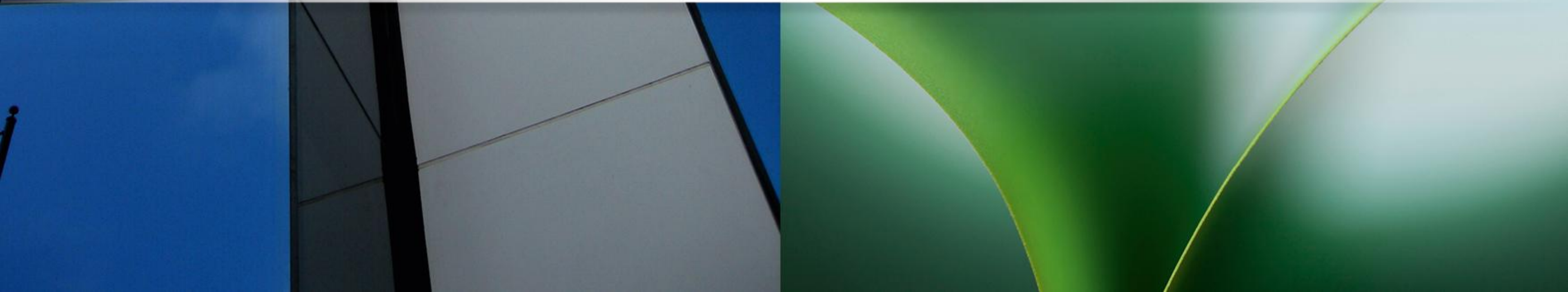
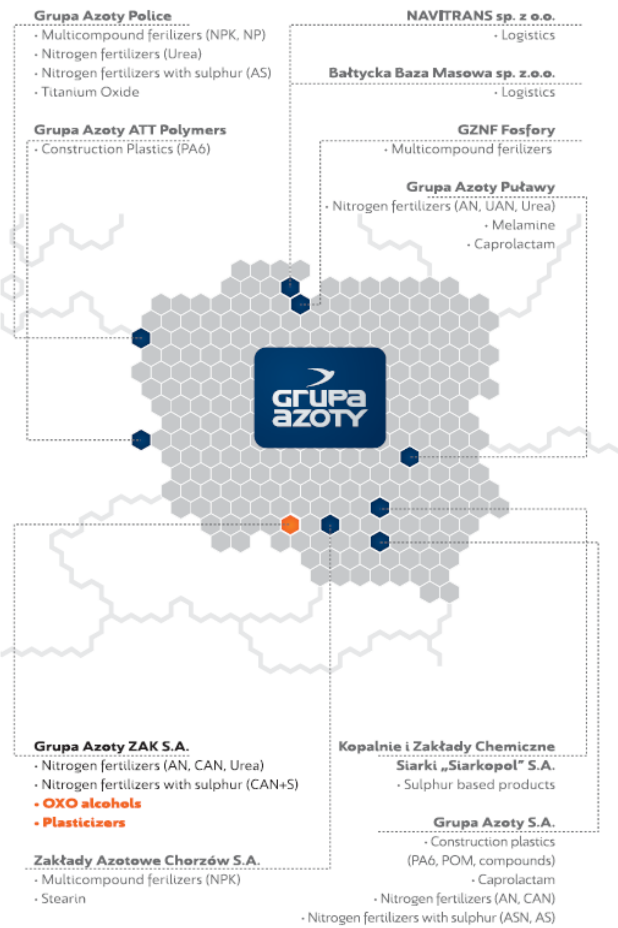
European oxo-alcohols market – A producer’s perspective

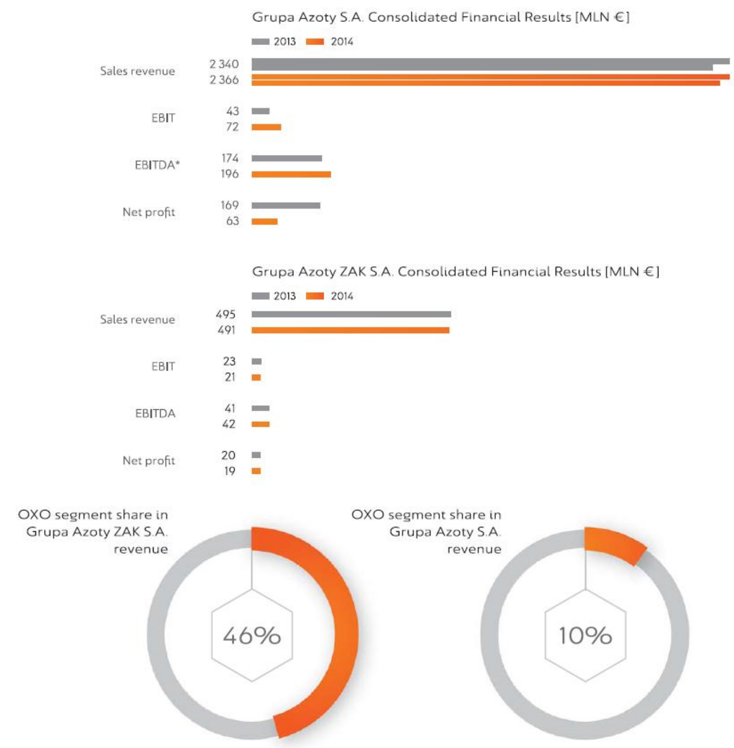


OXO Segment in brief

WE ARE A PART OF GRUPY AZOTY



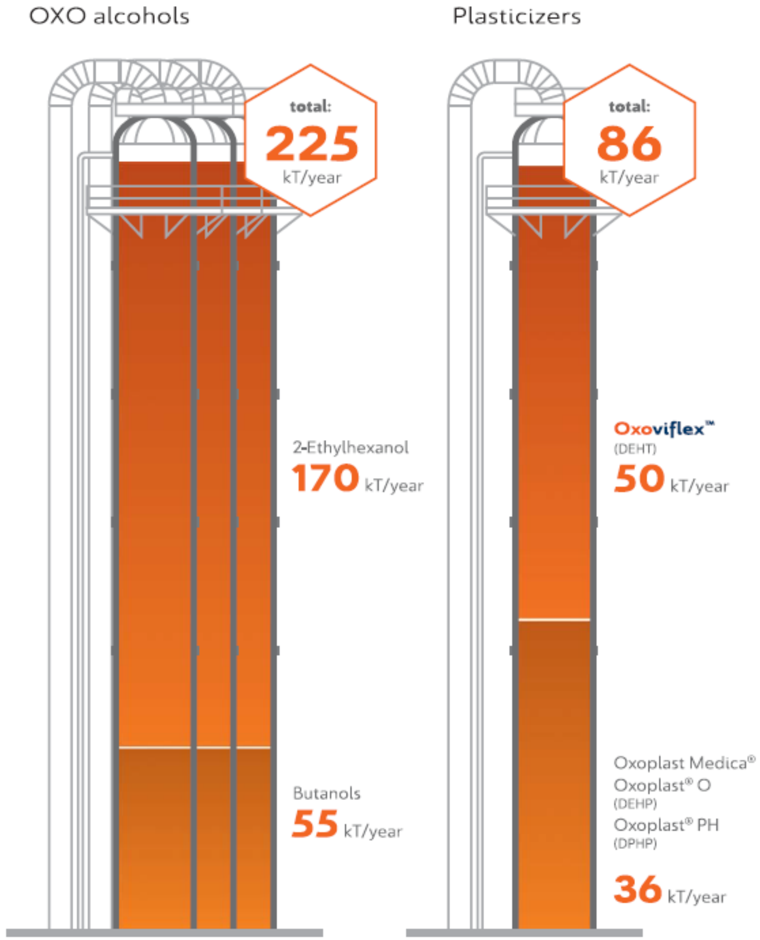
RELEVANT CONTRIBUTION TO REVENUES



2013: 1€ = 4,1975, 2014: 1€ = 4,1843

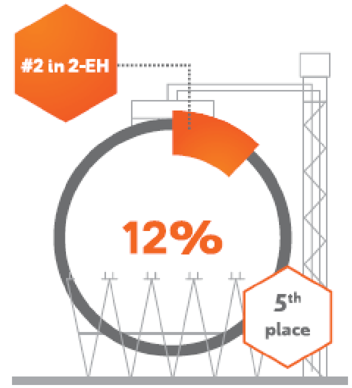
OXO Segment in brief

OUR MAIN CAPACITIES



JESTEŚMY LIDEREM RYNKU W EUROPIE

Market share in UE
OXO alcohols



with reference to 2-EH and Butanols

- We've been producing OXO alcohols since 1986.
- Our plant was modernised in **1998** and is one of the most modern in Europe.
- Apart form OXO alcohols we supply their precursors i.e. n-butyraldehyd & isobutyraldehyde
- We serve customers globally

• Our experience in plasticizers dates back to **1954.** We have been producing them ever since - constantly.

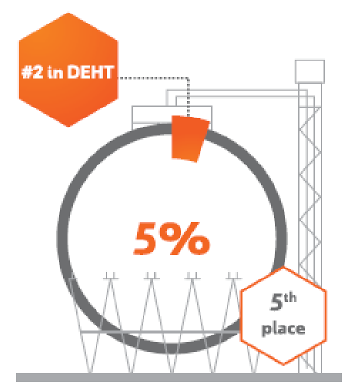
• We utilize two seperate plants.

• Our new **Oxoviflex™** plant places us within top three general purpose non-phtalate plasticizers producers in Europe.

• We do not erease the past- we still offer **DEHP** - produced at our facility since **1963**.

• Still we invest in future - **specialty esters, and other OXO derivatives.**

Market share in UE
Plasticizers

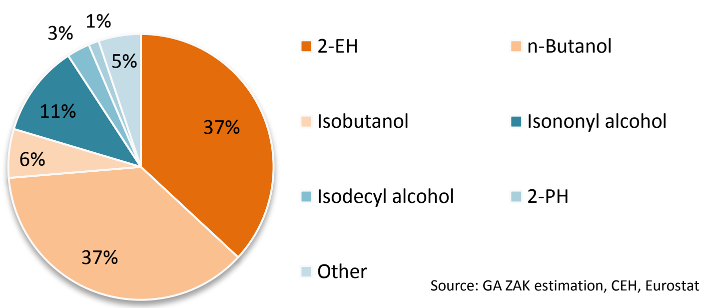


with reference to DEHT, DINCH, DINP, DPHP capacity

OXO alcohols market – global perspective -2014

MARKET SHARE BY PRODUCT

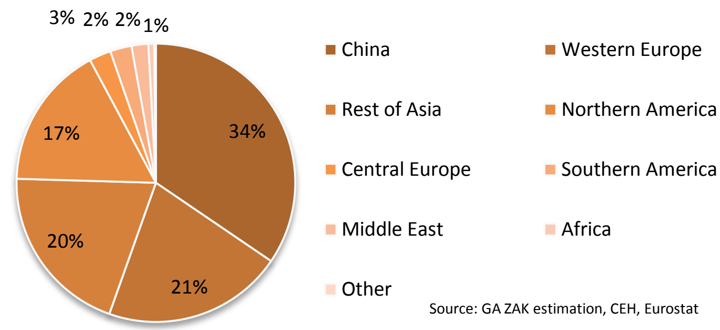
Global demand 9,8 mln t	2-EH 3,7 mln t	NBA 3,7 mln t	IBA 0,6 mln t



Source: GA ZAK estimation, CEH, Eurostat

MARKET SHARE BY REGION

Global demand 9,8 mln t	China 3,4 mln t	Western Europe 2,06 mln t	Rest of Asia 1,97 mln t



Source: GA ZAK estimation, CEH, Eurostat

2-EH i NBA – dominating the demand

- Alkohols with variety of applications are demand drivers for global OXO market.
- Overall 2-EH, n-Butanol i Isobutanol demand was app. 8 mln tons, thus 80% of share in demand.
- C9-C10 are dedictated to plasticizers production (phthalates and hydrogenated derrivatives). Thus demand is mainly generated captively by plasticizer producers. Commercial market is a very limited one.

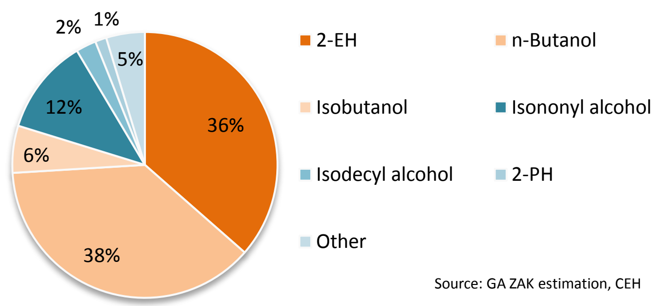
Asia – key market for OXOs

- In recent years Asia has become main consumer of OXO alcohols generating 5,4 mln tons of global consumption i.e 54%.
- Western Europe has maintaned strong second position owing to C9-C10 alcohols used in plasticizer production.
- Regardless of cost advantage drived from shale revolution USA has not moved ahaed with capacities and the market is still oversupplied.

OXO alcohols market – global perspective - 2020

MARKET SHARE BY PRODUCT

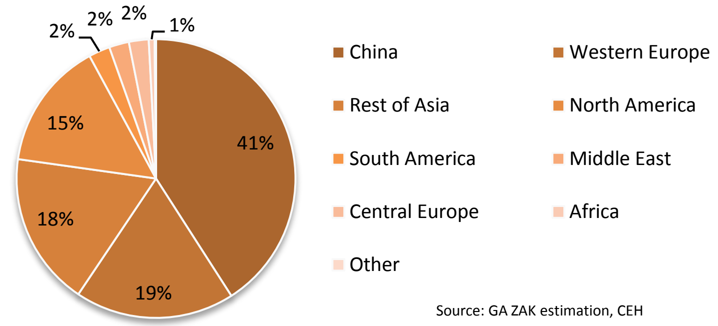
Global demand 12,4 mln t	2-EH 4,5 mln t	NBA 4,6 mln t	IBA 0,7 mln t



Source: GA ZAK estimation, CEH

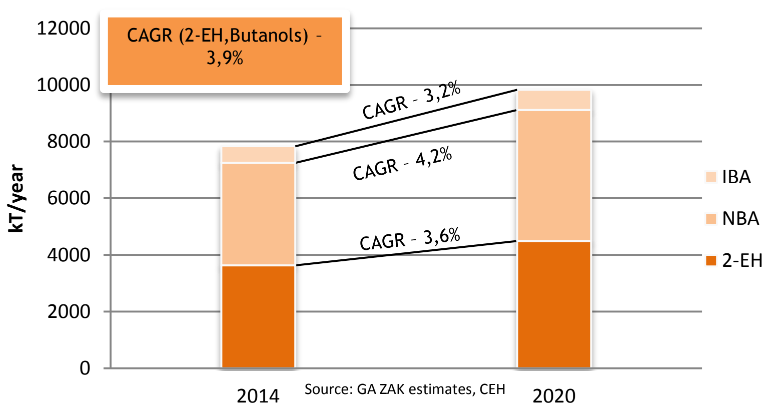
MARKET SHARE BY REGION

Global demand 12,4 mln t	China 5,01 mln t	Western Europe 2,3 mln t	Rest of Asia 2,2 mln t



Source: GA ZAK estimation, CEH

GROWTH RATES FOR 2-EH AND BUTANOLS



Source: GA ZAK estimates, CEH

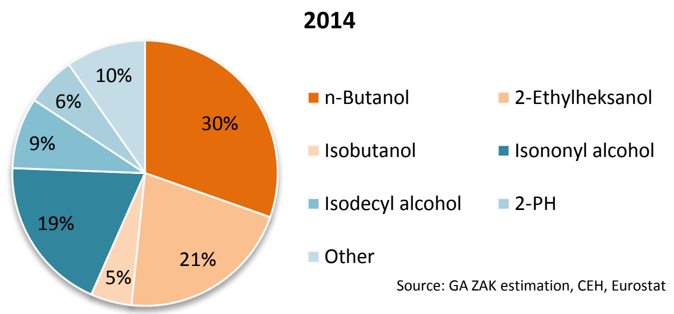
Asia – key market for OXOs

- Global demand for 2-EH and butanols will grow from 7,8 do 9,8 mln tons. 45% of 2-EH demand will be based in China.
- 2-EH and butanols will remain leading OXO alcohols accounting for 80% of global demand.
- China will increase its share in global demand to 41%. At the same time growth of capacities will place China as self-sufficient and net exporter position shortly.
- Europe's share in global demand will fall by 2%.

OXO alcohols market – Europe – 2014 - 2020

MARKET SHARE BY PRODUCT - 2014

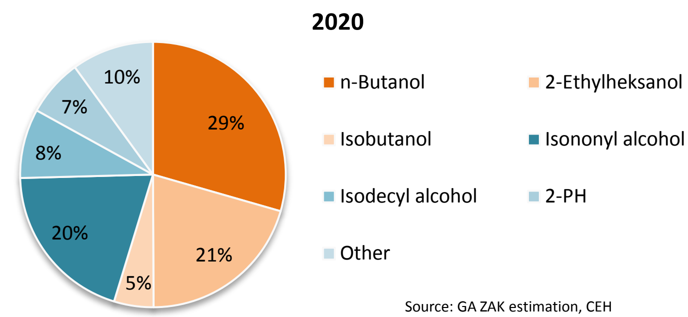
Demand in Europe 2,1 mln t	2-EH 0,44 mln t	NBA 0,6 mln t	IBA 0,1 mln t



Source: GA ZAK estimation, CEH, Eurostat

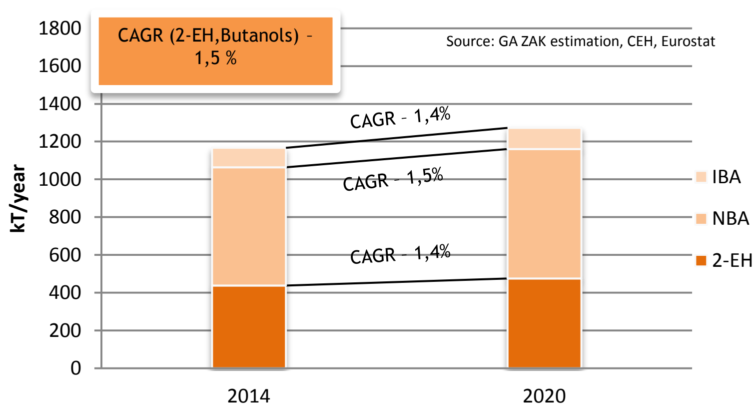
MARKET SHARE BY PRODUCT - 2020

Demand in Europe 2,3 mln t	2-EH 0,47 mln t	NBA 0,68 mln t	IBA 0,11 mln t



Source: GA ZAK estimation, CEH

GROWTH RATE FOR 2-EH AND BUTANOLS



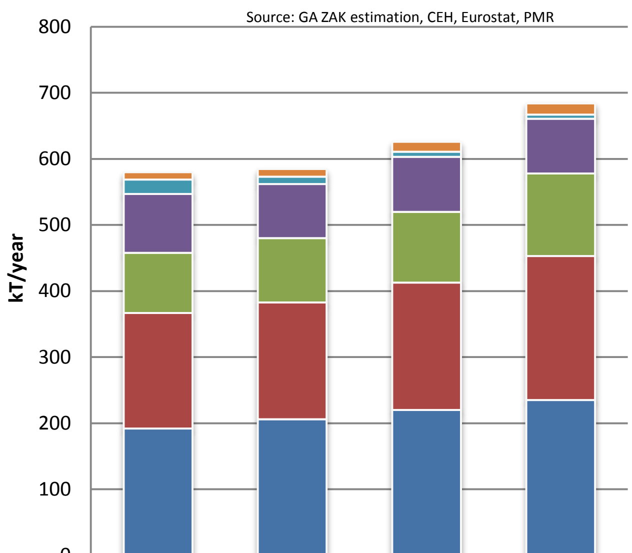
REGULATORY ISSUES – CREATING THE IMAGE

- Stable and mature market with overall growth rate CAGR of 1,5%.
- High share of C9-C10 alcohols used mainly captively for HMW phthalates and C9 alcohols hydrogenated derrivatives (DINCH).
- Commercial market for 2-EH and butanols.
- A market highly influenced by regulation especially in case 2-EH (plasticizer derrivatives), possibly in comming years C9-C10 alcohols may come under pressure due to uncertainty about phthalates safety - similar to DEHP effect in worst scenario. For C9 alcohol there's an alternative application (DINCH).

Butanols market – 2014 - 2020

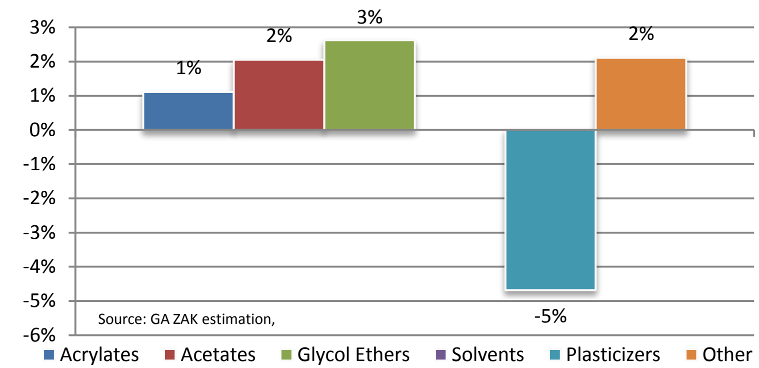
DEMAND BY APPLICATION – N-BUTANOL

Acrylates	Acetates	Glycol Ethers	Solvents	Plasticizers	Other
35%	**31%**	**17%**	**13%**	**1%**	**2%**



	2005	2010	2014	2020
Other	11	12	15	17
Plasticizers	22	11	8	6
Solvents	89	82	83	83
Glycol Ethers	91	97	107	125
Acetates	175	177	193	218
Acrylates	192	206	220	235

APLICATIONS GROWTH DYNAMICS CAGR 2014-2020 – N-BUTANOL



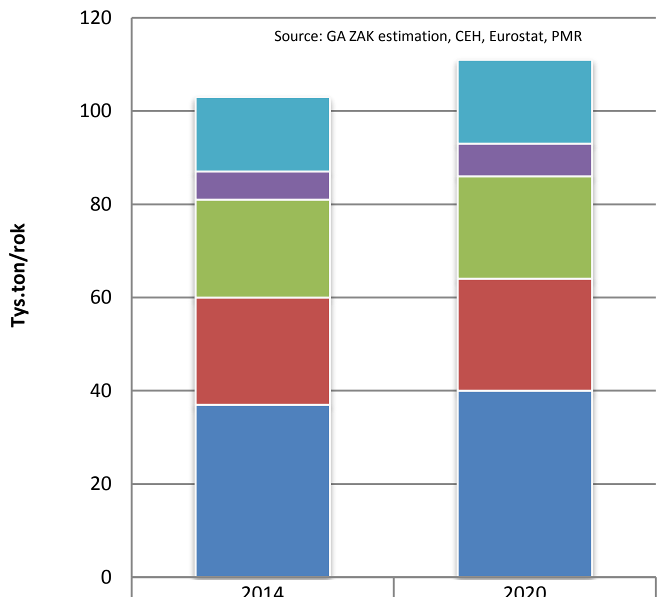
KEY FEATURES

- Stable application structure throughout analysed period
- Demand from main sectors in line with EU GDP forecasts and growth in paint and varnishes market.
- Negative growth rate for plasticizer applications. REACH regulation towards LMW phthalates (phased out from EU market). Demand from specialty plasticizers not strong enough to balance loss in share. But possibility remains - after 2020 …
- Generally balanced market – capable of self-sufficience - capacities in UE – app. 700 kT.

Butanols market – 2014 - 2020

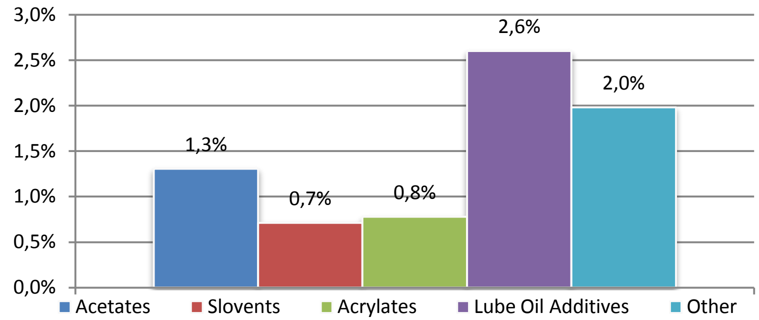
DEMAND BY APPLICATION – ISOBUTANOL

ACETATES	SOLVENTS	ACRYLATES	LUBE OIL ADDITIVES	OTHER
36%	22%	20%	6%	16%



	2014	2020
Other	16	18
Lube Oil Additives	6	7
Acrylates	21	22
Slovents	23	24
Acetates	37	40

APLICATIONS GROWTH DYNAMICS CAGR 2014-2020 - ISOBUTANOL



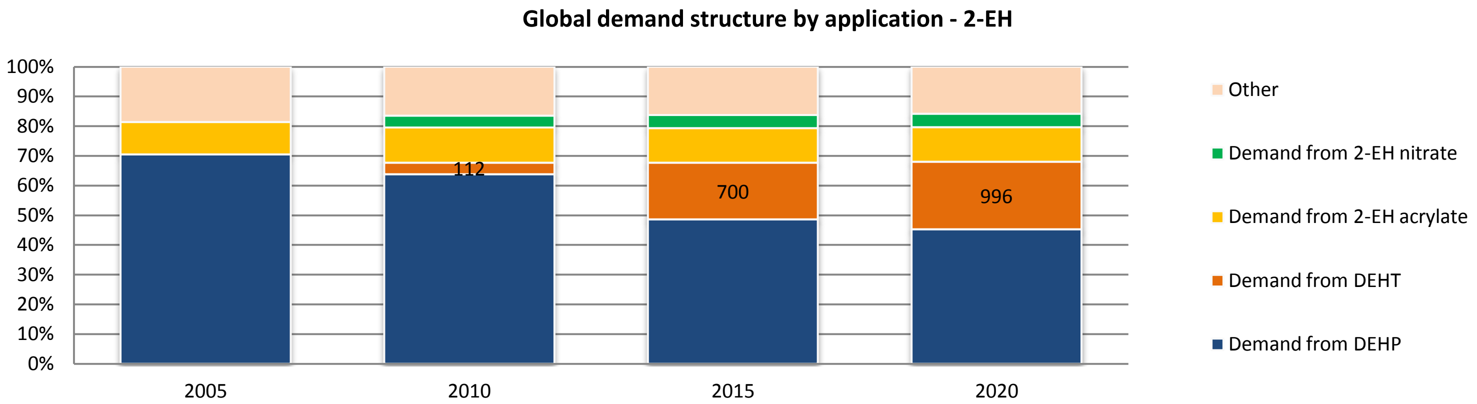
Source: GA ZAK estimation,

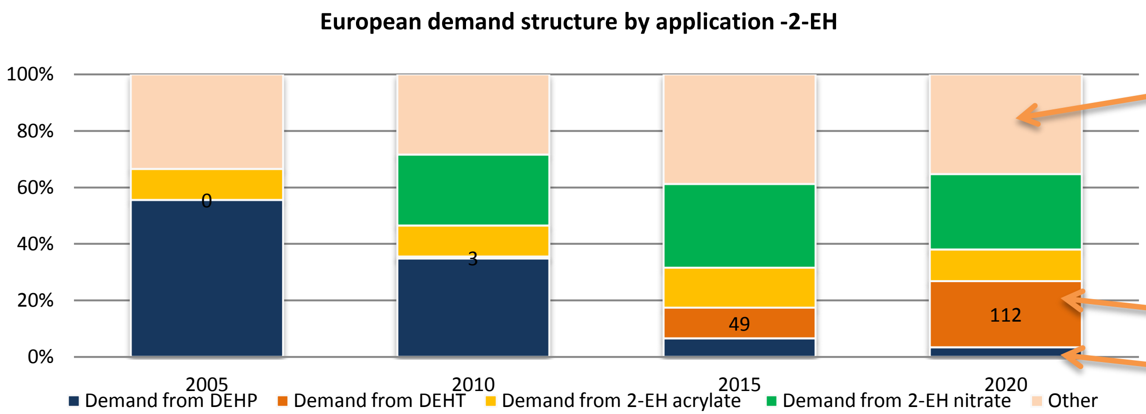
KEY FEATURES

- Stable application structure throughout analysed period
- Isobutanol for acetates – mainly captive use - high degree of back integration
- Low growth dynamics from paint aplications results from an ongoing shift to waterborne paints due to tight VOC regulation.
- Contradictory to Eastern Europe (CIS countries) – no demand from fuel sector

2-EH market – World vs. Europe

DEMAND BY APPLICATION– 2-EH	
GLOBAL DEMAND	EUROPEAN DEMAND
2014 – 3,7 mln tons → 2020 - 4,5 mln tons	2014 - 0,44 mln tons → 2020 - 0,47 mln tons





Including app. **15%** for 2-EH based **specialty esters/plasticizers**

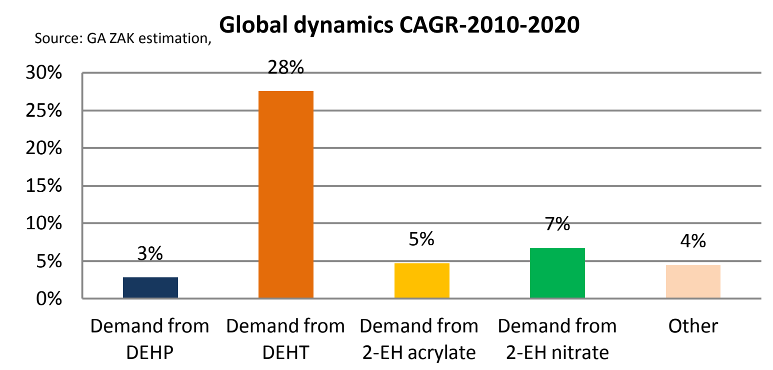
Total demand for plasticizers – app. 45%

Source: GA ZAK estimation, CEH, Eurostat, Tecnon Orbichem

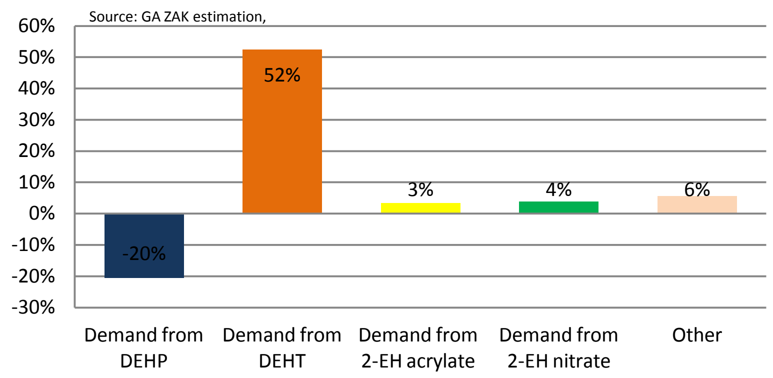
2-EH market – World vs. Europe

DEMAND BY APPLICATION & MARKET BALANCE – 2-EH

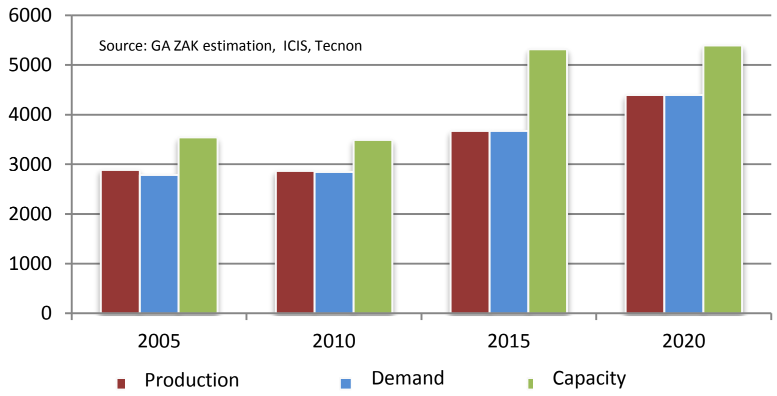
Global growth dynamics CAGR-2010-2020



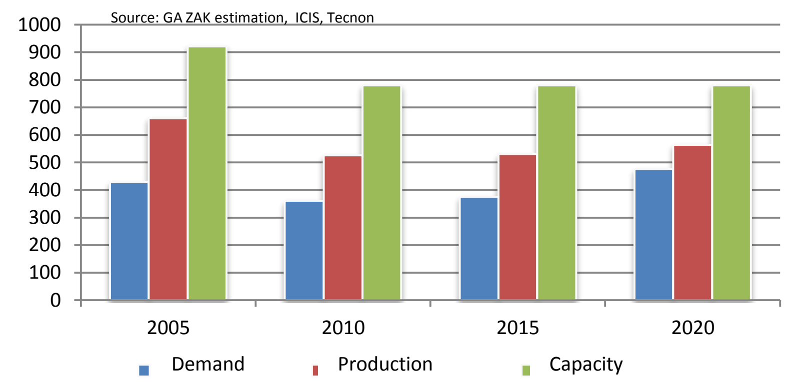
European growth dynamics CAGR-2010-2020



Global market balanece [kT/year]



European market balance [kT/year]

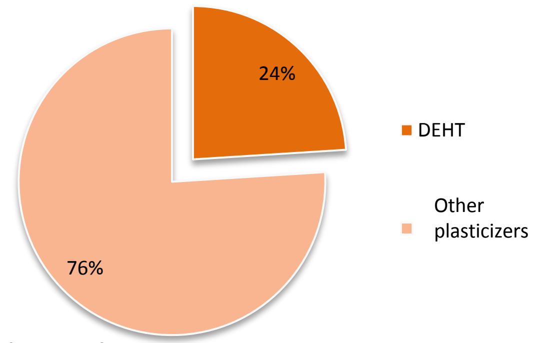


2-EH market - Summary

2-EH MARKET – KEY FEATURES

- Highest dynamics of structural changes within application portfolio. Especially evident in Europe due to REACH regulation for DEHP.
- Diversified segments providing balanced and relatively stable demand.
- Shift from demand generated by DEHP to other non-phthalate esters/plasticizers. High growth rate for demand generated by DEHT (28% - World, 52% - Europe)
- Unbalanced capacity volumes may be used for production of derrivatives (eg. DEHT/specialty chemicals). Approximate available volume **250 kT/year** in Europe and **1 mln tons/year** globally.
- App. 1,7 mln. tons of additional capacities in China (2010-2015).
- High dependence on tightening propylene market and polypropylene condition. Oportunities: **new on-purpose PDH plant by Grupa Azoty – propylene capacity 400 kT/year - sheduled to come on stream in 2019.** This means - upstream integration for Grupa Azoty ZAK.

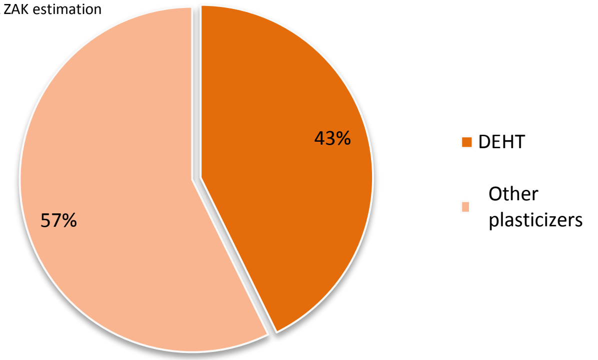
AND WHAT DOES IT MEAN FOR PLASTICIZERS MARKET ? – EUROPE 2015?



Source: GA ZAK estimation, ECPI, Eurostat, CEH

POSSIBLE OUTLOOK FOR 2020 - EUROPE

Source: GA ZAK estimation



If European market moves away from phthalates due to „regulatory" issues (country and EU level) – DEHP effect applied to DINP .

European oxo-alcohols market – A producer's perspective

Thank you

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MANAGER
STRATEGIC MARKETING OFFICE
Marketing & Development Department

GRUPA AZOTY ZAK S.A.

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