The Erie Canal, opened in 1825, was built by Governor Clinton with the aim of connecting the Atlantic Ocean to the Great Lakes. This inland trade connection boosted the national economy, triggered westward expansion, and solidified New York as a global city of trade and commerce.

Over time the canal was outmoded, first by the railroad and then by the highway. While it remained completely intact due to its strategic importance for the US military, it receded into the backyards of the communities left in its wake.

After years of neglect and deterioration, high oil prices, the growing wind turbine industry, and a potential rehabilitation of Detroit’s auto industry prime the Erie Canal’s resurgence as a regional shipping corridor. Yet if the canal operates simply as regional transport, the forces of advancing technology and the volatility of the market will surely ebb this infrastructure back into obsolescence.

Over the past years New York State has been contributing funds to rehabilitate the Erie Canal as a nation heritage corridor. This proposal conjoins with the development of The Hudson River Greenway Water Trail as regional network of recreation in New York State. But if this valuable infrastructure simply operates as a park, its industrial potentials are lost.

We pose that it is vital to understand the canal as a man-made ecology, an infrastructure capable of negotiating flows of people, energy, water and industry. Through a series of strategic urban interventions, we design these multiple flows to utilize the canal’s potential. We reconfigure what was once a predominately linear regional network into a series of local nodes, able to engage with local urban needs, to solidify the canal within the ecological framework of the New York region.

Retired industries in the rust belt are being retooled to produce wind turbines and thus have been taking advantage of shipping barges as then can accommodate (much better than trucks) the large scale of the turbines. Increased prices of fuel also make shipping goods along water a much cheaper option for many industries.

We take this opportunity of these increases to the canal revenue to upgrade the infrastructure with six non-conventional proposals. They will ameliorate New York Canals as a whole and will tighten regional bonds, but furthermore will improve hubs at the local scale and prepare these urban areas for the challenges of the 21st Century.
We propose six types of interventions to be placed on the Erie Canal and other New York State canals. Depending on the local characteristics of each site, such as topography, location, natural environment or land available, the different programs will be implemented.
WATERFORD
LOCKS ERIE CANAL E2, E3, E4, E5, E6

Waterford is located at the easternmost point of the Erie Canal at the intersection of the Hudson and Mohawk Rivers. Due to its dramatic topography, Waterford has five locks along its portion of the canal—more than any other section of the canal system to date. Waterford is the first phase of our interventions here to explore the range of typologies which would eventually be implemented along the entire length of the State canals.

Waterford is crossed by the Canal, but right now it lives totally detached from it. This proposal reunites infrastructure and town, as all its social, physical, and economic layers, and combines them into a symbiotic system that is more than the sum of its parts.

Implementing six new systems that are not conventionally related with canals, this proposal upgrades the existing infrastructure of locks, channels, and pools into another improved and more complex infrastructure. Waterford and its citizens gain new economic and industrial facilities, on top of a tighter social fabric and ameliorated public spaces and urban landscapes.

**PISCICULTURE WATER PURIFICATION**

**HYDROPOWER ELECTRICITY**

**AGRICULTURE HYDROGEN PRODUCTION**

**ECO/HERITAGE TOURISM**
To reduce water pollution in the Mohawk/Hudson network caused by urban runoff and light industry, the Canal will be upgraded to provide water purification.

The open overflow pools are planted with freshwater aquatic vegetation that act as biofilters and purify the still water. Also natural debris is deposit on the bed of the pool and it is cleaned periodically. In the pools’ spillovers, the water is oxygenated and filtered while it runs from one pool to the next one. This is achieved through trickling filters, made of gravel, sands and soils that host other vegetation and microbial slime. The filters are stepped down creating small waterfalls, and its surroundings can be conditioned as pedestrian paths and other public spaces.

Finally, the beds of the locks are covered with absorbent material that retain heavy pollutants and water deposits, and then are cleaned every winter when the canal is seasonally closed.

For the ships to move through the Canal, the locks require to be constantly filled and drained with water flown from upstream. This water drops from a height of more than 33 feet, giving the opportunity to generate hydropower electricity.

Each of the locks is upgraded with a pair of turbines that transforms the gravitational potential energy of the water into electricity. On top of that, more turbines are adapted to the pools and spillovers, creating a more efficient system.

Taking in account the five locks within Waterford boundaries, the town can get a free output of 10,850 kilowatts per hour of clean energy for its urban areas. Just with the energy of two locks the town can light its entire street lighting system every night.

Taking into account existing crops and another available land suitable for agriculture, an irrigation system can be developed using the purified water from the canal. Analyzing the aquifers and runoff that reaches the pools, we determine the surface area of crops and the amount of water that can be utilized.

Pumping stations drive water to storage pools at high topographic points, where they are further treated. From there gravity allows the irrigation of crops in surrounding areas as necessary. These crops will support New York State production of cabbage, potatoes, grapes, apples, hay, barley, blueberries, etc.

The Erie Canal has the potential to become an important hub for ecological and heritage tourism in New York State, since it is all its way to Buffalo surrounded by a rich natural environment and heritage towns. Waterford is part of the Erie Canal National Heritage Corridor, houses within its boundaries state parks and remarkable green areas, and annually hosts an important tugboat festival and other major events.

Taking advantage of the water transportation that the Canal offers and knowing that boat tourism is rising, three different locks are placed on the Canal. Two of them are located next to the historical districts, where the main touristic attractions and accommodation are, and the third is upstream, where the visitors can enjoy of the natural environment that surrounds the Canal.

This new infrastructure will improve Waterford’s touristic economy, besides of creating a tighter regional network with the rest of the towns on the Canal, which will also have their own new ports.

Waterford’s Broad Street and annual Tugboat Festival
Hydroelectric energy can be harvested from the gravity-guided water that flows through the locks and pools and utilized for the production of hydrogen. The burgeoning technology of hydrogen batteries will fuel cars and boats in the next decade. The physical characteristics of the Canal are a great asset for the nearby towns and will reduce their dependence on fossil fuels.

The hydrogen generators work with the same electric generator system we explained above. The generators produce hydrogen by hydrolysis and will fuel both cars on the streets and boats on the canal. They are located in the locks that are close to primary roads, urban density and next to the tourist docks. The turbines will consistently produce electricity; it will be delivered during peak hours to the urban areas and will generate hydrogen during low consumption hours.

Erie Canal has a potential energy for refueling 4850 cars a day. This is equal to the 33% of taxis of NYC.

The spillway pools present an opportunity to creating a pisciculture industry. Altogether with the vegetation that purifies the water, fish and other freshwater animals can live in a natural cycle in this manmade habitat. This is an extensive aquaculture system, which only utilizes the natural available resources of the pool and doesn’t require external ones.

The pools, free from ship traffic, are enclosed with nets and fish freely breeds in them. In order to tap all the food sources of the pool, the chosen fish occupy different places in the ecosystem: tilapia feeds from algae, carp from submerged weeds and the catfish is a benthic feeder. Also, mussels and other mollusks, which feed from filtration of the water, are raised on floating structures and afterward recollected. The whole system has a constant flow of oxygenated upstream water, which is cleaned by the mentioned vegetation.

While our strategy spans the Erie Canal network in New York State, there are currently over 4,000 miles of operational canals in the United States. These six typologies can be implemented throughout, adapting and diversifying to respond to each site and situation. The improved canals would boost new regional areas and improve the situation of many local hubs, and could prepare the nation for a more sustainable economy and a new concept of ecological urban development.