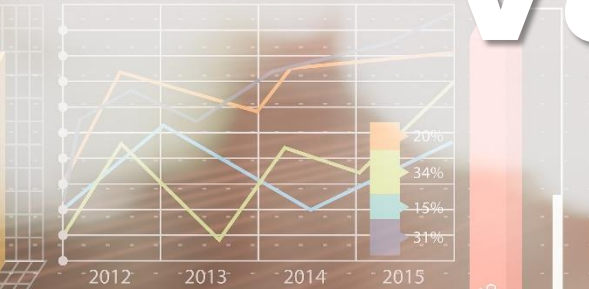


Onderhoudsmonteur van de toekomst

Impact van de 4 D's

Mark Haarman - Mainnovation
(KICMPI event "Aging Assets" 2023)



Symbol	Last	Chng.	% Chng.	Volume
BAX	22.94	+0.37	+1.64%	82.89M
XRF	23.64	+0.16	+0.67%	55.21M
CSK	7.45	-0.14	-1.78%	34.59M
SAY	224.70	+0.10	+0.04%	31.21M
EEM	36.24	+0.04	+0.11%	24.45M
DEAZ	3.70	-0.22	-5.64%	21.84M
MO	8.70	+0.05	+0.52%	19.39M
UCXY	9.57	+0.30	+3.24%	18.94M
VVX	-26.63	+0.41	+1.56%	18.33M
AKB	10.81	+0.02	+0.19%	18.18M



Even voorstellen



- **Mark Haarman**, 56 jaar
- **30+ jaren ervaring** in maintenance & asset management
- Oprichter en CEO van **Mainnovation**
- **Master Mechanical Engineering**, TU Delft, specialisatie Onderhoudsmanagement
- **Master Business Administration**, Erasmus Universiteit in Rotterdam
- **Schrijver** van de boeken:
 - VDM, Nieuw geloof in onderhoud (2003)
 - VDM^{XL}, Competing with aging assets (2015)
- Strategieconsultant en **marktonderzoeker**

Marktonderzoeken Mainnovation



Hoe ziet de **onderhoudsmonteur van de toekomst** er uit?



Megatrends in onderhoud – de 4D's



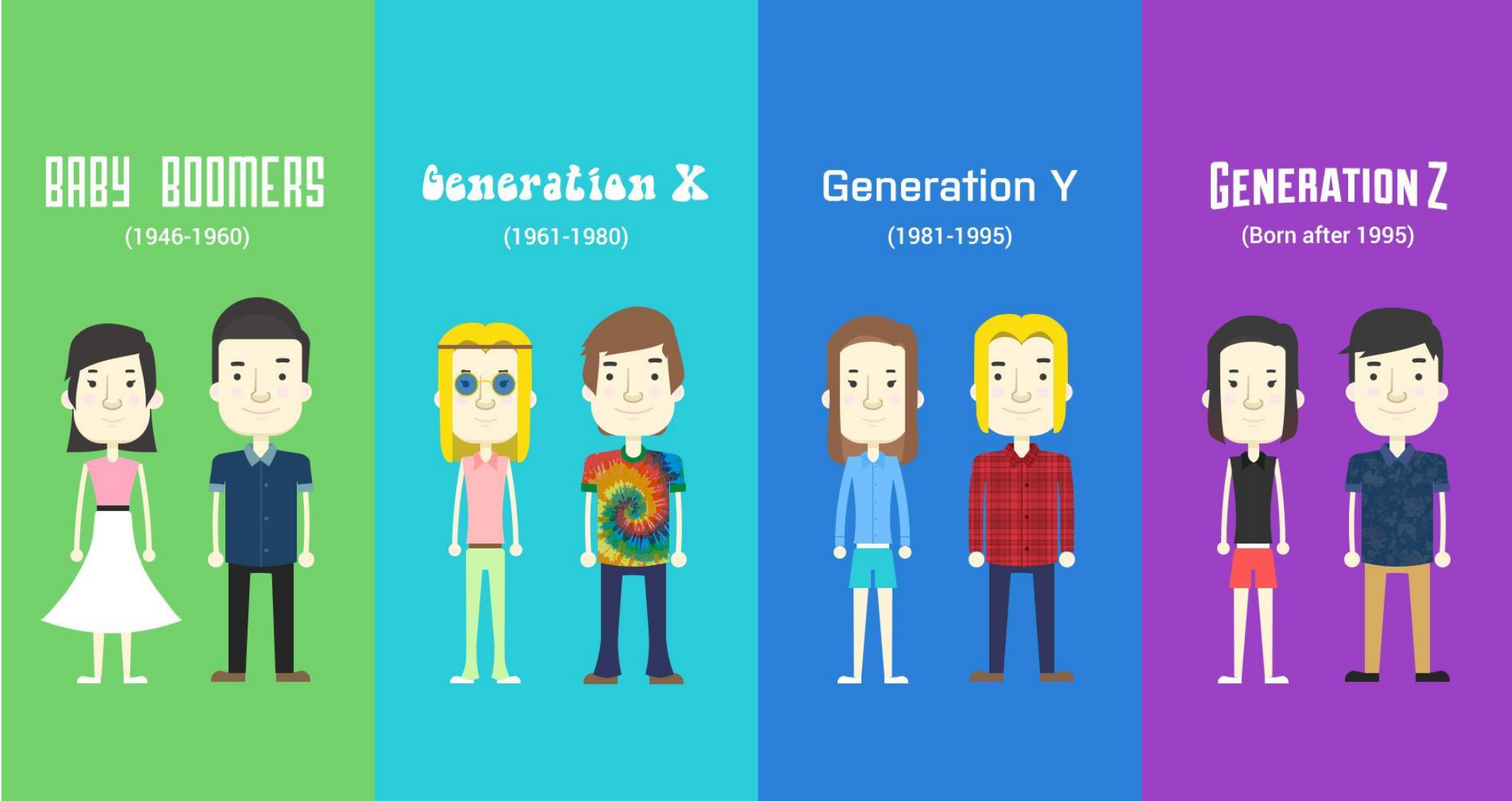
Digitalisation
Decarbonisation
De-aging Assets
Demographic Change

Megatrends in onderhoud – de 4D's



- D**igitalisation
- D**ecarbonisation
- D**e-aging Assets
- D**emographic Change

Onze generaties



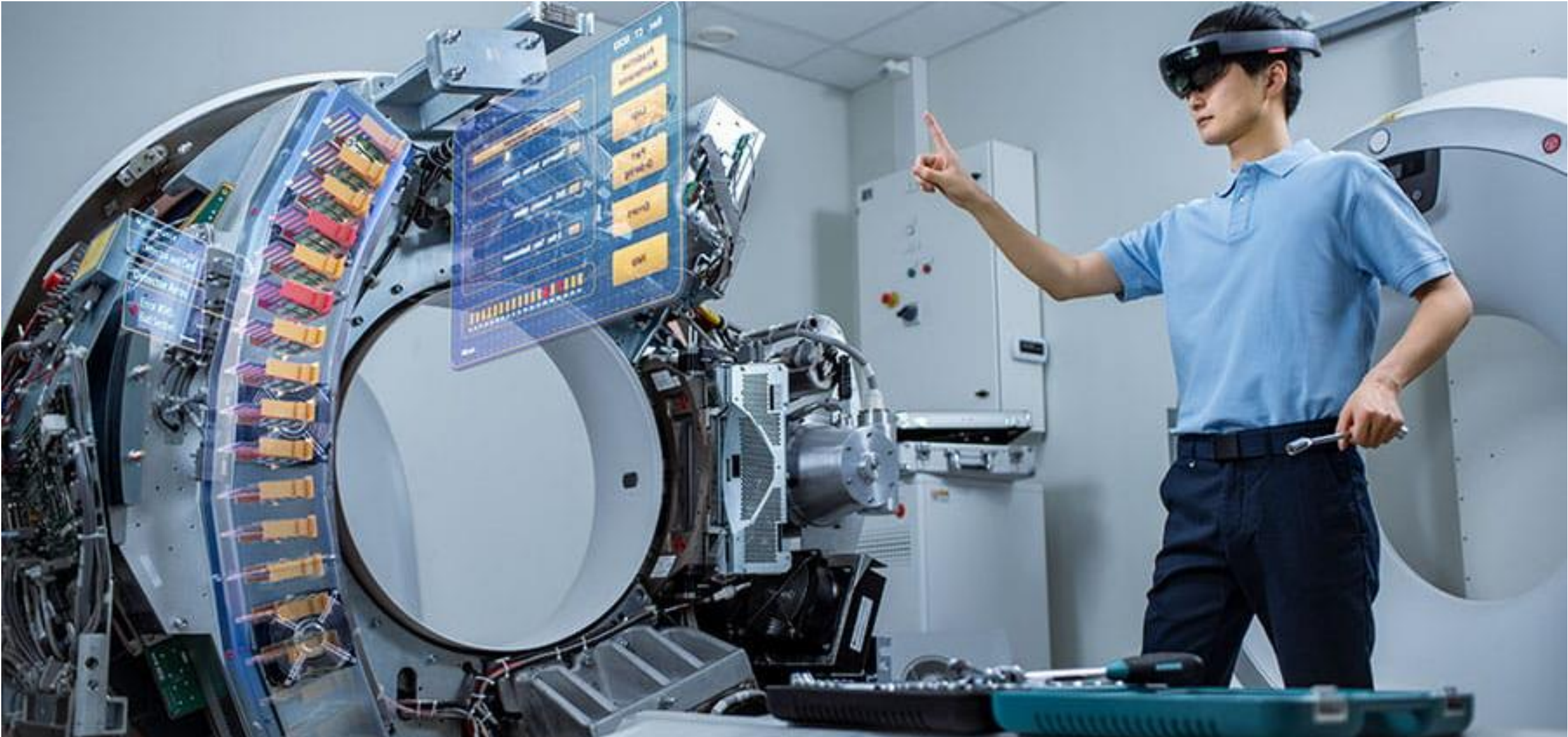
Digitalisation



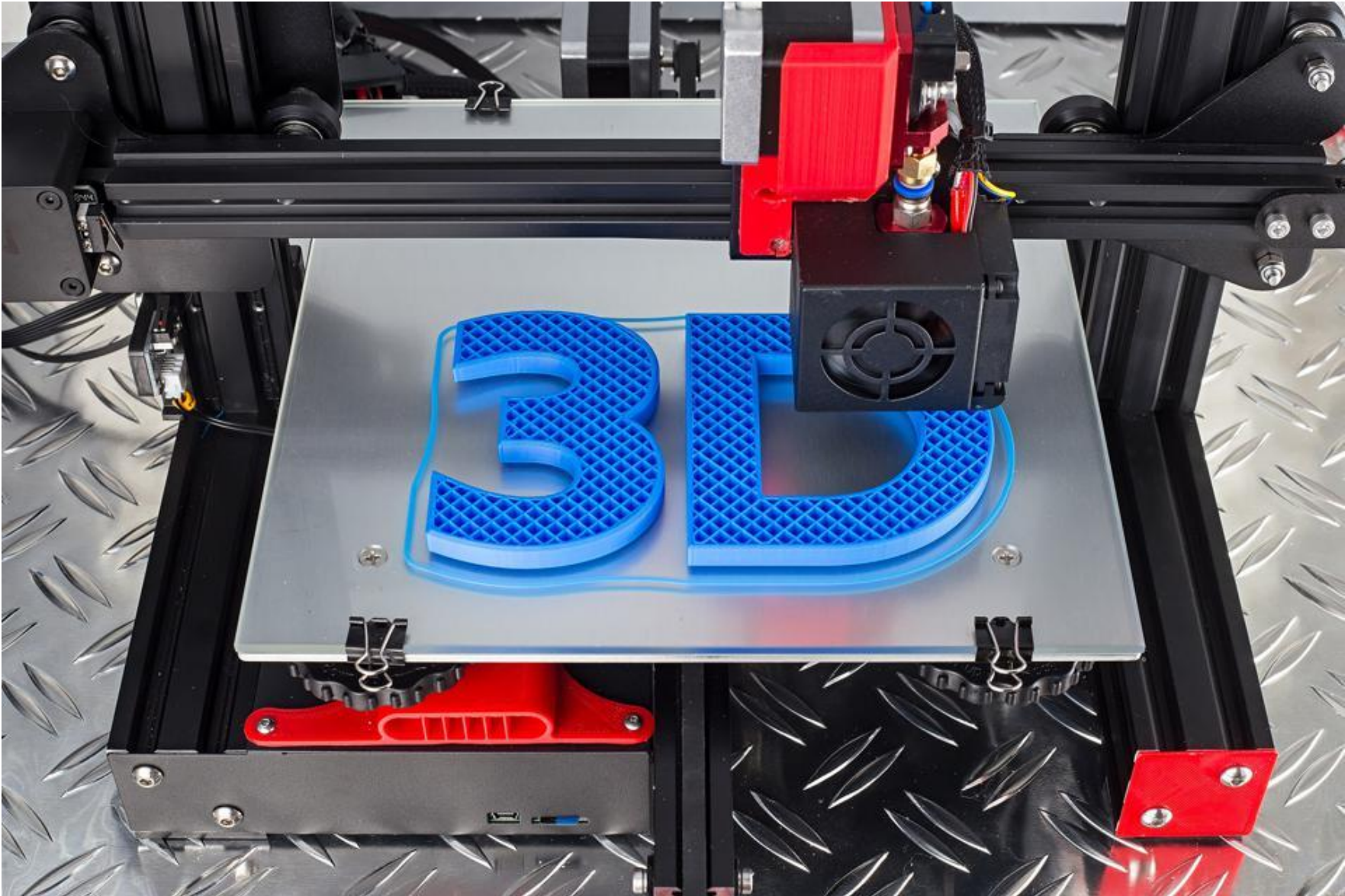
Predictive Maintenance | PdM4.0



Augmented Reality



3D Printing van reservedelen



Mobile Maintenance



Inspectierobots





Inspectierobots



Hoe ver zijn we met digitalisering?

% bedrijven dat de digitale oplossing heeft geïmplementeerd of hiermee bezig is

39%



Mobile
Maintenance

17%



PdM4.0

8%



3D
Printing

8%



Augmented
Reality

13%



Inspection
Robots

Generatie Z gaat het verschil maken



- Eerste echte digitale generatie
- Mobiel, tenzij
- Vertrouwen in het internet
- “Please, no more manuals”



Generatie Z gaat het verschil maken



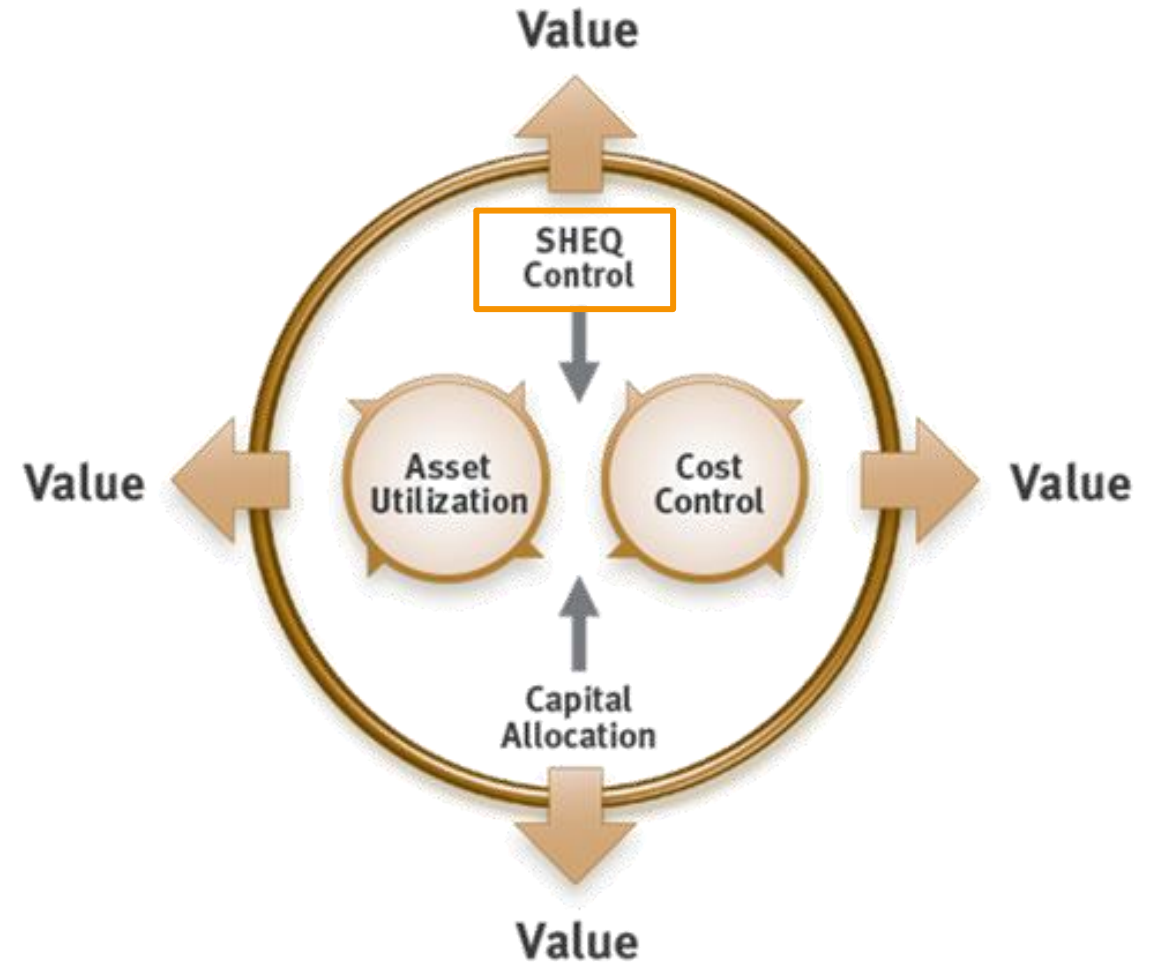
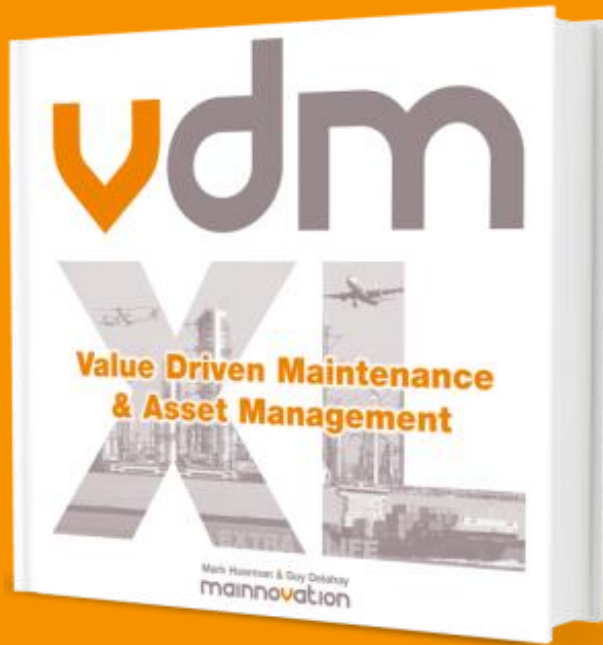
- Eerste echte digitale generatie
- Mobiel, tenzij
- Vertrouwen in het internet
- “Please, no more manuals”

Decarbonisation

Klimaatverandering



Economische waarde van Maintenance & Asset Management



EU Carbon Permits

Summary **Stats** Forecast Alerts ↓ Export

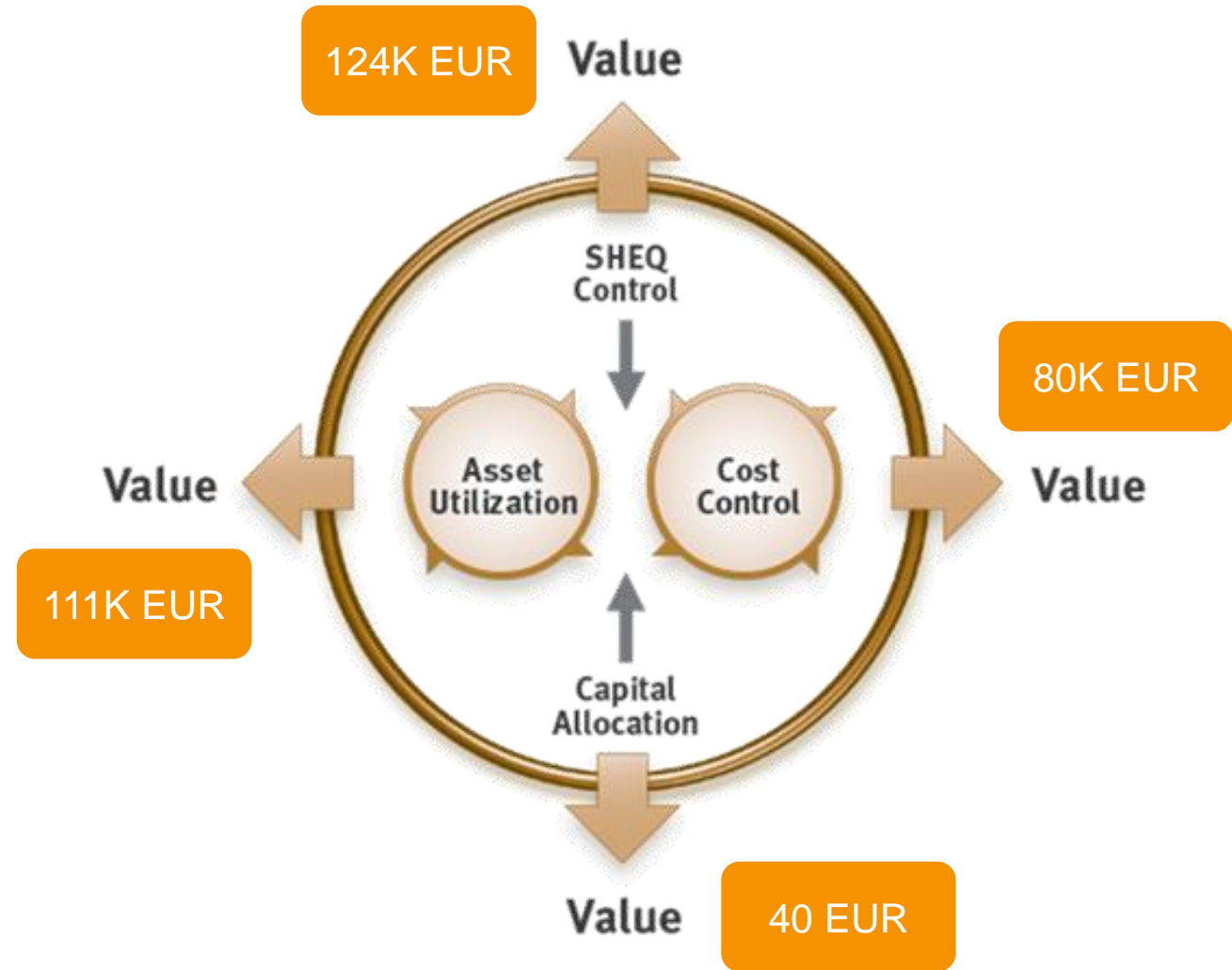
EU carbon permit prices fell below €73 per tonne, the lowest in over one year, driven by reduced demand for permits amid a sluggish manufacturing sector and declining natural gas prices. The latest S&P PMI showed the Eurozone's manufacturing sector contracted for the seventeenth consecutive month in November, with six out of eight surveyed nations in contraction territory. Austria, Germany, and France were the weakest performers, though they recorded milder rates of decline. The Netherlands and Spain also saw softer contractions. Conversely, Italy's manufacturing downturn intensified. Furthermore, European natural gas prices hit a two-month low, falling below €40/MWh, as persistent low demand allowed the region to maintain healthy gas reserves.



Economische waarde van 1% verbetering

Voorbeeld - chemische fabriek

- Vervangingswaarde fabriek = 450M EUR
- Onderhoudskosten = 8M EUR
- Onderhoudsprojecten = 4M EUR
- Technische beschikbaarheid = 90 %
- CO2 emissie = 170K ton
- EBITDA = 10M EUR
- Restlevensduur = 15 year



Generatie Z gaat het verschil maken



- Zeer bezorgd over onze **planeet**
- **Duurzaamheid** belangrijker dan salaris
- Niet alleen praten > **klimaat activisme**

Generatie Z gaat het verschil maken



- Ze zijn onze planeet
- De belangrijkste dan salaris
- Niet klimaat activisme



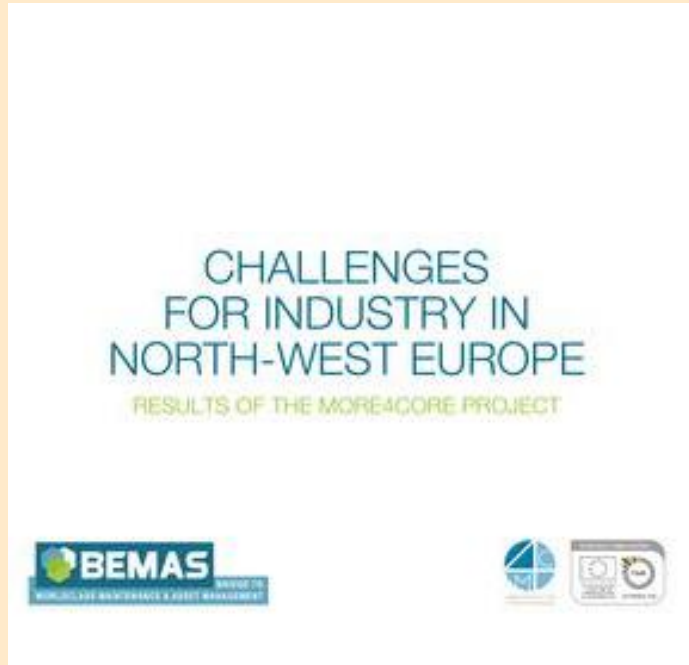
De-aging Assets

Aging Assets

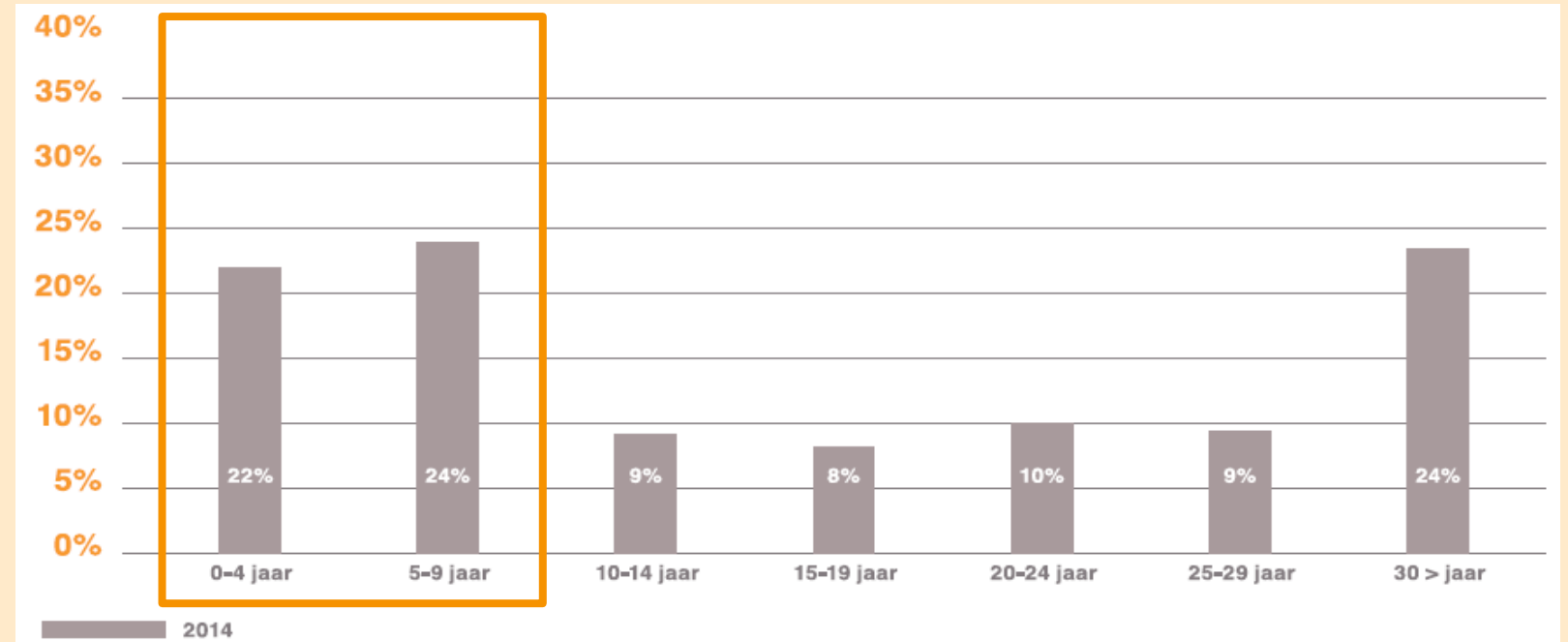


More4Core 2015 - Aging Assets is een nieuwe werkelijkheid

More4Core



Restlevensduur van alle fabrieken in Chemie NL



46% van asset base in Chemie NL nadert einde levensduur binnen 10 jaar

DutchNews.nl

News | Features | Blogs | Jobs | Housing | Best of the Web | Donate | Advert

Home | Corona | **Business** | Society | Sport | Education | Health | International |

Shell shuts Pernis plant until mid August after fire and leak

Business  August 2, 2017



Features

- 
- 
- 
- 
- 
- 

DutchNews.nl

News | Features | Blogs | Jobs | Housing | Best of the Web | Donate | Adverti

Home | Corona | Business | Society | Sport | Education | Health | International | E


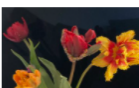


Rotterdam storage group Odfjell closes down more tanks

Uncategorized  July 26, 2012

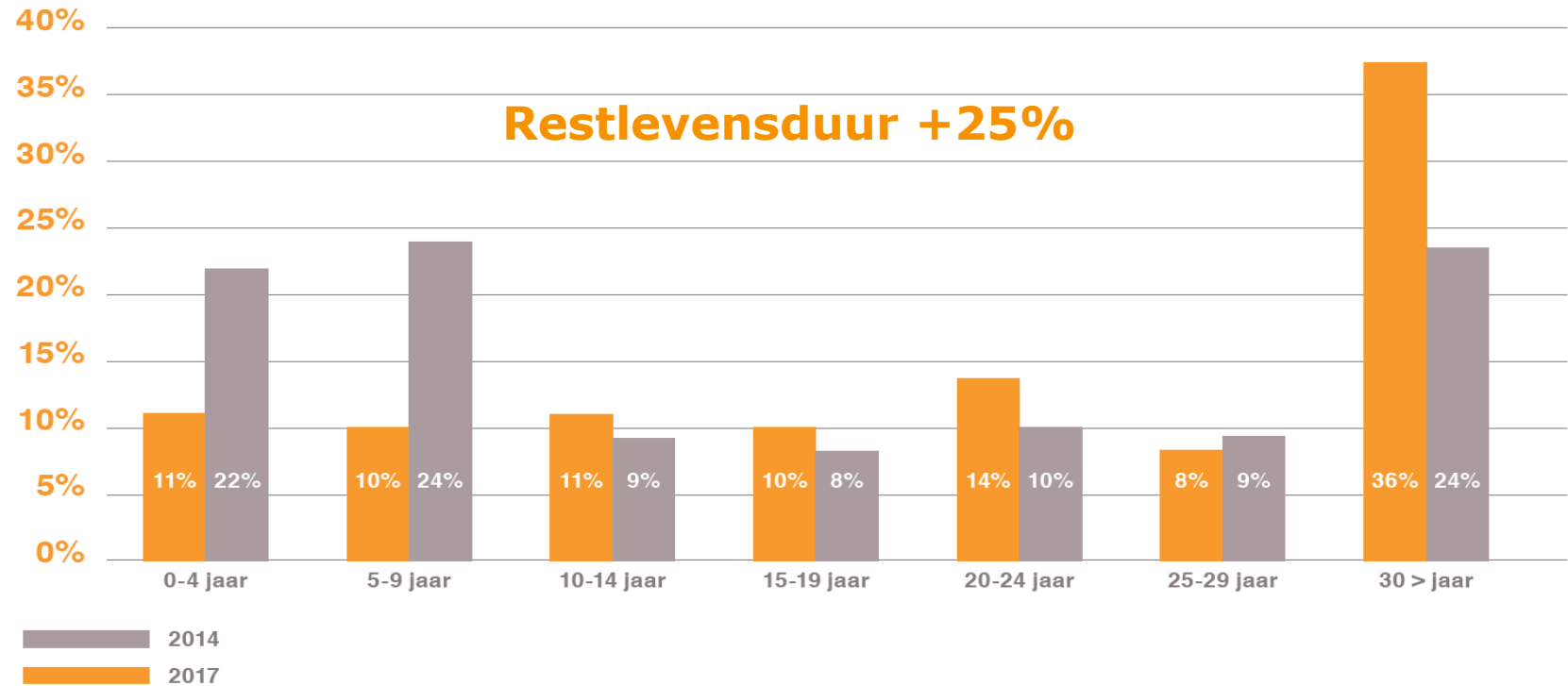
Norwegian tank storage company Odfjell has closed down a further 50 tanks at its Rotterdam site because of safety concerns, the company confirmed on Thursday.

Last week government inspectors ordered 30 tanks to be shut down because of the risk of leaks and the lack of proper safety measures. This means half the tanks operated by the company are now out of action. Odfjell has been given until August to get safety standards and personnel training in order. The company has admitted the problems and the director in charge of maintenance resigned last week, the Financieele Dagblad reported.

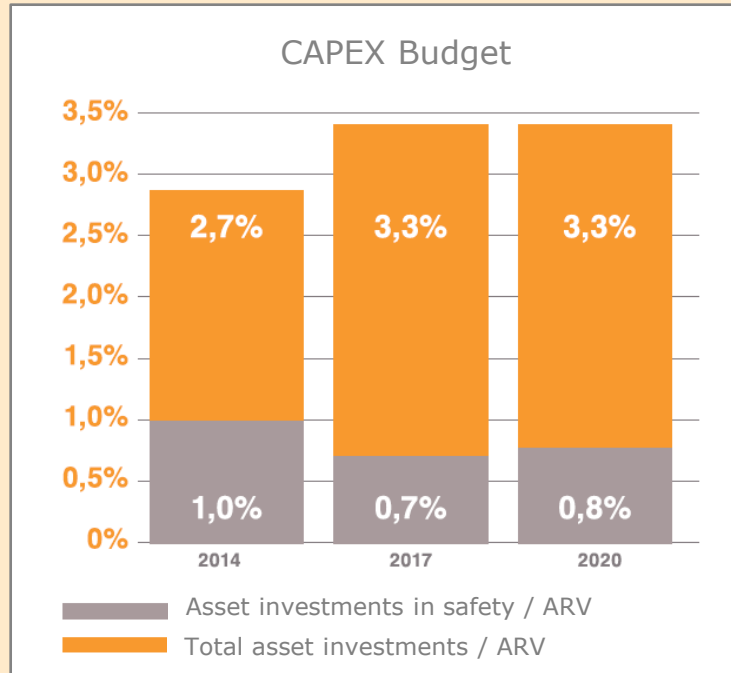
Features

- 
- 
- 
- 

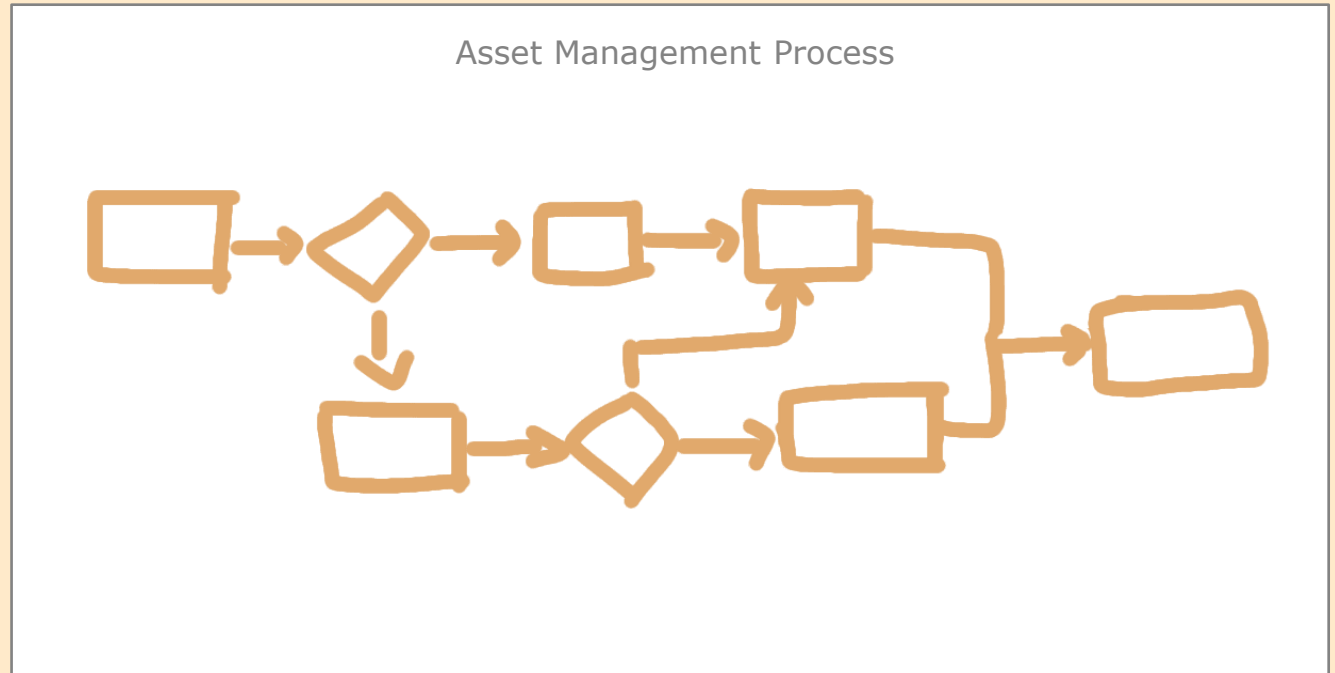
Nulmeting 2018 – Is er nog steeds sprake van Aging Assets in Chemie NL?



Maatregelen tegen Aging Assets

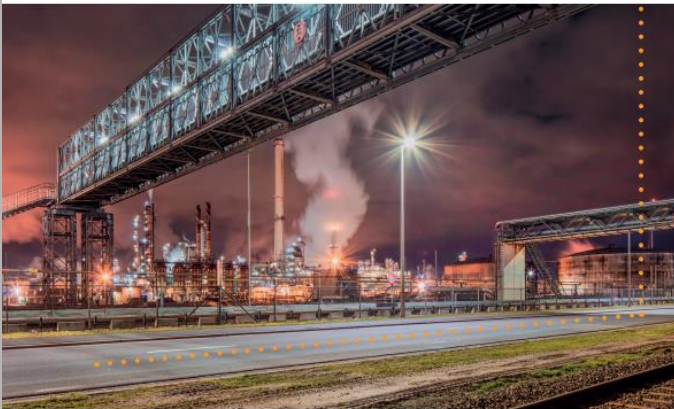


+

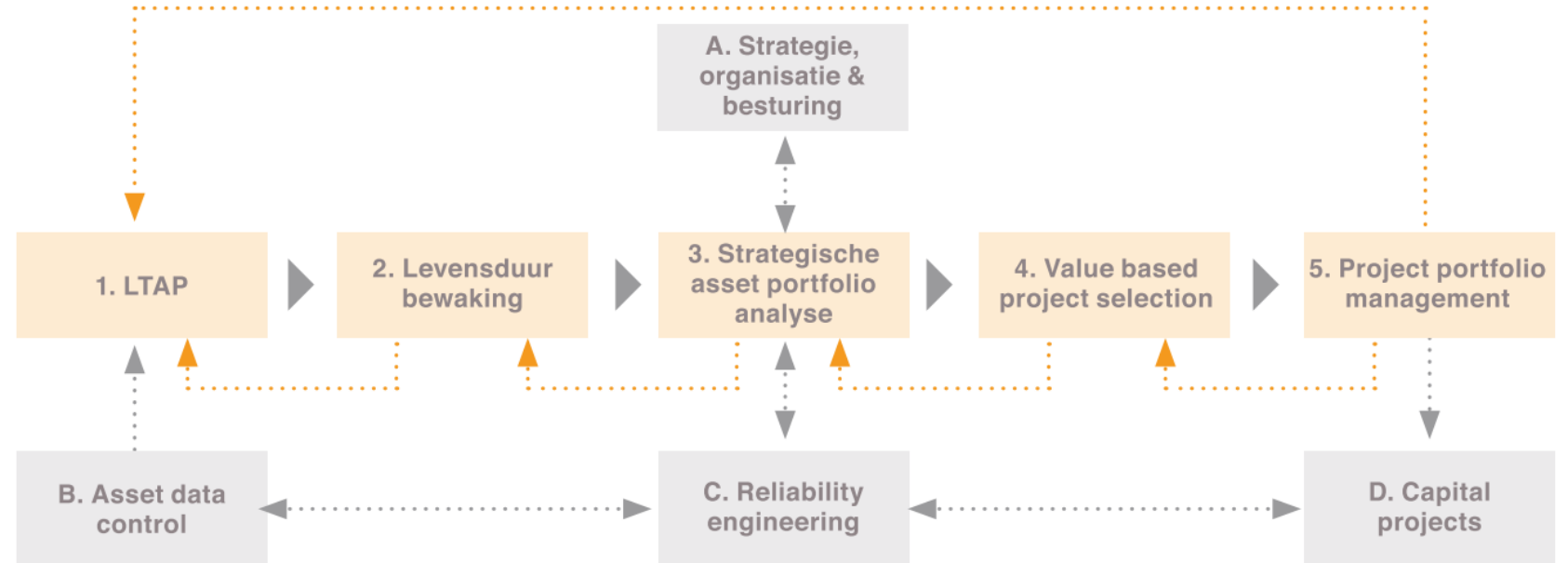


Roadmap Asset Management

Een praktisch handvat voor de invoering van asset management



mainnovation



Generation Z gaat het verschil maken



- Realistisch: opgegroeid met diverse crises
- Bewust & lange termijn focus
- Kans voor duurzaamheid & digitalisering
- Behoefte aan kennis van de beginjaren

Generation Z gaat het verschil maken



- Realistisch & pragmatisch: sky is not the limit
- Bewust & langdurig focus
- Kans voor duurzame realisering
- Behoefte aan jaren



Hoe ziet de **onderhoudsmonteur van de toekomst** er uit?

Digitalisation

Super cool



Decarbonisation

Maatschappelijk relevant



De-aging Assets

Bedrijfskritisch





mainnovation

maximize your asset value

Mark Haarman

Managing Partner

mark.haarman@mainnovation.com

+31 62155 3313

Mainnovation NL
Johan de Wittstraat 2
3311 KJ Dordrecht
The Netherlands
T. +31 78 614 67 24

Mainnovation BE
Pegasuslaan 5
1831 Diegem (Brussels)
Belgium
T. +32 2 709 29 11

Mainnovation FR
Boulevard Haussman 5
75008 Paris
France
T. +33 1 42 68 52 54

Mainnovation UK
Waterside Center 4200
B37 7YN Birmingham
United Kingdom
T. +44 7771 808 036

Mainnovation USA
Park Avenue 445
10022 New York
United States of America
T. +1 212 836 4306

www.mainnovation.com