

CASPIAN SEA – CLIMATE CHANGE

The Caspian Sea, which lies between Europe and Asia, has been slowly evaporating over the past two decades due to rising temperatures associated with climate change

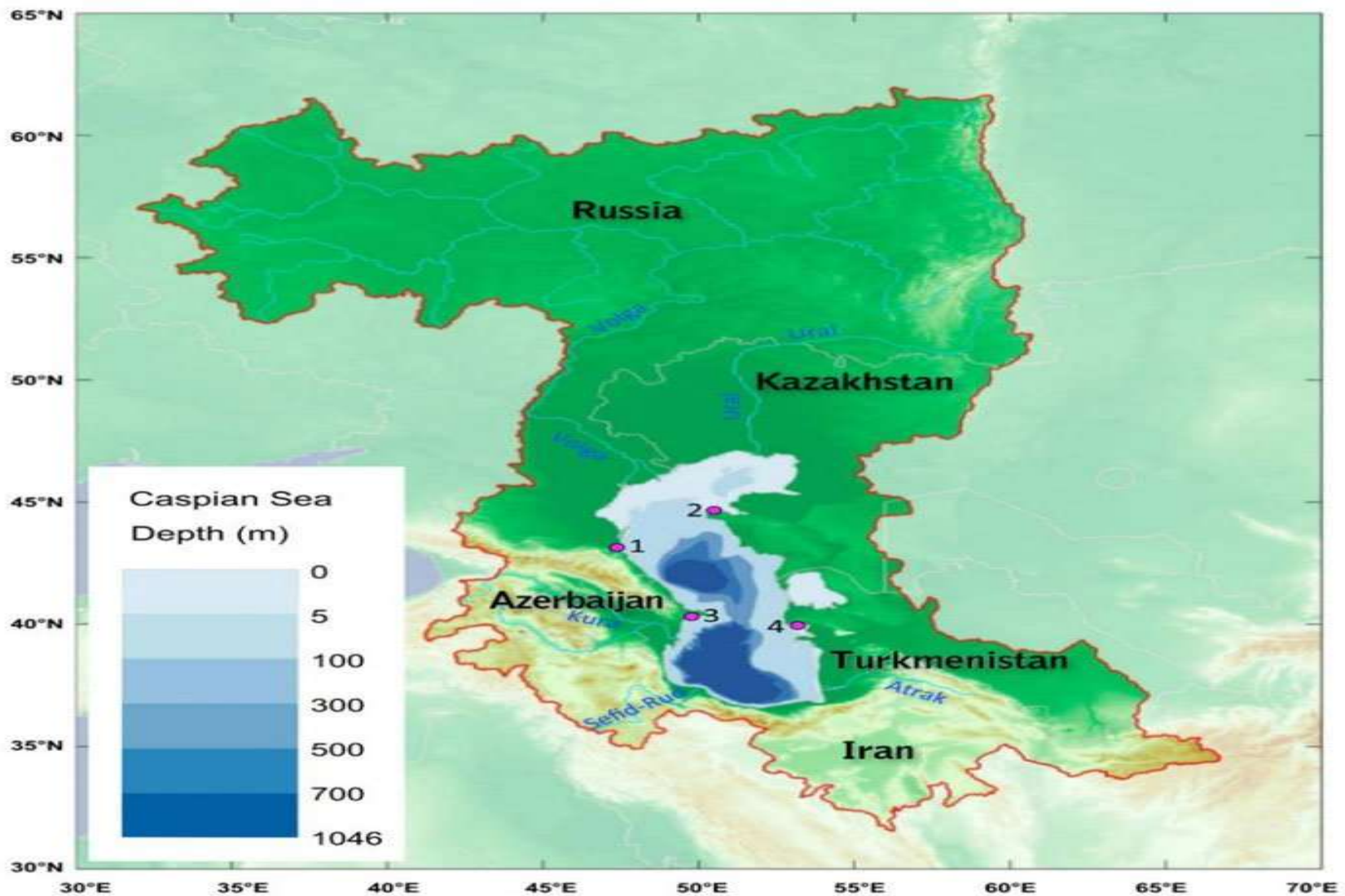


The Caspian Sea as seen from the International Space Station in 2015. A new study finds water levels in the

Caspian Sea

Evaporation has more of an impact than gains made from rainfall or water flowing into the Caspian Sea from 130 rivers surrounding the sea.





The studies have shown that under current climate models, the evaporation cause the northern waters of the Caspian vanish within 75 years.



Trade and Transportation Networks in the Caspian Region *Port of Baku at The Age of Connectivity*



Phased Port Development



The First Phase of PORT development

- 2 ferry berths:** 6,2 million tons
- 2 Ro-Ro berths:** 1,8 million tons
- 7 general cargo berths:** 7 million tons
- 1 Service berth**

Total throughput capacity:

15 million tons,
including 100 000 TEU

The max draught of berths and channel: -6.6m (can go up to -9.9m)



The Second Phase of PORT development

- 2 Ferry berths:** 6,2 million tons
- 5 Container berths:** 10 million tons
- 7 General cargo berths:** 7 million tons
- 2 Ro-Ro berths:** 1,8 million tons
- 1 Service berth.**

Total number of berths: 17

Total throughput capacity: 25 million tons,

including 500 000 TEU



GREEN PORT OF BAKU

Vision

Port of Baku aims to be the leading green port operator in terms of efficiency and sustainability to achieve the lowest ecological footprint and environmental impact to the region.






Strategy

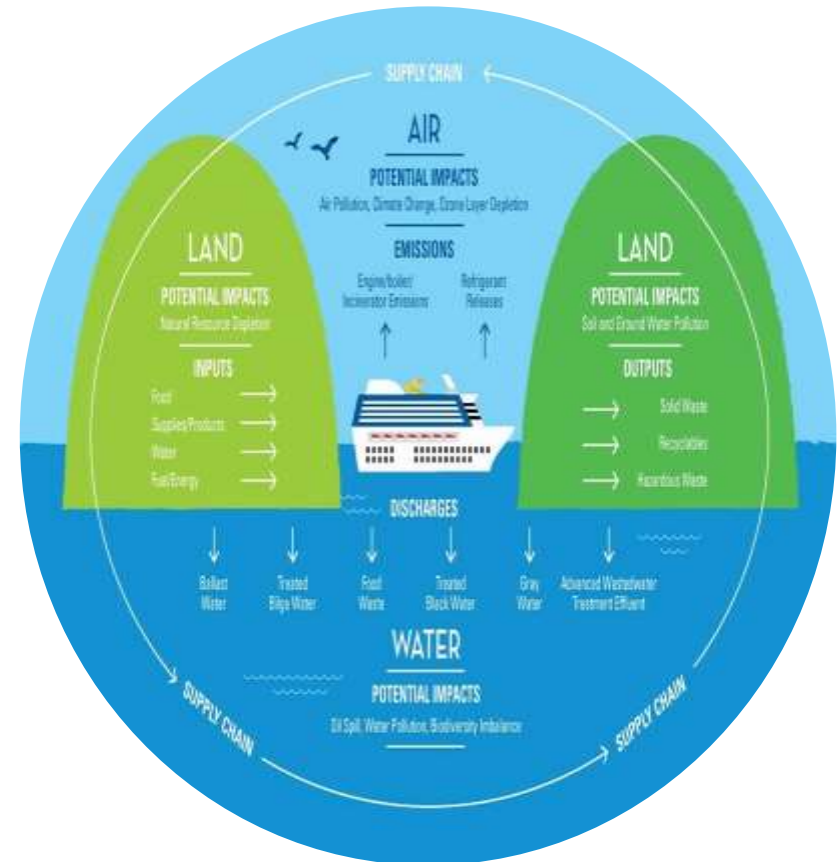


Development of a green port program to achieve continuous **environmental , social and economic benefits** via the following guiding principles



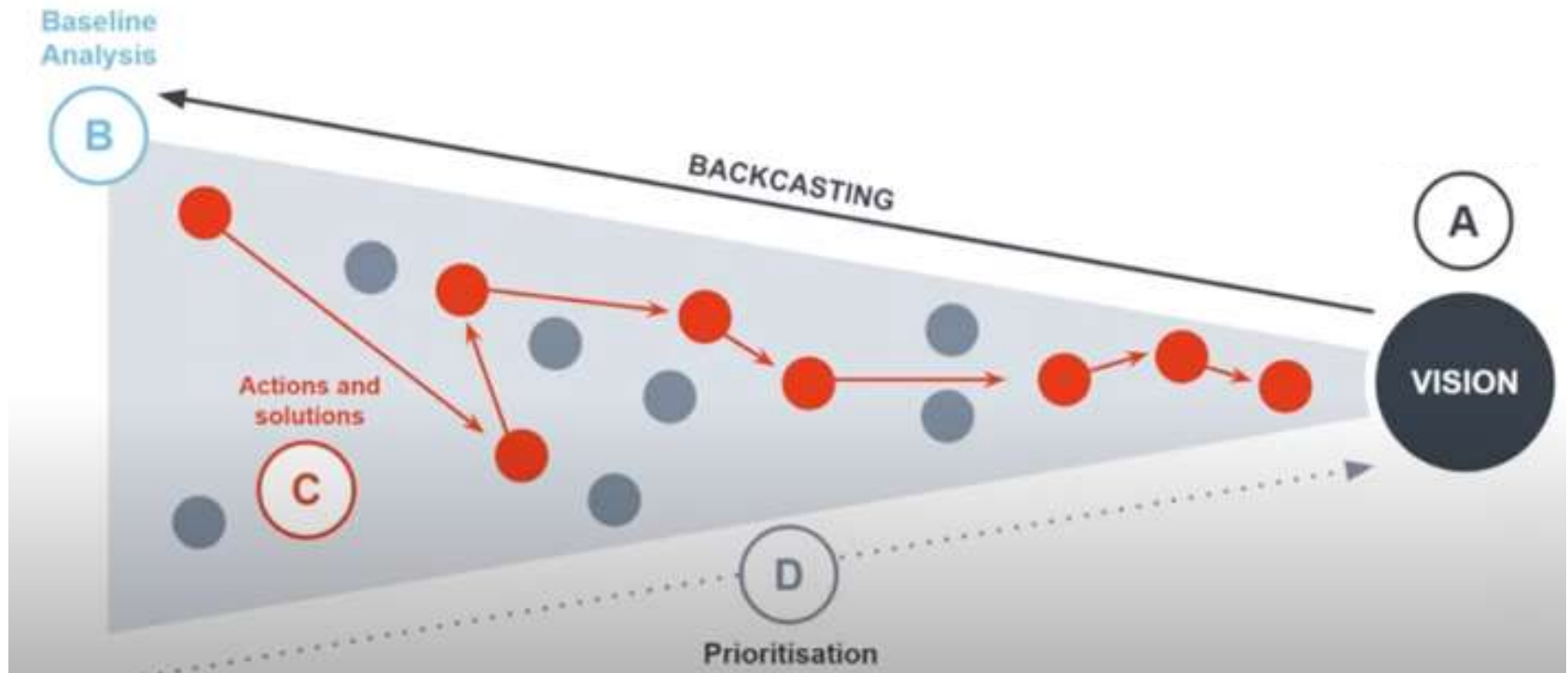
GUIDING PRINCIPLES

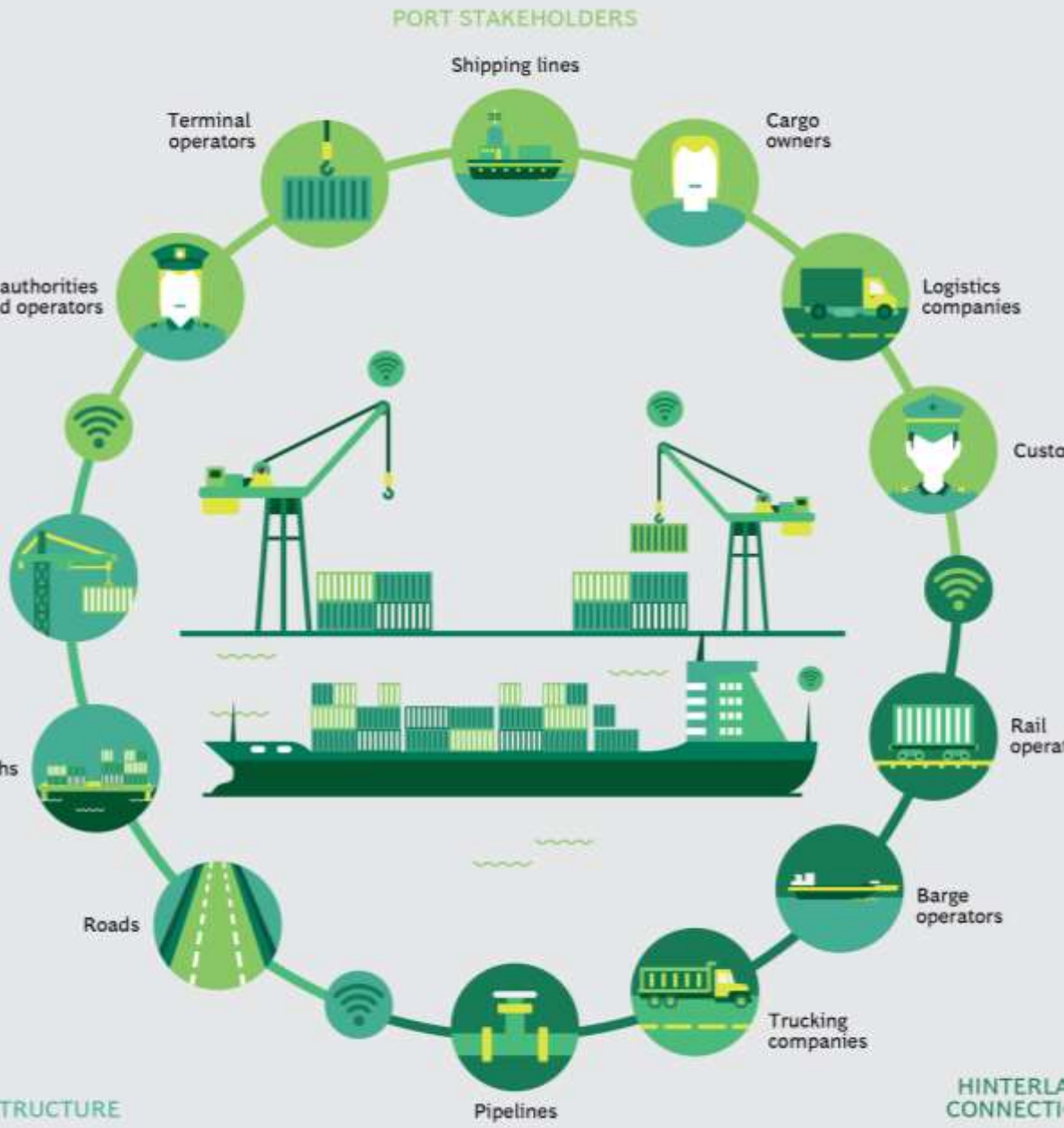
-  Promote sustainability in terminal design, development and all operations
-  Employ the best available technology to minimize port impacts and explore advanced technology solutions;
-  Protect the local community and environment from the harmful impacts of port operations;



Strategic Roadmap

Full decarbonization by 2035





DEVELOPING CLIMATE STRATEGY

■ Port Ecosystem and Stakeholders





**DEVELOPING
CLIMATE
STRATEGY**

Strategic Goals

- Reduction of port-related energy consumption and development of renewable energy and clean fuels
- Engagement and work with stakeholders to reduce GHG emissions (e.g. sea vessels, rail locomotives)

Framework for analysis of short, medium, long term climate actions



- Investments costs
- Technology Maturity
- Implementation plan for each action

CLIMATE ACTION PLAN



ONGOING PROJECTS

- **Climate
Action Plan**



Water Quality

Existing facilities for waste water treatment

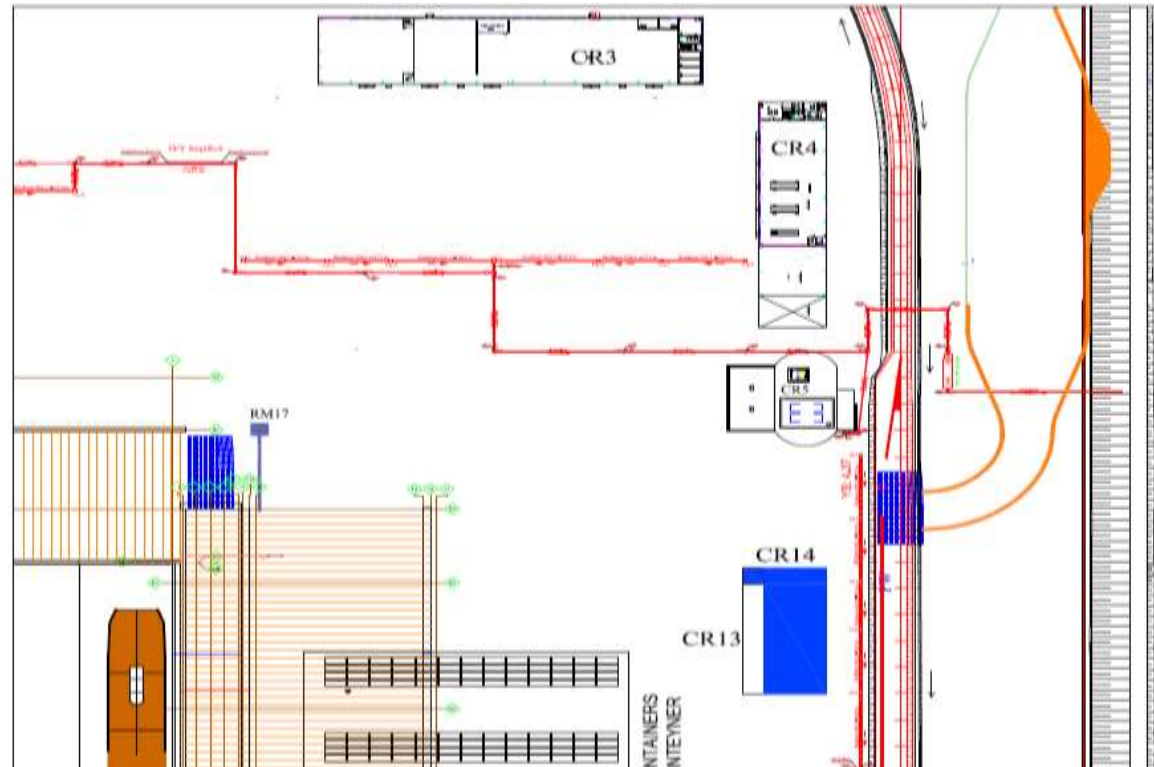
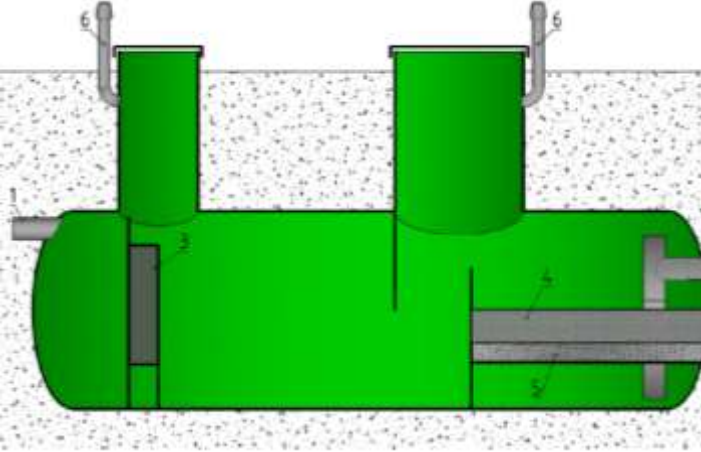
- 💡 A storm water drainage and treatment system
- 💡 A Sewage Water Treatment Plant (SWTP)
- 💡 An Oily Waste Water Treatment Plant (OWWTP)

In addition: Waste collection vessels



STORM WATER DRAINAGE AND TREATMENT SYSTEM

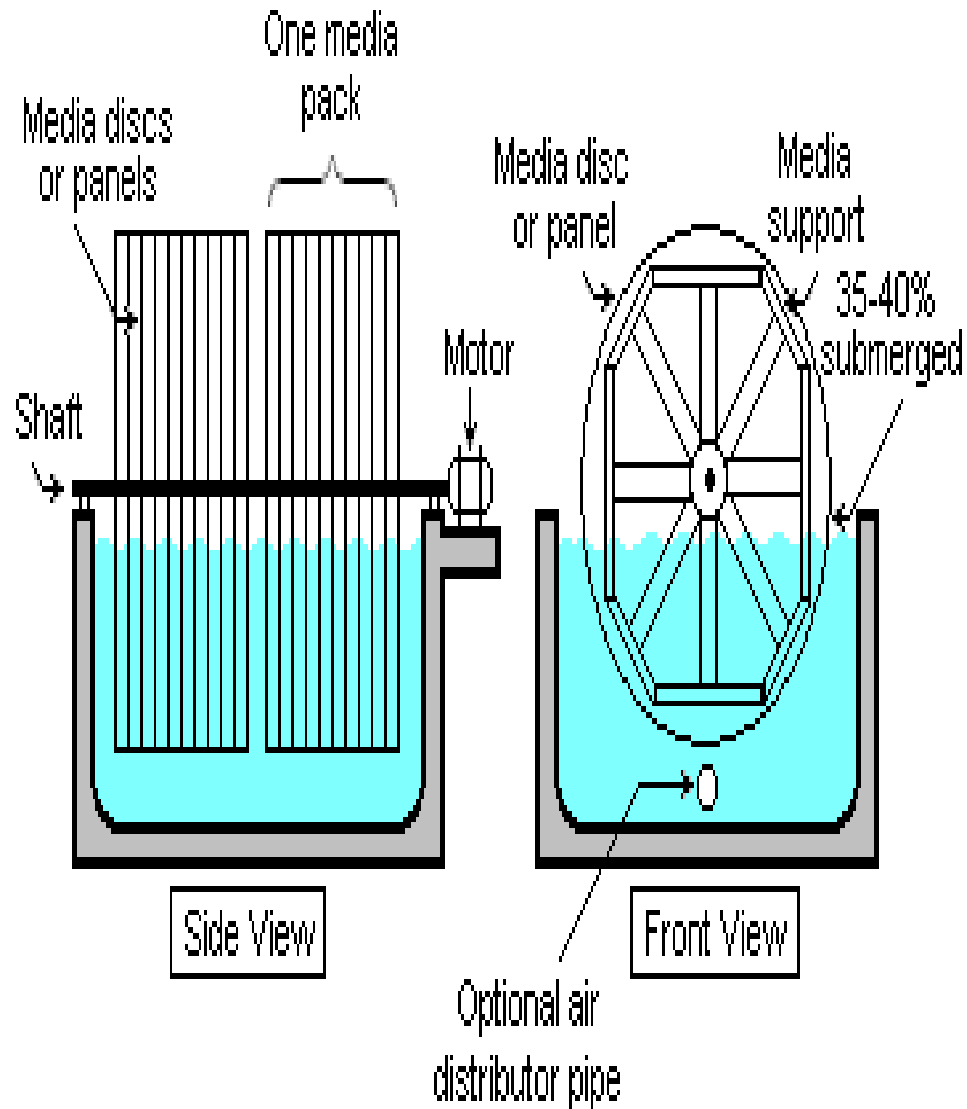
- Storm water is collected in all run-off areas and treated via **oil/water separators equipped with sediment traps** to prevent particulates (e.g. that could be released in handling of dry bulk) from reaching the surface water.
- Designed to **trap sand, suspended and floating substances** from surface and industrial wastewater.



SEWAGE WATER TREATMENT PLANT (SWTP)

- to treat sewerage from vessels and from land-based port operations.
- 5 modules and a sand filter
- capacity: 500 m³ per day to cater for 2500 people with potential to add new modules as and when required





SEWAGE WATER TREATMENT PLANT (SWTP)

- **Rotating Biological Contactor(RBC)**
- Disks which first submerge (40 % of the disks remain in wastewater) in wastewater are then contacted with air.
- As a result of this repetitive process, organisms accumulate on the disks in the course of time, receive oxygen from the air during rotation of the disks, consume the pollutants existing in the wastewater, and convert them into carbon dioxide and water naturally
- separate the water and solid particles from each other by mechanical filtration and precipitation,
- Recycled water for irrigation and sludge as a natural fertilizer.





OILY WASTE WATER TREATMENT PLANT

(UNDER COMMISSIONING
OPERATIONAL DATE WILL BE
DECEMBER 2022)



Source

- Oil-contaminated ballast water
- Washing of warehouses
- Treated water: 0.05 mg/l is stricter than the MARPOL requirement 15 mg/l



Capacity

- Total capacity of 3 tanks is 900 m³





OILY WASTE WATER TREATMENT PLANT FULLY AUTOMATED CLEANING STATION

Benefits of Galaxie Tower and Affinity Separator

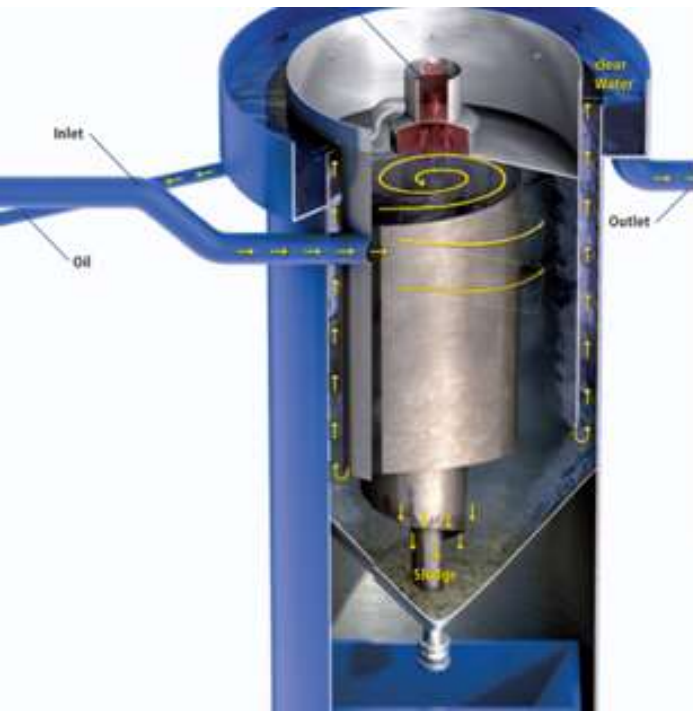
- ✔ Maintenance free and space saving – the economic investment
- ✔ Separates simultaneously sludge and oil

Combining physical and biophysical movement, adhesion and affinity forces, smallest free oil droplets and temporary emulsions are separated from the water without adding chemicals.

- ✔ Separated pollutants are automatically drawn off

✔ Uses of recycled matter

- Recycled treated water used as industrial water
- Recycled oil used in production of asphalt



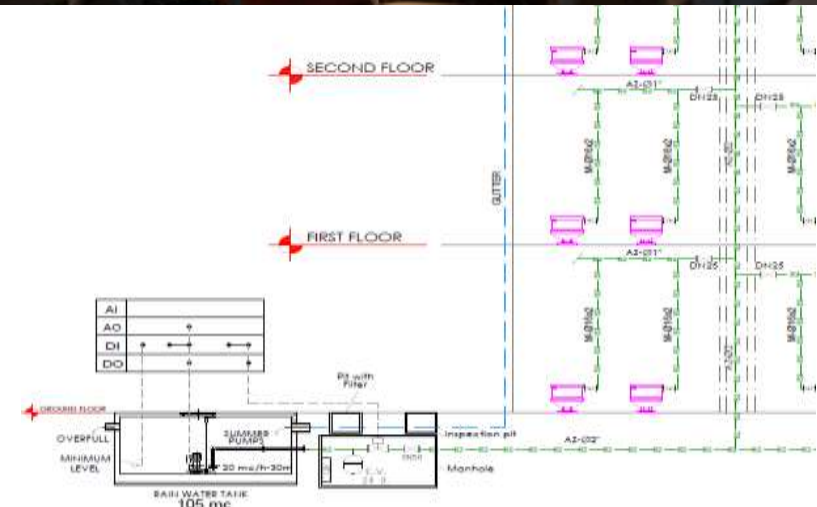
GREEN OPERATION BUILDING PROJECT EMPLOYING VARIOUS EFFICIENT TECHNOLOGIES TO REDUCE CARBON FOOTPRINT

Technology used

Benefits

- Water management - rainwater recovery
- Green cladding and facade of building
- Fresh air monitoring and ventilation
- Building management systems & building Alarm Control and Acknowledgement

- ⑩ energy saving up to 30%
- ⑩ recover potable water saving up to 35 %
- ⑩ Increased production and employee efficiency



REDUCING AIR POLLUTANTS

Continuously monitoring carbon monoxide, sulfur dioxide, nitric oxide, hydrogen sulfide, benzene, toluene, ethyl benzene, methaxylol, ortho-xylene, PM 2.5, PM 10) levels has been within the norm.

the portable devices provided by Ministry of Ecology and Natural Resources and exhaust gas analyser in the framework of JICA “Mini Grant Projects”



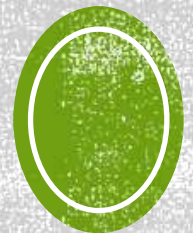
№	Area	Çirkləndiricilərin adı, mq/m³										
		Benzol	Toluol	Etil-benzol	Meta-ksilol	Orto-ksilol	Dem qazı	Azot-4 oksid	Kükürd qazı	Hidrogen-sulfid	PM 2.5	PM 10.0
1	8-ci körpü "Silk Way" gəmisi	0.325	0.228	0.012	0.117	0.061	2.2	0.06	0.029	0.002	0.010	0.045
2	Ck 8 cargo ərazisi	0.266	0.099	0.005	0.081	0.023	2.0	0.07	0.038	0.001	0.013	0.037
3	8-ci körpü şərqə 1 km	0.405	0.047	0.007	0.088	0	2.3	0.08	0.041	0.003	0.009	0.028
4	8-ci körpü qərbə 1 km	0.291	0.118	0.011	0.116	0.067	3.4	0.06	0.037	0.003	0.023	0.033
5	Ck 8 cargo ərazisi 1 km	0.335	0.120	0.006	0.033	0.089	3.0	0.04	0.052	0.04	0.018	0.019
6	Ck 8 cargo ərazisi 1km	0.460	0.076	0.015	0	0.052	3.2	0.02	0.049	0.006	0.019	0.012
	Permissible limit	1.5	0.6	0.02	0.2	0.2	5.0	0.085	0.5	0.008	0.025	0.050





MEASURES TAKEN FOR REF CONTAINERS

usage of electrical plugs instead the diesel

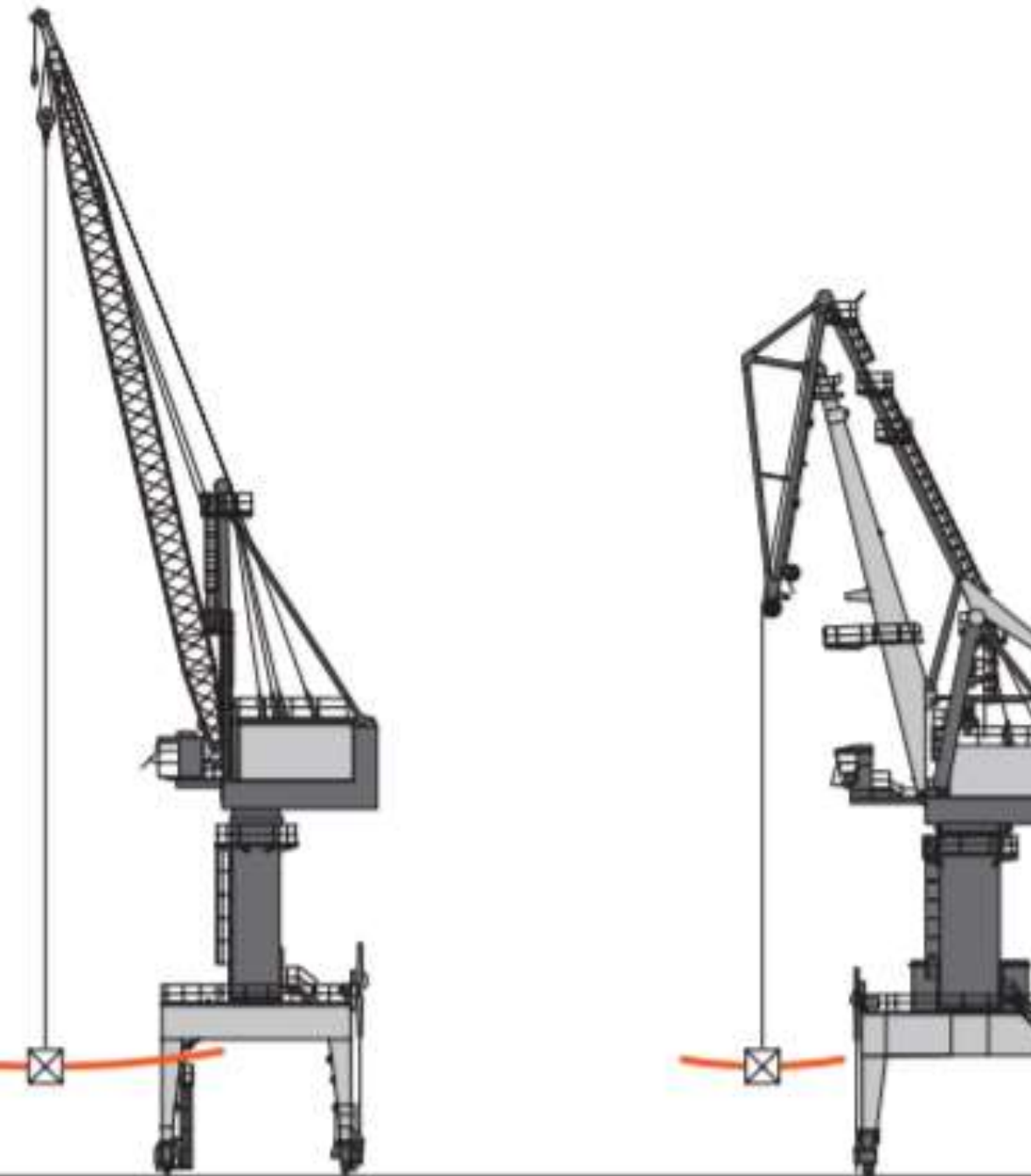


- A total of 26 cold ironing junction boxes in General Cargo, RORO, Ferry and Service berths

Cold ironing is also referred as “shore power” . The term cold ironing comes from the act of shutting down all onboard combustion, resulting in the vessel going “cold” and connecting to electrical power supplied at the dock.

this process eliminates virtually all emissions from a ship while it is in port. Other environmental impacts like noise and vibration are significantly reduced too.





Ardelt Cranes: Energy Saving Design

- ✦ Intelligent energy management system with recovery;

Savings of up to 30% can be achieved compared with electric systems with no recovery.

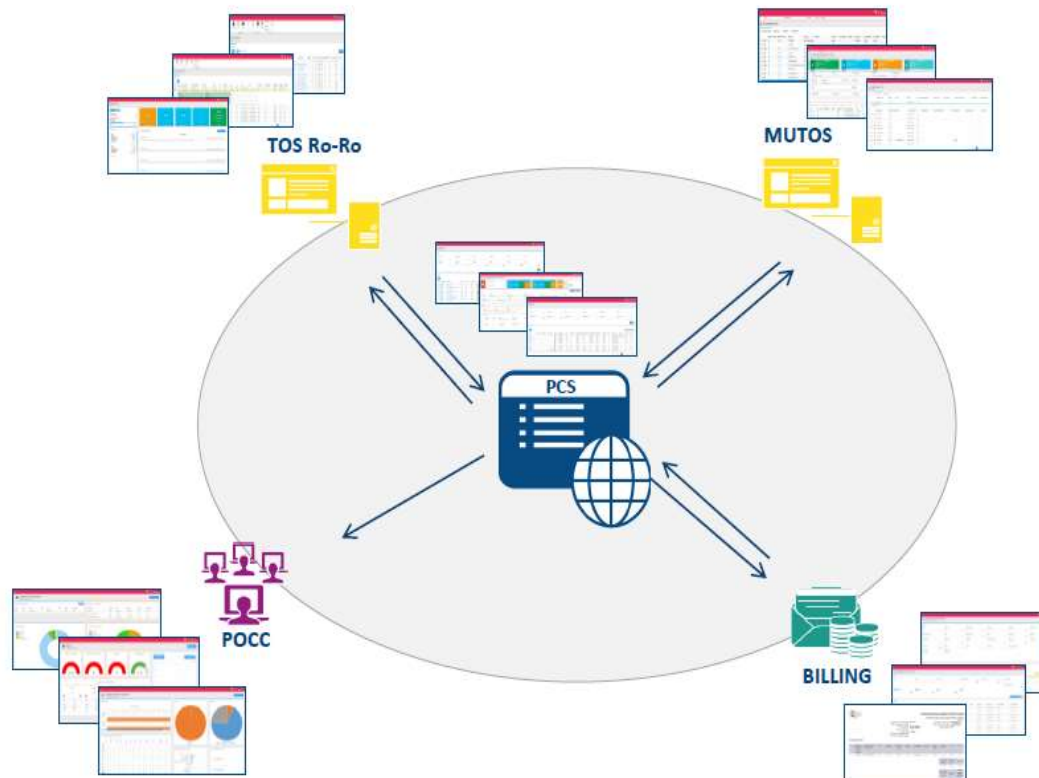
- ✦ Boom tip remains at the same height and close to the load, achieving horizontal load path. The lifting mechanism does not perform any additional, unwanted movements.

Saves lifting-mechanism energy



DIGITISATION OF WORK PROCESSES

A COMPLETE SOLUTION FOR THE PORT OF BAKU



Developed Modules

Integrated web based solution developed with new technologies for multi port/terminal usage.

Main Modules:

- **Port Community System (PCS),**
- **Terminal Operating System for Ro-Ro (TOS Ro-Ro)**
- **Terminal Operating System for Multiuser Terminal (MUTOS)**
- **Billing Module (BILL)**
- **Port operational Control room (POCC)**



CONTROL ROOM



GREEN PLANNING CREATION OF GREEN ZONES

- Green zones created : north and west of the port, along the coastline and around the shunting yard.



The Green Zones to:

- enable soil enrichment
- moderation of the microclimate in the area to have more positive impact on the surrounding semi-desert landscape.
- Development of “Action on planting 100.000 trees” for implementation in Alat area by 2025



Green Planning

video



▪ ***An overarching umbrella project:
integrated green eco-system showcase
(pilot)***

- floodwater redirection to be used in irrigation, which in turn can serve deforestation
- Development of “Action on planting 100.000 trees” for implementation in Alat area by 2025
- waste water treatment which results in cleaned water and this water can be used for irrigation, ammonia production, etc.
- hot houses to use the compost from the wastewater treatment

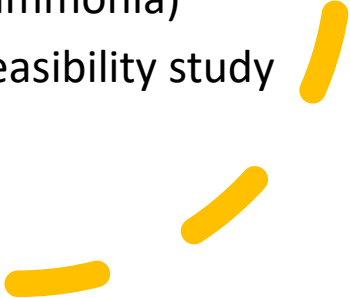




POTENTIAL FUTURE PROJECTS

Renewable energy

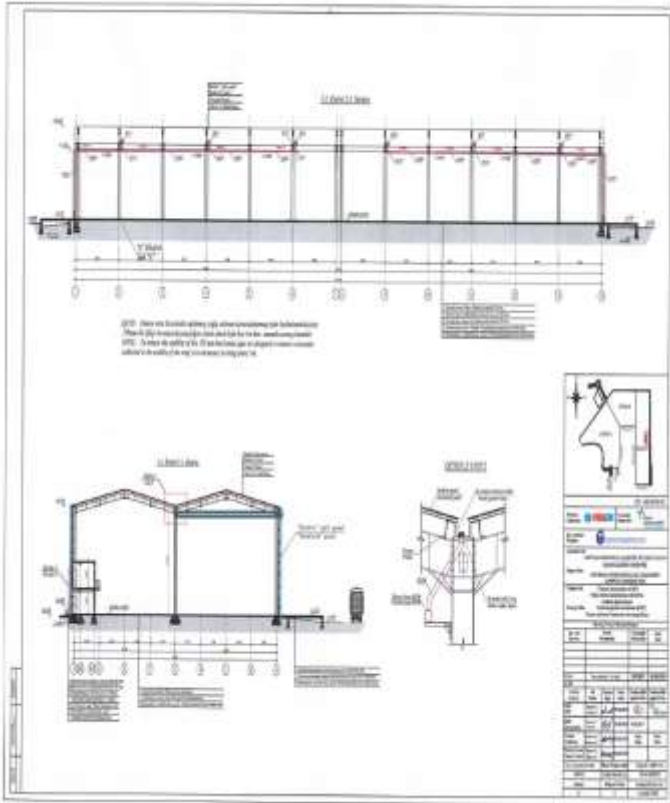
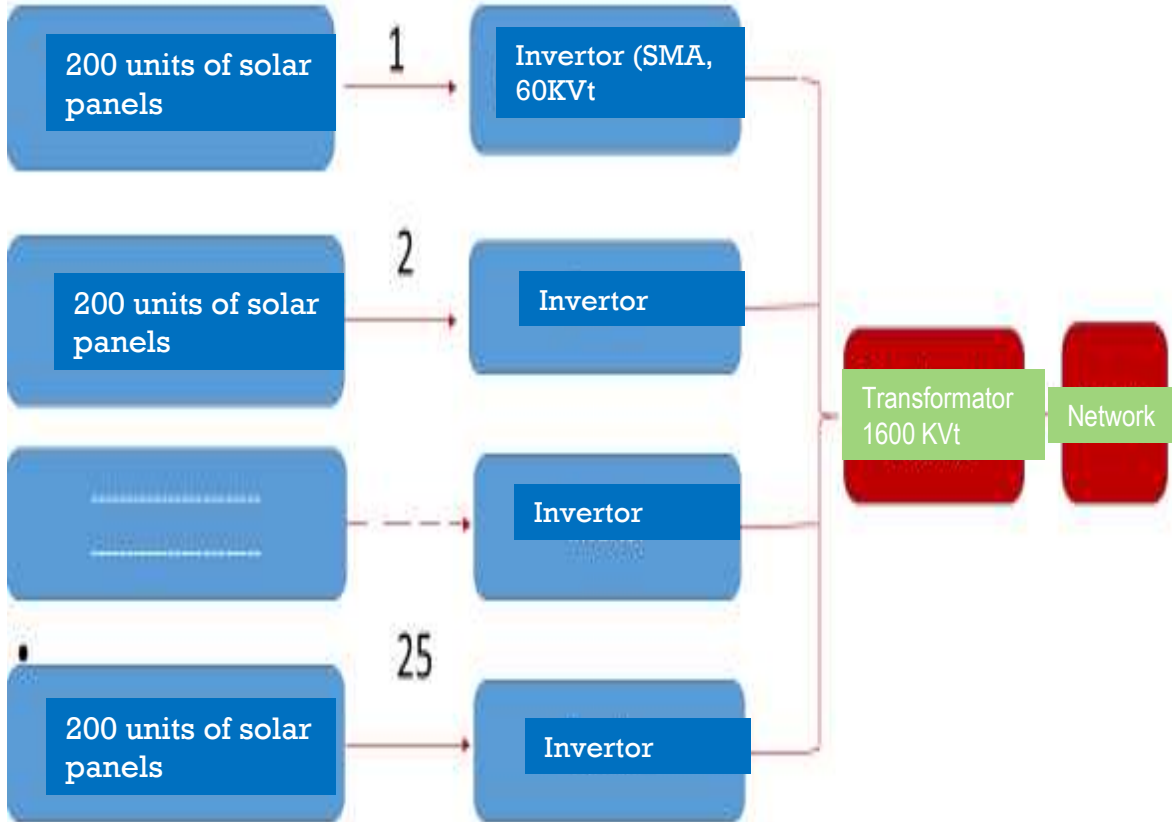
Fuels and alternative power systems

- Solar / Power energy to cover the whole demand (incl. peak demand) needed by the Port as result of electrification of port infrastructure
 - 10-12 MW of installed power might be needed to cover the port energy demand by 2035
 - Potential production of green NH₃ (ammonia) with actions for the PoB to conduct a feasibility study on this option in details in the future
- 

SOLAR PANELS ON WAREHOUSES



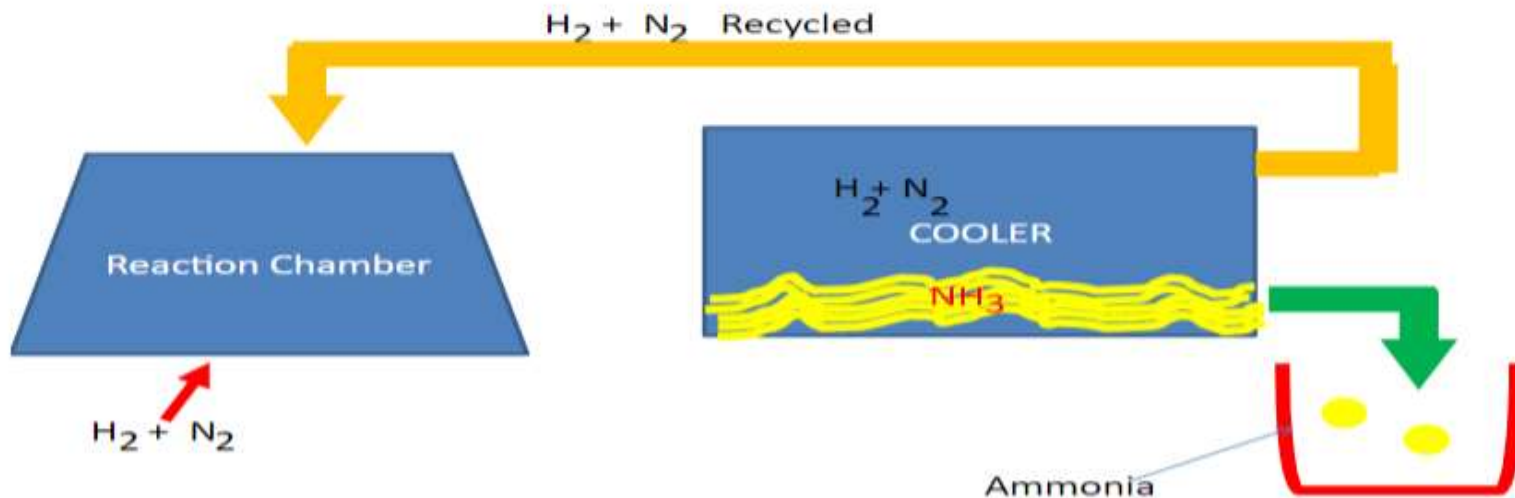
Area: 10 000 m²
Number of solar panels:
5040 units



Carbon Projects

Making use of renewable energy in the context of the Port: Usage of wind power to use electrolysis to make ammonia

The Haber Process



- to make ammonia from water and Nitrogen (Conventional Haber -Bosch process to create ammonia. supplying power for electrolysis.)
- Ammonia is made from graywater, which is the effluents from residential sinks, showers, and floor drains. The treated effluent from sewage plants could be used as well.



Carbon Projects

Making use of renewable energy in the context of the Port: Usage of wind power to use electrolysis to make ammonia



- ✦ Using wind power to strip water of its hydrogen produces no carbon dioxide. It does, though, produce pure medical grade oxygen, a valuable and marketable product
- ✦ One turbine can produce 3300 dollar worth of ammonia per day with the only feedstock for the process being water.
- Projected Wind Turbines – T1, T2, T3, T4, T5, T6
- Each turbine's power capacity: 2.5-3.5MW;
- All Wind Turbines: 15-21MW
- Meteorological mast should be in Wind Turbines area.



USAGE OF DIESEL FUEL TREATMENT PRODUCTS

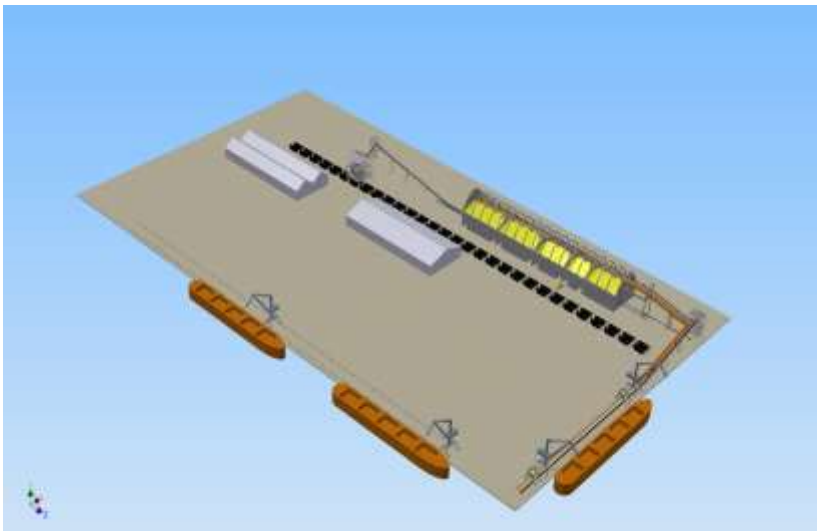


- an additive to the fuel which allows to reduce the fuel consumption and minimize emissions. pouring directly into fuel tank, then filling with fuel
- is effective for all diesel vehicle, marine, stationary and generator engines.



- addition of this catalyst decreases emission of sulphur oxides 7 times, additional 200 miles per fill-up in trucks (up to 25% increase in milage),
- “radically lowered the bearing temperatures, keeping the grinders operating efficiently
- is also being used in the hydraulic lube network and in stand-alone applications on timing systems in bearings in the massive grinders.

Fertilizer Terminal – Project Background



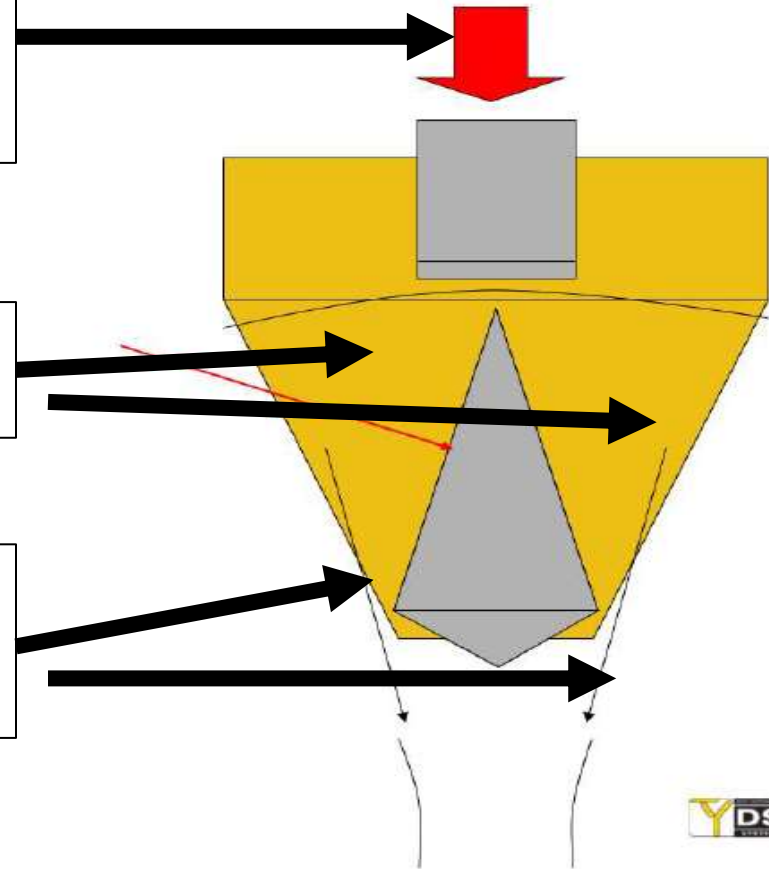
- The Government of Azerbaijan intends to build a fertilizer terminal in the Port of Baku to act as a major transshipment hub in the Black Sea and Caspian Sea regions for Central Asian fertilizer products.
- The terminal will be located on the South side of the Eastern Quay with an annual handling capacity of 2.5-3 million tons .
- All investment is done by the Government of Azerbaijan/PoB, including two storage warehouses (60,000 tons), two cargo (un)loading cranes (32 ton), two quay conveyor system (600 tons/hour) along the whole length of the berth, so that each of the warehouses have a dedicated intake system and a **dedicated train loading station**.
- The following estimations have been made on the measures of the fertilizer terminal based on the masterplan drawings:
 - ✓ **Total area: 34,000 sq m**
 - ✓ **Annual Throughput Capacity: 2.5-3 million tons**
 - ✓ **Two conveyer belt system (600 t/h)**
 - ✓ **Bulk storage capacity: 60,000 tons**
 - ✓ **The train loading station** with the outtake capacity of 600 tons/hour
 - ✓ **Quay cranes** – Two 32 t Ardel (Sokol) cranes
 - ✓ **Two railway tracks** (for loading of 50 hopper wagons)

Dust Suppression Hopper (DSH) system in the fertilizer terminal

Material enters from discharge of tripper car which fills the chute end with a pipe-shaped outlet

Material is transmitting to the reverse - cone-shaped structure (yellow)

Material is to exit in a straight line form rather than spreading. This allow to avoid dust.



Benefits

- No dust extraction system required
- Reduce maintenance and cleaning costs
- Increase capacity – less air = more product
- Safer working environment for your staff
- Reduce the risk of dust explosions



WHAT WE WANT TO ACHIEVE ?

- Reduction of CO2 emissions and negative environmental footprint.
 - Diversification of energy sources.
 - Reduction of costs by decreasing consumption of conventional energy.
 - Generate revenue from selling excessive energy from renewable sources.
 - Become an ambassador port for renewable energy in the region, which is added value for Port of Baku.
-
- **Necessity for external support**
-
- “Promoting Green Ports and Connectivity in the Caspian Region” project will support of government agen to employ renewable energy, achieve energy efficiency, and promote regional connectivity.



CERTIFICATE OF VERIFICATION



THIS IS TO CERTIFY THAT
THE DOCUMENTATION OF THE PORT ENVIRONMENTAL REVIEW SYSTEM OF:

Baku International Sea Trade
Port CJSC, Azerbaijan

HAS BEEN REVIEWED BY LLOYD'S REGISTER TO THE FOLLOWING
ENVIRONMENTAL MANAGEMENT STANDARD:

Port Environmental Review
System (PERS) version 5

THE SYSTEM IS APPLICABLE TO THE:

Activities, products and services
of the port authority

Certificate no: 206
Verification date: 13 August 2021
Expiry date: 12 August 2023

ON BEHALF OF ESPO

ON BEHALF OF
LLOYD'S REGISTER ROTTERDAM



Lloyd's Register
LRQA

A PERS certificate is the confirmation that the PERS requirements have been evaluated and met. However, because the review is based on third hand information, a PERS certificate is not a value judgement of the port environmental management system and its performance, since these have only been evaluated on the basis of documents supplied by the port.



ENVIRONMENTAL MANAGEMENT: PERFORMANCE & PROJECTS

Our Sustainability Policy established in 2019, directs us to integrate environmental, community and financial concerns into planning and performance.

- 🌿 ISO 14001:2015 **Certified**
- 🌿 ISO 9001:2015 **Certified**
- 🌿 OHSAS 18001: 2007 **Certified**
- 🌿 Eco Port **Certified** (*The Port of Baku is the first and only Caspian Eco Port.*)
- 🌿 Port Environmental Review System certification (PERS, certificate assessed by Lloyds register)



INTERNATIONAL COOPERATION ON SUSTAINABILITY INITIATIVES

Institution	Project	Results/Deliverables
EU	EU-funded TA project “EU Support Project to the Enhancement of Operational Capabilities of the Port of Baku” 16 January 2018- 15 April 2020	<ul style="list-style-type: none"> • Strategic Plan for the Port of Baku 2020-2022 was developed • Green Port/Sustainability Concept for POB together with Green Port Road Map for the short, medium and long-term was developed • POB obtained ISO 9001:2015 (Quality Management) and ISO 14001:2015 (Environment) and EcoPorts certification
	EU-funded TA project “EU Support Project to the Enhancement of Operational Capabilities of the Port of Baku -Phase 2” Nov 2020- June 2022:	<ul style="list-style-type: none"> • Establishment of the new Environment Monitoring System • Development of the “Net Zero Emission Climate Strategy 2035” • ISO 14001:2015 (Environment) and EcoPorts recertification • ISO 45001:2018 (Occupational Health and Safety) and ISO 50001:2018 (Energy Management) certification
OSCE	OSCE-implemented project “Promoting Green Ports and Connectivity in the Caspian Sea Region” (2019-2023) seeks to improve connectivity and sustainability on trade routes running from Asia to Europe through the Caspian Sea region.	In the Green Ports Work Stream, this involves the implementation of green ports principles, the integration of renewable energy and energy efficiency in port operations, and the establishment of Community of Green Ports between Asia and Europe.



INTERNATIONAL COOPERATION ON SUSTAINABILITY INITIATIVES

Institution	Project	Results/Deliverables
JICA	This project was funded from JICA Alumni Association budget in framework of JICA "Mini Grant Projects".	<p>The PoB became a winner of JICA Mini Grant projects competition in 2019. This device will support the PoB in applying appropriate measures to minimize/eliminate negative affect to environment by monitoring air emission from trucks.</p> <p>On February 2020, the official ceremony of transfer of portable engine exhaust gas analyser to the PoB was conducted.</p>
TAIEX Expert Mission	on Review Ship Waste Management Plan, 15-18 April 2019	Ship Waste Management Plan of POB was reviewed and recommendations on updating this document in line with Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives were provided.
TAIEX Expert Mission	on Improving the Air Quality Control System in the Port of Baku, 3-6 February 2020	PoB authorities were assisted to learn from the best EU system of air quality control in ports in order to increase their knowledge and good practice on preventing pollution from ships.
E5P	E5P – Eastern Europe Energy Efficiency and Environment Partnership- Solar Energy Panel Installation in the PoB area. Port of Baku is one of the selected project beneficiaries from the government of Azerbaijan.	The project is dedicated to the establishment of the roof and land solar energy panels in the Port area. The Project is currently on pre-feasibility stage.

