

KAART VAN DE BENEEDEN RIVIER DE MAAS
 EN DE MERWEDE, VAN DE NOORD ZEE TOT GORINCHEM
 Gecopieerd na de Kaart van den Landmeter M. BOLSTRA.

The role of marine contractors in the making of the Delta of the Future

Mark van Koningsveld

Program Director Innovation, Van Oord

Beneden rivier de Maas, by Izaak Tirion en Melchior Bolstra

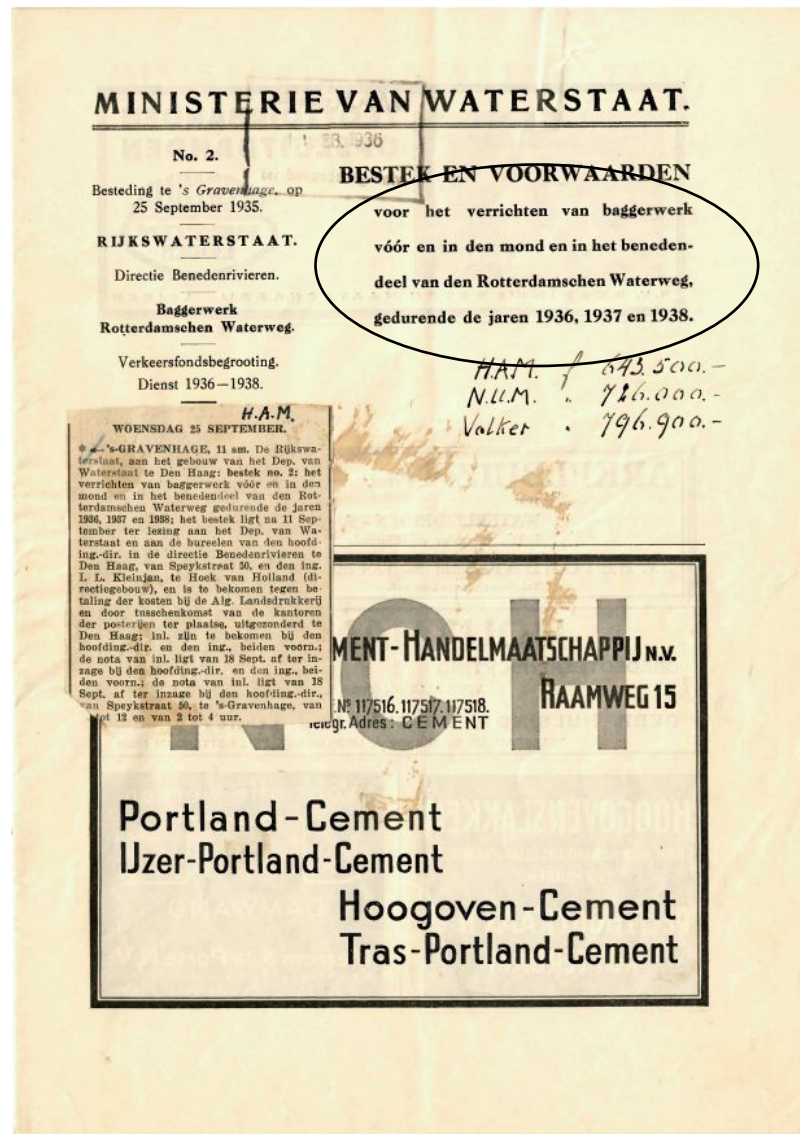
Is licenced under CC0 1.0

The initial construction of the 'Nieuwe Waterweg'

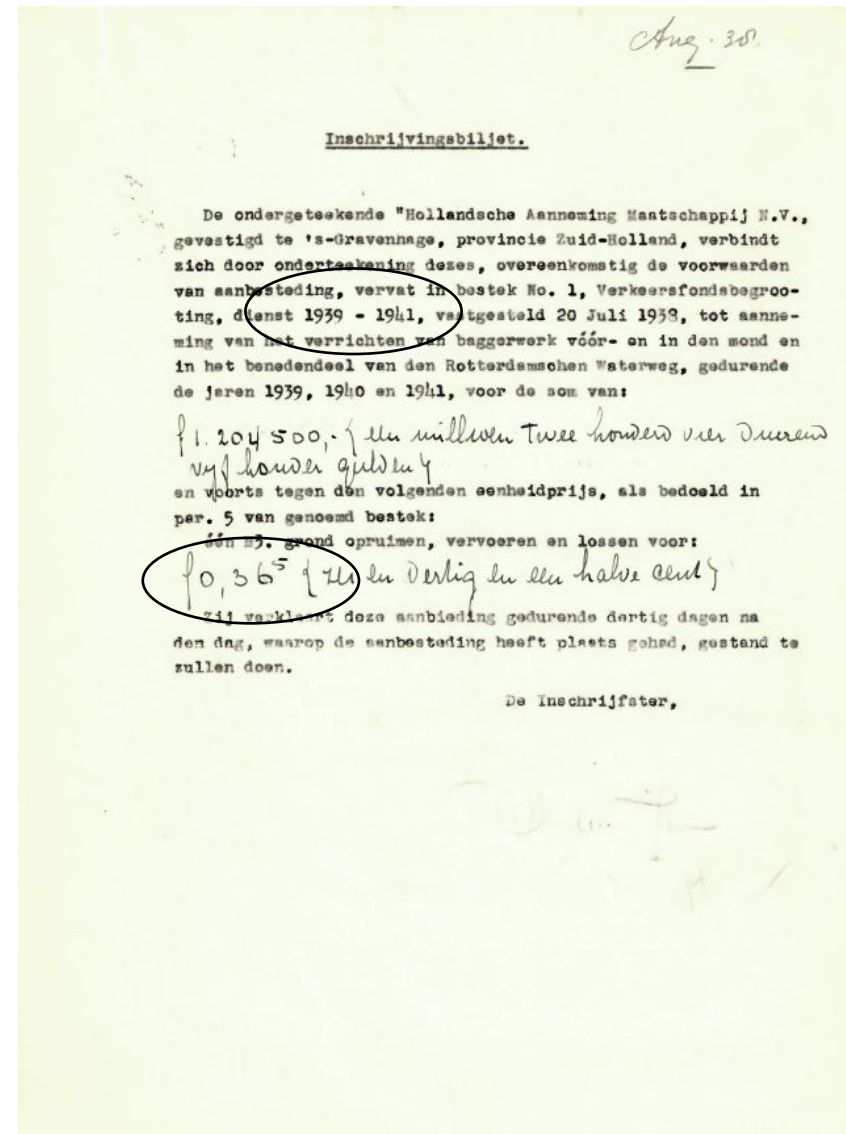
Some key moments and the link to contractors and innovation

- 1731: Nicolaus Cruquius created a first design for a cut through the Hoek van Holland
 - 1858: Raad van de Waterstaat issues its advice for a cut through the Hoek van Holland (plan by Pieter Caland)
 - 1863: 'Wet op den Waterweg van Rotterdam naar zee' signed.
 - 1864: Start of construction of the piers
 - 1865: Award of contract for the dredging works (delay to landownership discussions)
 - 1866: The Prince of Oranje opens the project ('eerste spade in de grond')
 - 1868: First connection to the North Sea is made
 - 1872: First vessels could pass Hoek van Holland and reach Rotterdam
 - 1885: The Nieuwe Waterweg is finally at the required depth, to a large part due to arrival of steam technology.
-
- **Innovation** - Adriaan Volker, one of our legal predecessors, was one of the main contractors of this large project. He was one of the first to introduce steam dredgers in the Netherlands. This innovation was an important enabler of the Nieuwe Waterweg dredging project and a powerful driver to grow Volkers company.
 - **Enabling projects** - Large projects provided the conditions for dredging companies to invest in better equipment. The improved equipment made more ambitious project feasible. This phenomenon continues to this day.

Maintenance works for the 'Rotterdamschen Waterweg' Project specifications (bestek), tender document (inschrijvingbiljet), 1936 - 1941



CVO1B 196



CVO1B 196

Maintenance works for the 'Rotterdamschen Waterweg'

Overview of the project progress, 1938

- HAM 301 moved 466.098 m³ of soil over a period of in total 52 weeks
- Interesting observations on productions are reported
- Also at this time energy use was of interest (1631 tons of coal in total)

Balans H,v.H.1938. OVERZICHT ZUIGWERK HOEK VAN HOLLAND 1938.

Gegevens :	"H.A.M.301 (810 m3.)			"N.U.M.18 (1293 m3.)			"H.A.M.2" (690 m3.)
	21 weken 12 uur p.d.	31 weken 10 uur p.d.	totaal 52 weken	21 weken 12 uur p.d.	30 weken 10 uur p.d.	totaal 51 weken	8½ week 10 uur p.d.
Grondverzet	205.717 m3.	260.381 m3.	466.098 m3.	315.672 m3.	392.099 m3.	707.771 m3.	54.438 m3.
Aantal vrachten			591			575	84
Aantal vrachten per week			11,4			11,3	9,9
Aantal m3. per week	9.796	8.399	8.964	15.032	13.070	13.878	6.405
Vulling per vracht			786			1.213	648
%			98,5 %			94 %	94 %
Werkuren	1.272 ¹⁵	1.605 ¹⁰	2.877 ²⁵	1.266 ¹⁰	1.546	2.812 ¹⁶	464 ¹⁵
Draaiuren	1.135 ⁴⁵	1.488 ²⁰	2.624 ⁰⁵	1.145 ¹⁰	1.442 ¹⁰	2.587 ²⁰	402 ²⁵
Percentage draaiuren - werkuren	90 %	93 %	91,2 %	90,5 %	92,6 %	91,6 %	87 %
m3. per werkuur	162	162	162	249	253	251,7	118
m3. per draaiuur	181	175	178	275,7	272	274	135
Zuigtijd totaal		58130 min.	58130 min.			66425 min.	9010 min.
Zuigtijd per vracht			97 min.			116 min.	107 min.
m3. per minuut			8,02			10,66	6,05
Arbeidsloon totaal	f.6403,42	f.8627,85	f.15031,27	f.8006,16	f.10404,59	f.18410,75	f.2473,38
idem per m3.	3,11 ct.	3,31 ct.	3,22 ct.	2,54 ct.	2,66 ct.	2,60 ct.	4,54 ct.
idem per week	f. 304,91	f. 278,32	f. 289,06	f. 381,24	f. 346,82	f. 360,99 ⁶	f. 290,10
Kolen totaal	680 ton	951 ton	1631 ton	1035 ton	1400 ton	2435 ton	214 ton
idem per 1000 m3.	3,30 ton	3,66 ton	3,5 ton	3,27 ton	3,57 ton	3,44 ton	3,94 ton
idem per week	32,4 ton	30,7 ton	31,4 ton	49,3 ton	46,7 ton	47,7 ton	25,2 ton
idem per draaiuur			0,62 ton			0,94 ton	0,53 ton
idem per werkuur			0,57 ton			0,86 ton	0,46 ton
Percentage vrachten buiten			31,8 %			32,3 %	10,7 %
Oponthoud			62			65	13

New possibilities (around the turn of the 19th to 20th century)
Innovations enabling projects, and projects enabling innovation



Workers construct Suez canal (around 1860)

The Suez Canal caused a 178 percent increase in steamship use on Asian routes and gave rise to the Suezmax vessel class.



Workers construct Panama canal (around 1910)

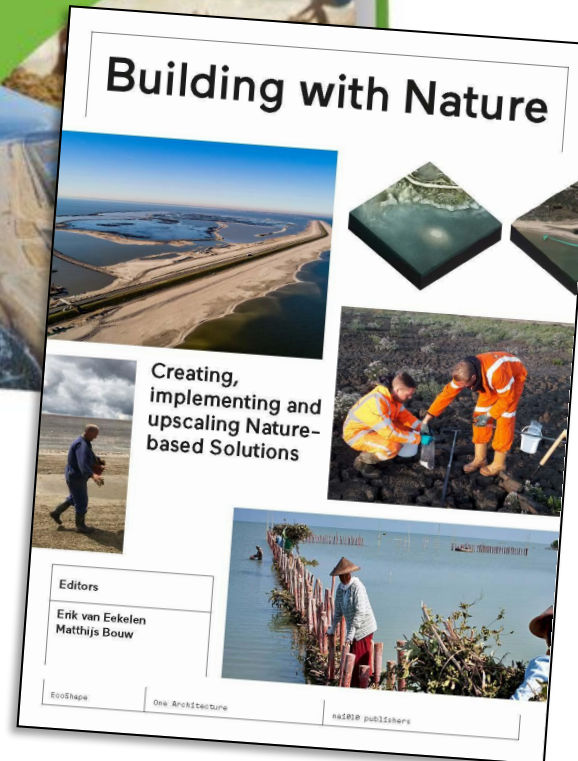
Just like the Suez Canal, the Panama Canal also affected shipping world-wide (Panamax vessel class)

Other examples (throughout the 20th century)
Innovations enabling projects, and projects enabling innovation



Increased stakeholder involvement and environmental awareness

The dredging community invests heavily in new design methods



Industrial scale coral breeding: the Coral Engine (Bahamas) Environmental innovation opening the door to new project designs?



Recruits of various age



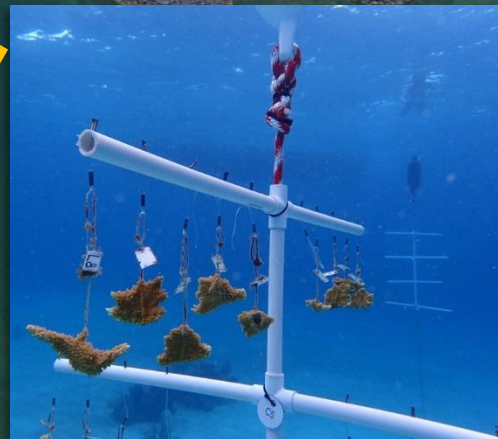
Mobilise ReefGuard
Containerised breeding facility

Build Coral Engine
Van Oord + Stakeholders

Use Engine for rehabilitation
Stakeholders long after project



Fragments of various colonies



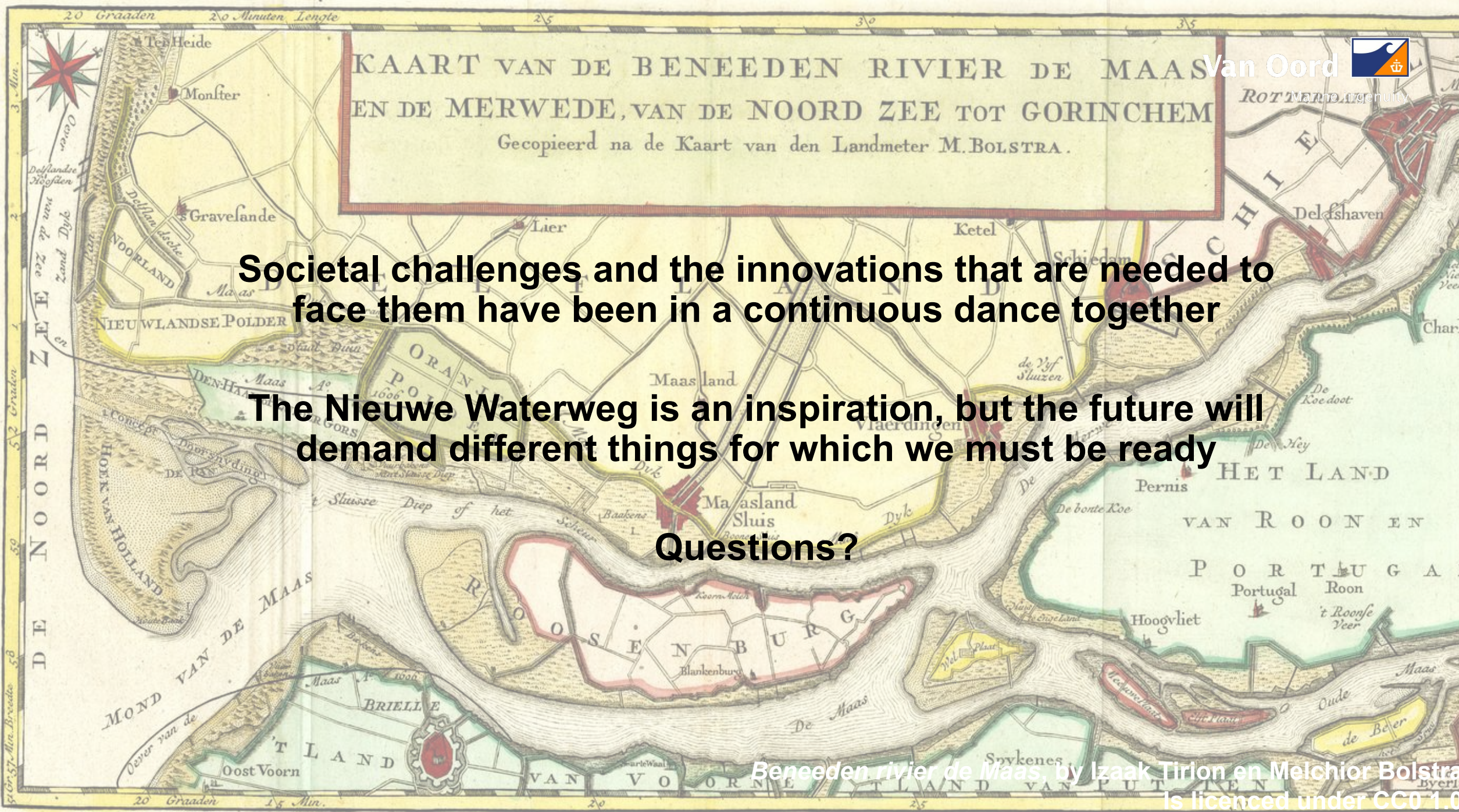
Other exciting examples of innovations that are paired with societal challenges
Innovations enabling projects, and projects enabling innovation



Boreas:
A new methanol electric installation vessel for offshore wind



Vox Ariane:
Van Oord's first TSHD equipped with an LNG fuel system



KAART VAN DE BENEEDEN RIVIER DE MAAS
 EN DE MERWEDE, VAN DE NOORD ZEE TOT GORINCHEM
 Gecopieerd na de Kaart van den Landmeter M. BOLSTRA.

Societal challenges and the innovations that are needed to face them have been in a continuous dance together

The Nieuwe Waterweg is an inspiration, but the future will demand different things for which we must be ready

Questions?