Design Thinking

Cities all over the world are reinventing their positions, either driven by changes in national policies decentralizing governance or reacting to the reality of competition and collaboration on subjects such as economy, services or the changing number of inhabitants. Often this is generated out of a desire or perceived necessity to respond to the changing ambitions of industries and citizens. One only has to think of notions like ‘Creative Cities’, ‘Metropolitan Regions’, ‘City Branding’ and ‘Self-regulation’ to understand that traditional ways to organize one’s community will fail to adequately address these emerging ambitions.

There is a need to improve decision-making and policy processes just as much as there is a need to service and renew spatial structures as demands are changing. One can state that changes in urban developments are driven by changes in population and their needs. Energy and sustainability issues have become a common consciousness deserving appropriate response in terms of policy and spatial planning. One can easily add to these examples.

These current challenges are becoming more complex and intertwined. Fed by a large number of sometimes contradictory and definitely various ambitions, they need to be addressed in a manner that do justice to all involved. Changes are good. And by nature, changes are complex and difficult to implement. They are disruptive and evoke resistance. Change needs community, involvement, and commitment. The more complex a challenge is, the more actors or stakeholders need to be involved, and the more inadequate traditional means for development becomes.

One needs to build robust solutions, or better, robust environments and contexts. Solutions tend to address current situations incapable of adjusting to changing realities. It is exactly those rapidly changing realities – economical, political and social – that have led to the realization that innovation in governance and policy-making processes is crucial for a city to keep operating successfully. Intelligent ways to address and implement developments are needed. Intelligent in terms of creating efficient and economically viable solutions for both processes and implementations; intelligent in being informed by relevant parties.

Current notions on ‘Design Thinking’ move towards inclusive and collaborative processes. These are aimed at efficiently producing inventories and analyses of stakeholders and context. Organizing effective prototyping presents essentially different strategic options and scenarios. Finally and foremost, these processes create collaborative structures for professionals, administrators and citizens.

Studio

MRDH2042 is a case study based research & design program. Students from the University of Kentucky – College of Design took on the challenge to research potential interventions for the municipality of Delft. Current ambitions and trends involve the position of the city of Delft in the upcoming Region Metropole Rotterdam Den Haag, the relation between the Delft University of Technology and the city itself and generic European challenges as changes in population, economy and resilience topics like environmental and social. The research includes the current condition of Delft in relation to the region and in comparison to similar cities in Europe and the US. Main focus for the development of various scenarios is to enhance opportunities and ambitions with a special interest to the built environment.

Although the subject of research is realistic and based on actual ambitions and challenges the MRDH2042 studio produces ‘academic’ results. It is not our aim to provide ‘ready-to-use’ solutions for either the municipality of Delft or other stakeholders. Our results are based on an open and suggestive approach and can be as extremes in terms of content and implementation conditions (financially, political, etc.) as the research and development of scenarios dictate. As much as the developed scenarios and proposed (spatial) implementations are grounded in actual conditions and political, economical or cultural ambitions they are meant to question and unravel exactly those premises.
**SWOT PERCEPTIONS & ANALYSIS**

**STRENGTHS** | economy, port of Rotterdam, recreation, entertainment, easy transportation, beaches, government seat, diversity, university, geographic location, population density, water ways, tourism, public, system

**WEAKNESS** | aging population, tourism, density, lack of collaboration, not united, economic disparity, branding, air quality, lack of social housing, no major airport, defense against water, energy dependency

**OPPORTUNITY** | tourists, energy gateway, empty spaces, disruption, beaches, recreation, olympics, branding, green tech, globalization, eu center, port economy, business

**THREATS** | tourism, competition internal, not #1 port, competition external, climate change, starting business

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**Economy (GDP)**
- GDP v GRP per capita
- Gross Regional Product (GRP) 36,500
- Gross Domestic Product (GDP) 34,500

**Location**
- Land Usage of the MRDH
  - Almost half the region is green space
- Built Land 440 km²
- Water 140 km²
- Companies and Institutions 140 km²
- Shops and Restaurants 50 km²
- Houses 250 km²

**Population MRDH**
- Two cities make up half the population of the region
- Rotterdam 629,606 People
- Den Haag 519,988 People

**Population of MRDH**
- 2.3 Million People

**Energy Production**
- Majority of power in NL generated by fossil fuels

**Energy Supply**
- The Netherlands does not produce all of its own power

**Energy Demand of NL**
- 108 Billion kwh

**Energy Demand of MRDH**
- 98 Billion kwh

**Energy Production of NL**
- 98 Billion kwh

**Exported Energy**
- 20 Billion kwh

**Imported Energy**
- 30 Billion kwh

**Opportunity**
- tourists, energy gateway, empty spaces, disruption, beaches, recreation, olympics, branding, green tech, globalization, eu center, port economy, business

**Threats**
- tourism, competition internal, not #1 port, competition external, climate change, starting business

**Waste**
- Recycled Waste 70-80%
- Construction/Demo Waste 81 Million Tons
- Household Waste 8.9 Million Tons
- Food Waste 7.7 Million Tons

**Water**
- NL at or below Sea Level 75%
- MRDH at or below sea level 100%

**Business - Partners**
- Province & Region
- Network South Randstad
- EPZ
- Innovation Quarter
- South
- Dova Platform Rotterdam
- Accessible Haaglanden
- EPZ
- Innovation Quarter
TRENDS & URGENCIES

AMBITIONS & PROGRAMS

- Depleting resources
- Climate change
- Transition in world economic leaders
- Growing disparity between economic classes
- Immigration influx
- Running out of room for waste
- Climate change
- Technology innovation
- Rising elderly population
- Connecting to the EU
- Rising sea levels (75% under sea level)
- Migration
- Population growth
- Growing disparity between economic classes

SUSTAINABLE DEVELOPMENT GOALS

- No poverty
- Zero hunger
- Good health & well-being
- Quality education
- Gender equality
- Clean water & sanitation
- Affordable clean energy
- Decent work & economic growth
- Industry, infrastructure, innovation
- Reduced inequalities
- Sustainable cities & communities
- Responsible consumption & production
- Peace, justice, strong institutions
- Climate action

PARIS AGREEMENT

- 2030 ENERGY NEUTRAL PLAN
- URGENDA
- Room for the rivers
- National water plan

NATIONAL WATER PLAN (SAFEST DELTA IN THE WORLD)

- Flood protection plan for areas surrounding rivers
- Improve water quality
- Water management innovations
- Climate resilient design

2030 PORT OF ROTTERDAM VISION

- To become leaders in sustainable energy
- To become leaders in transport efficiency
- First fully circular region in the world
- Build 240,000 homes
- Heat transition atlas
- Smart digital delta
- Smart energy delta
- Next society
- Improve public transport

MRDH 2042

- Tourism
- Influx of innovation/tech industry
- Lack of housing
- Dense cities
- Poor air quality

ROOM FOR THE RIVERS

- Flood protection plan for areas surrounding rivers

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MRDH ROADMAP
Cities around the world are pursuing ideas and pushing urban initiatives that make them the \textit{est}.

\textbf{URBAN INTELLIGENCE:} Urban environments that address the need of innovation with large scale implementations.

\textbf{ASSETS NEEDED FOR IDEAS TO SUCCEED...}

\begin{itemize}
  \item safety
  \item finances
  \item energy/willingness
  \item space
  \item technology
  \item accessibility
  \item skilled workers
  \item negotiable regulations
  \item resources
  \item urgency
  \item access to research
\end{itemize}

In order to \textbf{IMPLEMENT INNOVATIVE CONCEPTS} to achieve \textbf{URBAN INTELLIGENCE} it is necessary to \textbf{PROTOTYPE IDEAS ON A REAL LIFE URBAN SCALE}

\textit{"The rhetoric of smart cities would be more persuasive if the environment that the technology companies create was actually a compelling one that offered models for what the city can be"} - Rem Koolhaas

\textbf{URBAN INTELLIGENCE:} cities around the world are pursuing ideas and pushing urban initiatives that make them the \textit{est}.
**EMBRACE THE WATER**

**URGENCIES**

- **Need for:**
  - Economic boost
  - Increase population
  - City growth

- **Building Next Generation Residential**

**CURRENT AMBITION**

- **To create sustainable, life-resistant, and affordable housing and habitats.**

**PROPOSED AMBITION:**

To accommodate 240,000 houses in the region, green areas have to be developed into multi-purpose neighborhoods, which can also serve as detention basins, a flood-control method.

**SITE ANALYSIS:**

The presented maps show how susceptible the region is to flood damage, being almost completely below sea level.

- Risk areas (below sea level)
- Protected areas (above sea level)
- Main proposed areas for detention basins, based on risk-factors and nearby population

**SOLUTION:**

As a strategy for a better natural stormwater management and stronger defenses against imminent floods, incorporating detention areas in the region are needed in order to protect the inhabitants in high-risk areas.

Integrating the usefulness of detention basins, with water-robust housing units, will transform the MRDH into a living water-resilient region, capable of surviving floods and seeing climate change as an innovation challenge.

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**WATER-RESILIENT REGION BY 2042**

**MRDH in need of 240,000 Residential**

- Economic boost
- Increase population
- City growth

**National Water Plan:**

- Flood defenses
- Prevent flooding and waterlogging
- Climate resilient
- Water-robust

**NL under flood risk**

- 75% Under sea level
- 20% Temperature rise 80 cm sea level rise by 2042

**Risk areas (below sea level)**

**Protected areas (above sea level)**

**Main proposed areas for detention basins, based on risk-factors and nearby population**

**Detention basin diagram**

[Detention basin diagram](https://www.pewpewmwev.org/manu-al/chapter)

**Detention basin diagram**

1. Elevated Houses: Kasbah, Overijssel, NL
2. Amphibious Houses: Buckinghamshire, UK
3. Floating Houses: Amsterdam, NL
Climate change is a glaring problem for the world but a much more immediate problem for the Netherlands, because so much of the country is at or below the current sea level, including almost all of the MRDH region. This calls for a strict and immediate change to the policies and carbon output of the country through energy reform.

**CURRENT AMBITIONS**

**GLOBAL - Paris Agreement 2050**
The world almost unanimously agreed on the Paris Climate accords in June of 2017. It calls for countries to lower CO/two.den emissions to prevent the average world temperature from rising to +1.5 degrees celcius since the beginning of the industrial era by 2050. There was no direction given for HOW to achieve this however. Every country is basically on its own to limit their emissions.

**DUTCH - Energy Neutral 2030**
The Dutch government has plans for 2030 set in place to transition the infrastructure of the country to be energy neutral. This would constitute street signs/lights having solar panels, dams and bridges generating hydroelectricity, installing pressure pads that generate energy in the roads when walked or driven on etc. The Netherlands should not settle at being energy neutral. The MRDH region can be used as a starting point to set up a green energy model for the rest of the Netherlands. The rest of the region’s energy deficit should be made up but with renewable sources first. From there, the current energy production will need to be replaced phase by phase with solar, wind, and biofuel. This involves a revolving door of installing new sources in the most ideal areas, attaching them to the grid if necessary, and then shutting down the non-renewable energy plants.

**MRDH AMBITION**

**MRDH - Full Renewables 2042**
The Netherlands should not settle at being energy neutral. The MRDH region can be used as a starting point to set up a green energy model for the rest of the Netherlands. The rest of the region’s energy deficit should be made up but with renewable sources first. From there, the current energy production will need to be replaced phase by phase with solar, wind, and biofuel. This involves a revolving door of installing new sources in the most ideal areas, attaching them to the grid if necessary, and then shutting down the non-renewable energy plants.

**CONCLUSION**

Renewable energies are not reliable or efficient enough to rely on powering an entire country (let alone a region) on a single source. Therefore the MRDH needs to have a mix of renewable energy sources to shift to a full green energy grid. A proposal of a 40% wind, 70% solar and biofuel to fill whatever gaps that may appear. This involves over-generating electricity to have reserve energy in case of poor weather conditions or an emergency. This also highlights the need for more research into renewable energies to make it more efficient and needing less installations.
Moving to a circular economy means a shift in the way we think, make and act. It requires a systematic approach and has effects on how business models, governance, laws, housing, agriculture, are organised and structured.

- Materials are efficiently managed and recycled;
- Entirely on the basis of renewable energy;
- No actions cause negative effects on life and earth.

Fast Trash
In 6 months, 90% of the things we buy end up in the trash.

Balance of Resources
The ability to harvest natural resources at a slower rate and extending the life of products

Waste as a Resources
There are many examples of how materials can be redesign, reimagined, and renewed

Areas of Problem
Planned Obsolescence: Things designed for dump, useless as quick as possible.
Perceived Obsolescence: Getting the new style, trashing your current.

Average Person
Today consumes 2X as much as they did 50 years ago.

100,000+ Untested Chemicals
Landfills are still needed. Products aren’t good enough to go back into the ground or recycle.

The Spiral Ambition
Materials should be used most efficiently, cycling through a spiral multi-looped system.

Starting with responsible natural resource harvesting.
Moving into processing with a focus in making better products.
The product loops through the system many times, in order to adapt itself to best suit the needs of the consumers.

The material is then only used effectively as energy through incineration. Providing heat and electricity to the community, lowering the cost and later providing roads through the remaining ash and debris.

The MRDH should lead the charge in aiding the Netherlands as a whole to meet the goals and needs of the changing economy, from the inside out.

The NL 59 million tonnes of Waste it produces.

Netherlands Waste
Recycles - 78%
Incinerates - 19%
Landfilling - 3%

Sweden Waste
Recycles - 90%
Incinerates - 50%
Landfilling - 1%

1994 introduced the ban of landfilling of certain waste streams, which were characterised in 35 different waste categories.
2002, the tax on landfilling was further reinforced by a steep increase of EUR 11 per tonne. The purpose of this increase was to make landfilling more expensive.

Benefits
- Bring Circular to the country could contribute 80,000 jobs, and 20 million euros combining this with Waste as a Resource could generate many more jobs and growth opportunities.
- Curb Energy Consumption
- Provides 19% of Energy for NL

We can take better advantage of what we are landfilling and find new and innovative way to reuse, recycle and remake the products we no longer need over time.

With massive amounts of trash being regenterated as a resources the MRDH will now have enough waste to become truly circular.