



Bundesamt
für Wirtschaft und
Ausfuhrkontrolle



Key occupations and key competences in energy efficiency

Federal Energy Efficiency Center, Federal Office for Economic Affairs and Export Control in Germany

Session 1: Member States policy approaches and support programmes

Source: Prognos AG, Studie und Präsentation „Schlüsselberufe und Schlüsselkompetenzen in der Energieeffizienz“

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Background, Results, Methode

Background

- Qualified specialists are the bottleneck of the energy transition
- Already today, shortage of skilled workers in many areas:
 - demographic change
 - qualification mismatch
- With the introduction of new technologies and processes, requirements for competencies change

Results

- Transparent derivation of :
 - 55 key occupations in the sectors buildings, industry and transport
 - For 23 occupational groups competence profiles: technical and methodological skills that result form technological development
- Identification of 15 „potential occupations“,

Methode

- **Desk Research**: systematic analysis of existing studies, data and research literature with regard to technical developments
- **Broad stakeholder participation**: Validation of results through experts workshops



Challenges and limitations of the study

- ❖ **Transformation of the working and production process is mainly oriented to the applied procedures**
- ❖ **Different levels of knowledge about competence requirements in different sectors and for different occupations.**
 - Professions and competencies were selected according to the extent of change in activity and competency requirements as well as the quantitative importance of the profession (future forecast: market and technology development; identification of short- and long-term needs)
- ❖ **Complete systematic derivation not possible, therefore partly individual case decisions**
 - The Federal Employment Agency 2010 classification of occupations used does not always correspond to the practical context
 - Concrete occupations partly too small-scale to be able to use uniformly comparable data
 - To create concrete measures (e.g. new education programs) further specification of competencies needed



Building Sector-Key occupations

- Wood construction, cabinetry & interior design
- Architecture
- Construction planning & supervision
- Urban and regional planning
- Renewable energy technology
- Construction electrics
- Bricklaying
- Roofing
- Painting & varnishing work
- Façade construction
- Plaster's work
- Carpentry
- Building service engineering
- Plumbing
- Sanitary, heating and airconditioning technology
- Refrigeration engineering
- Environmental protection management Consulting



Industry -Key occupations

- Building materials production
- Metallurgical engineering
- Machine and plant operators
- Metal construction
- Mechanical & industrial engineering (without specialisations)

- Mechatronics
- Automation technology
- Occupations in energy and power plant engineering
- Electrical engineering
- Plant, container and apparatus construction

- Occupations in business organization and strategy
- chemistry
- Chemical and pharmaceutical engineering
- Chemical-technical laboratory
- Environmental protection management consulting



Transport-Key occupations

- Motor vehicle technology
- Mechatronics
- Electric machine technology

- Electrical engineering
- Information and telecommunications technology
- Vehicle electronics

- Urban and regional planning
- Supervision & control of traffic operations
- Supervision and control of rail transport operations



Summary: Key competencies in the building sector

- ❖ **Increasing importance of cross-professional key competencies**
 - Communication skills in dealing with employees and customers
 - Willingness to change, ability to innovate and solve problems

- ❖ **Increasing importance of interdisciplinary cooperation**
 - Systemic thinking & understanding of the interconnectedness of work processes
 - Partly technical competencies from other trades relevant

- ❖ **New technical competencies required in many professions**
 - Increasing complexity in the interaction between plant technology and building envelope
 - Continuous awareness and testing of new and further technical developments

- ❖ **Digital skills for improving energy efficiency**
 - Increasing complexity of digitized and automated systems engineering
 - From digital information and data skills to specific IT user skills



Summary: Key competencies in the industry

❖ Increasing importance of cross-professional key competencies

- Communication skills in dealing with employees and customers
- Willingness to change, ability to innovate and solve problems
- Awareness of resource- and energy-efficient work and production processes
- Interdisciplinary cooperation

❖ New technical competencies required in many professions

- Increasing complexity of networked energy systems and production plants and machines
- Continuous optimization of energy efficiency of production plants and processes (e.g. in connection with energy management systems)
- Electrification: especially skills in electrical, electrical engineering, and electrochemistry.

❖ Digital skills for improving energy efficiency

- Increasing complexity of digitized and automated machine and system technology
- Systems knowledge/holistic thinking in combination with comprehensive IT application skills
- Some specific IT skills (e.g., Big Data).



Summary: Key competencies in the traffic sector

- ❖ Increasing importance of cross-professional key competencies
- ❖ Communication skills in dealing with employees and customers
- ❖ Willingness to change, ability to innovate and solve problems
- ❖ Interdisciplinary cooperation
- ❖ New technical competencies required in many professions
- ❖ Changeover from combustion engines to electrified drives and increasing networking of vehicles changes competence requirements at all qualification levels
- ❖ Continuous awareness and testing of new and further technical developments
- ❖ Digital skills for improving energy efficiency/increase in complexity (digitized, networked vehicle systems)
- ❖ Holistic thinking required in combination with comprehensive IT user skills
- ❖ Partly also increased demand for specific IT skills, e.g. Big Data.



Potential Occupations: Selection of potential occupations

Filter 1: Empirical probability for Change into a relevant occupational subgroup is at least 1 percent

Filter 2:

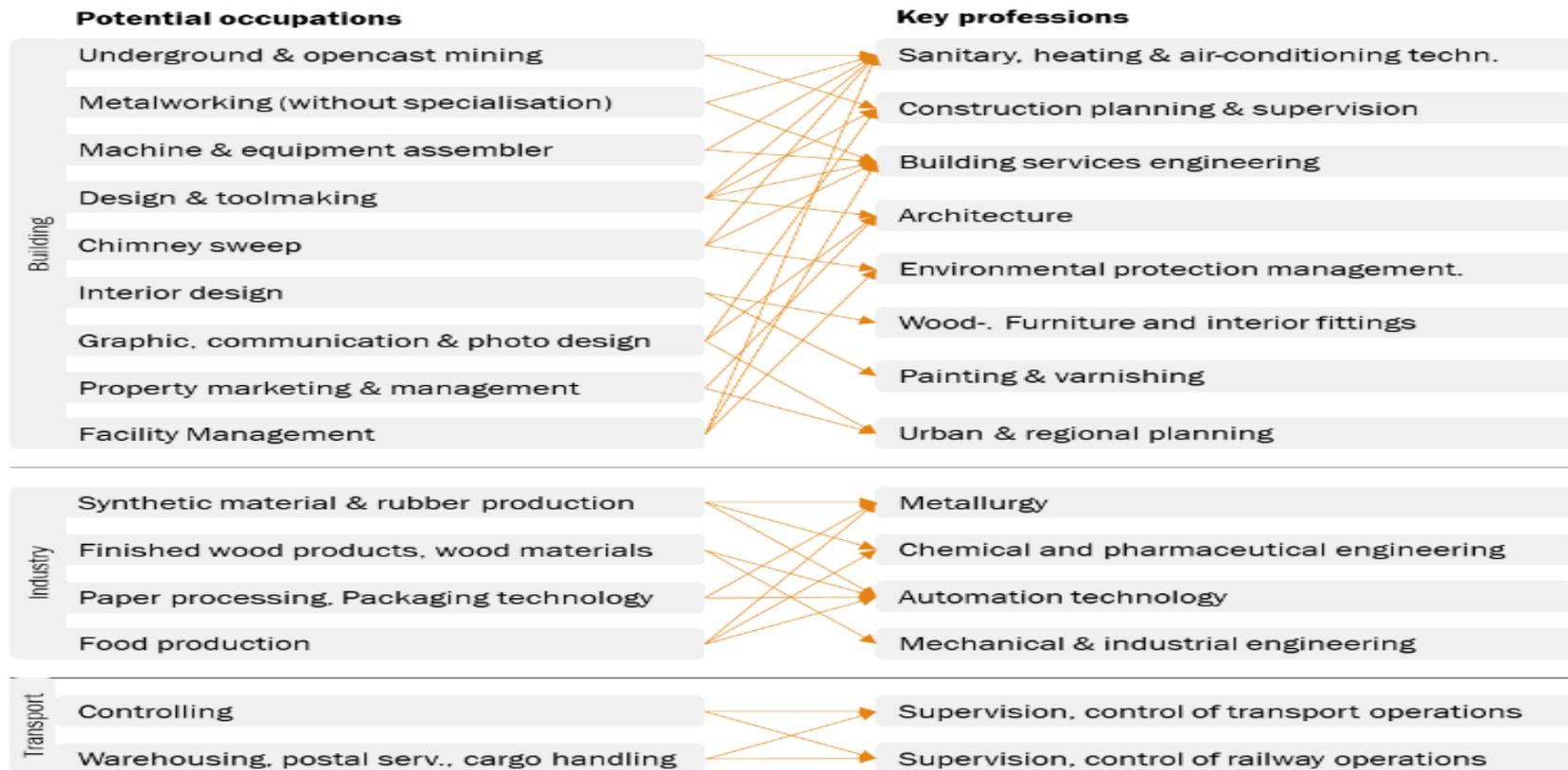
The order of magnitude of the remaining occupational subgroups is at least about 10,000 employees

Final Selection (Qualitative decision):

- 1) Activities are compatible with required activities of key occupations
- 2) (mostly) decreasing demand

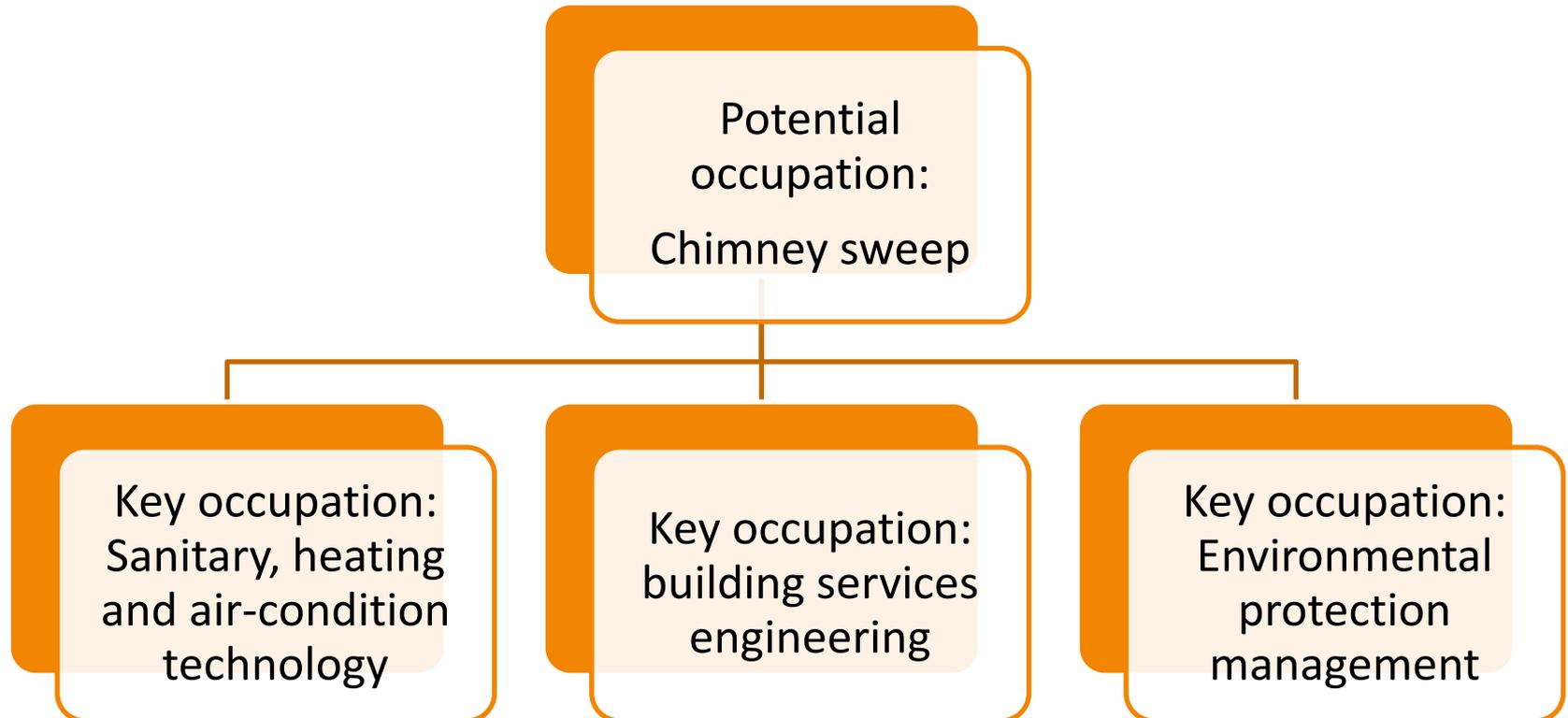


Potential occupations





Example: Potential occupations building sector





Practical Use of the Study: Fields of action for further development of qualification offers

Regular skills monitoring

- Changes continuously observing and assessing the associated need for adaptation of education and training
- Establishment of a responsible body or platform can be helpful in institutionally anchoring this process.

Adaptation of training and study curricula

- To transform towards climate neutrality /energy efficiency, training and study curricula must take into account the changed qualification and skills requirements.
- Creation of new additional and elective qualifications or well-defined specializations and fields of study is needed

(Further) development of further education and advanced training

- Continued development of further education and advanced training courses should be tailored to target groups
- To increase the potential of semi-skilled /unskilled workers through partial qualifications, examination to what extent energy efficiency/climate-relevant work can be made possible for this target group.
- To promote occupational mobility, tailor-made qualification offers for career changers as well as accompanying support measures are necessary.
- Immigrants can represent an important target group for professions relevant to energy efficiency/climate change.



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Thank you!



Link to english summary of study: https://www.bfee-online.de/SharedDocs/Downloads/BfEE/DE/Effizienzpolitik/schluesselberufe_kompetenzen_summary.pdf?__blob=publicationFile&v=3 Link to study in German: https://www.bfee-online.de/SharedDocs/Downloads/BfEE/DE/Effizienzpolitik/schluesselberufe_kompetenzen_endbericht.pdf?__blob=publicationFile&v=3