

Tehran has a Coast
35N51E 2050

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Hamed Khosravi

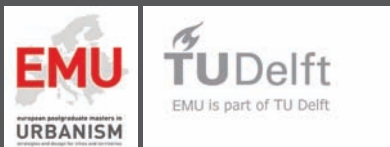
The thesis is an attempt to explore part of the never-ending field of Architecture and Urbanism, with the guidance of the mentors:

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Future Curators

“They’ll tear down your building in twenty-five years. All that will remain are its ideas.”

Louis Sullivan

Since 20th century, science fictions have described the World [Planet Earth] as a whole, as one entity which approached to an extreme future, mostly disastrous situations. This kind of dreams has led to such outstanding innovations which shapes our world today. We have dreamed about our cities, cars, hyper communication and climate control machine. Cities became bigger and bigger, the moving speed got faster, everyone can be connected to each other via Internet, weather is getting modified by cloud seeding and artificial rain and etc. The dreams have come true. Now we are as close as possible together.

We are, in a way, invading the time but still facing two extreme futures are probable; Utopia and Dystopia. Every fact can explain the future in its own way. Every alternative seems possible because of high speed of knowledge and wisdom expansion. In favour of mega infrastructure, today, the world is perceived as the “One”. Now it is time to call back the neglected visionary approaches to pave the ground for getting into the next steps. It is time to bring our favoured future to the front. We have missed the visionary thinking...

As Winy Maas, in the book *Visionary Cities*, describes a vision is, in a way, what happens between a question mark and a proposal. It asks the big questions and then paints an image for the future with its answer. Most importantly, it is a dream for the city and for

its spatial translation that offers a long-term, cohesive, seductive, and strong perspective for future societies. It is part curiosity, part exploration, part fantasy, and part real problem solving.

The role of the visionary is to guide, and direct and summarize the course for this increasingly urban world.

Now architects and urbanists changed their position;

They are not future creator anymore but they can be future curator.

:The Question

Among the new emerging metropolises in the third millennium, Tehran is one of the most populated and largest metropolitan areas. By 2050 Iran's predicted population will reach to 100 million [according to World Urbanisation report- UN]. Considering the fact that around 85% of this population will concentrate in the urban agglomerations, Tehran Metropolitan area, as the capital with almost more than half of the services and industries, is going to be one of the largest and most dense metropolitan regions in the World.

The urban settlement in Tehran started in 6000 BC which seems to be one of the everlasting urbanisation points. It has several booms in population growth and urban expansion during its history, but the most dramatic expansion took place after the Second World War, which gave the city the dimensions of a large metropolis. In this way, the built environment of the city was a comprehensive reflection of the stages of transition through which urban and national communities were passing. This trend amplified in 60's by the sharp rise in crude oil price which caused lots of immigrations to the city which continued after revolution during Iran-Iraq war period. According to *Vanstiphout*, "Tehran after 70's can be seen as a realized product of the American dream of modern town planning". The master plan of the city is done by *Victor Gruen* (American- Austrian architect) in 1967 who was invited by the Shah of Iran. The implementation of the mas-

Superstudio, MOMA Environment, 1972.
Source: Superstudio: Life without Objects, Sakira 2003



terplan was stopped by Islamic revolution, however just one decade later, after the Iran-Iraq war, municipality of Tehran decided to construct most parts of the plan. This made Tehran one of the fast growing urban concentrations in the World.

The problem of not having a clear Vision for the Future is the reasons which Tehran has suffered from mis-planning and mismanagement during last 250 years of being the Capital City. The problem is becoming serious when the city finds the way to expand beyond its natural limits. New territory will be attached to the Tehran's plain, as a part of time-space perception of the city, which will increase the uncertainty and it will make the city freeze in a transition form. The spatial structure of a city is very complex. It is the physical outcome of the subtle interactions over centuries between land markets, topography, infrastructure, regulations, and taxation. The complexity of urban spatial structures has often discouraged attempts to analyze them and even to try to relate urban policy to city shape.

The thesis will try to propose a new reading of the city/ region; a model formed based on the economical specifications, political direction and morphological traits of the region.

The strategic location of Tehran can be seen as a crossing point of two main axes; East-West [The main route of the Silk Road] and

North-South which connects two important bodies of water in the Central Asia; Caspian Sea and The Persian Gulf. Because of the Alborz Mountain in the northern part used to be a defensive barrier for the city, Tehran has been expanded alongside the East-West axis and partly southwards. All the transactions of the city have been developed through these directions. Especially after discovering the Oil in the southern part of Iran in 1911 the Persian Gulf-Tehran axis became the main route of the energy traffic in the region. After rising up the tensions in the Persian Gulf- led to Iraq war and US military presence- Tehran decided to develop the northern potentialities through the political moves in the Caspian Sea region. Iran National Tanker Company which is the World 4th largest oil and gas shipping company, started to invest more on the Caspian Sea shipping services. The ports were became activated and the negotiation with the other four neighbouring countries in the Caspian Sea region has been started. By launching the Tehran-Caspian Coast freeway, this national transportation fast connection will reveal its hidden geopolitical dimensions; this link can be also a shortcut in energy/ service corridor and more presence in the northern region. The current situation can be interpreted as turning northwards; when the risks are become increasingly plausible the process has been accelerated.

The future regional consequences of the current strategy are addressed as the body of the Hypothesis.

:The Method

Different dimensions of the question are being explored in each chapter; the thesis has structured based on series of hypothesis in distinct scales. The attempt is directed towards exploring different possible futures for the Region [by 2050]. The main theme has formulated as the form of Scenario:

What if Tehran had a Coast...

Hypothesis 00:

Approaching Northwards

The first hypothesis, by the end of chapter II, describes the direction of the future growth of Tehran as a New Town.

Hypothesis 01:

Energy Geopolitics

It interprets the regional conditions as the result of Geopolitical moves which can be led to emergence of a Mega Region fuelled by energy export. The role of Tehran in the region can be seen as the main urban centre in which can accelerate the process of emergence.

Hypothesis 02:

Caspian Sea Regional Metropolis

It characterizes the future mega-region by the Caspian Sea by its environmental resources and potentialities. Environmental coopera-

tion can be an important way of preventing conflicts and promoting peace between communities. While Energy trade can still be the driver to promote the life of the region.

Vision: Impossible

This part as the conclusion of the previous chapters draws a vision for the Iranian Part of the future Mega-Region; which is named Caspian Delta Region.

90min Delta

It describes a detailed-strategic plan for the starting point of future intervention; the mouth of the new freeway which connects Tehran to the Coast in less than an hour. It come up with image of growth management and urbanisation as a sort of visionary thinking for an inconvenient situation.

Tehran;

From “New Town” to Mega-Region

The future of the world is unmistakably urban; According to the World Urbanisation Prospect [The 2007 Revision], in 2050, 70% of the world population will live in the cities, so why do we still expect the worst about cities? Click through for fictional destructions galore. “The cities of the future are massive, sprawling, beautiful monsters, covering entire coastlines- in some cases, entire continents- Whether it’s Judge Dredd’s [1] Mega-Cities or William Gibson’s [2] Sprawl”. [3] Future cities always devour land. And what seems to be crucial, at the moment, is to set the scenery of the future urbanisation carefully to balance the whole world eco-system.

In the recent future of Urban World new form of urbanisation is emerging; Mega-Regions. According to *Richard Florida* “mega-region can be conceived as a parallel macro-structure. They are integrated sets of cities and their surrounding suburban hinterlands across which labour and capital can be re-located at very low cost”. [4]

Despite of the fact that Mega-Regions -described by Florida-, are the outcome of Capitalistic World View, but the concept of the introduction of new Scale -Macro Structure- in the field of planning has strong potentials for describing the reality of the world which we live in today.

Besides all of the emerging regional metropolises which already are imagined in the future

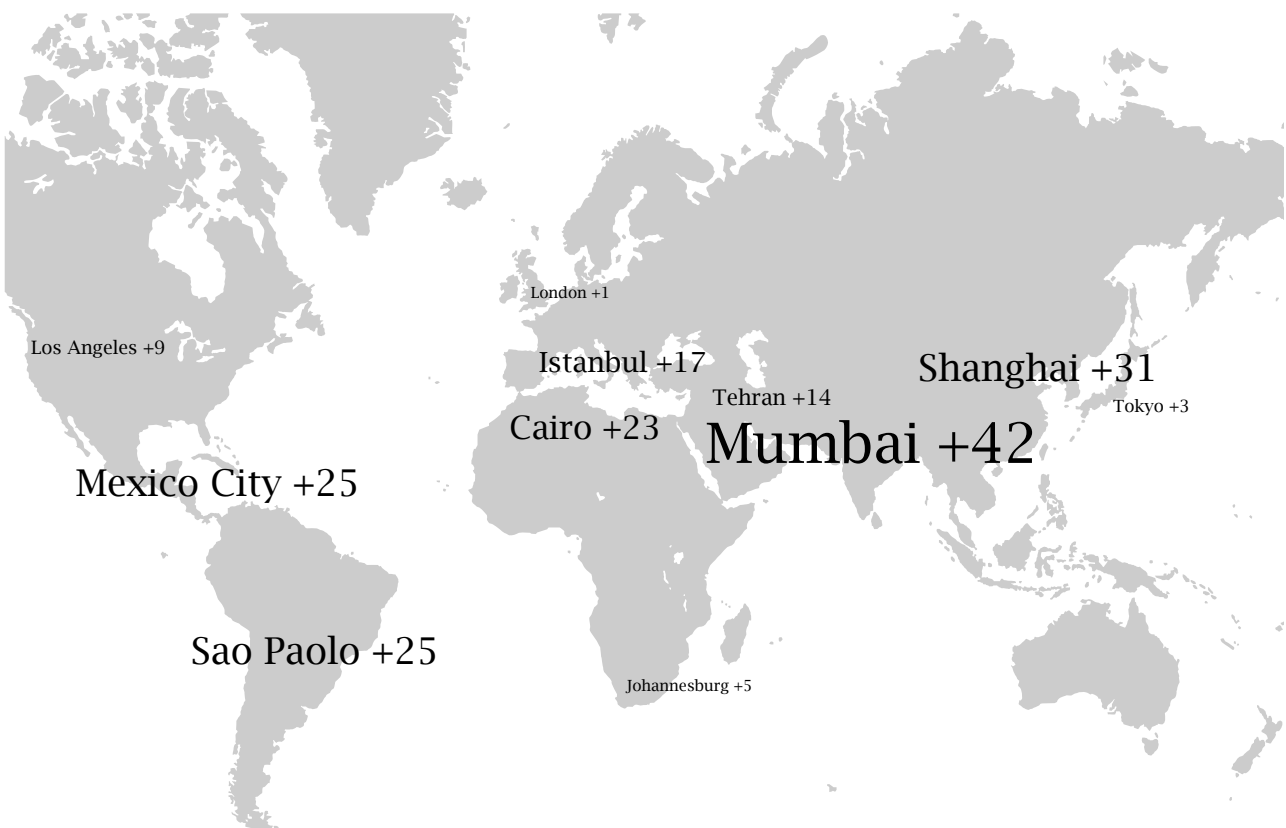
of urbanisation like:

North America: Northern California, Southern California, Great Lakes and Northeast [New York, Boston], South America: Rio-Sao Paulo Mega region, Europe: North West metropolitan Region [Amsterdam, Brussels, Paris, London, Milan, and Frankfurt], Asia: Tokyo-Osaka-Nagoya, Australia: Great Sydney,

Tehran metropolitan area is one of the feasible mega-regions which have not counted yet. However, by looking at geopolitical situation in Central Asia the ingredients of the future mega region in the making are detectable. But politically, both provocative and collaborative desires are arranging the urban masses there.



A map of your future Mega-Cities and Megalopolises; Based on the original illustration by Stephanie Fox. [io9.com]
 Edited by © Hamed Khosravi 2009



Global Cities Urban Growth per Hour [people/hr]
Original map designed by Angus Hyland which shows a comparison
of urban growth in ten global cities.

Edited by © Hamed Khosravi 2009

By 2050 Iran's predicted population will reach to 100 million. [5] Considering the fact that about 85% of this population will concentrate in the urban agglomerations, Tehran Metropolitan area is going to be one of the largest and most dense metropolitan regions in the World. It has high potentialities for economic development, being the largest urban concentration between Istanbul and Mumbai. [6]

Unless the other leading mega-regions in the world, [7] Tehran metropolitan area suffers from lack of Vision for heading to the future. Population growth, scarce natural resources, air pollution and high risk of natural disasters such as earthquake together with the uncertain and somehow isolated political situation make the future of the region vague and ambiguous.

:The Mutation

The images of Tehran has changed completely in its history; it was introduced by Persian empire during *Achaemenid* era, functioned as one of the main crossroads in the Silk Road, became the Capital City as the seat of the king in *Qajar* dynasty, approached to the Europe but designed by Americans and now the Megacity: *Super Tehran*.

By tracing the City's urbanisation process during the history is significant; it has mostly realized through infrastructural intervention, which has shaped the city. However future urbanisation horizon seems to be more irresolute, because the city now is facing its ecological limitations.

Tehran as a *New Town* [8] can be described as those human settlements that were founded at a certain moment in history by an explicit act of will, according to a preceding plan and aiming to survive as a self-sustaining local community and independent local government. It indicates the role of the City as, New Town, as an iconoclastic form of Political expression via *Planning*.

:Form Rey [Rhágai] to Tehran

The urban settlement in Tehran which has started in 6000 B.C. seems to be one of the everlasting urbanisation points on the Earth. It has several booms in population growth and urban expansion during its history. The first New Town appeared on the world map is Tehran. However, in that era the urban settlement by the Alborz mountain range was called Rhágai [in Greek] which the area is the starting point of today Super Tehran. [9]

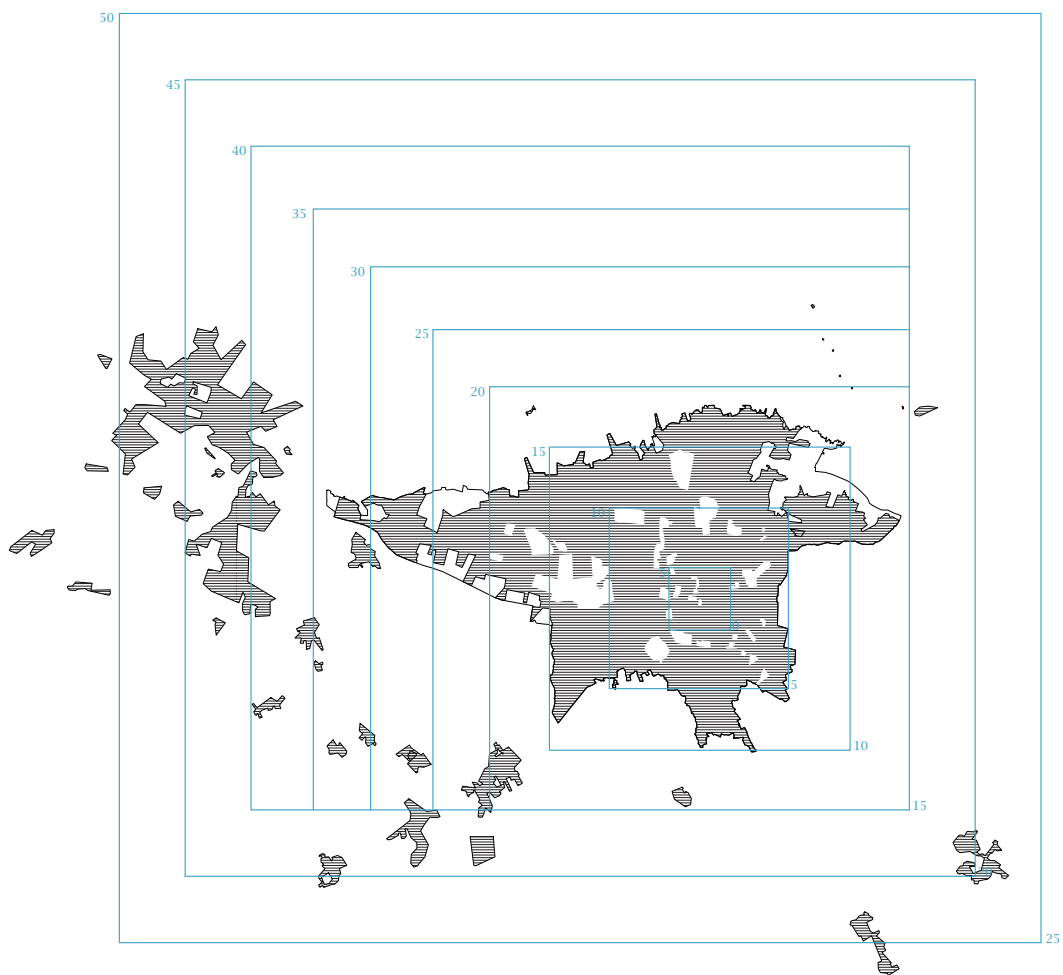
As *Jane Jacobs* [10] explains, the life of the cities always strongly links to the economy of the cities. They have born because of their economical interactions. The southern plain of Alborz mountain, Tehran's valley, is one of the most cultivated lands on the edge of the desert in Iran. Since long time it has been well-known for the orchards and agricultural products; as it described by *Pietro della Valle* in 1618 as "a large city... but not well peopled, nor containing many houses, the gardens being extremely large, and producing abundance of fruit of various descriptions". [11] But the most fundamental characteristic of this land is its strategic location. It is located on the cross point of two main international trade infrastructure of the world; the Silk Road [east- west] and Caspian Sea- Persian Gulf [north- south] axis.

The Main cross-continental route, the Silk Road, passes through the land in-between the

Alborz mountain range and central desert of Iran, where Tehran has lived during centuries. The world voyager documents show that the city made profits of these roads. By mapping the Caravanserais it can be easily traced that the caravans' route passing Tehran. The fact is this East -West axis is still remained as main backbone of urbanisation in this land.

The second axis which has more politically rather than economically importance is Caspian Sea- Persian Gulf which connects two main bodies of water in the northern and southern parts of Iran together. It has been always the strategic axis which main capital cities of Persian empires were located on it; Persepolis [Pasargadae], Shiraz, Isfahan and Tehran. It is main axis which serves whole the country and also the whole territory can be controlled by it. After establishment of each dynasty, these two seas have been used as main ports of the empire to mark new territories. By discovering oil in the early 20th century in south of Iran, this north- south axis became main energy line of the country. What is crucial for Tehran is the role of these two axes for the expansion of the city. Today by looking at the map of the city, it can be found that the major infrastructures of Tehran are still adjusted to these two historic routes.

Changes in spatial structure of the city of Tehran can be observed in six periods:



Tehran metropolitan area, Urbanisation Growth.

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The First Phase:

From a Market Town to the Capital city

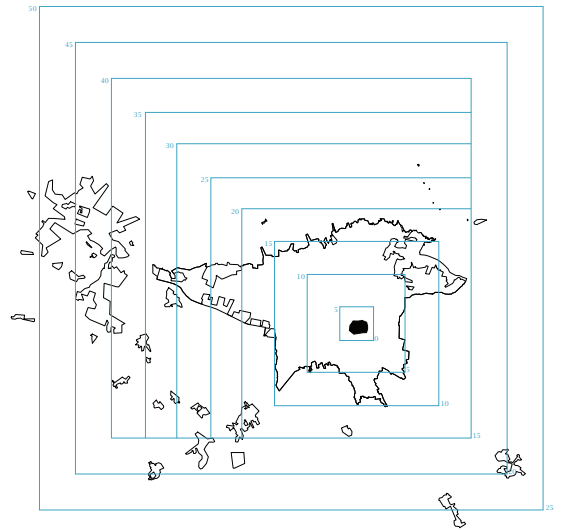
The strategic location of Tehran and its gardens attracted the Safavid king, Tahmasb, when visiting the tomb of one of his ancestors in the nearby shrine of Abdolazim). In 1553 (961 A.H), he built a bazaar and a town wall, which gave Tehran the status of a city.

[12]

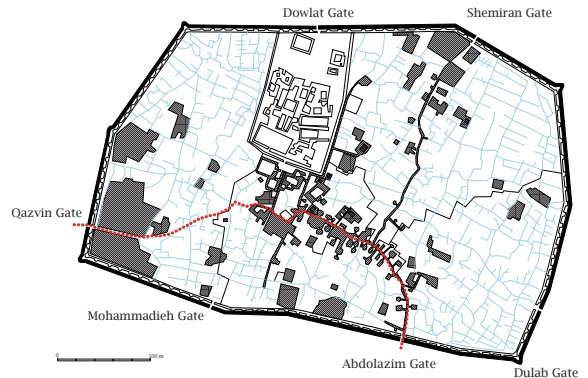
The structure of the city, an area of about four square kilometre enclosed within the Safavid walls of 1553, comprised of a citadel on the northern side, which was connected to the southern gate of the Holly Shrine [13] through the axis of bazaar. To this axis were attached the Friday and Shah Mosques. The rest of the town, in the form of four residential quarters, was clustered around this axis. This was an axial spatial structure with a clear functional organization: a political authority (royal compound), an economic centre (bazaar), a religious focus (Friday mosque) and living places of the townspeople (four quarters). [14]

The representation of the Caravans' route in the city was the axis between Abdolazim Gate, connecting the Bazaar, and Qazvin Gate which led to Qazvin city and Tabriz. This main structure of the city in 19th century was still based on the east- west axis of the Silk Road.

Through more than 200 years of becoming a city, Tehran transformed from a market town to a city. It was chosen by Agha Muham-



mad Khan, the founder of the Qajar dynasty, as the capital of Iran in 1785-6 (1200 A.H), mainly due to its central position and its vicinity to the tribal territories of the Qajars.



Caravan's Route through Tehran Citadel in 1800. Source: Based on the the original mapping by Tehran Geographic Information Centre, 2008. www.tehran.ir Edited by © Hamed Khosravi 2009

The Second Phase:

Approaching to the European Cities

The population of Tehran grew and the city spread beyond the limits of its physical boundary. In the late 1860s, the extramural inhabitants formed a tenth of its population.

[15] It was partly due to this factor and the development.

Urban transformation in Tehran not only helped in establishing the national and international importance of the capital, but also had immediate economic and social impacts by providing a new source of revenue for the government. [16]

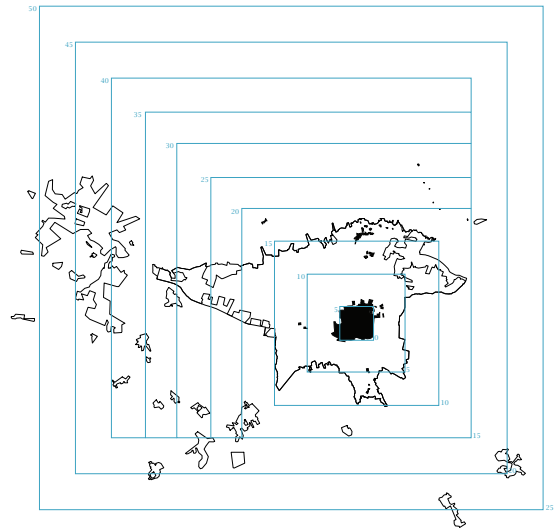
The first attempts to transform the old city were made during the long reign of Nasser al-Din Shah. The resulting changes in the city structure were so dramatic that, according to an observer, “the visitors in the first half of this [nineteenth] century would barely recognize it”, featuring what was regarded as the second stage of a “twofold renaissance”, the first one when Tehran became a capital city.

[17]

The new plan of the city was a perfect octagon, enclosed by moats and walls, with 58 spearhead shaped bastions, which were pierced with twelve gates. [18]

The most favoured model and which they attempted to evoke was Paris. The ramparts of Tehran were boltshaped and closely followed the Parisian fortifications, and the area north of the citadel recalled the schemes of Haussmann. [19]

It was described by *Bradley Birt*, an Indian



official, who travelled across Persia in 1909, considers the new walls a direct effect of Shah’s trip to Europe: “Nassereddin Shah, the first King of the Kings to make the tour of Europe, altogether succumbed to the Western craze, and at his bidding the capital rapidly assumed the Western air it still retains. Seized with the idea of elevating Tehran to the level of the European cities he had seen, he set out his task with characteristic Oriental caprice and magnificence. Tehran should resemble the Paris he loved, and at the bidding of the King of Kings its walls fell down that its borders might be enlarged, new fortifications being erected further back upon the plain that made the city eleven miles round. In the surrounding ramparts 12 gates gave access to the city, and it is typical of Persian lack of enterprise that, though primarily for defence, no trouble was ever taken to put these extensive fortifications into any sort or kind of defence”. [20]

“In spatial terms, the growing power of the State is reflected in the new spatial structure of Tehran. The intermediary role of the monarchy, between internal factions and external threats, was therefore reflected in the spatial structure of the city both before and after the transformation. It led to creation of a bipolar urban structure with a dual morphology: the old square surrounded by the old, traditional institutions housed in old parts of the town; and the new square surrounded by new insti-

tutions housed in newly developed areas. This bipolarity of the city was the first manifestation of what came to be an ever enduring north-south divide.” [\[21\]](#)

Tehran, Cannon Square- 50's. Photo by: Mahmoud Pakzad



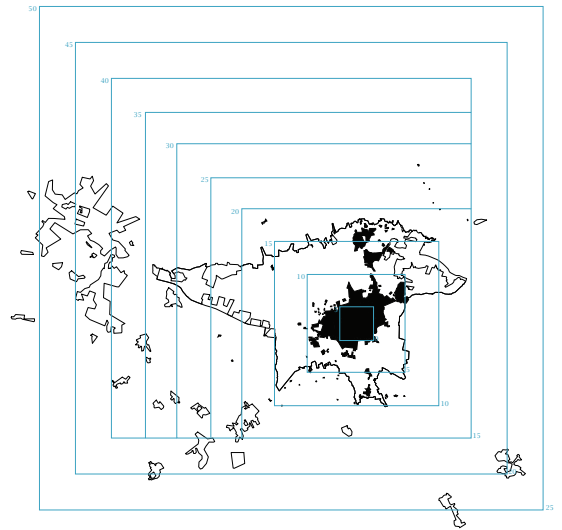
The Third Phase: *The Eastern west*

“By the turn of the century, the number of houses doubled and commercial activities flourished. Parallel to it, a secular trend was reflected in the decreasing number of religious institutions. [22] In these developments, Tehran found an increasing commercial importance [in 1911 Oil discovered in south of Iran], as reflected in the considerable increase in the number of traders and shopkeepers in the city. [23] This, which in turn attracted more people to the capital, was not due to its industries or agricultural production, but to its location along the main internal trade routes and the presence in it of the royal court.

The city was reshaped by opening up the urban structure to the emerging social relations. Nevertheless, this was a modest step when compared to the second phase of transformation in the twentieth century, which aimed at the creation and improvement of infrastructures.” [24]

The population density increased from 43.5 persons per hectare in 1883 to 65.5 in 1891, 80.5 in 1922, and 105 in 1932. During the inter-war period, its population rose to about 0.7 million. [25] This growth in population and density meant new pressures for urban development and expansion.

Whereas the second phase in the 1860s and 1870s was limited to the creation of new city walls and neighbourhoods, the third phase,



through large redevelopment schemes, was an attempt to change the morphology of the entire urban area. From “an Oriental city, without good communications and with but few amenities”, it was commented, Tehran was being “radically re-planned and re-built”.

[26]

The twelve gates of the city, together with numerous other buildings, were destroyed in 1930 for “modernization of the city”. As with the first stage, the route of the moats and walls provided the space for constructing wide boulevards. Apart from these, new streets were built, cutting through the old fabric of the city, which was regarded as a group of “squalid and congested areas”. [27] In this redevelopment of large parts of the city fabric, it was the outward appearances that were given priority, with carefully planned streets and imposing buildings. Infrastructures such as water and electricity were to be provided later. [28]

New boulevards were built on the ruins of the city walls and moats, as part of a transport network of 218 km of new roads. The walled royal compound was fragmented and replaced by a new government quarter. It can be seen as the starting point of the emergence of new centralities in the city. Retailers were encouraged to move to new streets and to abandon the old streets of the bazaar; and

new buildings and institutions sprang up all over the city.

The city was turned into an open matrix, which was a major step in laying the foundations for further modernization and future expansion.

Two more important streets, Enghelab and Vali-e-Asr, eventually formed the main east-west and north-south axis of the city structure. The latter was more than 20 kilometres long, which started from the railway station in the south, linked to the new Trans- Iranian network. The other avenue, Enghelab, which was built on the filled northern moat, was an east- west axis which intersected Pahlavi at right angles and along it were erected new institutions such as Tehran University.

The merchants and tradesmen, who would continue working in the bazaar, moved their residences out of the area to northern and western suburbs, which had better climates. This led to a deterioration of the old fabric [29], which has been a feature of the central and southern parts of the city up to the present day.

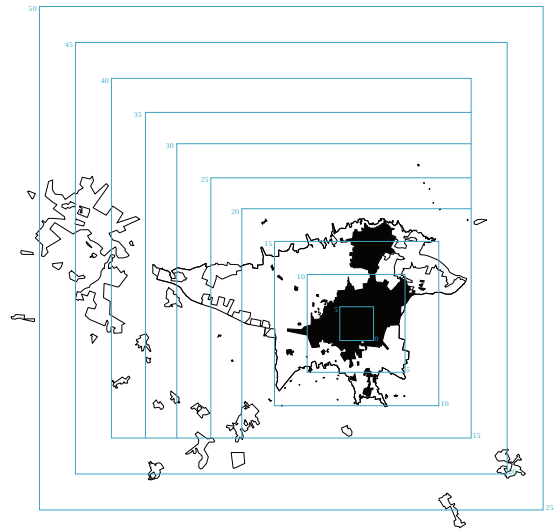
Tehran, Southeastern urban fabric- 70's



The Forth Phase: *The post-war city*

The post-Second World War development of Tehran was very rapid and uncontrolled. Within 45 years after 1941, its population grew 8.6 times and its area 12 times. It took the form of free expansion of the city into the surrounding land and the growth of suburban villages and satellite towns, which have been gradually integrating into the urban fabric by the new waves of expansion and development. The form of the built-up areas now seems to be a radial expansion of a core across the outgoing roads, especially on the west side, to constitute an ever growing metropolis. The rapid and unprecedented growth of the city caused the disappearance of the suburban and intra-urban gardens, which were subdivided and built over. The control over the post-war development was absent to the extent that a deputy mayor of Tehran in 1962 commented that in this city “the buildings and town have been developed by whoever has wanted in whatever way and wherever they have wanted”. The results of this were that Tehran was “in fact a number of towns connected to each other in an inappropriate way”. [30]

In mid 60's *Victor Gruen* [31] invited to work on the masterplan of the city. He joined to one of the most influential architects in Iran; *Aziz Farmanfarmaian*.



“Gruen’s plan for Tehran can be described as the diagram of the ideal metropolis stretched out over the city of Tehran and pulled in a western direction along the foothills of the Alborz Mountains, thereby forming something between a central city and a linear one. And yes; it was built up of ten cities; yes the green landscape would separate the cities from each other and create the backdrop for the extensive network of flowing highways. And yes the cities would be subdivided into towns, which would be built up of communities, made out of neighbourhoods. The diagram was not only adapted to the geology of the city, but also to its social-economic structure: the traditional north-south divide in a high lying rich part and a low lying poor part, was repeated in the new communities and towns planned by Gruen around the core of Tehran. The whole city - old and new - was to be cut open by a network of green valleys, which came down from the mountains or were just cut straight through the existing urban fabric. The immense network of highways and public transport would be embedded in these lush green corridors. Not only did the Tehran Comprehensive Plan foresee a detailed management of the typologies, the services, the public facilities and especially the densities of the new city, it also carefully choreographed its growth. The city was given growth boundaries that were expanded every five years, in order to maintain its coherence every step of the way.” [32]

But most parts of the comprehensive plan were halted because of Islamic revolution on 1978. It was a big change in foreign policies, cutting all the relations with the West. Thus, the Americanized masterplan was one the victims.

Tehran, 60's urban fabric- Zartosht St. Photo by: Hamed Khosravi- 2003

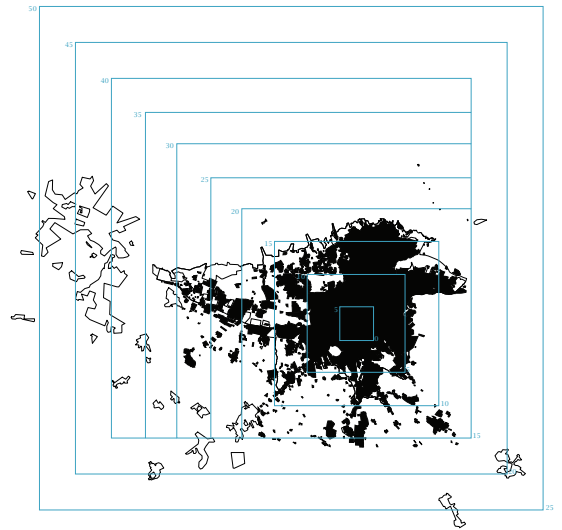


The Fifth Phase: *Power to the Mayor*

After the Islamic revolution and war [33], a period of normalization and reconstruction started, which lasted for most of the 1990s. This period witnessed a number of efforts at urban planning in Tehran. Once again, urban development had intensified without an effective framework to manage it. The masterplan came under attack after the revolution, as it was considered unable to cope with change.

Since the mayor-ship of the most influential mayor of Tehran, *Gholam Hossein Karbaschi* [34], in 1989, the Municipality financially became independent. In exchange for political security of investments for merchants, speculators and developers, the Municipality would extract fees and taxes for investment in public projects. [35] It was the moment for realizing the masterplan which Gruen planned about 20 years before. Several mega scale projects were launched and during almost 5 years most parts of the masterplan were constructed.

It has been the process of revising the Gruen's masterplan; the Mayor criticized it for being mainly a physical development plan, for being rooted in the political framework of the previous regime, and for not paying enough attention to the problems of implementation. And also in that moment the masterplan's



25-year lifespan came to an end in 1991.

In 1991, however, the plan was reviewed by the Iranian company *ATEC* in order to find solutions for the new problems of a metropolis which now had an area of 700 km². This review, however, included the City only within its borders (a total area of 707 km²) and ignored the new suburbs around it. *ATEC*'s analyses and proposals were not approved by Tehran's Municipality. Thus, the Ministry of Housing and Urban Development provided technical assistance to the Municipality to prepare a set of recommendations and directives that was to serve as the 25 year plan of Tehran. For the first time in 2001, the plan of Tehran's conurbation (Greater Tehran), concerning the City and the urbanized lands around it, was drafted. This plan brought about the idea of creating major and expensive infrastructures to be funded by the government of the province of Tehran. However, there has been no administrative organization to manage such projects in the scale of the Greater Tehran. [36] This was the first time which planning referred to a larger scale; Greater Tehran or Tehran Metropolitan Area.

As the process of revising the Gruen's masterplan did not have any major changes in the plan [37], whole the process can be seen as kind of legalization of the former plan ac-

according to the state's political figure. However, the Mayor, which has significant role to implement most parts of the plan accused of corruption and poisoned by the State. Actually it was part of the political scenario to position as the independent anti-American authority.

Tehran, North- Residential highrises mostly built after 90's.



The Sixth Phase:

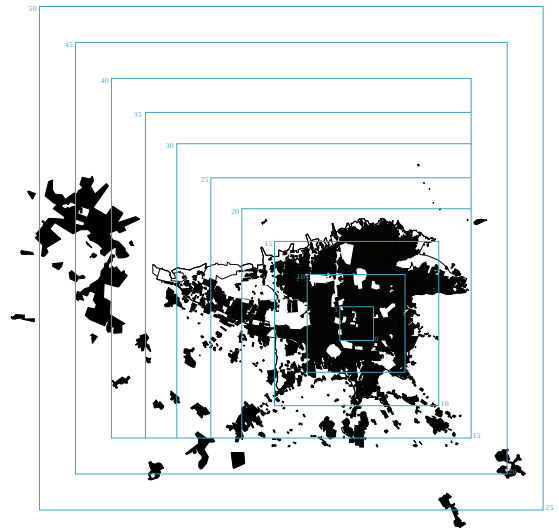
Back to the Future

There was big change in perception of Tehran after 2000; in last 10 years Tehran metropolitan area, as a whole, is the topic for future planning strategies. Since then, the term “regional planning” became common research framework for managing the urbanisation of Tehran. Tehran’s regional planning is focused in the urbanized area in Tehran province: the agglomeration of the urban areas which used to be satellite settlements around Tehran’s core in 60’s.

Today the problems and conflicts of Tehran are drawing new borders for the city; Mega Scale. It is not limited in the border of province anymore.

What the High Council of Architecture and Urban Planning is dreaming for Tehran for a 20-year vision which sounds too banal and limited. It seems that it is just a selection of the out-of-date issues of urban planning which transformed to a vision-like prescription for Tehran;

Clean City, Smoothly moving City, Green City, Cultural City, and Dynamic City with “Modern-Traditional” fabric!



In this Chapter, it has been tried to monitor and revise the changing structure of the City, especially future urban growth based on new planned infrastructure. And evaluate them according to political wills to apply the changes in the future.

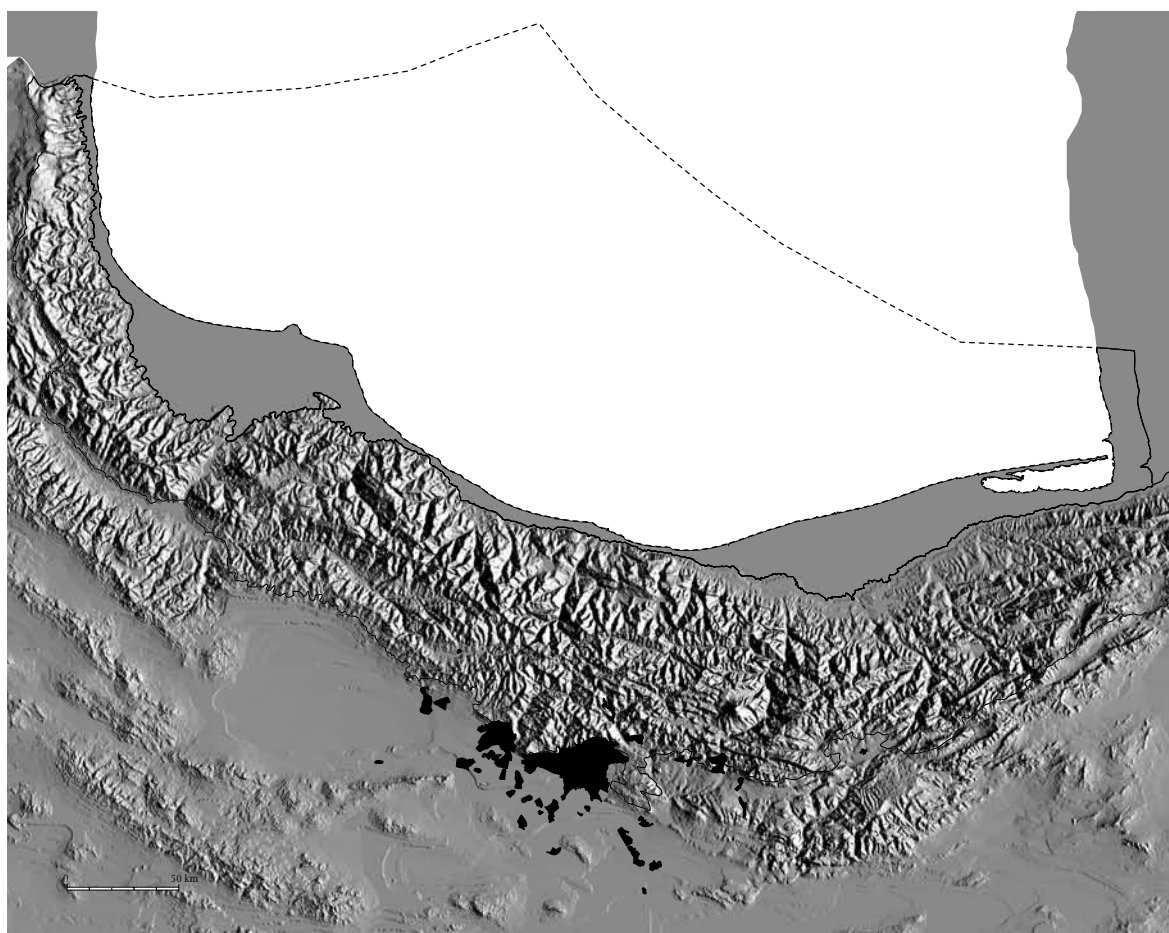
Again the new infrastructural projects are going to shape the Mega-city of Tehran in 2050; the construction of the rest of the metro network can change the city to have a definitely polycentric structure but in the other hand, the other mega project, Tehran- Caspian Coast freeway, which will connect Tehran to the coast in less than an hour, will have a massive impact on the city form. These factors have not been considered as part of vision for the city yet.

:The Project, larger than its scale

The idea to construct Tehran- North freeway was for the first time proposed in 1965, but was never put to action until 1996. The giant plan includes construction of more than 30 twin tunnels. The Alborz tunnel situated at an altitude of 2,450 meters will be the longest with a length of 6,300 meters. The four-lane freeway has a length of 121 km with a transport capacity of 6,000 vehicles per hour, and provides a shortcut from the capital Tehran to the Caspian Coast, reducing travel time from nearly five to less than an hour. [\[38\]](#)

Once completed, the passenger transfer capacity between the two provinces will increase by 20 times, which is much needed since Tehran- Caspian Coast freeway is one of the busiest throughout the country, especially during national holidays when the Coast hosts a large number of tourists.

Additionally, the project is part of the Persian Corridor international mega-project which connects Persian Gulf to the Caspian Sea. It will link Tehran to the northern neighbours; Azerbaijan, Russia and Turkmenistan. According to the Ministry of Roads and Transportation report the first phase of the freeway will become operational in 2011.

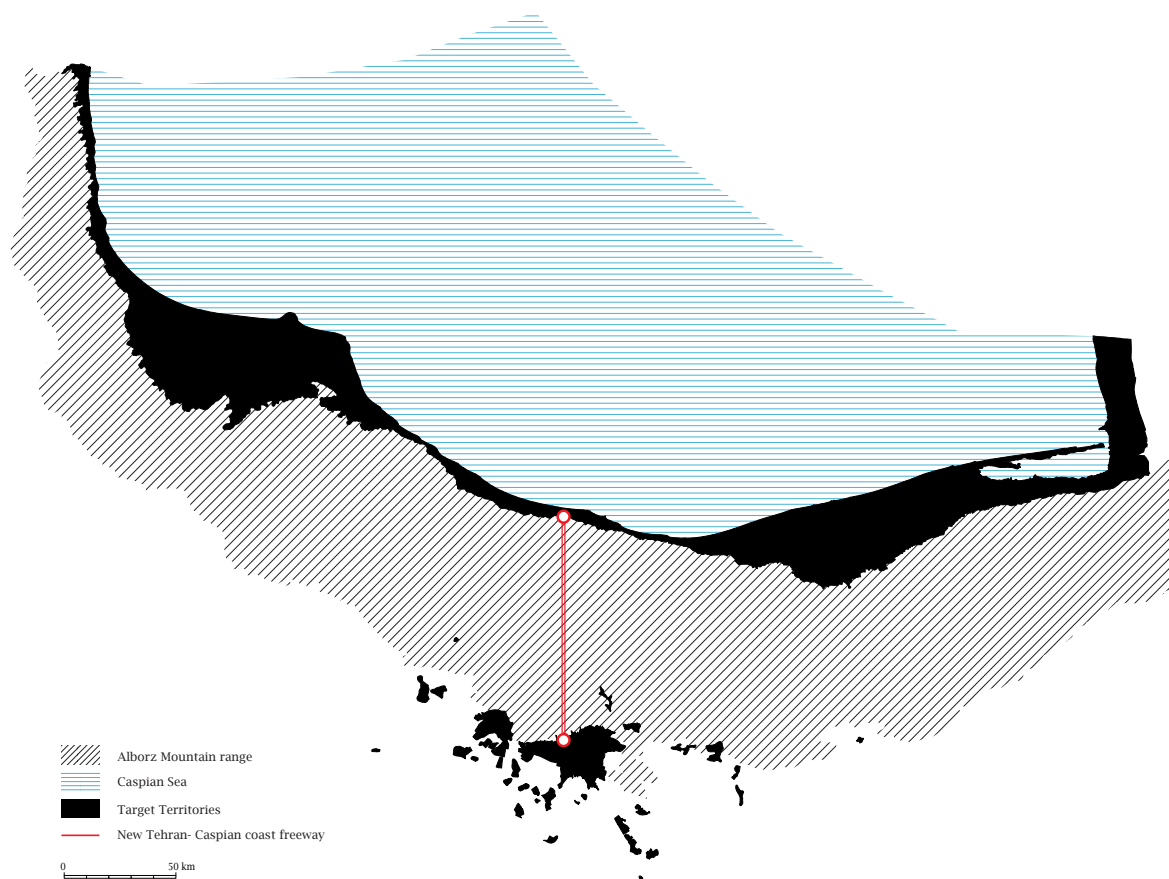


Iran-North, Topography map.
Source: GIS data, Tehran Geographic Information Centre.
© Hamed Khosravi 2009.

As Tehran is geographically limited by Mountain in the North and East and Desert in the South, the only corridor to grow is West part.

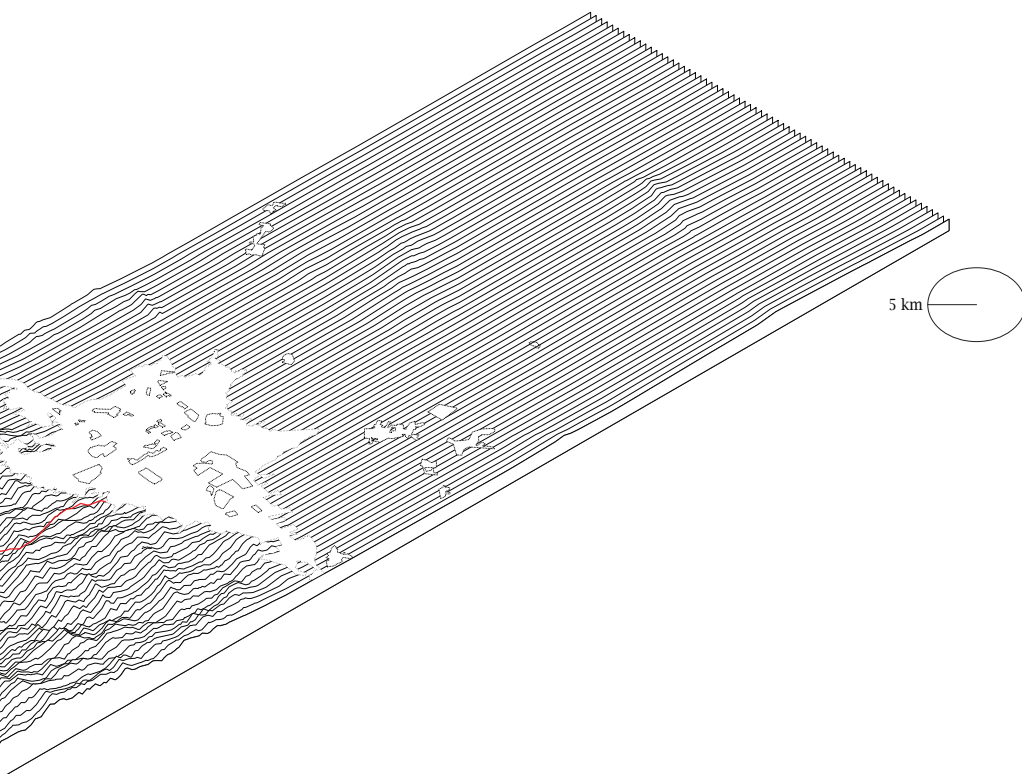
During last 50 years industrial land-uses have located themselves in the west and south western part of the city. This process has turned the small city of *Karaj* in the western part, to the main urban node with the population over 1.5 million as the main satellite city of Tehran. The future expansion of Tehran to the South and West is not desirable anymore, it is mostly because of the proximity to the desert and leftover industrial sites which have turned the western part to Dross-scape.

New Freeway in the North part can be the scape route of the city from its natural boundaries.



Iran-North, Geological Zoning map.
Source: Based on GIS data, Tehran Geographic Information Centre, © Hamed Khosravi 2009.





Tehran-Caspian Coast axanometric perspective.
Topographic section with 50 km width and average 180
km long from the Central desert of Iran to the Caspian
Sea, crossing Tehran valley, Alborz Mountain range and
Caspian Delta Region.
Source: Based on GIS data, Tehran Geographic Informtion
Centre, © Hamed Khosravi 2009.

Hypothesis 00:

Approaching Northwards

In a larger view, the new freeway will have a dramatic effect in the whole region. While Tehran will suffer of being over populated, this tunnel will direct the urbanisation flow from the Mega city of Tehran to the north. In a few years Tehran, with its floating spatial structure, will be connected the Caspian Sea, mountain and the Desert together in less than one hour!

By looking back to the 500 years history of urban transformation of Tehran, which is completely influenced by infrastructural projects, led by political desires, the near-future of the city can be dreamed as big challenge to face the Peak-Oil and environmental crisis. Need for a regional vision is inevitable.

The questions are How the Region can be inhabited by 30-40 million people? Is it flexible enough to host such a large urbanisation? Which kind of spatial structure should it have? Can it behave still like “one” city?

:Notes

[1] Judge Joe Dredd is a Comics character whose strip in the British science fiction anthology 2000 AD is the magazine's longest running (having been featured there since its second issue in 1977. In the strip, the Earth has been badly damaged by a series of international conflicts, much of the planet has turned to desert, and so populations have tended to aggregate in enormous conurbations known as 'mega-cities'. The world of Judge Dredd is centred on the megalopolis of Mega-City One

[2] American-Canadian science fiction writer. He is famous because of some special terms which introduced to the world and popularize later such as Cyberspace. The Sprawl trilogy is one of his famous works which is set on near-future and mostly take place in the Sprawl urban environment in the east coast of US.

[3] Has quoted from www.io9.com, "A Map of Your Future Mega-Cities and Megalopolises".

[4] Florida, R. and others, "The rise of the Mega-Regions", The Royal Institute of Technology (CESIS). Sweden- April 2008.

[5] World Urbanization Prospects, "The 2007 Revision High-lights", UN, New York, 2007. www.un.org

[6] Bertaud, Alain, "Tehran spatial structure: Constraints and Opportunities for Future Development, National Land and Housing Organization, 2003.

[7] See for example documents for America 2050, New York 2030, and Paris 2030.

[8] New Town is the research run by Dutch organization "The International New Town Institute" for studying the past, present and future of planned communities in an urbanizing world. www.newtowninstitute.org

[9] There is a morphological term in study of Persian cities that they displaced in their surrounding areas during the history. This phenomena is mostly happened because of changes in the river path [in general, natural resources' conditions], natural hazards like earthquakes and flooding and also being destroyed in the wars and invasions [like Mongols attack].

[10] Jacobs, Jane, "The Economy of Cities", Random House Inc., New York. 1969.

[11] Curzon, G., "Persia and the Persian Question", Longmans Green, London, 1892.

[12] Madanipour, Ali, "Early modernization and foundations of urban growth in Tehran", *Gahname*, No. 9, Verein Iranischer Naturwissenschaftler und Ingenieure (VINI) in der Bundesrepublik Deutschland e.V., June 2006.

[13] AbdolAzim holly shrine located in Rey city in southern part of Tehran. It was one of the main four elements of Tehran [Rey] based on the Persian city model, the Religious component.

[14] Madanipour, Ali. See 12.

[15] Ettihadieh, M. 1983, 'Patterns in Urban Development; the Growth of Tehran (1852-1903)', in E. Bosworth & C. Hillenbrand, eds, *Qajar Iran, Political, Social and Cultural Change 1800-1925*, Edinburgh University Press, Edinburgh.

[16] Curzon, G., See 11.

[17] Ibid.

[18] Alemi, Mahvash, "The 1891 Map of Tehran, Two Cities, Two Cores, Two Cultures", *Journal of Islamic Environmental Design Research Centre*, 1985. www.archnet.org

[19] Katouzian, Shahab, "Tehran, Capital City: 1786- 1997, the re-invention of a Metropolis", *Journal of Islamic Environmental Design Research Centre*, 1996. www.arch-net.org

[20] Alemi, Mahvash, See 18.

[21] Madanipour, Ali. See 12.

[22] Ettihadieh, M. See 15.

[23] Ibid.

[24] Madanipour, Ali. See 12.

[25] Iran Plan and Budget Organization report, 1987.

[26] Lockhart, Laurence, "Famous Cities of Iran", Walter Pearce & Co. Brentford, Middlesex, 1939.

[27] Lockhart, Laurence, "Persian Cities", Luzac, London, 1960.

[28] Elwell-Sutton, L.P., "Modern Iran", George Routledge & Sons, London, 1941.

[29] Motamani, M., "Enhetat-e Bakhsh-e Ghadimi-e Shahr-e Tehran" in Masael-e Ejtemai-e Shahr-e Tehran, a colloquium by Institute of Social Research and Study, University of Tehran, Tehran University Press, Tehran, 1964.

[30] Madanipour, Ali. See 12.

[31] Victor Gruen is an Austrian-American architect which introduced the Idea of the Future Metropolis based on the American capitalistic world view. He was designer of the Tehran Masterplan in 60's by collaboration with local architect, Aziz Farmanfarmaian.

[32] Vanstiphout, Wouter, "The Saddest City in the World; Tehran and the legacy of an American dream of modern town planning", The New Town Online Articles, 2006. www.thenewtown.nl

[33] Iran-Iraq war which started in September 1980 and lasted till 1988.

[34] Gholam Hossein Karbaschi was the Mayor of Tehran, between 1988 and 1998. He is considered politically reformist and is a close ally of former president Mohammad Khatami. He was arrested, tried convicted and imprisoned on corruption charges in what the New York Times claimed "was widely seen among moderates as a politically motivated attack" by the Government's conservatives and hard-liners to thwart President Mohammad Khatami's reformist agenda.

[35] Ehsani, Kaveh, "Municipal Matters: The Urbanization of Consciousness and Political Change in Tehran", Middle East Report, No. 212, Pushing the Limits: Iran's Islamic Revolution at Twenty, 1999.

[36] Tehran Municipality official website: www.tehran.ir

[37] The revised masterplan by ATEC consultant engineers just had some changes about the foreseen density in the 20-year lifespan and introduction of 5 satellite cities around Tehran, but it followed the former masterplan

designed by Gruen- Farmanfarmaian as main structure.

[38] Iran Daily, "Tehran-North freeway still underway", September 17, 2008.

The GeoPolitical

Today Geopolitics can be studied as the new form of politics which in a way controls the world. When Utopian cooperation all over the world have failed to respond usefully to the messiness of contemporary political practices, Geopolitics draws a different map of the world to centralize and concentrate power in specific regions. Energy resources, shared mega infrastructure and military independence are turned to common grammars in geopolitics today.

Since the very first geopolitical form of controlling a territory; Empires, infrastructure has been used as a means of expanding the power. Somehow it has been used to provide less tribute and indirect control. That is how worldwide land and maritime routes have developed. Today military forces has replaced with large-scale business and trades and the role of infrastructure slightly changed to directs the urbanisation via energy, capital and human flows.

:Tehran at the Crossrads

Many historians believe that Tehran has selected as the Capital City because of its strategic location in the global network rather than its economical and ecological potentialities;



..... Trans-Siberian Line
 — New Silk Road

The Trans-Asian Railway Network:
 The Main International East-West corridors; Trans-Siberian and The
 New Silk Road which is passing through Tehran.
 Source: Trans-Asian Railway Network, United Nation Report 2009.
 Edited by © Hamed Khosravi 2009

:The New Silk Road

The East-West Axis

Over many centuries, traders, nomadic warriors, prophets, emigrants and adventurers crossed the Silk Road that crossed much of the known world from Europe to the Far East, a 12,000-kilometer route through some of the harshest terrains on earth. But the huge deserts, endless steppes and towering mountains were only the physical barriers that the travellers had to pass; there were also brigands, wars, unfriendly rulers, natural disasters and disease. [\[1\]](#)

By the 16th century, European voyagers had discovered a south passage to Asia around the Cape of Good Hope [\[2\]](#) and the Americas were being explored. In the 17th century, Spain, Portugal and England were competing for dominance of maritime trade between Asia and Europe, sealing the fate of the slower land route. Over the following centuries, the European powers and Russia extended their sphere of influence into the territories of the Silk Road and new national boundaries changed the traders' freedom of mobility. Gradually, the Silk Road lost its purpose and its trade died out.

But now, after many changes, there is once again a trade land route between east and west—not by camel or donkey but by railway. In 1991, the existing east-west lines of national railways in Kazakhstan, Uzbekistan, Turkmenistan, Kyrgyzstan, and Tajikistan were linked to the tracks of the Railways of China. This historical event was made possible by the collapse of the Soviet Union and the new independence of these five central Asian countries. Instead of linking China to

the Soviet Union, the railway suddenly connected China to Central Asia. [\[3\]](#)

In 1996, the railway in Turkmenistan was extended southwards across the border with Iran to connect with the network of Iranian Railways. Thus, the east-west line had reached the Persian Gulf, with links to the Caucasus and Turkey, becoming an important trade artery for Eurasia, just like the old Silk Road.

Now Beijing, Istanbul and Tehran are the largest urban nodes along the corridor. The various services which they already have; business centres, transportation hubs and political seats, make them stronger to function as the main centralities. These potentialities turn them to be the drivers for the whole East-West corridor. Transportation, trade, tourism and energy are the main issues should be addressed. However, political tensions are still setting the invisible barriers between those countries.

:The Accelerator:
Energy Demands

The new Silk Road is largely the result of the confluence of China's and India's economic growth and high oil prices. By 2025, forecasts show, China will import three times much oil as the United States imports from the Persian Gulf.

Security in the Persian Gulf is now as important to Beijing and New Delhi as it is to Washington. China will no longer be content to perch under America's security umbrella, and the Indian navy now more assertively patrols the Persian Gulf. What's more, China and India have far more influence with Iran than Americans do- and less tolerance for a disruptive war. Many of the Iran's political elites are also business elites, eager to find a way out of conflict.

“Charting a path toward greater integration on the new Silk Road will probably be a more moderating force on the Iranian leadership than isolation. Iran's president, Mahmoud Ahmadinejad, may not be too concerned, but more powerful conservative establishment players are more interested in stability (and making money) than war.” ^[4]

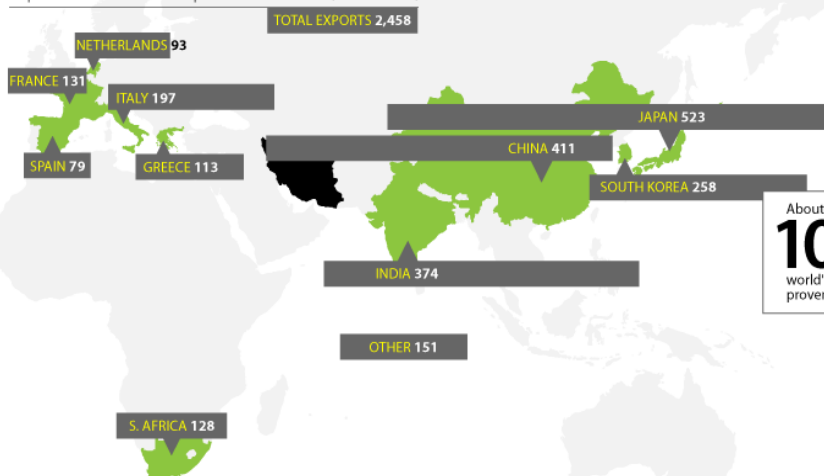
The East-West corridor technically is being developed. The new technologies, fast train and facilitated stations, are planned to apply to the route. Moreover, tourism and trade, especially from Europe to China and Japan are the common desires of the all countries for future investments on the corridor.

The role of Tehran as the mid-point of the corridor with the proximity to the open water in Persian Gulf, is becoming more prominent; now every infrastructural development inside Iran can seen as part of the bigger network system. For example a fast train track from Tehran to the Persian Gulf will change the situation in the whole Trans-Asian network.

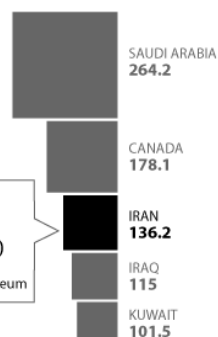
IRANIAN OIL



Top Iranian Crude Oil Export Destinations (Thousand bbl/d)

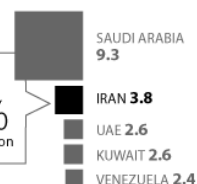


Top Proven World Oil Reserves (billion barrels)



About
10%
world's total
proven petroleum

OPEC Crude Oil Production (million barrels per day)



About
4.5%
of global production

Net oil export revenues amounted to approximately

\$57bn

With oil exports provide approximately half of Iran's government revenues, crude oil and its derivatives account for nearly 80% of total exports.

Subsidies for crude oil and its derivatives cost approximately

11% of its GDP

The National Iranian Tanker Company holds

29 including Very Large Crude Carriers.

Is the largest oil tanker fleet in the Middle East.

Top Iranian crude oil export destinations. Middle East Oil and Gas magazine. www.ngoilgasmena.com

:The Persian Corridor

The North-South Axis

Traditionally there have been strong ambitions towards reaching to the Persian Gulf as the “Blue Water”. [5] The northern neighbours of Iran, Former Soviet Union and now Russia and other new independent countries have always developed different scenarios to strengthen the North-South axis connecting Europe to Central Asia and Persian Gulf. Since the collapse of the Soviet Union the trend has been prioritized; the new independent countries are among the landlocked regions in the Central Asia.

As one of the first attempts, in 1939 the Trans-Iranian Railway was opened. This 1,392 km long connection links Torkaman Port [6] on the Caspian Sea and Imam Khomeyni Port [7] (formerly Shahpur port) on the Persian Gulf.

During the WW II, because of the good relation of the Shah of Iran with Germans in one hand and rising demands of Germans for Oil, Allies worried that Germany would look to neutral Iran [8] for help. They invaded Iran in 1941 and tried to control the most strategic north-south axis of Iran; Persian Corridor which was facilitated by Railway. They saw the newly opened Trans-Iranian Railway as an attractive route to transport supplies from the Persian Gulf to the Soviet region. Britain and the USSR used concessions extracted in previous interventions to pressure Iran (and, in Britain’s case, Iraq) into allowing the use of their territory for military and logistical purposes. Increased tensions with Britain especially led to pro-German rallies in Tehran.

The triangle of main players were arranged by Soviet union in the Northern border of Iran, Britain was controlling Iraq and had the

supervision on the Iranian oil fields in the South Western part of the country and American troops were present in the Persian Gulf and controlling the main ports. The main goal was to connect these three together as political partners in the WW II. The purpose of the invasion in that strategic period was to secure Persian oil fields and ensure supply lines for the Soviets fighting against Nazi Germany on the Eastern Front and send the supplies to the USSR from Persian Gulf via the shortcut of Persian Corridor. It became known as “The Bridge of Victory”.

The docks at Shahpur Port under control on US Army.
Photo: Eugene Warren





Iranian women watch an Allied supply convoy halted somewhere on the Corridor.

Near East Iran - truck convoy of US Supplies for USSR 6/5/1943 Item from Collection FDR-PHOCO: Franklin D. Roosevelt Library Public Domain Photographs, 1882 - 1962

:The International North-South Corridor

Today, the military facilities has replaced mostly by Energy, finance and trade routes. The former Persian Corridor has recently developed as an international corridor connecting Europe to India.

INSTC

International North-South Transport Corridor (INSTC) is a multi modal transportation route established in 12 September 2000 in St. Petersburg, by Iran, Russia and India for the purpose of promoting transportation cooperation among the Member States. This corridor connects India Ocean and Persian Gulf to the Caspian Sea via Iran, and then is connected to St. Petersburg and North European via Russia Federation. Actually it can be seen as revitalization of the Old Persian corridor. The INSTC was expanded to include eleven new members, namely: Republic of Azerbaijan, Republic of Armenia, Republic of Kazakhstan, Kyrgyz Republic, Republic of Tajikistan, Republic of Turkey, Republic of Ukraine, Republic of Belarus, Oman, Syria, and Bulgaria. [9] Future developments alongside the INSTC can be traced in three parts:

The Russian Part

Russia has launched a project to build a north-south link, connecting the Baltic and Russia to Iran and the Persian Gulf. It has opened a new port at Olya [10], on the Volga delta, connected to the river and canal system, and to the rail network that runs parallel to the river, providing for fast container transport. It also has plans to supplement the maritime route by developing a coastal rail link, modernising the existing track between Azerbaijan and Iran. [11]

The Caspian Part

The third meeting of the joint working group on transportation of Iran and the Russian Federation was held on 11 to 13 August 2009 in Moscow, Russia, with the participation of representatives of the two countries in all the relevant sectors, such as road, rail, maritime and aerial transport.

“In the maritime committee, the representatives of the two countries signed the memorandum of understanding (MOU) for the sister-ship of the ports of Amirabad [12] & Olya, and Nowshahr [13] & Makhachkala. [14] The two sides also agreed in this meeting that the procedure for the calculation of port charges for Ro-Ro ships [15] in the two countries be revised accordingly. It was also decided that the Russian side announce the time table of its Ro-Ro ships to the port of Anzali [16], the number of border control and customs officers be increased with the aim facilitating and expediting the provision of required services, and that the Russian side consider the issue of the increase of icebreaker vessels in the port of Astrakhan during the winter.” [17]



:The Accelerator:

Energy Transportation

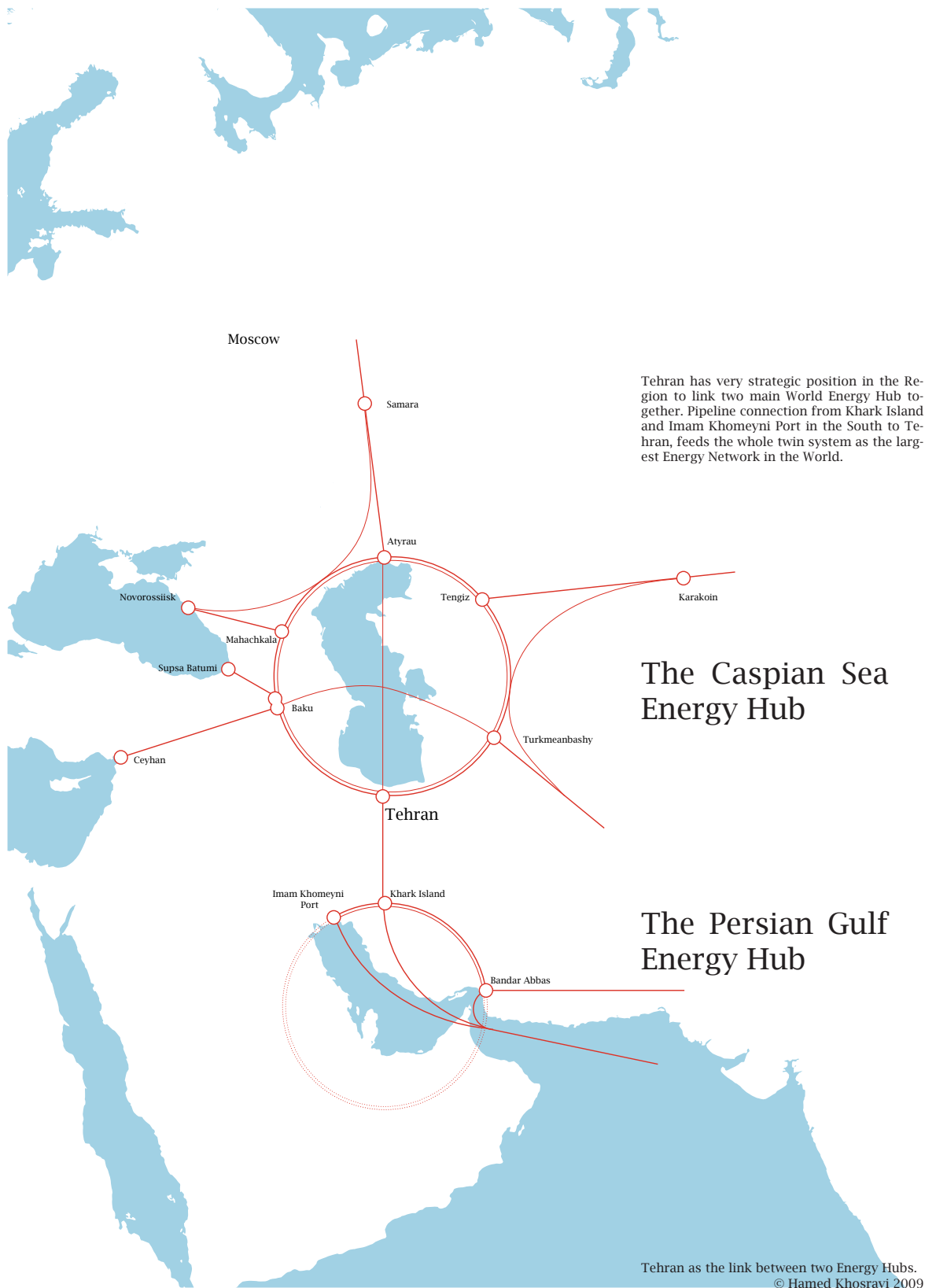
The transportation of energy not only creates various forms of interdependence between producers and consumers but also involves numerous actors and stakeholders. This situation increases the complexity of planning and building pipeline systems. For energy-thirsty consumers such as Europe, the United States, India and China diversifying the suppliers of energy contributes to reducing vulnerability created by dependence on a specific energy source (oil), from an insecurity-ridden supplier (the Middle East).

Diversifying energy suppliers increases energy security. In this context the gas and oil resources of the Caspian are of great interest to China and India, whose economic growth relies on increasing demand for energy. At present the European Union imports half of its energy products. The estimates published by the European Commission in 2006, for the G8 meeting in St. Petersburg – suggest that the EU's dependence on energy imports will further increase, reaching 70% of its total energy consumption by 2030 (94% of oil and 84% of natural gas). [21] The role of gas will increase considerably, hence the importance of securing the flow of energy. [22]

The Iranian Part

“More than 15 million tons of shipments have been carried through North-South Corridor within last year of course Iran is following its own projects to expand transit activities, for example the Qazvin-Rasht-Anzali -Astara [18] route is under construction and if this project completes then a consignment can be loaded in Helsinki Port in Northern Europe and after passing the way through railway unloaded in Bandar Abbas [19] and the coasts of Persian Gulf. It means that you can connect two far points via railway, which is basically a very important change in geographical map of the world. This railway route is one of our priorities, and as you know last year Mr. Khatami opened the construction project and the feasibility study phase is completed. The first part of this railway route is 220 kilometres long and the second part, which connects Anzali to Astara, will be constructed by direct cooperation of a consortium including Iran, Azerbaijan and Russia...

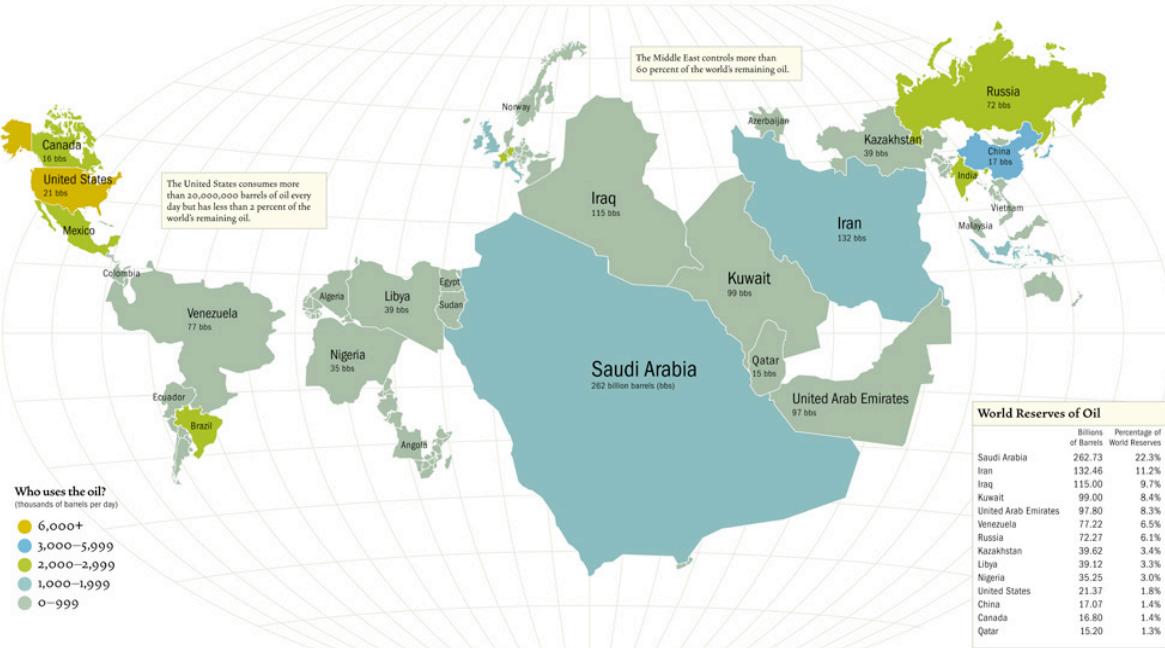
... In the sea area the priority is given to those ports located on the main transit routes for example the AmirAbad Port is constructed and completed for these reasons and many of its post are already active. Expanding the capacity of this port is one of our major plans in 2004 and the work will continue in 2005. Bandar Abbas and Chabahar Port are placed in high priorities for transit activities and we try to continuously increase their carrying capacity and increasing the speed of loading and unloading operations through provision of advanced equipments.” [20]



Iran as OPEC's second largest oil producer [after Saudi Arabia] and the fourth largest oil exporter in the world has a significant role in the energy network. Moreover by having the second largest Gas reserves after Russia, it is identified as the pivot point in the region. 90% of the Iranian Gas and Oil export is through Persian Gulf where political conflicts and military presence has created an uncertain condition, While most top export destinations located in the North of the country; China, Japan and EU. [\[23\]](#)

Strategically Iran has started to invest on the new regional pipeline network, to use lower risk and shorter distances in the north. Currently an extensive pipeline network is under construction which connects the main Iranian energy hubs in the Persian Gulf to the new hubs by the Caspian Sea. This amount of input energy in addition to potential reserves in the Caspian Sea can make the region as one of the largest energy hubs in the world.

Who has the oil?



Who has the oil: Each country's size is proportional to the amount of oil it contains. (oil reserves).
Source: BP Statistical Review Year end 2004 and Energy Information Administration.

The Geopolitics: Caspian Sea Region

Since the early 1990s, the Caspian Sea region has been seen as a potential major oil and gas producer. Following the 9/11, 2001 terrorist attacks in the United States and the 2003 war in Iraq, energy consumers have shown more interest in the Caspian region and Central Asia to supplement energy supplies from the Middle East and to contain militant Islam. There is competing pipeline schemes which causes conflicting interests between United States, Russia and China.

There is room for cooperation, particularly in the areas of combating terrorism and restricting drug trafficking. Political stability and economic prosperity in the Caspian Sea/Central Asia would serve the interests of all concerned parties. [24]

Legal issues regarding the Caspian Sea reflect Caspian politics. They are also a “wild card” that each country uses to enhance its position. They arise because the Caspian is not technically a “sea” as defined by the 1982 UN

:Legal Issues

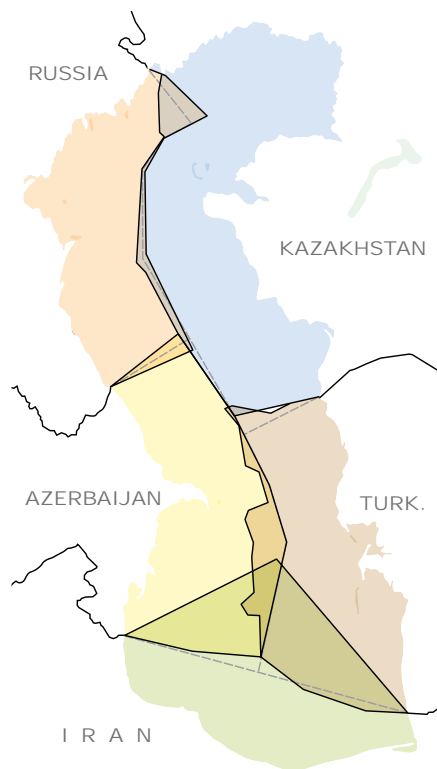
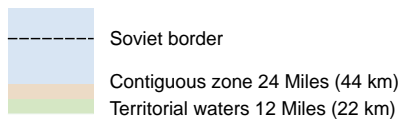
Convention on the Law of the Sea, but rather “a special inner sea”. Up until the end of the Soviet Union, the sea was joint Soviet-Iranian property by the Protocol of 1940. With the breakup of the Soviet Union, conflict between the littoral states-Azerbaijan, Turkmenistan, Kazakhstan, Iran, and Russia - for ownership of the Caspian began.

Both Russia and Iran want to see the five states share the resources since their immediate offshore waters do not contain significant reserves. At first, Russia took a hard line, opposing any division of the Caspian among the five states. Since then, Russia has proposed a condominium approach whereby the seabed would be divided into five sections, but the water above shared. This means that to start an oil project, all five littoral states would still have to vote on it beforehand. Motivated by a feeling that oil and gas development will go on regardless of legal issues and a desire to share in Kazakhstan's success, Russia came to an agreement with Kazakhstan on demarcation lines in August 1998. Iran, on the other hand, is still arguing for a shared seabed, either that or a redrawing of demarcation lines that would give Iran a substantial increase in offshore reserves. Turkmenistan is reluctant to agree to divide the seabed because of three reasons: a dispute with Azerbaijan over an offshore oil field, close ties to Iran, and a lack of its own offshore reserves.

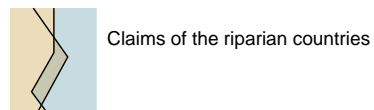
Azerbaijan, on the other hand, wants to see the agreement go further and divide the “water-column”. Kazakhstan and Turkmenistan, since the beginning, have not been supportive of the Azeri stance, jealous of Azerbai-



If the Caspian was a sea...



If the Caspian was a lake...



The uncertain status of the Caspian Sea.
Source: Environment and Security: Transforming risks into cooperation the case study of the eastern Caspian region

jan's far greater offshore oil reserves. In the future, however, Kazakhstan will want freedom to explore its own oil reserves.

Legal issues concerning the Caspian Sea really come down to economics and geopolitics. The issue surfaces whenever there is something to be gained or lost. [\[25\]](#)



Caspian Sea, Baku- August 2004
Source: Yep. www.flickr.com

Hypothesis 01:

Energy Geopolitics

Based on the current international political strategies, as the impact of sanctions and political isolation, Iran will invest more on the regional cooperation. The relationship with the northern neighbours; Azerbaijan, Russia, Turkmenistan, Kazakhstan and Turkey will be strengthened.

Iran's Geopolitical vision, as one of the main exporters of Oil and Gas, will be drawn around finding new ways of collaboration on extraction, production and shipment of the new resources of energy which now are focused on two main regions; Persian Gulf and Caspian Sea.

The development of an extensive energy network in the Caspian Sea Region will bring the neighbouring countries' desires in a common ground. Two main global corridors will strengthen the unity of the Region in terms of transportation, production and tourism development. It can be seen as the process of emergence of a new Regional Metropolis around energy network and transportation.

:Notes

[1] Jones, Benjamin, "The Silk Road", the World Tourism Organisation, Spain, 2007. www.unwto.org

[2] The Cape of the Hope is a rocky headland on the Atlantic coast of South Africa. Since years by a very common misconception, that the Cape of Good Hope is considered the southern tip of Africa and the dividing point between the Atlantic and Indian Oceans.

[3] Otsuka, Shigeru, "Central Asia's Rail Network and the Eurasian Land Bridge", Japan Railway & Transport Review, September 2001.

[4] Molavi, Afshin, "The New Silk Road", the Washington Post, April 9, 2007.
<http://www.washingtonpost.com/wp-dyn/content/article/2007/04/08/AR2007040800923.html>

[5] The term blue-water navy is a colloquialism used to describe a maritime force capable of operating across the deep waters of open oceans. While what actually constitutes such a force remains undefined, there is a requirement for the ability to exercise sea control at wide ranges.

[6] Torkaman Port is one of the oldest Iranian ports by the Caspian Sea located in the extreme eastern coastline. The first Trans-Iranian railway linked this port to the Persian Gulf in the south.

[7] Imam Khomeini Port [Shahpur Port] is an Old Iranian port by the Persian Gulf which is connected to the Iranian Railway and developed mostly by British as an oil export hub before Islamic revolution.

[8] Iran supposed to be neutral in WW II but during the start of the war the Allies demanded that Iran remove German nationals from Iran fearing they might be Nazi spies or harm the British-owned oil facilities, but Shah refused. And Allies invaded Iran.

[9] www.instc.org

[10] Olya is the newly developed Russian port in the mouth of Volga which currently has Ferry routes to Anzali port and Nowshahr Port in Iranian Coast. It is connected to Moscow by railway.

[11] Various Authors, "Vital Caspian Graphics: Challenges

beyond Caviar"-UNEP/GRID-Arendal 2006

[12] Amirabad is newly developed port near Sari in eastern Iranian Caspian Coastline, which is connected to Tehran by railway.

[13] Nowshahr is the closest port to Tehran, located at the mouth of the new Freeway connecting Tehran to Caspian coast. It already has planned ferry line to Baku and Olya but it is not working now.

[14] Makhachkala is a city in Russia, the capital of the Republic of Dagestan. It is located on the western shore of the Caspian Sea.

[15] Roll on-Roll off ships which are designed to carry wheeled cargo such as automobiles, trucks, semi-trailer trucks, trailers or railroad cars that are driven on and off the ship on their own wheels.

[16] Anzali Port is the biggest and oldest Iranian port by the Caspian Sea, close to Rasht.

[17] Report: "Iran & Russia transport authorities met in Moscow", Supplement to Port & Maritime Magazine- Sep. 2009.

[18] Newly planned railway proposal which will connect Tehran to the western Caspian Coastline and to Baku.

[19] Bandar Abbas [Abbas Port] one of the largest ports in the Persian Gulf, located in the very strategic location at Hormoz Strait.

[20] Interview with Atrchian, "Managing director of Transit and Frontier Terminals", Published in INSTC Report, Jan. 2005. <http://www.instc.org/EArchive/EArchiveE/Item.asp?ParentID=26&ItemID=112&Doc=>

[21] The European Union currently imports 45% of its oil from the Middle East and 40% of its gas from Russia (30% Algeria, 25% Norway). By 2030, the EU estimates that 90% of its oil consumption will have to be covered by imports, with over 60% of EU gas imports expected to come from Russia with overall external gas dependence expected to reach 80%. Source http://ec.europa.eu/external_relations/energy/

[22] De Martino, Luigi / Novikov, Viktor, "Environment and Security: Transforming risks into cooperation the case study of the eastern Caspian region", UNEP/GRID-Arendal, France, 2008.

[23] In an article published in the Austrian newspaper Die Presse, Professor Gerhard Mangott from the Austrian Institute for International Policy described the significance of Iranian involvement in Nabucco: "The profitability of Nabucco requires a transport quantity of 31 bcm (billions cubic meters). From the current standpoint this volume cannot be acquired without Iranian natural gas. After Russia, Iran holds the second largest global reserves of natural gas (16 percent). Up to 60 percent of this total resides in largely unexplored gas fields. Access to this gas is strategically vital for the energy security of the European Union." http://asianenergy.blogspot.com/2009_06_28_archive.html

[24] Bahgat, Gawdat, "Strategic Rivalry in the Caspian Sea", the American Political Science Association, 2006.

[25] "Vital Caspian Graphics: Challenges beyond Caviar", See 11.

The Caspian Sea Metropolitan Region

In recent years the Caspian Sea has been the focus of increased global attention. The world-wide decline in oil and gas reserves and the corresponding rise in the price of hydrocarbon have increased interest in an area where there is still growth potential in oil and gas exploration. In addition, the region presents a wealth of opportunities in other areas, including bio-resources, transport corridors, and not least eco-tourism. These new ventures may bring increased prosperity, but they also put pressure on traditional rural communities and the environment.

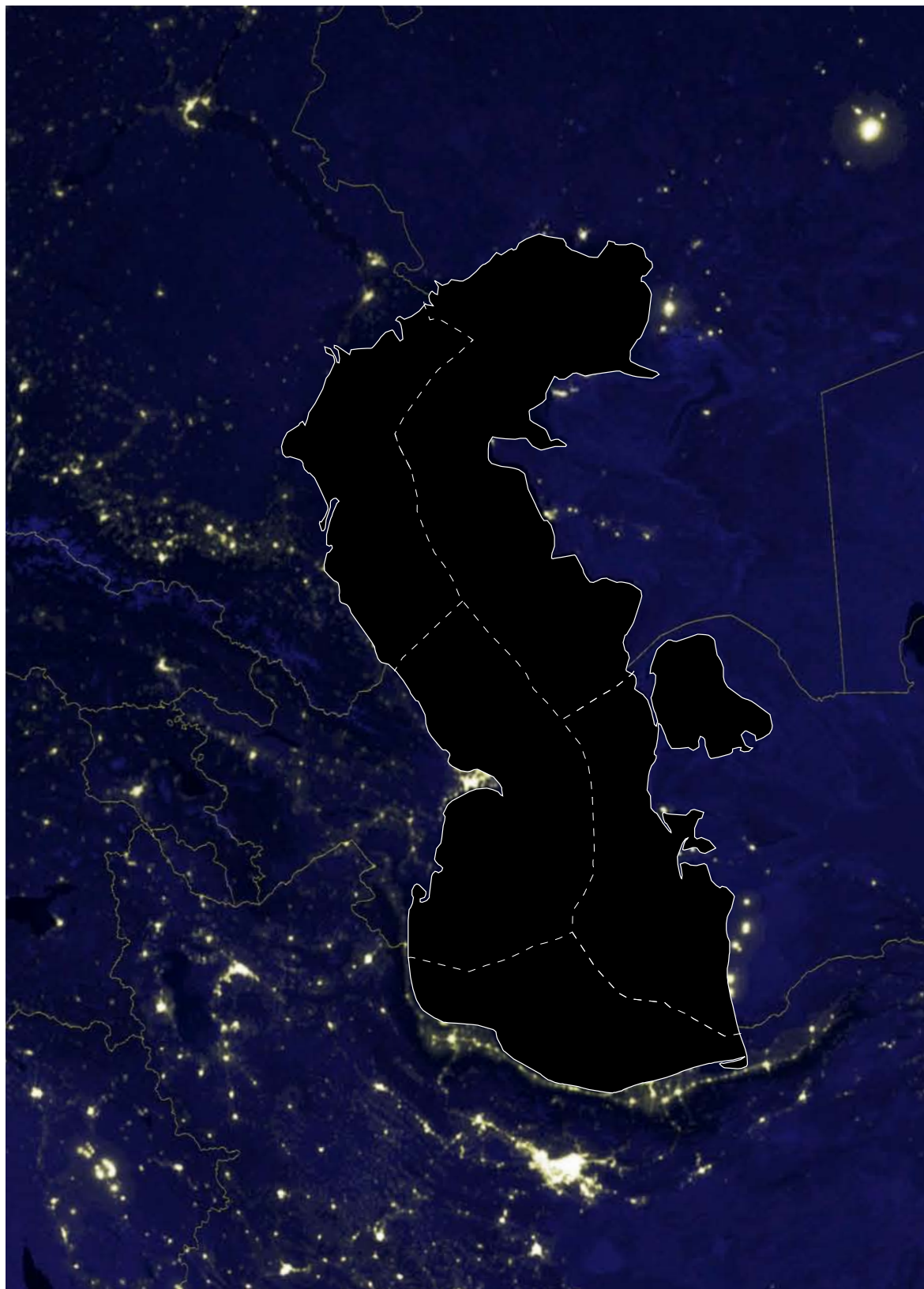
The presence of significant oil and gas deposits and the lack of systematic geological exploration before 1991 rose hopes of unproven reserves, which is competing the Persian Gulf, according to the most optimistic estimates. [1] In a period of growing demand, and worldwide decline in oil and gas reserves and correspondingly high prices for hydrocarbon, these hopes have done much to encourage interest in the region, focusing in particular on the size of its hydrocarbon reserves, its geopolitical influence and the route taken by export pipelines.

In areas where the economic interests vested in natural and mineral resources are as strong as around the Caspian, environmental protection tends to be a low priority. But some of the natural resources such as fish, which form the basis for human survival and economic activities in the region, depend on an intact environment. The exploitation of other natural resources is particularly profitable, because little account is made for pos-

sible negative side-effects.

The region's valuable natural resources – some non-renewable such as oil and gas, others renewable such as fish – are an important factor in relations between states and the various communities living around the Caspian sea. In particular they may create international tension, as for instance with the ongoing discussions about sustainable exploitation of fish resources.

With decreasing overall oil resources, enduring instability in the Middle East, new markets and rising demand for energy, many players have good reason to be interested in the Caspian basin and the export of its resources: states (the producers themselves, the countries through which products transit, and end users), and oil and gas companies. In principle it is in the interest of such players to maintain regional stability in order to secure investments in the energy sector. [2]



Caspian Sea Region, Night Earth View.
Source: www.earth.google.com Edited by © Hamed Khosravi 2009

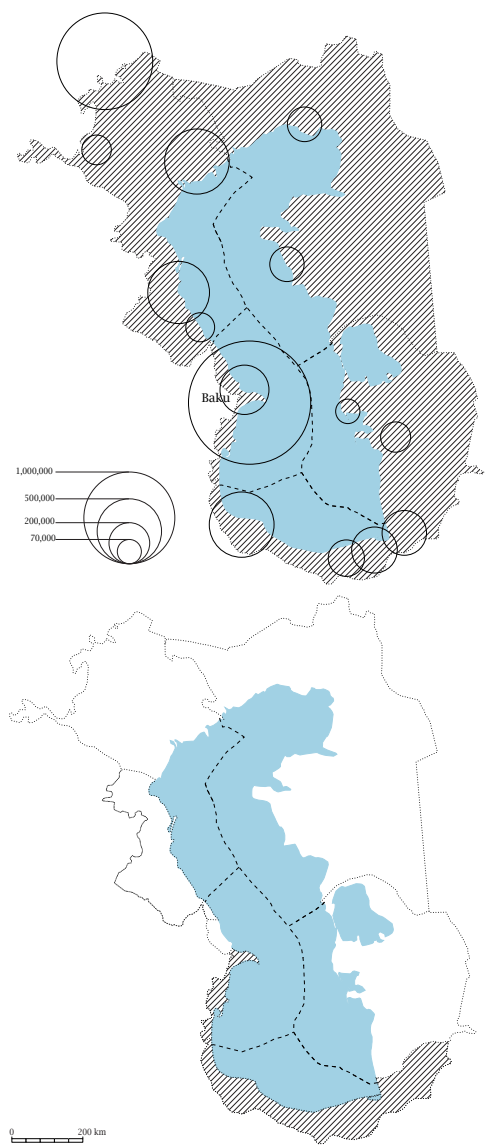
:The Physical

Located at the crossroads between Europe and Asia, the Caucasus and Central Asia, Russia and Iran, the Caspian Sea is the world's largest body of inland water covering 371000 km², slightly larger than Germany. It is land-locked and drains inward. For this reason the inflow of its rivers largely determine the level of the Caspian Sea. With no outlet the Caspian Sea is the repository of all that is transported by and discharged into its waters by the rivers, including pollution.

Human life and the rural economy in these rough conditions strongly depend on the ecosystem's flexibility and stability. Globally significant biological species of sturgeon, Caspian seals, pink flamingo, and about 400 other species live in the sea. Sturgeons look very much as they did 100 million years ago, in the age of dinosaurs. Migration routes of rare species, such as saigak antelope [3], wolves and foxes pass along the semi-desert coastal zones of the Caspian Sea. The north Caspian shelf, Ural River delta, Mangystau peninsula [4]-which boasts impressively diverse and unique geological sites- and the Turkmenbashy gulf are amongst the most important biodiversity areas. They also hold the greatest potential for local eco-tourism. [5]

The area the Caspian Sea is divided into three, approximately equal, parts: Northern, Middle and Southern. Their volumes are extremely different.

The Northern Caspian is the shallowest, and its area makes about 29% of the entire area of the sea, though its volume makes less than 1%. The average depth is 6 meters, maximal



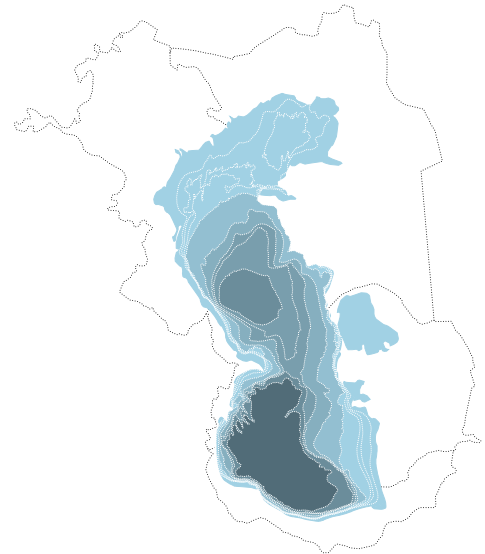


Previous Page, Top: The Caspian Sea Region, Main Urban Centres; Baku, 2 million inhabitants by 2010. Source: Vital Caspian Geraphics.
Bottom: The Caspian Sea Region, Highest urban density in the Southern part [Iranian Coast; Average Density= 150 /km². Source: Based on Wikipedia, Density comparison of each administrative zone.
This Page: The World largest Lakes, Scale comparison. Edited by © Hamed Khosravi 2009

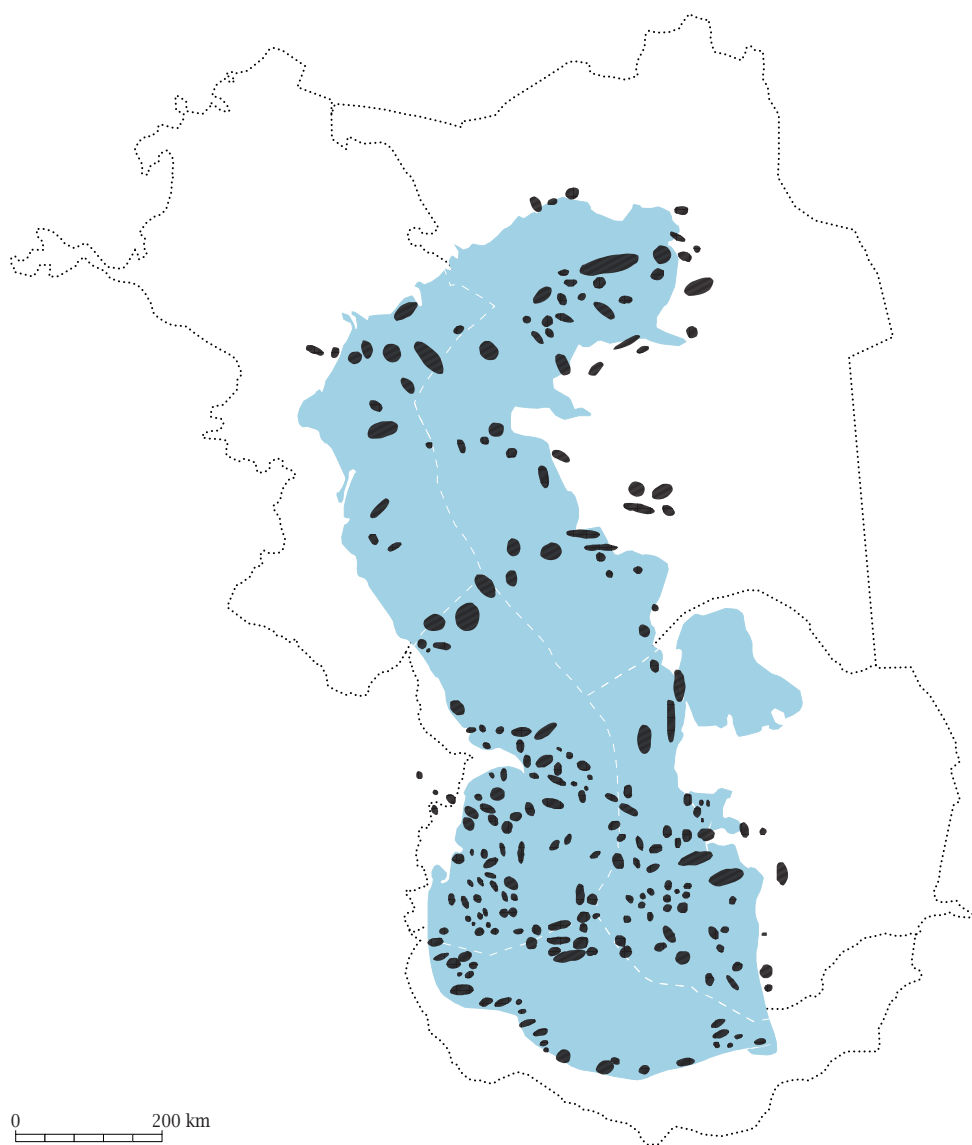
depths do not exceed 10m, and about 20% of the area has the depths less than 1 m. The area of the Middle Caspian makes up about 36% and its volume about 35% of the sea. The average depth of is about 175 m, and the greatest - 790 m. The Southern Caspian has the largest volume - some 64% of the total volume, and its area amounts to 35% of the total area of the sea. It is the deepest part of the sea with the maximum depth reaching 1025 m and the average depth is 300 m.

The coastal regions located to the northeast and east of the Caspian in Kazakhstan and Turkmenistan display many similarities: a dry climate and a mostly desert landscape with very low population density. The majority of the population currently lives in urban settlements along the coast.

The main urbanisation centralities are located on the western and southern part of the Sea. Baku with almost 2 million inhabitants [6] is the largest urban centre, while the densest urbanised area is the southern part, with overall 6 million inhabitants, where the three Iranian provinces are located.

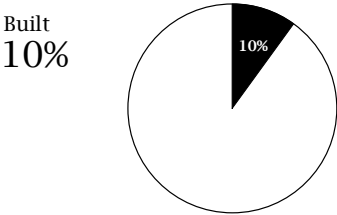


This Page, Top: The Caspian Sea, Depth Zones. Source: Based on Vital Caspian Graphics.
Bottom: The Caspian Sea Region, Main rivers. Source: Based on Vital Caspian Graphics.
Next Page: Proven Oil and Gas field in Caspian Sea, Source: Based on "Storm in a Precious Teacup", The Economist, August 2, 2001.
 All the maps are Edited and redrawn by © Hamed Khosravi 2009.



:Caspian Sea Delta Region

Iranian Coast of the Caspian Sea is about 740 km and the Coastline is about 900 km long. The land descends from the lower slopes of the Alburz Mountains to the Caspian Sea. The coastal plain varies in width from less than 2 km in parts of the western and central parts to more than 40 km in the delta regions and in the Torkaman Steppe to the east.



Total Land Area 10 372 km²

Total Green Area 8 712 km²

Agriculture	5 704 km²
Orchard	1 556 km²
Lawn	830 km²
Forest	622 km²

Total Water Area 56 774 km²

Sea	56 634 km²
River	35 km²
Wetland	104 km²

Total Built Area 939 km²

Total Population 6 000 000 inh.

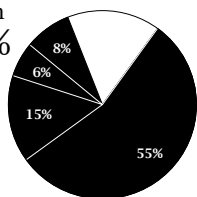
Total Built Area (3D)

FAR	1.2
Average Floors	2

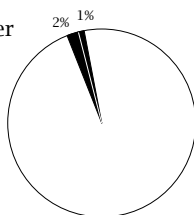


0 50 km

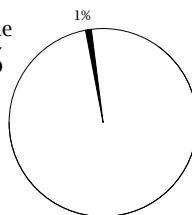
Green
84%



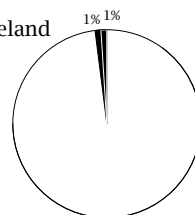
Water
3%



Dune
1%



Wasteland
2%

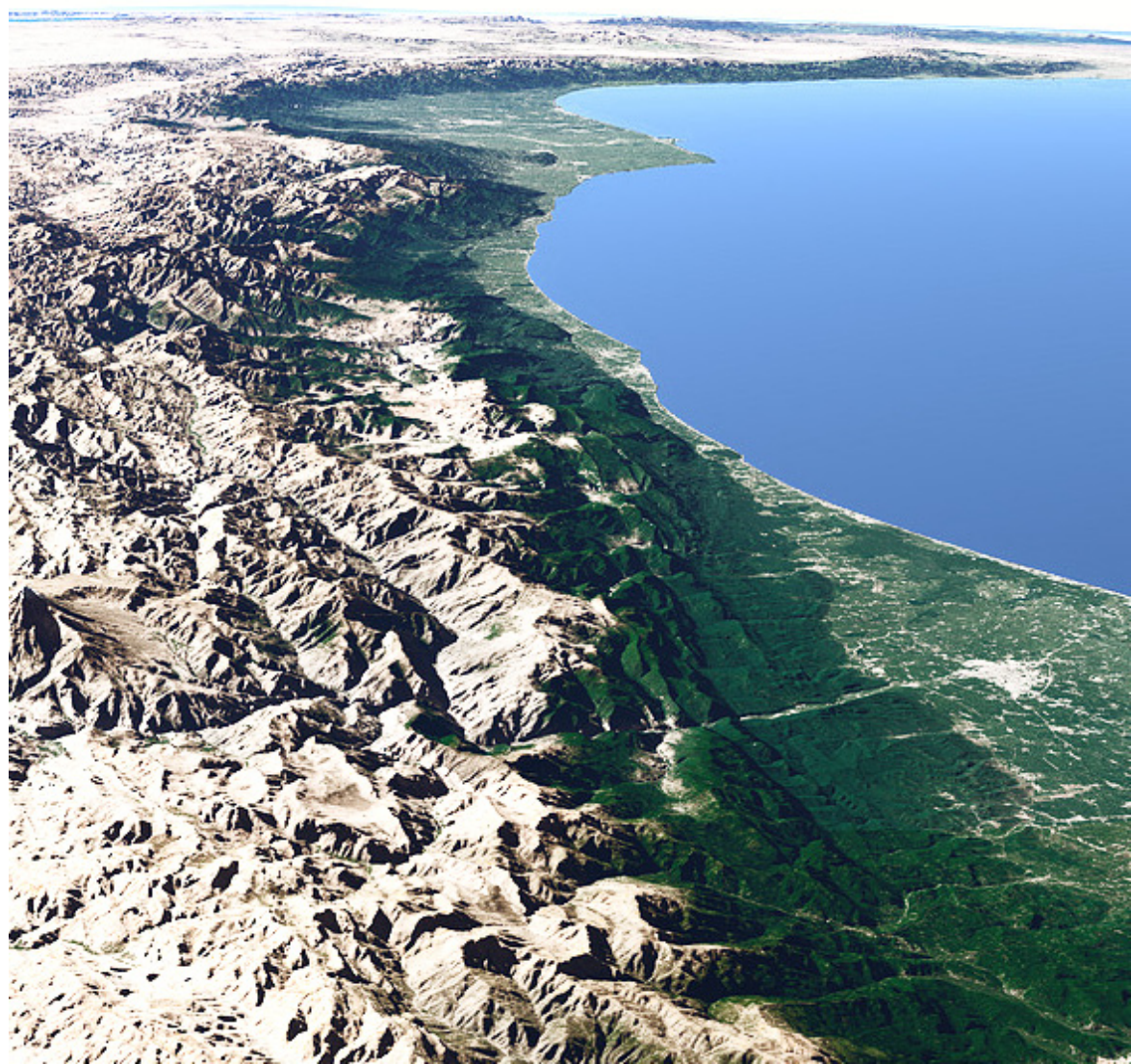


:The Climate

Comparing to the other parts of Caspian region, the southern part has completely different situation. Because it is located as a narrow strip between Alborz Mountain and the Sea, it has plenty of fresh water coming from the northern foothills of Alborz. The proportion of the land, high altitude of the mountain range in the south and Caspian Sea in the north has made an extensive climate system in the region: *Sub-Tropical* climate.

[7] This distinctive situation in southern part has create a *Strip Island* zone in the middle of central Asia and Caucasus, while the other zones around the Caspian Sea have completely different ecological conditions; Eastern part, Turkmenistan and Kazakhstan coastal zone, is covered by salty, dry land, Northern part of the sea is cover with Ice [especially in winters] and except of the Volga Delta which is the largest River Delta in Caspian Sea, the other parts are facing the process of desertification.

High range of evaporation and precipitation has provided very desirable region in case of agricultural productivity and urbanisation in Southern part.



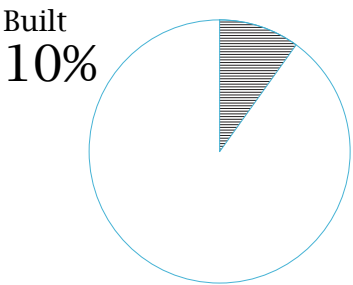
:The Urbanisation

The Caspian Sea Delta Region contains of three provinces: Gilan, Mazandaran and Golestan. Overall coastal population is about 6 million. According to the predicted natural growth, the region has 2.6 growth rate from 1996 to 2011.^[7] This amount will reach to 7.5 million by 2050. ^[9]

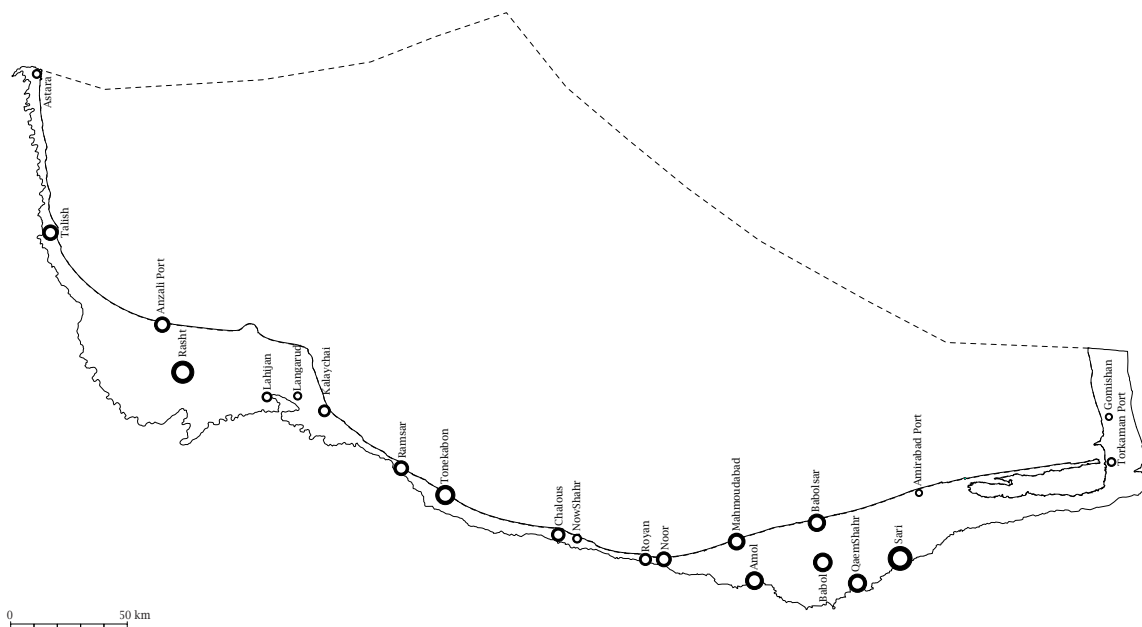
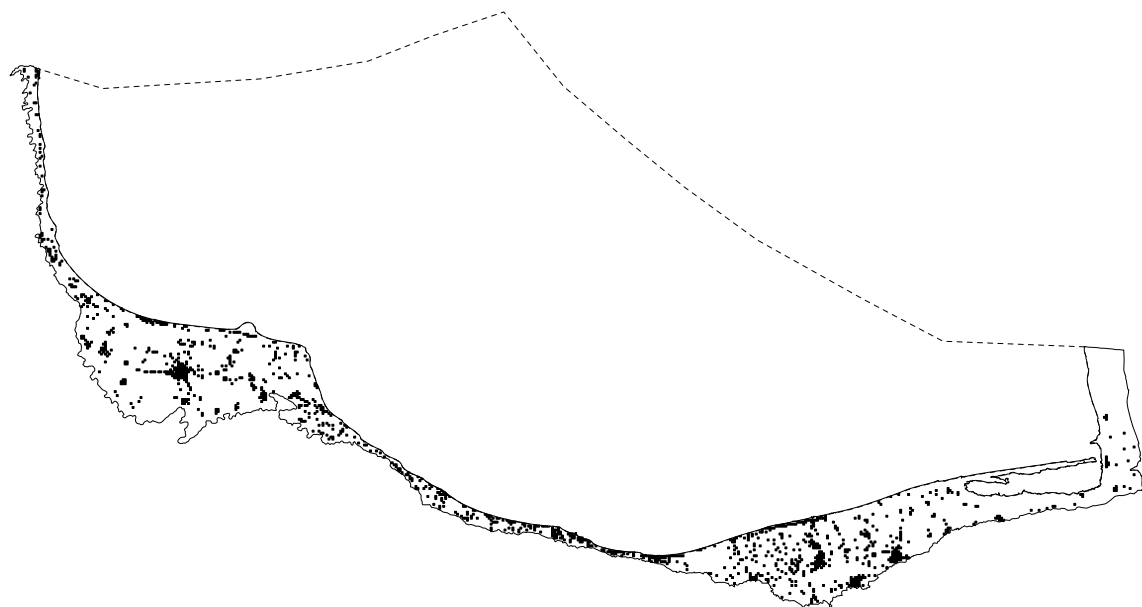
The region, now, is 52% urban and 48%, but the urbanisation will increase in coming years. The process of urbanisation is accelerated by rising amount of construction of Villas and second houses mostly by Tehran's citizens. This trend is dramatically effecting the productivity of the region; by illegal change of the land uses, from agricultural field and orchards to residential, the area is facing a kind of *Sprawl* phenomena.

Moreover, unorganized urbanisation has caused environmental threats; rising amount of car access (asphalt) to the dispersed housing areas, has affected the permeability of the land which caused floodings especially in the rainy seasons. Soil and water pollution has also threatened the region.

There no such centralized urban area in the southern Caspian coast. Two main centres of the provinces are located in the delta of two main streams; *Sefid Roud* ^[10] and *Tajan* ^[11], which together host no more than 900,000 inhabitants. The other main concentration is alongside the coastline, which has connected to each other as a linear urban area by the main coastal road. The rest, are mostly small agricultural villages which has located themselves on the crossroads of water resource [rivers] and secondary access routes.



Next Page Top: The Caspian Delta Region; Urbanisation pattern.
Bottom: The Caspian Delta Region; Main Urban centralities.
Source: GIS Data mapping. by © Hamed Khosravi 2009



:The Infrastructure

Port

During the historical development on the Caspian Sea coastline, there has been always shipping routes, mostly from Iran to Russia. But in Iranian part these ports have never developed so far. Anzali port is one of the oldest harbour towns by the Caspian coast. The port technically has developed in 19th century by Russian engineers. It is close to Rasht, the capital of the Gilan province. Thus, most trade routes of the region, now, end to the Anzali Port.

Amirabad Port has recently built in the eastern part of the region, close to Sari, another main urban centre in Caspian coast. It is already connected to Sari and Tehran by Railroad. It is planned to improve and facilitate the eastern part of the region. Some other ports like NowShahr and Astara do not have wide international connections.

Airport

Four airports: Rasht, Ramsar, Dasht-e-Naz and Nowshahr are currently active in the region, but there are just few international flights from Rasht Airport and the other are being used just for local flights.

Railway

The only railway in this region is the one which has developed in 30's as part of Persian Corridor. It connects Tehran to Torkaman Port and Gorgan. There is an extension which is constructed to link Amirabad port to the railway network which goes from Sari

to Amirabad port.

There is a fast train track which connects Tehran to Anzali port via Rasht. This line is currently under construction and in 3 years will be opened. Another accepted proposal which will be launched in coming years is a local train which will go from Sari to Astara, passing all the coastal cities.

Roads

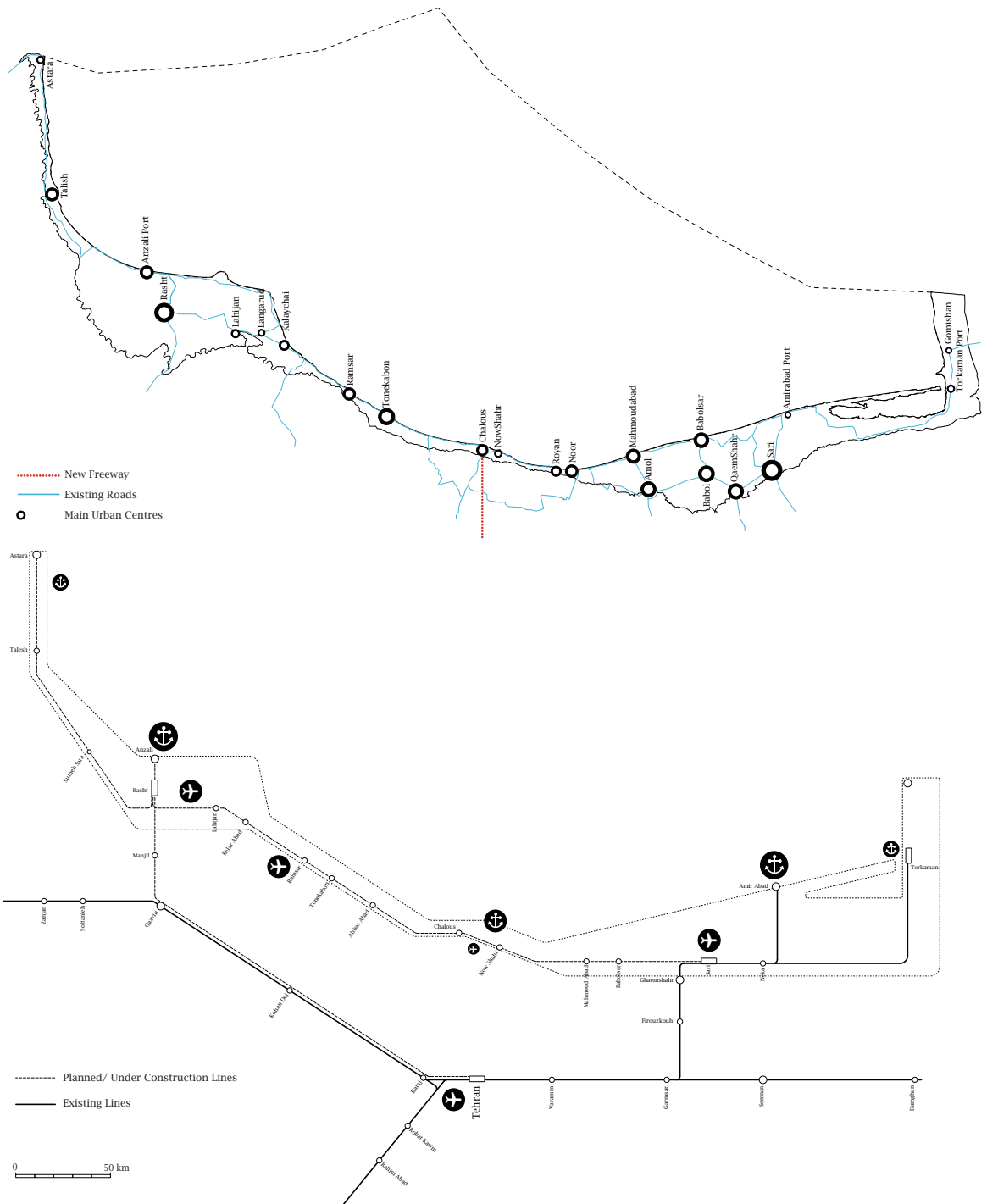
Because of linear expansion of the region along the Caspian coastline, the main regional backbone is the coastal road parallel to the coastline. It is currently linked to Tehran by four main access ways through Rasht, Chalous [10], Amol and Ghaemshahr. Secondary access ways are mainly perpendicular to the coastal road towards northern Alborz foothills.

After finishing the construction of the new freeway which connects Tehran to Chalous in less than an hour, whole the region will be deformed according to *Time-Space* reading of the territory.

Next Page Top: The Caspian Delta Region; Regional Roads and urban centres. Source: GIS Data mapping.

Next Page Bottom: The Caspian Delta Region; Main Infrastructure: Airport, Ports and Railway [Planned and Existing lines].

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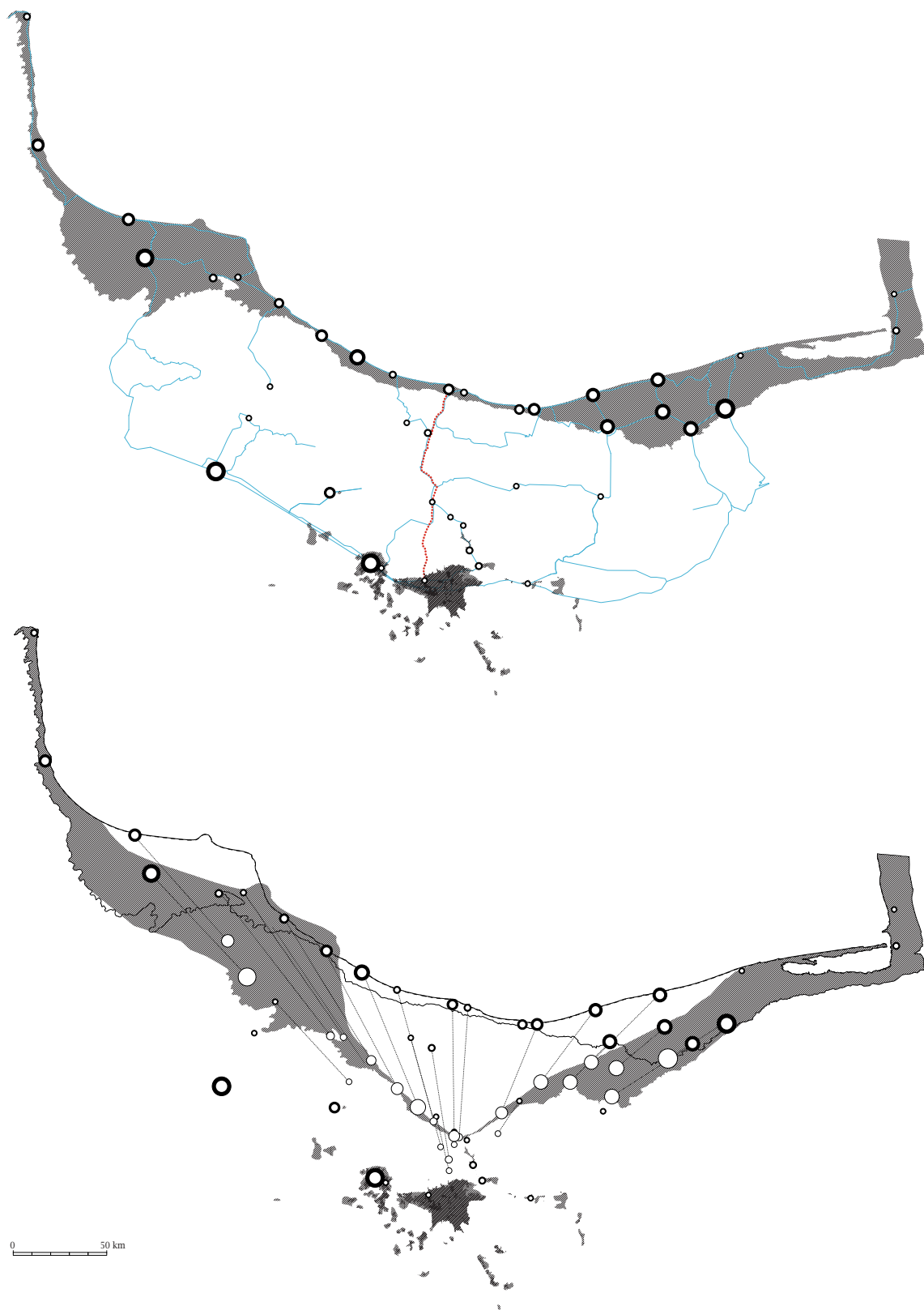
:Time-Space Deformation

Construction of the Tehran-Caspian Coast shortcut will change the access time of the region dramatically. To map these changes a scientific method has been used:

The process is a kind of accessibility map of the region according to the existing connection and new Freeway; the access road of the Caspian Delta region and the neighbouring area, especially Tehran, are selected from the GIS map of Iran. There is an average car speed assigned [according to their definition and traffic rules] to every road type. The access time of each city in the whole network is calculated based on the shortest path. The proportion of current access time and after implementation of the new freeway has applied to each road. According to the new deformation factor all of the distances are re-scaled based on the Tehran [as the centre]. Of course this calculation includes the accessibility of the water which has calculated based on the current access points, harbours, piers and average ferry speed.

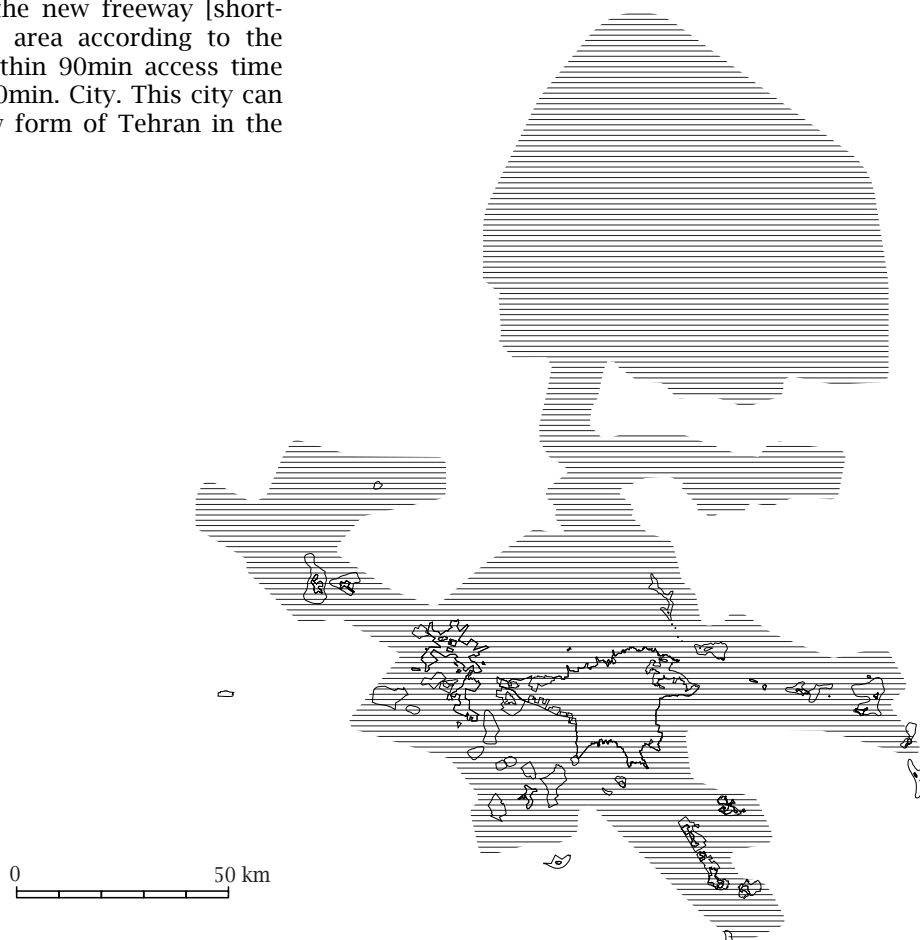
Next Page Top: Nodes and links in the regional network. Source: GIS Data mapping.

Next Page Bottom: Deformation of the territory based on the changes in the access time of each node after implementation of the new freeway. © Hamed Khosravi 2009.



:90min City

The average travel time in the City of Tehran [by car] is about 90 minutes. This scale has perceived by the citizen of the city as an accepted dimension of the city. 90min. has used as the indicator to mark the deformed territory based on the new freeway [short-cut]. The accessible area according to the centre of Tehran within 90min access time has introduced as 90min. City. This city can be identified as new form of Tehran in the future.



90min City Border, The Area of the most probable future expansion of Tehran.

© Hamed Khosravi 2009.



90min City formation: the time-space deformation process of territory after implementation of the new freeway from Tehran towards Caspian coast.

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:The Agriculture

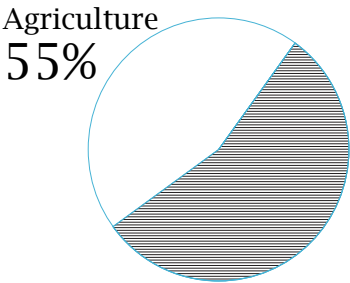
Comparing to the Iran’s overall land which is suited for large-scale agriculture, Caspian Delta Region is one of the most cultivated land in the whole country. About 55% of the total area is dedicated to the Agriculture and orchards which are the food production engines of the country. Region produces %16.7 of value added of the country’s agriculture and fishery. [13]

Because of the rapid growth of urbanisation, most parts of the Agricultural lands and orchards are considered as Agriculture under pressure which needs the urgent conservation plan.

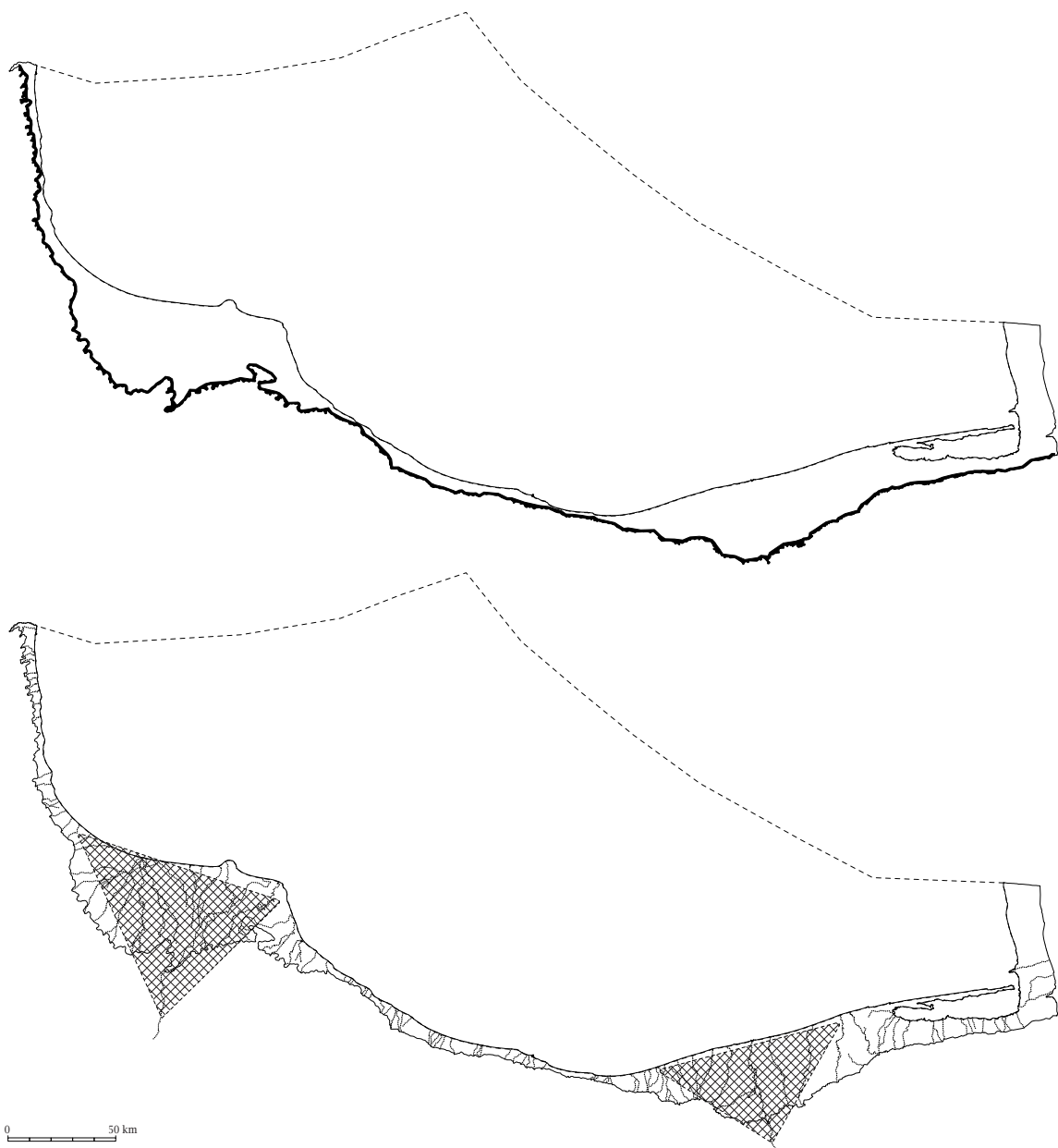
The agriculture is specialized on two strategic products: Rice and Tea. 90% of the Rice and Tea production of the whole country has been localized in the Caspian Sea Delta Region.

Rice fields need extensive amount of water, thus, two main river Deltas are the best place for them; Sefid Roud [White River] and Tajan. The best fields for tea farming are located in the elevation + 1 500 meters. They are mainly located on the northern Alborz foothills on the steep.

The other crops, like wheat, are also developed especially in the eastern part of the region. This kind of agricultural products are vastly industrialized, however tea and rice production are mostly tied up with the high quality traditional and unindustrialized farming; new machinery, automatic irrigation and post production services has largely introduced to the region.



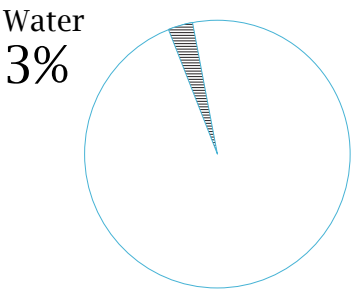
Next Page Top: The Caspian Delta Region; Tea Farms, located in the elevation + 1000 m in the northern Alborz foothills.
Next Page Bottom: The Caspian Delta Region; Rice Fields, located in the two main delta valleys. © Hamed Khosravi 2009.



:The Natural Resources

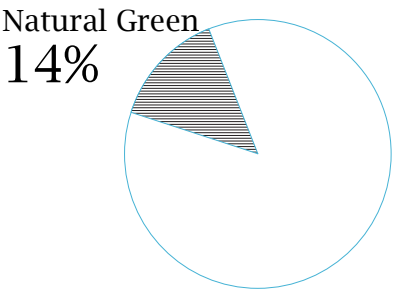
Water

Almost 3% of the land area is covered by rivers and wetlands. There are more than 100 seasonal and permanent rivers which go to the Caspian Sea from northern foothills of Alborz. Because of the steep slope of the foothills most parts of the fresh water go directly to the Sea. Two main Wetlands; Anzali [fresh water] and Miankaleh [14] [salty water] are located in western and eastern parts of the region. These two are the most popular eco-tourism attraction; with rich biodiversity and unique vegetation.



Green

Green spaces are the unique characteristic of the Region. Different types of forest and lawn are covered 14% of the area, which mostly concentrated on the southern edge of the region and extended to the northern foothills of Alborz. Despite of their productivity in terms of biomass energy and livestock production, they are one of the main attractions for the eco-tourism. Because of the definition of the Caspian Delta Region border which is mostly based on land elevation, the main body of the dense forests are not included in the land use of the region.



Next Page Top: The Caspian Delta Region; Main water streams and Wetlands. Source: Based on GIS data mapping.
Next Page Bottom: The Caspian Delta Region; Main Greens; Forests and Lawns. Source: Based on GIS data mapping. © Hamed Khosravi 2009.



:The Tourism

Tourism plays a major role on the Iranian coast, where a pleasant subtropical climate attracts a large number of Iranian vacationers during the hot summer months and Spring times. It is one of the most popular destinations for Iran's domestic tourists. Sandy beaches give way to wide open steppes, thickly forested foothills and eventually the bare peaks of the Alborz mountain range. For many Iranians, especially those from Tehran, the lush vegetation and spectacular natural scenery, along with the tropical summers and mild winters, offer a striking contrast from city life and the dry interior. As a result, the three provinces of Gilan, Mazandaran and Golestan which front the Caspian Sea are facilitated by resort complexes, leisure facilities and holiday homes, [15] which obviously are not enough for the increasing demands.

For the international traveller too, the Caspian coast offers a wealth of attractions and activities. The scenery, climate and natural environment mean that it is one of the best areas in Iran for outdoor activities such as trekking, mountain climbing, camping and horse riding, and with a wider range of biological diversity than anywhere else in Iran, there is great potential for eco-tourism of all kinds.

The Delta Region hosts more than 20 million tourists yearly. The coastline as one of the main tourism attraction is fully built up; 78% of the Coastline has already constructed 34% private ownership and 44% governmental construction. Consequently there are just a few public facilities like beaches and leisure service in the Caspian Coastline and The main attraction for the tourist is almost blocked.



Caspian Sea, Ashuradeh Island- Iran. 2008
Photo: Shayda.photo www.flickr.com

:Energy Production

The Caspian Delta region has the self sufficiency in case of Electricity production. The surplus of the energy goes to the national electricity network which has linked internationally to Azerbaijan, Armenia and Afghanistan to send energy as one of the energy export sections. Most part of the production is by the fossil fuel power plants and hydro-electric plants.

Recently renewable energy has introduced to the region; in 2008, Iran generated 85 megawatts of electricity from wind power, being ranked 30th in the world. Wind power in Iran has been experiencing a growth in wind generation in recent years, and has a plan to substantially increase wind generation each year. Iran is the sole centre producing wind turbines in the Middle East. Considering the advances made in the construction of wind turbines and the resulting decrease in the cost of electricity production, this energy has been mentioned as one of the most suitable renewable energy resources for the production of electricity. Geographically, Iran is situated in the route of the world's main wind currents. [\[16\]](#)



New Wind Farm pilot project in the Caspian Delta Region, Manjil-Iran

:The Mysterious Rise and Fall of the Caspian Sea

From its source in European Russia to where it enters the sea in a one hundred mile-wide web of delta channels, the Volga River supplies eighty percent of the water volume of the Caspian Sea. Once it enters the sea, the only outlet for this water is evaporation. Even in prehistoric times, the size of the Caspian varied widely. During its largest stage, the Caspian probably connected to both the Baltic and the Black Seas, yet when the Caspian was at its smallest, the Volga ran all the way to Baku (now situated midway down the coast) before draining into the sea.

The Caspian reached its lowest point in modern times in the early 1970s after falling twelve feet beginning in the 1920s. In 1977, the water level suddenly began a rise that today puts it back near 1930s levels, having regained almost ten feet. However, even the return of the waters to the Caspian has not been enough to help scientists to pinpoint the cause of their fluctuations in the first place. One factor that contributes significantly, though certainly not exclusively, to the increasing water level is the existing pollution in the Caspian. Leaks from oil fields have created thin films of oil that cover parts of the sea in some areas, thus reducing evaporative water loss.

Former Soviet republics that once considered diverting rivers from Siberia into the Caspian region, in order to stop the fall of the Caspian water level, now struggle to deal with water that stretches twelve miles inland in places that were dry in recent memory. Forty thousand square kilometres of coastal zone has

been flooded altogether. The greatest threat to local residents, tourists, offshore workers, and fisheries could come from the flooding of radioactive soils that remain from the time in which Soviet nuclear weapons were tested underground and nuclear explosives were used to carve out the land.

A one meter rise is the estimate that many in Baku give for what it would take to flood oil wells, pipelines, and refineries along their coast. Unfortunately, continued flooding appears imminent.

Scientists currently forecast that the Caspian Sea will continue to rise another one to one and a half meters until 2020 and will then stabilize over the following forty to fifty years at twenty-six meters below sea level.

The threat is made direr by the desire of many port cities such as Aktau in Kazakhstan to build breakwaters to hold back the rising sea as part of modernization plans in anticipation of increased tanker traffic. Pushing back the seas in populous, industrial areas will only force more water onshore in those that are less populated and less prosperous, such as those contaminated by nuclear wastes. [17]

The high flooding risk area; lands lower than 26 m below sea level.
The areas are mapped based on the topographic GIS data.
Based on the water level rising predictions, by 2050, the Caspian Sea
region will lose almost 16% of its area by flooding.
Source: GIS data analysis. © Hamed Khosravi 2009.



0 50 km

:The Energy Network

As the Caspian is a land-locked region, and there is only a small local demand for oil and gas, there is therefore a need to construct long distance pipelines to Western countries that are dependent on energy imports and see the Caspian basin as a potentially new, non-OPEC source of oil and natural gas. In this regard, gaining control over the Caspian energy resources and pipelines in a region where local and external actors are competing for influence, and pursuing different agendas will be significantly important and is linked to series of political and economic factors. It appears that pipeline policy forms the most important subject in the political and economic developments in the Caspian region. On the other hand, the recent energy crisis between Russia and Ukraine which threatened European energy supply, proved this reality that EU should diversify its energy resources. In this regard, as some European politicians announced, the role of Iran is getting more important in energy supply to Europe. [18]

The role of Iran to manage the whole geopolitical conflicts is now very crucial. It has its main resources of Gas and Oil in the South by the Persian Gulf but by connecting to the regional Pipeline network there is opportunities to export gas and Oil by pipeline from the north to the EU and Far East countries, which are the main consumers, instead of Persian Gulf. Despite of the new hydrocarbon resources in the Caspian Sea, the proven amount of energy resources from the Persian Gulf would guarantee the life of the region as energy hub.

In the other hand, considering the fact that

fossil energy will be replaced by new kind of energy especially renewable energy in coming decades, in addition to extensive environmental threats which is caused by oil transportation, will urge us to find new ways of development towards a green region.

Over and above conflicting interests, some scenarios suggest that drilling for oil and gas could seriously affect the sea level and, worse, trigger earthquakes in this seismically active region. Furthermore, however clean modern oil production may be, it involves the risk of accidents causing serious pollution, typically oil spills during transportation. Nor can it completely avoid continuous emissions during operation. Environmental pollution has trans-boundary effects that need to be tackled multilaterally.

Hypothesis 02:

The Caspian Sea Metropolis

Ongoing disputes and disagreements over the management of natural resources shared by two or more states can deepen divides and lead to hostilities. But common problems regarding the use of natural resources may also bring people together in a positive way. Communities and nations can build mutual confidence through joint efforts to improve the state and management of nature. Environmental cooperation can be an important way of preventing conflicts and promoting peace between communities. Furthermore the environment is a suitable topic to focus people's attention, in particular when they are personally affected. Raising people's awareness of the stakes may be a way of promoting more active participation in political life, and, ultimately democracy and shared economic prosperity.

Tourism, renewable energy production, Green space preservation and sustainable flooding risks management can be key points which will characterize the future of the Region; Caspian Sea Metropolis.

As it is already mentioned in the previous chapter, strategic role of this region in the World Geopolitics as the "Centre" of the *World Island*,^[19] can be the power for the economic engine of the region. Being located at the crossroads of global connections; the new Silk road and International North-South transportation corridor will lead to emergence of the new World Hub. Energy transportation is the driver of regional cooperation which should be developed as an environmental friendly infrastructure.

:Notes

[1] Khan Imran, "Central Asia: Energy pipelines or economic lifelines?" *Alexander Gas & Oil Connections*, January 12 2006. Knight Robin, "Is the Caspian an oil El Dorado?" *Time Magazine, International edition*, 151(26):28, 29 June 1998. Bruce Nelan, "Caspian black gold", *Time Magazine, International edition*, 26(26), 29 June 1998.

[2] Various Authors, "Vital Caspian Graphics: Challenges beyond Caviar"-UNEP/GRID-Arendal 2006

[3] A Very rare kind of Antelope which today only can be found in a few areas in Kalmykia (Russia), Kazakhstan, and western Mongolia.

[4] Mangystau peninsula is located in western Kazakhstan. It borders on the Caspian Sea in the north and west.

[5] Aladin Nicolai, Plotnikov Igor," *Invasive Aquatic Species of Europe*", Kluwer Academic publishers, Netherlands, 2002.

[6] World Urbanization Prospects, "The 2007 Revision High-lights", UN, New York, 2007. www.un.org

[7] Caspian Environment Programme National Caspian Action Plan -Update I (Draft) Islamic Republic of Iran July 2007.

[8] World Urbanization Prospects. See 6.

[9] Ibid.

[10] Sefid Roud is a river, approximately 670 kilometres (416 mi) long, rising in north-western Iran and flowing generally northeast to meet the Caspian Sea at Rasht. The river is Iran's second longest river after the Karun.

[11]Tajan is one of the longest river in the Caspian Delta region which passes Sari and goes to Caspian Sea.

[12] Chalous is one of the largest cities in the Caspian Delta Region. It is located at the mouth of tunnel where the new freeway will connect Tehran to the Coast.

[13] International Monetary Fund - World Economic Outlook, 2009.

[14] Miankaleh peninsula is one of the richest ecological

havens in West Asia and perhaps in the whole world. It is home to many unique Caspian bird and reptile species native to this region. It's also a very important internationally-recognized refuge for migratory birds.

[15] Iran tourism guide: <http://www.iranvisitor.com/index.php?cID=414&pID=1167>

[16] Moj News Agency: http://www.mojnews.com/en/Miscellaneous/ViewContents.aspx?Contract=cms_Contents_I_News&r=353518

[17] Vital Caspian Graphics. See 2.

[18] Moradi Manouchehr, "Caspian Pipeline Politics and Iran-EU Relations", Institute for Political and International Studies (IPIs), Tehran, 2006.

[19] The basic notions of Mackinder's doctrine [doctrine of Geopolitics] involve considering the geography of the Earth as being divided into two sections, the World Island or Core, comprising Eurasia and Africa; and the Periphery, including the Americas, the British Isles, and Oceania

Vision: Impossible

:Towards Ecotopia

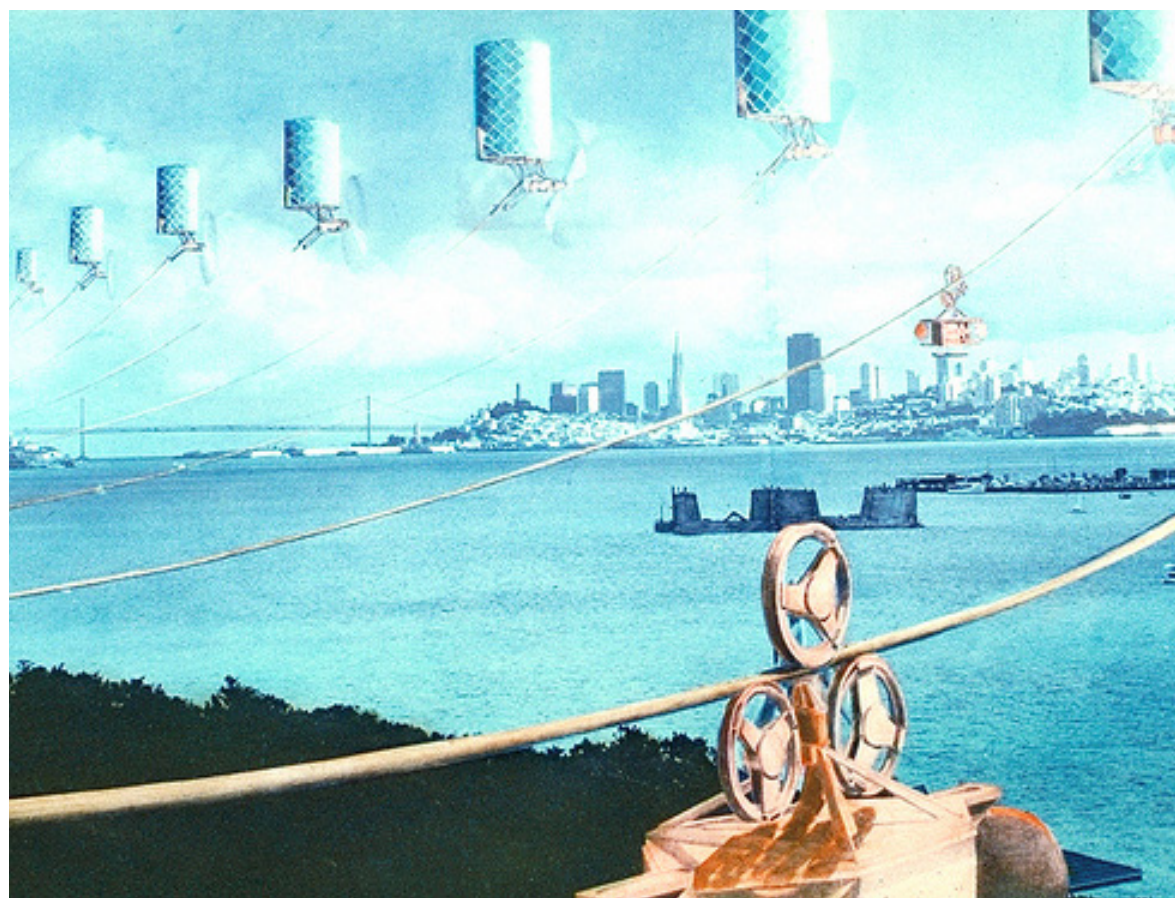
Throughout history, architects and planners have dreamed of “better” and different cities— more flexible, more controllable, more defensible, more efficient, more monumental, more organic, taller, denser, sparser or greener. With every plan, radical visions were proposed, ones that embodied not only the desires but also, and more often, the fears and anxieties of their time. [1] In our time, when fears are more than hopes, Architects and Urbanists have lost the 60's and 70's courage for the visionary thinking. As Future Curators, now, it is time to set the upcoming scenes for a new period of human civilization. Scientists, geologists and environmental specialists will help us in this time to adjust the imagination to an extensive body of knowledge for having more reachable and feasible future.

The geopolitical struggle in the Caspian Sea Region has reached to a point that each side insists on its own profits. There is no common point to agree on. Hence, what is already being threatened is the Caspian Region itself as one of the very Economical/ Environmental potential mega-regions in the World.

In coming chapter, it has been tried to come up with the regional Vision for the Iranian part of the Caspian Coast.

The name *Ecotopia* comes from the title of a brilliant, 1975 novel, by *Ernest Callenbach*. In Callenbach's book, the year is 1999; nineteen years after Northern California, Oregon, and Washington have separated from the United States. *Joel Garreau* in his book describes the Ecotopia: “The inhabitants of these states has taken their final look at the nuclear-and-foreign-oil-addicted, materialistic, wasteful, polluting, military-industrial-oriented, racist, sexist, and soul-mangling direction in which North America was galloping headlong, and decided they wanted out. Through implausible nuclear blackmail, they had forced the rest of the country to allow them to separate and had set up their own independent nation, which they named Ecotopia.” [2]

The situation this is described in the book is in a way similar to the current condition of Iran; International conflicts on reaching to the nuclear energy, neglected pollution-making industries and environmental crisis altogether have made a distrustful atmosphere in which no one can trust the government and there are just hopes for a “Green” Future. Iconoclastically, the idea of Caspian regional metropolis will try to draw a vision for a Utopian Region. There are footsteps to follow; scientifically description of the ecological footprint for every region can help to pinpoint the indicators of the Regional Vision.



Craig Hodgetts' 1978 vision for the cult novel "Ecotopia" includes balloon generators over San Francisco Bay, with a maintenance gondola in the foreground

Ecological Footprint:

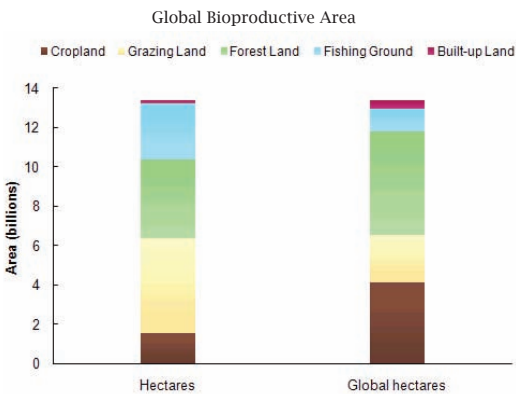
Scientific approach towards Ecotopia

The Ecological Footprint has emerged as the world's premier measure of humanity's demand on nature. It measures how much land and water area a human population requires to produce the resource it consumes and to absorb its wastes, using prevailing technology. [3] Six indicators have selected to standardize the ecological footprint of each country or region; Carbon Uptake Land, Grazing land [Lawns], Fishing Ground [Inland and Marine waters], Cropland [Agriculture] , Forest land and Built-up land.

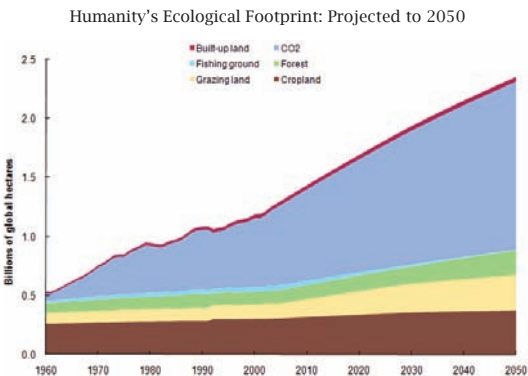
Different scenarios have been drawn to reduce the global overshoot. All of them have followed different guidelines to decrease the Ecological Footprint [demands]; minimizing CO2 emission and maximizing Biocapacity: bio-productivity of different land-uses like Agriculture and Forests.

Iran's position amongst the countries in the world has fallen dramatically; in 2005 it used Natural resources more than 50% larger than its Biocapacity while it was between the countries with Biocapacity more than 150% of Footprint in 1961. Thus, is has to come up with a rapid-reduction scenario to reduce the overshoot.

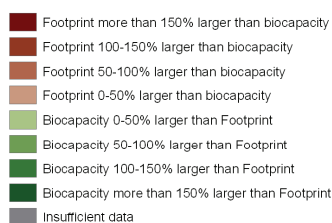
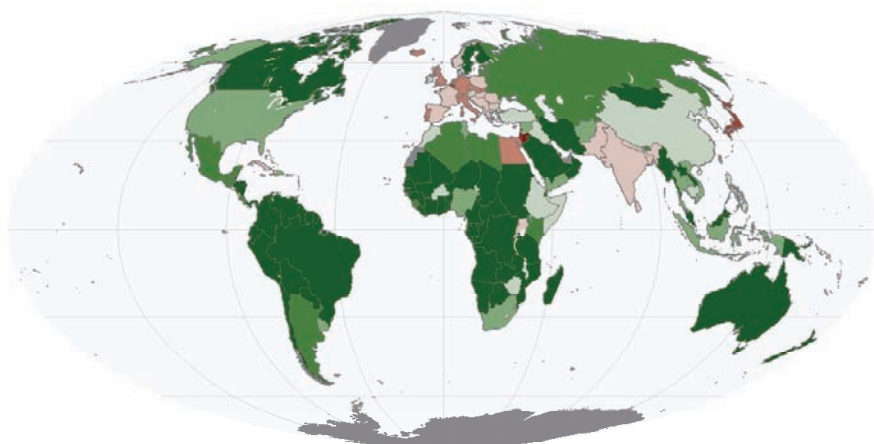
Caspian Delta Region is one of those areas which strongly being threatened by mismanagement and over consuming the natural resources. The Vision for the southern coast is drawn around maximum preservation and bio-productivity of the area.



Relative area of land types worldwide in hectares and global hectares, 2005. Source: The Ecological Footprint Atlas 2008.

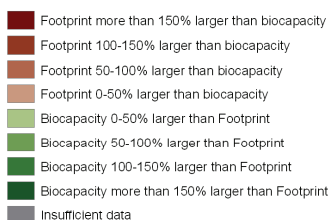
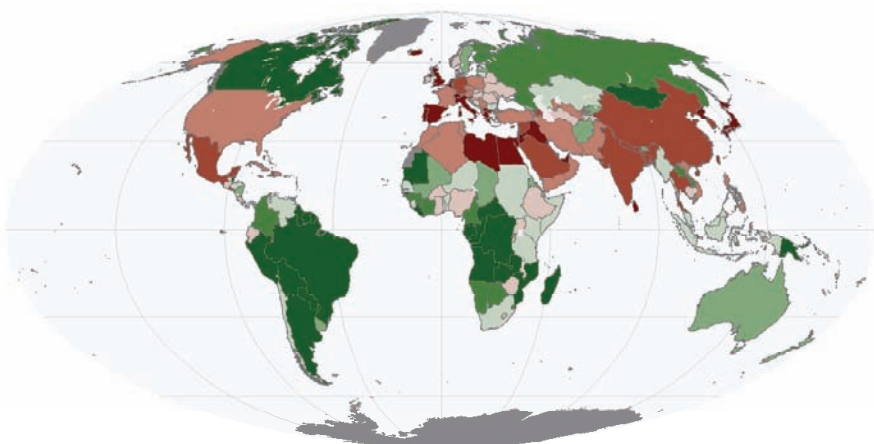


Estimated ecological overshoot in 2050 based on IPCC A1B and other projections. Source: The Ecological Footprint Atlas 2008



1961

Iran



2005

Iran

Ecological creditor and debtor countries, 1961 and 2005. THE ECOLOGICAL FOOTPRINT ATLAS 2008

Based on the main criteria addressed by the min. Ecological footprint scenario, the Vision for the Caspian Delta Region has been set thematically in six categories in which each part has come up with a proposed Component:

:Infrastructure

Compact urban form will lead to shorten the access ways. The proposed means of transportation for the region is a combination of High Speed Train between main transportation hubs and regional Light-Rail for the local connection. These two will be parallel to the coastline in which the Light-Rail has some perpendicular routes towards foothills.

High Speed Train new line is proposed in three phases:

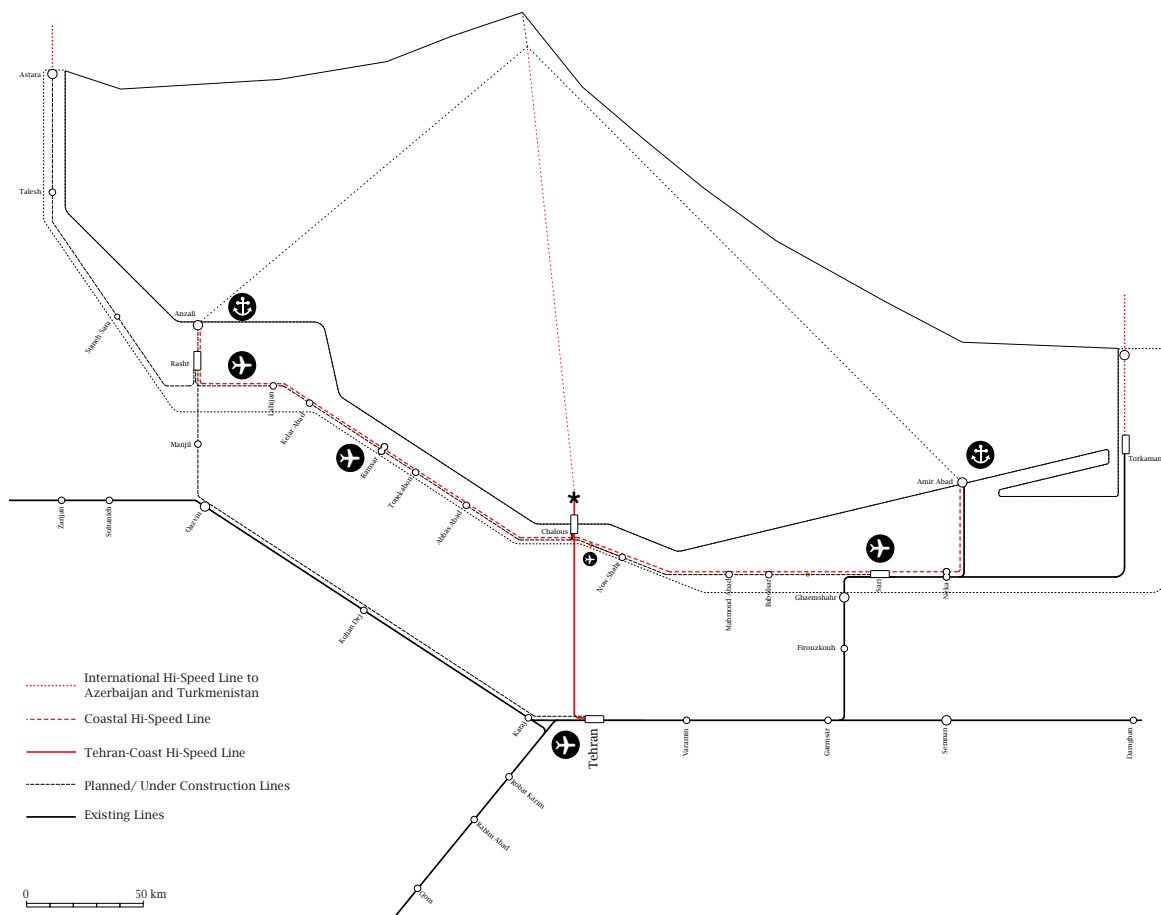
_Fast train connection from Tehran to the Coast: The route is parallel to the New Freeway. The pathway is selected due to minimum slope and possibilities to construct the bridges. The access time from Central Train Station of Tehran to the Coastal Station [Tehran North] with the regular Hi-Speed train [average speed of 145 km/h] will be around 45 minutes. It will facilitate new shortcut by public transportation means.

_Anzali-NowShahr-AmirAbad fast connection: to facilitate the current main ports: Anzali and AmirAbad as Cargo and Energy transportation Hub and new Passenger Hub in the former Nowshahr Port, the Fast connection in addition to the regular train is

proposed to make the regional system more coherent and networked. Dispersed mega infrastructure like international airports and connection to Tehran can be provided by implementation of the new hi-speed line.

_Development of the Border Stations in to Borders of Azerbaijan [Astara] and Turkmenistan [Gomishan]: these new currently small stations can be seen as two main regional nodes in the Caspian network. In the Azerbaijan border the rail track exists but in the eastern border [Turkmenistan] the rail track between Torkaman Port and border station should be completed.

Light-Air connection: for the accessibility of the mountain parts and the valley in-between which some of them are the most probable point for the future densification and urbanisation, a combination of the Cable Car, which is already being used in some parts of the region, and Zeppelin, as one of the Greenest and cheapest means of transport, which is suitable for the hilly landscape with no extra space for landing and taking off is proposed.



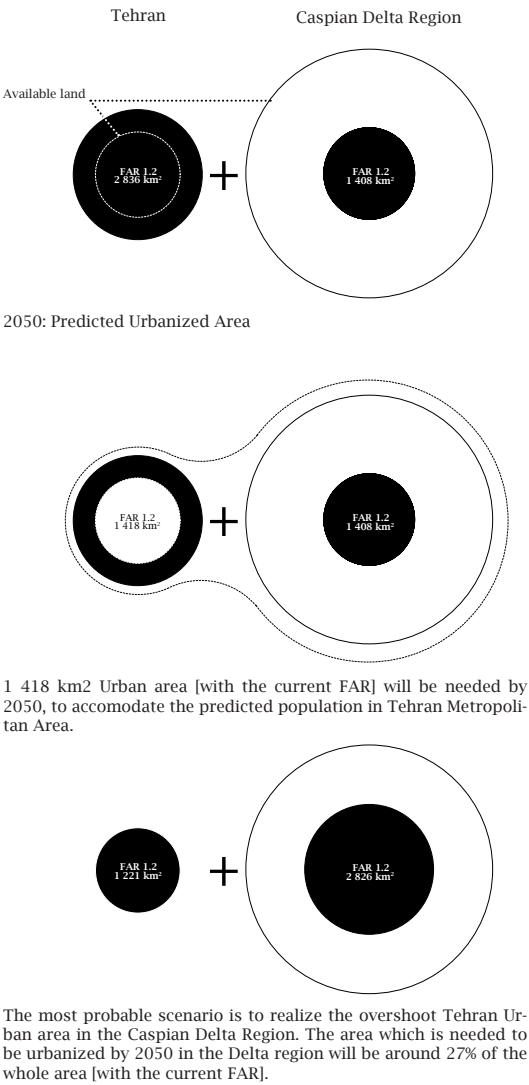
:Urbanisation

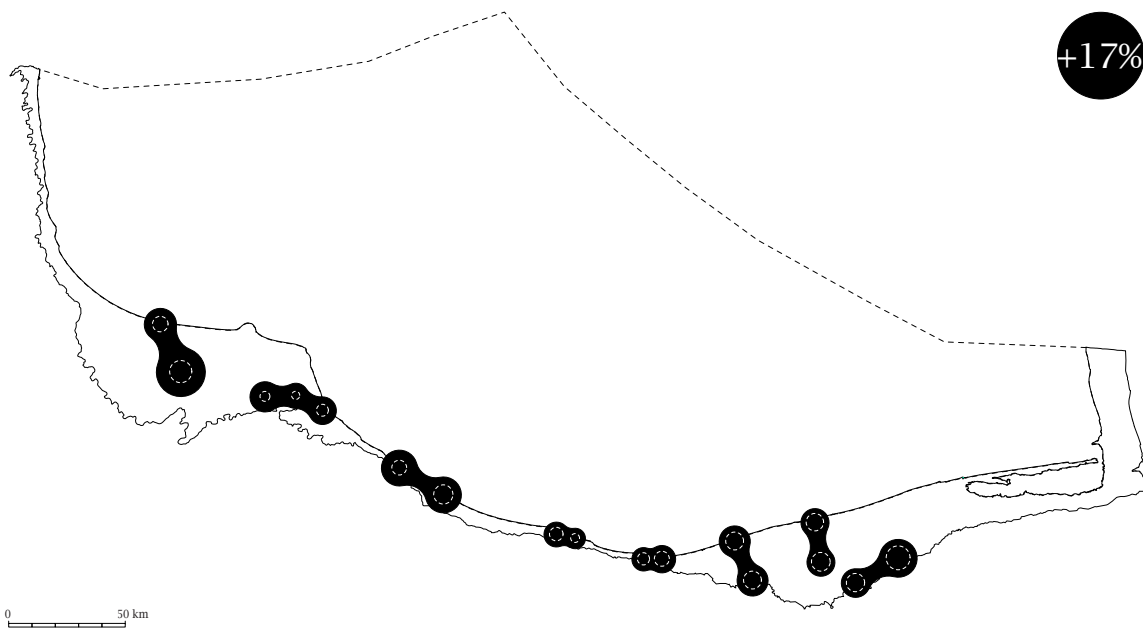
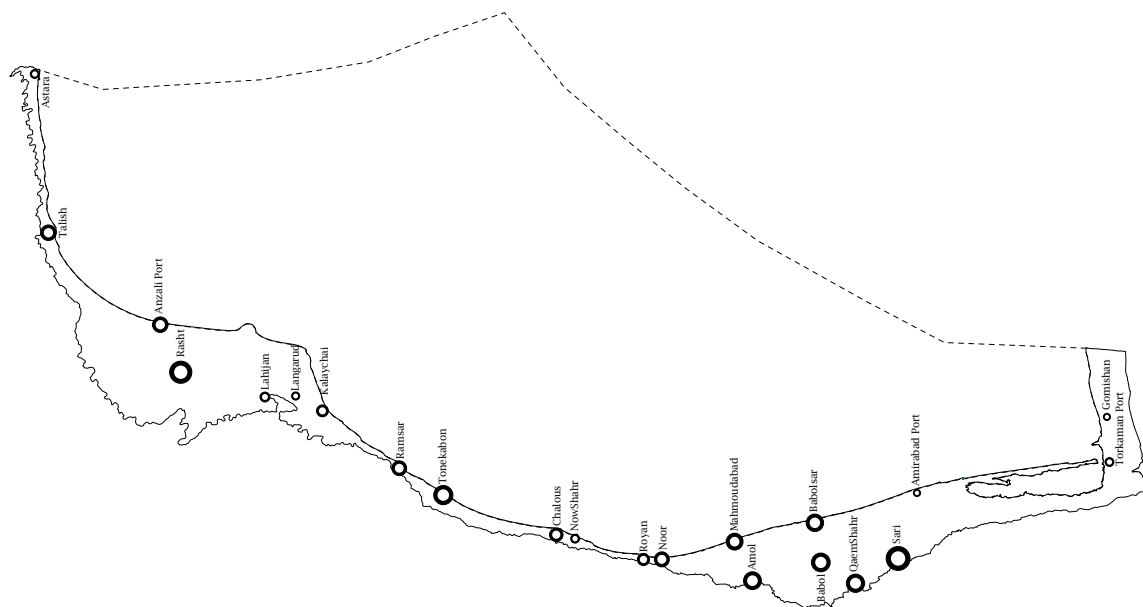
According to the *Hypothesis 00*, in 2050, the overload of Tehran’s population will move to Caspian Delta Region. This amount will be added to the natural population growth of the region. The following massing tests are exploring different possibilities to manage the growth:

: Twin Cities

Due to minimizing the CO₂ emission and urban footprint, the approach is to limit the process of Sprawl and dispersion and manage the urbanisation in the form of Compact Cities. Considering the closeness of the cities especially along the coastline and near the main centralities, directing the growth towards emerging the twin cities is reasonable: Existing twin city systems such as those centralities which are tightly connected to a port nearby.

Considering the fact that for hosting the foreseen population in the region 27% of the area must be occupied. This amount of land has calculated based on the current average FAR= 1.2 in the Coastal Delta. By changing the FAR factor, the land consumption is manageable. The only buildable land is 10% existing urban area and 2% of the waste lands. By construction of the waste lands and densifying the urbanized area, extra need for new land is inevitable.





The future growth in the main urban centralities in the Caspian Delta region can be directed towards formation of the twin urban centres, mostly a delta city + port city.

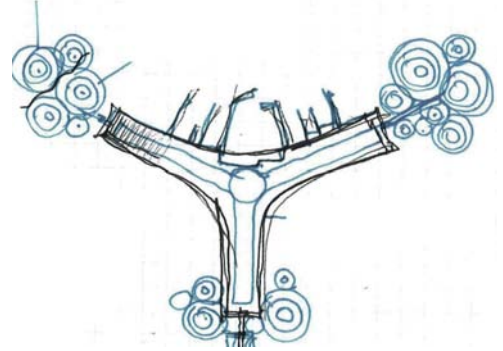
Component 01

Archipelago

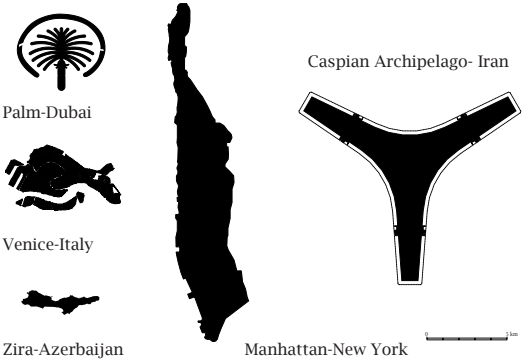
The proposal identifies these new urban centres as Archipelagos; series of islands in the Delta region and also in water by reclaiming the land in the less deep area [<10 m].

“The archipelago is a mythical figure for its immediate legibility while being made of parts: the island-parts concentrate and appoint each their own specific place, while at the same time, by virtue of proximity, they establish the veritable sea- Archipelagos- of which they all are part. The archipelago represents a multiplicity in which the manifold (or multiplicity itself) is not dispersed, but presented in its conceptual essence as an absolute entity among parts, by comparison, juxtaposition and counter-position.” [4]

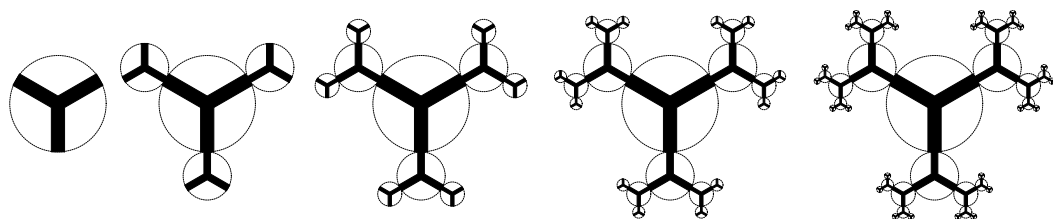
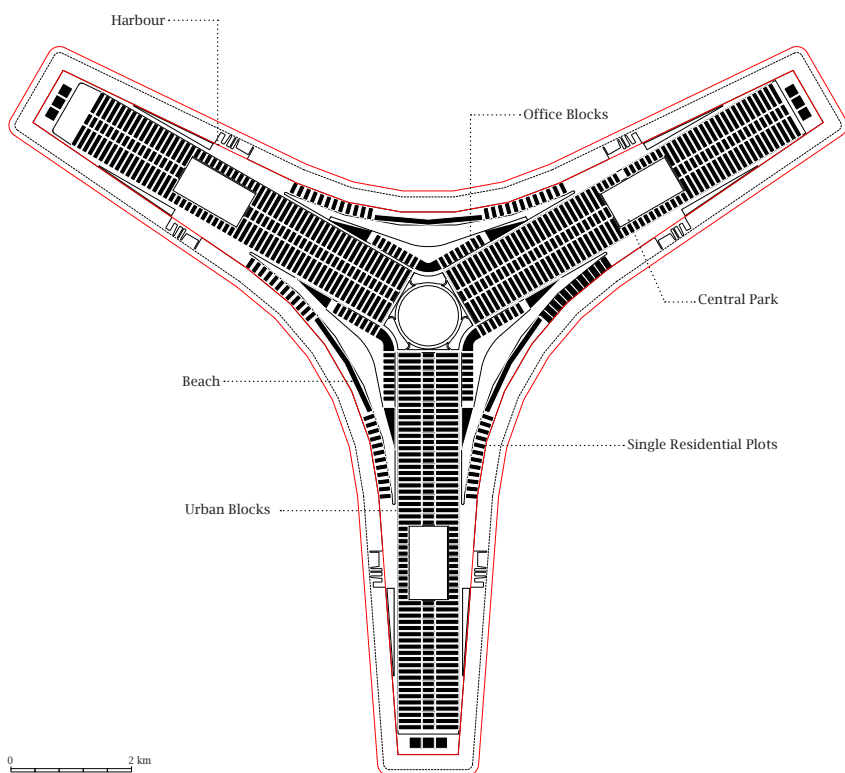
A modular form which can be repeated as hierarchical system of growth; the basic form is shaped like Tri-Wing Island with a centre and three linear urban districts, each one contains a Park and a Harbour. The access network is extensible by linking to the new Island at the end of each wing.



Archipelago; series of island connected to each other as urban clusters. They can be linked to the energy production plant [wind farm] and Agriculture island as an urban system.



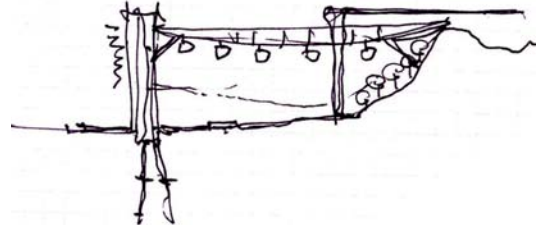
Next Page Top: Tha Archipelago Structure.
 Next Page Bottom: The Archipelago Modular extensions.
 © Hamed Khosravi 2009.



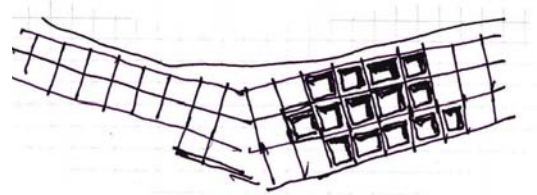
Component 02

Urban Container

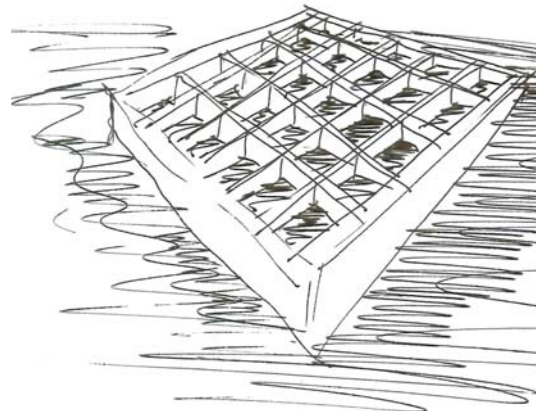
Densification can happen in the narrowest part of the region which is exactly where the new freeway meets the Coastal land. This area, because of the proximity to Tehran, is one of the first areas which will be occupied by urban mass. The new densification area is defined in the border of 90min City which is introduced. The proposal is a kind of radical urbanisation as a compact city with maximum density and minimum footprint. Hi-rise Slabs which are facing to the sea can be interpreted as urban container which will accommodate the future residents who mostly will be highly connected to Tehran for daily work and also future seasonal tourism housing. There would be emergence of new Downtown for the whole region.



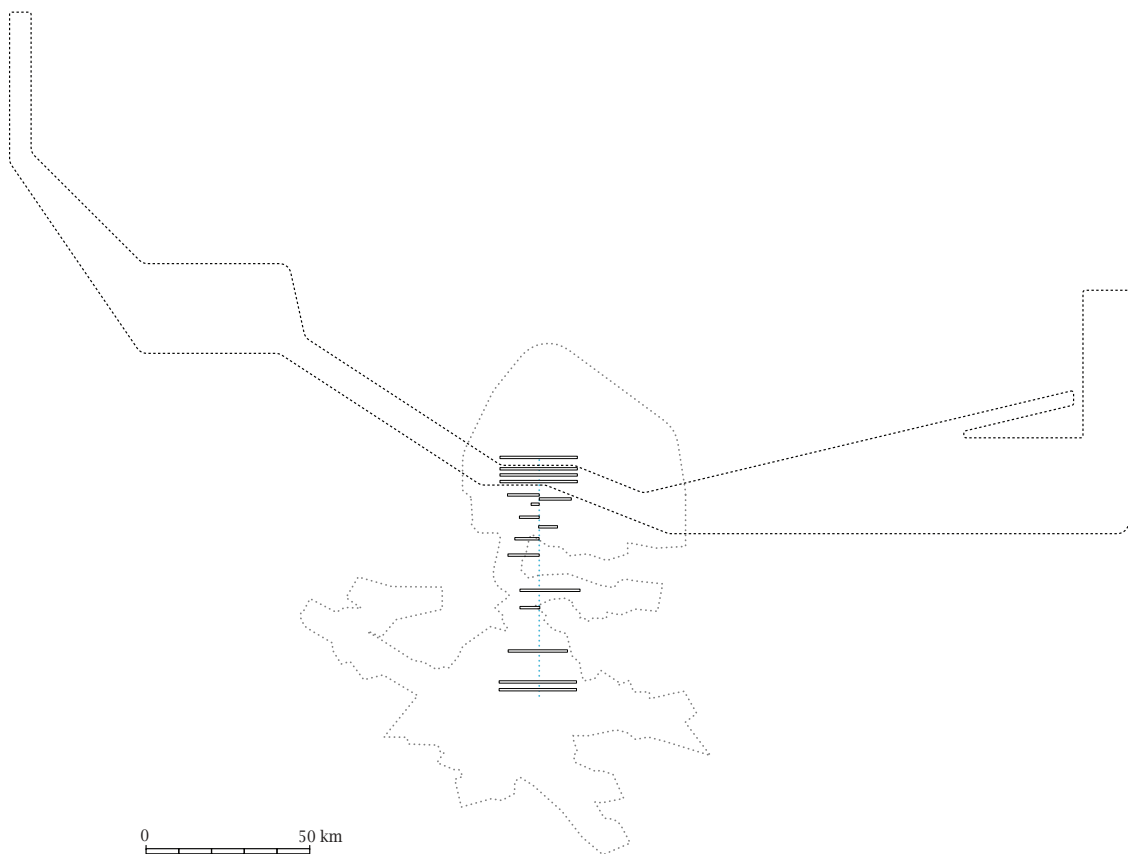
Delta Region Section; Urban Container is linked to the foothills by cable car.



The Super grid defines the Urban Container pattern, parallel to the coastline.



Extruded Super grid as the Urban Container.



The Urban Container; Series of Super Blocks parallel to the Coastline which are connected to each other by Cable-Car and Zeppelin and main infrastructure [new freeway] as the backbone. They meet the Valleys and peaks as series of leisure activities across the mountain range.

:Energy Production

Great potential for development of the renewable energy production has already been investigated in this region. The being by the sea prioritizes the Wind-Based energy production. Two extreme east and west parts of the Delta region has the best position in the regional wind corridor.

to the bio-energy producer plants to use the maximum needed electricity.

Component 03

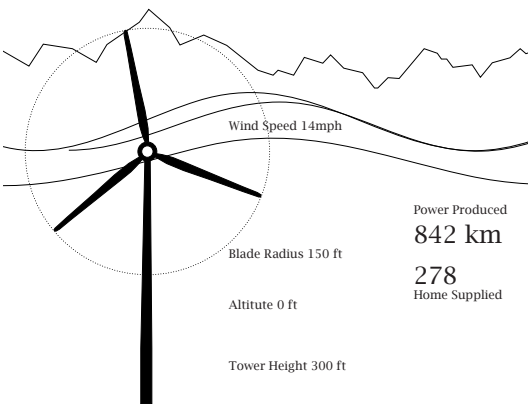
Wind Farm

Group of wind turbines in the same location used for production of electric power can be located in the land and low deep sea water. Each cluster needs to have a transformation/Adaptation plant in which can be connected to the national electricity network with the constant voltage.

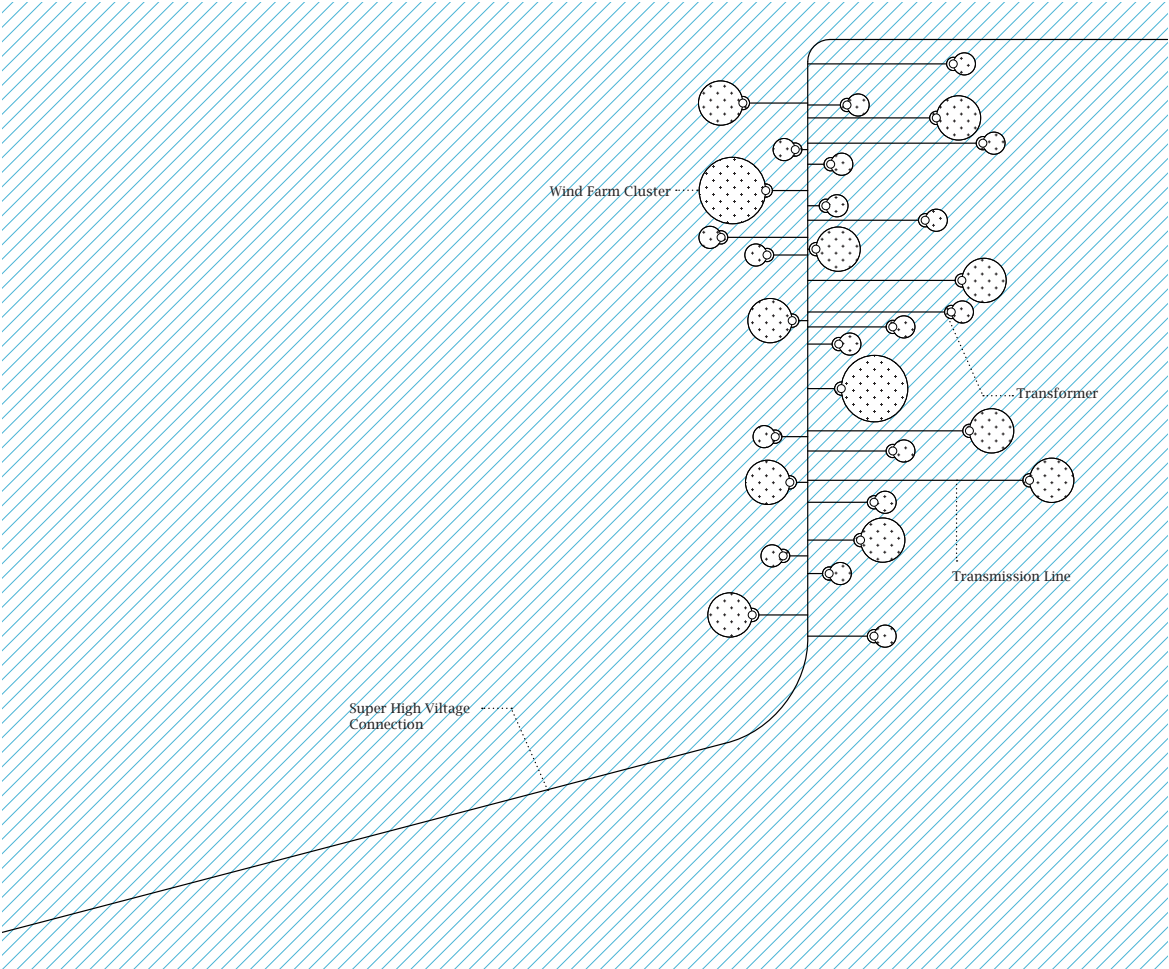
As transportation of the electricity reduces the efficiency and voltage, the local consumers are the best places to use the energy. Moreover, the proximity to the neighbouring countries and the tradition to export electricity to them especially Azerbaijan, Armenia and Afghanistan can be best probable outward destinations for electricity export.

The green bio-energy producer plants will be replaced with the current fossil fuel electricity power plant to reduce the carbon footprint of the region.

New technology parks and Data centres which are planned to be developed in the Caspian region can locate themselves in proximity



Sample Windmill performance calculation based on the Caspian Delta Region conditions. Source: www.environment.nationalgeographic.com Edited by © Hamed Khosravi 2009.



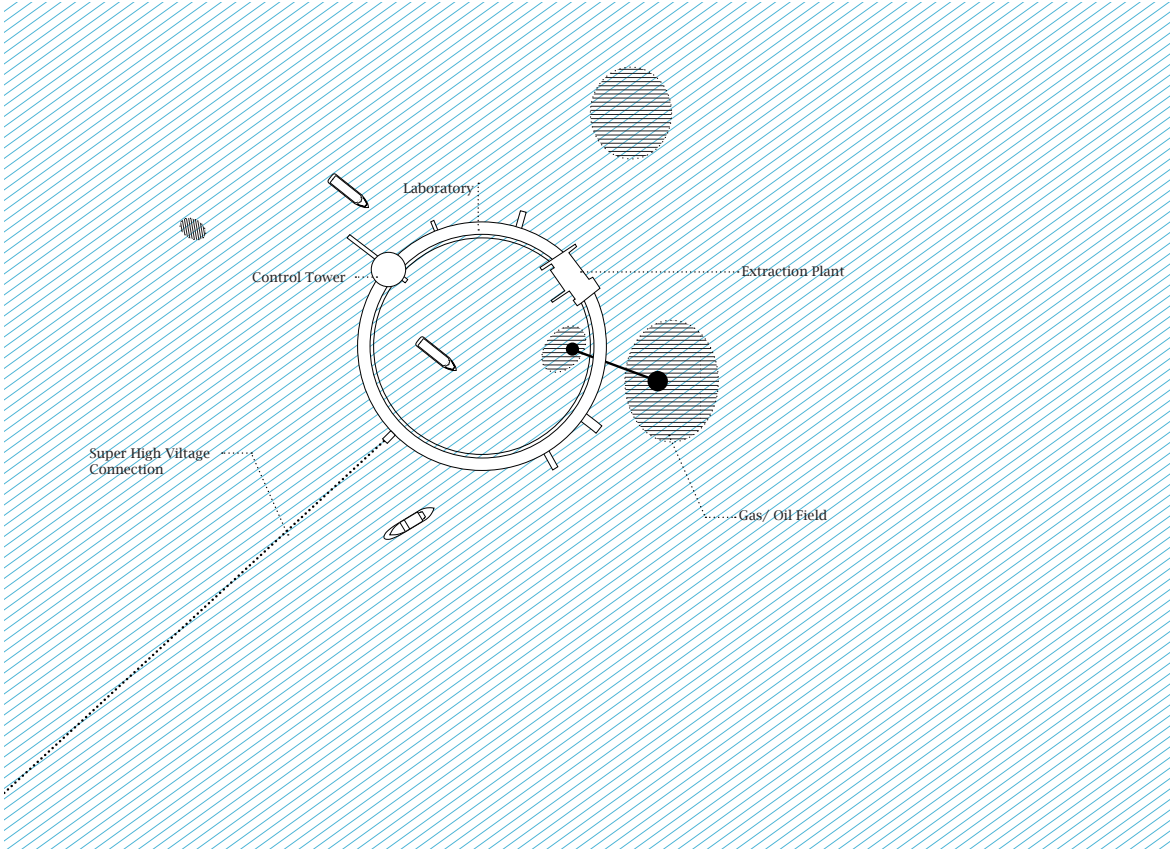
:Energy Hub

Because of the strategic position of the region in the Energy transportation network, the role of multi-modal energy hub, instead of pipeline, seems crucial. Transportation of Gas/Oil via shipment has lower impact to the environment. These hubs can be located near the main ports with the external connection to the newly explored zone in the sea. They can be fed by the incoming oil/gas from the Persian Gulf and export them across two main international corridors: The New Silk Road and INSTC.

Component 04

Off-shore Lab

Most of large Gas and Oil reserves in the Caspian Sea are still remained untouched. A sort of off-shore plants which includes exploration machines, research lab and shipment docks are proposed to investigate the vast economic potential of the region. These Off-Shore plants can be used as energy terminals to prevent coastal pollution caused by energy transportation.



:Agriculture

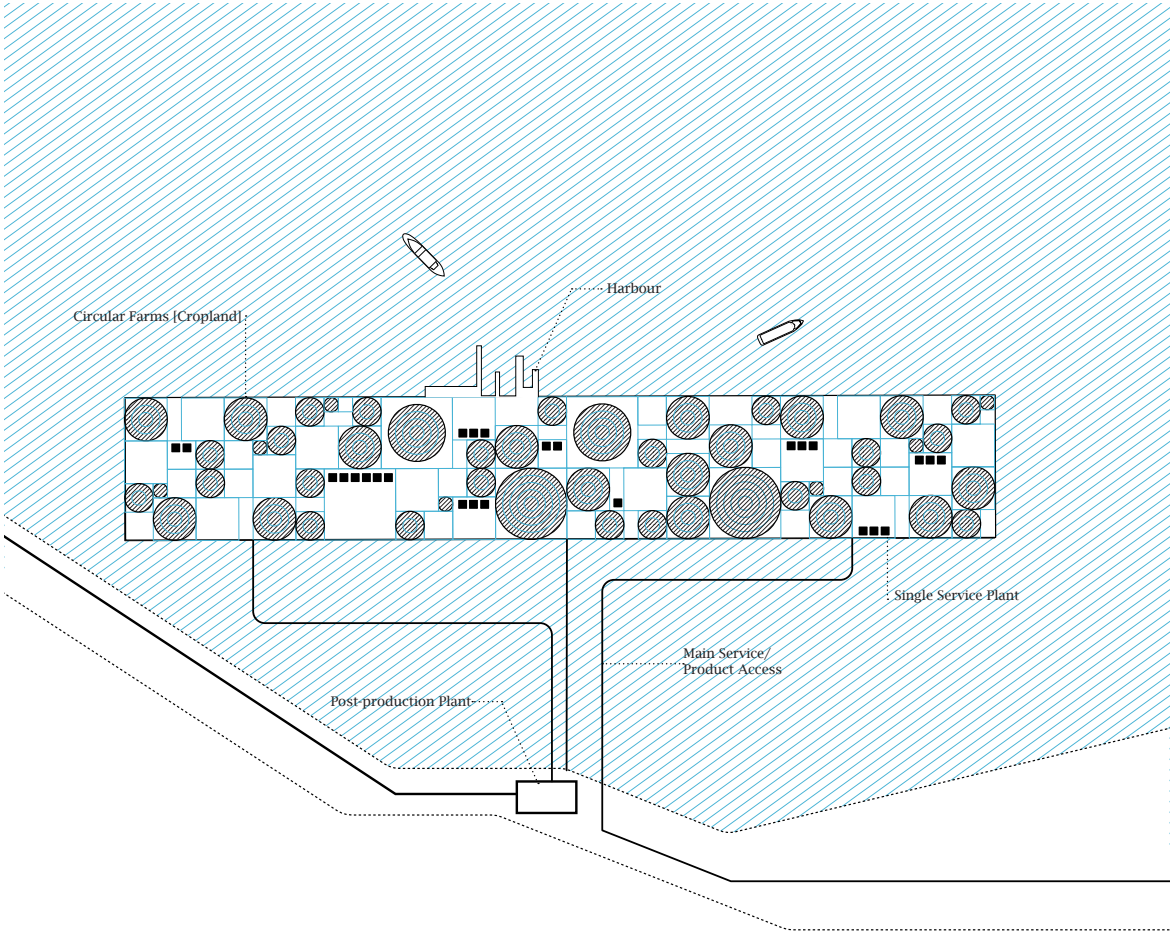
While decline of agricultural productivity, as the result of the rapid urbanisation and illegal land-use changes, has become the major crisis for the region, strategies for reclamation of the new productive lands can be a reasonable solution for the region. Elevated Agricultural land can form new island in the Caspian Sea where the depth of the water is less than 5 meters.

Component 05 *Agricultural Cluster*

Apart from two strategic products of the region; Tea and Rice, the other types of Crops can be developed for increasing the Biocapacity. The fully industrial agriculture has tested there. The proposal for maximizing the productive of the land is the Agricultural Clusters in the water. Between the different forms of the Agricultural land, circular irrigation has selected to have maximum area fed by automatic irrigation system. The clusters should be linked to the post-production centres for processing and packaging for the domestic use or export.

Circular irrigation fields
Southeastern Kansas, USA 2001 Source: www.oceanworld.com





:Environmental Management

Extensive water resources in the region have made lots of advantages in specialized agricultural and energy production. While the unique characteristics of the region is green area and waterscapes [including inland water and marine], there are lots of threats such as pollution and human impacts on the natural resources in the region.

Component 06

Water Adapter

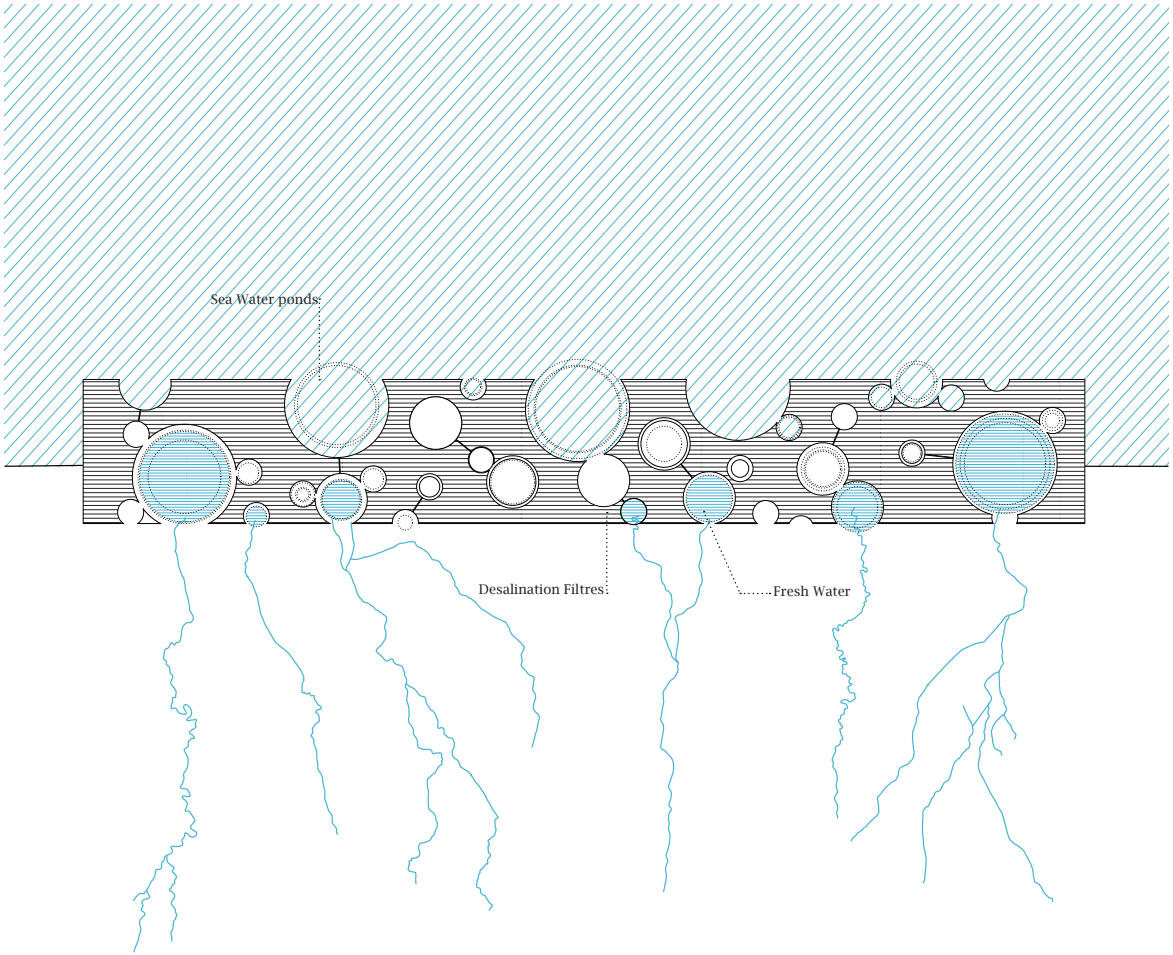
Fresh water coming from the northern foothills of Alborz has been exhausted by directly going to the sea. The high speed of water caused by: short distance between mountain and sea and steep slope. As one of the sustainable forms of water storages, Wetlands can be more developed for reducing the speed of water and store it for further usage like agriculture or drinking water.

As a result of scarce land, these kinds of artificial wetlands can be constructed at the mouth of rivers or even in the sea. There are series of ponds connected to each other by filtration in which can collect fresh water and the overload will directly go to the sea. These components can also work in other way around to collect sea water and desalinate it for being used in the common uses. They can be used as swimming pool connected to the sea in the tourism leisure services.

By raising the water level in coming 50 years

to 26 meter below sea level, most parts of the delta region, especially around two main wetlands; Anzali and Miankaleh will be affected largely. Apart from the damages which can threaten urban area and infrastructure, there are lots of opportunities to give more space to the water as a kind of rich natural park for the future. There is already distinctive biodiversity in terms of different kind of species; birds and fishes. Eco-tourism which has been introduced vastly in recent years can be developed as an international attraction in the southern Coast.

The components trigger the future developments as kind of strategic regional plan for the Caspian Delta Region. These in each part, as the consequence of the priorities, every component can be introduced as the driver for that area. It is not necessary to pinpoint all of them in one specific are, they can be developed as 40-year lifespan plan to Minimize the Ecological footprint of the region.



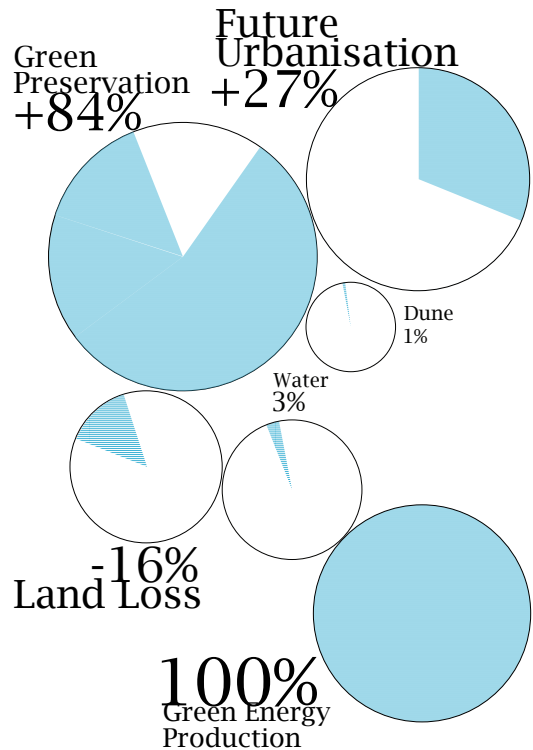
:Min. Ecological Footprint
Max. Biocapacity

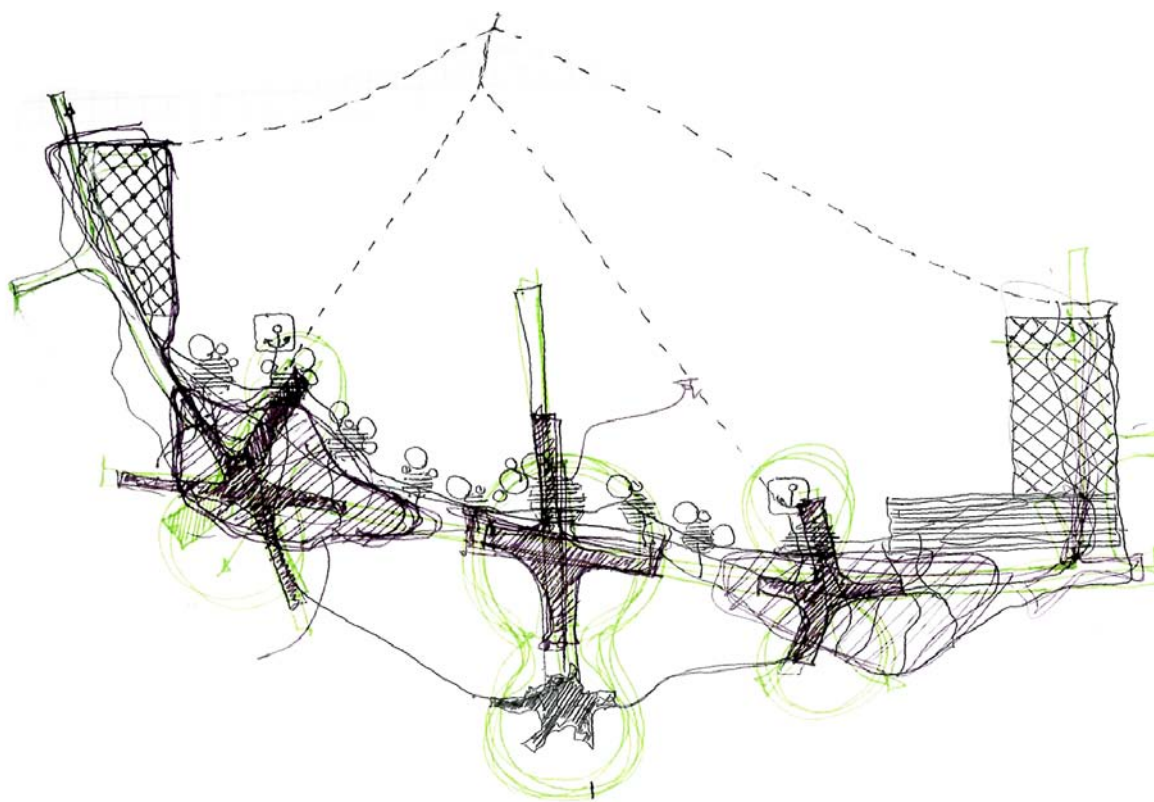
Out of the analysis of the Caspian Delta region, the critical variables have been highlighted:

The land is scarce and productive; by 2050 16% of the land will be flooded, Urbanisation needs 27% of the region, while 84% of the natural green spaces and agriculture fields have to be preserved. Thus, natural footprint must be extended and urban footprint should be minimized.

The region will head for maximum green energy production out of Biomass, wind and hydro energy resources.















Considering the fact that Tehran metropolitan region is one of the most unsustainable regions in terms of natural resources consumption and CO2 emission , by merging Tehran with Caspian Delta region as the one regional metropolis the *Vision: Impossible* for Tehran as a Green City can be achievable.



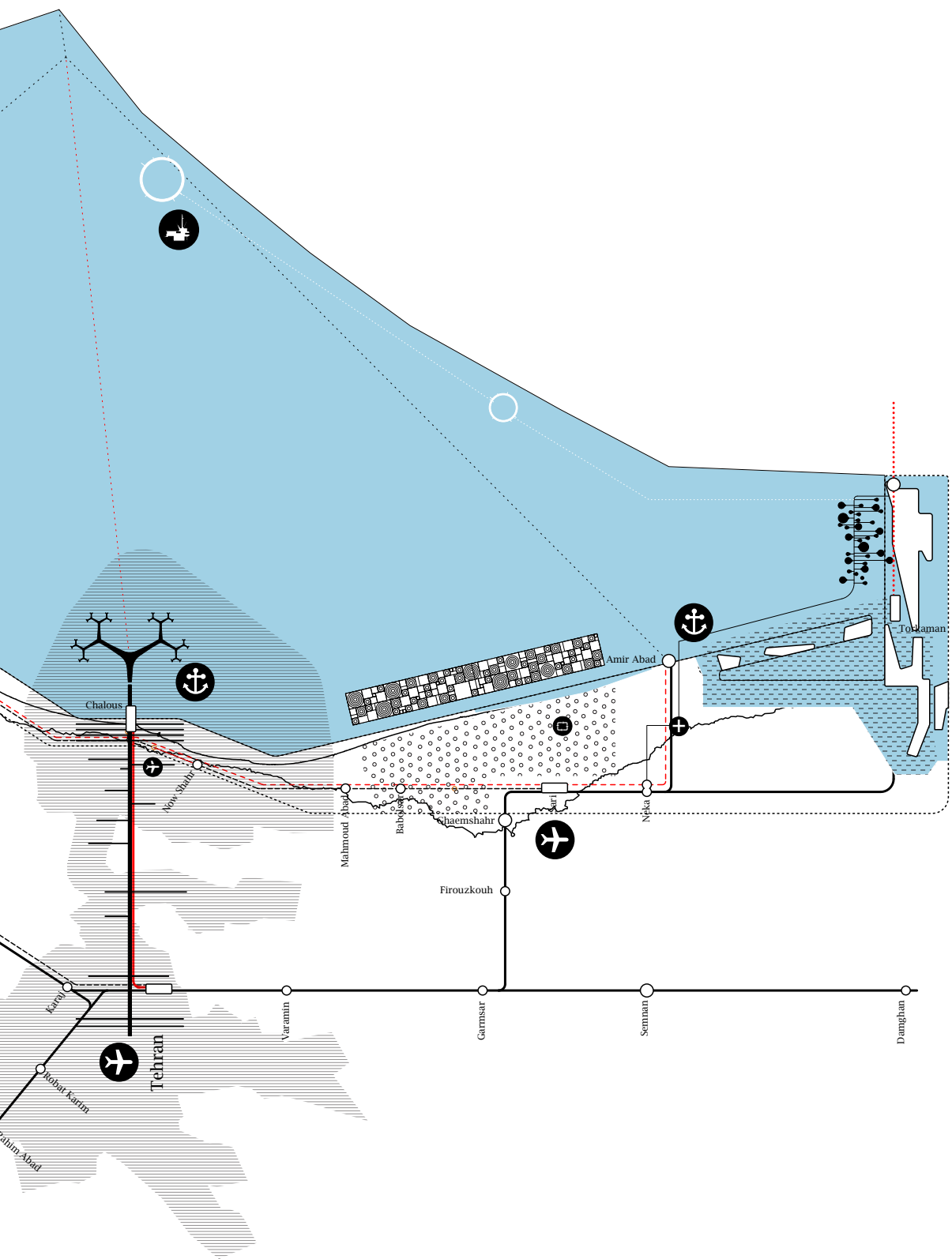


Three main strategic nodes + Tehran structure the future plan for the Caspian Sea Delt Region. Three twin Cities; Tehran will have a port at the mouth of new freeway [tunnel] in the coast. Regional hi-speed connection links the nodes together.

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-  Agricultural Cluster
-  Wind Farm
-  Water Adapter
-  Archipelago
-  Urban Container
-  Off-shore Lab
-  International Airport
-  Post-production Plant
-  Energy Hub
-  International Port
-  Gas/Oil Off-shore Lab
-  Natural Park
-  Delta Agriculture
-  90min City





Vision:

The Ecotopia

Economic engines of the Caspian Delta Region [Southern part]; energy transportation and tourism, in addition to an extensive natural resources, will make this part as the first Driver for the whole Caspian Sea Metropolitan Region formation.

Two main especial features of the Central Asia are meeting each other. Tehran Metropolitan region with the almost 40 million inhabitant by 2050 which is the main centrality between Mumbai and Istanbul, is merging with Caspian Delta Region, a Sub-tropical island in the whole Central Asia.

As the consequence, Green Regional Metropolis Scenario seems very probable; a Cohesive Vision ,drawn around the natural resources management and in general *Minimum Ecological Footprint*, can pave the ground for the Future to come.

In spatial term, a perceptual boundary for the future urbanisation is defined based on time-space understanding the region; 90min City is the area accessible from centre of Tehran by car [which is the common means of transportation in the city]. This zone covers a strip in the Caspian Delta Region, which in the vision, it considered as the Downtown; a compact city.

In the next Chapter the general composition of the 90min Delta will be described.

:Notes

[1] Andraos, Amale and others, "49 Cities- WORKac", Storefront for Art and Architecture, New York, 2009.

[2] Garreau, Joel, "The Nine Nations of North America", Avon Books, USA, 1982.

[3] Footprint basics; Overview. www.footprintnetwork.org

[4] Aureli, Pier Vittorio and others, "Brussels- A Manifesto Towards the Capital of Europe", NAI Publishers, Rotterdam, 2007.

90min Delta

90min Delta, the part of Delta which is accessible within 90min to the centre of Tehran, is the first strategic step towards realization of the Caspian Regional Metropolis.

The six components which are introduced in the previous chapter will pinpoint the future guidelines for the development of the Region as the design toolbox;

The point where the infrastructure [new freeway] meets the coastline can function as a node to slow down the the large flow coming form Tehran. Its compactness will make this point as the destination not just a cross-roads.

If the new freeway connects directly to the coastal network which function locally as an access to the small towns alongside the coastline, the whole system will be influenced dramatically. The role of small town as the main points of agricultural production is so crucial to maintain.

Urban Container, as an Architecture Infrastructure, shapes the 90min Delta in a radical way. It will bring back the “Cityness” to the region, which is now just Urban. Series of Super blocks which will absorb the future growth from Tehran to the Coast. They would form the skeleton of the urbanisation corridor from Tehran to there and will manage the unexpected urbanisation.



90min Delta Zone; The Caspian Sea Coastline accessible within 90 minutes driving to Tehran's Centre.

:The Urban Structure

The Delta is structured by various rivers coming from the Alborz to the Caspian Sea. Coastal road which is the backbone of the region crosses the rivers perpendicularly and together make a grid shape pattern which allocate urban nodes at the crossings.

In the 90min Delta the main urban centralities are located around the point where Old mountain road and New Freeway connects Tehran to the Coast. Chalous and Nowshahr are the main two cities at mouth of the freeway.

The area is facing the Sprawl phenomena: while because of the proximity to the Infrastructure, Tehranian people become really interested to buy land in this region. The agricultural land changes to the Single Family houses and Villas. Everyone seeks for the best location; close to the green and having the view of the sea. It causes the illegal occupation of some parts of the foothills in the southern part. As the second house, the new comers want the maximum privacy. So, it has led to the dispersed housing units in the middle of the Agricultural land. Recently this trend has organized by some developers which has come up with the worth result: there are some 4-5 storey building raising up instead of small villas.

It seems that the current trend will speed up during the recent years. By the extra urbanisation coming from Tehran after implementation of the freeway, the whole territory will be threatened.



90min Delta Zone; The Urbanisation, Rivers and Infrastructure.
 The rivers' routes and the access way creates a Grid pattern which
 Urban nodes have developed there.

Source: Based on GIS data coordinated with the Google image.
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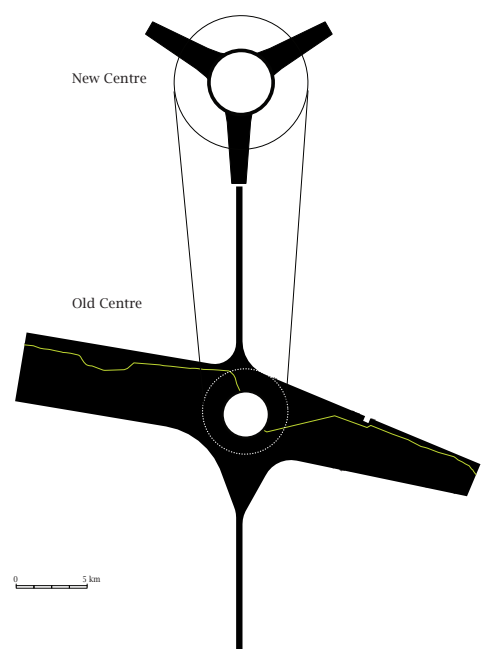
90min Delta Zone; The coastline is blocked by buildings.



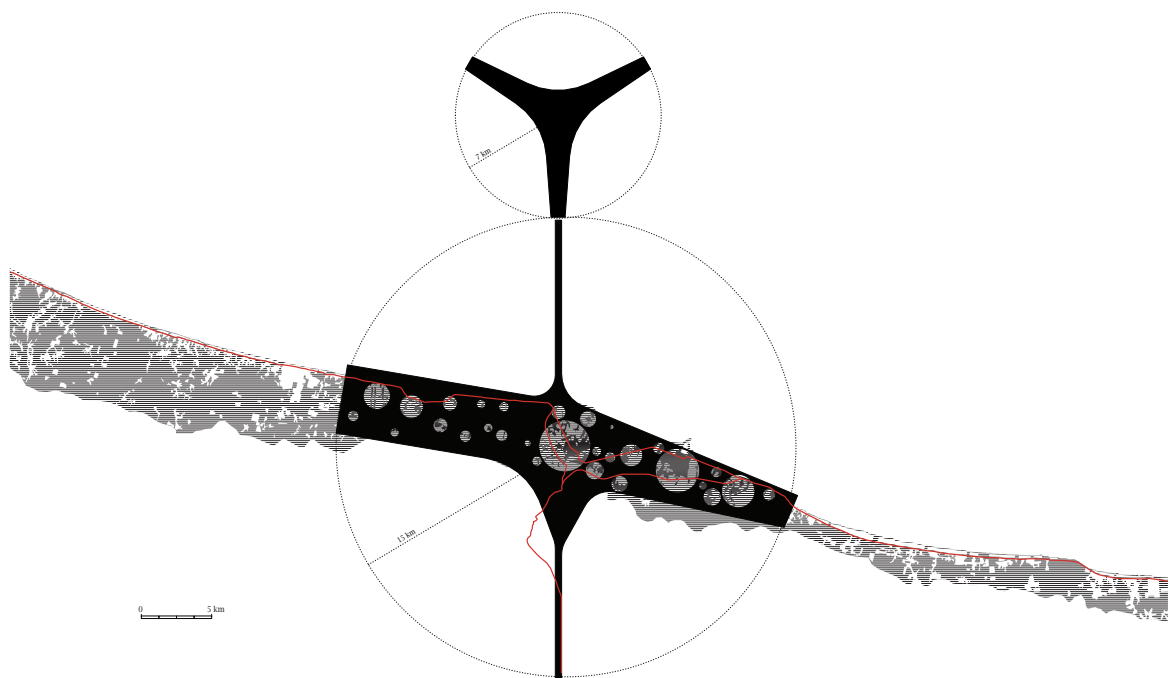
:New Centre

The current urban centres, Chalous and Nowshahr are functioning as the main service point between surrounding towns. For future urbanisation of the 90min Delta, the Archipelago, can have the role of New Centre, absorbing new construction in proximity to the old one. The twin centres are connected together with a Bridge alomaset 10 km long.

The area influenced by the main centre is defined by the radius 15 km from the Old Centre [Chalous]. Because of the integrated urban system it is hard to identify an urban system clearly. So, the distance-based parameter has hired to define the main body of the “Urb”.



The city of Chalous and the new Island will form the twin-centre city at the mouth of the new freeway connecting Tehran to the coast.



The Urban system in the 15 km radius zone; The urban centralities and the existing infrastructure.

:Zoning

The plan is swinging between a early modernistic “Blue Print” and today rather open way of planning. There, some tool are used to control the future urbanisation and some parts are still left open to be self-managed.

The most critical issue is the maximum preservation of the agriculture and green while directing the urban mass.

Two buffer zones has considered to limit the growth; Forest Buffer Zone and Beach.

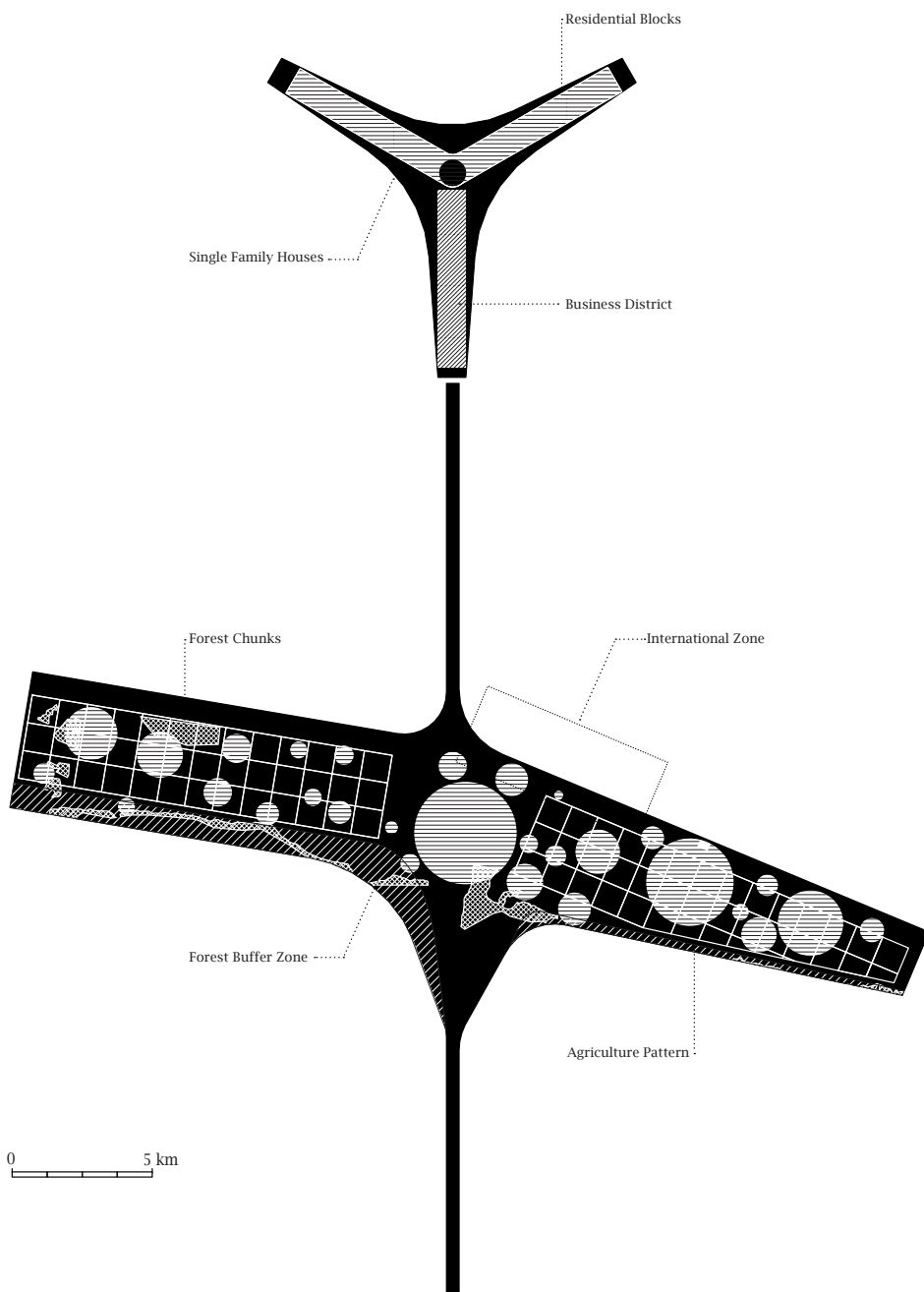
The current occupation trend is going south wards in the Delta region, where there is an extensive green quality and also enough altitude to have nice view to the Caspian Sea. The forest buffer zone will protect the foothills from urbanisation. While by removing the governmental and private properties on the shore, there is an opportunity to preserve the Coastal Zone and turn it to a Strip Public Beach.

The dispersed urban nodes which tend to merge in the future will be limited by the Green Corridors, connecting the forest in the southern part to the isolated leftover parts of the diminished forest between the urban zones.

The New International Zone will be the link between the old city periphery and the new island's bridge. The linear waterfront zone dedicated to new coming international organisations and institutes will power up the engine of development in the linking part. It will be characterized by the series of extendable Docklands connected to the Ferry Port.

The southern Wing of the Island will be the Business District with the high accessibility to the Freeway and Public transportation. The two other wings will mostly be covered with the Tehran-Like residential urban blocks; combination of the mixed-type of residential building in the range of 5-storey apartment to highrises. The single family houses with their own private beach will be located in the receded parts of the Island.

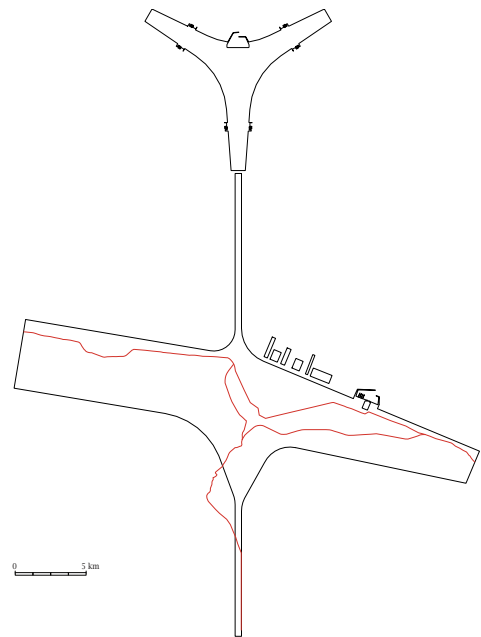
There boundaries around the building zones are rather flexible while the infrastructure will draw fixed border for the protected agriculture and green.



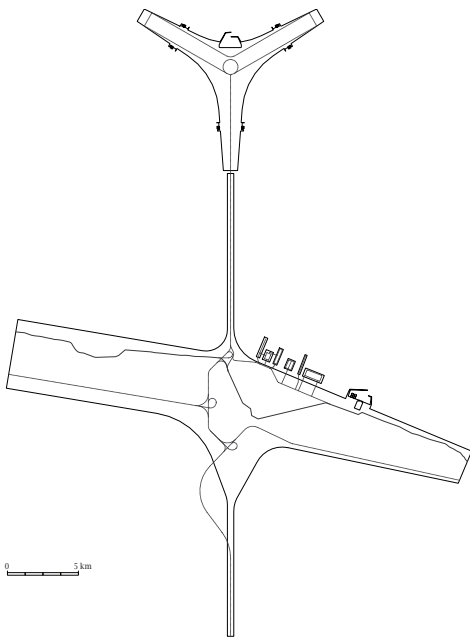
:Infrastructure

The new highway network is proposed to direct the flow of new Freeway. It will be connected to the existing Coastal road and new Island with three main Exits. The new access way will go parallel to the Coastal Road which now is just working as the local access. It will offer fast connection as a kind of Bypass road. In the other hand the new highway will limit the urban area in-between the former coastal road and itself and it will function as the border for the Forest Buffer zone.

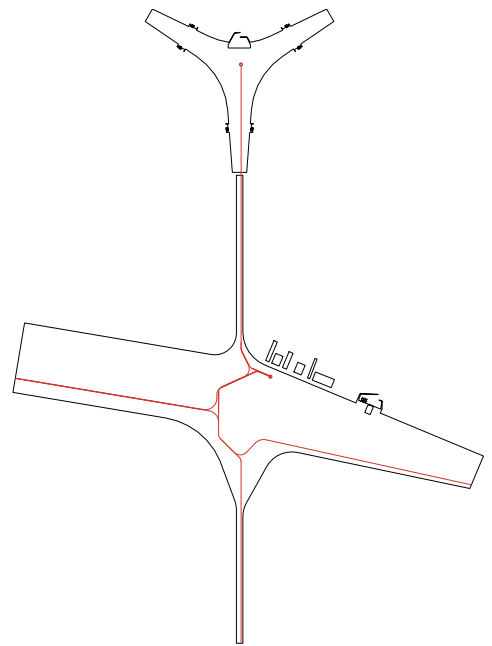
The proposed regional railway which links Tehran to the Coast and the Main ports [Anzali and Amirabad] will mostly follow the new highway routes. The South-North line turns around the city of Chalous and will have an stop the New Chalous Train Station by the International Zone, then, it goes upwards to the Island as the ending destination. The East-West axis goes on the southern edge of the Delta parallel to the new highway and sometimes is elevated on top of the highway. It meets the other line in Chalous Train Station.



The existing coastal road



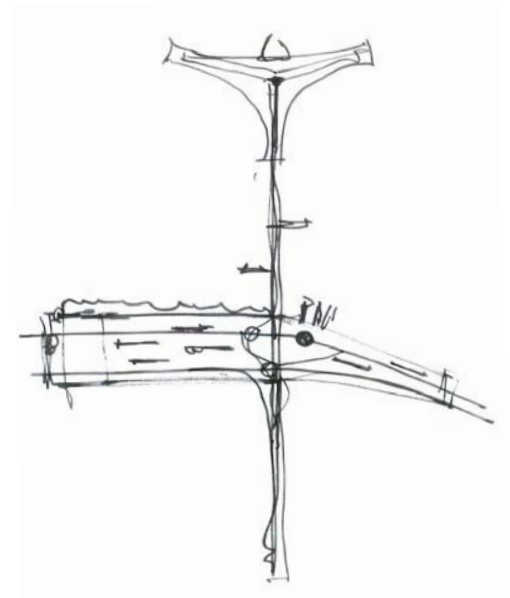
The new highway



The new railway

:The Extended Beach

As the most parts of the coastline is blocked now by the governmental and private buildings, the beach is not open to public. The part which is set up for public use is too narrow and limited to use. The idea is to change the constructed line of mass between existing coastal road and the sea to the public and leisure services oriented around water sport facilities, short stay services and resorts. Moreover by reclaiming the land from the sea the beach can be extended. As the risk of rising water is threatening the region, the Water Adapters as the elevated dune-shaped kind of beaches can be used to have both fresh water and Sea ponds next to each other. As it has mentioned before, they can collect the part of the fresh water coming from the rivers and also desalinate the sea water especially for agriculture fields.

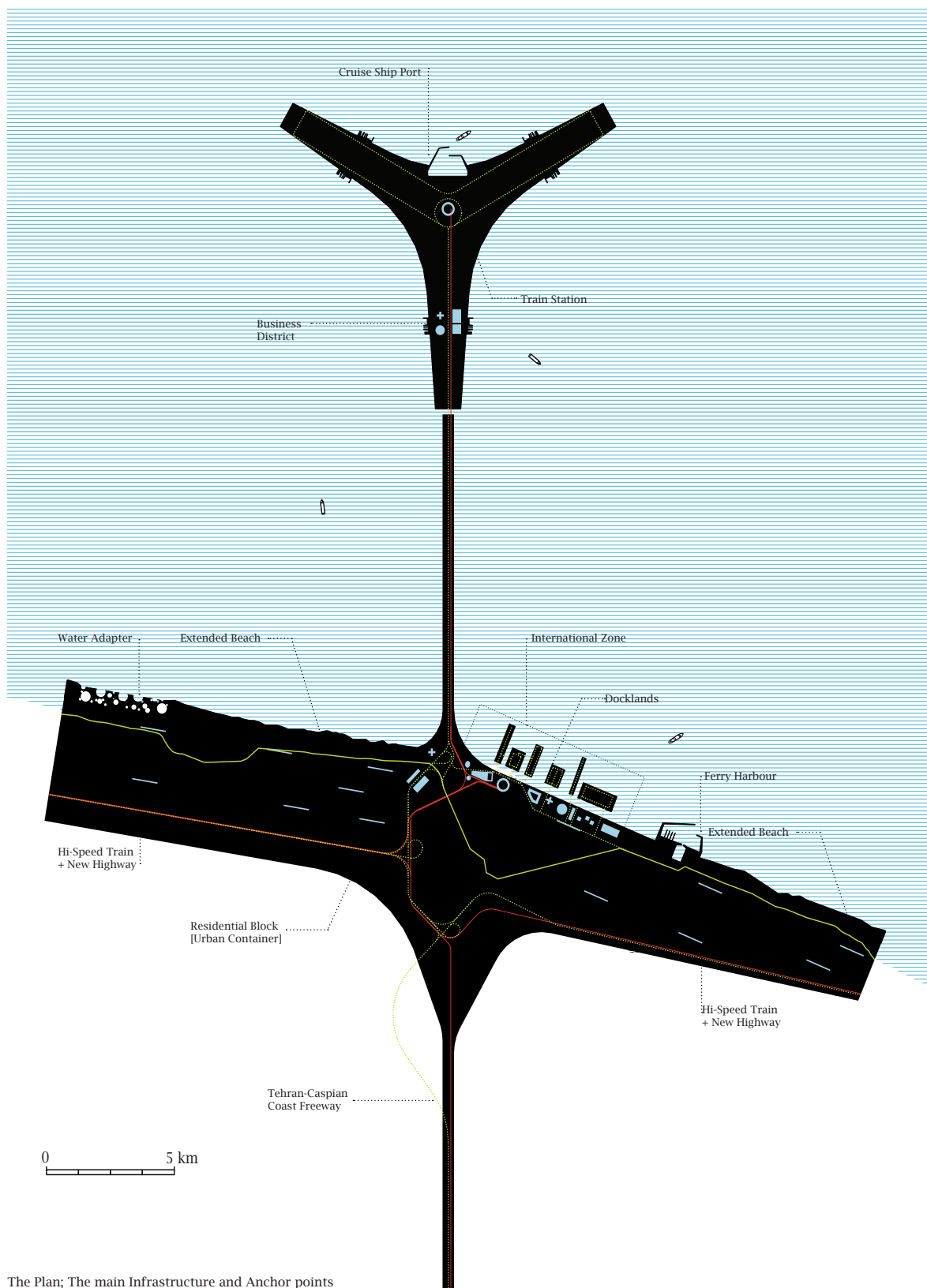


90min Delta; the whole urban system. main structure and the attached chunks.

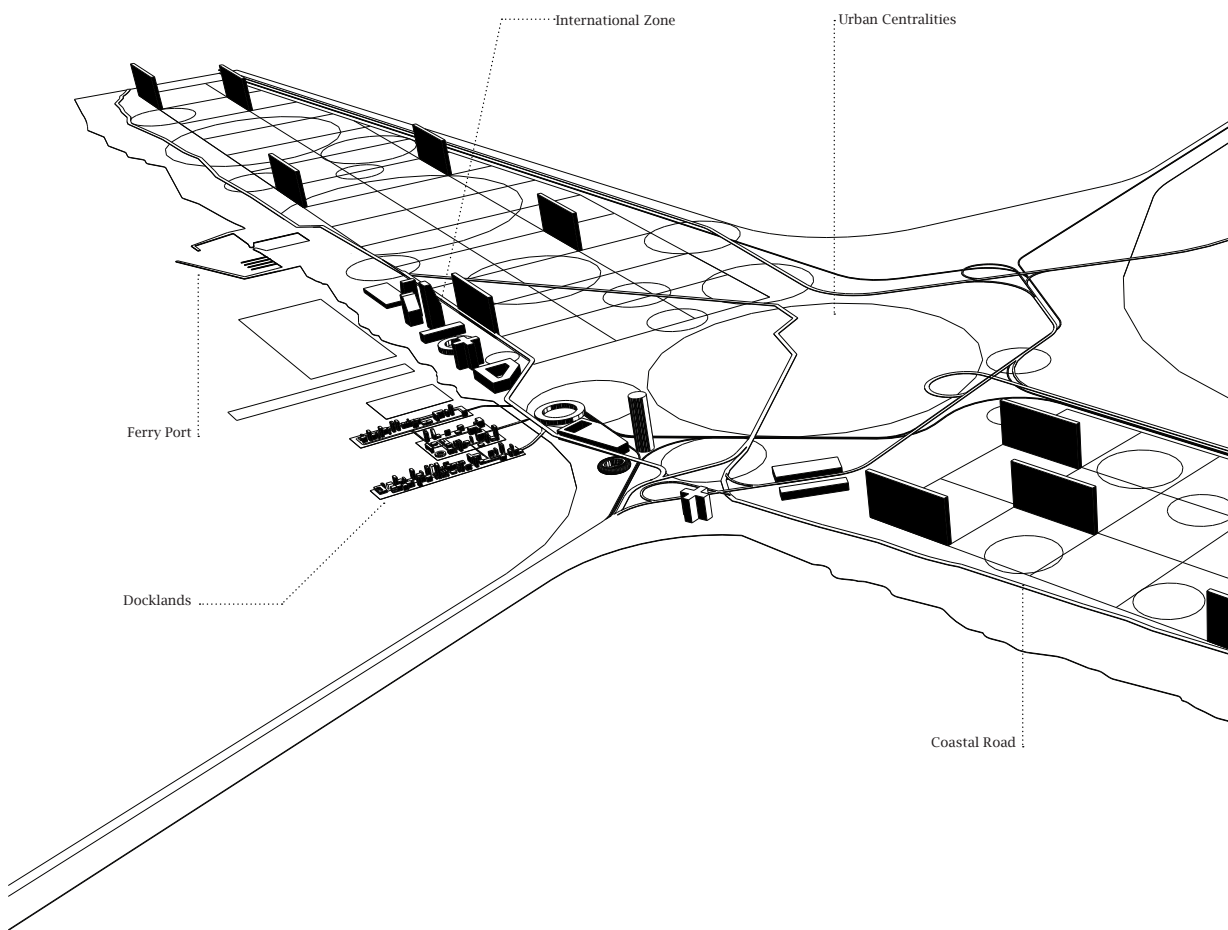
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:The International Zone

The zone at the corner of the mother-land and the new bridge shapes a linear water-front zone where the International Zone will be developed. New coming functions like Chalous Central Station, Caspian Environmental program centre, Caspian Tourism Organization will located themselves around the Office towers, Hotels and Sport facilities. By redevelopment of the existing Nowshahr port it can be equipped as a new Ferry port close to the International port. Using the accommodation facilities and international environment can absorb the Ferry tourism in that area.

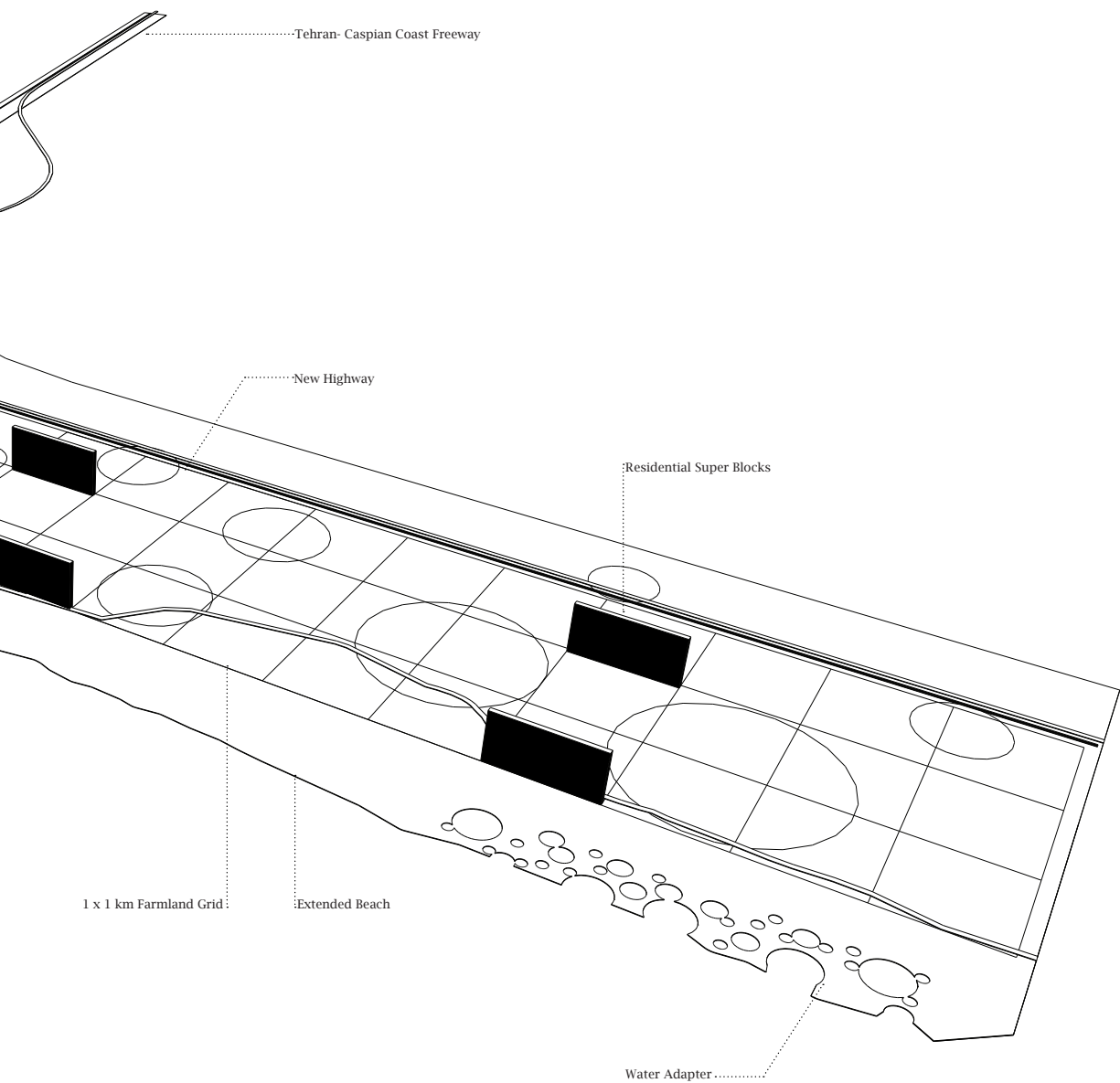


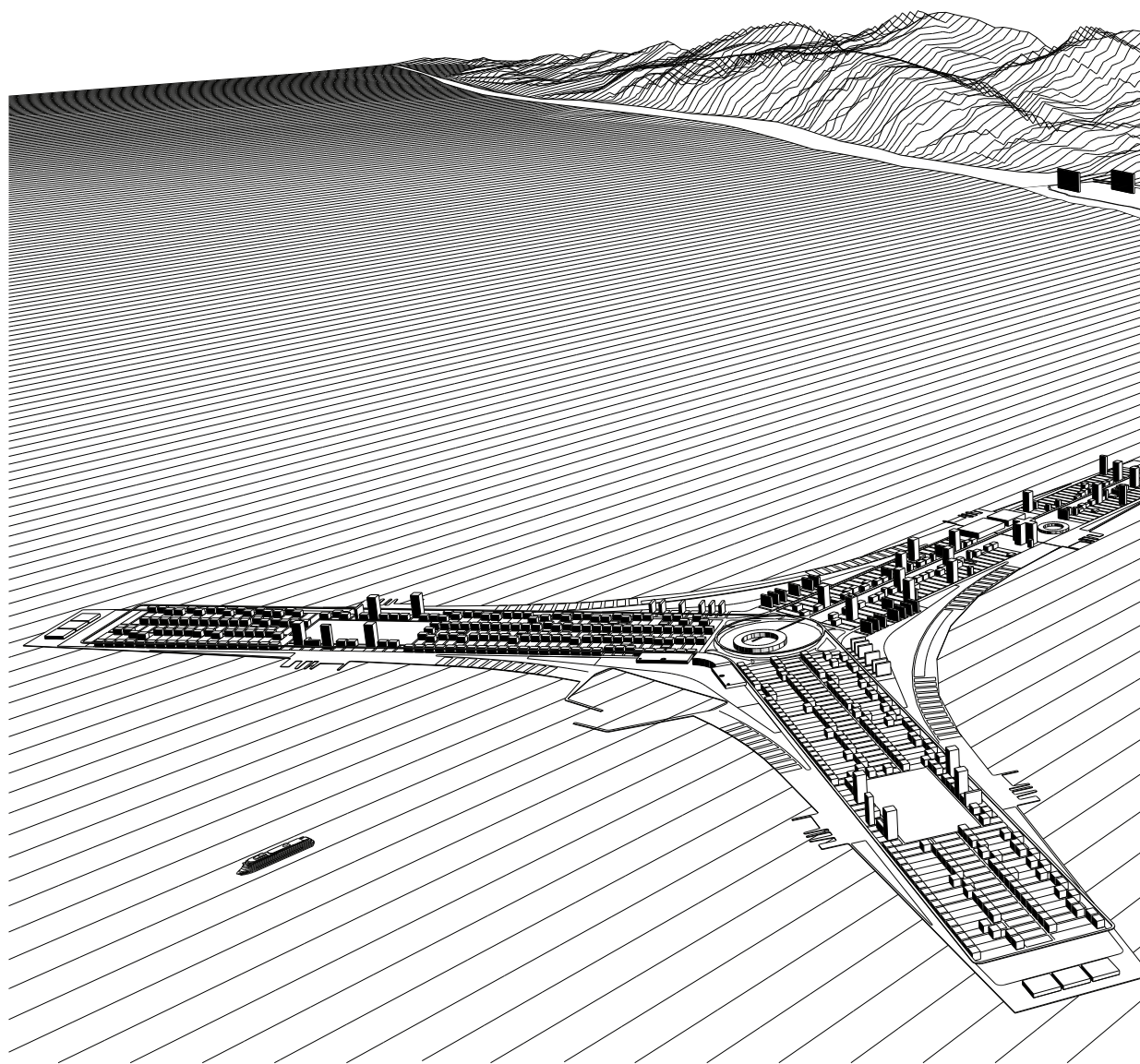
The Plan; The main Infrastructure and Anchor points



The coastal elements; The new International Zone characterizes the expansion of the city of Chalous, while new infrastructure direct the future urbanisation towards north where the new Islands are constructed.

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The view from the Island to the coast; Narrow 90min Delta has stretched between the mountain and the Sea.

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