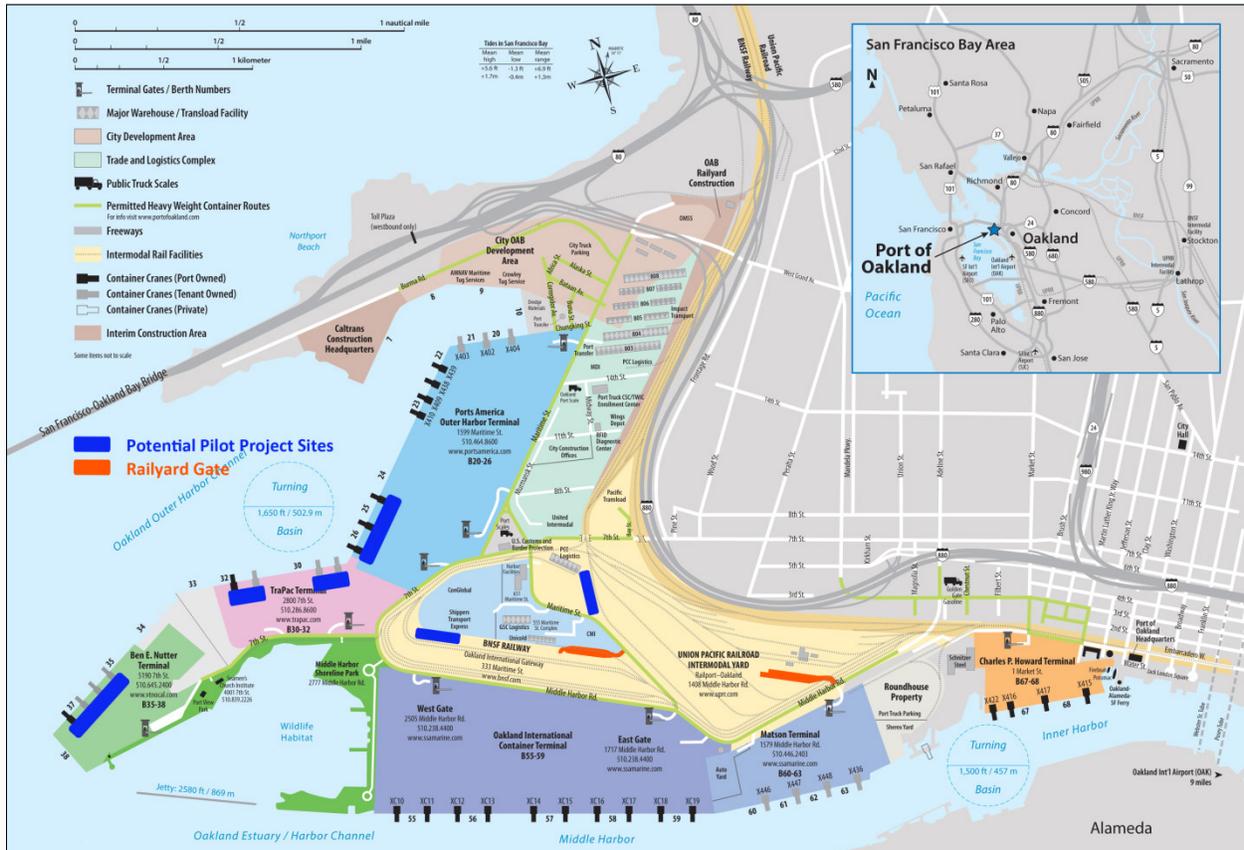


LEVX® Intermodal Freight Transport System: Port of Oakland



Pilot Project Ideas
California Sustainable Freight Action Plan

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California Sustainable Freight Action Plan: Pilot Project Ideas

1. Contact Information

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2. Project Title

Zero Emission LEVX® Intermodal Freight Transport System: **Port of Oakland**

3. Location of project

Port of Oakland, California, extending from a selected marine terminal such as Berths 30-32 at the TraPac Terminal, 35-38 at the Ben E Nutter Terminal or Berths 24-26 at the Ports America Outer Harbor Terminal.

Utilize some potentially vacant space between TraPac and Ben E Nutter terminals for a base of operation for the LEVX® pilot project

4. Executive Summary

The Port of Oakland owns approximately 1,300 acres of well-developed marine terminals, intermodal rail facilities and maritime support areas with 18 deepwater berths and approximately 770 acres of container terminals. However, while the Port's marine terminals and intermodal railyards are well developed, there is only one truck entrance to each rail yard oriented to the easterly ends of the yards. Trucks wishing to make deliveries into the railyards may become trapped in long lines with other drayage trucks.

A LEVX® Intermodal Freight Transport System (LIFT System) could enhance the Port's overall efficiency by providing direct connectivity between marine terminals and the Port's intermodal

railyards. Routing the LEVX® zero emission LIFT System as directly as possible between the most isolated marine terminals and the railyards will not only increase security and speed container delivery but reduce surface street congestion within the Port.

5. Detailed description:

Advanced technologies: LEVX® advanced technologies combine time tested, passive, magnetic suspension with highly efficient LEVX® propulsion and braking. The LEVX® system will also take advantage of state of the art energy storage, electric motor, power management and renewable energy technologies.

Alternative Fuels: LEVX® systems can be configured with any desired fuel source. Zero emission options include onboard battery, fuel cell and solar combinations. Near zero options include battery systems that are recharged in transit with onboard CNG micro turbine generators. Pilot project development could also include on site renewable energy supplies such as solar and wind power.

Freight and fuel infrastructure: Light weight, grade separated fixed guideway civil structure with LEVX® components installed and LEVX® freight carriages. Additionally:

- Power supply for battery charging
- Solar, wind or other infrastructure depending on the choices of the energy sources
- Intermodal facility infrastructure as needed in the railyard

Local economic development: New family wage job creation during construction and manufacturing activities for the pilot project followed by new ongoing jobs for the operation of LEVX® zero emission LIFT System. While LEVX® transportation systems may be fully automated; Phase 1 of this pilot project is planned to include individual carriage operators (drivers).

Long term impact on the efficiency of Port operations and increased velocity of freight through the Port would also have a positive economic impact on the region.

Advance goal of improving freight efficiency: Freight efficiency requires minimizing the handling, transferring and storage of freight containers. LEVX® zero emission LIFT System's bidirectional infrastructure is capable of transporting an initial 115,000 TEUs a year per port crane-shift. This pilot project is designed to:

- Prevent drayage truck backups at the marine terminals and railyards
- Minimize container stacking at marine terminals
- Transfer freight directly to and from the LIFT system without stacking whenever possible

- Free up land uses to support the growth of other port business
- Promote utilization of the nearby railroad connection

Transitioning to zero emission technology: Highly efficient LEVX® carriages allow for zero or near zero emission operation to extend the working range of current energy technologies.

Increase competitiveness of California freight system: A pilot project to showcase high capacity technology effectiveness and benefits to the wider California freight system. Increasing the velocity of freight movement through a port facility will attract freight owners who prefer to receive their shipments as quickly as possible. High velocity freight movement will also be essential to increasing the market for farm fresh produce. Highly efficient operations may also serve to lower the cost of freight.

6. Estimated cost for implementation and existing funding commitments:

Magna Force has received preliminary commitments to fund the 1+ lane mile guideway and up to 12 freight carriages from LEVX® supporters. A share of the intermodal freight facility and gate development could also be potentially funded by LEVX® supporters with an expectation for a long term payback.

7. Timeline

Magna Force is ready to begin site engineering for the pilot project. Site engineering, site preparedness and any required environmental studies must be completed early in the timeline.

Construction time for the guideway and manufacturing of carriages is complicated by existing and ongoing marine terminal and yard activities and may need to be limited to weekend only construction schedule or another coordinated schedule. Overall, project implementation might require a year or more to complete, depending upon the requirements of the marine terminal.

8. Measure of progress toward meeting goals over time

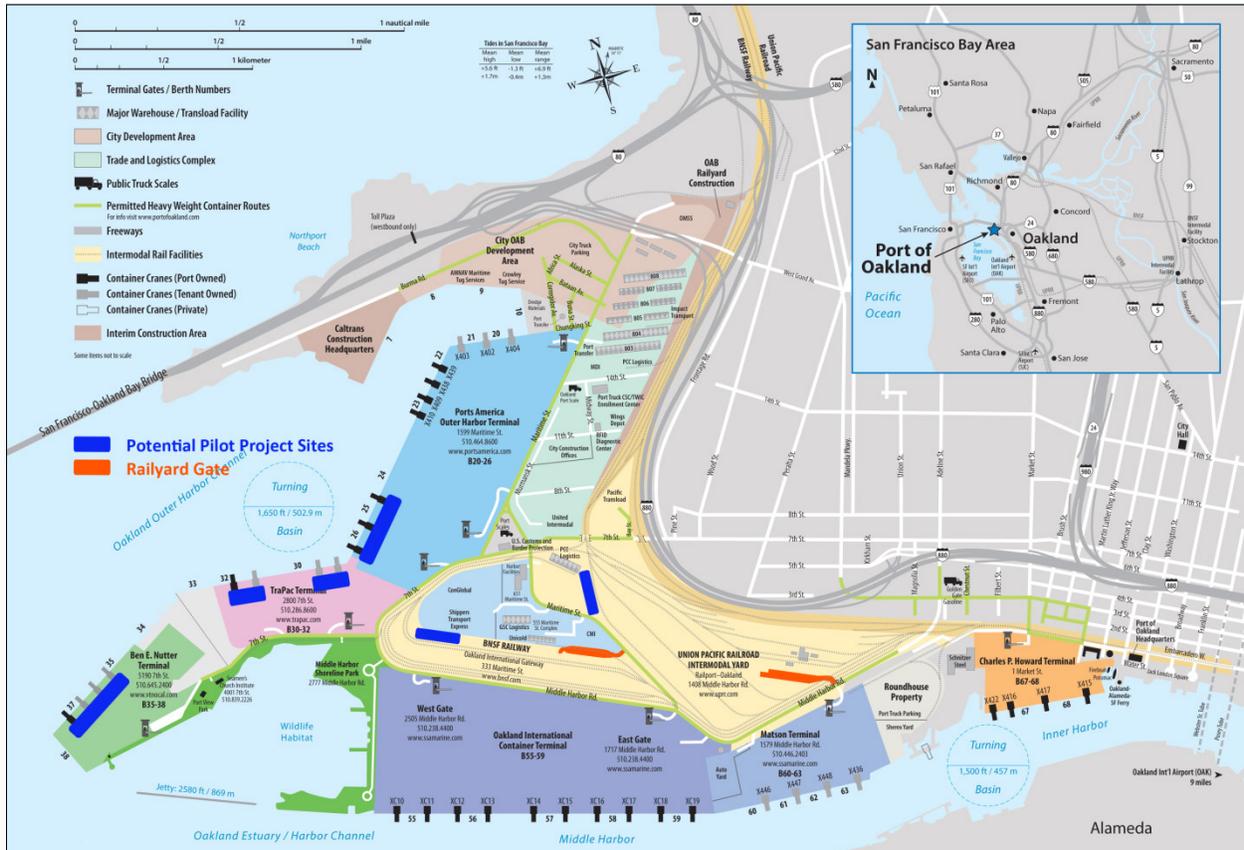
- Measure container/freight throughput at the distribution yard, year over year as a measure of economic growth

- Track time required to handle and store container freight within the port and distribution yard
- Track new job creation within the port and distribution yard related to the pilot project
- Meter electrical usage transporting containers via LEVX® versus comparable diesel truck miles and idle time to measure the benefits of high efficiency zero emission technology in the environment
- comparative cost analysis of electrical versus fueled energy supplies
- Measure battery life and range
- Measure benefits of coexisting technology pilot projects for a total impact

9. Potential roles of interagency partners to support the projects implementation

- Assistance with permitting, regulatory issues, requirements for environmental studies
- Agency support with identifying funding programs/grant writing including federal dollars to supplement private investment in the overall effort
- Progress monitoring and study, promotion and report writing, marketing of pilot project
- Expertise and advisory services in multiple arenas for pilot project
- Support for solar or other renewable energy infrastructure at site

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Sustainable Transportation Infrastructure for the Future

Sustainable development is a principal objective of all countries. Efficient transportation, industrial development and innovation are critical prerequisites to reducing poverty, creating decent jobs, ensuring food, energy and water security, delivering sustainable goods and services and raising living standards for all.

Transportation infrastructure is the foundation that connects a nation's businesses, communities, and people, driving its economy and improving quality of life of its citizen's. For an economy to be competitive in today's world it will need a first class transportation infrastructure system – one that will move people and goods efficiently and at reasonable cost, one that will conserve vital energy resources and one that can reverse the environmental and health impacts caused by today's transportation options.

Until now, our transportation systems have been unsustainable, adding to rapid global resource depletion, pollution, degradation of ecosystems and the threat of climate change, with potentially irreversible and disastrous consequences. To reduce exposure to the economic and environmental risks posed by the depletion of natural resources, all future industrial growth that developing countries are embarking upon needs to be accompanied by enhanced efforts to increase the productive use of natural resources and reduce wastes, pollution and emissions.

LEVX® freight and passenger transport systems have been designed using simplified, friction free, mechanical components that are both technologically and economically feasible to decouple the relationship between economic growth and resource use and support essential sustainability. LEVX® transport systems enable the efficient use of land and raw materials with ultra-lightweight overhead guideway infrastructure that engineers expect to last up to 50% longer than conventional civil structures. LEVX® carriages slash transport energy requirements by as much as 95% as well as reducing maintenance and waste by eliminating weight bearing wheels and replacing them with non-wearing, friction free suspension, propulsion and braking components.

The Port of Oakland, California

The Port of Oakland is the 5th busiest container port in the U.S. handling 99% of the containerized goods moving through the region or more than 2.3 million TEUs per year. The Port of Oakland owns approximately 1,300 acres of well-developed marine terminals, intermodal rail facilities and maritime support areas with 18 deepwater berths and approximately 770 acres of container terminals.

While the port's marine terminals and intermodal railyards are well developed, there is only one truck entrance to each rail yard oriented to the easterly ends of the yards. Trucks wishing to make deliveries into the railyards may become trapped in long lines with other drayage trucks. This is especially true for the Ben E. Nutter Terminal and the TraPac Terminal.

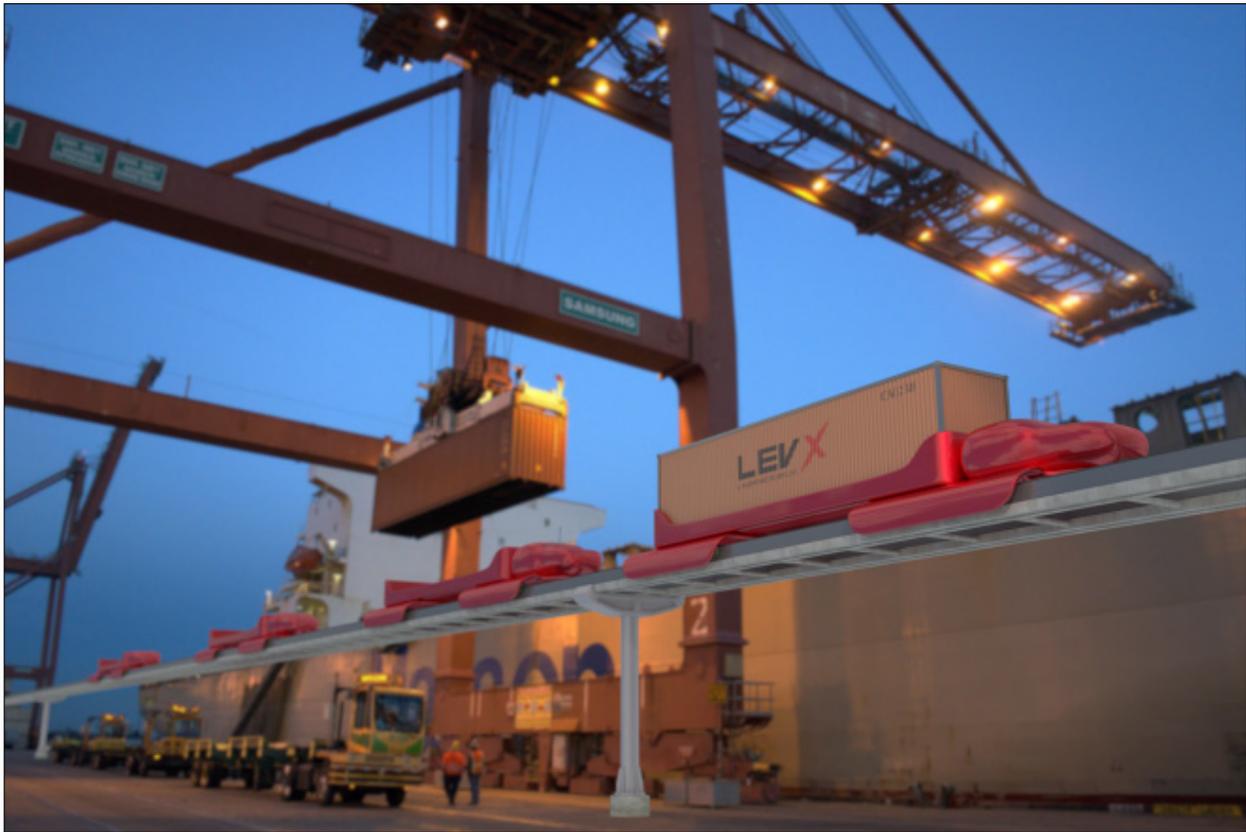


A LEVX® Intermodal Freight Transport System (LIFT System) could enhance the Port's overall efficiency by providing direct connectivity between marine terminals and the port's intermodal railyards. Routing the LEVX® zero emission LIFT System as directly as possible between the most isolated marine terminals and the railyards will not only increase security and speed container delivery but reduce surface street congestion within the port.

Pilot Project Phase 1 – Establishing Zero Emission Circulating Intermodal Service

Phase 1 of the LEVX® zero emission LIFT System pilot project would provide a volume efficient, circulating traffic pattern between a selected marine terminal and an intermodal railyard. The LEVX® zero emission LIFT System could impact the efficiency of both the marine terminal and rail yard by moving containerized freight destined for the intermodal railyard past congestion at gates and immediately away from the wharf. Removing those container trips from surface

streets will decrease the port's overall congestion with a positive impact on regional transport efficiency.



Future expansion would require additional guideway infrastructure to be built connecting other marine terminals to the LEVX® zero emission LIFT System as well as the addition of more freight carriages for container transport.

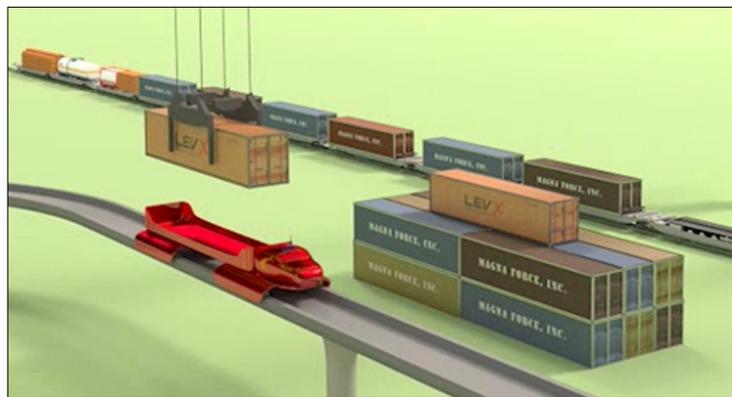
The LEVX® zero emission LIFT System would be designed to initially handle up to 20 LEVX® carriages moving to and from the marine terminal and the nearby intermodal freight facility per hour. Depending upon the location for the pilot project, Phase 1 of the LEVX® zero emission LIFT System would include as little as 1 lane mile of grade separated guideway with the number of carriages in circulation dependent on the demand for freight movement between sites.



Oakland LEVX® Zero Emission LIFT System Estimated Design Capacity

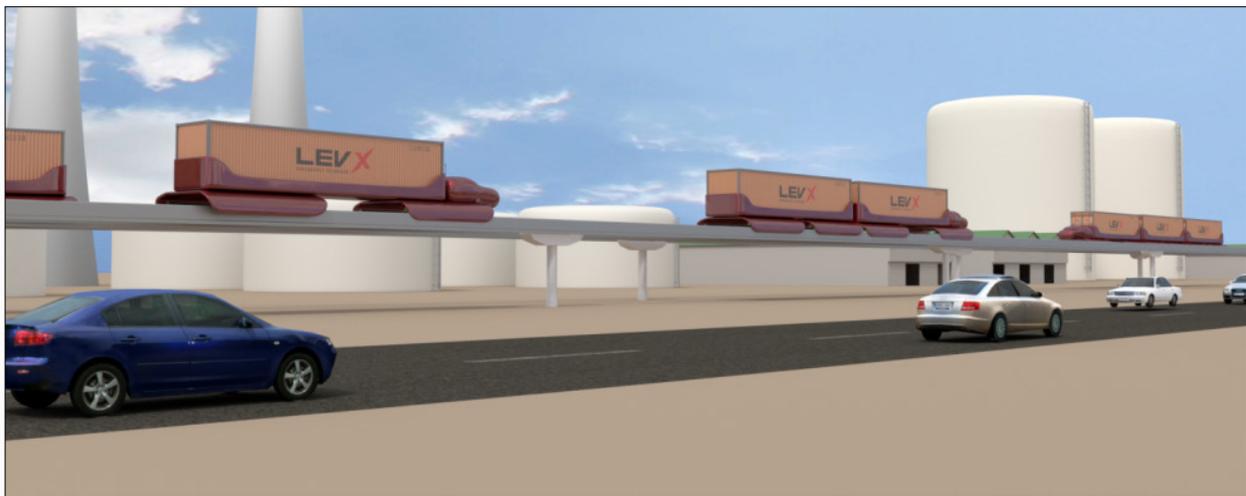
Design capacity for the proposed Oakland LEVX® zero emission LIFT System can be expanded to meet the full requirements of all of the port's marine terminals and both intermodal railyards in later phases of development by extending guideways into the desired areas and adding freight carriages as needed.

The combined intermodal railyards at the Port of Oakland can handle 750,000 lifts a year or an assumed maximum of 1.5 million TEUs per year. The LEVX® zero emission LIFT System can easily match the railyard demand for container transport to and from the various marine terminals. Excess capacity allows the LIFT System to absorb peak



season demand and varying terminal schedules while accommodating the needs of 2 separate railyard operations. Once guideway infrastructure is in place, overall system capacity is managed by the number of freight carriages in circulation.

Carriages / TEUs Per Consist	Outbound / Inbound TEUs per Hour	Total TEU capacity per Year	Total TEU Capacity BNSF / UP per Year
3 / 6	360 / 360	6.2 M	3.1 M / 3.1 M
2 / 4	240 / 240	4.1 M	2.0 M / 2.0 M
1 / 2	120 / 120	2.0 M	1.0 M / 1.0 M



Advantages of the LEVX® zero emission LIFT System to the Port of Oakland

Preferred LEVX® guideway designs create an efficient grade separated, dedicated and secure closed loop transportation circuit with carriages flowing in a designated direction without interruption or intersections with other traffic or pedestrians.

For example, design capacity for a bidirectional guideway system with LEVX® carriages carrying containerized cargo and traveling ganged together in groups of 4 can convey up to 240 carriages to and from a facility per hour offering a design capacity of 960 TEUs per hour (480 TEUs per direction) or a total of over 8.4 million TEUs annually.

The addition of a LEVX® zero emission LIFT System to the Port of Oakland’s transportation plan would serve to:

- Increase the productivity of the Port’s land use

- Increase the velocity of the regions freight throughput
- Better manage the flow of freight traffic to and from the port
- Increase security for both marine terminal and railyard operations
- Increase overall capacity and competitiveness
- Support the environmental and energy conservation goals of the Port, region and the State of California

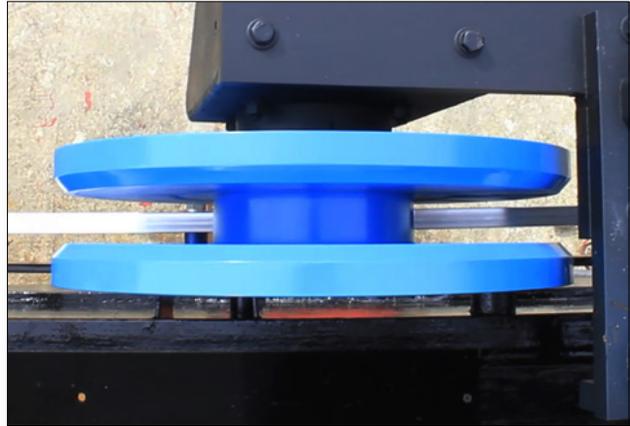
Core Technical Advancements

LEVX® systems have been designed to transform a complex and expensive electricity based concept (maglev) into an elegantly simple mechanically functional design. Looking at it another way, the LEVX design team very purposely converted the educational requirement for building and operating the system from a PhD level to high school education level.



Container transport carriages are held in continuous energy free magnetic suspension above a truly passive guideway (*no electrified third rails, overhead wires or wayside power stations*) utilizing the patented LEVX® magnetic suspension system eliminating the need for heavy wheel and axle components. No energy, linear velocity, sensors or air gap (*the vertical space between levitated carriages and guideway components*) management controls are required for LEVX® carriages to perpetually hover above the guideway. Perpetual defiance of gravity is achieved through the simple magnetic repulsion that naturally occurs between like poles of permanent magnets and provides superior efficiency and lift potential compared to all other maglev configurations.

The frictionless, magnetic suspension distributes the vehicles weight over the length of the LEVX® carriage eliminating the static drag and point contact loading that occurs between weight bearing wheels and rails or road surfaces. No point along the interface between the suspended vehicle and the guideway bears more than 20 pounds per square inch no matter how heavy the load as opposed to the thousands of pounds per square inch transferred to infrastructure through the wheels of conventional rail cars or trucks.



The LEVX® frictionless, non-contact, non-wearing propulsion and dynamic braking system is taken directly from the core technologies utilized in Magna Force's proven industrial power transmission products. Carriage mounted magnetic discs rotate near but not touching an aluminum linear reaction rail mounted in the guideway. The rotation of the magnetic discs produces a powerful forward or backward force against the aluminum reaction rail moving the carriage along the passive guideway. These highly efficient magnetic forces are safely created by eddy currents rather than electromagnetic currents. Carriage speed and directions are controlled by simply adjusting the speed and direction of rotation of the magnetic discs.





Lowering Costs with Technology

The patented LEVX® technology replaces complex, energy intensive systems with simple mechanical devices. LEVX® freight transport systems are comprised of several core technical advancements that when combined offer achievable and sustainable options for mobility and the environment. LEVX® works to support sustainability by providing significant environmental benefits coupled with low cost implementation and minimized operational and maintenance costs.

Construction costs are lowered:

- Light gauge construction materials
- Longer spans between vertical supports
- Minimal loading spur requirements
- No costly electrified components in the guideway
- No substations, wayside power conditioning equipment, third rails, overhead wires
- Resilient infrastructure with an extended useful life of up to 50% longer than conventional civil structures

Operating costs are lowered:

- Slashed energy requirements
- Optional automated operations
- Localized control systems

Maintenance costs are lowered:

- Non-contact, friction free suspension replaces weight bearing wheels/tires
- Non-contact, friction free propulsion, primary and secondary braking systems
- Fewer moving/wearing parts

Environmental costs are lowered:

- 95% less energy/emissions when compared to diesel trucks
- Reduced surface street congestion and road maintenance
- Quiet operations