

Sketch for a Pioneering Region of Bioeconomy, Circular Economy and Energies based on renewable Sources

LEADING REMARKS

This compilation has been put together in the summer of 2018 with a few add-ons in the following as a contribution to the public discussion that accompanied the work of a federal commission in Germany on how to fade out coal-mining in the next years. This fall the German Federal Government debates the upcoming law, that will provide about 40 Billion Euros of funding the next 20 years for upcoming post-coal-regions in transition. In the following sketch one can find an english translation of it, providing a brief collection of existing projects and enterprises that might be useful building blocks for a Pioneering Region of BIOECONOMY, CIRCULAR ECONOMY and Energies based on renewable Sources. The leading thought is to present a number of ideas within the aspects of Labor, Agriculture, Architecture, Mobility and Energy, without any aiming at completeness. It is a contribution to conversations in those fields, maybe providing inspiration to already ongoing thoughts and practices in Regions. This would already be a great outcome of this sketch, that is first for all a commented list of Web-Links. As research has been shown in the last months, a whole further richness of projects, enterprises and scientific research have been found, that fit in well within this brief sketch and its leading thoughts. Ideas and Remarks to this sketch are highly welcome, especially Critics will help and contribute to conversations on how a Pioneering Region of BIOECONOMY, CIRCULAR ECONOMY and Energies based on renewable Sources might be shaped. The given Web-Links have been altered to provide english information, by a lack of those an alternative english source has been added. In a few cases the original Web-Link is unchanged, as it points to local or regional projects in Germany without any english alternative. So all Web-Links colored **green** lead to an english source, **grey** ones provide information in german language, by that hopefully contributing to a smooth further reading on the Web. The text has not been changed, only the highly remarkable book «*Material Matters*» by THOMAS RAU und SABINE OBERHUBER and their ideas to «*Products as a Service*» has been added, replacing a newspaper article to Architecture and Regions in THE STARTING POINT and a few lines in the main text to aspects of «*Products as a Service*» within a CIRCULAR ECONOMY.

SOME BOOKS PROVIDING A STARTING POINT

«*The Planet as a Gift. Future starts after Oil*»

«*Der geschenkte Planet. Nach dem Öl beginnt die Zukunft*»

Prof. Dr. ARMIN RELLER, Chemist at the UNIVERSITY OF AUGSBURG and HEIKE HOLDINGHAUSEN, WESTEND 2014 (Link: [Website](#))

«*Material Revolution. New Sustainable and Multi-Purpose Materials for Design and Architecture*»

«*Material Revolution 2. New Sustainable and Multi-Purpose Materials for Design and Architecture*»

Dr. SASCHA PETERS, BIRKHÄUSER 2011 and BIRKHÄUSER 2014 (Link: [Website](#))

«*Material Matters. Products as a Service*»

THOMAS RAU and SABINE OBERHUBER, ECON PUBLISHING 2018 (Link: [Website](#))

As this compilation has been inspired by a Bavarian radio report by MORITZ HOHLFELDER on the 24th of August 2018 how post-coal-mining regions could be shaped, especially in Eastern Germany (Link: [Report](#)), I want to start this sketch with aspects of **Labor**, that might offer new perspectives for people living in those regions. To this day a lot of heavy industries can be found in coal-mining regions, enterprises and research institutions that bring in ideas and practices within the field of Cleantech for water and landscape-conversion might be a highly valuable approach for a Region like this. So one can find an article at SPIEGEL-ONLINE by MANUEL BERKEL on the 23rd of August 2018 on how coal-mining-areas can be turned into storage system for energy that is based on renewable sources, reporting about applied research of DEUTSCHE ZENTRUM FÜR LUFT - UND RAUMFAHRT (DLR). Existing technological structures can be altered for thermal storage making use of salt, the enterprise STEAG in Essen already has taken a look on those concepts, as one can read (Link: [Article](#)). SIEMENS GAMESA has successfully tested a new storage system for electricity based on rocks in Hamburg that might also offer paths for post-coal-energy plants (Link: [Website](#)). Perhaps this might offer cooperation within the railroad-ballast recycling programme of the DEUTSCHEN BAHN, if this would be a useful source of stones (Link: [Article](#)). Austrian engineer Prof. Dr. ZOTLÖTERER has shaped innovative small-scale Hydropower Engines, his work has been nominated for the Austrian Wateraward Neptun. He has also shaped small-scale Wind-Energy Engines (Link: [Website](#)). Enterprise AWAS in the region of Dresden works with new kind of rotors, so-called Oloids, within aspects water-rehabilitation and waste-water-cleaning (Link: [Website](#)), it also has been part of project AUTARTEC of FRAUNHOFER IVI INSTITUTE, for water-floating-homes (Link: [Website](#)). Scientist Dr. KLAUS OPWIS, conducting research within Environmental Technologies & Catalysis of DEUTSCHES TEXTILFORSCHUNGSZENTRUM in Krefeld, Germany, came up with a special textile for process-waste-waters, that regains metals of Platinum, Gold, Silver and Palladium (Link: [Website](#)), within Bavarian Research Association FORCYCLE there also has been found a way for the effective collection of metals from industrial waste-waters (Link: [Website](#)), PERRY ALAGAPPAN and his colleagues at RICE UNIVERSITY put together a filter that is based on Quarzwool, that cleans water from Lead, Copper and Mercury (Link: [Article](#)). Within a Pioneering Region enterprises that focus on Cleantech might offer labor, that can be linked to already existing industrial structures. By this one can find a starting point within sustainability and Cleantech to also look out for aspects of Agriculture, Architecture, Mobility and Energies based on renewable sources that might contribute to this approach. As the EU has recently updated its Strategy for BIOECONOMY, this might add further thoughts and practices to this (Link: [Website](#)), as well as NATIONALE FORSCHUNGSSTRATEGIE BIOÖKONOMIE 2030 of the BUNDESMINISTERIUM FÜR FORSCHUNG (Link: [Website](#)). By this **Agriculture** in a region will become an important and vital part in a Pioneering Region. Swiss ITHAKA-INSTITUT and its director HANS – PETER SCHMIDT is working on carbon-cycling, the reshaping of ecological systems and wine-growing (Link: [Website](#)). The Institute has published studies to Biochar, e.g. in cooperation with Prof. Dr. CLAUDIA KAMMANN of the UNIVERSITÄT GEISENHEIM, e.g. in science-magazines like NATURE COMMUNICATIONS (Link: [Article](#)), just recently they published a study about a pioneering farm in Switzerland, that has established a climate-positive farming concept (Link: [Article](#)). One can also read in an article of the FAZ from Frankfurt on the 25.10.2017 on the research of Prof. Dr. CLAUDIA KAMMANN to this so-called breakthrough in agriculture. The FRAUNHOFER UMSICHT INSTITUTE in Bavaria has come up with a technology called THERMO-KATALYTISCHES REFORMING (TCR) to transform valuable leftover agricultural waste resources to Biochar, also gaining Oil and Gas (Link: [Article](#)). Within the TWITTER-Post of the UMSICHT INSTITUTE one can see a 1-Litre car by VOLKSWAGEN that is powered by this (Link: [Twitter](#)). Within the scientific Journal of the ITHAKA-INSTITUTE one can find an article of GUNTER PAULI and HAIKO PIEPLOW about mulberry-trees, that can feed as pioneering trees silkworms, the leaves can be used as animal feed. In the year 1785 in Prussia around 14.000 pounds of silk were harvested, about 12.000 people worked in that field of textile-production. As one can read in this remarkable report, there are various applications for silk, also in technical means (Link: [Article](#)). A sustainable Agriculture not only provides food but also a wide range for materials, that can be the starting point for shaping new regional value-structures. Ideas to that can be found at the FACHAGENTUR FÜR NACHWACHSENDE ROHSTOFFE in Gülzow-Prüzen (Link: [Website](#)) und der FACHAGENTUR DES BUNDESMINISTERIUM FÜR BILDUNG UND FORSCHUNG ZUR BIOÖKONOMIE (Link: [Website](#)). So the FRAUNHOFER INSTITUTE IBP has put together a plant-based insulation for houses that also works within a CIRCULAR ECONOMY, based on the Typha water plant (Link: [Website](#)). By restoring the

environment in terms of soil, water and a sustainable Agriculture this will provide a wide range of labor for people in a Pioneering Region for shaping new regional value-chains. By that environmental and agricultural knowledge, Trade, Crafts, Research and Design are laying further ground for development. This also brings in innovation to **Architecture**, that can be shaped by a more regional approach, becoming an applied science for sustainable Buildings, Water-cycles and Energy based on renewable sources. So for existing Buildings new ways for insulation can be turned into practice, that can also be combined by solar heating and power production (Link: [Website](#)). Within the NATURAL BUILDING LAB, e.g. ZRS Architects and Engineers from Berlin are working on concepts for climate-active natural building materials that reduce the need for high-technologies (Link: [Website](#)). By this also new modular structures for buildings within so-called «*Tiny Houses*» could be developed and shaped, that can be re-arranged within upcoming and yet unknown demands. A recent exhibition at Museum Ludwigsburg to so called «*room-pioneers*» showed examples to this (Link: [Website](#)). Another example is provided within the exhibition area for sustainable building in Middlefort in Denmark by «*Een til Een*» architects that is only making use of materials from re-growing sources like grass, straw, algae, wood with kebony-technology, pressed straw-plates, algae-based insulation, hemp-fiber and soy based beams, corn based flooring, a solar energy with an added salt-water-battery and post groundings (Link: [Article](#)). By that Architecture can become a living mirror for Agriculture, Crafts, Trade, Research and Design of a Pioneering Region and new ideas and products could be shaped within this local and regional approach. In addition to that also new and innovative concepts for decentralized waste-water-treatment can be applied. A detailed radio-report in 2016 by NORA BAUER ON DEUTSCHLANDFUNK focused on sustainable waste-water-concepts that e.g. has been put up in housing estate Flintenbreite near the city of Kiel in Germany, also being based on the work of Prof. Dr. RALF OTTERPOHL from TH HAMBURG-HAARBURG (Link: [Website](#)). After splitting waste-waters-streams and intense treatment a fertilizer for local and regional Agriculture can be gained. Another innovative approach for water is shown within the «*Roof Water Farm*» from Berlin, that is supported by federal funding (Link: [Website](#)). Heat-Pumps can also contribute to future-heating in Architecture, FRAUNHOFER INSTITUTE ISE in Freiburg is conducting research to this technology (Link: [Article](#)). At TU BERLIN there has been research for a new light-weight-concrete, that also brings in better insulation and offers perspectives for recycling, maybe offering new perspectives to this material (Link: [Article](#)). As the maintenance of buildings is a highly demanding task, one can also take a look at the organizational approach by shared-ownership, that takes a long-term perspectives into account. This idea may also be useful in shaping new ways of **Mobility**, that is connecting all those areas of a Pioneering Region. By focusing on a local and regional development walking and various shapes of cycling-concepts can play a new and vital role, also for transporting goods on small-scales. Shared owner-ship concepts can be applied for providing various forms of mobility-centers, also providing cars. An interesting concept for bicycle-transport is provided by CITKAR from Berlin (Link: [Website](#)), also German Parcel Service has shaped a similar approach that is being put into practice in cities like Frankfurt (Link: [Article](#)). The DEUTSCHE POST has developed an electric Vehicle called STREETScooter, that is being used for parcel-delivery (Link: [Website](#)). A way for recycling Lithium-Ion Batteries can be for example found with REDUX in Offenbach near Frankfurt (Link: [Website](#)). An interesting concept can be found within the enterprise «*Air Mobility*» that is moved by compressed air, the energy could be gained from Energies from renewable sources (Link: [Website](#)). It might be also an idea to shape new material approaches for bicycles, that fit and work within a Pioneering Region, also contributing to the ideas of a BIOECONOMY and CIRCULAR ECONOMY. One example is enterprise MULI from the region of Hessen in Germany, that manufactures the transporting-bicycles on a local scale (Link: [Website](#)). That a lot can be done with new materials, shows ship-craftsmen FRIEDRICH DEIMANN from Bremen, who works with regrowing materials like Flax, Cork and Linen that also have been tested at the local BIONIK-FORSCHUNGSZENTRUM (Link: [Article](#)). Within a project at TU EINDHOVEN scientists have also shaped a model for a car titled «*Noah*» that is based entirely on materials based on renewable sources. By this all Materials can be used again at the end of the product-cycle when it returns to the producing enterprise, making use of the idea of «*Products as a Service*» (Link: [Article](#)). Of course railroad stations are useful too, being closely connected to a modular system of mobility. For all of this one also has to provide **Energy**. By adding up the given examples and projects to this point one can see clearly that this will diminish the need for electricity, being somewhat lower than that existing infrastructures and social routines are run on today. Bringing in decentral ways of providing electricity, e.g. based on Wind, Water, Photovoltaik or Biogas, this could connect the local and regional living and working areas. So for example the city of Nürtingen, Germany is offering a so-called «*Beelectricity*» that provides electricity by Biogas making use of regional plants that also

contribute to insect life and biodiversity (Link: [Website](#)). In the region of Bavaria the BAYERISCHE LANDESANSTALT FÜR WEIN - UND GARTENBAU (Link: [Website](#)) and the TECHNOLOGIE - UND FÖRDERZENTRUM IM KOMPETENZENTRUM FÜR NACHWACHSENDE ROHSTOFFE IN BAYERN (Link: [Website](#)) is conducting research in that area to identify a useful combination of plants, also does NETZWERK NACHWACHSENDE ROHSTOFFE UND BIOÖKONOMIE E.V. in the Region of Niedersachsen (Link: [Website](#)). Within gaining electricity using Photovoltaik it would be useful to connect local enterprises and research institutions to provide technology and distribution system within the concept «*Products as a Service*» that would reduce the problem of wasting valuable materials by an ununified production process. By making use of the idea of «*Product as a Service*» all the materials in a product will only be borrowed by customers, the ownership of it will continue to be within the producing and emitting enterprise. So aspects of the end-of-use of products and the regaining of the materials will become a vital part of an enterprise, by that also turning in an applied research institution in that field. The longer the product lasts, the better the materials can be regained, the more earnings can be harvested. This will also be a benefit for the customers and will drastically diminish the need for legislation for environmental means by providing a new business model, opening up various new paths to be shaped within social innovations and processes. So FRAUNHOFER ISC in Würzburg shaped a new way for regaining the materials of used Photovoltaik-modules that also was awarded the Environmental Prize of the BAYERISCHEN LANDESSTIFTUNG in 2016 (Link: [Website](#)). Within the various projects of «*ForCycle*» one can also find first steps for regaining materials from used Windblades from rotors (Link: [Website](#)). Further research in this field seems to be a meaningful and useful task, though.

NOTES ON ENTERPRISES THAT COULD CONTRIBUTE TO THE STRUCTURE AND HISTORY IN THE REGION OF LEIPZIG, GERMANY

The region of Leipzig has a long tradition in **Publishing**, still being highly visible within the Leipzig Book Fair, Publishing Houses and University Institutes, hosting also the eastern part of the German National Library. Within the research magazine MÜLL UND ABFALL 03/2016 Chemist Prof. Dr. MARTIN BRAUNGART, who also co-coined the term «*Cradle2Cradle*» has outlined a highly remarkable path for a CIRCULAR ECONOMY of paper and ink within the printing industry (Link: [Website](#)). Austrian enterprise GUGLER is also printing with those materials making use of this outlined approach (Link: [Website](#)), using environmental friendly substances only. So fibers, that have become too short for a further use in paper, finally can be used as safe natural fertilizers in forests and agriculture. Enterprise STEINBEIS has shaped a paper meeting these demands for a circular approach (Link: [Website](#)), also enterprise WEPA from the Netherlands offers paper for a circular use within the sanitary field (Link: [Website](#)). Colors for a circular printing are provided by enterprise GREEN4PRINT (Link: [Website](#)), also DOROTHEE HESS co-founder of pioneering organic textiles manufacturer HESSNATUR has been part of conducting research for environmentally friendly printing inks, so-called EARTHCOLORS, that might also contribute to this circular approach (Link: [Award](#)). Enterprise PROMETHO GMBH from Bonefeld has also shaped colors for the printing industry, that are gained from regrowing sources (Link: [Website](#)). Also **Textiles** enterprises have shaped the region of Leipzig. Within the aim of a CIRCULAR ECONOMY traditional fiber plants like Linen and Hemp could be re-introduced, accompanied by new production technologies and scientific approaches within a BIOECONOMY. Also the approach to gain fibers from wood, e.g. like Modal from Austrian enterprise LENZING, that has been around for about 70 years already, could contribute to that (Link: [Website](#)). In Switzerland enterprise FREITAG has come up with textile fabrics for clothing that is made of a combination of those materials, being also entirely grown, weaved and manufactured in Europe (Link: [Website](#)). Helpful advice might offer FRAUNHOFER INSTITUT FÜR BIOLOGISCH- CHEMISCHE PROZESSE located in Leuna, Germany, that is conducting research to new materials from wood and cellulose (Link: [Website](#)). Also there might be chances to bring in ideas from enterprises that have come up with **Innovations**, contributing to Pioneering Regions. So enterprise FAIRWINDEL has shaped and is still further exploring ways to reduce the amount of waste from diapers, already cutting about 80% plastic waste, also making use of a modular approach (Link: [Website](#)). MARC BUTTMAN has come up with a way to regain valuable materials from sewage sludge with enterprise TERRANOVA, that can be used in Agriculture (Link: [Website](#)). Enterprise MATTECO is making use of old tires from cars for rubber-mats that have found various uses in industries and transportation. By following a CIRCULAR ECONOMY approach in manufacturing those rubber-mats can be re-gained and re-used within a closed material-loop (Link: [Website](#)).