FUTURE CHALLENGE NO 1:

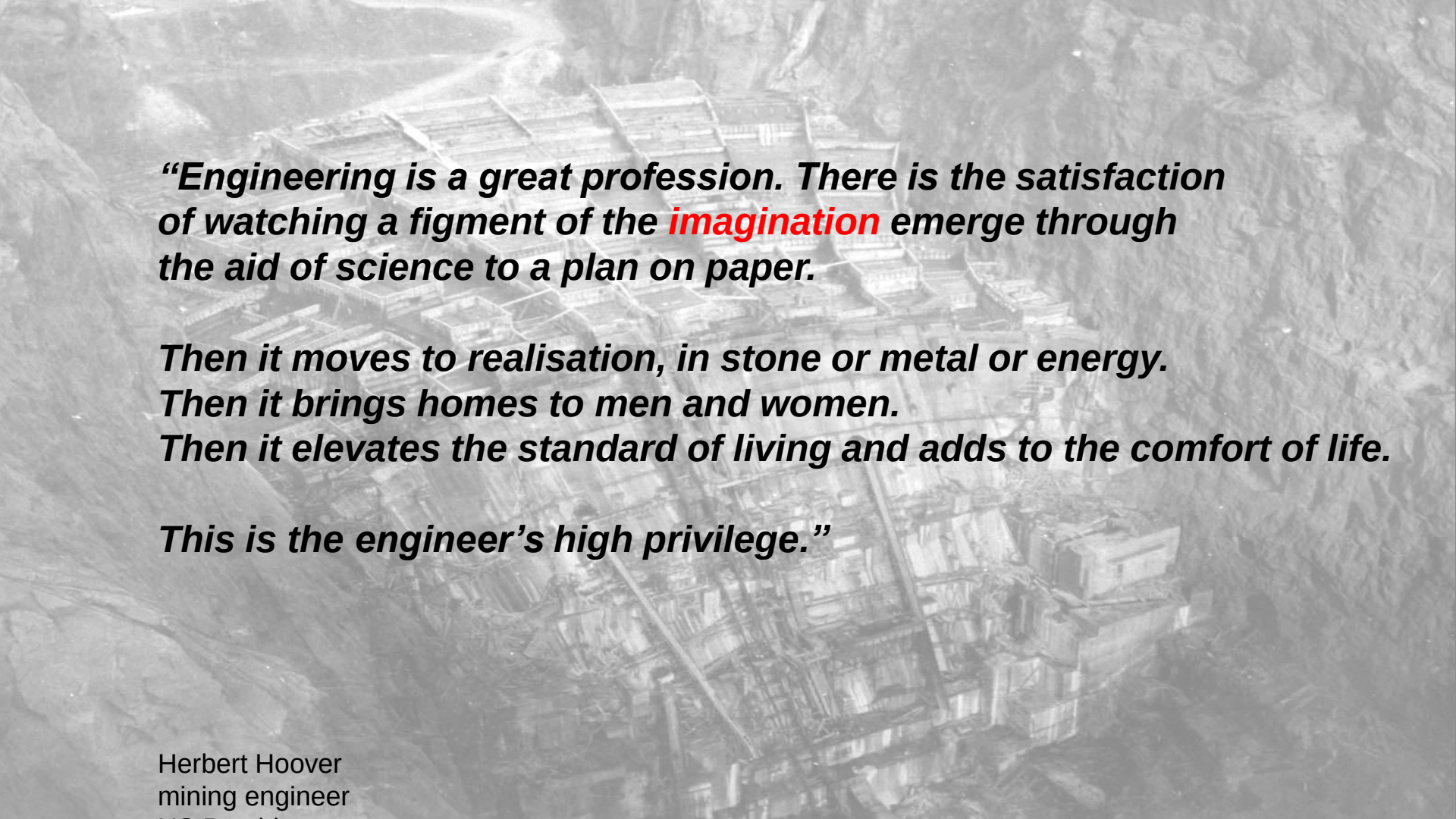
ENGINEERING THE URBAN AGE: LIVING ON THE EDGE

GIJS VAN DEN BOOMEN

KC

KuiperCompagnons

Knowledge * Concepts



*“Engineering is a great profession. There is the satisfaction of watching a figment of the **imagination** emerge through the aid of science to a plan on paper.*

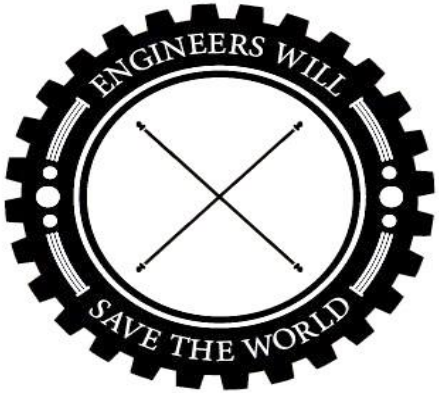
Then it moves to realisation, in stone or metal or energy.
Then it brings homes to men and women.
Then it elevates the standard of living and adds to the comfort of life.

This is the engineer’s high privilege.”

Herbert Hoover
mining engineer

Trust Me, I'm an Engineer

To save time, let's just assume that I'm never wrong



FACULTY OF ENGINEERING
UNIVERSITY OF SOUTHERN DENMARK.DK

THE BIG
GET
PICTURE

GREAT
DYNAMICS
ASK FOR
BOLD
IDEAS
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
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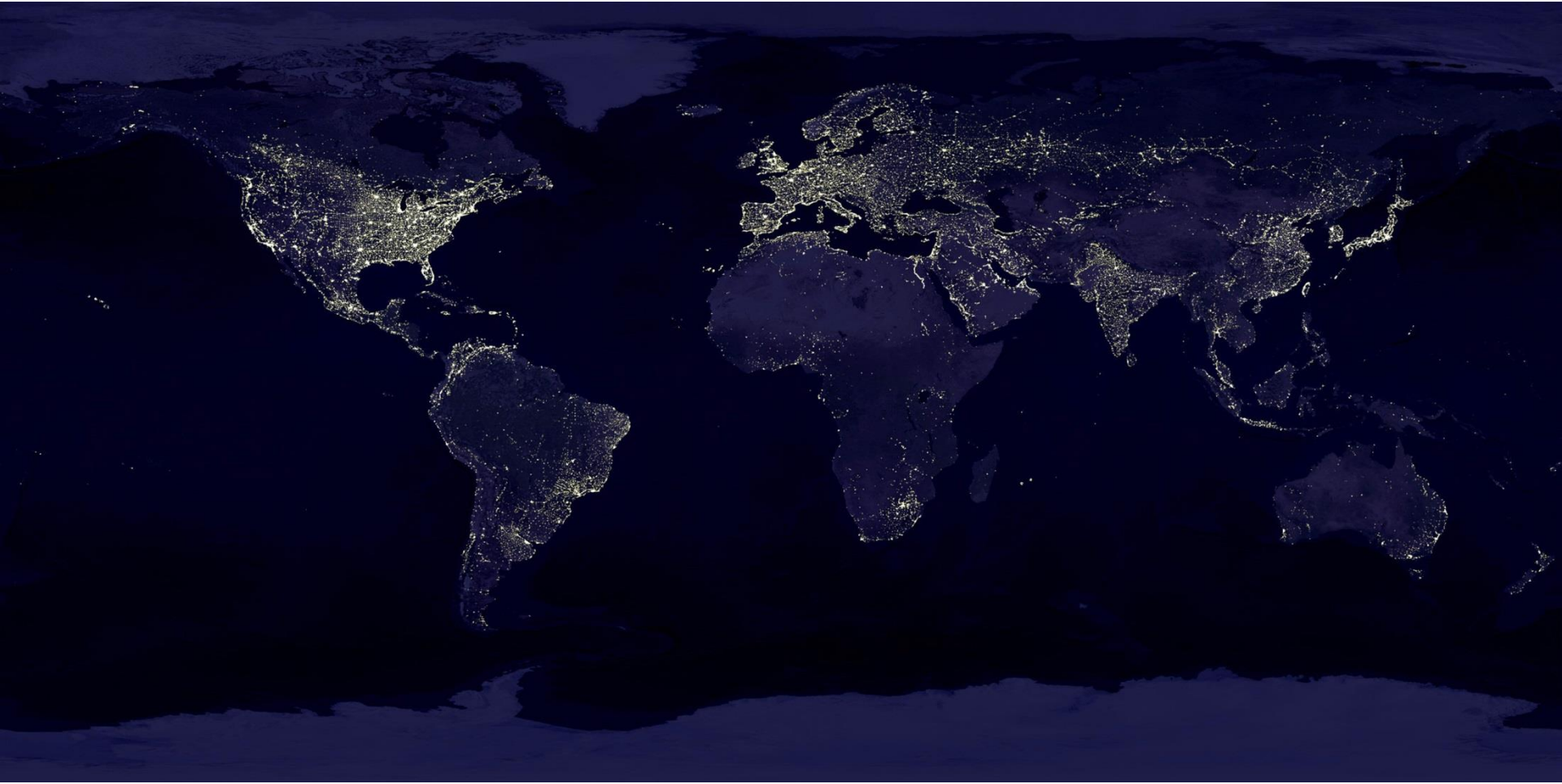
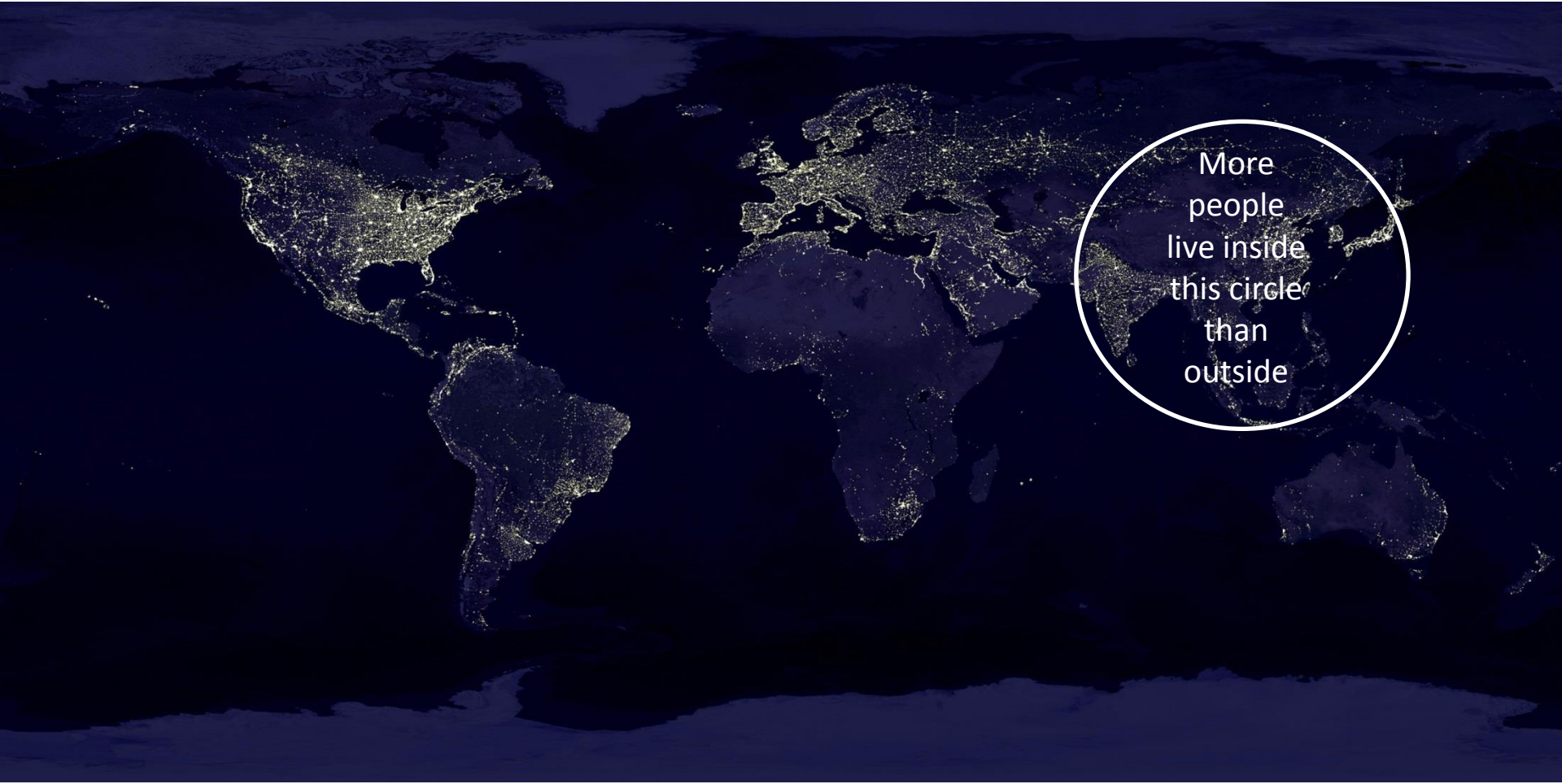
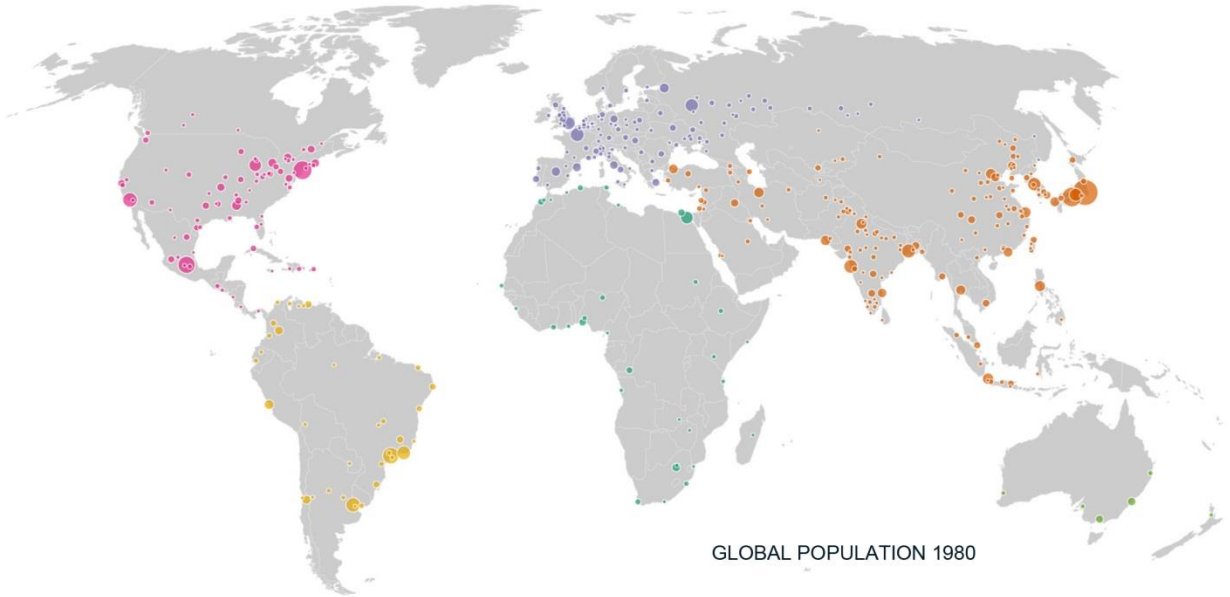


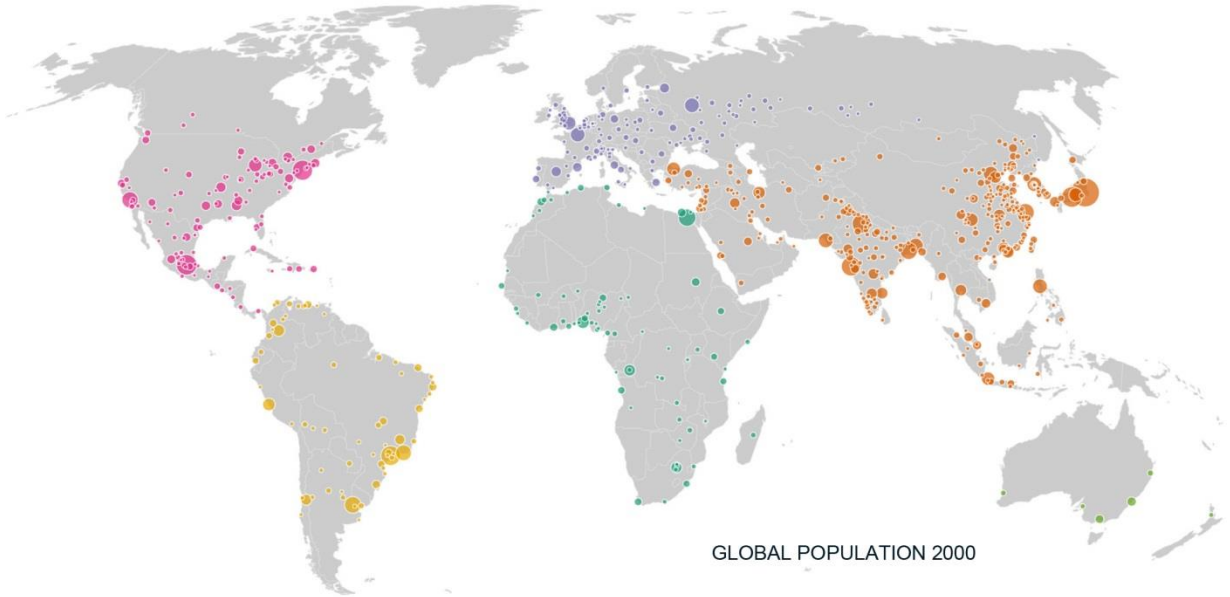

More
people
live inside
this circle
than
outside

PEOPLE

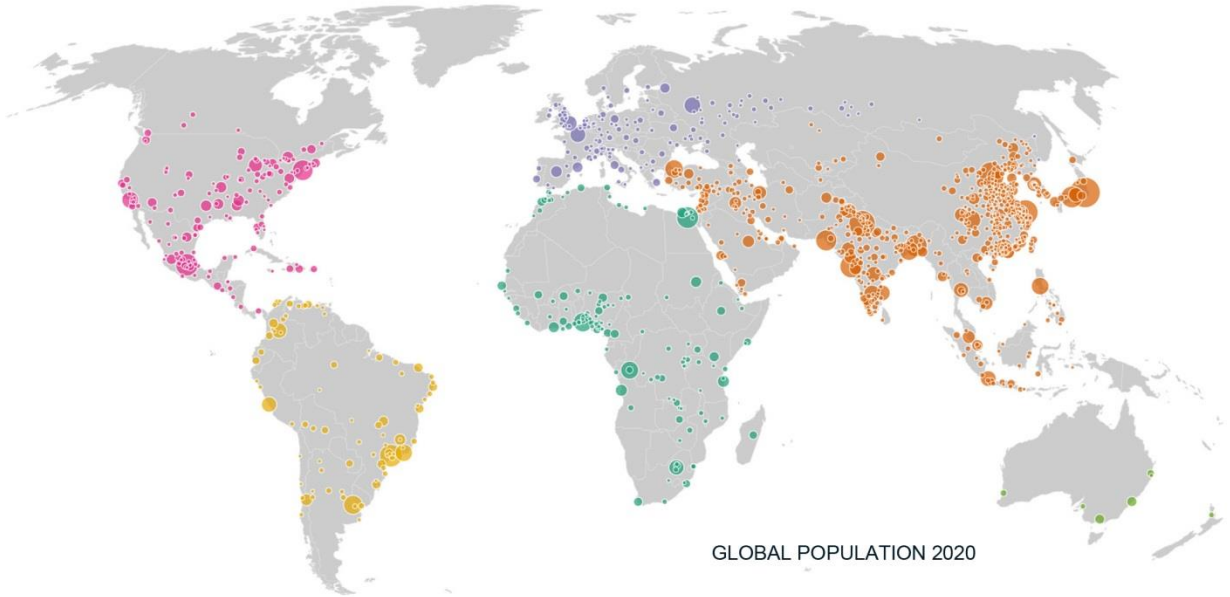
GLOBAL POPULATION 1960



GLOBAL POPULATION 1980

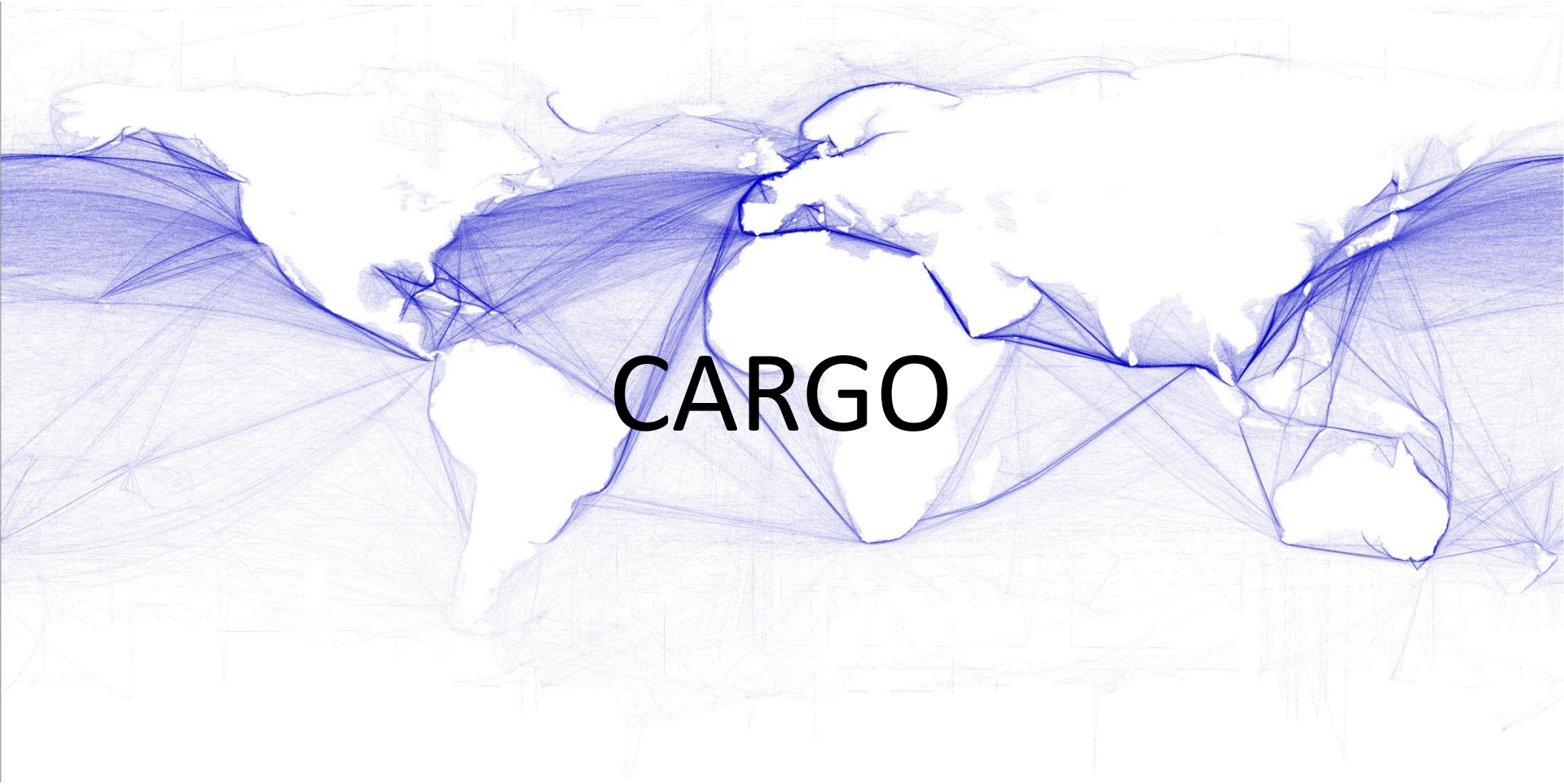


GLOBAL POPULATION 2000



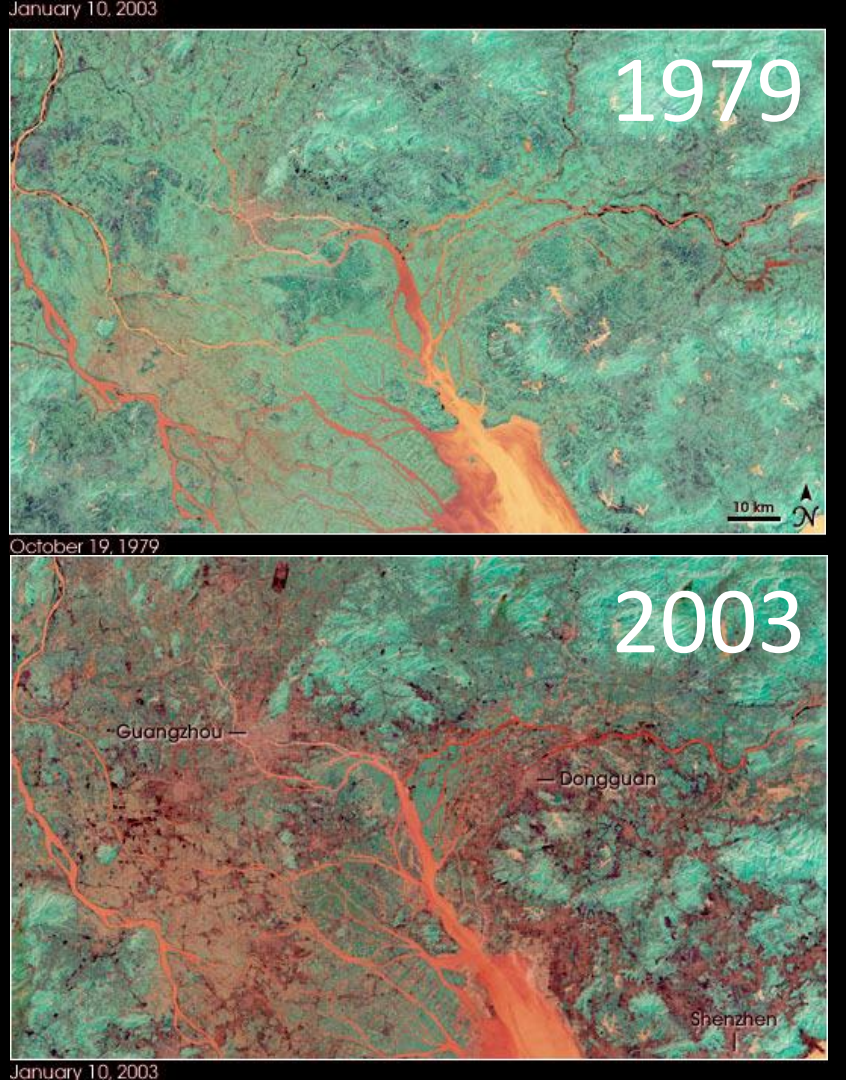
GLOBAL POPULATION 2020

TRAVEL
Airline*
Emirates
Lufthansa
Delta Air Lines
Air France
British Airways
Cathay Pacific
Singapore Airlines
*Ordered by scheduled international passenger kilometres flown in 2010 (source Wikipedia).
Only routes in the OpenFlights database are plotted.
Map: James Cheshire, spatialanalysis.co.uk
Flights Data: openflights.org
Basemap Data: naturalearthdata.com


CARGO

LIVING ON THE EDGE:
DELTA
INTERFACE
PORT

LIVING ON THE EDGE:
LAND
INTERFACE
WATER



CONNECTING WORLDS

INTERFACE

PEARL RIVER DELTA

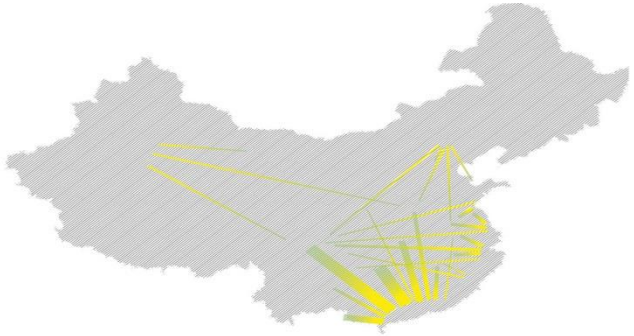
CONNECTING WORLDS

INTERFACE

YANGTZE RIVER DELTA

MEGA CITY

DELTA CITY



CONNECTING WORLDS

Antonis Samaras & Li Keqiang

China Planning $50 Billion Fund for ‘New Silk Road’

Bloomberg
8 November 2014

iron silk road

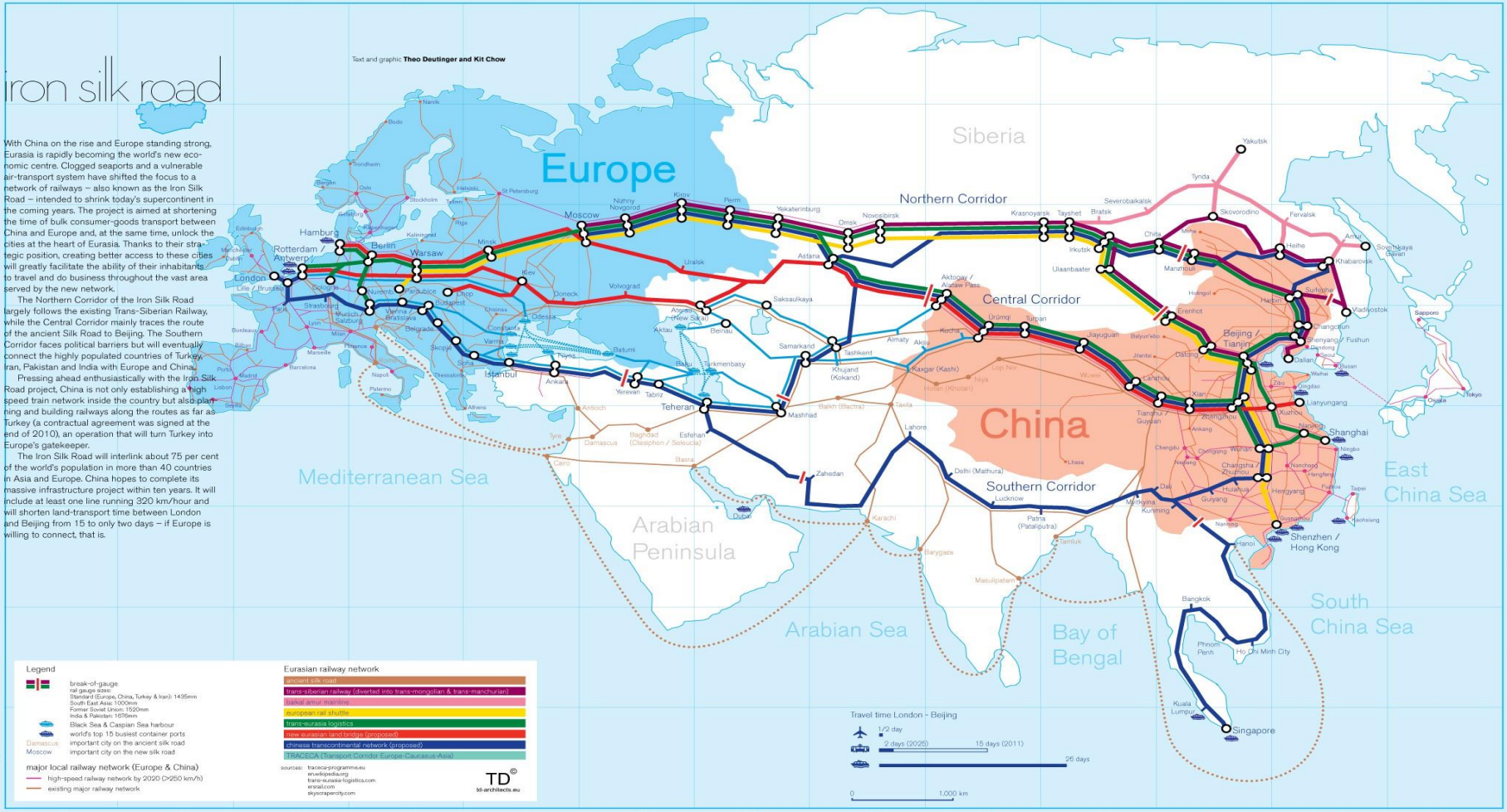
Text and graphic **Theo Deutinger and Kit Chow**

With China on the rise and Europe standing strong, Eurasia is rapidly becoming the world's new economic centre. Clogged seaports and a vulnerable air-transport system have shifted the focus to a network of railways – also known as the Iron Silk Road – intended to shrink today's supercontinent in the coming years. The project is aimed at shortening the time of bulk consumer-goods transport between China and Europe and, at the same time, unlock the cities at the heart of Eurasia. Thanks to their strategic position, creating better access to these cities will greatly facilitate the ability of their inhabitants to travel and do business throughout the vast area served by the new network.

The Northern Corridor of the Iron Silk Road largely follows the existing Trans-Siberian Railway, while the Central Corridor mainly traces the route of the ancient Silk Road to Beijing. The Southern Corridor faces political barriers but will eventually connect the highly populated countries of Turkey, Iran, Pakistan and India with Europe and China.

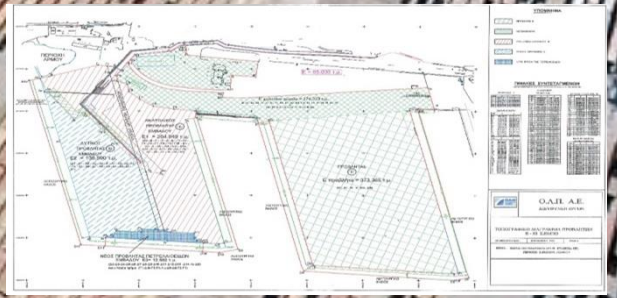
Pressing ahead enthusiastically with the Iron Silk Road project, China is not only establishing a high speed train network inside the country but also planning and building railways along the routes as far as Turkey (a contractual agreement was signed at the end of 2010), an operation that will turn Turkey into Europe's gatekeeper.

The Iron Silk Road will interlink about 75 per cent of the world's population in more than 40 countries in Asia and Europe. China hopes to complete its massive infrastructure project within ten years. It will include at least one line running 320 km/hour and will shorten land-transport time between London and Beijing from 15 to only two days – if Europe is willing to connect, that is.



Piraeus
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Image Landsat
Image IBCAO
©2010 Google

PIRAEUS



Chinese premier Li Kechiang confirmed that China will dynamically enter the Greek privatization program.

Among Chinese targets are ports, airports, railroads, and also the energy sector. More specifically, Mr Kechiang noted his satisfaction for the Cosco investment in Piraeus, and also referred to the prospects of its expansion. Mr Kechiang reiterated that Greece remains the basic entrance point for Chinese goods into Europe.

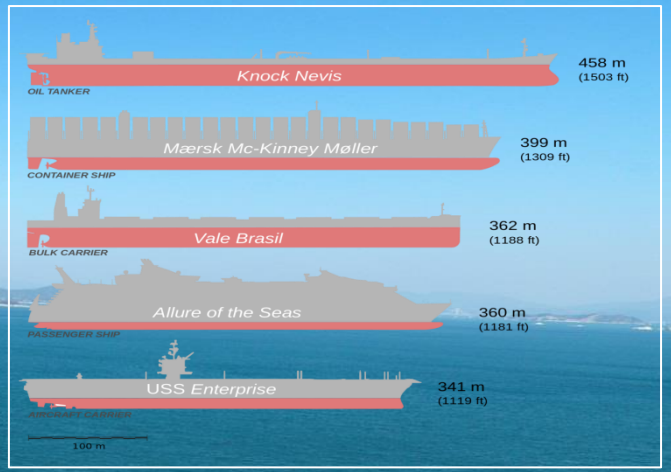
Antonis Samaras & Li Keqiang

Among the investments eyed by the Chinese firms for investments are:

1. **Eleftherios Venizelos Athens International Airport**
2. **The new airport at Kasteli, Crete**
3. **Railroad firm TRAINOSE**
4. **Thriasio Pedio logistics base**
5. **Thessaloniki Port Authority**
6. **Independent Regulator for Electric Power Transfer**

SHORT CUTS
&
CHOKEPOINTS

SIZE



New generation bulk carriers are driving shipping rates down to the level of 1977.

SUEZ

18 October 2014:

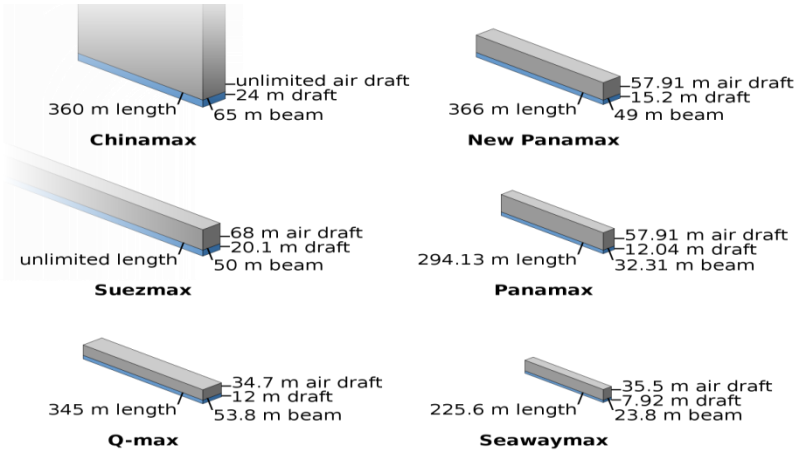
Boskalis consortium acquires Suez Canal expansion contract

Boskalis' strategy is aimed at benefitting from key macro-economic factors which drive worldwide demand in our markets: expansion of the global economy, increase in energy consumption, global population growth and the challenges that go hand in hand with climate change. This project is driven by increasing global trade.

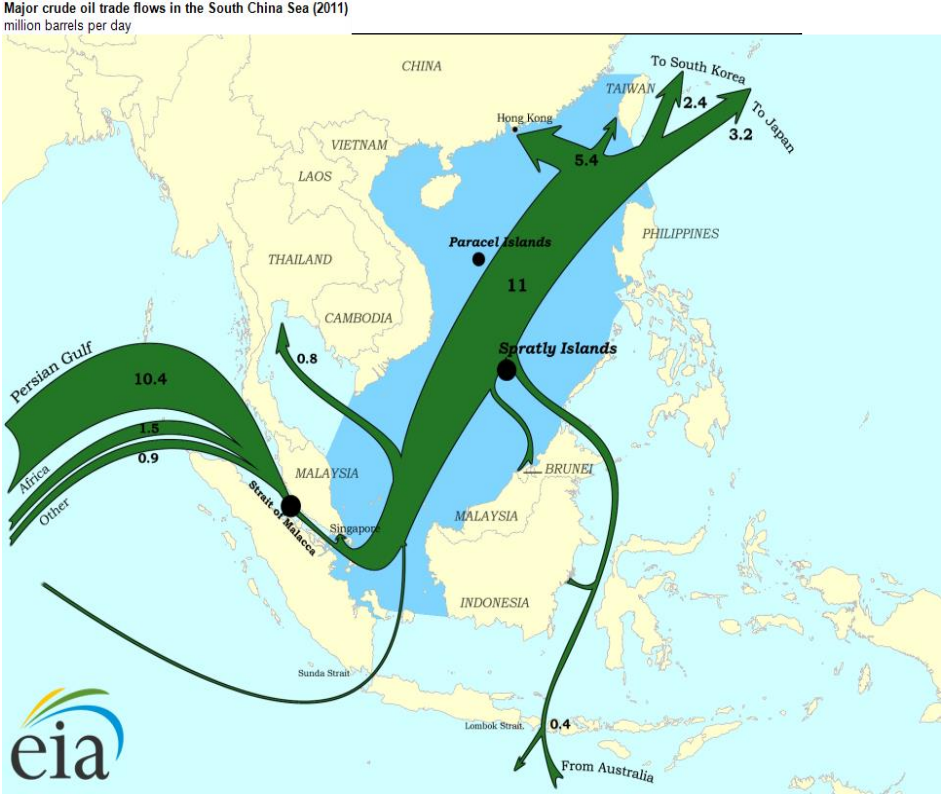
CHOKEPOINTS

Volume of Crude Oil and Petroleum Products Transported Through World Chokepoints, 2007-2011					
Location	2007	2008	2009	2010	2011
Bab el_Mandab	**4.6**	**4.5**	**2.9**	**2.7**	**3.4**
Turkish Straits	**2.7**	**2.7**	**2.8**	**2.9**	**N/A**
Danish Straits	**3.2**	**2.8**	**3.0**	**3.0**	**N/A**
Strait of Hormuz	**16.7**	**17.5**	**15.7**	**15.9**	**17.0**
Panama Canal	**0.7**	**0.7**	**0.8**	**0.7**	**0.8**
Crude Oil	0.1	0.2	0.2	0.1	0.1
Petroleum Products	0.6	0.6	0.6	0.6	0.6
Suez Canal and SUMED Pipeline	**4.7**	**4.6**	**3.0**	**3.1**	**3.8**
Suez Crude Oil	1.3	1.2	0.6	0.7	0.8
Suez Petroleum Products	1.1	1.3	1.3	1.3	1.4
SUMED Crude Oil	2.4	2.1	1.2	1.1	1.7

Notes: · All estimates are in million barrels per day. · "N/A" is not available. · The table does not include a breakout of crude oil and petroleum products for most chokepoints because only the Panama Canal and Suez Canal have official data to confirm breakout numbers. · Adding crude oil and petroleum products may be different than the total because of rounding. · Data for Panama Canal is by fiscal years.
Source: EIA estimates based on APEX Tanker Data (Lloyd's Maritime Intelligence Unit). Panama Canal Authority and Suez Canal Authority, converted with EIA conversion factors.



STRAIT OF MALACCA SHORT CUT



ISTHMUS OF AMERICAS
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Image Landsat
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PANAMA II

GRAN CANAL INTEROCEANICO NICARAGUA

Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Image Landsat
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IISRA
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
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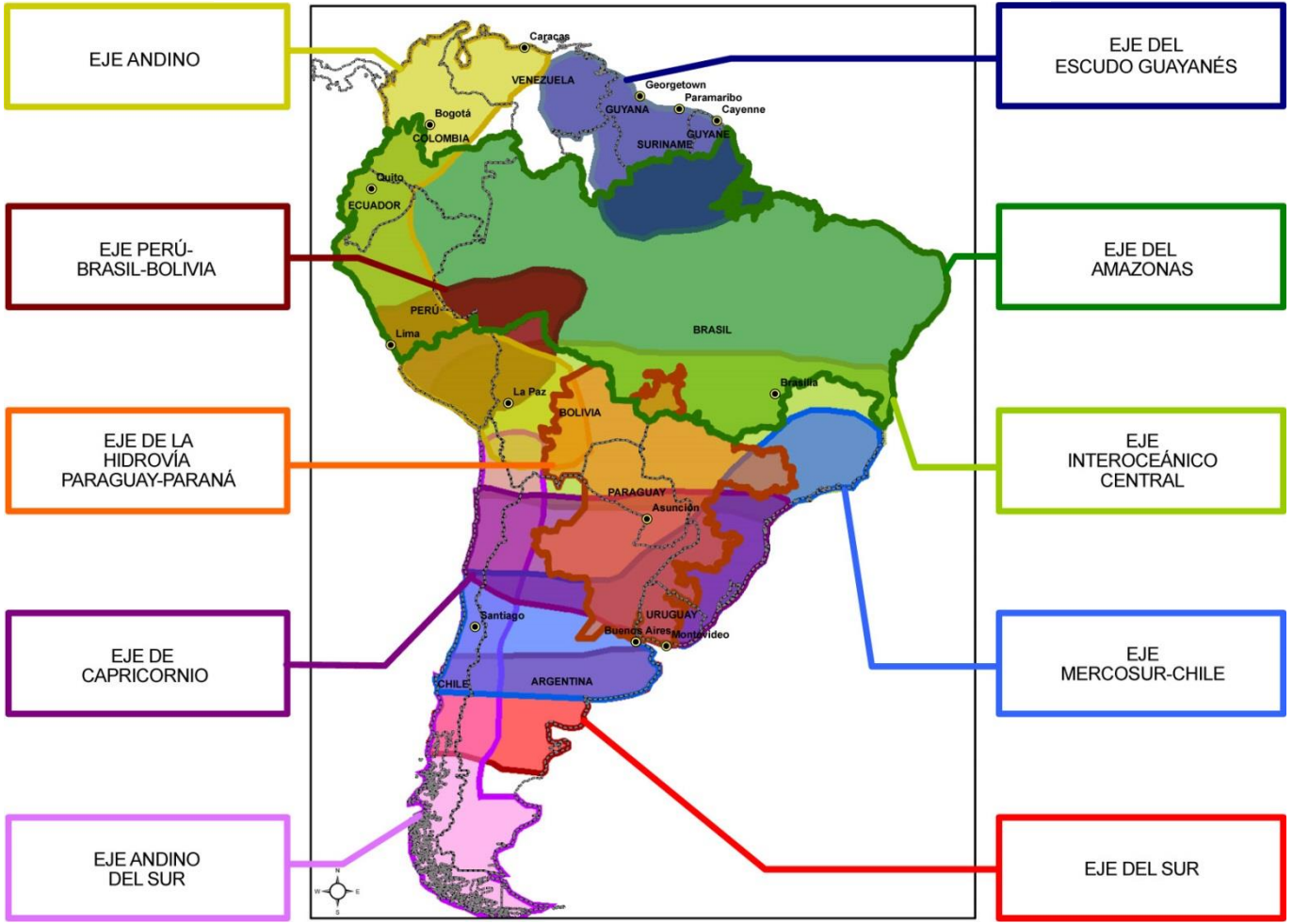
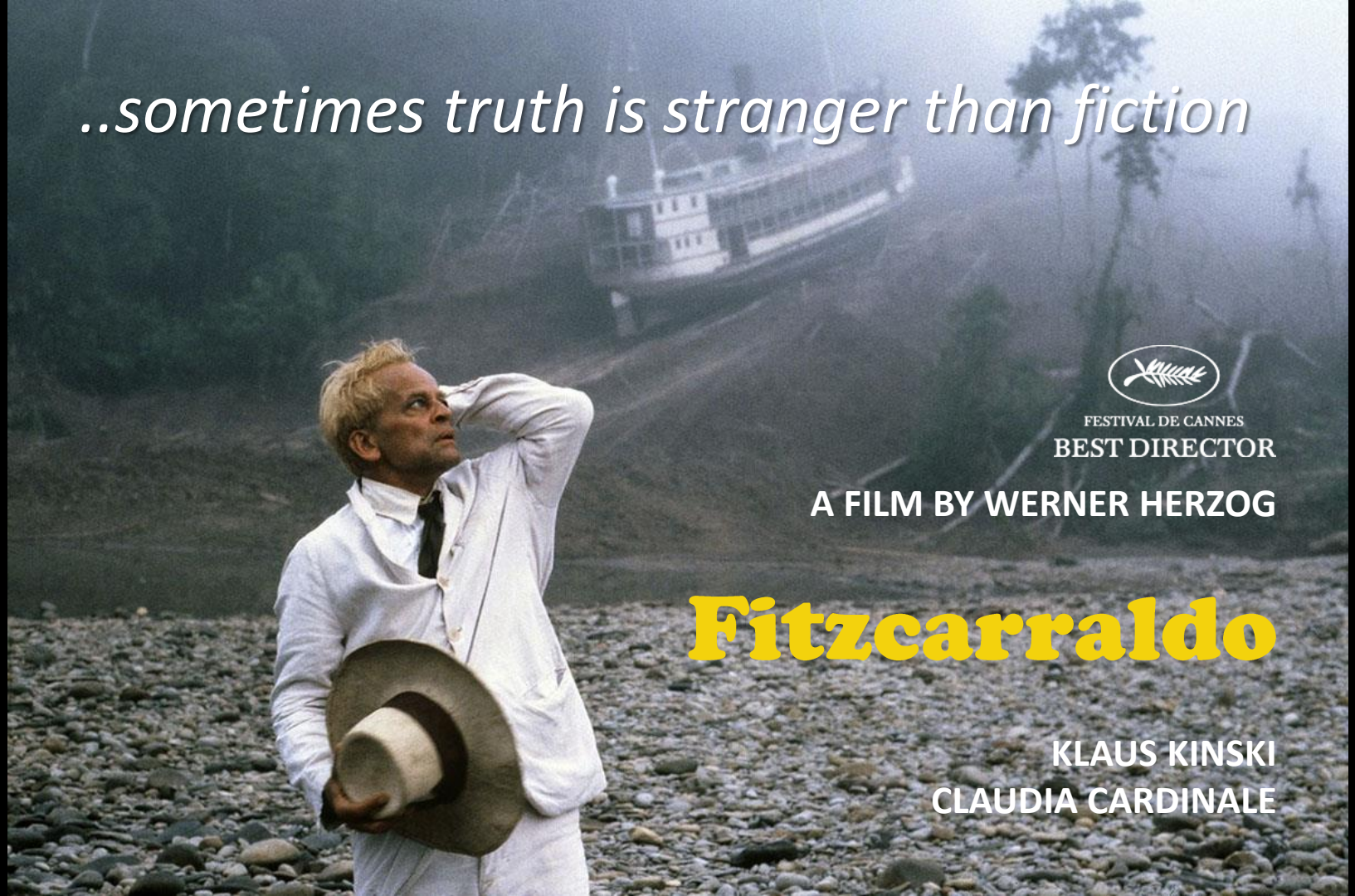
IIRSA: 10 INTER OCEANIC AXES



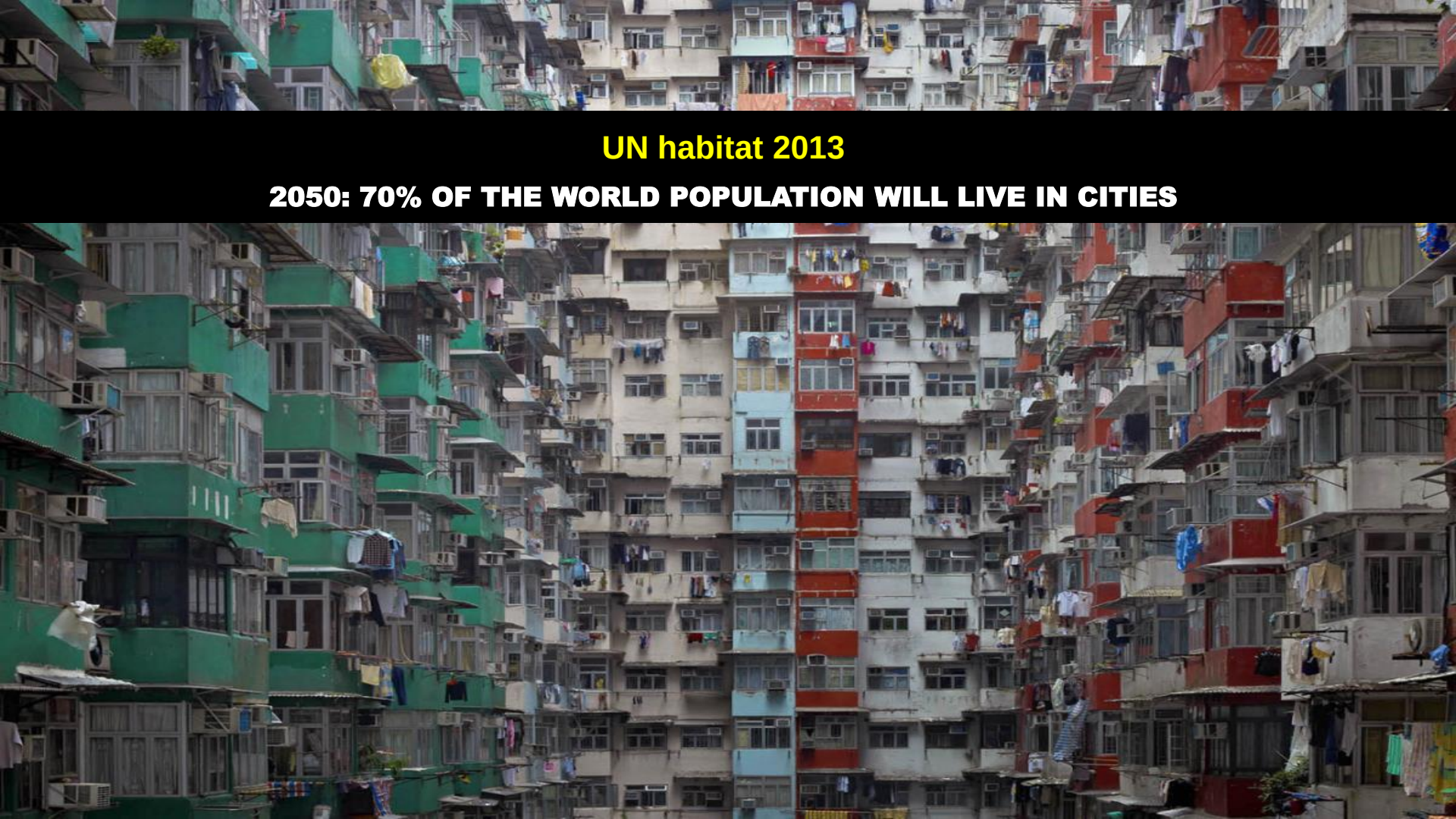
SHORT CUTS

MANTA - MANAUS


..sometimes truth is stranger than fiction
FESTIVAL DE CANNES
BEST DIRECTOR
A FILM BY WERNER HERZOG
Fitzcarraldo
KLAUS KINSKI
CLAUDIA CARDINALE

SOCIAL RELEVANCE

the world on the threshold of the urban era



UN habitat 2013

2050: 70% OF THE WORLD POPULATION WILL LIVE IN CITIES

UN habitat 2013;

2025:

71% OF THE WORLD'S URBAN POPULATION WILL LIVE IN LOW-ELAVATION COASTAL ZONES

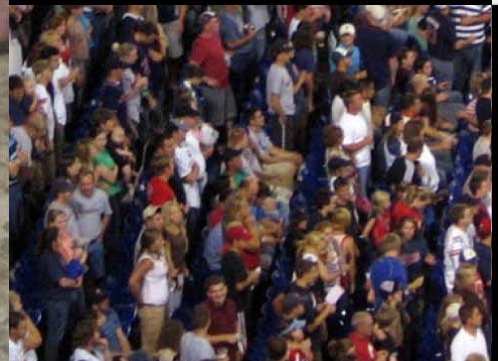
UN habitat 2013

2025-2050: 50% OF THE WORLD POPULATION LIVES IN LOW ELAVATION COASTAL ZONES
AND WILL INCREASINGLY BE AT RISK FROM CONSEQUENCES OF CLIMATE CHANGE

RETHINKING JAKARTA

SINKING AT
A RATE OF 8 TO
25 CM PER YEAR

4.5 MILLION
PEOPLE AT
INCREASING RISK



DECLINING
PROSPECT OF
PROSPERITY

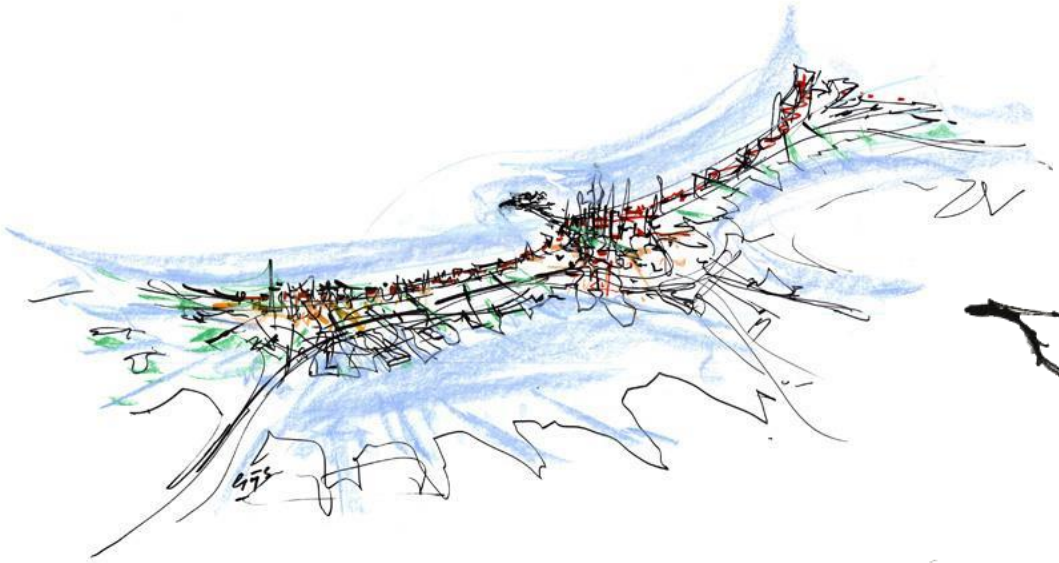
UNPRECEDENTED ENGINEERING

URBANISME ACCORDING TO THE ROBIN HOOD PRINCIPLE

A NEW PERSPECTIVE FOR THE PEOPLE OF JAKARTA

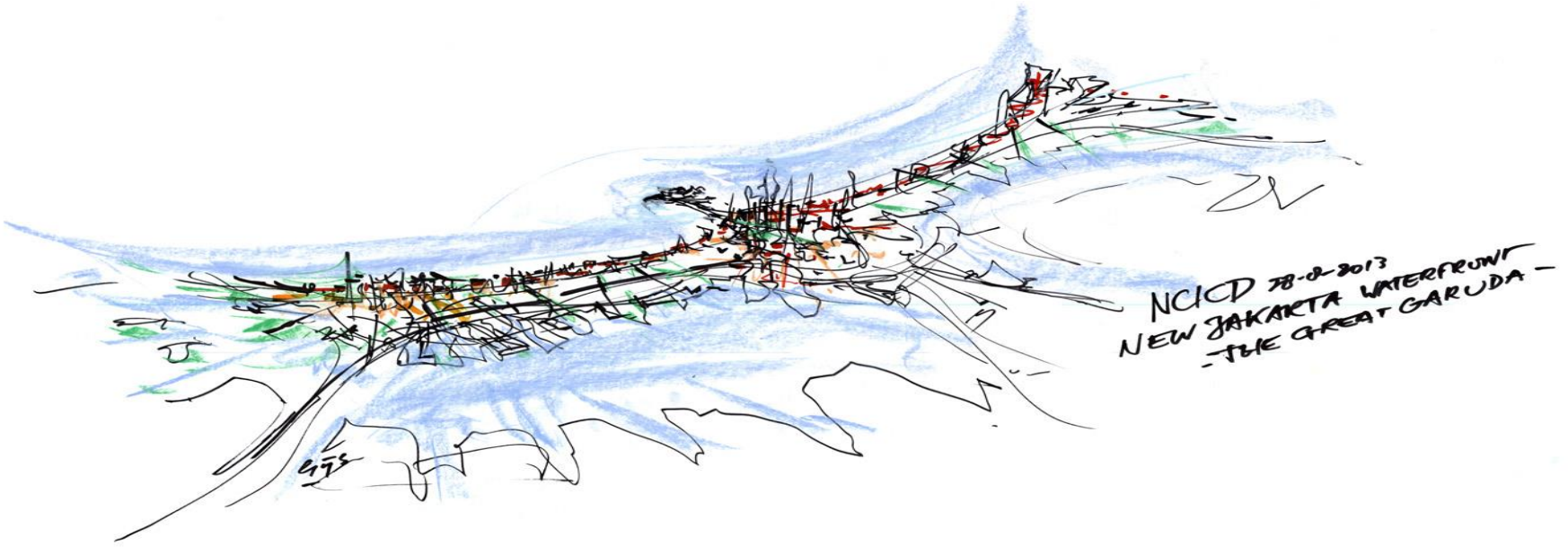
THE ROBIN HOOD PRINCIPLE

DEVELOPING FOR THE RICH…



…TO HELP THE POOR

ICONIC MOTIF WITH SYMBOLIC MEANING ON A NATIONAL SCALE


NCICD 28-8-2013
NEW JAKARTA WATERFRONT
- THE GREAT GARUDA -

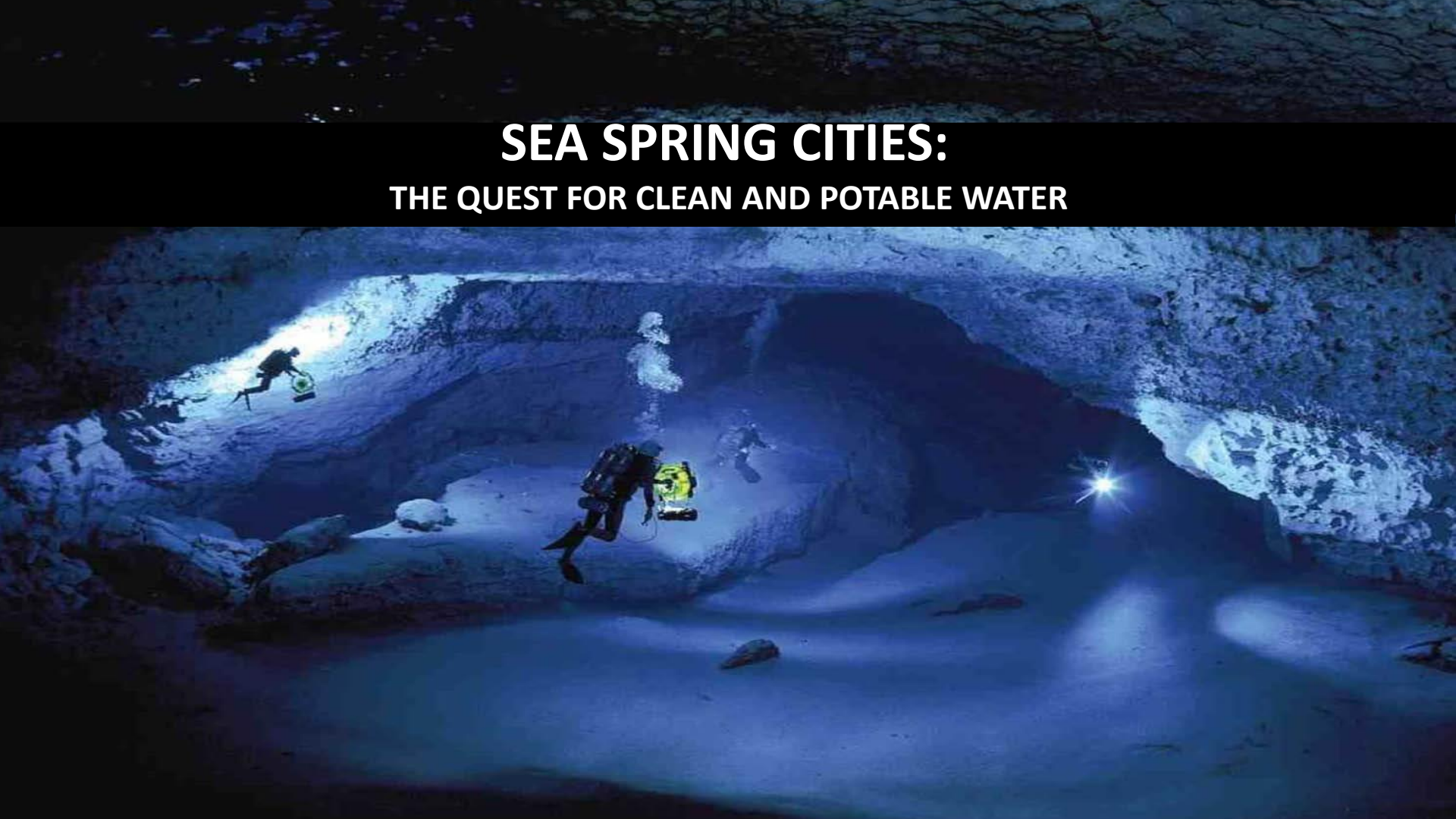
CCTV: 1,2 BILLION VIEWERS

Stage A Launching event 9 October 2014

SEA SPRING CITIES: WATER EVERYWHERE, BUT NOT A DROP TO DRINK

SEA SPRING CITIES:

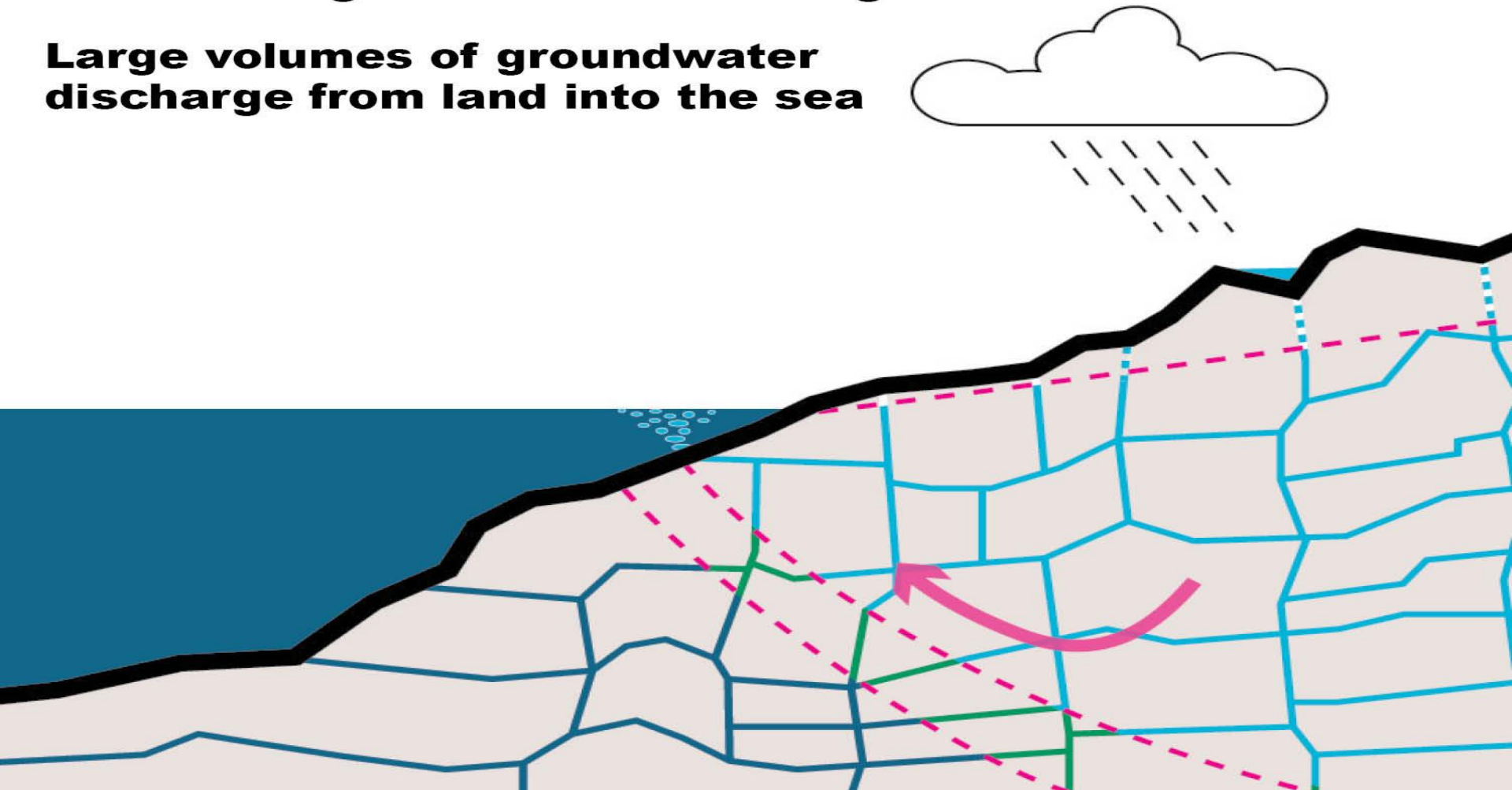
THE QUEST FOR CLEAN AND POTABLE WATER



SUBMARINE SEA SPRINGS

Submarine groundwater discharge

Large volumes of groundwater discharge from land into the sea

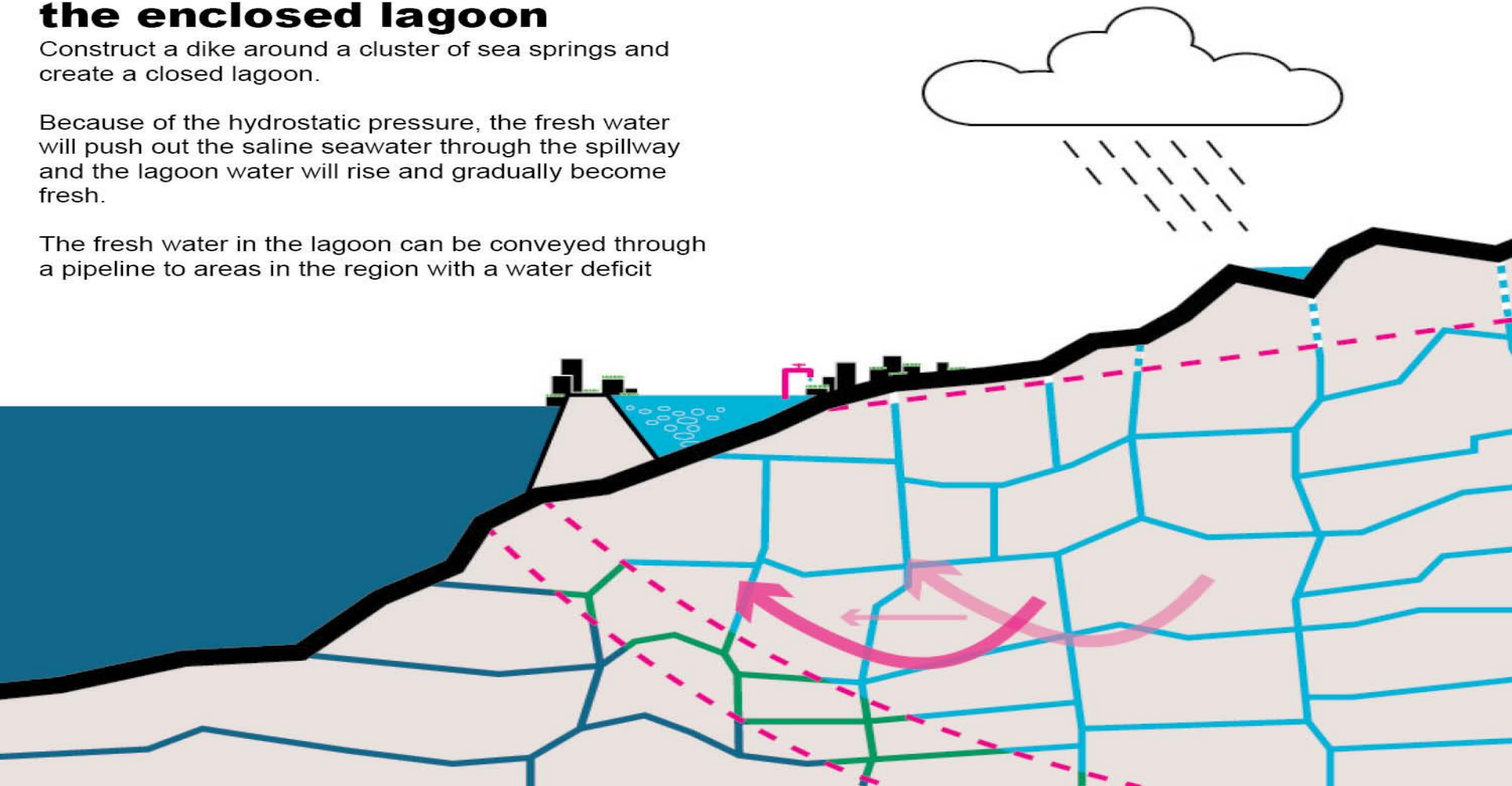


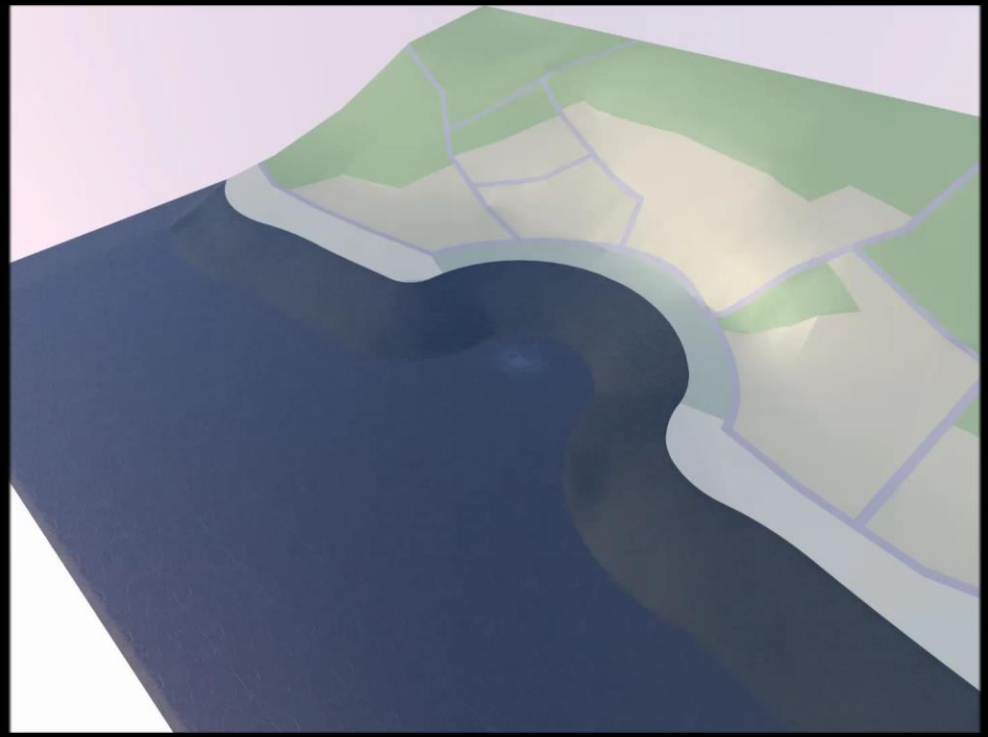
Submarine groundwater discharge captured in the enclosed lagoon

Construct a dike around a cluster of sea springs and create a closed lagoon.

Because of the hydrostatic pressure, the fresh water will push out the saline seawater through the spillway and the lagoon water will rise and gradually become fresh.

The fresh water in the lagoon can be conveyed through a pipeline to areas in the region with a water deficit





SEA SPRING CITIES (VIDEO)

UN habitat 2007; World Wide Urban Challenges

1: CLIMATE CHANGE & MEGACITIES

population growth urbanization vulnerability to climate-related disasters

THE BIG
PICTURE

NEW HEROES OF HOLLAND

are about societal relevance

NEW HEROES OF HOLLAND
bridge the gap:

corporate	→	personal
vested interest	→	innovation
anonymous	→	personal
structure	→	content
expected	→	exciting

Founder and CEO of The Ocean Cleanup

Devised a system though which, driven by the ocean currents, the plastic would concentrate itself, reducing the theoretical cleanup time from millennia to mere years

In June 2014, having lead an international team of 100 scientists and engineers for a year, the concept turned out to be 'likely a technically feasible and financially viable' method to clean up half the Great Pacific Garbage Patch in 10 years' time.

Has been recognized as one of the 20 Most Promising Young Entrepreneurs Worldwide (Intel EYE50)

2014 Champion of the Earth, the United Nations' highest environmental accolade.

The Ocean Cleanup has been recognized as Design of the Year by the London Design Museum.

ALEC MOMONT

He strives to improve global health, to optimise life's journey for people. Through design his aim is to solve problems for people and improve their overall quality of life

With Drones For Good he set out to change the negative perception of drones. The idea has been very warmly welcomed all over the world and reached over 200 million people. One of the concepts that embodies this idea is the "Ambulance Drone" - a high speed emergency network of drones that save lives.

DAAN ROOSEGAARDE

Internationally known for creating social designs exploring the relation between people, technology and space.

Roosegaarde is Young Global Leader at the World Economic Forum, in the top 5 of Sustainable Trouw 100 as the most influential Dutch green leader, and selected as Talent of the Year 2015 by Kunstweek.

With projects ranging from fashion to architecture, his interactive designs such as Dune, Smart Highway and Waterlicht are tactile high-tech environments in which viewer and space become one. This connection, established between ideology and technology, results in what Roosegaarde calls 'techno-poetry'.

NEW HEROES OF HOLLAND

societal relevance & innovation

IF YOU WANT SOMETHING YOU'VE NEVER HAD,

THEN YOU'VE GOT TO DO SOMETHING YOU'VE NEVER DONE.

Thomas Jefferson

NEW HEROES OF HOLLAND

corporate → personal

PHILIPS
206.000.000

BOSKALIS
474.000

AKZO
6.3900.000

SHELL
485.000.000

ASML
730.000

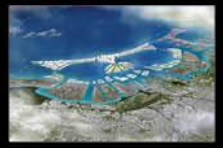
TOMTOM
60.100.000

CRUCELL
311.000

BOYAN SLAT
OCEAN CLEANUP
82.200.00

ALEC MOMONT
DRONES
50.300.000

DAAN ROOSEGAARDE
STUDIO ROOSEGAARDE
154.000



NCICD
GREAT GARUDA
1.540.000

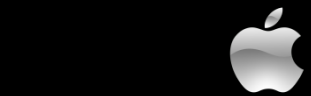
"Here’s to the crazy ones.

The round pegs in the square holes.

The ones who see things differently.

Because they change things. They push the human race forward.

Because the people who are crazy enough to think they can change the world, are the ones who do."



INVEST IN PERSONS

ENDORSE IDEAS

“Imagination is more important than knowledge.

For knowledge is limited to all we know and understand, while imagination embraces the entire world, and all there ever will be to know and understand.”

Albert Einstein, genius

YOU

can make a difference!