

# Implementing cleaner production options

viewpoint of  
a german  
small business



# 7 steps of integrated approach

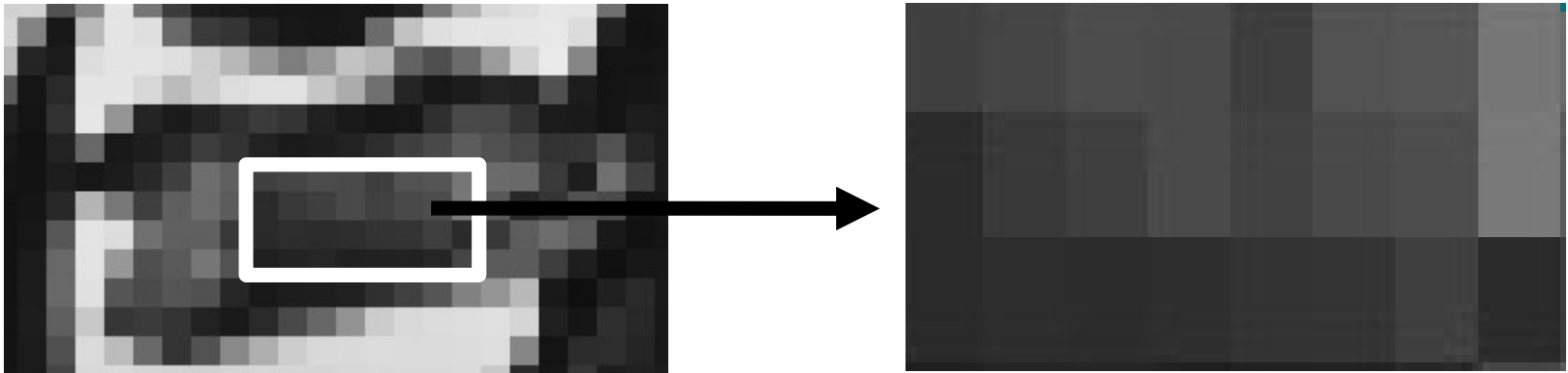
- getting deeper understanding of single existing processes
- simulation and modelling along the whole process chains
- modularisation to FPU's
- analysis of each FPU among the value chain
- science based process optimization
- development of eco-designs options
- management methodologies

**=> classical bottom-up strategy**

# Looking at the details

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What are we targetting at?



increasing knowledge?

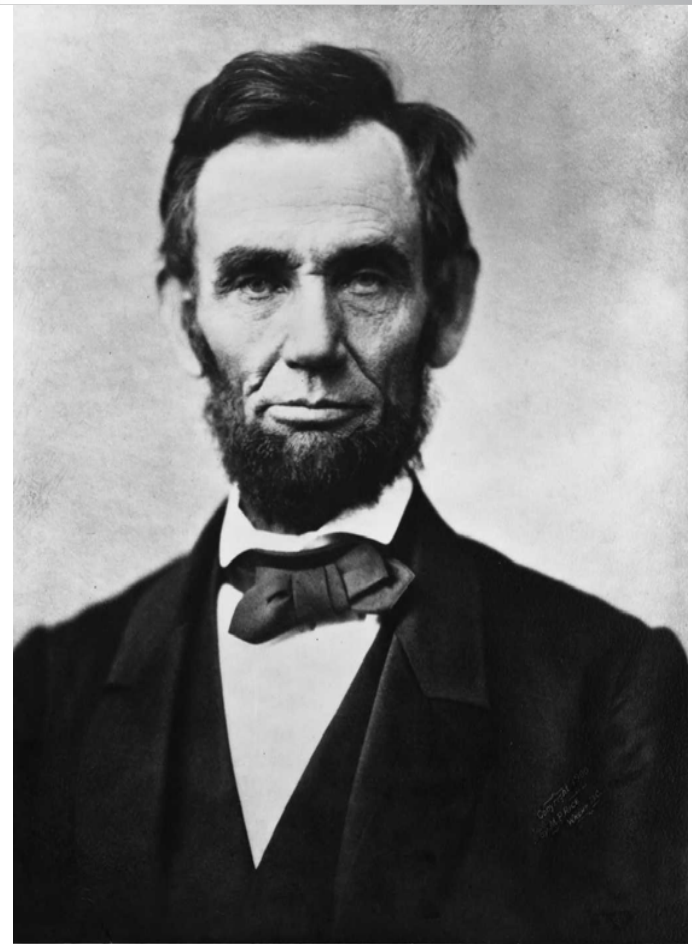
# Searching the overview

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getting an idea?

# Bottom-up analysis



# definitions?

- what is a „cleaner production“?

*Periodensystem der Elemente*

1																	18
1	2											13	14	15	16	17	
1.01 <b>H</b> Wasserstoff																	4.00 <b>He</b> Helium
2	3											13	14	15	16	17	
6.94 <b>Li</b> Lithium	9.01 <b>Be</b> Beryllium											10.81 <b>B</b> Bor	12.01 <b>C</b> Kohlenstoff	14.01 <b>N</b> Stickstoff	15.999 <b>O</b> Sauerstoff	18.998 <b>F</b> Fluor	20.18 <b>Ne</b> Neon
22.99 <b>Na</b> Natrium	24.31 <b>Mg</b> Magnesium											26.98 <b>Al</b> Aluminium	28.09 <b>Si</b> Silicium	30.97 <b>P</b> Phosphor	32.07 <b>S</b> Schwefel	35.45 <b>Cl</b> Chlor	39.95 <b>Ar</b> Argon
3	4	5	6	7	8	9	10	11	12								
39.10 <b>K</b> Kalium	40.08 <b>Ca</b> Calcium	44.96 <b>Sc</b> Scandium	47.88 <b>Ti</b> Titan	50.94 <b>V</b> Vanadium	52.00 <b>Cr</b> Chrom	54.94 <b>Mn</b> Mangan	55.85 <b>Fe</b> Eisen	58.93 <b>Co</b> Cobalt	58.70 <b>Ni</b> Nickel	63.55 <b>Cu</b> Kupfer	65.38 <b>Zn</b> Zink	69.72 <b>Ga</b> Gallium	72.61 <b>Ge</b> Germanium	74.92 <b>As</b> Arsen	78.96 <b>Se</b> Selen	79.90 <b>Br</b> Brom	83.80 <b>Kr</b> Krypton
85.47 <b>Rb</b> Rubidium	87.52 <b>Sr</b> Strontium	88.91 <b>Y</b> Yttrium	91.22 <b>Zr</b> Zirkonium	92.91 <b>Nb</b> Niobium	95.94 <b>Mo</b> Molybdän	(98) <b>Tc</b> Technetium	101.07 <b>Ru</b> Ruthenium	102.91 <b>Rh</b> Rhodium	106.42 <b>Pd</b> Palladium	107.87 <b>Ag</b> Silber	112.41 <b>Cd</b> Cadmium	114.82 <b>In</b> Indium	118.71 <b>Sn</b> Zinn	121.76 <b>Sb</b> Antimon	127.60 <b>Te</b> Tellur	126.90 <b>I</b> Jod	131.29 <b>Xe</b> Xenon
132.91 <b>Cs</b> Cäsium	137.33 <b>Ba</b> Barium	La-Lu	178.49 <b>Hf</b> Hafnium	180.95 <b>Ta</b> Tantal	183.84 <b>W</b> Wolfram	186.21 <b>Re</b> Rhenium	190.23 <b>Os</b> Osmium	192.22 <b>Ir</b> Iridium	195.08 <b>Pt</b> Platin	196.97 <b>Au</b> Gold	200.59 <b>Hg</b> Quecksilber	204.38 <b>Tl</b> Thallium	207.2 <b>Pb</b> Blei	208.98 <b>Bi</b> Bismut	(209) <b>Po</b> Polonium	(210) <b>At</b> Astat	(222) <b>Rn</b> Radon
(223) <b>Fr</b> Francium	(226) <b>Ra</b> Radium	Ac-Lr	(261) <b>Rf</b> Rutherfordium	(262) <b>Db</b> Dubnium	(263) <b>Sg</b> Seaborgium	(262) <b>Bh</b> Bohrium	(265) <b>Hs</b> Hassium	(266) <b>Mt</b> Meitnerium	(269) <b>Ds</b> Darmstadtium								

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138.91 <b>La</b> Lanthan	140.12 <b>Ce</b> Cer	144.24 <b>Pr</b> Praseodym	144.24 <b>Nd</b> Neodym	(145) <b>Pm</b> Promethium	150.36 <b>Sm</b> Samarium	151.97 <b>Eu</b> Europium	157.25 <b>Gd</b> Gadolinium	158.93 <b>Tb</b> Terbium	162.50 <b>Dy</b> Dysprosium	164.93 <b>Ho</b> Holmium	167.26 <b>Er</b> Erbium	168.93 <b>Tm</b> Thulium	173.04 <b>Yb</b> Ytterbium	174.97 <b>Lu</b> Lutetium
227.03 <b>Ac</b> Actinium	232.04 <b>Th</b> Thorium	231.04 <b>Pa</b> Protactinium	238.03 <b>U</b> Uran	(237) <b>Np</b> Neptunium	(244) <b>Pu</b> Plutonium	(243) <b>Am</b> Americium	(247) <b>Cm</b> Curium	(247) <b>Bk</b> Berkelium	(251) <b>Cf</b> Californium	(252) <b>Es</b> Einsteinium	(257) <b>Fm</b> Fermium	(258) <b>Md</b> Mendelevium	(259) <b>No</b> Nobelium	(260) <b>Lr</b> Lawrencium

# Conclusion?

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„The age of fossil fuels  
will not end by the lack of fossil fuels  
as well as  
stone age did not end  
due to the lack of stones“

# aims

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- finding better ways to produce energy
- more sophisticated ways to use it
- preventing the dissipation of resources
- avoiding unneeded risks

but.....

**Let's mind the context!!**

**Let's ask for the sense, too!!**

# Sustainability

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***Creating the possible  
requires  
trying the impossible  
continuously!***

Hermann Hesse

