

INTRODUCTION: The future is up in CITAZAR.

How long will it take for us to build our cities completely differently using the technology we have? Wheels are ancient inventions, but we only started putting them on suitcases recently.

CITAZAR, is an entirely different future city concept self-sufficient for energy, food, land and more. A large linear mega-concept but scalable and modular to be built in small increments.

CITAZAR, is a vision for prosperity and a concept to withstand natural perils, increase arable lands, restore lost ecosystem and to reduce our carbon footprint. The costs of reconstruction after wildfire, flood, tornado, hurricane, and earthquake are formidable. Instead of rebuilding the same old, why not invest in a CITAZAR: Next-Generation-City, a transformation from old city-wealth to a new city-wealth in new self-sustaining cities.

There are no streets in CITAZAR but is walkable. Sidewalks, piazzas, and parks are contiguous and provide the links for connectivity between a network of neighbourhoods. Movement is by public transit systems; cars are optional in designated promenades. The urban fabric is the city's infrastructure with dedicated promenades for walking, bicycles, self-driving cars, water, sanitary, storm, waste, and emergencies. No more digging for pipes in the ground like Romans did!

CITAZAR concept will return 60% of the urban land to nature and farming with a high-density compact urban form and clusters of pin-towers for all functions we need: residential, office, government, education, industrial, leisure, vertical farms and more. The future is up in CITAZAR.



CITAZAR

THE FUTURE IS UP

A VISION FOR FUTURE CITIES
COMPACT AND LINEAR!

by Loghman Azar, M.Arch.UD. AIBC. OAA

Toronto, October 2020

LINE

ARCHITECT

POWERED BY NATURE

From Trombe Wall To CITAZAR!

BY LOGHMAN AZAR, M.ARCH.UD. AIBC. OAA

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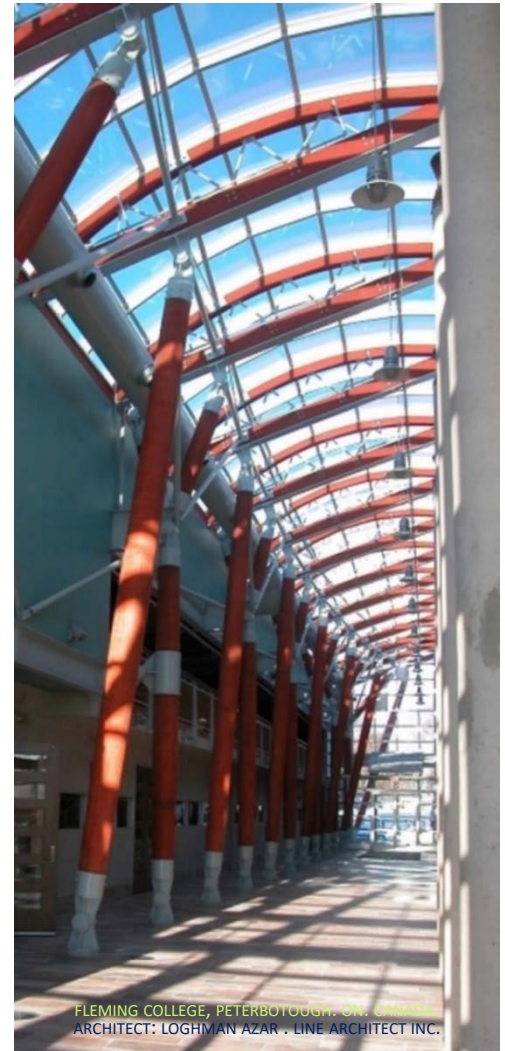
TROMBE WALL

The Trombe wall is designed to connect the natural world to the made-environment and permit entry of sunlight for heating buildings at no cost. Trombe Wall was designed by a French engineer, Felix Trombe, in the early 20th century. A simple Trombe Wall is essentially a thermal mass, a thick brick wall for example built inside the house close to a window, under a skylight, or in a sunroom with good exposure to sunlight, preferably due south. It is a small design feature in a house that costs very little, works well and saves energy in buildings. But make no mistakes, Trombe Wall has science behind it too, it works based on the thermodynamic laws. The solar heat is absorbed by the mass of walls during the day and released at night to warm the space inside. The trick is that they must not be covered by drywall. This, we call thermal massing!

Many varieties of Trombe Wall are in existence. Advanced versions of Trombe Wall are designed to enhance performance by combining other strategies to further reduce the energy demand in buildings. Now that makes good economic sense too because no one likes to spend more money on heating buildings than needed. They work better in combination with other energy saving measures. For example, combined with a Thermal Chimney (induces natural ventilation) will make the Trombe Wall even more effective.

NATURE-WISE AND NATURE-RICH DESIGN

In a study commissioned and published by Union Gas and Enbridge we compared several different energy saving strategies in buildings using DOE.1 energy modelling. The best energy saving results found to be possible with a combination of 4 to 5 different measures including natural ventilation and daylight which are most effective in reducing energy demand in buildings. Trombe wall is only one of the solutions in a growing palette of Holistic Design strategies that makes buildings more energy efficient. Architects, designers, engineers, scientists, artist, community groups, governments and creative people are discovering more and more ways of making better and more sustainable buildings. There seems to be no shortage of good ideas. The challenge is, however, to figure out an apposite combination of good ideas that will yield the most benefits at the lowest possible cost. Truly, it can be challenging but to make the analysis manageable we have organized them into two groups. First group are for reducing the energy demand and waste that we call **Nature-Wise** design solutions, and the second group is **Nature-Rich** technologies for power generating from renewable and other sources. Trombe wall, thermal massing, nocturnal heat exchange, solar controls, building orientation, window-wall ratio, skylights, clerestory, atriums, galleria, etc. are just a few examples in the first group. The group two technologies that are currently responsible for producing the entire energy supply in the world include a wide range of options. The renewable sources of sun, geothermal, wind, hydro accounts only for less than 5% of the total production. The remainder of energy production is from fossil fuel, nuclear power, hydro dams, and others with their pros and cons. The **Nature-Wise** solutions are smart design ideas, some passive and some active, but mostly possible at a little or no extra cost. The **Nature-Rich** options require investment -very large investments- and may be selected with an overly complicated cost benefit analysis but is totally dependent on capital financing drivers. The important thing is that we must give up our wasteful habits of consumption and love of disposable things. Remembering that there is no place in nature for throw-away things. And we need to change our inefficient but commonly practiced land use patterns in our cities and to stop urban sprawl.



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1. DRAWING FROM TROMBE WALL PRINCIPLES, GALLERIA IS THE MAIN INTERIOR STREET WITH A VAULTED GLASS ROOF DESIGN IN FLEMING COLLEGE WHICH INVITES SUN TO ENTER AND HEAT THE WALLS AND FLOORS DURING THE DAY AND RADIATE BACK TO HEAT THE SPACE AT NIGHT. ENERGY MODELING CONFIRMED THE GALLERIA IS EFFECTIVE SAVING 6% OF THE TOTAL ENERGY USED.

The two-tier approach with Nature-Wise and Nature-Rich strategies helps in considering a wide range of options and focusing on what matters the most. We can design Net-zero buildings that generate own energy they need. This is a significant saving in energy use if we consider that buildings accounts for more that 40% of the total energy consumption globally. Harmful emissions such as carbon dioxide are also reduced or may even be brought down to zero with some design vigour.

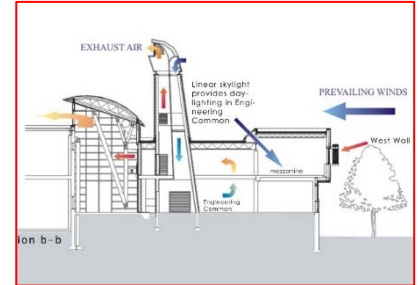
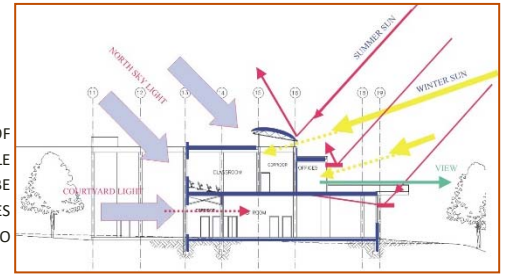
Recently, much progress has been made as we can see important and remarkable works of sustainable architecture are completed throughout the world. The irony is that we are doing the good things but in a wrong place. New high-performance buildings will ease the pain for a while, but eventually will be subject to system failure due to inherit limits and incapacity of aging infrastructure in our cities. Our cities are designed and built with an infrastructure based on Roman's technology, albeit upgraded incrementally since the industrial era. We still dig the ground and lay pipes, dig, dig and dig never stop repeating the same thing over-and-over again. We need to wake up from this insanity.

How long will it take to occur to us that there are other ways of building cities? Probably as much as it took us to put wheels on suitcases!

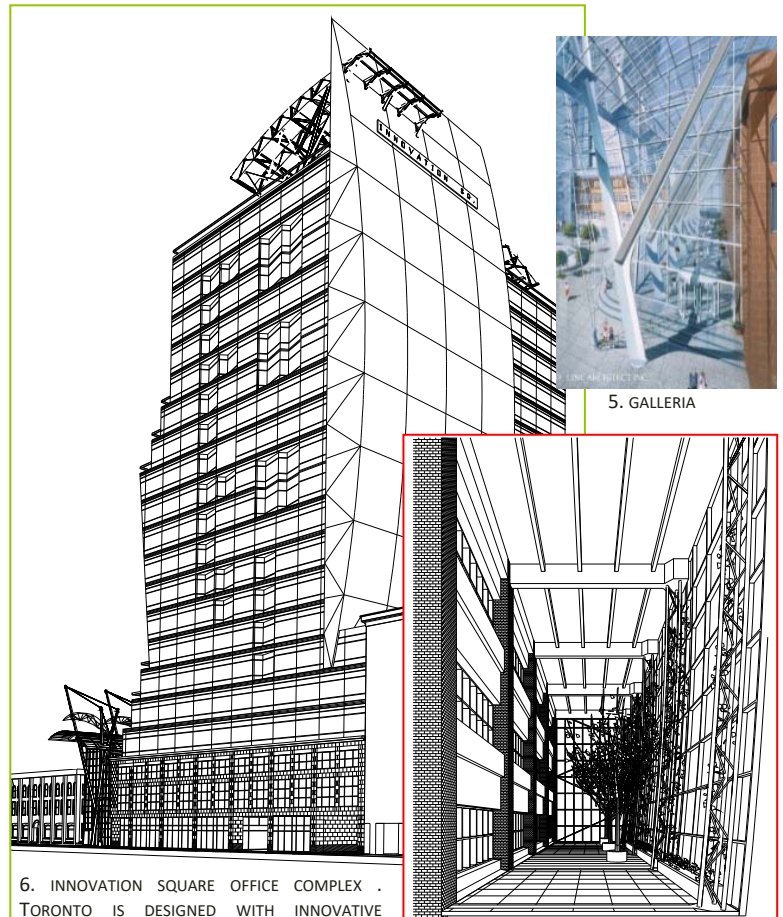
Who was not excited with the advent of cars in our lives? It gave us comfort and freedom to go everywhere. But we are more and more restricted in mobility as the cities grew larger and larger, largely due to cars, traffic congestion and street patterns.

No one needs much convincing to agree that one person per car is not an efficient use of fuel, or cost of cars, insurance, and maintenance. Add to it the cost of building roads and maintenance at tax-payers costs. Spending hours in traffic jam just to drive between home and work is likely despised by all. Not to mention depriving children the family time they could otherwise have with their parents. Our mobility is normally subject to street patterns, often a gridiron. It forces our movement to right and left constantly turning every trip into a zigzagging nightmare path whereas we only want to go from point A to B, preferably in a straight line if possible. The perception of the other places nearby, or afar, contribute no advantage to the experience of a place once you reach the destination. So, why is it necessary to endure frustrating trips?

2. BY PROPER ORIENTATION OF BUILDING THE HIGH-ANGLE SUMMER SUN MAY BE CONTROLLED WITH SUNSHADES BUT PERMIT WINTER SUN TO HEAT THE INTERIORS.



3. 4. THERMAL CHIMNEY USES BUILDING MASS TO FACILITATE NATURAL VENTILATION, STORES DAY TIME HEAT TO INDUCE AIR CIRCULATION. CHIMNEY TOWER PULLS FRESH AIR INSIDE AND EXHAUSTS HOT AIR OUT.



6. INNOVATION SQUARE OFFICE COMPLEX . TORONTO IS DESIGNED WITH INNOVATIVE

ENERGY SAVING ARCHITECTURE INCLUDING A 4-STORY HIGH GALLERIA AND SOLAR SAIL ON THE WEST SIDE TO MITIGATE SOLAR GAIN WITH 5 STACKED 3-STORY GREEN HOUSES.

7. INTERIOR OF 3-STORY GREENHOUSE. HEAT COLLECTED HERE IS USED TO INDUCE NATURAL VENTILATION IN THE TALL BUILDING AND ELIMINATE HUNDREDS OF FANS.

PROLOGUE TO CITAZAR: A FUTURE CITY CONCEPT

In 1993 Innovative Housing Conference in Vancouver Professor William Reese presented his study that shows Low density urban form and massive land coverage have resulted in far exceeding carbon footprint in our cities. This represents a risk to the natural ecosystem and a serious reduction of arable lands where our food comes from. Since then we have made quantum leaps towards sustainability, tremendous achievements in designing sustainable architecture in cities are revered by all. They are of course important, but unfortunately are built in cities with low density and unsustainable infrastructure. The remedy, urban intensification, is arguably a good concept, however, given the unsustainable infrastructure in our cities, we seem heading towards an unknown future and a potential disaster by pushing the fragile infrastructure to the breaking point.

The trouble is that the ailing infrastructures in our cities are inherently unreliable and inefficient. Overloading with good architecture is not going to make it better. It is only a matter of time to reach the event horizon or point of total failure. Fixing the wrong thing over and over is destined to fail. In addition, there is another serious concern that we see every year. Cities are evacuated and become unlivable due to power outages, flooding, and other extreme storms and natural events. Human sufferings of the displaced people who lost their homes and businesses are beyond measure. Cost of rebuilding after each disaster has skyrocketed and is no longer affordable either, it is not even a good use of capital, just emergency relief at best. It is time to think differently about design of our future cities. Our chance of survival on earth is much higher here than any other planet. Superbly higher! Governments and the private sectors have poured gigantic amount of money in space exploration which no one is likely to dislike. But why does it seem rather inconceivable to spend a portion of our money on building sustainable future cities? What is the future sustainable city supposed to look like? Although we need many of the same things we currently have in our cities, such as good neighbourhood, parks, schools, hospitals, offices, industries, jobs, leisure and on and on, I can only imagine that Future Cities though must be nothing like our current cities.

CITAZAR is such a Future City model to create own energy, food, economy, self-sufficiency and withstands natural perils. There are no streets in CITAZAR, but nice promenades for walking and biking, network of neighbourhood, parks, piazza, mass transits and an integrated urban fabric and infrastructure. (see CITAZAR by Loghman Azar) -LA



LOGHMAN AZAR, IS AN ARCHITECT AND URBANIST BASED IN TORONTO. HE GRADUATED FROM HARVARD UNIVERSITY AND IS RECOGNIZED FOR EXPERTISE IN SUSTAINABLE DESIGN AND HIGH PERFORMANCE BUILDINGS.
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8. CITAZAR IS THE BRAND NAME FOR FUTURE CITY AND IS DESIGNED WITH A LINEAR FORM, COMPACT HIGH DENSITY LAND-USE TO FREE UP 60% FOR LAND FOR FARMING AND RESTORING ECOSYSTEM. THE CITY FOR IS MADE OF PIN-TOWERS FOR LIVE, WORK, PLAY AND LEARN, ALL CONNECTED WITH A CONTIGUOUS BARRIER FREE NETWORK OF WALKWAYS, SQUARES, PIAZZAS, PARKETTES AND PARKS EVERYWHERE. INDUSTRIES AND FARMS ARE ALSO PLACES IN VERTICAL PIN-TOWERS FOR MAKING ONLY NEEDED THINGS. THERE ARE NO STREETS, BUT PROMENADES FOR MASS TRANSIT, SELF DRIVING CARS, BICYCLES, ETC. INFRASTRUCTURE IS THE CITY AND CITY IS THE INFRASTRUCTURE. VISITING HINTERLAND IS AS EASY AS TAKING THE ELEVATOR DOWN TO THE GROUND LEVEL. LOCAL ECONOMY WILL THRIVE WITH ENDLESS HOBS BUILDING CITAZAR, A MODULAR CONSTRUCTION WITH REPLACEABLE PARTS TO UPGRADE ITSELF WITH NEW TECHNOLOGY IN PERPETUITY.