

Industry 4.0 for a Sustainable World (Chemical Industry)



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Gymnazium Teplice
Teplice, Czech Republic

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La Salle-Buen Consejo
Puerto Real, Spain

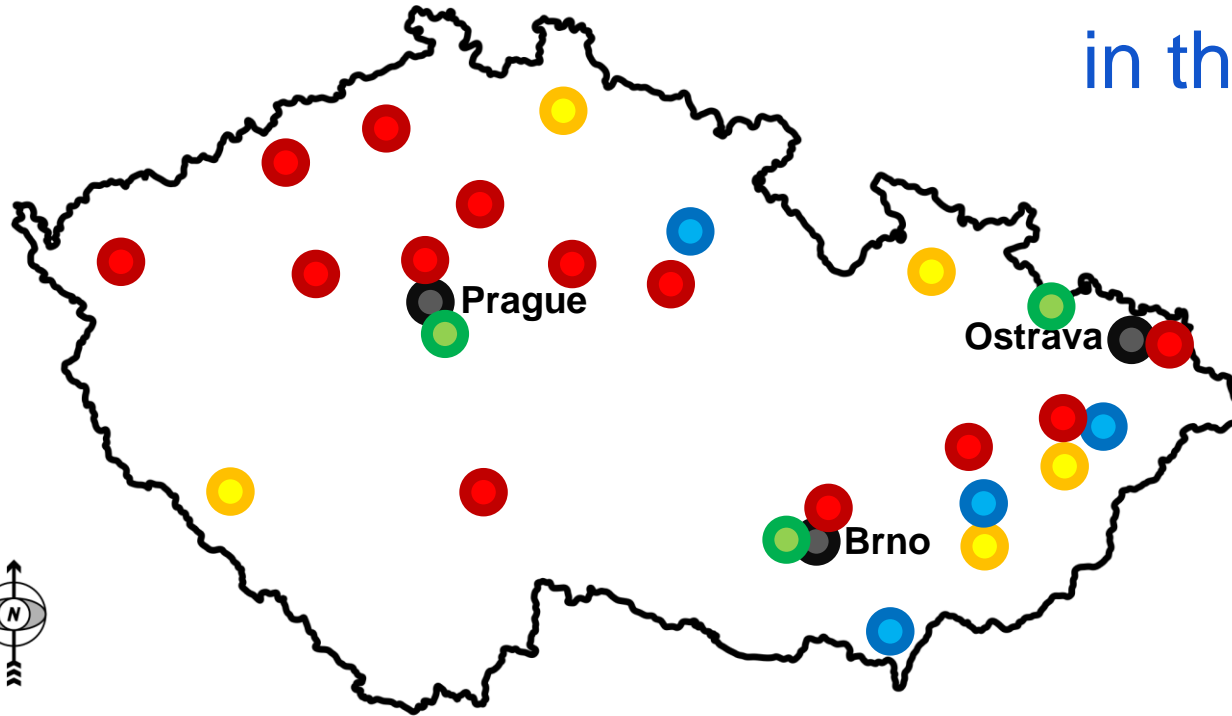
**La
Salle**
N. S. Buen Consejo
Puerto Real



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Distribution of chemical industry in the Czech Republic



- raw materials processing
- pharmaceuticals
- rubber production
- plastics, synthetic fibers
- important cities



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Distribution of chemical industry in the Czech Republic

- Petroleum industry
 - substances from oil
 - plastics, explosives, cosmetics, dyes and varnishes
- Coal chemistry
 - processing by-products when coal is produced
 - fats, soaps, dyes, thinners, medicines and explosives
- Rubber industry
 - vulcanization (mixing rubber and sulphur)
 - tires, protective clothing, latex foam
- Pharmaceutical industry
 - production of medicines and drugs





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Most important producers

- Spolchemie – syntetic resin, petroleum
- Lovochemie – fertilizers
- Setuza – oilseeds
- Synthos Kralupy – rubber
- Zentiva – pharmaceuticals
- KRPA – paper
- Fatra – plastics



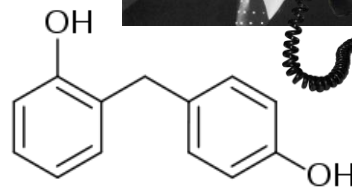
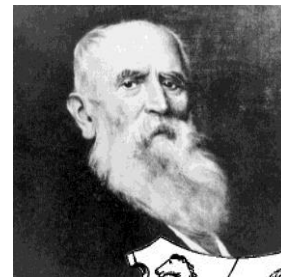
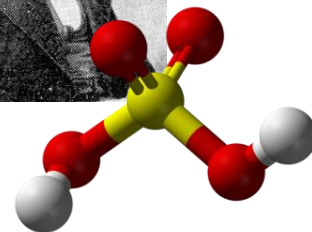
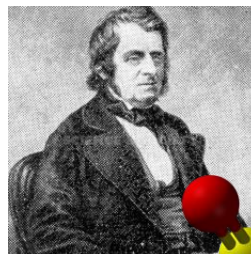


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History of chemical industry

- **18th century**
 - impulse from Great Britain
 - John Reabuck – new method H_2SO_4 production
 - production of Na_2CO_3
- **19th century**
 - organic chemistry
 - first artificial fibers
 - big growth of chemical industry in USA and Europe
 - 1865 – Friedrich Engelhorn (BASF)
- **20th century**
 - 1907 – Leo Baekeland (bakelite)
 - nylon (parachutes)
 - 1930s – first synthetic pesticides



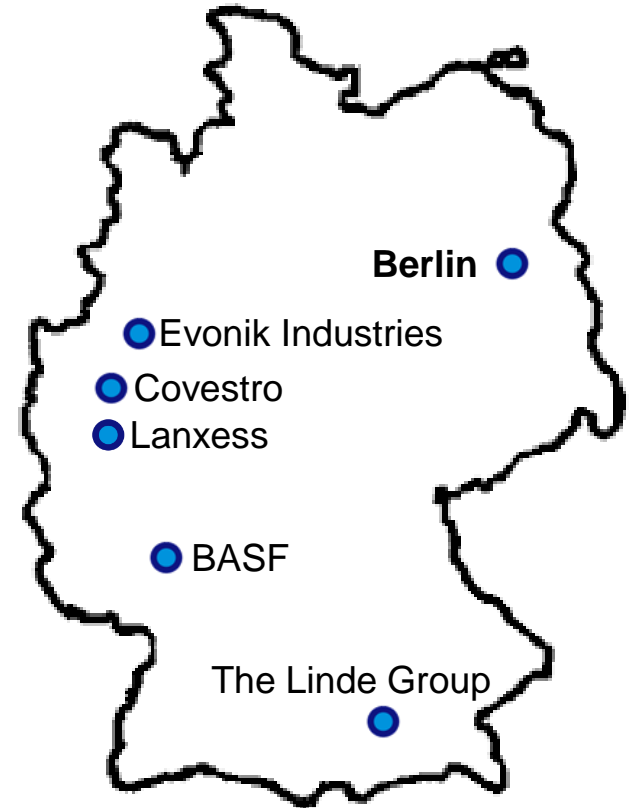


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Germany

- **BASF**
chemicals, plastics Performance Products
- **The Linde Group**
industrial gases, chemical plants
- **Evonik Industries**
specialty chemicals, polyester-polyols
- **Covestro**
heat insulation foams, polycarbonate, plastics
- **Lanxess**
rubber, plastics, specialty chemicals



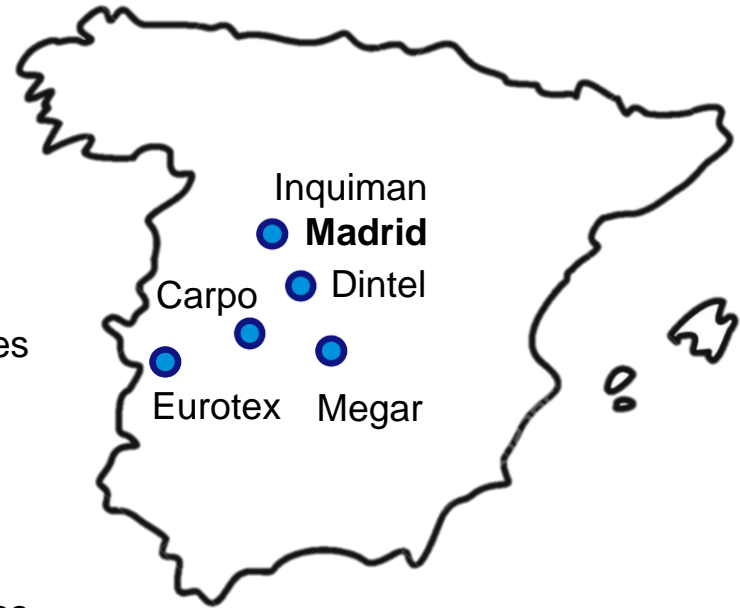


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Spain

- **Eurotex**
Sevilla
paints and varnishes
- **Carpo**
Jean
varnishes, paints solvents, dyes and enamels
- **Megar**
Murcia
soaps, detergents and cleaning, polishing articles
- **Inquiman**
Madrid
perfumery and cosmetics products
- **Dintel**
Ciudad Real
soaps, detergents and cleaning, polishing articles



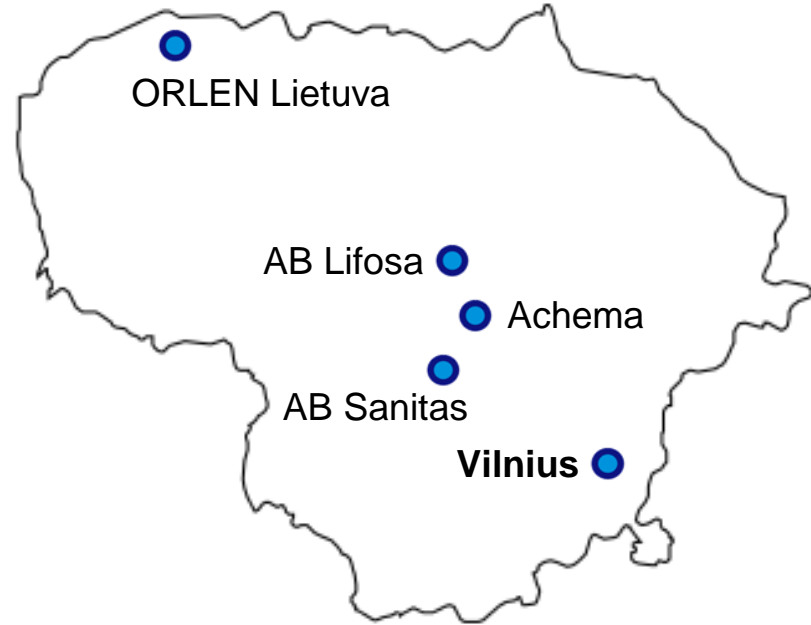


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Lithuania

- **Achema**
Jonava
the largest fertiliser manufacturer
of the Baltic states
- **AB Lifosa**
Kėdainiai
one of the largest manufacturers
of fertilisers in eastern Europe
98 % of its production is exported
- **AB Sanitas**
Kaunas
pharmaceutical products
- **ORLEN Lietuva**
Juodeikiai
the only refinery in the Baltic states





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Quantification of chemical industry

	Employment in chemical industry	Turnover	Turnovers (the biggest factories)	Number of companies
Czech Republic	129 000 employees	19,77 billion €	5 billion € (Unipetrol)	1 851
Germany	350 000 employees	203 billion €	64,5 billion € (BASF)	2 050
Spain	197 000 employees	65,7 billion €	809,8 million € (Lilly Sa)	3 300
Lithuania	5 000 employees	2,2 billion €	796,5 million € (Achema)	114



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Experiments



measuring acid rain



measuring UV

Thank you for your attention!

Dvořák Vojtěch
Krippnerová Lenka
Laštovková Bára
Vais Michal



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