101	100	1	%
4. Total Containers Per Year	110,995	110,995	0	
5. Total Logistics Cost	$369,503,970	$368,394,015	$1,109,955	
6. Investment Costs for Improvements (US$)	N/A	$1,500,000	N/A	
7. Discounted Cost Savings for Shippers (US$)	N/A	N/A	$8,947,721	
8. Net Present Value (US$) (discounted savings - costs)			$6,649,751	

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Numbers calculated in spreadsheet

Table E2b. Evaluation of Port Management Information System
FastPath
Cost-Benefit Analysis Sheet

Base Scenario Name:	Lomé-Ouaga Containers Inbound		
Improved Scenario Name:	Implementation of a Port Management Informa	**Year:**	2013

Assumptions:

Investment Year:	2013
Opening year:	2014
Base Case Total Shipper Price	$369,503,970
Improved Total Shipper Price	$368,394,015
Total Shipper Savings	$1,109,955
Growth Rate of Savings (%/yr)	9%
Year of Maximum Savings:	2015
Discount Rate (%)	12%

Annual Costs and Savings

Year	Investment	Savings	Net Savings
2013	$1,500,000		-$1,500,000
2014		$1,109,955	$1,109,955
2015		$1,209,851	$1,209,851
2016		$1,209,851	$1,209,851
2017		$1,209,851	$1,209,851
2018		$1,209,851	$1,209,851
2019		$1,209,851	$1,209,851
2020		$1,209,851	$1,209,851
2021		$1,209,851	$1,209,851
2022		$1,209,851	$1,209,851
2023		$1,209,851	$1,209,851
2024		$1,209,851	$1,209,851
2025		$1,209,851	$1,209,851
2026		$1,209,851	$1,209,851
2027		$1,209,851	$1,209,851
2028		$1,209,851	$1,209,851
2029		$1,209,851	$1,209,851
2030		$1,209,851	$1,209,851
2031		$1,209,851	$1,209,851
2032		$1,209,851	$1,209,851
2033		$1,209,851	$1,209,851
Net Present Value:		$8,947,721	$6,649,751

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Table E3a. Evaluation of a Truck Appointment System
FastPath
Summary Comparative Investment Evaluation Form

Base Scenario Name:	Port of Lomé - Current Operations			
Improved Scenario Name:	Truck Appointment System		**Year:**	2013

Performance Indicator	Base	Improved	Difference	
1. Unit Transport Price to Shipper	$3,329	$3,319	$10	
2. Av. Transit Time for Trip	572	568	4	hours
3. Reliability (% of mean time)	101	101	0	%
4. Total Containers Per Year	110,995	110,995	0	
5. Total Logistics Cost	$369,503,970	$368,394,015	$1,109,955	
6. Investment Costs for Improvements (US$)	N/A	$800,000	N/A	
7. Discounted Cost Savings for Shippers (US$)	N/A	N/A	$8,947,721	
8. Net Present Value (US$) (discounted savings - costs)			$7,274,751	

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Data imported from database
Numbers calculated in spreadsheet

Table E3b. Evaluation of a Truck Appointment System
FastPath
Cost-Benefit Analysis Sheet

Base Scenario Name:	Port of Lomé - Current Operations		
Improved Scenario Name:	Truck Appointment System	**Year:**	2013

Assumptions:

Investment Year:	2013
Opening year:	2014
Base Case Total Shipper Price	$369,503,970
Improved Total Shipper Price	$368,394,015
Total Shipper Savings	$1,109,955
Growth Rate of Savings (%/yr)	9%
Year of Maximum Savings:	2015
Discount Rate (%)	12%

Annual Costs and Savings

Year	Investment	Savings	Net Savings
2013	$800,000		-$800,000
2014		$1,109,955	$1,109,955
2015		$1,209,851	$1,209,851
2016		$1,209,851	$1,209,851
2017		$1,209,851	$1,209,851
2018		$1,209,851	$1,209,851
2019		$1,209,851	$1,209,851
2020		$1,209,851	$1,209,851
2021		$1,209,851	$1,209,851
2022		$1,209,851	$1,209,851
2023		$1,209,851	$1,209,851
2024		$1,209,851	$1,209,851
2025		$1,209,851	$1,209,851
2026		$1,209,851	$1,209,851
2027		$1,209,851	$1,209,851
2028		$1,209,851	$1,209,851
2029		$1,209,851	$1,209,851
2030		$1,209,851	$1,209,851
2031		$1,209,851	$1,209,851
2032		$1,209,851	$1,209,851
2033		$1,209,851	$1,209,851
Net Present Value:		$8,947,721	$7,274,751

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Table E4a. Evaluation of an Electronic Transit Tracking System
FastPath
Summary Comparative Investment Evaluation Form

Base Scenario Name:	Lomé-Ouaga Containers Inbound			
Improved Scenario Name:	Lomé-Ouaga Electronic Transit System		**Year:**	2103

Performance Indicator	Base	Improved	Difference	
1. Unit Transport Price to Shipper	$3,329	$3,264	$65	
2. Av. Transit Time for Trip	572	538	34	hours
3. Reliability (% of mean time)	101	100	1	%
4. Total Containers Per Year	110,995	110,995	0	
5. Total Logistics Cost	$369,503,970	$362,289,264	$7,214,707	
6. Investment Costs for Improvements (US$)	N/A	$8,500,000	N/A	
7. Discounted Cost Savings for Shippers (US$)	N/A	N/A	$53,889,844	
8. Net Present Value (US$) (discounted savings - costs)			$40,526,646	

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Numbers calculated in spreadsheet

Table E4b. Evaluation of an Electronic Transit Tracking System
FastPath
Cost-Benefit Analysis Sheet

Base Scenario Name:	Lomé-Ouaga Containers Inbound		
Improved Scenario Name:	Lomé-Ouaga Electronic Transit System	**Year:**	2103

Assumptions:

Investment Year:	2013
Opening year:	2016
Base Case Total Shipper Price	$369,503,970
Improved Total Shipper Price	$362,289,264
Total Shipper Savings	$7,214,707
Growth Rate of Savings (%/yr)	9%
Year of Maximum Savings:	2015
Discount Rate (%)	12%

Annual Costs and Savings

Year	Investment	Savings	Net Savings
2013	$8,500,000		-$8,500,000
2016		$7,214,707	$7,214,707
2017		$7,214,707	$7,214,707
2018		$7,214,707	$7,214,707
2019		$7,214,707	$7,214,707
2020		$7,214,707	$7,214,707
2021		$7,214,707	$7,214,707
2022		$7,214,707	$7,214,707
2023		$7,214,707	$7,214,707
2024		$7,214,707	$7,214,707
2025		$7,214,707	$7,214,707
2026		$7,214,707	$7,214,707
2027		$7,214,707	$7,214,707
2028		$7,214,707	$7,214,707
2029		$7,214,707	$7,214,707
2030		$7,214,707	$7,214,707
2031		$7,214,707	$7,214,707
2032		$7,214,707	$7,214,707
2033		$7,214,707	$7,214,707
2034		$7,214,707	$7,214,707
2035		$7,214,707	$7,214,707
Net Present Value:		$53,889,844	$40,526,646

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Table E5a. Evaluation of a Strategy to Develop the Road Transport Sector
FastPath
Summary Comparative Investment Evaluation Form

Base Scenario Name:	Lomé-Ouaga Containers Inbound			
Improved Scenario Name:	Lomé-Ouaga Road Transport Sector Strategy		**Year:**	2013

Performance Indicator	Base	Improved	Difference	
1. Unit Transport Price to Shipper	$3,329	$3,258	$71	
2. Av. Transit Time for Trip	572	565	7	hours
3. Reliability (% of mean time)	101	100	1	%
4. Total Containers Per Year	110,995	110,995	0	
5. Total Logistics Cost	$369,503,970	$361,623,291	$7,880,679	
6. Investment Costs for Improvements (US$)	N/A	$5,000,000	N/A	
7. Discounted Cost Savings for Shippers (US$)	N/A	N/A	$58,864,291	
8. Net Present Value (US$) (discounted savings - costs)			$48,093,117	

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Data imported from database
Numbers calculated in spreadsheet

Table E5b. Evaluation of a Strategy to Develop the Road Transport Sector
FastPath
Cost-Benefit Analysis Sheet

Base Scenario Name:	Lomé-Ouaga Containers Inbound		
Improved Scenario Name:	Lomé-Ouaga Road Transport Sector Strategy	**Year:**	2013

Assumptions:

Investment Year:	2013
Opening year:	2016
Base Case Total Shipper Price	$369,503,970
Improved Total Shipper Price	$361,623,291
Total Shipper Savings	$7,880,679
Growth Rate of Savings (%/yr)	9%
Year of Maximum Savings:	2015
Discount Rate (%)	12%

Annual Costs and Savings

Year	Investment	Savings	Net Savings
2013	$5,000,000		-$5,000,000
2016		$7,880,679	$7,880,679
2017		$7,880,679	$7,880,679
2018		$7,880,679	$7,880,679
2019		$7,880,679	$7,880,679
2020		$7,880,679	$7,880,679
2021		$7,880,679	$7,880,679
2022		$7,880,679	$7,880,679
2023		$7,880,679	$7,880,679
2024		$7,880,679	$7,880,679
2025		$7,880,679	$7,880,679
2026		$7,880,679	$7,880,679
2027		$7,880,679	$7,880,679
2028		$7,880,679	$7,880,679
2029		$7,880,679	$7,880,679
2030		$7,880,679	$7,880,679
2031		$7,880,679	$7,880,679
2032		$7,880,679	$7,880,679
2033		$7,880,679	$7,880,679
2034		$7,880,679	$7,880,679
2035		$7,880,679	$7,880,679
Net Present Value:		$58,864,291	$48,093,117

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Data Imported from database
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Table E6a. Evaluation of City Beltway around Lomé
FastPath
Summary Comparative Investment Evaluation Form

Base Scenario Name:	Lomé-Ouaga Containerized and Non-containerized cargo inbound and outbound			
Improved Scenario Name:	Construction of City Beltway around Lomé		**Year:**	2013

Performance Indicator	Base	Improved	Difference	
1. Unit Transport Price to Shipper	$4	$0	$4	
2. Av. Transit Time for Trip	0.5	0	0.5	hours
3. Reliability (% of mean time)	N/A	N/A		%
4. Total Trucks Per Year	131,519	131,519	0	
5. Total Logistics Cost	$526,077	$0	$526,077	
6. Investment Costs for Improvements (US$)	N/A	$110,000,000	N/A	
7. Discounted Cost Savings for Shippers (US$)	N/A	N/A	$3,929,504	
8. Net Present Value (US$) (discounted savings - costs)			($94,705,800)	

Data input by user
Data imported from database
Numbers calculated in spreadsheet

Table E6b. Evaluation of City Beltway around Lomé
FastPath
Cost-Benefit Analysis Sheet

Base Scenario Name:	Lomé-Ouaga Containerized and Non-containerized cargo inbound and outbound		
Improved Scenario Name:	Construction of City Beltway around Lomé	**Year:**	2013

Assumptions:

Investment Year:	2013
Opening year:	2016
Base Case Total Shipper Price	$526,077
Improved Total Shipper Price	$0
Total Shipper Savings	$526,077
Growth Rate of Savings (%/yr)	9%
Year of Maximum Savings:	2015
Discount Rate (%)	12%

Annual Costs and Savings

Year	Investment	Savings	Net Savings
2013	$110,000,000		-$110,000,000
2016		$526,077	$526,077
2017		$526,077	$526,077
2018		$526,077	$526,077
2019		$526,077	$526,077
2020		$526,077	$526,077
2021		$526,077	$526,077
2022		$526,077	$526,077
2023		$526,077	$526,077
2024		$526,077	$526,077
2025		$526,077	$526,077
2026		$526,077	$526,077
2027		$526,077	$526,077
2028		$526,077	$526,077
2029		$526,077	$526,077
2030		$526,077	$526,077
2031		$526,077	$526,077
2032		$526,077	$526,077
2033		$526,077	$526,077
2034		$526,077	$526,077
2035		$526,077	$526,077
Net Present Value:		$3,929,504	($94,705,800)

Data Input by user on this sheet
Data Imported from database
Data calculated by spreadsheet