

The Pilot Corridor: Brenner

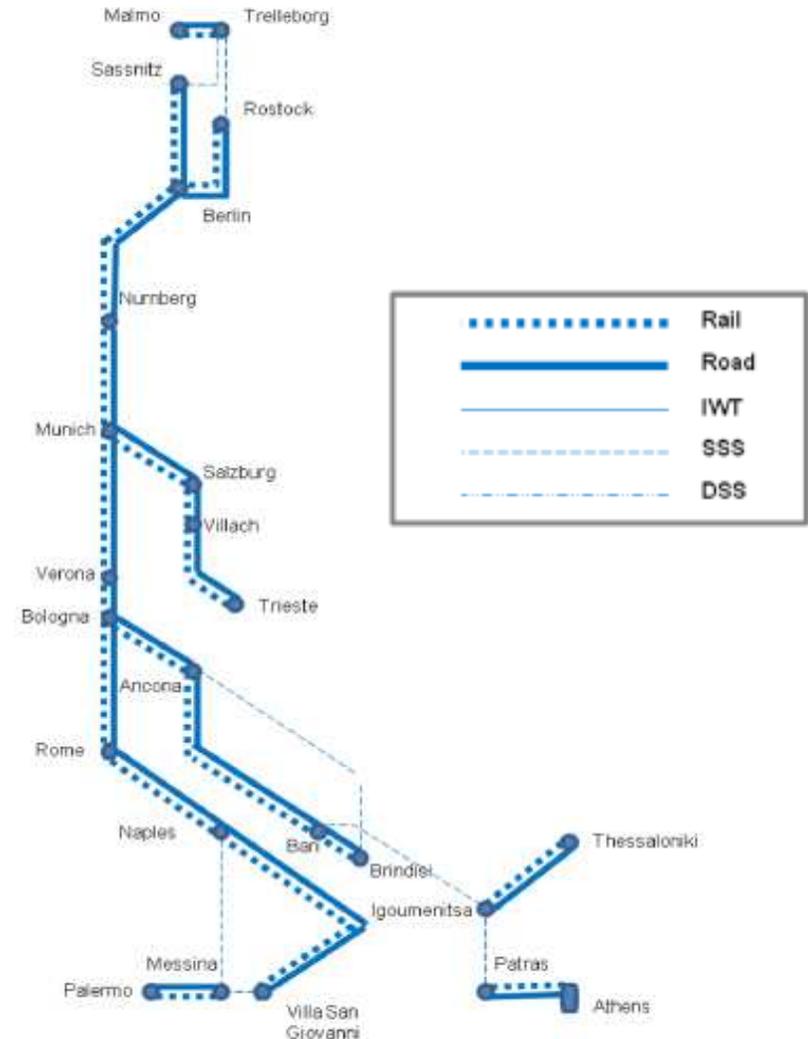
Branch		Segment
MC1	Main Corridor	Malmö-Trelleborg
MC2	Main Corridor	Trelleborg-Rostock
MC3	Main Corridor	Trelleborg-Sassnitz
MC4	Main Corridor	Rostock- Berlin
MC5	Main Corridor	Sassnitz-Berlin
MC6	Main Corridor	Berlin-Nurnberg
MC7	Main Corridor	Nurnberg-Munich
MC8	Main Corridor	Munich-Salzburg
MC9	Main Corridor	Salzburg-Verona
MC10	Main Corridor	Verona-Bologna
MC11	Main Corridor	Bologna-Rome
MC12	Main Corridor	Rome-Naples
MC13	Main Corridor	Naples-Messina
MC14	Main Corridor	Messina-Palermo
MC15	Main Corridor	Naples- Villa San Giovanni
MC16	Main Corridor	Messina - Villa San Giovanni

BA1	Branch A	Salzburg-Villach
BA2	Branch A	Villach-Trieste

BB1	Branch B	Bologna-Ancona
BB2	Branch B	Ancona-Bari
BB3	Branch B	Bari-Brindisi
BB4	Branch B	Ancona-Brindisi
BB5	Branch B	Ancona-Igoumenitsa
BB6	Branch B	Ancona-Patras
BB7	Branch B	Bari-Igoumenitsa
BB8	Branch B	Bari-Patras
BB9	Branch B	Brindisi-Igoumenitsa
BB10	Branch B	Brindisi-Patras
BB11	Branch B	Igoumenitsa-Thessaloniki
BB12	Branch B	Patras-Athens

Node	
N1	Trelleborg
N2	Malmö
N3	Sassnitz
N4	Rostock
N5	Berlin
N6	Nurnberg
N7	Munich
N8	Salzburg
N9	Villach
N10	Trieste
N11	Verona
N12	Bologna
N13	Ancona
N14	Bari
N15	Brindisi
N16	Rome
N17	Naples
N18	Villa San Giovanni
N19	Messina
N20	Palermo
N21	Igoumenitsa
N22	Thessaloniki
N23	Patras
N24	Athens

Brenner [BerPal]



Engines and propulsion systems

ID	Cat.	Technology Name	Transport Mode	Description	Applicability				Influence on KPIs						
					MC	BA	BB	Detailed segments and nodes	CO2	SOx	Cost	Time	Freq.	Rel.	
EN02	A	Directly driven propeller	Maritime	Slow speed engine directly connected to propeller shaft, 20 year life time, running 5500 h/a.	X		X	Technology applicable on all sea segments of the corridor: BB4, BB5, BB6, BB7, BB8, BB9, BB10, MC15, MC16, MC3, MC2	2	2					
EN03	A	Mechanically connected propeller	Maritime	Medium speed engine connected by a reduction gear to the propeller shaft, 20 year life time, running 5500 h/a	X		X	Technology applicable on all sea segments of the corridor: BB4, BB5, BB6, BB7, BB8, BB9, BB10, MC15, MC16, MC3, MC2	2	2					
EN07	A	Diesel-mechanic propulsion with high speed engine	Maritime	High speed engine connected by a reduction gear to the propeller shaft, 20 year life time, running 5500 h/a.	X		X	Technology applicable on all sea segments of the corridor: BB4, BB5, BB6, BB7, BB8, BB9, BB10, MC15, MC16, MC3, MC2	2	2					
EN16	A	Full/parallel hybrid	Road	Electrical support of engine power by saving and re-use of break-energy; combination of 6 cylinder engine plus electrical engine	X	X	X	Technology applicable in specific links: MC8, MC9, MC11, BA1, BA2, BB11. Technology applicable in specific nodes: All nodes of the corridor	1	1	-2				
EN21	A	Nauticlean S System	Inland Waterways	It consists of two reactors with a selective-catalytic reduction (SCR)				Technology not relevant for the whole corridor							
EN06	B	Mechanical azimuthing thrusters	Maritime	The engine runs generator. An electric motor is located inside the ship where it runs propeller shaft. 20 year life time, running 5500 h/a.	X		X	Technology applicable on all sea segments of the corridor: BB4, BB5, BB6, BB7, BB8, BB9, BB10, MC15, MC16, MC3, MC2	2	2	-1				
EN 15	C	PG Engine Diesel Locomotives	Railway	A propulsion system for a four-axle, standard-gauge, centre-cab locomotive using a liquefied petroleum gas (LPG) engine instead of conventional diesel				Technology not relevant for the whole corridor							

Fuels and sources of energy

ID	Cat.	Technology Name	Transport Mode	Description	Applicability				Influence on KPIs					
					MC	A	B	Detailed segments and nodes	CO2	SOx	Cost	T. Time	Freq.	Rel.
FU02	A	Ethanol and bio-diesel	Maritime	Investigation about using alternative fuels.				Technology not relevant for the whole corridor						
			Road					Technology not relevant for the whole corridor						
FU03	A	CGN (compressed natural gas)	Multimodal	Cleaner fuel for yard handling equipment (Prime movers)	X	X	X	Technology applicable on nodes of the corridor	2	2	-1			
FU08	A	LNG	Multimodal	Liquefied natural gas	X	X	X	Technology applicable on all road segments of the corridor: MC1, MC4, MC5, MC6, MC7, MC8, MC9, MC10, MC11, MC12, MC13, MC14, MC15, BA1, BA2, BB1, BB2, BB3, BB4, BB11, BB12.	1		-1			
FU18	A	Biogas	Multimodal	Biogas is mainly produced from bio-waste, agricultural residues and residues from sewage treatment plants	X	X	X	Technology applicable on all road segments of the corridor: MC1, MC4, MC5, MC6, MC7, MC8, MC9, MC10, MC11, MC12, MC13, MC14, MC15, BA1, BA2, BB1, BB2, BB3, BB4, BB11, BB12.	2	2	-2			
FU05	B	AMP	Maritime	Alternative Maritime Power is a shore-side power source, that transforms the shore-side power voltage to match the vessel power system	X	X	X	Technology applicable on all ports of the corridor: N1, N2, N3, N4, N10, N13, N14, N15, N21, N23, N17, N18, N19, N20	2	2	-2			
FU06	B	Wind energy	Maritime	Wind turbines which will generate clean energy to power 14 Container Terminal Quay cranes, reefer containers, repair workshops and other power consumption needs	X	X	X	Technology applicable on all ports of the corridor: N1, N2, N3, N4, N10, N13, N14, N15, N21, N23, N17, N18, N19, N20	2	2	-1			
			Inland Waterways					Technology not relevant for the whole corridor						
FU13	B	Electricity	Road	Electricity is today produced from fossil fuels, nuclear energy and renewable energy sources				Technology not relevant for the road segments of the corridor						
			Railway					Technology already applied						
FU01	C	Ultra-low sulphur diesel	Maritime	Switch from industrial diesel oil (IDO 0,5% sulphur) to ultra-low sulphur diesel (ULSD 0,005%) for PMs and RTGs.				Technology not relevant for the whole corridor						
			Inland Waterways											
			Railway											
			Road						Technology already applied					
FU04	C	Solar power network	Multimodal	A 6.600 square-meter solar panel able to generate clean energy which will reduce reliance on oil and cut electricity-related greenhouse gas emissions	X		X	Technology applicable on nodes in south Italy and Greece: N17, N18, N19, N20, N14, N15, N21, N23, N24, N22	2	2				
FU07	C	HFO	Maritime	Heavy fuel oil				Technology already applied						
			Railway											
			Road											
FU14	C	Hydrogen	Road	Hydrogen is today mainly produced from steam reforming of fossil gas - some production from electricity and renewable sources				Technology not relevant for the whole corridor						
			Inland Waterways											
FU23	C	Nuclear Power	Inland Waterways	Nuclear Power				Technology not relevant for the whole corridor						
			Maritime											

Cargo handling and transfer

ID	Cat.	Technology Name	Technology Name	Description	Applicability			Influence on KPIs						
					MC	A	B	Detailed segments and nodes	CO2	SOx	Cost	T. Time	Freq.	Rel.
HT01	A	Conversion of RTGs from diesel to electric power	Maritime	RTGs fitted with electrical components in place of traditional hydraulic parts. Conversion will eliminate black emissions and lower noise levels of engines	X		X	Technology applicable on all ports of the corridor: N1, N2, N3, N4, N10, N13, N14, N15, N21, N23, N17, N18, N19, N20	1	1	-1			
			Multimodal		X		X		1	1	-1			
HT03	A	Hybrid hydraulic drive Terminal tractors	Maritime	Storing braking energy into hydraulic system for acceleration and system	X	X	X	Technology applicable on all ports of the corridor: N1, N2, N3, N4, N10, N13, N14, N15, N21, N23, N17, N18, N19, N20	1	1	-1			
HT07	A	Low emission engines	Multimodal	Euro III/ IV compliant engines burn diesel more efficiently, reducing emission of CO2 and providing up to 5% reduction on fuel consumption	X	X	X	Technology applicable on all road segments of the corridor: MC1, MC4, MC5, MC6, MC7, MC8, MC9, MC10, MC11, MC12, MC13, MC14, MC15, BA1, BA2, BB1, BB2, BB3, BB4, BB11, BB12.	2					
HT10	A	Metrocargo	Railway	Containers cargo handling in overhead electrified railways with a horizontal movement system from an automated platform to train wagons.	X	X	X	Technology applicable on multimodal nodes of the corridor: N6, N7, N12, N17,			1	2	2	
			Multimodal		X	X	X				1	2	2	
			Maritime		X	X	X				1	2	2	
HT06	B	MP-RTGs	Multimodal	Mains-powered RTGs transfer the power generation from the engine of the yard crane to a far more efficient power station. Power station can be up to 40% more efficient than equipment engine.	X	X	X	Technology applicable on multimodal nodes of the corridor: N6, N7, N12, N17, N21, N23, N4, N9	1		-2			
HT11	B	Cargo Cassette and Translifter	Maritime	Wheel less cargo cassette is a loading platform which is used together with a translifter in a cassette system. Translifter is a steerable lifting trailer which together with cassettes replaces roll trailers in Ro-Ro and StoRo handling.				Technology not relevant for the whole corridor						
HT20	C	BEX	Inland Waterways	Barge Express is an integrated concept for transport for automated handling of large scale barge container at terminals				Technology not relevant for the whole corridor						
HT24	C	FCT	Maritime	The Floating Container Terminal collects and distributes containers originating from small calls, and bundles these currents with containers				Technology not relevant for the whole corridor						

Heating and cooling

ID	Cat.	Technology Name	Technology Name	Description	Applicability				Influence on KPIs					
					MC	A	B	Detailed segments and nodes	CO2	SOx	Cost	T. Time	Freq.	Rel.
HCO2	B	Intelligent unit	Multimodal	Refrigerated boxcars will be built with energy efficient cooling systems, GPS tracking, fresh air exchange and the ability to remote monitoring the systems. RFID (Radio Frequency Identification) for tracking services are the main support.	X	X	X	Technology applicable on the whole corridor	1	1		1		1

Vehicles

ID	Cat.	Technology Name	Technology Name	Description	Applicability				Influence on KPIs						
					MC	A	B	Detailed segments and nodes	CO2	SOx	Cost	T. Time	Freq.	Rel.	
VE02	A	NS 999 Electric Locomotive	Railway	NS 999 is an entirely electric locomotive that uses a lead-acid energy storage system without the use of a diesel engine and with zero exhaust emissions.	X	X	X	Technology applicable on all rail segments of the corridor: MC1, MC4, MC5, MC6, MC7, MC8, MC9, MC10, MC11, MC12, MC13, MC14, MC15, BA1, BA2, BB1, BB2, BB3, BB4, BB11, BB12.	2						
VE03	A	M2eHybrid Freightliner	Road	Support engine plus auxiliary drive to operate an elevating platform of the truck; combination of 6 cylinder engine plus electrical engine	X	X	X	Technology applicable on all road segments of the corridor: MC1, MC4, MC5, MC6, MC7, MC8, MC9, MC10, MC11, MC12, MC13, MC14, MC15, BA1, BA2, BB1, BB2, BB3, BB4, BB11, BB12.	2						
VE09	A	Battery-electric vehicles	Road	Battery-electric vehicles	X	X	X	Technology applicable on all road segments of the corridor: MC1, MC4, MC5, MC6, MC7, MC8, MC9, MC10, MC11, MC12, MC13, MC14, MC15, BA1, BA2, BB1, BB2, BB3, BB4, BB11, BB12.	2						

Vehicles

ID	Cat.	Technology Name	Technology Name	Description	Applicability				Influence on KPIs					
					MC	A	B	Detailed segments and nodes	CO2	SOx	Cost	T. Time	Freq.	Rel.
VE10	A	Euro VI vehicles	Road	Euro VI is compulsory for new trucks from 2013, replacing Euro V	X	X	X	Technology applicable on all road segments of the corridor: MC1, MC4, MC5, MC6, MC7, MC8, MC9, MC10, MC11, MC12, MC13, MC14, MC15, BA1, BA2, BB1, BB2, BB3, BB4, BB11, BB12.						
VE01	B	Hybrid Locomotive	Railway	Hybrid Locomotive was developed with the goal of creating the cleanest, most fuel-efficient high-horsepower diesel locomotive ever built.	X	X	X	Technology applicable on all road segments of the corridor: MC1, MC4, MC5, MC6, MC7, MC8, MC9, MC10, MC11, MC12, MC13, MC14, MC15, BA1, BA2, BB1, BB2, BB3, BB4, BB11, BB12.	2					
VE25	B	Braking energy recovery	Railway	Reversible DC Substation for recovering of dynamic braking energy and restitution to national grid	X	X	X	Technology applicable on all road segments of the corridor: MC1, MC4, MC5, MC6, MC7, MC8, MC9, MC10, MC11, MC12, MC13, MC14, MC15, BA1, BA2, BB1, BB2, BB3, BB4, BB11, BB12.	2					

Navigation technologies

ID	Cat.	Technology Name	Technology Name	Description	Applicability				Influence on KPIs						
					MC	A	B	Detailed segments and nodes	CO2	SOx	Cost	T. Time	Freq.	Rel.	
NA02	A	Automatic Identification System (AIS)	Maritime	Ship-to-ship, ship-to-shore and shore-to-ship system. Main purpose is collision avoidance, ship tracking and tracing. Works on VHF (Very high frequency, 30–300 MHz) radio frequency.				Technology already applied						2	2
NA15	A	WiMax	Maritime	Worldwide Interoperability for Microwave Access. Long range, high bandwidth wireless Internet				Technology already applied							
			RailwayRoad												
NA01	B	Train Control System	Railway	Train control and tracking system based on a special GPRS method.				Technology already applied							
NA05	B	ECDIS	Maritime	An Electronic Chart Display and Information System (ECDIS) is a computer-based navigation information system that can be used as an alternative to paper nautical charts. Integrates position information from GPS and other navigational sensors (radar, AIS). It may also give Sailing Directions and fathometer.	X	X	X	Technology applicable on all ports of the corridor: N1, N2, N3, N4, N10, N13, N14, N15, N21, N23, N17, N18, N19, N20					2		2
NA09	B	Radarsat 1 and 2	Maritime	Canadian earth observation satellite that monitors environmental changes and the planet's natural resources. Equipped with a synthetic aperture radar (SAR), it acquires images of the Earth day or night, in all weather and through cloud cover, smoke and haze. Can enhance marine surveillance, ice monitoring, disaster management, environmental monitoring, resource management and mapping	X	X	X	Technology applicable on all ports of the corridor: N1, N2, N3, N4, N10, N13, N14, N15, N21, N23, N17, N18, N19, N20					2		2
NA12	B	GEO satellites	Maritime	Geosynchronous Satellite whose orbital track on the Earth repeats regularly over points on the Earth over time. If such a satellite's orbit lies over the equator and the orbit is circular, it is called a geostationary satellite.	X	X	X	Technology applicable on all ports of the corridor: N1, N2, N3, N4, N10, N13, N14, N15, N21, N23, N17, N18, N19, N20					2		2
NA13	B	LEO satellites	Maritime	A low Earth orbit (LEO) is generally defined as an orbit within the locus extending from the Earth's surface up to an altitude of 2,000 km. Given the rapid orbital decay of objects below approximately 200 km, the commonly accepted definition for LEO is between 160 - 2,000 km (100 - 1,240 miles) above the Earth's surface.	X	X	X	Technology applicable on all ports of the corridor: N1, N2, N3, N4, N10, N13, N14, N15, N21, N23, N17, N18, N19, N20					2		2

Navigation technologies

ID	Cat.	Technology Name	Technology Name	Description	Applicability				Influence on KPIs						
					MC	A	B	Detailed segments and nodes	CO2	SOx	Cost	T. Time	Freq.	Rel.	
NA14	B	Inmarsat	Maritime	British satellite telecommunications company, offering global, mobile services. It provides telephony and data services to users worldwide, via portable or mobile terminals which communicate to ground stations through eleven geosynchronous telecommunications satellites.				Technology already applied							
NA16	B	ATM	Inland Waterways	The advising Tempomaat (ATM) is a computer program advising the skipper on the most economical combination of route and speed, enabling the vessel to arrive on time with a most efficient use of fuel leading to a reduction of fuel consumption and emissions.				Technology not relevant for the whole corridor							
NA07	C	Global Navigation Satellite Systems or GNSS	Maritime	Global Navigation Satellite Systems (GNSS) is the standard generic term for satellite navigation systems ("sat nav") that provide autonomous geo-spatial positioning with global coverage. GNSS allows small electronic receivers to determine their location	X	X	X	Technology applicable on the whole corridor							2
			Railway										2	1	2
			Road												2
NA11	C	LRIT	Maritime	The Long Range Identification and Tracking (LRIT) of ships. Consists of the ship borne LRIT information transmitting equipment, Communications Service Providers (CSPs), Application Service Providers (ASPs), LRIT Data Centers, the LRIT Data Distribution Plan and the International LRIT Data Exchange.	X		X	Technology applicable on all sea segments of the corridor: BB4, BB5, BB6, BB7, BB8, BB9, BB10, MC15, MC16, MC3, MC2							

Best practices

ID	Cat.	Technology Name	Transport Mode	Description	Applicability				Influence on KPIs						
					MC	A	B	Detailed segments and nodes	CO2	SOx	Cost	T. Time	Freq.	Rel.	
BP04	A	Traffic Flow Management	Railway	A system for online optimization of rail traffic flow to have minimum delays and minimum energy consumption, developed by Emkamatik on behalf of SBB				Technology not relevant for the whole corridor							
BP07	A	Carbon-free rail freight transport	Railway	DB Schenker Rail replaces the electricity required for your freight transport with regenerative energy that comes 100% from renewable sources in Germany. This helps to avoid carbon emissions right from the outset. Even the smallest quantities can be transported in this way without carbon emissions, on a national and international scale.				Technology not relevant for the whole corridor							
BP02	B	TDS	Railway	Train Control System based on a GPS application method				Technology not relevant for the whole corridor							
BP03	B	GEKKO	Railway	A system to provide guidance to energy efficiency driving and timetable optimization, developed for Danish State Railways				Technology not relevant for the whole corridor							
BP08	B	Coaster Express (CoEx)	Maritime	Short sea transport concept directed to bundling the transport flows, scaling-up the short sea facilities and standardization and automation of the transition processes.	X	X	X	Technology applicable on all ports of the corridor: N1, N2, N3, N4, N10, N13, N14, N15, N21, N23, N17, N18, N19, N20						2	

The Pilot Corridor: Strauss

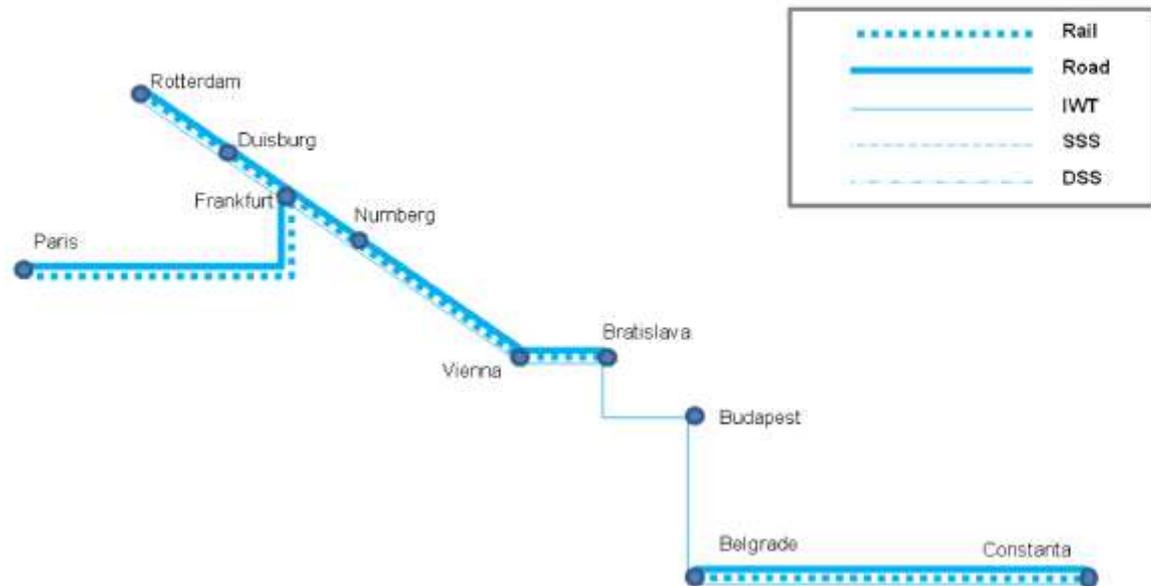
Branch		Segment
BA1	Branch A	Rotterdam-Duisburg
BA2	Branch A	Duisburg-Frankfurt

BB1	Branch B	Frankfurt-Paris
-----	----------	-----------------

MC1	Main Corridor	Frankfurt-Nurnberg
MC2	Main Corridor	Nurnberg-Vienna
MC3	Main Corridor	Vienna-Bratislava
MC4	Main Corridor	Bratislava-Budapest
MC5	Main Corridor	Budapest-Belgrade
MC6	Main Corridor	Belgrade-Constanta

Node	
N1	Belgrade
N2	Bratislava
N3	Budapest
N4	Constanta
N5	Duisburg
N6	Frankfurt
N7	Nurnberg
N8	Paris
N9	Vienna
N10	Rotterdam

Strauss [RhiDan]



Engines and propulsion systems

ID	Cat.	Technology Name	Transport Mode	Description	Applicability			Influence on KPIs							
					MC	BA	BB	Detailed segments and nodes			CO2	SOx	Cost	Time	Freq.
EN02	A	Directly driven propeller	Maritime	Slow speed engine directly connected to propeller shaft, 20 year life time, running 5500 h/a.	X	X		Segments: MC1, MC2, MC3, MC4, MC5, MC6, BA1, BA2	+2	+2					+2
EN03	A	Mechanically connected propeller	Maritime	Medium speed engine connected by a reduction gear to the propeller shaft, 20 year life time, running 5500 h/a	X	X		Segments: MC1, MC2, MC3, MC4, MC5, MC6, BA1, BA2	+2	+2					+1
EN07	A	Diesel-mechanic propulsion with high speed engine	Maritime	High speed engine connected by a reduction gear to the propeller shaft, 20 year life time, running 5500 h/a.	X	X		Segments: MC1, MC2, MC3, MC4, MC5, MC6, BA1, BA2	+2	+2	-2				+1
EN16	A	Full/parallel hybrid	Road	Electrical support of engine power by saving and re-use of break-energy; combination of 6 cylinder engine plus electrical engine	X	X	X	Segments: MC1, MC2, MC3, MC6, BA1, BA2, BB1	+1	+1	-2				
EN21	A	Nauticlean S System	Inland Waterways	It consists of two reactors with a selective-catalytic reduction (SCR)	X	X		Segments: MC1, MC2, MC3, MC4, MC5, MC6, BA1, BA2	+2	+2					
EN06	B	Mechanical azimuthing thrusters	Maritime	The engine runs generator. An electric motor is located inside the ship where it runs propeller shaft. 20 year life time, running 5500 h/a.	X	X		Segments: MC1, MC2, MC3, MC4, MC5, MC6, BA1, BA2	+1	+1	-1				
EN 15	C	LPG Engine Diesel Locomotives	Railway	A propulsion system for a four-axle, standard-gauge, centre-cab locomotive using a liquefied petroleum gas (LPG) engine instead of conventional diesel	X	X	X	Segments: MC1, MC2, MC3, MC6, BA1, BA2, BB1	+1		+1				

Fuels and sources of energy

ID	Cat.	Technology Name	Transport Mode	Description	Applicability			Influence on KPIs						
					MC	A	B	Detailed segments and nodes			CO2	SOx	Cost	T. Time
FU02	A	Ethanol and bio-diesel	Maritime	Investigation about using alternative fuels.	X	X		Segments: MC1, MC2, MC3, MC4, MC5, MC6, BA1, BA2 Comment: studies are still ongoing			-1			
			Road		X	X	X	Segments: MC1, MC2, MC3, MC6, BA1, BA2, BB1 Comment: studies are still ongoing			-1			
FU03	A	CGN (compressed natural gas)	Multimodal	Cleaner fuel for yard handling equipment (Prime movers)	X	X	X	On the whole corridor Comment: already applied in N1, N5, N6, N7	+1	+2	-1			-2
FU08	A	LNG	Multimodal	Liquefied natural gas	X	X	X	On the whole corridor	+1	+2	-1			
FU18	A	Biogas	Multimodal	Biogas is mainly produced from bio-waste, agricultural residues and residues from sewage treatment plants	X	X	X	On the whole corridor	+2	+2	-2			
FU05	B	AMP	Maritime	Alternative Maritime Power is a shore-side power source, that transforms the shore-side power voltage to match the vessel power system	X	X		Segments: MC1, MC2, MC3, MC4, MC5, MC6, BA1, BA2	+2	+2	-2			
FU06	B	Wind energy	Maritime	Wind turbines which will generate clean energy to power 14 Container Terminal Quay cranes, reefer containers, repair workshops and other power				Not relevant for the whole corridor	✓	✓	✓	✓	✓	✓
			Inland Waterways		X	X		Nodes: N5, N6, N7, N9 Comment: already applied in N10	+2	+2	0			-1
FU13	B	Electricity	Road	Electricity is today produced from fossil fuels, nuclear energy and renewable energy sources	X	X	X	Segments: MC1, MC2, MC3, MC6, BA1, BA2, BB1 Nodes: N1, N2, N4, N5, N6, N7, N8, N9, N10	+2	+2	+1			
			Railway		X	X	X	Segments: MC1, MC2, MC3, MC6, BA1, BA2, BB1 Already applied on the corridor	+2	+2	+1			
FU01	C	Ultra-low sulphur diesel	Maritime	Switch from industrial diesel oil (IDO 0,5% sulphur) to ultra-low sulphur diesel (ULSD 0,005%) for PMs and RTGs.				Not relevant for the whole corridor	✓	✓	✓	✓	✓	✓
			Inland Waterways		X	X	X	Segments: MC1, MC2, MC3, MC4, MC5, MC6, BA1, BA2 Already applied on the corridor	+2	+2	-2			
			Railway					Not relevant for the whole corridor	✓	✓	✓	✓	✓	✓
			Road		X	X	X	Segments: MC1, MC2, MC3, MC6, BA1, BA2, BB1 Already applied on the corridor	+2	+2	-2			
FU04	C	Solar power network	Multimodal	A 6.600 square-meter solar panel able to generate clean energy which will reduce reliance on oil and cut electricity-related greenhouse gas emissions	X	X	X	On the whole corridor	+2	+2	-2			-1
FU07	C	HFO	Maritime	Heavy fuel oil				Not relevant for the whole corridor	✓	✓	✓	✓	✓	✓
			Railway					Not relevant for the whole corridor	✓	✓	✓	✓	✓	✓
			Road		X	X	X	Segments: MC1, MC2, MC3, MC6, BA1, BA2, BB1 Already applied on the corridor		-1	+2			
FU14	C	Hydrogen	Road	Hydrogen is today mainly produced from steam reforming of fossil gas - some production from electricity and renewable sources	X	X	X	Segments: MC1, MC2, MC3, MC6, BA1, BA2, BB1 Nodes: N1, N2, N4, N5, N6, N7, N8, N9, N10	+2	+2	-2			-2
			Inland Waterways		X	X		Segments: MC1, MC2, MC3, MC4, MC5, MC6, BA1, BA2 Nodes: N1, N2, N3, N4, N5, N6, N7, N9, N10	+2	+2	-2			-2
FU23	C	Nuclear Power	Inland Waterways	Nuclear Power	X	X		Segments: MC1, MC2, MC3, MC4, MC5, MC6, BA1, BA2 Nodes: N1, N2, N3, N4, N5, N6, N7, N10	+1	+1	+1			
			Maritime					Not relevant for the whole corridor	✓	✓	✓	✓	✓	✓

Cargo handling and transfer

ID	Cat.	Technology Name	Technology Name	Description	Applicability			Influence on KPIs						
					MC	A	B	Detailed segments and nodes			CO2	SOx	Cost	T. Time
HT01	A	Conversion of RTGs from diesel to electric power	Maritime	RTGs fitted with electrical components in place of traditional hydraulic parts. Conversion will eliminate black emissions and lower noise levels of engines	X	X		Nodes: N1, N2, N3, N4, N5, N6, N7, N9, N10 Comment: All handling machine in ports and inland terminals can be electrified.	+1	+1	-1			
			Multimodal		X	X	X	On the all nodes of the corridor	+1	+1	-1			
HT03	A	Hybrid hydraulic drive Terminal tractors	Maritime	Storing braking energy into hydraulic system for acceleration and system	X	X		Nodes: N1, N2, N3, N4, N5, N6, N7, N9, N10 Comment: All handling machine in ports and inland terminals can be electrified.	+1	+1	-1			
HT07	A	Low emission engines	Multimodal	Euro III/ IV compliant engines burn diesel more efficiently, reducing emission of CO2 and providing up to 5% reduction on fuel consumption	X	X	X	Segments: MC1, MC2, MC3, MC6, BA1, BA2, BB1	+1		+1			
HT10	A	Metrocargo	Railway	Containers cargo handling in overhead electrified railways with a horizontal movement system from an automated platform to train wagons.	X	X	X	Nodes: N1, N2, N4, N5, N6, N7, N8, N9, N10			+1	+2	+2	+2
			Multimodal		X	X	X	On the all nodes of the corridor			+1	+2	+2	+2
			Maritime					Not relevant for the whole corridor	✓	✓	✓	✓	✓	✓
HT06	B	MP-RTGs	Multimodal	Mains-powered RTGs transfer the power generation from the engine of the yard crane to a far more efficient power station. Power station can be up to 40% more efficient than equipment engine.	X	X	X	On the all nodes of the corridor	+1		-2		+1	
HT11	B	Cargo Cassette and Translifter	Maritime	Wheel less cargo cassette is a loading platform which is used together with a translifter in a cassette system. Translifter is a steerable lifting trailer which together with cassettes replaces roll trailers in Ro-Ro and StoRo handling.	X	X		Nodes: N1, N2, N3, N4, N5, N6, N7, N9, N10			+2			
HT20	C	BEX	Inland Waterways	Barge Express is an integrated concept for transport for automated handling of large scale barge container at terminals	X	X		Nodes: N1, N2, N3, N4, N6, N7, N9 Comment: already applied in N5, N10			+1		+2	
HT24	C	FCT	Maritime	The Floating Container Terminal collects and distributes containers originating from small calls, and bundles these currents with containers	X	X		Nodes: N1, N2, N3, N4, N5, N6, N7, N9 Comment: already applied in N10			-1		+1	

Heating and cooling

ID	Cat.	Technology Name	Technology Name	Description	Applicability				Influence on KPIs					
					MC	A	B	Detailed segments and nodes	CO2	SOx	Cost	T. Time	Freq.	Rel.
HC02	B	Intelligent unit	Multimodal	Refrigerated boxcars will be built with energy efficient cooling systems, GPS tracking, fresh air exchange and the ability to remote monitoring the systems. RFID (Radio Frequency Identification) for tracking services are the main support.	X	X	X	On the whole corridor	+1	+1		+1		+1

Vehicles

ID	Cat.	Technology Name	Technology Name	Description	Applicability				Influence on KPIs					
					MC	A	B	Detailed segments and nodes	CO2	SOx	Cost	T. Time	Freq.	Rel.
VE02	A	NS 999 Electric Locomotive	Railway	NS 999 is an entirely electric locomotive that uses a lead-acid energy storage system without the use of a diesel engine and with zero exhaust emissions.	X	X	X	Segments: MC1, MC2, MC3, MC6, BA1, BA2, BB1	+2	+2	0			
VE03	A	M2eHybrid Freightliner	Road	Support engine plus auxiliary drive to operate an elevating platform of the truck; combination of 6 cylinder engine plus electrical engine	X	X	X	Segments: MC1, MC2, MC3, MC6, BA1, BA2, BB1	+1		+1	+1		+1
VE09	A	Battery-electric vehicles	Road	Battery-electric vehicles	X	X	X	Segments: MC1, MC2, MC3, MC6, BA1, BA2, BB1	+2	+2	0	0	0	0
VE10	A	Euro VI vehicles	Road	Euro VI is compulsory for new trucks from 2013, replacing Euro V	X	X	X	Segments: MC1, MC2, MC3, MC6, BA1, BA2, BB1 Comment: in all road of the Strauss corridor as of 1 september 2014	0	0	-1			
VE01	B	Hybrid Locomotive	Railway	Hybrid Locomotive was developed with the goal of creating the cleanest, most fuel-efficient high-horsepower diesel locomotive ever built.	X	X	X	Segments: MC1, MC2, MC3, MC6, BA1, BA2, BB1 Comment: important on all railway segments	+2		+1			
VE25	B	Braking energy recovery	Railway	Reversible DC Substation for recovering of dynamic braking energy and restitution to national grid	X	X	X	Segments: MC1, MC2, MC3, MC6, BA1, BA2, BB1 Comment: very important on all railway segments	+1		-1			

Navigation technologies

ID	Cat.	Technology Name	Technology Name	Description	Applicability			Influence on KPIs							
					MC	A	B	Detailed segments and nodes			CO2	SOx	Cost	T. Time	Freq.
NA02	A	Automatic Identification System (AIS)	Maritime	Ship-to-ship, ship-to-shore and shore-to-ship system. Main purpose is collision avoidance, ship tracking and tracing. Works on VHF (Very high frequency, 30–300 MHz) radio frequency.	X	X		Segments: MC1, MC2, MC3, MC4, MC5, MC6, BA1, BA2 Nodes: N1, N2, N3, N4, N5, N6, N7, N10 Comment: already covered N9						+1	+2
NA15	A	WiMax	Maritime	Worldwide Interoperability for Microwave Access. Long range, high bandwidth wireless Internet	X	X		Segments: MC1, MC2, MC3, MC4, MC5, MC6, BA1, BA2 Nodes: N1, N2, N3, N4, N5, N6, N7, N9, N10							-1
			RailwayRoad		X	X	X	Segments: MC1, MC2, MC3, MC6, BA1, BA2, BB1 Nodes: N1, N2, N4, N5, N6, N7, N8, N9, N10							-1
NA01	B	Train Control System	Railway	Train control and tracking system based on a special GPRS method.	X	X	X	Segments: MC1, MC2, MC3, MC6, BA2, BB1 Comment: already covered BA1				+1			
NA05	B	ECDIS	Maritime	An Electronic Chart Display and Information System (ECDIS) is a computer-based navigation information system that can be used as an alternative to paper nautical charts. Integrates position information from GPS and other navigational sensors (radar, AIS). It may also give Sailing Directions and fathometer.	X	X		Nodes: N2, N4, N5, N6, N7 Comment: already covered N1, N3, N9, N10				+2	+1	+2	
NA09	B	Radarsat 1 and 2	Maritime	Canadian earth observation satellite that monitors environmental changes and the planet's natural resources. Equipped with a synthetic aperture radar (SAR), it acquires images of the Earth day or night, in all weather and through cloud cover, smoke and haze. Can enhance marine surveillance, ice monitoring, disaster management, environmental monitoring, resource management and mapping	X	X		Nodes: N1, N2, N3, N4, N5, N6, N7, N9, N10				+1	+1	+2	
NA12	B	GEO satellites	Maritime	Geosynchronous Satellite whose orbital track on the Earth repeats regularly over points on the Earth over time. If such a satellite's orbit lies over the equator and the orbit is circular, it is called a geostationary satellite.	X	X		Nodes: N1, N2, N3, N4, N5, N6, N7, N9, N10			+2	+1			-1
NA13	B	LEO satellites	Maritime	A low Earth orbit (LEO) is generally defined as an orbit within the locus extending from the Earth's surface up to an altitude of 2,000 km. Given the rapid orbital decay of objects below approximately 200 km, the commonly accepted definition for LEO is between 160 - 2,000 km (100 - 1,240 miles) above the Earth's surface.	X	X		Nodes: N1, N2, N3, N4, N5, N6, N7, N9, N10				+1			+2

Navigation technologies

ID	Cat.	Technology Name	Technology Name	Description	Applicability			Influence on KPIs							
					MC	A	B	Detailed segments and nodes			CO2	SOx	Cost	T. Time	Freq.
NA14	B	Inmarsat	Maritime	British satellite telecommunications company, offering global, mobile services. It provides telephony and data services to users worldwide, via portable or mobile terminals which communicate to ground stations through eleven geosynchronous telecommunications satellites.	X	X		Segments: MC1, MC2, MC3, MC4, MC5, MC6, BA, BA2 Nodes: N1, N2, N3, N4, N5, N6, N7, N9, N10			+1				
NA16	B	ATM	Inland Waterways	The advising Tempomaat (ATM) is a computer program advising the skipper on the most economical combination of route and speed, enabling the vessel to arrive on time with a most efficient use of fuel leading to a reduction of fuel consumption and emissions.	X	X		Nodes: N1, N2, N3, N4, N5, N6, N7, N9 Already covered: N10	+1	+1					
NA07	C	Global Navigation Satellite Systems or GNSS	Maritime	Global Navigation Satellite Systems (GNSS) is the standard generic term for satellite navigation systems ("sat nav") that provide autonomous geo-spatial positioning with global coverage. GNSS allows small electronic receivers to determine their location (longitude, latitude, and altitude) to within a few metres using time signals transmitted along a line-of-sight by radio from satellites.	X	X		Segments: MC1, MC2, MC3, MC4, MC5, MC6, BA1, BA2 Nodes: N1, N2, N3, N4, N5, N6, N7, N9, N10 Comment: GALILEO in Europe will be operational in 2020.							+1
			Railway		X	X	X	Segments: MC1, MC2, MC3, MC6, BA1, BA2, BB1 Nodes: N1, N2, N4, N5, N6, N7, N8, N9, N10 Comment: GALILEO in Europe will be operational in 2020.				+1	+1	+1	
			Road		X	X	X	Segments: MC1, MC2, MC3, MC6, BA1, BA2, BB1 Nodes: N1, N2, N4, N5, N6, N7, N8, N9, N10 Comment: GALILEO in Europe will be operational in 2020.						+1	
NA11	C	LRIT	Maritime	The Long Range Identification and Tracking (LRIT) of ships. Consists of the ship borne LRIT information transmitting equipment, Communications Service Providers (CSPs), Application Service Providers (ASPs), LRIT Data Centers, the LRIT Data Distribution Plan and the International LRIT Data Exchange.				Not relevant for the whole corridor	✓	✓	✓	✓	✓	✓	

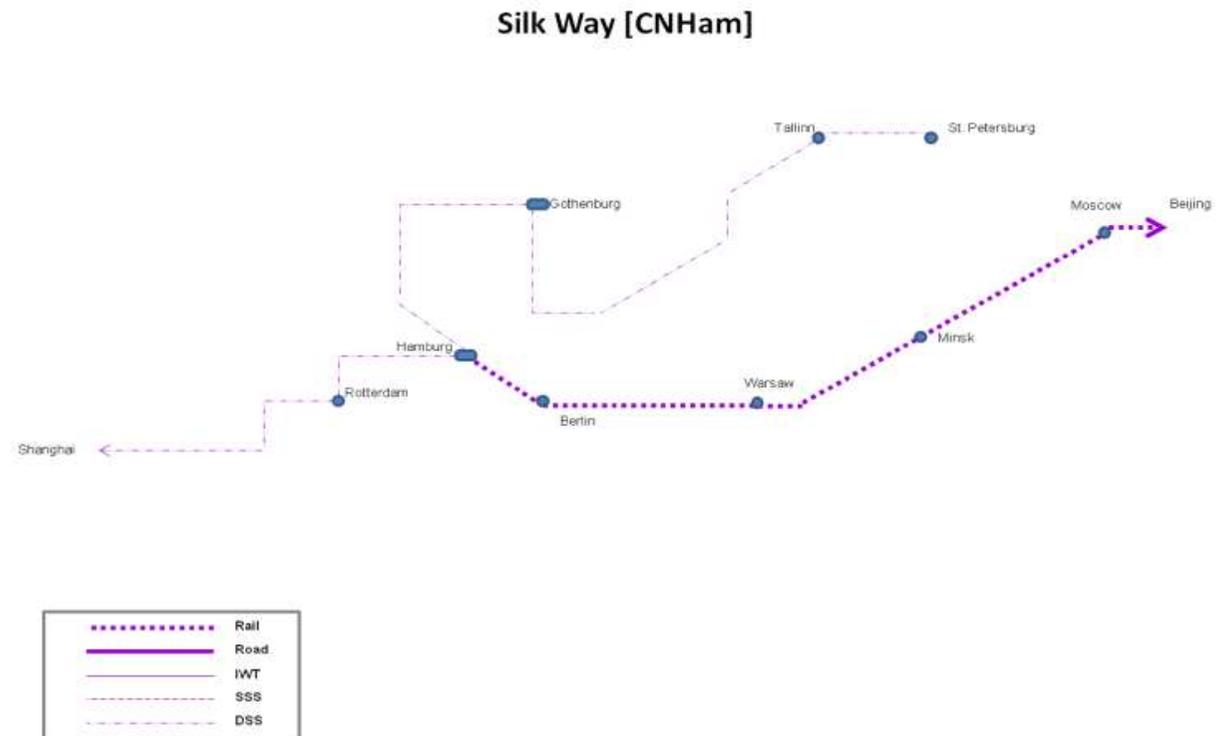
Best practices

ID	Cat.	Technology Name	Transport Mode	Description	Applicability				Influence on KPIs					
					MC	A	B	Detailed segments and nodes	CO2	SOx	Cost	T. Time	Freq.	Rel.
BP04	A	Traffic Flow Management	Railway	A system for online optimization of rail traffic flow to have minimum delays and minimum energy consumption, developed by Emkamatik on behalf of SBB	X	X	X	Segments: MC1, MC2, MC3, MC6, BA1, BA2, BB1 Nodes: N1, N2, N4, N5, N6, N7, N8, N9, N10			+1	+1		
BP07	A	Carbon-free rail freight transport	Railway	DB Schenker Rail replaces the electricity required for your freight transport with regenerative energy that comes 100% from renewable sources in Germany. This helps to avoid carbon emissions right from the outset. Even the smallest quantities can be transported in this way without carbon emissions, on a national and international scale.	X	X	X	Segments: MC1, MC2, MC3, MC6, BA1, BA2, BB1	+1	+1				
BP02	B	TDS	Railway	Train Control System based on a GPS application method	X	X	X	Segments: MC1, MC2, MC3, MC6, BA1, BA2, BB1 Nodes: N1, N2, N4, N5, N6, N7, N8, N9, N10						+1
BP03	B	GEKKO	Railway	A system to provide guidance to energy efficiency driving and timetable optimization, developed for Danish State Railways	X	X	X	Segments: MC1, MC2, MC3, MC6, BA1, BA2, BB1			+1	+1		
BP08	B	Coaster Express (CoEx)	Maritime	Short sea transport concept directed to bundling the transport flows, scaling-up the short sea facilities and standardization and automation of the transition processes.				Not relevant for the whole corridor	✓	✓	✓	✓	✓	✓

The Pilot Corridor: Silk Way

Branch		Segment
MC1	Main Corridor	Shanghai-Rotterdam
MC2	Main Corridor	Rotterdam-Hamburg
MC3	Main Corridor	Hamburg-Göteborg
MC4	Main Corridor	Göteborg-Tallinn
MC5	Main Corridor	Tallinn-St. Petersburg
BA1	Branch A	Hamburg-Berlin
BA2	Branch A	Berlin-Warsaw
BA3	Branch A	Warsaw-Minsk
BA4	Branch A	Minsk-Moscow
BA5	Branch A	Moscow-Beijing

Node	
N1	Beijing
N2	Berlin
N3	Göteborg
N4	Hamburg
N5	Minsk
N6	Moscow
N7	Rotterdam
N8	Shanghai
N9	St. Petersburg
N10	Tallinn
N11	Warsaw



Engines and propulsion systems

ID	Cat.	Technology Name	Transport Mode	Description	Applicability				Influence on KPIs					
					MC	BA	BB	Detailed segments and nodes	CO2	SOx	Cost	Time	Freq.	Rel.
EN02	A	Directly driven propeller	Maritime	Slow speed engine directly connected to propeller shaft, 20 year life time, running 5500 h/a.	x			MC1-MC5	0	0	0	0	0	0
EN03	A	Mechanically connected propeller	Maritime	Medium speed engine connected by a reduction gear to the propeller shaft, 20 year life time, running 5500 h/a	x			MC1-MC5	-1	-1	-1			
EN07	A	Diesel-mechanic propulsion with high speed engine	Maritime	High speed engine connected by a reduction gear to the propeller shaft, 20 year life time, running 5500 h/a.	x			MC1-MC5	-1	-1	-1			
EN16	A	Full/parallel hybrid	Road	Electrical support of engine power by saving and re-use of break-energy; combination of 6 cylinder engine plus electrical engine				Not relevant						
EN21	A	Nauticlean S System	Inland Waterways	It consists of two reactors with a selective-catalytic reduction (SCR)				Not relevant						
EN06	B	Mechanical azimuthing thrusters	Maritime	The engine runs generator. An electric motor is located inside the ship where it runs propeller shaft. 20 year life time, running 5500 h/a.	x			MC1-MC5	-1	-1	-1			
EN 15	C	PG Engine Diesel Locomotives	Railway	A propulsion system for a four-axle, standard-gauge, centre-cab locomotive using a liquefied petroleum gas (LPG) engine instead of conventional diesel		x		BA1-BA5	0	2				

Fuels and sources of energy

ID	Cat.	Technology Name	Transport Mode	Description	Applicability				Influence on KPIs					
					MC	A	B	Detailed segments and nodes	CO2	SOx	Cost	T. Time	Freq.	Rel.
FU02	A	Ethanol and bio-diesel	Maritime Road	Investigation about using alternative fuels.	x			MC1-MC5	2	2	-2			
FU03	A	CGN (compressed	Multimodal		Cleaner fuel for yard handling equipment (Prime	x	x		Technology applicable on nodes of the corridor	0	2	?		
FU08	A	LNG	Multimodal	Liquefied natural gas	x	x		Technology applicable on nodes of the corridor	0	2	?			
FU18	A	Biogas	Multimodal	Biogas is mainly produced from bio-waste, agricultural residues and residues from sewage treatment plants	x	x		Technology applicable on nodes of the corridor	2	2	-2			
FU05	B	AMP	Maritime	Alternative Maritime Power is a shore-side power source, that transforms the shore-side power voltage to match the vessel power system	x			Technology applicable in all ports of the corridor	2	2	-2			
FU06	B	Wind energy	Maritime	Wind turbines which will generate clean energy to power 14 Container Terminal Quay cranes, reefer containers, repair workshops and other power consumption needs	x			Technology applicable in all ports of the corridor	2	2	-1			
			Inland Waterways											
FU13	B	Electricity	Road	Electricity is today produced from fossil fuels, nuclear energy and renewable energy sources				BA1-BA5	2	2				
			Railway											
FU01	C	Ultra-low sulphur diesel	Maritime	Switch from industrial diesel oil (IDO 0,5% sulphur) to ultra-low sulphur diesel (ULSD 0,005%) for PMs and RTGs.	x			MC1-MC5	0	2	-2			
			Inland Waterways											
			Railway											
			Road											
FU04	C	Solar power network	Multimodal	A 6.600 square-meter solar panel able to generate clean energy which will reduce reliance on oil and cut electricity-related greenhouse gas emissions				Not applicable						
FU07	C	HFO	Maritime	Heavy fuel oil	x			MC1-MC5	0	0	0	0	0	0
			Railway											
			Road											
FU14	C	Hydrogen	Road	Hydrogen is today mainly produced from steam reforming of fossil gas - some production from electricity and renewable sources				not relevant						
			Inland Waterways											
FU23	C	Nuclear Power	Inland Waterways	Nuclear Power				MC1-MC5	2	2				
			Maritime											

Cargo handling and transfer

ID	Cat.	Technology Name	Technology Name	Description	Applicability				Influence on KPIs					
					MC	A	B	Detailed segments and nodes	CO2	SOx	Cost	T. Time	Freq.	Rel.
HT01	A	Conversion of RTGs from diesel to electric power	Maritime	RTGs fitted with electrical components in place of traditional hydraulic parts. Conversion will eliminate black emissions and lower noise levels of engines	x			Technology applicable on all ports of the corridor	1	1	-1			
			Multimodal		x			Technology applicable on all ports of the corridor	1	1	-1			
HT03	A	Hybrid hydraulic drive Terminal tractors	Maritime	Storing braking energy into hydraulic system for acceleration and system	x			Technology applicable on all ports of the corridor	1	1	-1			
HT07	A	Low emission engines	Multimodal	Euro III/ IV compliant engines burn diesel more efficiently, reducing emission of CO2 and providing up to 5% reduction on fuel consumption										
HT10	A	Metrocargo	Railway	Containers cargo handling in overhead electrified railways with a horizontal movement system from an automated platform to train wagons.	x	x		Tecnology applicable on multimodal nodes of the corridor			1	2	2	
			Multimodal											
			Maritime		x	x		Tecnology applicable on			1	2	2	
HT06	B	MP-RTGs	Multimodal	Mains-powered RTGs transfer the power generation from the engine of the yard crane to a far more efficient power station. Power station can be up to 40% more efficient than equipment engine.	x	x		Tecnology applicable on multimodal nodes of the corridor	1		-2			
HT11	B	Cargo Cassette and Translifter	Maritime	Wheel less cargo cassette is a loading platform which is used together with a translifter in a cassette system. Translifter is a steerable lifting trailer which together with cassettes replaces roll trailers in Ro-Ro and StoRo handling.				not relevant						
HT20	C	BEX	Inland Waterways	Barge Express is an integrated concept for transport for automated handling of large scale barge container at terminals				not relevant						
HT24	C	FCT	Maritime	The Floating Container Terminal collects and distributes containers originating from small calls, and bundles these currents with containers				not relevant						

Heating and cooling

ID	Cat.	Technology Name	Technology Name	Description	Applicability				Influence on KPIs					
					MC	A	B	Detailed segments and nodes	CO2	SOx	Cost	T. Time	Freq.	Rel.
HC02	B	Intelligent unit	Multimodal	Refrigerated boxcars will be built with energy efficient cooling systems, GPS tracking, fresh air exchange and the ability to remote monitoring the systems. RFID (Radio Frequency Identification) for tracking services are the main support.	x	x		Technology applicable on the whole corridor	1	1		1		1

Vehicles

ID	Cat.	Technology Name	Technology Name	Description	Applicability				Influence on KPIs					
					MC	A	B	Detailed segments and nodes	CO2	SOx	Cost	T. Time	Freq.	Rel.
VE02	A	NS 999 Electric Locomotive	Railway	NS 999 is an entirely electric locomotive that uses a lead-acid energy storage system without the use of a diesel engine and with zero exhaust emissions.		x		BA1-BA5	2	2				
VE03	A	M2eHybrid Freightliner	Road	Support engine plus auxiliary drive to operate an elevating platform of the truck; combination of 6 cylinder engine plus electrical engine				not relevant						
VE09	A	Battery-electric vehicles	Road	Battery-electric vehicles				not relevant						
VE10	A	Euro VI vehicles	Road	Euro VI is compulsory for new trucks from 2013, replacing Euro V				not relevant						
VE01	B	Hybrid Locomotive	Railway	Hybrid Locomotive was developed with the goal of creating the cleanest, most fuel-efficient high-horsepower diesel locomotive ever built.		x		BA1-BA5	1	1				
VE25	B	Braking energy recovery	Railway	Reversible DC Substation for recovering of dynamic braking energy and restitution to national grid		x		BA1-BA5	1	1				

Navigation technologies

ID	Cat.	Technology Name	Technology Name	Description	Applicability				Influence on KPIs						
					MC	A	B	Detailed segments and nodes	CO2	SOx	Cost	T. Time	Freq.	Rel.	
NA02	A	Automatic Identification System (AIS)	Maritime	Ship-to-ship, ship-to-shore and shore-to-ship system. Main purpose is collision avoidance, ship tracking and tracing. Works on VHF (Very high frequency, 30–300 MHz) radio frequency.				Technology already applied						2	2
NA15	A	WiMax	Maritime	Worldwide Interoperability for Microwave Access. Long range, high bandwidth wireless Internet				Technology already applied							
			RailwayRoad												
NA01	B	Train Control System	Railway	Train control and tracking system based on a special GPRS method.				Technology already applied							
NA05	B	ECDIS	Maritime	An Electronic Chart Display and Information System (ECDIS) is a computer-based navigation information system that can be used as an alternative to paper nautical charts. Integrates position information from GPS and other navigational sensors (radar, AIS). It may also give Sailing Directions and fathometer.	X	X		Technology applicable on all ports of the corridor:					2		2
NA09	B	Radarsat 1 and 2	Maritime	Canadian earth observation satellite that monitors environmental changes and the planet's natural resources. Equipped with a synthetic aperture radar (SAR), it acquires images of the Earth day or night, in all weather and through cloud cover, smoke and haze. Can enhance marine surveillance, ice monitoring, disaster management, environmental monitoring, resource management and mapping	X	X		Technology applicable on all ports of the corridor: 0					2		2
NA12	B	GEO satellites	Maritime	Geosynchronous Satellite whose orbital track on the Earth repeats regularly over points on the Earth over time. If such a satellite's orbit lies over the equator and the orbit is circular, it is called a geostationary satellite.	X	X		Technology applicable on all ports of the corridor					2		2
NA13	B	LEO satellites	Maritime	A low Earth orbit (LEO) is generally defined as an orbit within the locus extending from the Earth's surface up to an altitude of 2,000 km. Given the rapid orbital decay of objects below approximately 200 km, the commonly accepted definition for LEO is between 160 - 2,000 km (100 - 1,240 miles) above the Earth's surface.	X	X		Technology applicable on all ports of the corridor:					2		2

Navigation technologies

ID	Cat.	Technology Name	Technology Name	Description	Applicability				Influence on KPIs								
					MC	A	B	Detailed segments and nodes	CO2	SOx	Cost	T. Time	Freq.	Rel.			
NA14	B	Inmarsat	Maritime	British satellite telecommunications company, offering global, mobile services. It provides telephony and data services to users worldwide, via portable or mobile terminals which communicate to ground stations through eleven geosynchronous telecommunications satellites.				Technology already applied									
NA16	B	ATM	Inland Waterways	The advising Tempomaat (ATM) is a computer program advising the skipper on the most economical combination of route and speed, enabling the vessel to arrive on time with a most efficient use of fuel leading to a reduction of fuel consumption and emissions.				Technology not relevant for the whole corridor									
NA07	C	Global Navigation Satellite Systems or GNSS	Maritime	Global Navigation Satellite Systems (GNSS) is the standard generic term for satellite navigation systems ("sat nav") that provide autonomous geo-spatial	X	X		Technology applicable on the whole corridor							2		
			Railway												2	1	2
			Road														
NA11	C	LRIT	Maritime	The Long Range Identification and Tracking (LRIT) of ships. Consists of the ship borne LRIT information transmitting equipment, Communications Service Providers (CSPs), Application Service Providers (ASPs), LRIT Data Centers, the LRIT Data Distribution Plan and the International LRIT Data Exchange.	X		X	MC1-MC5									

The Pilot Corridor: Mare Nostrum

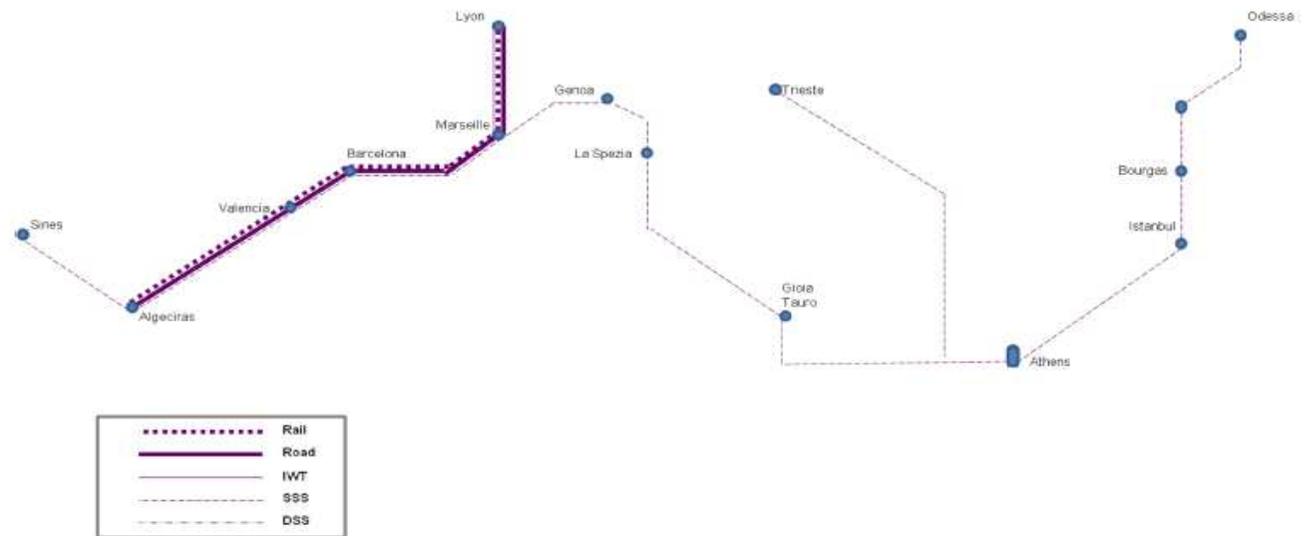
Branch		Segment
MC1	Main	Odessa-Constanta
MC2	Main	Constanta-Bourgas
MC3	Main	Bourgas-Istanbul
MC4	Main	Istanbul-Athens
MC5	Main	Athens-Gioia Tauro
MC6	Main	Gioia Tauro-La Spezia
MC7	Main	La Spezia-Genoa
MC8	Main	Genoa-Marseille
MC9	Main	Marseille-Barcelona
MC10	Main	Barcelona-Valencia
MC11	Main	Valencia-Algeciras
MC12	Main	Algeciras-Sines

BA1	Branch A	Algeciras-Valencia
BA2	Branch A	Valencia-Barcelona
BA3	Branch A	Barcelona-Marseille
BA4	Branch A	Marseille-Lyon

BB1	Branch B	Piraeus-Trieste
-----	----------	-----------------

Node	
N1	Genoa
N2	Algeciras
N3	Athens
N4	Barcelona
N5	Bourgas
N6	Constanta
N7	Genoa
N8	Gioia Tauro
N9	Istanbul
N10	La Spezia
N11	Lyon
N12	Marseille
N13	Odessa
N14	Piraeus
N15	Sines
N16	Trieste
N17	Valencia

Mare Nostrum [SinOde]



Engines and propulsion systems

ID	Cat.	Technology Name	Transport Mode	Description	Applicability				Influence on KPIs					
					MC	BA	BB	Detailed segments and nodes	CO2	SOx	Cost	Time	Freq.	Rel.
EN02	A	Directly driven propeller	Maritime	Slow speed engine directly connected to propeller shaft, 20 year life time, running 5500 h/a.	X	X	X	MC1-MC12, BA1-BA4, BB1, N1-N17	-1	-2	2	-1	0	2
EN03	A	Mechanically connected propeller	Maritime	Medium speed engine connected by a reduction gear to the propeller shaft, 20 year life time, running 5500 h/a	X	X	X	MC1-MC12, BA1-BA4, BB1, N1-N17	-1	-2	1	-1	0	2
EN07	A	Diesel-mechanic propulsion with high speed engine	Maritime	High speed engine connected by a reduction gear to the propeller shaft, 20 year life time, running 5500 h/a.	X	X	X	MC1-MC12, BA1-BA4, BB1, N1-N17	0	0	0	0	0	0
EN16	A	Full/parallel hybrid	Road	Electrical support of engine power by saving and re-use of break-energy; combination of 6 cylinder engine plus electrical engine	X	X		MC9-MC12, BA1-BA4, N1,N2,N4,N11,N12, N15, N17	-1	-1	-2	0	0	1
EN21	A	Nauticlean S System	Inland Waterways	It consists of two reactors with a selective-catalytic reduction (SCR)										
EN06	B	Mechanical azimuthing thrusters	Maritime	The engine runs generator. An electric motor is located inside the ship where it runs propeller shaft. 20 year life time, running 5500 h/a.	X	X	X	MC1-MC12, BA1-BA4, BB1, N1-N17	-1	-2	1	-1	0	2
EN 15	C	PG Engine Diesel Locomotives	Railway	A propulsion system for a four-axle, standard-gauge, centre-cab locomotive using a liquefied petroleum gas (LPG) engine instead of conventional diesel	X	X			1	2	1	0	0	2

Fuels and sources of energy

ID	Cat.	Technology Name	Transport Mode	Description	Applicability				Influence on KPIs						
					MC	A	B	Detailed segments and nodes	CO2	SOx	Cost	T. Time	Freq.	Rel.	
FU02	A	Ethanol and bio-diesel	Maritime	Investigation about using alternative fuels.	X	X	X	MC9-MC12, BA1-BA4, N1,N2,N4,N11,N12, N15, N17							
			Road		X	X		MC9-MC12, BA1-BA4, N1,N2,N4,N11,N12, N15, N17	1	1	-2	0	0	2	
FU03	A	CGN (compressed	Multimodal	Cleaner fuel for yard handling equipment (Prime	X	X		MC9-MC12, BA1-BA4, N1,N2,N4,N11,N12, N15, N17	1	2	-1	0	0	2	
FU08	A	LNG	Multimodal	Liquefied natural gas	X	X		MC9-MC12, BA1-BA4, N1,N2,N4,N11,N12, N15, N17	1	2	-1	0	0	2	
FU18	A	Biogas	Multimodal	Biogas is mainly produced from bio-waste, agricultural residues and residues from sewage treatment plants	X	X		MC9-MC12, BA1-BA4, N1,N2,N4,N11,N12, N15, N17	2	2	2	0	0	1	
FU05	B	AMP	Maritime	Alternative Maritime Power is a shore-side power source, that transforms the shore-side power voltage to match the vessel power system	X	X	X	MC9-MC12, BA1-BA4, N1,N2,N4,N11,N12, N15, N17	0	0	0	0	0	0	
FU06	B	Wind energy	Maritime	Wind turbines which will generate clean energy to power 14 Container Terminal Quay cranes, reefer containers, repair workshops and other power consumption needs	X	X	X	MC9-MC12, BA1-BA4, N1,N2,N4,N11,N12, N15, N17	2	2	-2	0	0	2	
			Inland Waterways												
FU13	B	Electricity	Road	Electricity is today produced from fossil fuels, nuclear energy and renewable energy sources	X	X		MC9-MC12, BA1-BA4, N1,N2,N4,N11,N12, N15, N17							
			Railway		X	X		MC9-MC12, BA1-BA4, N1,N2,N4,N11,N12, N15, N17	-1	-2	2	0	0	2	
FU01	C	Ultra-low sulphur diesel	Maritime	Switch from industrial diesel oil (IDO 0,5% sulphur) to ultra-low sulphur diesel (ULSD 0,005%) for PMs and RTGs.	X	X	X	MC9-MC12, BA1-BA4, N1,N2,N4,N11,N12, N15, N17	1	2	-2	0	0	2	
			Inland Waterways												
			Railway		X	X		MC9-MC12, BA1-BA4, N1,N2,N4,N11,N12, N15, N17	1	2	-2	0	0	2	
			Road		X	X		MC9-MC12, BA1-BA4, N1,N2,N4,N11,N12, N15, N17	1	2	-2	0	0	2	
FU04	C	Solar power network	Multimodal	A 6.600 square-meter solar panel able to generate clean energy which will reduce reliance on oil and cut electricity-related greenhouse gas emissions	X	X		MC9-MC12, BA1-BA4, N1,N2,N4,N11,N12, N15, N17	-1	-2	2	-1	0	2	
FU07	C	HFO	Maritime	Heavy fuel oil	X	X	X	MC9-MC12, BA1-BA4, N1,N2,N4,N11,N12, N15, N17							
			Railway		X	X		MC9-MC12, BA1-BA4, N1,N2,N4,N11,N12, N15, N17							
			Road		X	X		MC9-MC12, BA1-BA4, N1,N2,N4,N11,N12, N15, N17							
FU14	C	Hydrogen	Road	Hydrogen is today mainly produced from steam reforming of fossil gas - some production from electricity and renewable sources	X	X		MC9-MC12, BA1-BA4, N1,N2,N4,N11,N12, N15, N17	2	2	2	0	0	2	
			Inland Waterways												
FU23	C	Nuclear Power	Inland Waterways	Nuclear Power											
			Maritime		X	X	X	MC9-MC12, BA1-BA4, N1,N2,N4,N11,N12, N15, N17	2	2	2	0	0	2	

Cargo handling and transfer

ID	Cat.	Technology Name	Technology Name	Description	Applicability				Influence on KPIs					
					MC	A	B	Detailed segments and nodes	CO2	SOx	Cost	T. Time	Freq.	Rel.
HT01	A	Conversion of RTGs from diesel to electric power	Maritime	RTGs fitted with electrical components in place of traditional hydraulic parts. Conversion will eliminate black emissions and lower noise levels of engines	X	X	X	MC1-MC12, BA1-BA4, BB1, N1-N17	1	1	2	1	1	2
			Multimodal		X	X		MC9-MC12, BA1-BA4, N1,N2,N4,N11,N12, N15, N17	1	2	-1	2	2	1
HT03	A	Hybrid hydraulic drive Terminal tractors	Maritime	Storing braking energy into hydraulic system for acceleration and system	X	X	X	MC1-MC12, BA1-BA4, BB1, N1-N17	1	1	1	2	0	1
HT07	A	Low emission engines	Multimodal	Euro III/ IV compliant engines burn diesel more efficiently, reducing emission of CO2 and providing up to 5% reduction on fuel consumption	X	X		MC9-MC12, BA1-BA4, N1,N2,N4,N11,N12, N15, N17	2	2	-2	0	0	2
HT10	A	Metrocargo	Railway	Containers cargo handling in overhead electrified railways with a horizontal movement system from an automated platform to train wagons.	X	X		MC9-MC12, BA1-BA4, N1,N2,N4,N11,N12, N15, N17	2	2	1	0	0	2
			Multimodal		X	X		MC9-MC12, BA1-BA4, N1,N2,N4,N11,N12, N15, N17	1	1	-1	1	1	1
			Maritime		X	X	X	MC1-MC12, BA1-BA4, BB1, N1-N17	2	1	1	2	0	1
HT06	B	MP-RTGs	Multimodal	Mains-powered RTGs transfer the power generation from the engine of the yard crane to a far more efficient power station. Power station can be up to 40% more efficient than equipment engine.	X	X		MC9-MC12, BA1-BA4, N1,N2,N4,N11,N12, N15, N17	2	2	-2	0	0	2
HT11	B	Cargo Cassette and Translifter	Maritime	Wheel less cargo cassette is a loading platform which is used together with a translifter in a cassette system. Translifter is a steerable lifting trailer which together with cassettes replaces roll trailers in Ro-Ro and StoRo handling.	X	X	X	MC1-MC12, BA1-BA4, BB1, N1-N17	1	1	2	1	1	2
HT20	C	BEX	Inland Waterways	Barge Express is an integrated concept for transport for automated handling of large scale barge container at terminals				MC9-MC12, BA1-BA4, N1,N2,N4,N11,N12, N15, N17	0	0	0	0	0	0
HT24	C	FCT	Maritime	The Floating Container Terminal collects and distributes containers originating from small calls, and bundles these currents with containers	X	X	X	MC1-MC12, BA1-BA4, BB1, N1-N17	2	1	-1	1	2	1

Heating and cooling

ID	Cat.	Technology Name	Technology Name	Description	Applicability				Influence on KPIs					
					MC	A	B	Detailed segments and nodes	CO2	SOx	Cost	T. Time	Freq.	Rel.
HC02	B	Intelligent unit	Multimodal	Refrigerated boxcars will be built with energy efficient cooling systems, GPS tracking, fresh air exchange and the ability to remote monitoring the systems. RFID (Radio Frequency Identification) for tracking services are the main support.	X	X		MC9-MC12, BA1-BA4, N1,N2,N4,N11,N12, N15, N17	1	2	2	0	1	1

Vehicles

ID	Cat.	Technology Name	Technology Name	Description	Applicability				Influence on KPIs					
					MC	A	B	Detailed segments and nodes	CO2	SOx	Cost	T. Time	Freq.	Rel.
VE02	A	NS 999 Electric Locomotive	Railway	NS 999 is an entirely electric locomotive that uses a lead-acid energy storage system without the use of a diesel engine and with zero exhaust emissions.	X	X		MC9-MC12, BA1-BA4, N1,N2,N4,N11,N12, N15, N17	1	1	-1	1	1	1
VE03	A	M2eHybrid Freightliner	Road	Support engine plus auxiliary drive to operate an elevating platform of the truck; combination of 6 cylinder engine plus electrical engine	X	X		MC9-MC12, BA1-BA4, N1,N2,N4,N11,N12, N15, N17	2	1	-2	2	1	1
VE09	A	Battery-electric vehicles	Road	Battery-electric vehicles	X	X		MC9-MC12, BA1-BA4, N1,N2,N4,N11,N12, N15, N17	1	2	-1	1	1	1
VE10	A	Euro VI vehicles	Road	Euro VI is compulsory for new trucks from 2013, replacing Euro V	X	X		MC9-MC12, BA1-BA4, N1,N2,N4,N11,N12, N15, N17	1	1	-1	2	2	2
VE01	B	Hybrid Locomotive	Railway	Hybrid Locomotive was developed with the goal of creating the cleanest, most fuel-efficient high-horsepower diesel locomotive ever built.	X	X		MC9-MC12, BA1-BA4, N1,N2,N4,N11,N12, N15, N17	2	1	-2	1	1	2
VE25	B	Braking energy recovery	Railway	Reversible DC Substation for recovering of dynamic braking energy and restitution to national grid	X	X		MC9-MC12, BA1-BA4, N1,N2,N4,N11,N12, N15, N17	1	2	-1	1	2	2

Navigation technologies

ID	Cat.	Technology Name	Technology Name	Description	Applicability				Influence on KPIs					
					MC	A	B	Detailed segments and nodes	CO2	SOx	Cost	T. Time	Freq.	Rel.
NA02	A	Automatic Identification System (AIS)	Maritime	Ship-to-ship, ship-to-shore and shore-to-ship system. Main purpose is collision avoidance, ship tracking and tracing. Works on VHF (Very high frequency, 30–300 MHz) radio frequency.	X	X	X	MC1-MC12, BA1-BA4, BB1, N1-N17	1	2	-1	2	0	1
NA15	A	WiMax	Maritime	Worldwide Interoperability for Microwave Access. Long range, high bandwidth wireless Internet	X	X	X	MC1-MC12, BA1-BA4, BB1, N1-N17	1	2	-2	0	1	1
			RailwayRoad		X	X		MC9-MC12, BA1-BA4, N1,N2,N4,N11,N12, N15, N17	2	1	-1	0	0	1
NA01	B	Train Control System	Railway	Train control and tracking system based on a special GPRS method.	X	X		MC9-MC12, BA1-BA4, N1,N2,N4,N11,N12, N15, N17	1	2	-2	1	0	0
NA05	B	ECDIS	Maritime	An Electronic Chart Display and Information System (ECDIS) is a computer-based navigation information system that can be used as an alternative to paper nautical charts. Integrates position information from GPS and other navigational sensors (radar, AIS). It may also give Sailing Directions and fathometer.	X	X	X	MC1-MC12, BA1-BA4, BB1, N1-N17	2	1	1	0	0	1
NA09	B	Radarsat 1 and 2	Maritime	Canadian earth observation satellite that monitors environmental changes and the planet's natural resources. Equipped with a synthetic aperture radar (SAR), it acquires images of the Earth day or night, in all weather and through cloud cover, smoke and haze. Can enhance marine surveillance, ice monitoring, disaster management, environmental monitoring, resource management and mapping	X	X	X	MC1-MC12, BA1-BA4, BB1, N1-N17	2	2	-1	2	1	2
NA12	B	GEO satellites	Maritime	Geosynchronous Satellite whose orbital track on the Earth repeats regularly over points on the Earth over time. If such a satellite's orbit lies over the equator and the orbit is circular, it is called a geostationary satellite.	X	X	X	MC1-MC12, BA1-BA4, BB1, N1-N17	1	1	-1	0	0	1
NA13	B	LEO satellites	Maritime	A low Earth orbit (LEO) is generally defined as an orbit within the locus extending from the Earth's surface up to an altitude of 2,000 km. Given the rapid orbital decay of objects below approximately 200 km, the commonly accepted definition for LEO is between 160 - 2,000 km (100 - 1,240 miles) above the Earth's surface.	X	X	X	MC1-MC12, BA1-BA4, BB1, N1-N17	2	1	-2	1	0	0

Navigation technologies

ID	Cat.	Technology Name	Technology Name	Description	Applicability				Influence on KPIs					
					MC	A	B	Detailed segments and nodes	CO2	SOx	Cost	T. Time	Freq.	Rel.
NA14	B	Inmarsat	Maritime	British satellite telecommunications company, offering global, mobile services. It provides telephony and data services to users worldwide, via portable or mobile terminals which communicate to ground stations through eleven geosynchronous telecommunications satellites.	X	X	X	MC1-MC12, BA1-BA4, BB1, N1-N17	1	2	-1	0	1	1
NA16	B	ATM	Inland Waterways	The advising Tempomaat (ATM) is a computer program advising the skipper on the most economical combination of route and speed, enabling the vessel to arrive on time with a most efficient use of fuel leading to a reduction of fuel consumption and emissions.										
NA07	C	Global Navigation Satellite Systems or GNSS	Maritime	Global Navigation Satellite Systems (GNSS) is the standard generic term for satellite navigation systems ("sat nav") that provide autonomous geo-spatial positioning with global coverage. GNSS allows small electronic receivers to determine their location (longitude, latitude, and altitude) to within a few metres using time signals transmitted along a line-of-sight by radio from satellites.	X	X	X	MC1-MC12, BA1-BA4, BB1, N1-N17	2	2	-1	0	1	2
			Railway		X	X		MC9-MC12, BA1-BA4, N1,N2,N4,N11,N12, N15, N17	1	1	-2	0	0	2
			Road		X	X		MC9-MC12, BA1-BA4, N1,N2,N4,N11,N12, N15, N17	1	1	-1	1	2	1
NA11	C	LRIT	Maritime	The Long Range Identification and Tracking (LRIT) of ships. Consists of the ship borne LRIT information transmitting equipment, Communications Service Providers (CSPs), Application Service Providers (ASPs), LRIT Data Centers, the LRIT Data Distribution Plan and the International LRIT Data Exchange.	X	X	X	MC1-MC12, BA1-BA4, BB1, N1-N17	1	2	-2	2	1	0

Best practices

ID	Cat.	Technology Name	Transport Mode	Description	Applicability				Influence on KPIs					
					MC	A	B	Detailed segments and nodes	CO2	SOx	Cost	T. Time	Freq.	Rel.
BP04	A	Traffic Flow Management	Railway	A system for online optimization of rail traffic flow to have minimum delays and minimum energy consumption, developed by Emkamatik on behalf of SBB	X	X		MC9-MC12, BA1-BA4, N1,N2,N4,N11,N12, N15, N17	2	1	-1	1	0	2
BP07	A	Carbon-free rail freight transport	Railway	DB Schenker Rail replaces the electricity required for your freight transport with regenerative energy that comes 100% from renewable sources in Germany. This helps to avoid carbon emissions right from the outset. Even the smallest quantities can be transported in this way without carbon emissions, on a national and international scale.	X	X		MC9-MC12, BA1-BA4, N1,N2,N4,N11,N12, N15, N17	2	1	-2	1	1	1
BP02	B	TDS	Railway	Train Control System based on a GPS application method	X	X		MC9-MC12, BA1-BA4, N1,N2,N4,N11,N12, N15, N17	1	1	-2	2	0	2
BP03	B	GEKKO	Railway	A system to provide guidance to energy efficiency driving and timetable optimization, developed for Danish State Railways	X	X		MC9-MC12, BA1-BA4, N1,N2,N4,N11,N12, N15, N17	1	2	-1	1	1	1
BP08	B	Coaster Express (CoEx)	Maritime	Short sea transport concept directed to bundling the transport flows, scaling-up the short sea facilities and standardization and automation of the transition processes.	X	X	X	MC1-MC12, BA1-BA4, BB1, N1-N17	1	2	1	2	1	1

The Pilot Corridor: Finnis Terrae

Branch		Segment
MC1	Main	Madrid-Valladolid
MC2	Main	Valladolid-Gijon
MC3	Main	Gijon-St. Nazaire
MC4	Main	Saint Nazaire-Paris
MC5	Main	Paris-Irun
MC6	Main	Irun-Valladolid
BA1	Branch A	Madrid-Lisboa

Node	
N1	Gijon
N2	Irun
N3	Lisboa
N4	Madrid
N5	Paris
N6	Saint Nazaire
N7	St. Nazaire
N8	Valladolid

Finis terrae [MadPar]



Engines and propulsion systems

ID	Cat.	Technology Name	Transport Mode	Description	Applicability			Influence on KPIs						
					MC	BA	BB	Comments on segments and nodes	CO2	SOx	Cost	Time	Freq.	Rel.
EN02	A	Directly driven propeller	Maritime	Slow speed engine directly connected to propeller shaft, 20 year life time, running 5500 h/a.	x			MC3	0	0	0			0
EN03	A	Mechanically connected propeller	Maritime	Medium speed engine connected by a reduction gear to the propeller shaft, 20 year life time, running 5500 h/a	x			MC3	-1	-1	-1			-1
EN07	A	Diesel-mechanic propulsion with high speed engine	Maritime	High speed engine connected by a reduction gear to the propeller shaft, 20 year life time, running 5500 h/a.	x			MC3	-1	-1	-2			-1
EN16	A	Full/parallel hybrid	Road	Electrical support of engine power by saving and re-use of break-energy; combination of 6 cylinder engine plus electrical engine	x	x		MC1,2,4,5,6,BA1	1	1	-2			-1
EN21	A	Nauticlean S System	Inland Waterways	It consists of two reactors with a selective-catalytic reduction (SCR)										
EN06	B	Mechanical azimuthing thrusters	Maritime	The engine runs generator. An electric motor is located inside the ship where it runs propeller shaft. 20 year life time, running 5500 h/a.	x			MC3	2	2	-1			1
EN 15	C	PG Engine Diesel Locomotives	Railway	A propulsion system for a four-axle, standard-gauge, centre-cab locomotive using a liquefied petroleum gas (LPG) engine instead of conventional diesel	x	x		MC1,2,4,5,6,BA1	2	2	-2			1

Fuels and sources of energy

ID	Cat.	Technology Name	Transport Mode	Description	Applicability				Influence on KPIs					
					MC	A	B	Detailed segments and nodes	CO2	SOx	Cost	T. Time	Freq.	Rel.
FU02	A	Ethanol and bio-diesel	Maritime	Investigation about using alternative fuels.	x			MC3	2	2	-2			1
			Road		x	x		MC1,2,4,5,6,BA1	2	2	-2			1
FU03	A	CGN (compressed	Multimodal	Cleaner fuel for yard handling equipment (Prime	x	x		MC1,2,4,5,6,BA1	2	2	-2			1
FU08	A	LNG	Multimodal	Liquefied natural gas	x	x		MC1,2,4,5,6,BA1	2	2	-1			1
FU18	A	Biogas	Multimodal	Biogas is mainly produced from bio-waste, agricultural residues and residues from sewage treatment plants	x	x		MC1,2,4,5,6,BA1	2	2	-1			1
FU05	B	AMP	Maritime	Alternative Maritime Power is a shore-side power source, that transforms the shore-side power voltage to match the vessel power system	x			MC3	2	2	1			
FU06	B	Wind energy	Maritime	Wind turbines which will generate clean energy to power 14 Container Terminal Quay cranes, reefer containers, repair workshops and other power	x			MC3 nodes	2	2	-2			-1
			Inland Waterways											
FU13	B	Electricity	Road	Electricity is today produced from fossil fuels, nuclear energy and renewable energy sources										
			Railway											
FU01	C	Ultra-low sulphur diesel	Maritime	Switch from industrial diesel oil (IDO 0,5% sulphur) to ultra-low sulphur diesel (ULSD 0,005%) for PMs and RTGs.	x			MC3 nodes		2	-1			
			Inland Waterways											
			Railway		x	x		MC1,2,4,5,6,BA1	2	2	-1			
			Road		x	x		MC1,2,4,5,6,BA1	2	2	-1			
FU04	C	Solar power network	Multimodal	A 6.600 square-meter solar panel able to generate clean energy which will reduce reliance on oil and cut electricity-related greenhouse gas emissions	x	x		All nodes	2	2	-2			-1
FU07	C	HFO	Maritime	Heavy fuel oil	x			MC3	0	0	0			0
			Railway											
			Road											
FU14	C	Hydrogen	Road	Hydrogen is today mainly produced from steam reforming of fossil gas - some production from electricity and renewable sources										
			Inland Waterways											
FU23	C	Nuclear Power	Inland Waterways	Nuclear Power										
			Maritime		x			MC3	2	2	-2			

Cargo handling and transfer

ID	Cat.	Technology Name	Technology Name	Description	Applicability				Influence on KPIs						
					MC	A	B	Detailed segments and nodes	CO2	SOx	Cost	T. Time	Freq.	Rel.	
HT01	A	Conversion of RTGs from diesel to electric	Maritime	RTGs fitted with electrical components in place of traditional hydraulic parts. Conversion will eliminate	x			MC3 nodes	2	2	2				-1
			Multimodal		x	x		MC1,2,4,5,6,BA1 - nodes	2	2	2				-1
HT03	A	Hybrid hydraulic drive Terminal tractors	Maritime	Storing braking energy into hydraulic system for acceleration and system	x			MC3 nodes	2	2	1				
HT07	A	Low emission engines	Multimodal	Euro III/ IV compliant engines burn diesel more efficiently, reducing emission of CO2 and providing up to 5% reduction on fuel consumption	x	x		MC1,2,4,5,6,BA1 - nodes	2	2	-1				
HT10	A	Metrocargo	Railway	Containers cargo handling in overhead electrified railways with a horizontal movement system from an automated platform to train wagons.	x	x		MC1,2,4,5,6,BA1 - nodes	1	1	1	2	2		
			Multimodal		x	x		MC1,2,4,5,6,BA1 - nodes	1	1	1	2	2		
			Maritime		x	x		MC3 nodes	1	1	1	2	2		
HT06	B	MP-RTGs	Multimodal	Mains-powered RTGs transfer the power generation from the engine of the yard crane to a far more efficient power station. Power station can be up to 40% more efficient than equipment engine.	x	x		MC1,2,4,5,6,BA1 - nodes	1	1	1				
HT11	B	Cargo Cassette and Translifter	Maritime	Wheel less cargo cassette is a loading platform which is used together with a translifter in a cassette system. Translifter is a steerable lifting trailer which together with cassettes replaces roll trailers in Ro-Ro and StoRo handling.	x			MC3 nodes			-1	1	1		
HT20	C	BEX	Inland Waterways	Barge Express is an integrated concept for transport for automated handling of large scale barge container at terminals											
HT24	C	FCT	Maritime	The Floating Container Terminal collects and distributes containers originating from small calls, and bundles these currents with containers				not relevant							

Heating and cooling

ID	Cat.	Technology Name	Technology Name	Description	Applicability				Influence on KPIs					
					MC	A	B	Detailed segments and nodes	CO2	SOx	Cost	T. Time	Freq.	Rel.
HC02	B	Intelligent unit	Multimodal	Refrigerated boxcars will be built with energy efficient cooling systems, GPS tracking, fresh air exchange and the ability to remote monitoring the systems. RFID (Radio Frequency Identification) for tracking services are the main support.	x	x		Entire corridor	1	1	1	1	1	1

Vehicles

ID	Cat.	Technology Name	Technology Name	Description	Applicability				Influence on KPIs					
					MC	A	B	Detailed segments and nodes	CO2	SOx	Cost	T. Time	Freq.	Rel.
VE02	A	NS 999 Electric Locomotive	Railway	NS 999 is an entirely electric locomotive that uses a lead-acid energy storage system without the use of a diesel engine and with zero exhaust emissions.	x	x		MC1,2,4,5,6,BA1	2	2	-2			
VE03	A	M2eHybrid Freightliner	Road	Support engine plus auxiliary drive to operate an elevating platform of the truck; combination of 6 cylinder engine plus electrical engine	x	x		MC1,2,4,5,6,BA1	1	1	-1			
VE09	A	Battery-electric vehicles	Road	Battery-electric vehicles	x	x		MC1,2,4,5,6,BA1	2	2	-2			
VE10	A	Euro VI vehicles	Road	Euro VI is compulsory for new trucks from 2013, replacing Euro V	x	x		MC1,2,4,5,6,BA1	1	1	-1			
VE01	B	Hybrid Locomotive	Railway	Hybrid Locomotive was developed with the goal of creating the cleanest, most fuel-efficient high-horsepower diesel locomotive ever built.	x	x		MC1,2,4,5,6,BA1	1	1	-1			
VE25	B	Braking energy recovery	Railway	Reversible DC Substation for recovering of dynamic braking energy and restitution to national grid	x	x		MC1,2,4,5,6,BA1	1	1	1			

Navigation technologies

ID	Cat.	Technology Name	Technology Name	Description	Applicability				Influence on KPIs					
					MC	A	B	Detailed segments and nodes	CO2	SOx	Cost	T. Time	Freq.	Rel.
NA02	A	Automatic Identification System (AIS)	Maritime	Ship-to-ship, ship-to-shore and shore-to-ship system. Main purpose is collision avoidance, ship tracking and tracing. Works on VHF (Very high frequency, 30–300 MHz) radio frequency.	x	x		MC3	0	0	0	0	0	0
NA15	A	WiMax	Maritime	Worldwide Interoperability for Microwave Access. Long range, high bandwidth wireless Internet	x	x		MC3	0	0	0	0	0	0
			RailwayRoad		x	x		MC1,2,4,5,6,BA1	0	0	0	0	0	0
NA01	B	Train Control System	Railway	Train control and tracking system based on a special GPRS method.	x	x		MC1,2,4,5,6,BA1	0	0	0	0	0	0
NA05	B	ECDIS	Maritime	An Electronic Chart Display and Information System (ECDIS) is a computer-based navigation information system that can be used as an alternative to paper nautical charts. Integrates position information from GPS and other navigational sensors (radar, AIS). It may also give Sailing Directions and fathometer.	x	x		MC3	0	0	0	0	0	0
NA09	B	Radarsat 1 and 2	Maritime	Canadian earth observation satellite that monitors environmental changes and the planet's natural resources. Equipped with a synthetic aperture radar (SAR), it acquires images of the Earth day or night, in all weather and through cloud cover, smoke and haze. Can enhance marine surveillance, ice monitoring, disaster management, environmental monitoring, resource management and mapping				not relevant						
NA12	B	GEO satellites	Maritime	Geosynchronous Satellite whose orbital track on the Earth repeats regularly over points on the Earth over time. If such a satellite's orbit lies over the equator and the orbit is circular, it is called a geostationary satellite.	x	x		MC3	0	0	0	0	0	0
NA13	B	LEO satellites	Maritime	A low Earth orbit (LEO) is generally defined as an orbit within the locus extending from the Earth's surface up to an altitude of 2,000 km. Given the rapid orbital decay of objects below approximately 200 km, the commonly accepted definition for LEO is between 160 - 2,000 km (100 - 1,240 miles) above the Earth's surface.	x	x		MC3	0	0	0	0	0	0

Navigation technologies

ID	Cat.	Technology Name	Technology Name	Description	Applicability				Influence on KPIs					
					MC	A	B	Detailed segments and nodes	CO2	SOx	Cost	T. Time	Freq.	Rel.
NA14	B	Inmarsat	Maritime	British satellite telecommunications company, offering global, mobile services. It provides telephony and data services to users worldwide, via portable or mobile terminals which communicate to ground stations through eleven geosynchronous telecommunications satellites.	x	x		MC3	0	0	0	0	0	0
NA16	B	ATM	Inland Waterways	The advising Tempomaat (ATM) is a computer program advising the skipper on the most economical combination of route and speed, enabling the vessel to arrive on time with a most efficient use of fuel leading to a reduction of fuel consumption and emissions.										
NA07	C	Global Navigation Satellite Systems or GNSS	Maritime	Global Navigation Satellite Systems (GNSS) is the standard generic term for satellite navigation systems ("sat nav") that provide autonomous geo-spatial	x	x		MC3	0	0	0	0	0	0
			Railway											
			Road											
NA11	C	LRIT	Maritime	The Long Range Identification and Tracking (LRIT) of ships. Consists of the ship borne LRIT information transmitting equipment, Communications Service Providers (CSPs), Application Service Providers (ASPs), LRIT Data Centers, the LRIT Data Distribution Plan and the International LRIT Data Exchange.	x	x		MC3	0	0	0	0	0	0

Best practices

ID	Cat.	Technology Name	Transport Mode	Description	Applicability				Influence on KPIs					
					MC	A	B	Detailed segments and nodes	CO2	SOx	Cost	T. Time	Freq.	Rel.
BP04	A	Traffic Flow Management	Railway	A system for online optimization of rail traffic flow to have minimum delays and minimum energy consumption, developed by Emkamatik on behalf of SBB	x	x		MC1,2,4,5,6,BA1	1	1	1	1	1	1
BP07	A	Carbon-free rail freight transport	Railway	DB Schenker Rail replaces the electricity required for your freight transport with regenerative energy that comes 100% from renewable sources in Germany. This helps to avoid carbon emissions right from the outset. Even the smallest quantities can be transported in this way without carbon emissions, on a national and international scale.	x	x		MC1,2,4,5,6,BA1	2	2	-2			
BP02	B	TDS	Railway	Train Control System based on a GPS application method	x	x		MC1,2,4,5,6,BA1	1	1	1	1	1	1
BP03	B	GEKKO	Railway	A system to provide guidance to energy efficiency driving and timetable optimization, developed for Danish State Railways	x	x		MC1,2,4,5,6,BA1	1	1	1	1	1	1
BP08	B	Coaster Express (CoEx)	Maritime	Short sea transport concept directed to bundling the transport flows, scaling-up the short sea facilities and standardization and automation of the transition processes.	x			MC3	1	1	2			-1

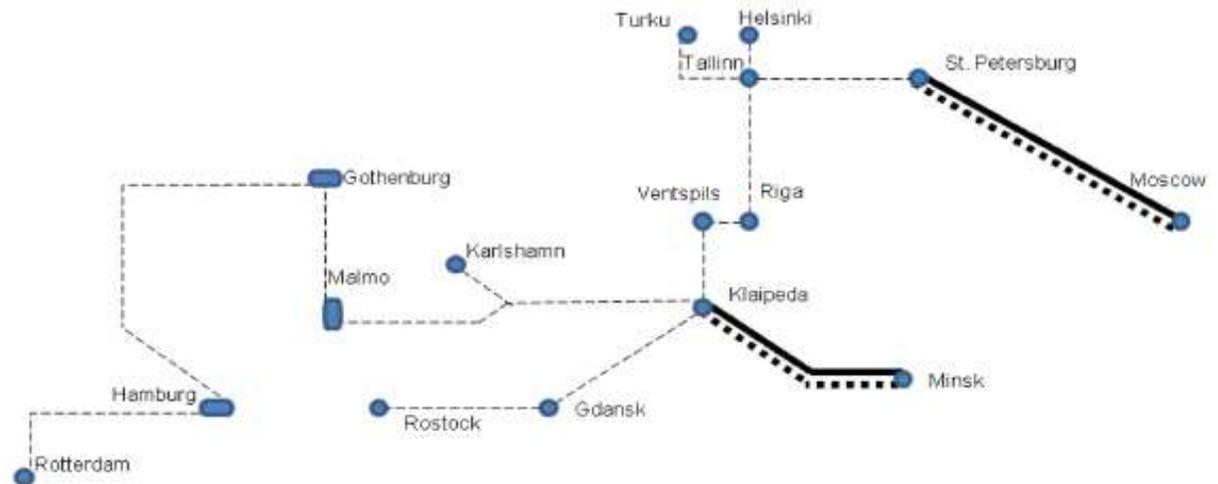
The Pilot Corridor: Nureyev

Branch		Segment
MC1	Main Corridor	Rotterdam-Hamburg
MC2	Main Corridor	Hamburg-Gothenburg
MC3	Main Corridor	Gothenburg-Malmo
MC4	Main Corridor	Malmo-Karlshamn
MC5	Main Corridor	Malmo-Klaipeda
MC6	Main Corridor	Klaipeda-Gdansk
MC7	Main Corridor	Gdansk-Rostock
MC8	Main Corridor	Klaipeda-Ventspils
MC9	Main Corridor	Ventspils-Riga
MC10	Main Corridor	Riga-Tallinn
MC11	Main Corridor	Tallinn-Turku
MC12	Main Corridor	Tallinn-Helsinki
MC13	Main Corridor	Tallinn-St. Petersburg

BA1	Branch A	St. Petersburg-Moscow
BA2	Branch A	Klaipeda-Minsk

Node	
N1	Gdansk
N2	Gothenburg
N3	Hamburg
N4	Helsinki
N5	Karlshamn
N6	Klaipeda
N7	Malmo
N8	Minsk
N9	Moscow
N10	Riga
N11	Rostock
N12	Rotterdam
N13	St. Petersburg
N14	Tallinn
N15	Turku
N16	Ventspils

Nureyev [RotMos]



Engines and propulsion systems

ID	Cat.	Technology Name	Transport Mode	Description	Applicability				Influence on KPIs					
					MC	BA	BB	Detailed segments and nodes	CO2	SOx	Cost	Time	Freq.	Rel.
EN02	A	Directly driven propeller	Maritime	Slow speed engine directly connected to propeller shaft, 20 year life time, running 5500 h/a.	X			Technology applicable on main corridor	1	1	0	0	0	0
EN03	A	Mechanically connected propeller	Maritime	Medium speed engine connected by a reduction gear to the propeller shaft, 20 year life time, running 5500 h/a	X			Technology applicable on main corridor	1	1	0	0	0	0
EN07	A	Diesel-mechanic propulsion with high speed engine	Maritime	High speed engine connected by a reduction gear to the propeller shaft, 20 year life time, running 5500 h/a.	X			Technology applicable on main corridor	1	1	0	0	0	0
EN16	A	Full/parallel hybrid	Road	Electrical support of engine power by saving and re-use of break-energy; combination of 6 cylinder engine plus electrical engine		X		Technology applicable on branch A	1	0	-1	0	0	0
EN21	A	Nauticlean S System	Inland Waterways	It consists of two reactors with a selective-catalytic reduction (SCR)				Technology not relevant the whole corridor						
EN06	B	Mechanical azimuthing thrusters	Maritime	The engine runs generator. An electric motor is located inside the ship where it runs propeller shaft. 20 year life time, running 5500 h/a.	X			Technology applicable on main corridor	1	1	-1	0	0	0
EN 15	C	PG Engine Diesel Locomotives	Railway	A propulsion system for a four-axle, standard-gauge, centre-cab locomotive using a liquefied petroleum gas (LPG) engine instead of conventional diesel		X		Technology applicable in Klaipeda-Minsk segment and marshalling yards	0	1	-1	0	0	0

Fuels and sources of energy

ID	Cat.	Technology Name	Transport Mode	Description	Applicability				Influence on KPIs					
					MC	A	B	Detailed segments and nodes	CO2	SOx	Cost	T. Time	Freq.	Rel.
FU02	A	Ethanol and bio-diesel	Maritime	Investigation about using alternative fuels.	X			Technology applicable on main corridor	1	2	-2	0	0	0
			Road			X		Technology applicable on branch A	1	1	-1	0	0	0
FU03	A	CGN (compressed	Multimodal	Cleaner fuel for yard handling equipment (Prime	X			Technology applicable in all terminals	0	1	-1	0	0	0
FU08	A	LNG	Multimodal	Liquefied natural gas	X	X		Technology applicable on main corridor, branch A road and non-electric train traction and all terminals	0	1	-1	0	0	0
FU18	A	Biogas	Multimodal	Biogas is mainly produced from bio-waste, agricultural residues and residues from sewage treatment plants	X			Technology applicable in all terminals	2	2	-1	0	0	0
FU05	B	AMP	Maritime	Alternative Maritime Power is a shore-side power source, that transforms the shore-side power voltage to match the vessel power system	X			Technology applicable in all ports	1	1	0	0	0	0
FU06	B	Wind energy	Maritime	Wind turbines which will generate clean energy to power 14 Container Terminal Quay cranes, reefer containers, repair workshops and other power	X			Technology applicable in all terminals	2	2	-2	0	0	0
			Inland Waterways					Technology not relevant the whole corridor						
FU13	B	Electricity	Road	Electricity is today produced from fossil fuels, nuclear energy and renewable energy sources		X		Technology applicable in all terminals	1	0	0	0	0	0
			Railway			X		Technology applicable in Klaipeda-Minsk segment (electrification of track)	2	0	-1	0	0	0
FU01	C	Ultra-low sulphur diesel	Maritime	Switch from industrial diesel oil (IDO 0,5% sulphur) to ultra-low sulphur diesel (ULSD 0,005%) for PMs and RTGs.	X			Technology applicable in all ports	0	1	-1	0	0	0
			Inland Waterways					Technology not relevant the whole corridor						
			Railway			X		Technology already applied on branch A						
			Road			X		Technology already applied on branch A						
FU04	C	Solar power network	Multimodal	A 6.600 square-meter solar panel able to generate clean energy which will reduce reliance on oil and cut electricity-related greenhouse gas emissions	X			Technology applicable in all terminals	2	1	-2	0	0	0
FU07	C	HFO	Maritime	Heavy fuel oil	X			Technology already applied on main corridor						
			Railway			X		Technology not relevant on branch A						
			Road			X		Technology not relevant on branch A						
FU14	C	Hydrogen	Road	Hydrogen is today mainly produced from steam reforming of fossil gas - some production from electricity and renewable sources		X		Technology applicable in all terminals	2	1	-2	0	0	0
			Inland Waterways					Technology not relevant the whole corridor						
FU23	C	Nuclear Power	Inland Waterways	Nuclear Power				Technology not relevant the whole corridor						
			Maritime					Technology not relevant the whole corridor						

Cargo handling and transfer

ID	Cat.	Technology Name	Technology Name	Description	Applicability				Influence on KPIs					
					MC	A	B	Detailed segments and nodes	CO2	SOx	Cost	T. Time	Freq.	Rel.
HT01	A	Conversion of RTGs from diesel to electric power	Maritime	RTGs fitted with electrical components in place of traditional hydraulic parts. Conversion will eliminate black emissions and lower noise levels of engines	X			Technology applicable in all ports	0	0	-1	0	0	0
			Multimodal		X			Technology applicable in all terminals	0	0	-1	0	0	0
HT03	A	Hybrid hydraulic drive Terminal tractors	Maritime	Storing braking energy into hydraulic system for acceleration and system	X			Technology applicable in all ports	1	1	-1	0	0	0
HT07	A	Low emission engines	Multimodal	Euro III/ IV compliant engines burn diesel more efficiently, reducing emission of CO2 and providing up to 5% reduction on fuel consumption		X		Technology already applied on branch A						
HT10	A	Metrocargo	Railway	Containers cargo handling in overhead electrified railways with a horizontal movement system from an automated platform to train wagons.		X		Technology applicable in all terminals which have electrified track	0	0	-1	1	1	0
			Multimodal		X			Technology applicable in all ports which have electrified track	0	0	-1	1	1	0
			Maritime		X			Technology applicable in all ports which have electrified track	0	0	-1	1	1	0
HT06	B	MP-RTGs	Multimodal	Mains-powered RTGs transfer the power generation from the engine of the yard crane to a far more efficient power station. Power station can be up to 40% more efficient than equipment engine.	X			Technology applicable in all terminals	1	0	-1	0	0	0
HT11	B	Cargo Cassette and Translifter	Maritime	Wheel less cargo cassette is a loading platform which is used together with a translifter in a cassette system. Translifter is a steerable lifting trailer which together with cassettes replaces roll trailers in Ro-Ro and StoRo handling.	X			Technology applicable in all terminals	0	0	?	?	0	0
HT20	C	BEX	Inland Waterways	Barge Express is an integrated concept for transport for automated handling of large scale barge container at terminals				Technology not relevant the whole corridor						
HT24	C	FCT	Maritime	The Floating Container Terminal collects and distributes containers originating from small calls, and bundles these currents with containers	X			???						

Heating and cooling

ID	Cat.	Technology Name	Technology Name	Description	Applicability				Influence on KPIs					
					MC	A	B	Detailed segments and nodes	CO2	SOx	Cost	T. Time	Freq.	Rel.
HC02	B	Intelligent unit	Multimodal	Refrigerated boxcars will be built with energy efficient cooling systems, GPS tracking, fresh air exchange and the ability to remote monitoring the systems. RFID (Radio Frequency Identification) for tracking services are the main support.		X		Technology applicable on branch A	1	0	-1	0	0	0

Vehicles

ID	Cat.	Technology Name	Technology Name	Description	Applicability				Influence on KPIs					
					MC	A	B	Detailed segments and nodes	CO2	SOx	Cost	T. Time	Freq.	Rel.
VE02	A	NS 999 Electric Locomotive	Railway	NS 999 is an entirely electric locomotive that uses a lead-acid energy storage system without the use of a diesel engine and with zero exhaust emissions.		X		Technology applicable on marshalling yards	2	1	-1	0	0	0
VE03	A	M2eHybrid Freightliner	Road	Support engine plus auxiliary drive to operate an elevating platform of the truck; combination of 6 cylinder engine plus electrical engine		X		Technology applicable on branch A	1	0	-1	0	0	0
VE09	A	Battery-electric vehicles	Road	Battery-electric vehicles		X		Technology applicable in all terminals	1	0	-1	0	0	0
VE10	A	Euro VI vehicles	Road	Euro VI is compulsory for new trucks from 2013, replacing Euro V		X		Technology applicable on branch A	0	0	-1	0	0	0
VE01	B	Hybrid Locomotive	Railway	Hybrid Locomotive was developed with the goal of creating the cleanest, most fuel-efficient high-horsepower diesel locomotive ever built.		X		Technology applicable in Klaipeda-Minsk segment and marshalling yards	1	0	-1	0	0	0
VE25	B	Braking energy recovery	Railway	Reversible DC Substation for recovering of dynamic braking energy and restitution to national grid		X		Technology applicable in St.Petersburg-Moscow segment	2	0	-1	0	0	0

Navigation technologies

ID	Cat.	Technology Name	Technology Name	Description	Applicability				Influence on KPIs						
					MC	A	B	Detailed segments and nodes	CO2	SOx	Cost	T. Time	Freq.	Rel.	
NA02	A	Automatic Identification System (AIS)	Maritime	Ship-to-ship, ship-to-shore and shore-to-ship system. Main purpose is collision avoidance, ship tracking and tracing. Works on VHF (Very high frequency, 30–300 MHz) radio frequency.	X			Technology already applied on main corridor							
NA15	A	WiMax	Maritime	Worldwide Interoperability for Microwave Access. Long range, high bandwidth wireless Internet	X			Technology already applied on main corridor							
			RailwayRoad			X		Technology applicable on branch A (Road)	1	0	-1	1	1	0	
NA01	B	Train Control System	Railway	Train control and tracking system based on a special GPRS method.		X		Technology applicable on branch A	1	0	-1	1	1	1	
NA05	B	ECDIS	Maritime	An Electronic Chart Display and Information System (ECDIS) is a computer-based navigation information system that can be used as an alternative to paper nautical charts. Integrates position information from GPS and other navigational sensors (radar, AIS). It may also give Sailing Directions and fathometer.	X			Technology already applied on main corridor							
NA09	B	Radarsat 1 and 2	Maritime	Canadian earth observation satellite that monitors environmental changes and the planet's natural resources. Equipped with a synthetic aperture radar (SAR), it acquires images of the Earth day or night, in all weather and through cloud cover, smoke and haze. Can enhance marine surveillance, ice monitoring, disaster management, environmental monitoring, resource management and mapping	X			Technology already applied on main corridor							
NA12	B	GEO satellites	Maritime	Geosynchronous Satellite whose orbital track on the Earth repeats regularly over points on the Earth over time. If such a satellite's orbit lies over the equator and the orbit is circular, it is called a geostationary satellite.	X			Technology already applied on main corridor							

Navigation technologies

ID	Cat.	Technology Name	Technology Name	Description	Applicability				Influence on KPIs						
					MC	A	B	Detailed segments and nodes	CO2	SOx	Cost	T. Time	Freq.	Rel.	
NA13	B	LEO satellites	Maritime	A low Earth orbit (LEO) is generally defined as an orbit within the locus extending from the Earth's surface up to an altitude of 2,000 km. Given the rapid orbital decay of objects below approximately 200 km, the commonly accepted definition for LEO is between 160 - 2,000 km (100 - 1,240 miles) above the Earth's surface.	X			Technology already applied on main corridor							
NA14	B	Inmarsat	Maritime	British satellite telecommunications company, offering global, mobile services. It provides telephony and data services to users worldwide, via portable or mobile terminals which communicate to ground stations through eleven geosynchronous telecommunications satellites.	X			Technology already applied on main corridor							
NA16	B	ATM	Inland Waterways	The advising Tempomaat (ATM) is a computer program advising the skipper on the most economical combination of route and speed, enabling the vessel to arrive on time with a most efficient use of fuel leading to a reduction of fuel consumption and emissions.				Technology not relevant the whole corridor							
NA07	C	Global Navigation Satellite Systems or GNSS	Maritime	Global Navigation Satellite Systems (GNSS) is the standard generic term for satellite navigation systems ("sat nav") that provide autonomous geo-spatial positioning with global coverage. GNSS allows small electronic receivers to determine their location (longitude, latitude, and altitude) to within a few metres using time signals transmitted along a line-of-sight by radio from satellites.	X			Technology already applied on main corridor							
			Railway			X		Technology applicable on branch A	1	0	-1	1	0	1	
			Road			X		Technology applicable on branch A	1	0	-1	1	1	1	
NA11	C	LRIT	Maritime	The Long Range Identification and Tracking (LRIT) of ships. Consists of the ship borne LRIT information transmitting equipment, Communications Service Providers (CSPs), Application Service Providers (ASPs), LRIT Data Centers, the LRIT Data Distribution Plan and the International LRIT Data Exchange.	X			Technology already applied on main corridor							

Best practices

ID	Cat.	Technology Name	Transport Mode	Description	Applicability				Influence on KPIs					
					MC	A	B	Detailed segments and nodes	CO2	SOx	Cost	T. Time	Freq.	Rel.
BP04	A	Traffic Flow Management	Railway	A system for online optimization of rail traffic flow to have minimum delays and minimum energy consumption, developed by Emkamatik on behalf of SBB		X		Technology applicable on branch A	2	0	-1	1	0	1
BP07	A	Carbon-free rail freight transport	Railway	DB Schenker Rail replaces the electricity required for your freight transport with regenerative energy that comes 100% from renewable sources in Germany. This helps to avoid carbon emissions right from the outset. Even the smallest quantities can be transported in this way without carbon emissions, on a national and international scale.		X		Technology not relevant on branch A						
BP02	B	TDS	Railway	Train Control System based on a GPS application method		X		Technology applicable on branch A	2	0	-1	1	0	1
BP03	B	GEKKO	Railway	A system to provide guidance to energy efficiency driving and timetable optimization, developed for Danish State Railways		X		Technology applicable on branch A	2	0	-1	1	0	0
BP08	B	Coaster Express (CoEx)	Maritime	Short sea transport concept directed to bundling the transport flows, scaling-up the short sea facilities and standardization and automation of the transition processes.	X			Technology applicable in all ports	?	?	?	?	?	?