2042

MRDH

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 interwoven. 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 as 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 extreme 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 unveil exactly those premises.

EXTREME SCENARIOS FOR THE METROPOLE REGION ROTTERDAM DEN HAAG

SWOT
PERCEPTIONS & ANALYSIS

MRDH 2042

Economy (GDP)
GDP v GRP per capita

- Gross Regional Product
  36,500
- Gross Domestic Product
  34,500

Location
Land Usage of the MRDH
Almost half the region is
green space

- Agriculture/Nature/Recreational
  550 km2
- 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

- Population of NL
  17 Million People
- Population of MRDH
  2.3 Million People
- Rotterdam
  629,606 People
- Den Haag
  519,988 People
- Zoetermeer
  124,107 People
- Delft
  101,034 People

Energy Production
Majority of power in NL
generated by fossil fuels

- Energy Demand of NL
  108 Billion kwh
- Energy Demand of MRDH
  14.6 Billion kwh
- Fossil Fuels
  90%
- Renewable Sources
  10%
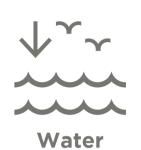
Energy Supply
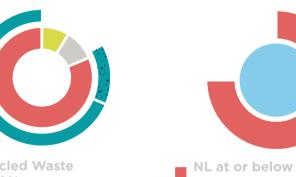The Netherlands does not
produce all of its' own
power

- Energy Demand of NL
  108 Billion kwh
- Energy Production of NL
  98 Billion kwh
- Imported Energy
  30 Billion kwh
- Exported Energy
  20 Billion kwh

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

Dova
Province S. Holland
Platform Beter Benutten
Network South Randstad
Accessible Haaglanden
Bereik!
Traffic Management Company Rotterdam
EPZ
Stedenbaan
Innovation Quarter

- Transport
- Economy
- Spatial Development
- Innovation
- Collaboration Platform

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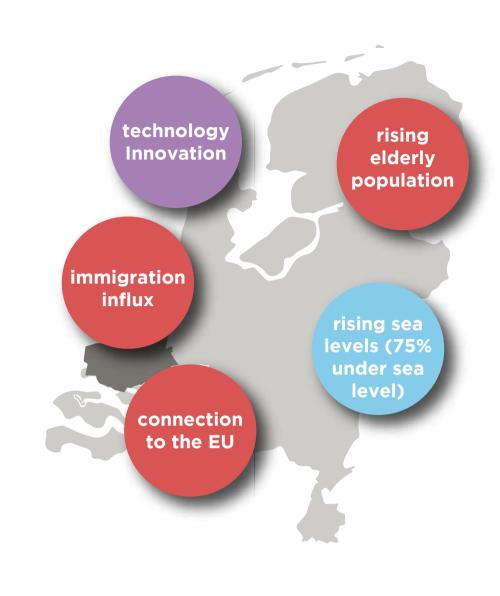
OPPORTUNITY | tourists, **energy gateway, empty spaces**, disruption, beaches, recreation, olympics, branding, green tech, **globalization**, eu center, port economy, **business**

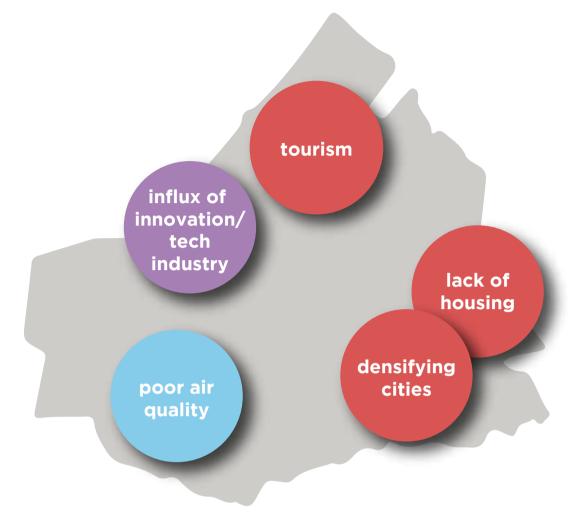**THREATS** | tourism, **competition internal**, not #1 port, **competition external, climate change, starting business**

TRENDS & URGENCIES
AMBITIONS & PROGRAMS

MRDH 2042

World map (trends)

- globalization
- transition in world economic leaders
- migration
- technology Innovation
- population growth
- growing disparity between economic classes
- depleting resources
- running out of room for waste
- climate change

Europe map (trends)

- technology Innovation
- rising elderly population
- immigration influx
- rising sea levels (75% under sea level)
- connection to the EU

MRDH region map (trends)

- influx of innovation/tech industry
- tourism
- lack of housing
- densifying cities
- poor air quality

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
- life below water
- life on land
- peace, justice, strong institutions
- climate action

PARIS AGREEMENT

- mitigate climate change (2020+)
- mitigate global warming (2020+)

2030 ENERGY NEUTRAL PLAN

- infrastructurally energy neutral by 2030

URGENDA

- citizen fight against climate change (for human safety)

ROOM FOR THE RIVERS

- flood protection plan for areas surrounding rivers

NATIONAL WATER PLAN (SAFEST DELTA IN THE WORLD)

- improve water quality
- water management innovations
- climate resilient design
- flood protection plan for areas surrounding rivers

2030 PORT OF ROTTERDAM VISION

- to become leaders in sustainable energy
- to become leaders in transport efficiency

MRDH ROADMAP

- first fully circular region in the world
- build 240,000 homes
- heat transition atlas
- encourage entrepreneurial efforts
- pursue large scale events/projects
- smart digital delta
- smart energy delta
- next society
- improve public transport

URBAN INTELLIGENCE
A REGION THAT PERFORMS

-est

cities around the world are pursuing ideas and pushing urban initiatives that make them the -est

happy-*est*

sydney, australia

green-*est*

copenhagen, denmark

cool-*est*

rotterdam, netherlands

smart-est

new york city, usa

"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

innovative ideas...

...at urban scales...

...serve communities

=

URBAN INTELLIGENCE :
urban environments that address the need of innovation with large scale implementations

urban intelligence

or

smart cities

METROPOOL REGIO ROTTERDAM DEN HAAG

MRDH 2042
RESEARCH DEVELOP IMPLEMENT

ASSETS FOR **RDI** 2042
RESEARCH DEVELOP IMPLEMENT

ASSETS FOR **MRDH**
METROPOOL REGIO ROTTERDAM DEN HAAG

population
population density

urban
rural

public transit
highways
ports (sea & air)
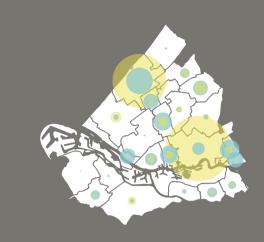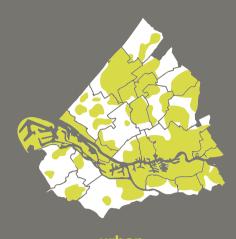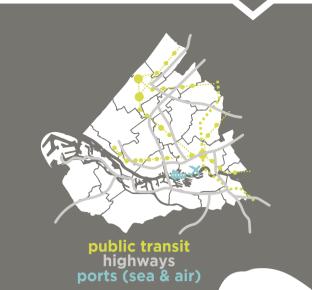
pre-existing innovative examples

high % of early adopters
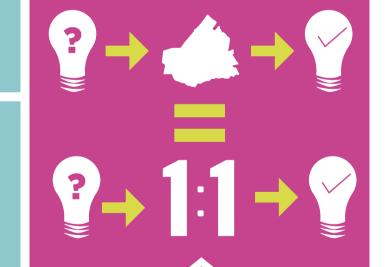
innovation centers

...safety	...finances	...energy/willingness	...space
...technology	...accessiblity	...skilled workers	...negotiable regulations
...resources	...urgency	...access to research	
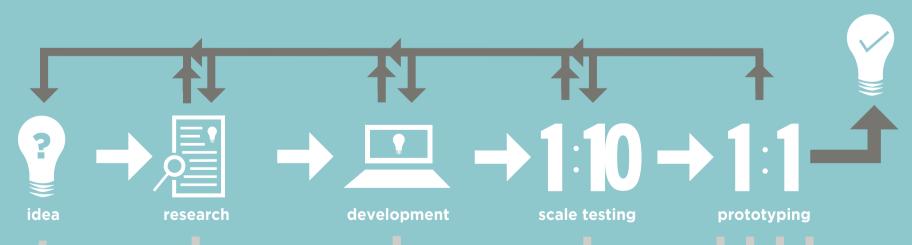
ASSETS NEEDED FOR IDEAS TO SUCCEED...

idea → research → development → 1:10 → 1:1
prototyping

idea   research   development   scale testing   prototyping

REASONS IDEAS GET CANNED

lack of...

...safety	...finances	...energy/willingness	...space
...technology	...accessiblity	...skilled workers	...negotiable regulations
...resources	...urgency	...access to research	

METROPOOL REGIO ROTTERDAM DEN HAAG
MRDH 2042
RESEARCH DEVELOP IMPLEMENT

? → → ✓

=

? → 1:1 → ✓

1:1

in order to
IMPLEMENT INNOVATIVE CONCEPTS
to achieve
URBAN INTELLIGENCE
it is necessary to
PROTOTYPE IDEAS ON A REAL LIFE URBAN SCALE

ALMERE AMSTERDAM ANTWERPEN BARCELONA BRUGGE BRUSSEL DELFT DEN HAAG HAARLEM HILVERSUM HOEK VAN HOLLAND IJMUIDEN KEULEN KREFELD LEIDEN MAASTRICHT MECHERNICH ROTTERDAM UTRECHT ZOETERMEER

URGENCIES

DRIVEN BY

CURRENT AMBITION
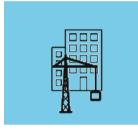
MRDH in need of 240,000

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

Building Next Generation Residential

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

75%

NL under flood risk

3/4 Under sea level

NL Global 2x TEMPERATURE RISE

20%

50 cm sea level rise by 2042

National Water Plan:
- Flood defenses
- Prevent flooding and waterlogging
- Climate resilient
- Water-robust

PROPOSED AMBITION:

To accomodate 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:

Detention basin diagram
https://www.pwdplanreview.org/manu-al/chapter

1. Elevated Houses: Kasbah, Overijssel, NL

2. Amphibious Houses: Buckinghamshire, UK

3. Floating Houses: Amsterdam, NL

As a strategy for a better natural stormwater management and stronger defenses against inminent floods, incorporating detention areas in the region are needed in order to protect the habitants 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.
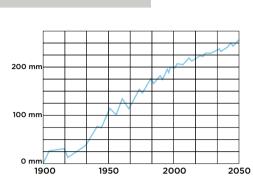
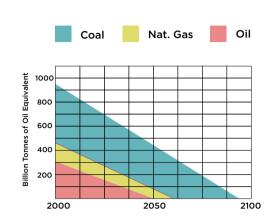# THE GREEN ENERGY CATALYST

CURRENT SITUATION

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.

Coal | Nat. Gas | Oil

Average global temperature has increased 0.6 - 0.9°C in the last decade

Sea levels are rising at an average of 1.8 mm per year

Known sources of non-renewable energies will be depleted before the turn of the century

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_2 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.
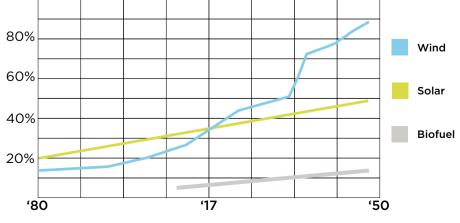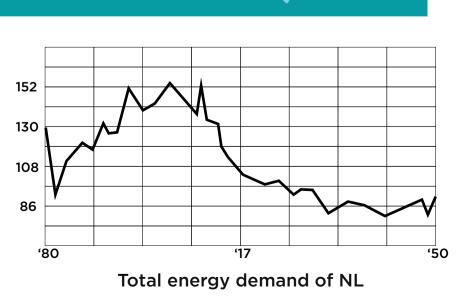
MRDH AMBITION

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.
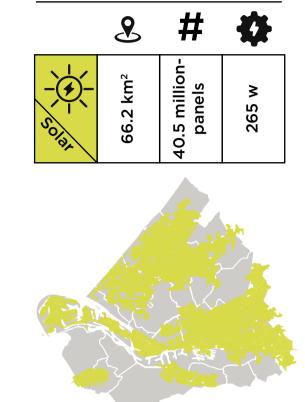
Wind | Solar | Biofuel

Efficiency of renewable sources

Total energy demand of NL

MAKING IT WORK

Solar	66.2 km2	40.5 million-panels	265 w

Biofuel	8320 km2	10.5 million tons	x

Wind	1458 km2	2430 turbines	7500 kw

Built Land

Free Green Space

Area of built land: 440 km2

Percentage of houses with solar panels: 60%

98 Million Tons of available waste: Amount burned for energy is 12% of renewable energy in NL

Area of green space: 550 km2
Required spacing of windmills: 600 m apart
Amount of turbines that fit in available space: 1182

By simply placing solar panels on buildings and houses in the MRDH, there would be enough coverage on a good day to produce enough energy to completely power the MRDH.
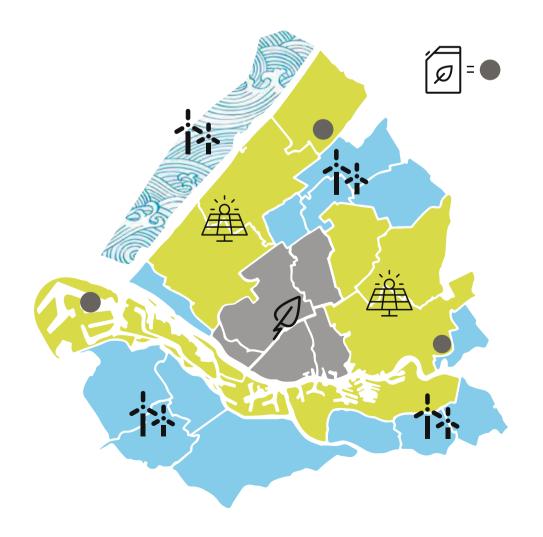
Between burning waste and growing enough crops, the MRDH just simply does not have enough space to fully power the region through biofuels alone.

Placing wind turbines in the open country-side and off shore would provide a substantial amount of energy to the region, but not enough to fully power it alone.

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.

Waste as a Resource

MRDH 2042

Urgencies

1 Massive Trash Produced

2017   29,880,453,000... Tons of resources extracted from Earth Globally this year.

2,120,000,000... Tons of waste Landfilled.

2042   66% of Natural Resources

2 Limited Natural Resources

- 1970's Began living beyond our means.
- 2007 = 30 years used 33% of Natural Resources on Earth!

2017 + 7.5 Billion People =
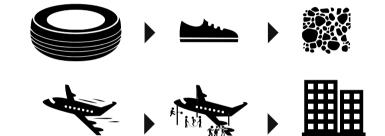2042 + 8.7 Billion People =
2100 + 13.3 Billion People =

What If Not All Waste is Trash?

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

The current Systems

Linear
Take - Make - Use - Trash
This process consists of 4 parts

Circluar
Take - Make - Loop
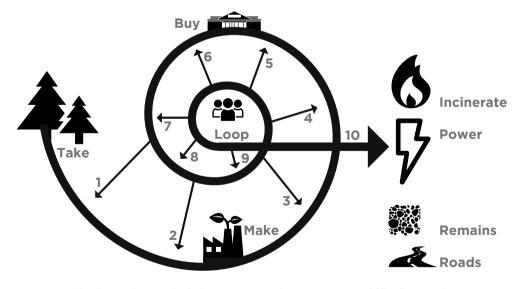This process consists of 2 or 3 parts

No Trash

In order to create a balance, some western countries would need to reduce use of natural resources by as much as 90% before 2030.

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.

The Spiral Ambition

Buy
Loop
Take
Make
Incinerate
Power
Remains
Roads

Materials should be used most efficiently, cycling through a sprial multi-looped system.

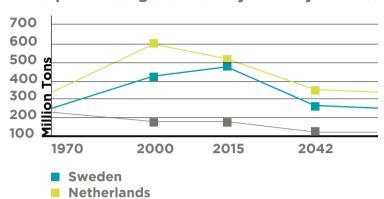Starting with responsible natural resource harvesting.

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.

Municipal waste generated by country Eurostat

Million Tons

700
600
500
400
300
200
100

1970   2000   2015   2042

- Sweden
- Netherlands
- MRDH

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.

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.

MRDH perfect place

The MRDH has the ambition to be amongst the front runners as innovative, economic strong, sustainable and accessible region. It has all the necessary conditions to be a competitive innovative region.

Assests
- Close Proximity to each other
- The People
- Materials
- Production
- Knoweledge
- Business
- Institutions
- Talent

Goals
- Reduce Natural Resource Extraction
- Create Balance of All Resources
- Making better Products
- Recycle All Possible

MRDH 2042

Benefits

- Reduce C02 Emissions

- Bringing Circularity to the country could contribute 80,000 jobs, and 20 million euros combinding this with Waste as a Resourse 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.