Siemens Professional Education (SPE) goes Green Skills

UNESCO-UNEVOC and BIBB Learning Forum:
New Qualifications and Competencies: building the future of TVET

December 2021
Barbara Ofstad, Siemens AG
Conclusion

1. Siemens Professional Education (SPE) and Siemens Sustainability framework
   - Strategic innovation approach ensures green skills curriculum

2. Fast and agile implementation of sustainability education project

3. Conclusion
We provide training for 6,720¹ young talents worldwide with a total investment of € 153’ p.a.

As of September 2021

¹ Therein 1,029 learners for external partners and 1,772 learners for Strategic Companies (Mobility: 1,158 | SHS: 614)
Siemens DEGREE framework sets clear priorities for Sustainability at Siemens and must be operationalized into apprenticeship curriculum

**Decarbonization**
support the 1.5°C target to fight global warming

**Ethics**
foster a culture of trust, adhere to ethical standards and handle data with care

**Governance**
apply state-of-the-art systems for effective and responsible business conduct

**Resource efficiency**
achieve circularity and dematerialization

**Equity**
foster diversity, inclusion, and community development to create a sense of belonging

**Employability**
enable our people to stay resilient and relevant in a permanently changing environment
Siemens Professional Education (SPE) and Siemens Sustainability framework

Strategic innovation approach ensures green skills curriculum

Fast and agile implementation of sustainability education project

Conclusion
Co-Creation Product lifecycle management in VET
Innovation management ensures up-to-date technology and business trends in VET
VET roadmap to include yearly updates of green skills topics embedded in continuous enhancement of IoT themes

**Curriculum successfully enhanced:**
- Cyber Security
- IoT, Industrial Edge
- Simulation and Digital Twin
- Low Coding
- Sustainability & Circularity

**Initiatives to enhance curriculum:**
- Mobile Robotics, Driverless Transport Systems
- Open Ecosystems & Digital Business Models
- Open Source Software & Re-use
- Decentralized & Alternative Energy and Storage

**Candidates for Initiatives:**
- Blockchain Applications for Industry
- Predictive Maintenance incl. Serviceability
- Zero Coding
- Autonomous Robotics
- Retrofit and Shortage of Resources, Disassembly

1 FY23: Topics for continuous curriculum development
At Siemens we strive to make **every employee** and each **apprentice** aware of climate protection goals serving business and society, while fostering basic understanding, self-reflexion and business understanding of sustainability along the entire value chain.
Agenda

1. Siemens Professional Education (SPE) and Siemens Sustainability framework

2. Strategic innovation approach ensures green skills curriculum

3. Fast and agile implementation of sustainability education project

4. Conclusion
Sustainability and Circular Economy
High prior Trend card at SPE Trend Radar 2019

The starting point for green skills training development

TREND DETAILS

Description
Sustainability and circular economy/solutions is a highly prioritized trend mentioned by the majority of external and internal interviewees in all branches in 2019

Examples
- Energy: Power to Gas to Power incl. use of renewables to power electrolyzer
- Communication industry: Re-use of rare raw materials to save supply cost

Strategic Relevance
- Customer ask for sustainable (CO2 consumption free) solutions
- High on the agenda of international regulation

Key Facts
- High Availability Risk for >100 Raw Materials (VDMA, 2019)
- Increase of international waste is rising by 70 % until 2050 (VDMA, 2019)
- Need for reduction of CO2 consumption (parisan climate agreement, 2015)

RELATED TRENDS

EDU
Generalist & flexible multiple Specialization

Business
Predictive Maintenance
Customer Value Co-Creation
Retrofit and Shortage of Resources

Technology
Business
Distributed Energy Systems

Work Environment
Interdisciplinary Collaboration & external networks
Understanding of Complex Systems

EDU Generalist & flexible multiple Specialization

www.circulary.eu
## Technology and business competency assignment to green skills in multi level hierarchy allow for a differentiated VET portfolio

<table>
<thead>
<tr>
<th>Description</th>
<th>Level</th>
<th>Common terms, standards &amp; definitions</th>
<th>User benefit, innovation &amp; business</th>
<th>Climate change</th>
<th>Political &amp; legal framework</th>
<th>Self-reflection (exercise)</th>
<th>Resource limitation &amp; efficiency</th>
<th>Data assessment, methods &amp; tools</th>
<th>System behaviour &amp; life cycle perspective</th>
<th>Information &amp; communication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transfer to reality</td>
<td>EXPERT</td>
<td>Planetary boundaries</td>
<td>Assess customer's portfolio &amp; derive innovation potentials</td>
<td>Negative emissions</td>
<td>Derive development &amp; design implications</td>
<td>CE business models and their perception</td>
<td>Closed/open loop</td>
<td>FInd trade-offs for decision-making</td>
<td>CE risks &amp; opportunities</td>
<td>Integrated Materials Management</td>
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<tr>
<td>Experience in application</td>
<td>ADVANCED</td>
<td>GHG emissions &amp; CO2-equiv.</td>
<td>Perform value stream mapping for a better circularity</td>
<td>LHDS, material compliance (RoHS, REACH)</td>
<td>Transfer individual targets to company level</td>
<td>Improvement in resource efficiency &amp; rebound effect</td>
<td>Transfer to customer's business</td>
<td>Perform system modeling</td>
<td>Identify hot &amp; cold spots for improvements</td>
<td>LCC &amp; DCC</td>
</tr>
<tr>
<td>Facts, knowledge</td>
<td>BASIC</td>
<td>Basic requirements from EU CE Action Plan</td>
<td>Influence factors &amp; levers</td>
<td>GHG mitigation potential of Siemens Portfolio</td>
<td>Identified opportunities &amp; risks</td>
<td>Criticality of resources</td>
<td>Criticality impact categories</td>
<td>Approaches of life cycle thinking</td>
<td>Influening behavior to complex system actions</td>
<td>Track &amp; trace solutions for products</td>
</tr>
<tr>
<td>Motivation</td>
<td>BEGINNER</td>
<td>Understanding of sustainable business activities</td>
<td>Derive actions to deliver CE value to customers</td>
<td>Stakeholders and their requirements</td>
<td>Discussion on potential contributions to sustainability &amp; CE</td>
<td>Awareness of SDG's importance</td>
<td>Definition of resource efficiency</td>
<td>Evaluation of decision-related info</td>
<td>Transfer basic idea to different types of systems</td>
<td>Stakeholder requirement engineering</td>
</tr>
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</table>

- **Motivation**
  - **"Knows"**
    - Understanding of sustainable business activities
    - Understanding of stakeholder value perception
  - **"Knows how"**
    - KNOWLEDGE
      - Drivers of environmental and social impacts
      - Products & solutions in Siemens portfolio
  - **"Shows how"**
    - KNOWS HOW
      - Stakeholders and their requirements
      - Drivers of environmental and social impacts
  - **"Does"**
    - DOES
      - Transfer individual targets to company level
      - Improvement in resource efficiency & rebound effect

- **Common terms, standards & definitions**
- **User benefit, innovation & business**
- **Climate change**
- **Political & legal framework**
- **Self-reflection (exercise)**
- **Resource limitation & efficiency**
- **Data assessment, methods & tools**
- **System behaviour & life cycle perspective**
- **Information & communication**
Project Sustainability & Circular Economy

Innovative formats including project design, gamification and interactive elements to motivate apprentices, thereby contributing to enhanced mindset at participants.

### Planned VET activities
- Pilot run with a learning group in Regensburg, Austria and Switzerland in June 2021
- Subsequent improvements and finalization of the learning concept
- Rollout as project-based (2 – 3 days) learning for all SPE learning groups starting in September 2021 for all occupations

### Further implementation options
Adaptation and adjustment for other learning groups: E.g., blue collar learners

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<tr>
<th>Climate change</th>
<th>Resource &amp; energy efficiency</th>
<th>SDC Sustainable development goals</th>
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<tr>
<td>Greenhouse gases (GHG)</td>
<td>Carbon footprint (Scope 1,2,3)</td>
<td>Siemens Solutions</td>
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<tr>
<td>Carbon footprint (personal)</td>
<td>Carbon footprint (company)</td>
<td>Targets &amp; Measures</td>
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<tr>
<td>Carbon footprint (product)</td>
<td>Hot spot analysis</td>
<td>Siemens Solutions</td>
</tr>
<tr>
<td>Scouting in resource &amp; energy efficiency</td>
<td>Critical materials</td>
<td>Targets &amp; Measures</td>
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<tr>
<td>Own activities</td>
<td>Closing the material loops</td>
<td>Possible Transfer products</td>
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<tr>
<td>Buildings</td>
<td>Personal examples</td>
<td>Fact sheets/Did you know …</td>
</tr>
<tr>
<td>Production processes</td>
<td>Company operation</td>
<td>Sustainability alphabet</td>
</tr>
<tr>
<td>Product vs. system</td>
<td>Business models (e.g., pulp&amp;paper)</td>
<td></td>
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https://www.vdma.org/future-business, Mechanical and Plant Engineering, restricted area for VDMA members only, Trendradar 2019
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Conclusion for fast implementation of green skills
Reach a broad range of young talents rather than deep-dive for individual occupations

Apprentices to know the **connections** between greenhouse gas emissions, climate change and energy and resource efficiency.

SPE to **create awareness** for the dimensions of sustainability and how these are lived and addressed at Siemens.

SPE to create an understanding of one’s **own contribution** and possibilities for exerting influence in relation to sustainability.

SPE to motivate apprentices (and other learners within Siemens) to **reflect and advance** the topics in their daily work and with the customer in relation to sustainability.
Contact

Barbara Ofstad  
Head of SPE Germany  
Siemens Professional Education BO & GSP  
Siemens AG  
Lyoner Str. 27  
60528 Frankfurt am Main  
Germany

Mobile +49 (152) 22912176  
E-mail barbara.ofstad@siemens.com