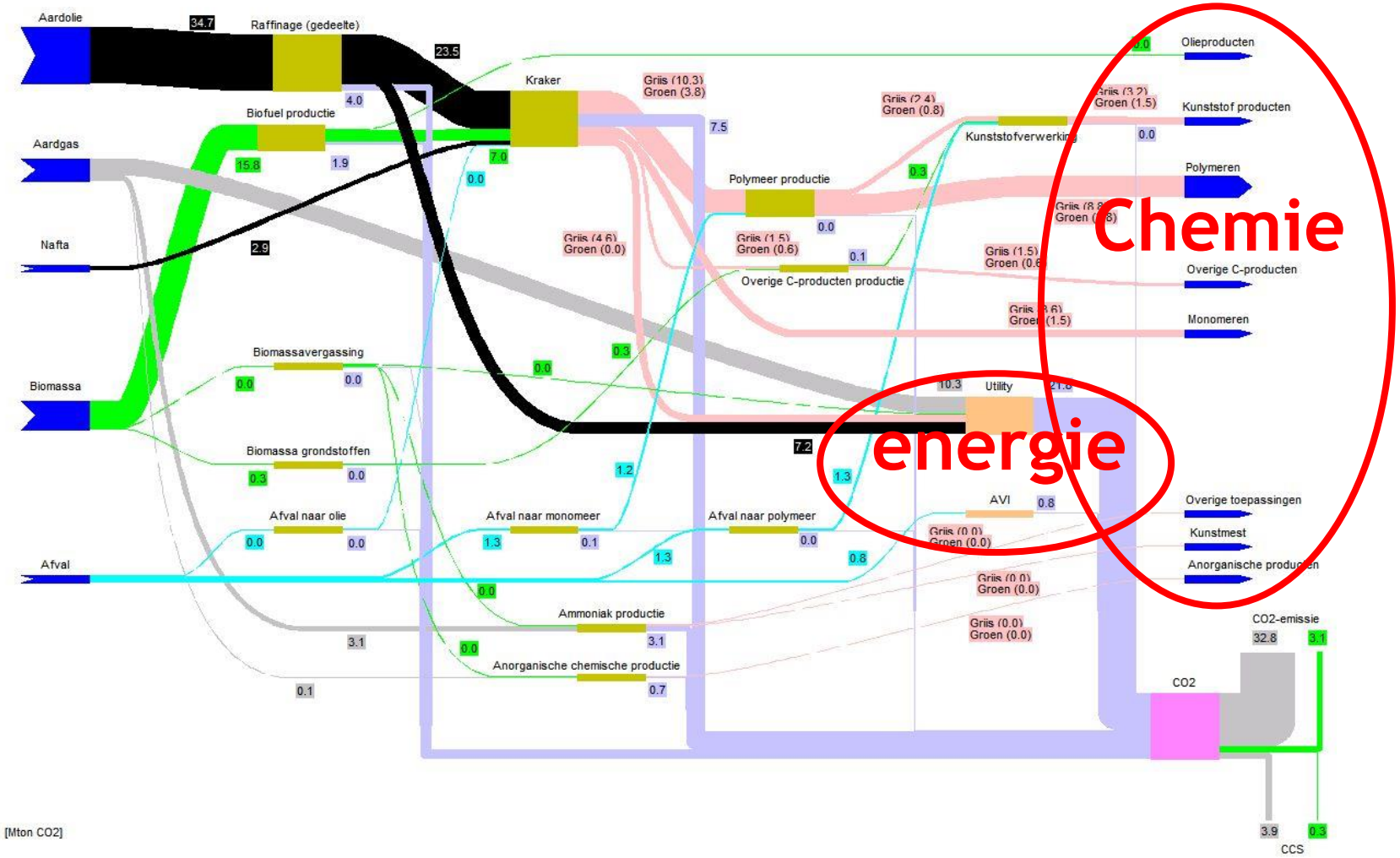
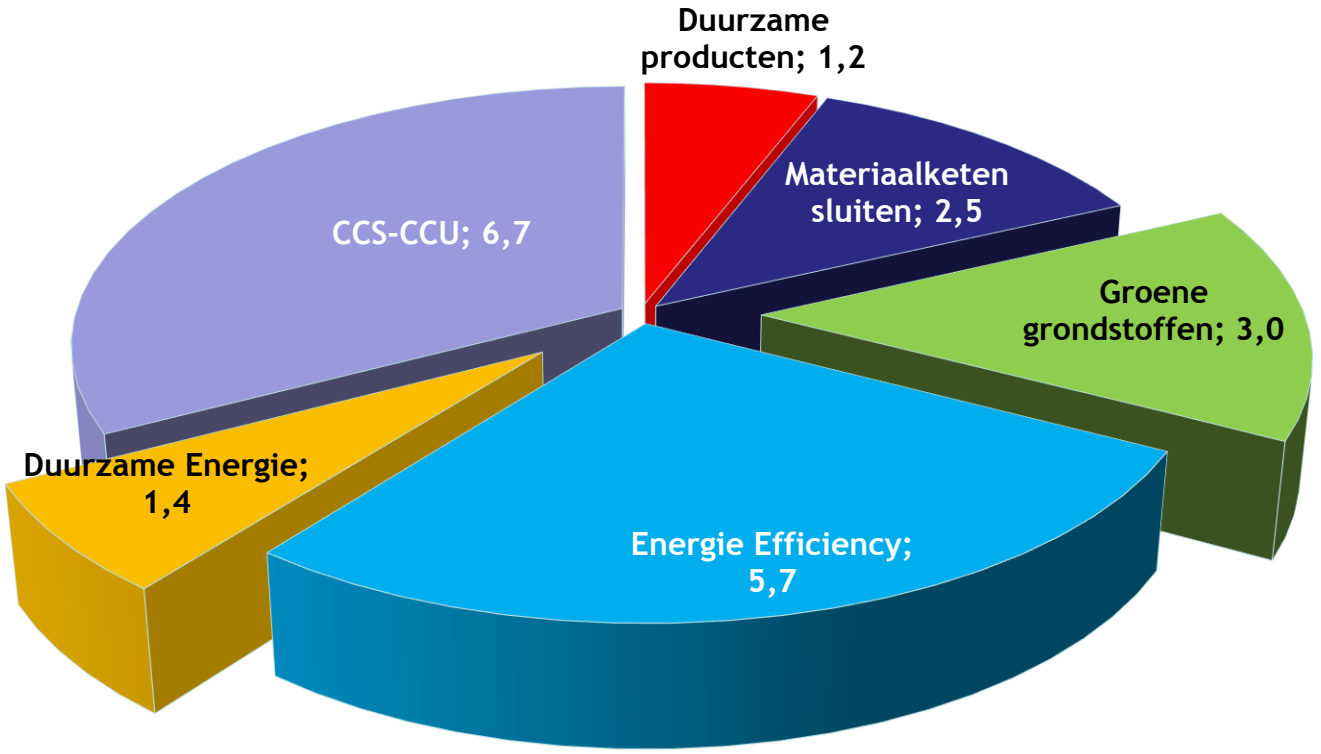
Gevolgen voor de Europese Chemische Industrie
Economische impact in Nederland

Reinier Gerrits
Speerpuntmanager Energie & Klimaat

Routekaart chemie 2030
De Sleutelrol waarmaken

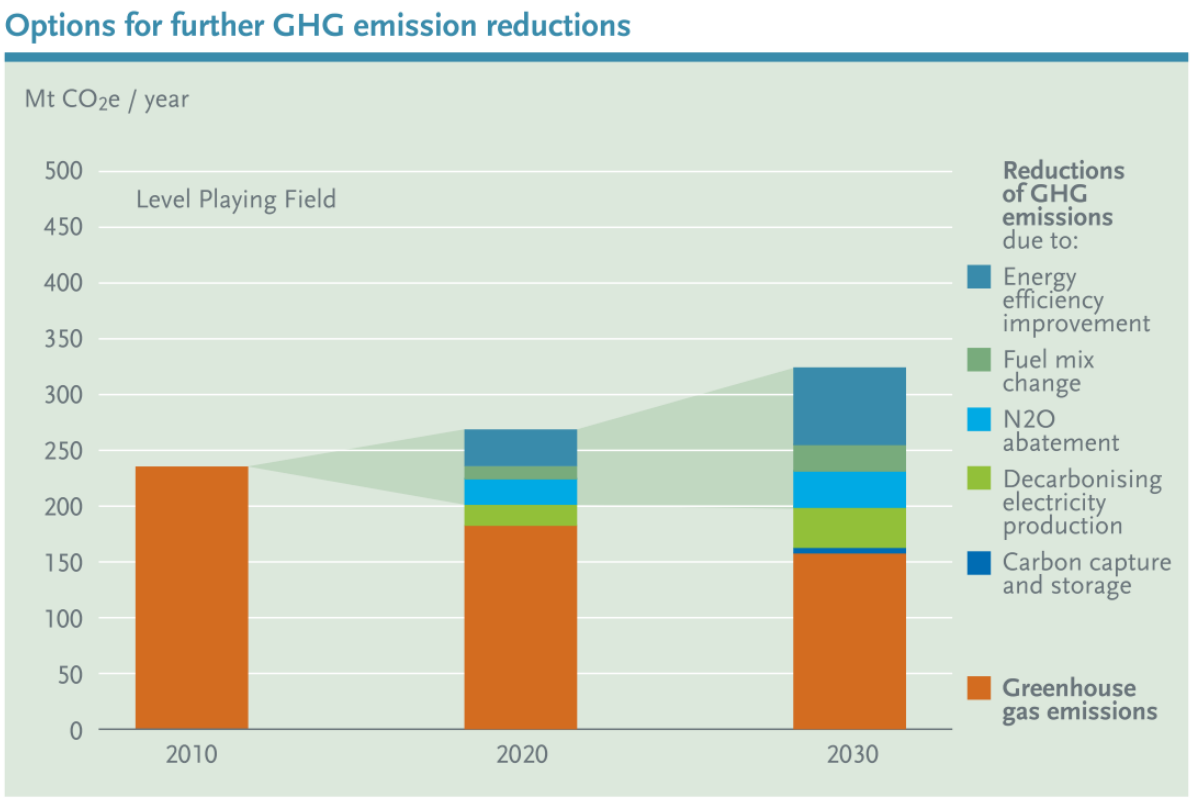


Ambitie Routekaart 2030



Cefic roadmap ‘Energy policy at the crossroads’

A range of options can contribute to further greenhouse gas emissions reductions in the European chemical industry. Under a global level playing field, reductions of 15% between 2010 and 2030 can be achieved. All options rely on further innovation.



CEFIC – ENERGY POLICY AT THE CROSSROADS

SPiCE³ | Sectoral Platform in Chemicals for Energy Efficiency Excellence

Home Over Login/Registreren Contact

Land Nederland (NL)

Registreer nu en krijg vrije toegang tot hulpmiddelen en kennisbronnen »

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Snel zoeken...

Gedetailleerd zoeken per trefwoord

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- PEEK Profiler
- Quick Guide
- Activiteiten
- Good Practice
- News
- Forum
- Het project
- Registreer nu

EU Chemische sector

1990-2011

Energiegebruik daalde met 17%

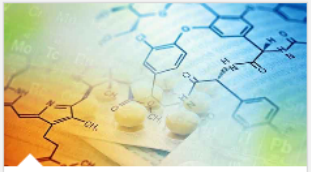
PEEK Profiler »

Stel het niveau van uw energie efficientie vast

Registreer nu »

Krijg vrije toegang tot kennisbronnen die leiden naar een

Sleutelbronnen



CARE+

09 oktober 2013

Languages: UK BG DE

Cefic and its partners in CARE+ developed a detailed set of

SPiCE³ Award

04 juli 2013

The winner of the Responsible Care Awards 2013 - Energy Efficiency Award Category was

Responsible Care

04 juli 2013

Responsible Care is global and operates in 52 countries whose combined chemical industries

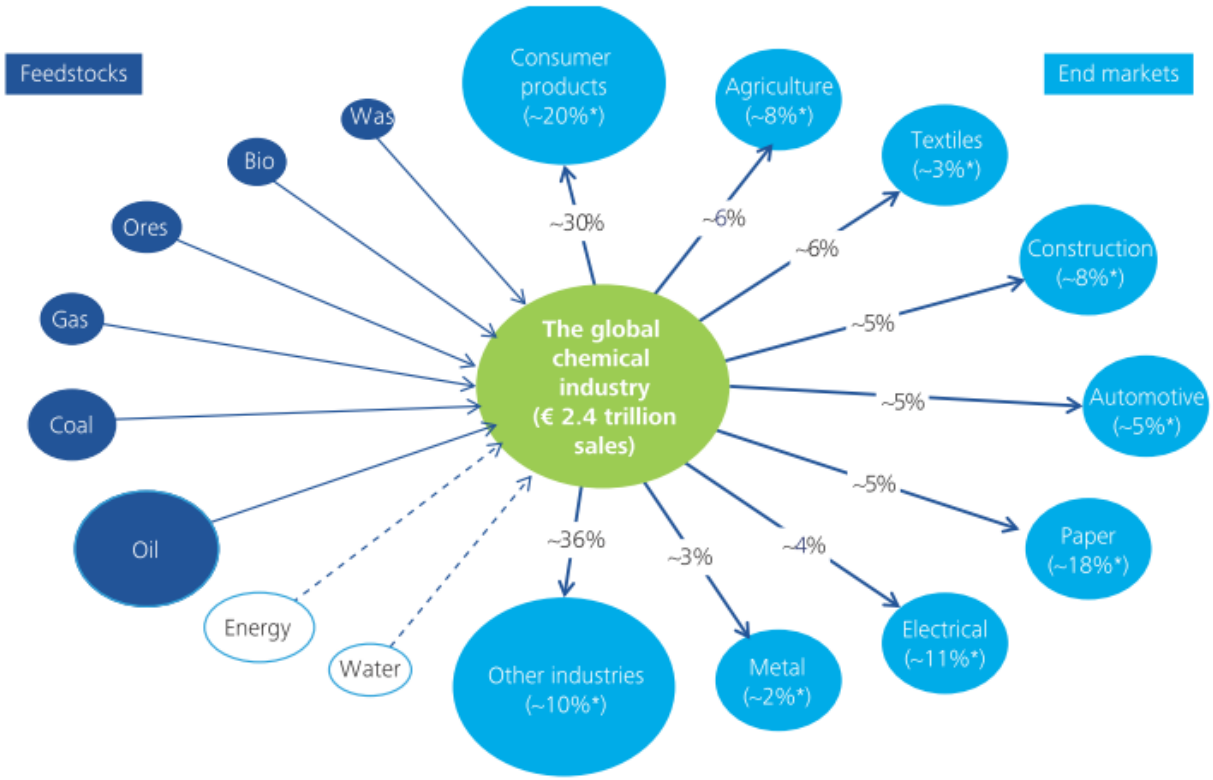

Technologische risico's
1. Stabiliteit, onderhoudsgevoeligheid en beheersbaarheid van productieproces (en daarmee ook kwaliteit op eindproduct) door doorvoeren van nieuwe technologieën
2. Mate van ingrijpen (retrofitting) in huidige proces (dat is geoptimaliseerd)
3. Veel aanpassingen tijdens turn-around, dus in korte tijdspanne
4. Stabiliteit van productstromen belangrijk voor energie-efficiency optimalisatie, staat haaks op specials leveren
5. Energie-effiency verbetering kan resulteren in een lagere benuttings-graad en daarmee efficiency van een WKK
6. Proceskennis niet meer binnen het bedrijf
7. Veel specifieke risico's voor PI (zie verdiepende studie PI op de website)
Marktrisico's
8. Volatiliteit van prijs van warmte (ook laagwaardig) en elektriciteit
9. Investering (in o.a. infra-structuur) met lange TVT niet mogelijk voor bedrijven
10. Level playing field: energieprijzen, CO2-pricing en wetgeving (zie par 9.1)
11. WKK, rentabiliteit onder druk als gasprijs t.o.v. stroomprijs hoog is. Ook b voor extra geg de CO, (ETS)
Ontbreken langetermijnonder-steuning voor WKK (vanuit overheid), bijvoorbeeld door subsidie of WKK-elektriciteit voorrang geven
Organisatorische risico's
13. Conservatieve cultuur m.b.t. nieuwe (proces-) technologie en beperkte resources (mankracht) voor EE-projecten
14. Samenwerking: contract-voorwaarden levering warmte, stoom of elektriciteit (bijvoorbeeld hoe lang is afname gegarandeerd, wie betaalt voor back -up systeem)
15. Financiering, van EE-projecten, maar zeker ook infrastructuur voor delen met buren en onderzoek (tussen proof of principle en proof of concept)
16. Beslissentrum bevindt zich in het buitenland; daarom concurrentie om investeringen binnen internationale bedrijven
17. Wie neemt risico voor zijn rekening van nieuwe technologie, mkb (chemie), grootbedrijven (chemie), equipment manufacturer
18. Vergunningen (milieu) voor uitbreiding/ aanpassing
Schaliegas

VNCI/Deloitte Report finalised

Scope

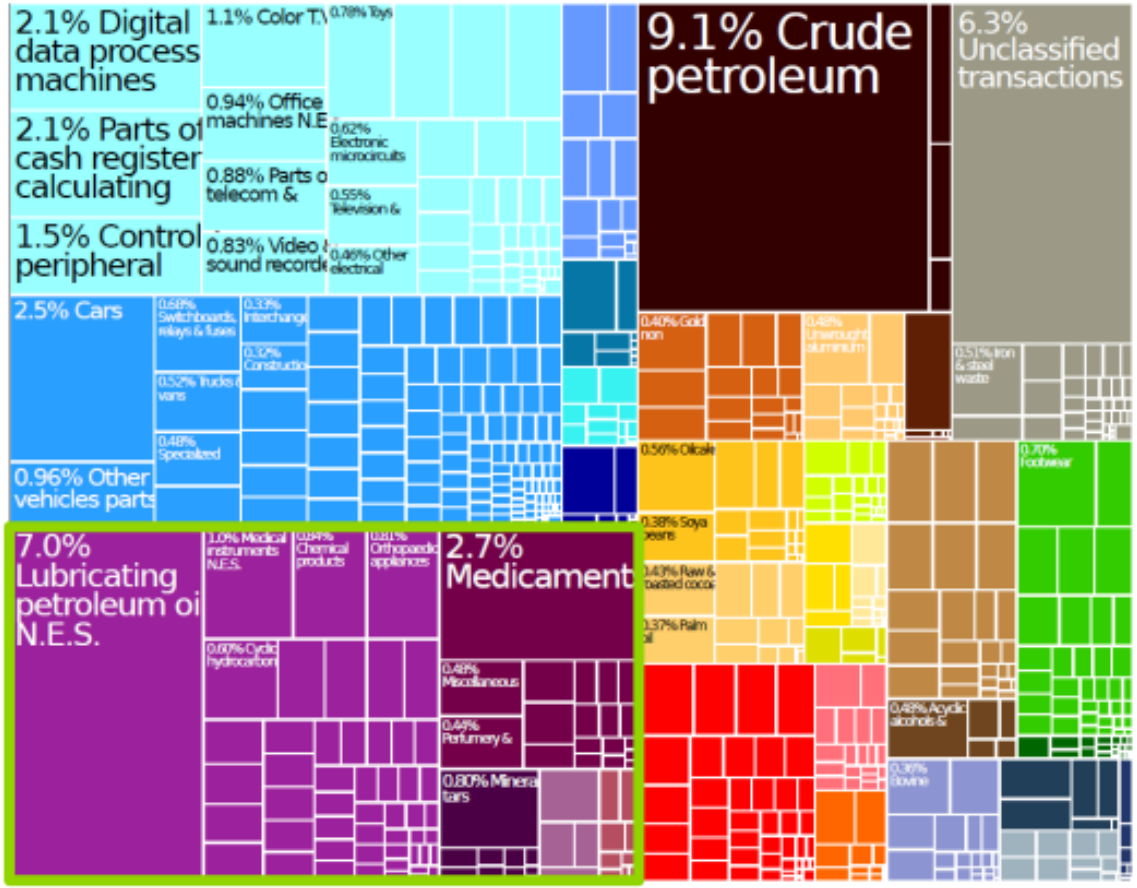
- impact of shalegas revolution on prospects of CI in The Netherlands
- consequence for strategies defined in Vision 2030-2050

Industry of industries



This large share of output ensures that Chemicals and Health are the strongest contributors to manufacturing exports from the Netherlands

Netherlands exports versus Global manufacturing clusters



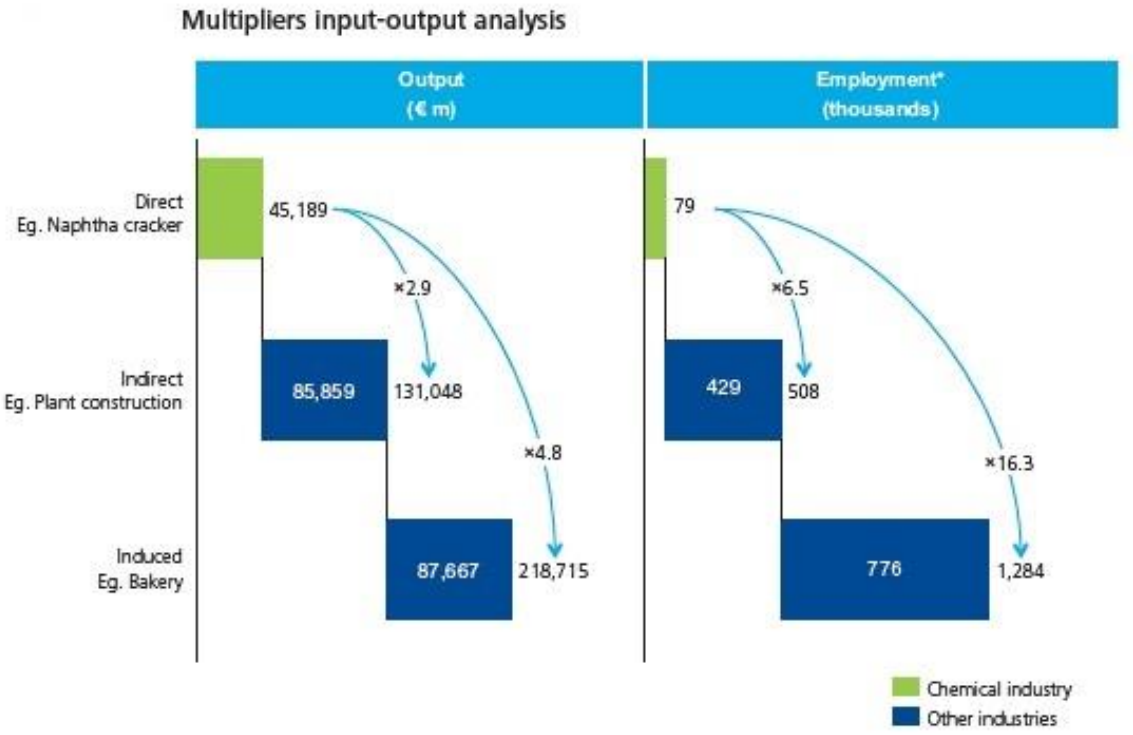
Note: Surface area proportionate to export volume
Source: The Atlas of Economic Complexity, Harvard University; Deloitte analysis

Clarification

- Each area represents a manufacturing industry
- Area size is proportional to Dutch exports
- Industries in one cluster are located together and have a similar color

- Electronics
- Machinery
- Plants
- Food
- Chemicals & Health
- Meat
- Dairy
- Steel
- Construction
- Textile

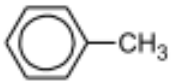
Chemical Industry is of high importance for Dutch economy



* Multipliers are calculated for chemicals and pharmaceuticals and multiplied for employment of chemicals and converters
Note: Multipliers are generally used for calculating small differences and may overstate the realistic effects due to underlying assumptions

Source: OECD, Deloitte analysis

Overview building blocks

Building block		Structure	Production process
Petro-chemicals	**Methanol (C1)**	$H_3C—OH$	• Methane is converted in Syngas, which reacts over a catalyst to produce methanol
	Ethylene (C2)	$H_2C{=}CH_2$	• Steam cracking of Naphtha • Steam cracking of ethane
	Propylene (C3)		• Steam cracking of Naphtha • On-purpose dehydrogenation of propane
	(Iso)Butene Butadiene (C4)	 and other C4	• Steam cracking of Naphtha
	BTX (C5+)	 And other Aromatics	• Steam cracking of Naphtha • Refinery reformer
Inorganics	**Ammonia (NH3)**	NH_3	• Methane is converted in Syngas, The hydrogen reacts with nitrogen from the air to form ammonia via the Haber-Bosch process
	Chlorine & C.Soda (ECU)	Cl_2 + NaOH	• Electrolysis of salt water

Source: Deloitte Analysis

Overview of products from C_1-C_{5+} building blocks

	Building blocks	Tier 1		Tier 2		Tier 3	
Petro-chemicals	Methanol (C_1)	Acetic acid Formaldehyde Methyl amines MMA MTBE		**Formaldeh. resin** Methylamine **Phenolic resins** **Polyacetal resin** Vinyl acetate		**Amino resin** DDSA **EVA co-polymers** Paraformaldehyde Polyvinyl acetate	Polyvinyl alcohol
	Ethylene (C_2)	Ethylene dichloride Ethylene oxide **HDPE** **LDPE** **LLDPE**	Perchloroethylene Polyethylene	Ethanoamines Ethoxylates Ethylene glycol Glycol esters Glycol ethers	PET Polyacetal resin Polyethylene glycol Polyols Vinyl chloride	**Antifreeze** **PET containers** **PET film** **PET resins** **Plasticizers**	**Polyester fiber** Polyisobutene **Polyvinyl chloride**
	Propylene (C_3)	Acrylate esters Acrylic acid Acrylonitrile Butanol Isobutanol	Isopropanol **Polypropylene** Propylene oxide	Acrylamide **Acrylic fibers** **Acrilyc resin** Adiponitrile **Fibers**	Glycol esters Polyols Polyether polyols Propylene glycol **Surface coatings**	**Adhesives** **Antifreeze** **De-icing fluids**	
	Butadiene (C_4)	2,6 NDC HDMA Isobutylene Isoprene Polybutadiene	Polychloroprene SB copolymer	**ABS resin** Polyisoprene		**Nylon** **ABS resin** **Latex** **Nitrile Rubber** **SBR**	**SBR Copolymer** **Styrene-butadiene**
	BTX (C_{5+})	Aniline Cumene Cyclohexane Dinitrotoluene Ethylbenzene Nitrobenzene	Styrene Para-Xylene Ortho-Xylene Meta-Xylene	Acetone Adipic acid Caprolactam Divinyl benzene DMT Phthalic acid	EPS MDI Polystyrene TDI Phenol Phthalic anhydrie	**Amino resin** **Epoxy resins** EPS Bisphenol-A Bispenol Dioctyl phthalate	**Nylon 6 & 66** Phenol. form. **Polycarbonate** **Polyurethane** **PET film&resins** **Polyester fiber**
Inorganics	Ammonia (NH3)	Nitric acid Methyl amines Ureum Acrylonitril	Delamine	Caprolactam Methylamine Ammonium nitrate Ammonium salts	Melamine Polyacrilonitril **Fertilizer**	**Amino resin** **Nylon 6 & 66** **Polyurethane** **Nitrile Rubber**	**polyacrylamide**
	Chlorine & C.Soda (ECU)	Perchloroethylene Chloric acid Phosgene **Glass**		Vinyl chloride MDI TDI Isocyanate	**Polyurethane**	**Polyvinyl chloride** **Bleach**	**Pesticides** **Freon**

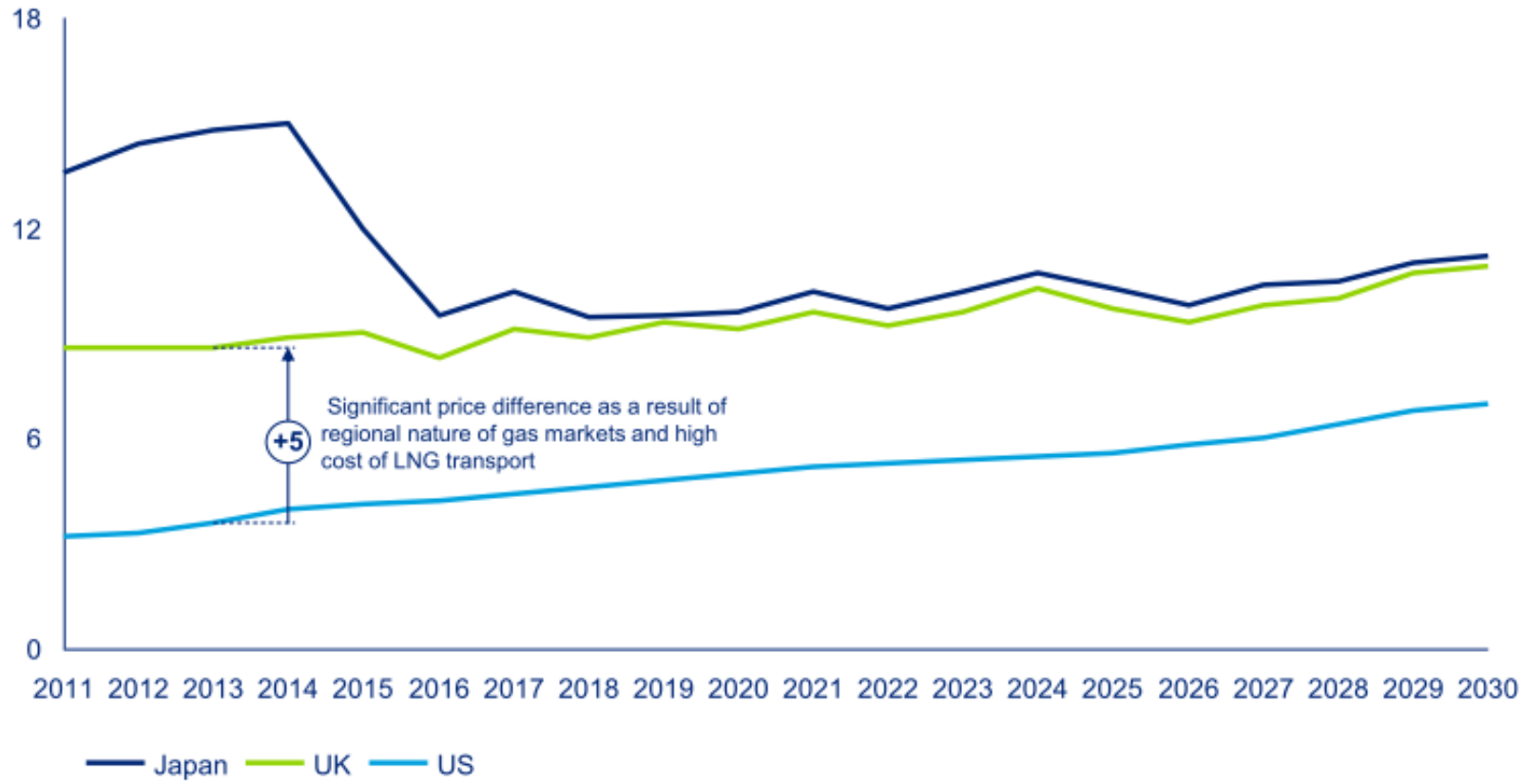
Note: Not a comprehensive list
Source: Deloitte Analysis

Products in light blue: Traded globally, except when waterborne

Products in bold: No further chemical processing, Downstream processing via physical means

Prices of natural gas in Europe and Asia are expected to equalise, but remain above US levels

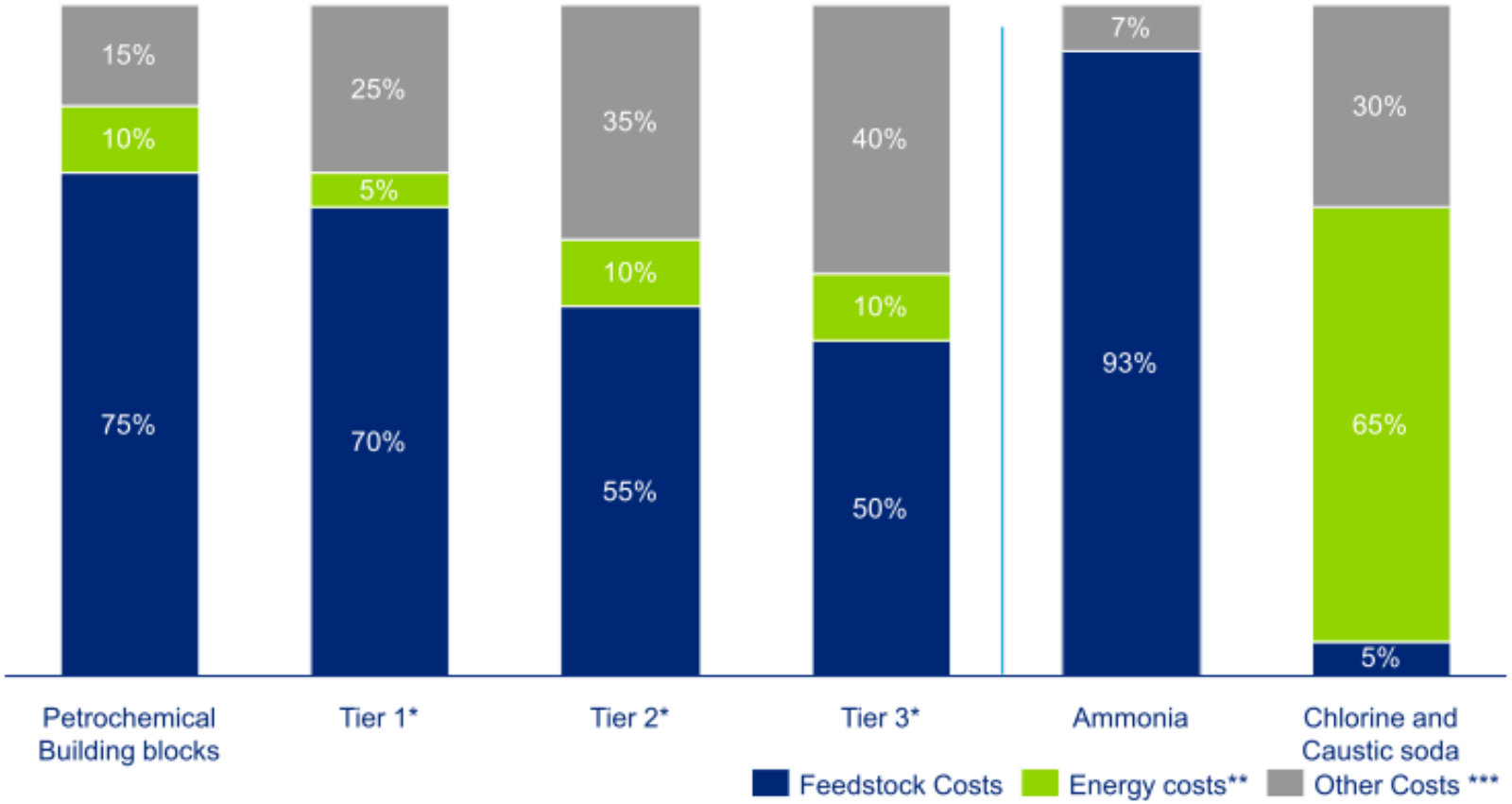
Natural gas price(2011-2030, $/mmbtu)



Note: Based on 6 Bcf/d export from the US, 10% of national demand
Source: Deloitte world gas model projections, EIA energy outlook 2013

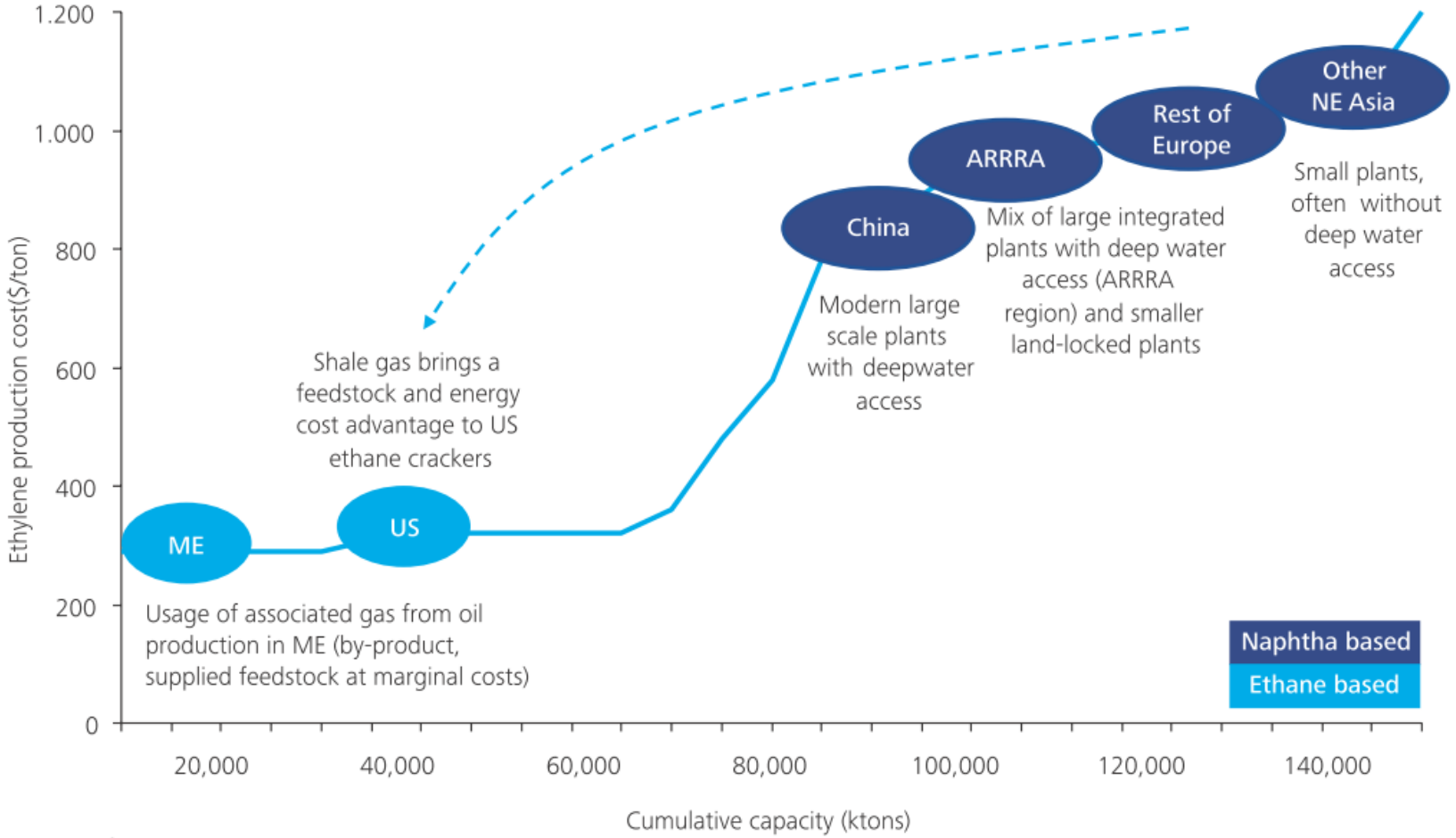
The price of basic petrochemicals is dominated by feedstock costs, energy and feedstock fractions decrease when moving away from the cracker

Production cost composition of chemical products(%, indicative)



* Based on most important products in each building block chain for an integrated player | ** Energy costs only include external heat and electricity
*** Other costs: Capital recovery, labour, R&D, maintenance, sales, overhead
Source: expert interviews, IHS, TFI, Fertecon, PotashCorp, Deloitte analysis

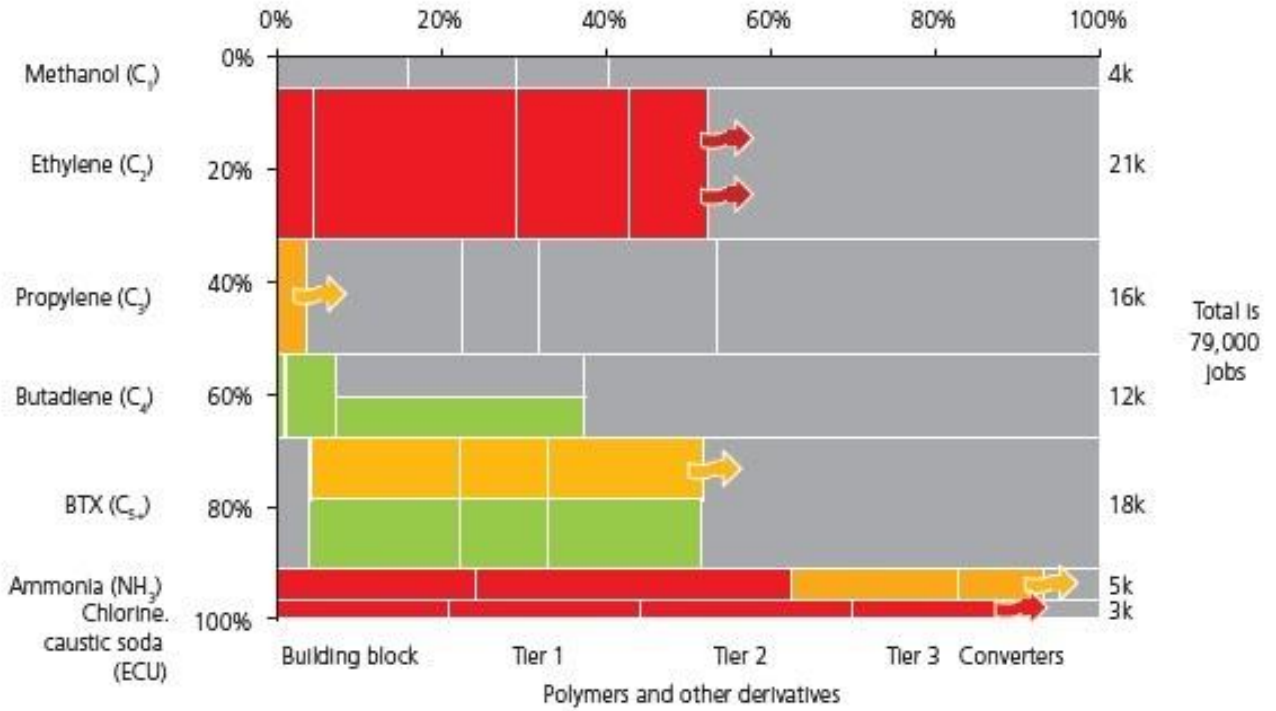
Global ethylene (C2) industry cost curve (2012)



Source: Cefic, Deloitte analysis

Initial negative impact on 29% on employment and 48% of revenue

Initial impact on employment in the NL chemical industry by product category (2012, # jobs)

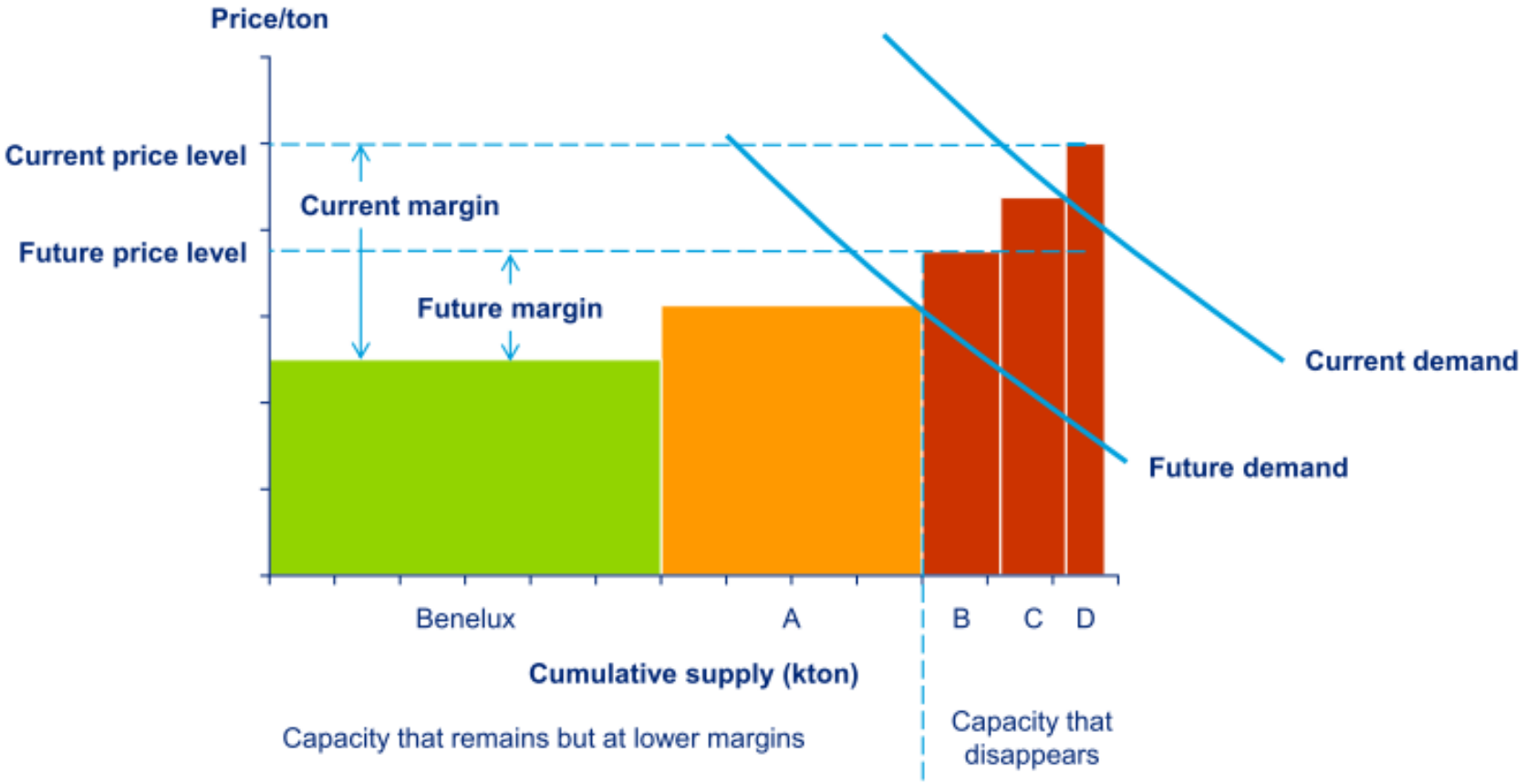


	Substantially weaker competitive position		Weaker competitive position		Neutral competitive position		Potentially stronger competitive position	
Direct jobs impacted	16.3	21%	6.3	8%	49.2	62%	7.0	9%
Revenue impacted	€ 21.1 bn	35%	€ 7.8 bn	13%	€ 24.3 bn	40%	€ 7.0 bn	12%

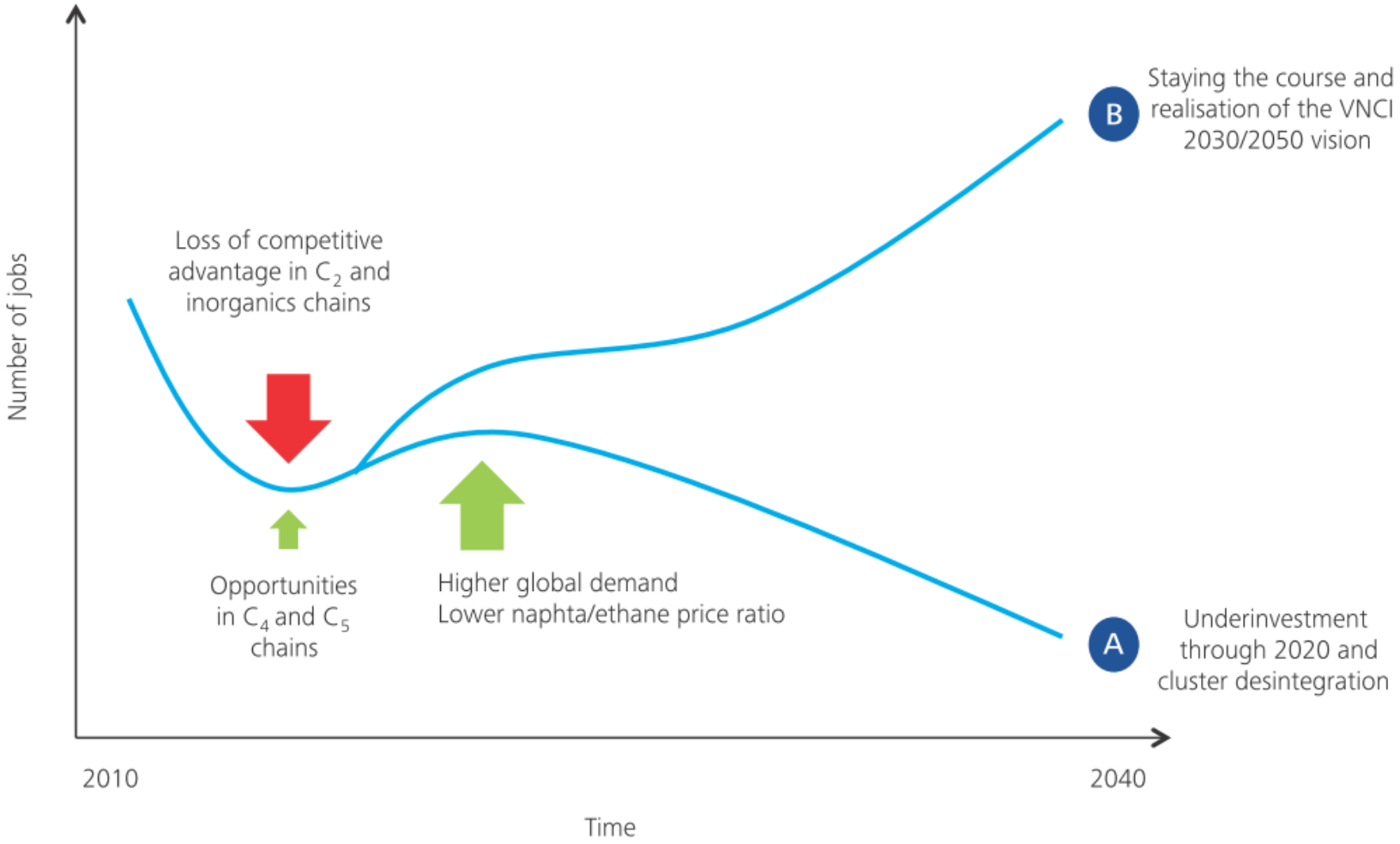
Source: CBS, Deloitte analysis

Discussion: Ultimate effects on base chemicals (and refining)

European chemical supply and demand - CONCEPTUAL



Potential futures for the Dutch Chemical industry



Major longer term risks

- underinvestment in assets
- underinvestment in innovation
- disintegration of competitiveness of clusterén

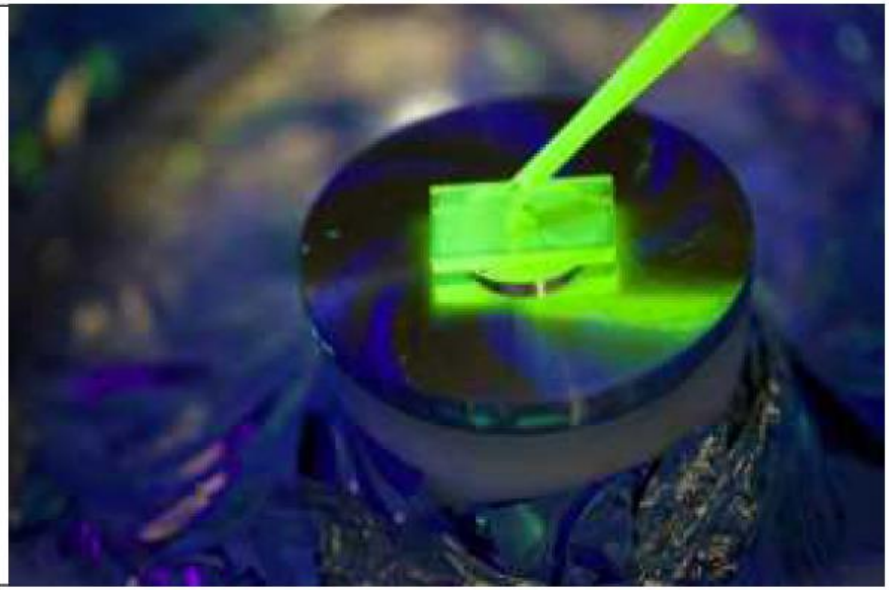
Conclusions:

- The sector should pursue all the earlier defined strategic objectives (as in Vision 2030-2050) with extra vigor
- Complementary policy measures are needed to help the sector to weather the storm

Vision 2030-2050

Key characteristics

1. Tightly integrated physical and organisational network
2. Flexibility to use a wide range of feedstock
3. Leading innovation eco-system
4. Clear regulatory framework



Policy measures discussed:

- Support for defined projects to strengthen the clusters
- Support for innovation
- European agenda
  - concrete measures that would lead to a reduction of energy and raw material cost for the CI
  - concrete measures that widen the options for MS support
- Other (national) framework conditions (regulatory; human capital)

Questions?

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