Siemens Professional Education (SPE) goes Green Skills

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

December 2021

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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

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We provide training for 6,720[1] young talents worldwide with a total investment of € 153’ p.a.

Norway
Apprentices: 4

European Union

Great Britain
Apprentices: 350

Switzerland
Apprentices: 238

China
Apprentices: 19

India
Apprentices: 400

Saudi Arabia
Apprentices: 12

Bangladesh
Apprentices: 6

Australia
Apprentices: 2

South Africa
Apprentices: 43

Mexico
Apprentices: 26

Ecuador
Apprentices: 12

Colombia
Apprentices: 43

Brazil
Apprentices: 28

Argentina
Apprentices: 21

Chile
Apprentices: 5

Sweden
Apprentices: 3

Denmark
Apprentices: 17

Germany
Apprentices: 3.682

Austria
Apprentices: 312

Spain
Apprentices: 30

France
Apprentices: 377

Ireland
Apprentices: 1

Italy
Apprentices: 44

Portugal
Apprentices: 4

Slovakia
Apprentices: 12

As of September 2021
1 Therein 1,029 learners for external partners and 1,772 learners for Strategic Companies (Mobility: 1,158 | SHS: 614)

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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

Resource efficiency

achieve circularity and dematerialization

Ethics

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

Equity

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

Governance

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

Employability

enable our people to stay resilient and relevant in a permanently changing environment

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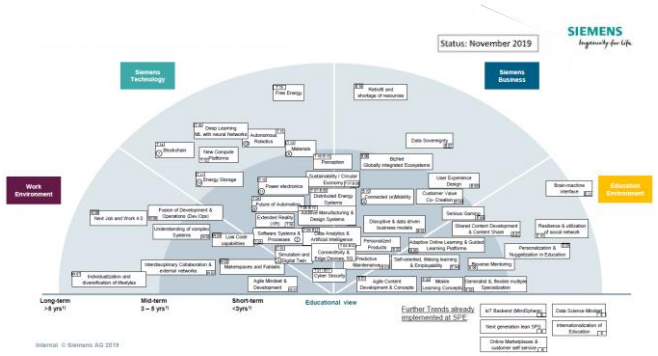
Co-Creation Product lifecycle management in VET

Innovation management ensures up-to-date technology and business trends in VET

Innovation	Strategic verification	Product development
TREND RADAR	CUSTOMER PANELS	ROADMAP

Trend Radar

Siemens Professional Education 2019



Portfolio Strategy

Competence & Content

Learning Ecosystem: Siemens Business | Siemens Education | External Partners

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VET roadmap to include yearly updates of green skills topics embedded in continuous enhancement of IoT themes

FY21

Curriculum successfully enhanced:

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

FY22

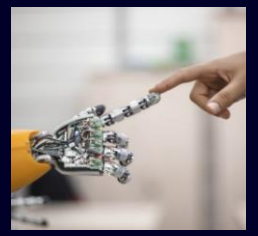
Initiatives to enhance curriculum:

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

FY23[1]

Candidates for Initiatives:

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



USE CASE BASED DATA ANALYTICS & ARTIFICIAL INTELLIGENCE

1 FY23: Topics for continuous curriculum development

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Affected apprenticeships and dual study programs at Siemens

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.

1 Product Lifecycle Management **2** Environment Social Governance

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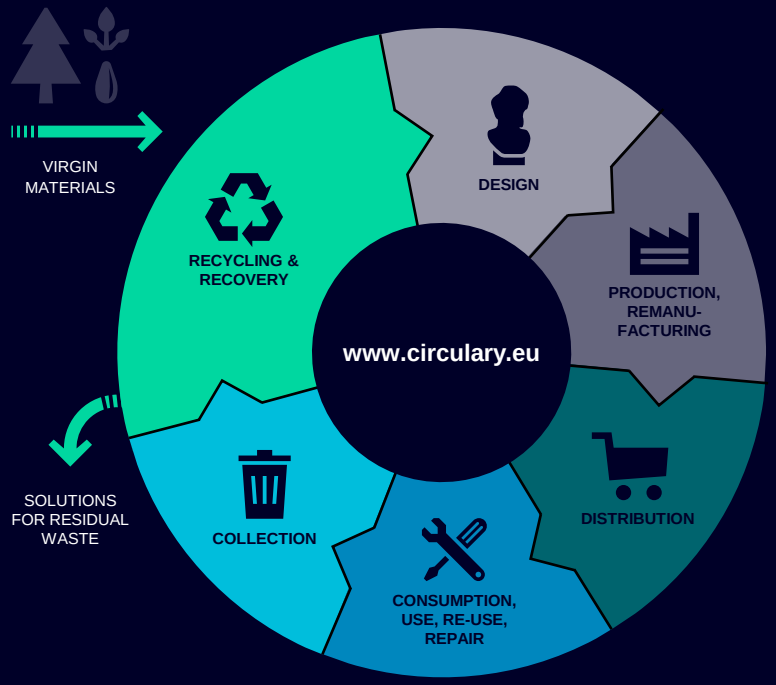
Sustainability and Circular Economy
High prior Trend card at SPE Trend Radar 2019

The starting point for green skills training development



RELATED TRENDS

EDU
Generalist & flexible multiple Specialization

Business
Predictive Maintenance

Business
Customer Value Co-Creation

Business
Retrofit and Shortage of Resources

Technology
Business
Distributed Energy Systems

Work Environment
Interdisciplinary Collabo-ration & external networks

Work Environment
Understanding of Complex Systems

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 CO_2 consumption (parisian climate agreement, 2015)

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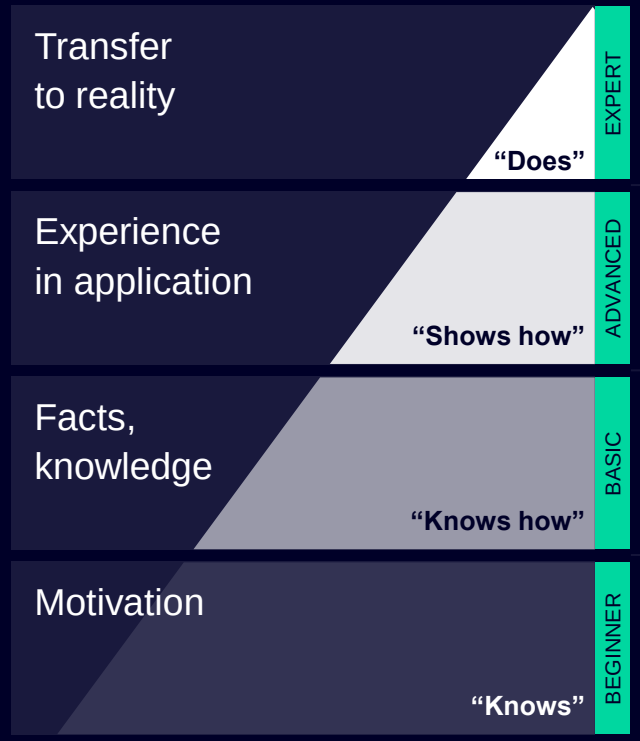
Technology and business competency assignment to green skills in multi level hierarchy allow for a differentiated VET portfolio



Description	Level	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 & communi-cation
	EXPERT	Planetary boundaries	Assess customer's portfolio & derive innovation potentials	Negative emissions	Derive development & design implications	CE business models and their perception	Closed/ open loop	Find trade-offs for decision-making	CE risks & opportunities	Integrated Materials Management
		Screening methods		Energy system transformation			Substitution			
		Criticality		Decarbonization or carbon neutrality	LoDS, material compliance (RoHS, REACh)	Transfer individual targets to company level	Circularity metrics	Transfer to customer's business	Awareness of rebound effects and avoidance	Virtual Product Design
	ADVANCED	GHG emissions & CO_2-equiv.	Perform value stream mapping for a better circularity				Improvement in resource efficiency & rebound effect	Perform system modelling		
		Basic understanding of LCA methodology		GHG mitigation potential of Siemens Portfolio	EU Green Deal & UNEP SDG's	Reflexing on customer's behavior	Criticality of resources	LCA & LCC	Identify hot & cold spots for improvements	PLM & how to work with digital twins
		IPCC Reports on climate change	Influencing factors & levers	Basics of carbon footprint (products)	Identified opportunities & risks		Recycled content in materials	Criticality impact categories	Approach of life cycle thinking	Track & trace solutions for products
	BASIC	CSR Reporting of corporations	Future challenges in customer's business	GHG emissions & accounting and tracing	Stakeholders and their requirements	Discussion on potential contributions to sustainability & CE	Systems performance versus efficiency	Tools & method for material flow analysis (MFA)	Influencing behavior to complex system actions	Importance of transparency
		Basic requirements from EU CE Action Plan	Derive actions to deliver CE value to customers	Drivers of envi-ronmental and societal impacts	Products & solutions with implications from legal framework	Awareness of SDG's importance	Definition of resource efficiency	Extraction of decision-related info	Transfer basic idea to different types of systems	Stakeholder requirement engineering
		17 UNEP "Sus-tainability Deve-lopment Goals	Products & solutions in Siemens portfolio							
	BEGINNER	Understanding of sustainable business activities	Understanding of stakeholder value perception	Know fundamental mechanismen of climate change	Fundamental knowledge of regulations & guidelines	Reflexing on individual private & professional impact	Know different types of resources and their limitations	Gathering data for life cycle inventories	Understanding of components & their interaction in systems	Identify customers USP's to communicate benefits & savings

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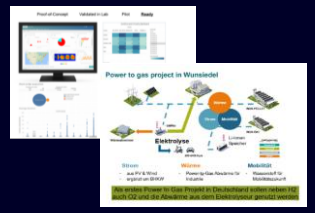
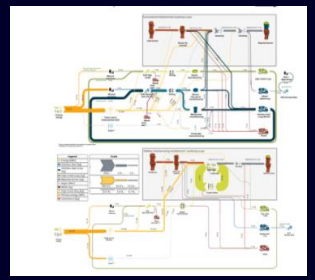
Project Sustainability & Circular Economy

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

Climate change

Greenhouse gases (GHG)	Carbon footprint (Scope 1,2,3)	Siemens Solutions	Targets & Measures
	Carbon footprint (personal)		Own activities
	Carbon footprint (company)		Company operation climate neutral program
Resource & energy efficiency	Carbon footprint (product)		Product/Service/ Solution
Scouting in resource & energy efficiency	Hot spot analysis	Critical materials	Closing the material loops
	Own activities		Personal examples
	Buildings		Company operation
	Production processes		Business models (e.g., pulp&paper)
SDG Sustainable development goals	Product vs. system		
Business2society	Siemens regions & Challenges	Linking SDG to own business operation	Vertical markets

Possible Transfer products

Fact sheets/Did you know …

Sustainability alphabet

Sketch-notes

https://www.vdma.org/future-business, Mechanical and Plant Engineering, restricted area for VDMA members only, Trendradar 2019
https://www.un.org/en/climatechange/paris-agreement

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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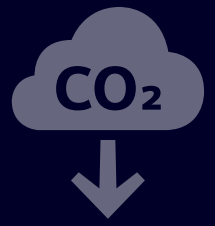
Conclusion for fast implementation of green skills

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 withing Siemens) to **reflect and advance** the topics in their daily work and with the customer in relation to sustainability.

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