**Workshop topic:**

Labor Market Needs Analysis for VET

18- 19.04.2023

Online

Trainer: Mr Ken Wechuli

VET4GREEN

Developing Capacities in the Area of VET for
Green Energy Transition in Sub-Saharan Africa

Co-funded by the
European Union

# Agenda

Workshop topic: Labor Market Needs Analysis for VET

Development

**DAY ONE**

10:00 am - 10:15 am:Opening Session

10:15 am - 11:00 am: Understanding Green Energy Sector Dynamics

11:00 am - 11:45 am: Renewable Energy Technologies and Innovations

11:45 am - 12:00 pm: Break

12:00 pm - 12:45 pm: Sustainability and Circular Economy Principles

12:45 pm - 1:30 pm: Policy and Regulatory Frameworks in Green Energy

1:30 pm - 2:00 pm: Wrap-up and Q&A Session

**DAY TWO**

10:00 am - 10:15 am: Recap of Day 1

10:15 am - 11:00 am: Introduction to ICT and Digital Transformation

11:00 am - 11:45 am: Cybersecurity and Data Protection

11:45 am - 12:00 pm: Break

12:00 pm - 12:45 pm: Cloud Computing and Infrastructure Management

12:45 pm - 1:30 pm: Emerging Technologies and Future Trends in ICT

1:30 pm - 2:00 pm: Closing Session and Feedback



VET4GREEN

Developing Capacities in the Area of VET for Green Energy Transition in Sub-Saharan Africa



Co-funded by the European Union

# What is Green Energy?
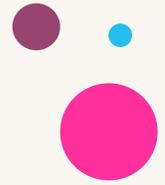
Green energy refers to energy that is produced from renewable sources that have minimal negative impact on the environment.

# Global Trends in Green Energy
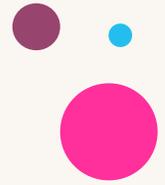
- Vocational Education and Training (VET) plays a crucial role in preparing individuals for careers in the green energy sector by providing specialized education and practical skills development. VET programs offer hands-on training in renewable energy technologies, such as solar photovoltaic (PV) systems, wind turbines, and energy-efficient building practices. Through VET, students gain the technical expertise and industry-specific knowledge needed to install, maintain, and operate green energy infrastructure.

**Several trends are shaping the landscape of green energy:**

- *Transition to Solar and Wind*: Solar and wind power have become the fastest-growing sources of renewable energy. Falling costs, technological advancements, and government incentives have driven their adoption. Both solar and wind energy have seen substantial increases in capacity and are becoming increasingly competitive with conventional energy sources.

- *Energy Storage*: The integration of energy storage solutions, such as batteries, pumped hydro, and other grid-scale storage technologies, has become crucial for balancing the intermittent nature of renewable energy sources like solar and wind. Advances in battery technology, particularly in lithium-ion batteries, have made energy storage more affordable and efficient, enabling better utilization of renewable energy.

- *Electrification of Transportation*: The transportation sector is a significant contributor to greenhouse gas emissions. The shift towards electric vehicles (EVs) is accelerating, driven by technological advancements, government regulations promoting clean transportation, and increasing consumer demand for environmentally friendly options. This trend is creating new opportunities for integrating renewable energy into transportation infrastructure, such as EV charging stations powered by solar or wind energy.

- *Decentralization and Microgrids*: The decentralization of energy production and distribution is gaining traction, driven by the rise of distributed energy resources (DERs) such as rooftop solar panels, small wind turbines, and community-owned renewable energy projects. Microgrids, which operate independently or in conjunction with the main grid, offer increased resilience, energy security, and the potential for local energy optimization.

# Labor Market Trends

- The green energy sector is experiencing a surge in job opportunities across various disciplines, including engineering, construction, maintenance, and operations.
- Demand for skilled workers in areas such as solar panel installation, wind turbine maintenance, energy storage management, and smart grid technology is on the rise.
- According to industry forecasts, the green energy sector is expected to continue expanding, creating a sustained demand for qualified professionals.

## Skill Sets in Demand;

- Technical Skills:
    - Proficiency in renewable energy technologies (solar, wind, etc.)
    - Installation, maintenance, and repair of green energy systems
    - Energy storage technologies and grid integration
    - Electrical and mechanical engineering skills
- Soft Skills:
    - Problem-solving and critical thinking
    - Teamwork and collaboration
    - Adaptability to evolving technologies and work environments
    - Effective communication and customer service

VET4GREEN
Developing Capacities in the Area of VET for
Green Energy Transition in Sub-Saharan Africa

Co-funded by the
European Union

# Training Needs Analysis

- Vocational Education and Training (VET) programs play a crucial role in preparing individuals for careers in the green energy sector.
- There is a need for VET institutions to align their curriculum with industry requirements and emerging technologies.
- Hands-on training, internships, and apprenticeship programs are essential for providing practical experience and bridging the skills gap.

Industry Collaboration:

1. Collaboration between VET institutions, industry stakeholders, and government agencies is essential for addressing labor market needs effectively.
2. Industry partnerships can facilitate curriculum development, provide access to state-of-the-art facilities and equipment, and offer internship opportunities for students.
3. Government support through funding initiatives and policy incentives can further promote the growth of VET programs in the green energy sector.

VET4GREEN
Developing Capacities in the Area of VET for
Green Energy Transition in Sub-Saharan Africa

Co-funded by the
European Union

# Recommendations

- Enhance collaboration between VET institutions, industry, and government agencies to ensure alignment with labor market needs.
- Develop flexible and responsive training programs that incorporate emerging technologies and industry best practices.
- Promote awareness of career opportunities in the green energy sector and the value of vocational education and training.
- Continuously evaluate and update curriculum to address evolving industry requirements and technological advancements.

Q&A
- Open floor for questions and discussions.

**VET4GREEN**
Developing Capacities in the Area of VET for
Green Energy Transition in Sub-Saharan Africa

Co-funded by the
European Union

# Renewable Energy Technologies and Innovations

What is renewable energy?

- Renewable energy is energy derived from natural sources that are replenished at a higher rate than they are consumed.

- Renewable energy technologies encompass a diverse range of sources, including solar, wind, hydroelectric, geothermal, and biomass.
- Advances in technology have led to increased efficiency, affordability, and scalability of renewable energy solutions, making them increasingly competitive with conventional energy sources.



**VET4GREEN**
Developing Capacities in the Area of VET for Green Energy Transition in Sub-Saharan Africa

Co-funded by the European Union

# Types of renewable energy
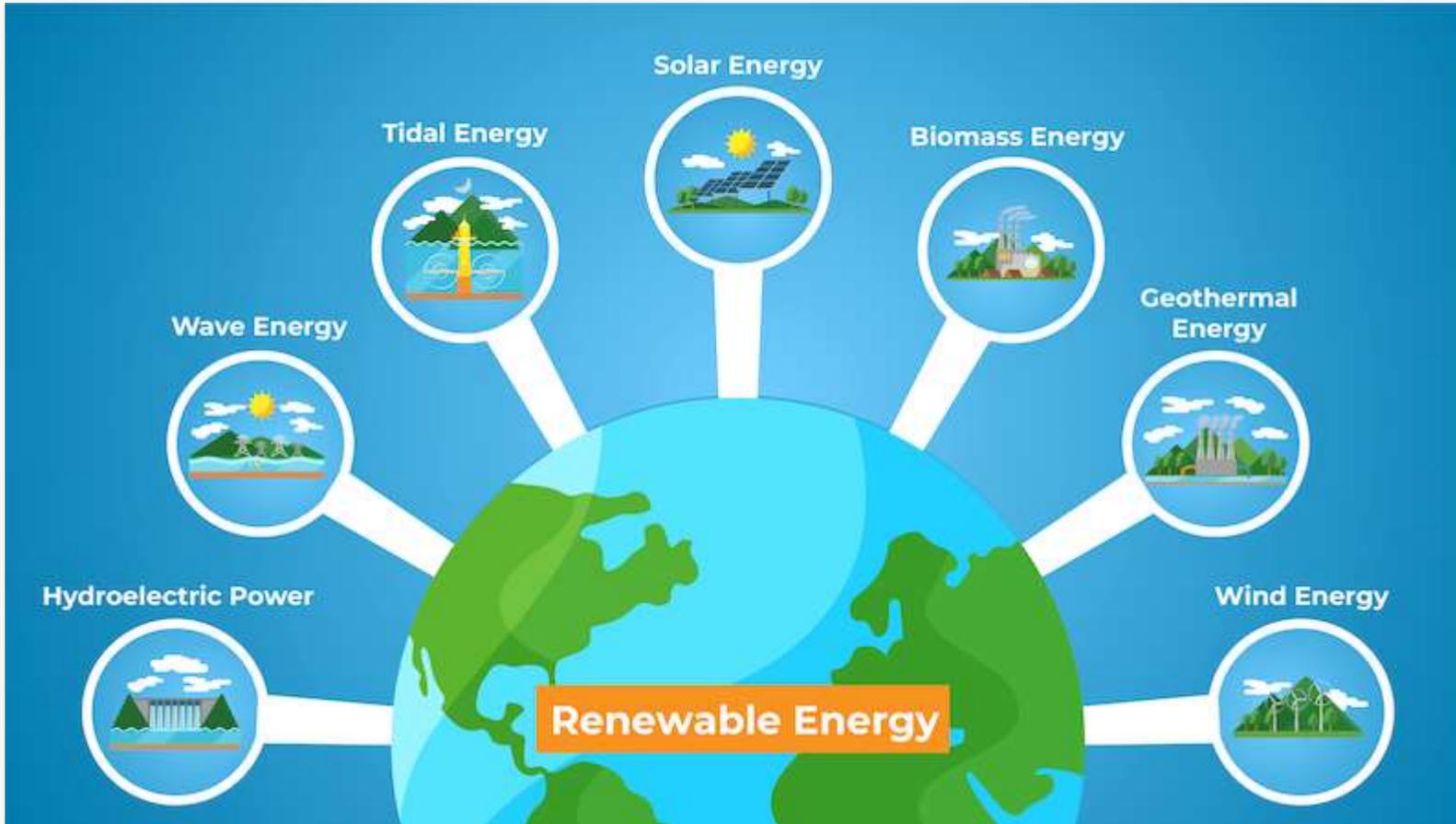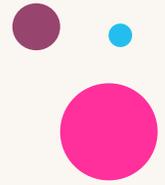
# Labor Market Trends

- The renewable energy sector is experiencing robust growth, fueled by increasing global demand for clean energy solutions and government commitments to reduce carbon emissions.
- Job opportunities in renewable energy are diverse and encompass various roles, including engineering, manufacturing, installation, maintenance, research, and development.
- Demand for skilled workers with expertise in renewable energy technologies and innovations is on the rise, creating a need for specialized training and education programs.
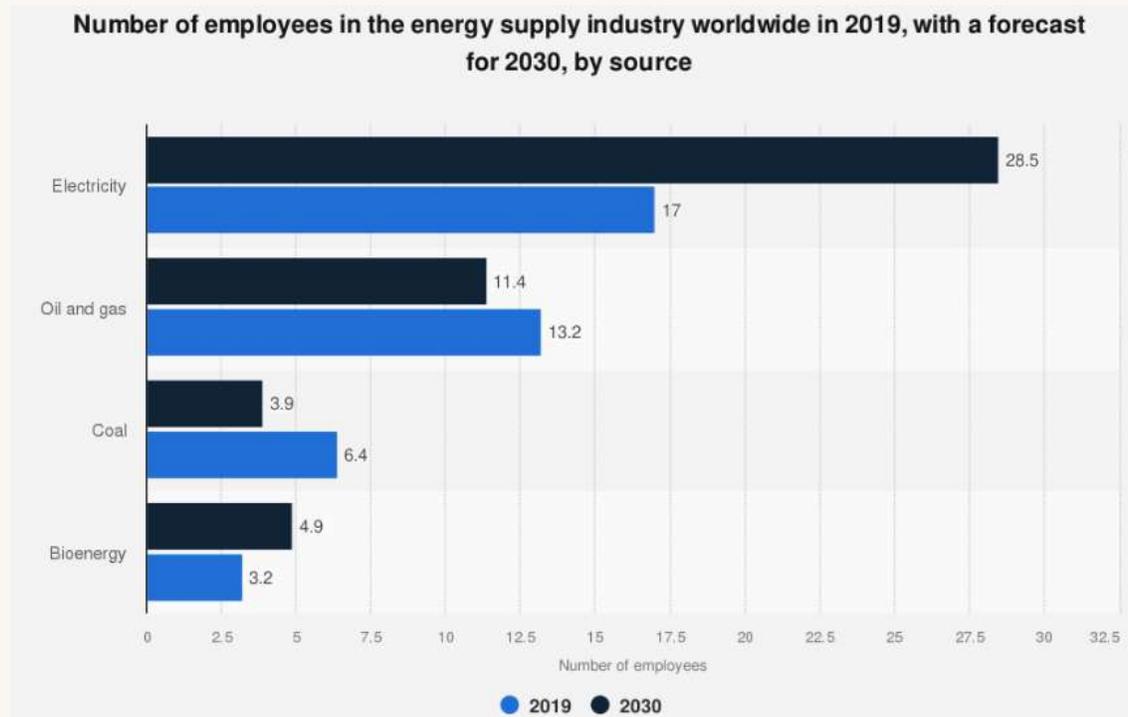
Number of employees in the energy supply industry worldwide in 2019, with a forecast for 2030, by source

| Source | 2019 | 2030 |
|---|---|---|
| Electricity | 17 | 28.5 |
| Oil and gas | 13.2 | 11.4 |
| Coal | 6.4 | 3.9 |
| Bioenergy | 3.2 | 4.9 |

Number of employees

● 2019 ● 2030

**VET4GREEN**
Developing Capacities in the Area of VET for Green Energy Transition in Sub-Saharan Africa

Co-funded by the European Union

# Skill Sets in Demand
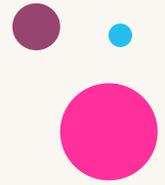
- **Technical Skills:**
  - Proficiency in renewable energy systems and technologies
  - Design, engineering, and optimization of renewable energy projects
  - Installation, operation, and maintenance of renewable energy systems
  - Data analysis and modeling for renewable energy planning and integration

- **Soft Skills:**
  - Problem-solving and critical thinking
  - Collaboration and teamwork
  - Adaptability to new technologies and changing work environments
  - Effective communication and project management



**VET4GREEN**
Developing Capacities in the Area of VET for Green Energy Transition in Sub-Saharan Africa

Co-funded by the European Union

# Training Needs Analysis

- VET programs play a critical role in preparing individuals for careers in renewable energy technologies and innovations.
- There is a need for VET institutions to develop specialized training programs that align with industry requirements and emerging technologies.
- Hands-on training, laboratory exercises, and industry partnerships are essential for providing students with practical experience and industry-relevant skills.

## Industry Collaboration;

- Collaboration between VET institutions, industry stakeholders, and research organizations is crucial for addressing labor market needs effectively.

- Industry partnerships can provide input on curriculum development, offer internship and apprenticeship opportunities, and facilitate access to state-of-the-art facilities and equipment.

- Government support through funding initiatives and policy incentives can further promote collaboration and investment in renewable energy training programs.



**VET4GREEN**
Developing Capacities in the Area of VET for Green Energy Transition in Sub-Saharan Africa

Co-funded by the European Union

# Recommendations

- Enhance collaboration between VET institutions, industry stakeholders, and government agencies to ensure alignment with labor market needs.

- Develop specialized training programs that cover a wide range of renewable energy technologies and innovations, incorporating hands-on learning and industry partnerships.

- Promote awareness of career opportunities in renewable energy and the value of vocational education and training in preparing individuals for rewarding and impactful careers.

- Invest in faculty development and infrastructure to support the delivery of high-quality renewable energy training programs.

Q&A
- Open floor for questions and discussions.

Pick Your Brain

1. What are the main types of renewable energy in your area, and how do they help protect the environment?

2. How have solar panels improved over time, and why are they becoming more popular?

3. How do wind turbines work, and what new designs are making them better?


VET4GREEN
Developing Capacities in the Area of VET for
Green Energy Transition in Sub-Saharan Africa


Co-funded by the
European Union

# Sustainability and Circular Economy Principles

- Sustainability involves meeting the needs of the present without compromising the ability of future generations to meet their own needs.
- Circular economy principles aim to minimize waste, maximize resource efficiency, and promote the reuse, recycling, and regeneration of materials and products.

Importance of Sustainability and Circular Economy

- Sustainability and circular economy principles are critical for addressing global

  environmental challenges such as climate change, resource depletion, and pollution.
- Embracing these principles can lead to economic benefits, including cost savings, job creation,

  and innovation opportunities.

Key Concepts in Sustainability and Circular Economy

- Reduce: Minimizing resource consumption and waste generation through efficient design

  and production processes.
- Reuse: Extending the lifespan of products and materials by promoting reuse and refurbishment.
- Recycle: Recovering and recycling materials to create new products and close the loop of resource use.
- Regenerate: Restoring natural ecosystems and enhancing biodiversity through sustainable land

  management practices.



VET4GREEN
Developing Capacities in the Area of VET for
Green Energy Transition in Sub-Saharan Africa

Co-funded by the
European Union

# Marketing and circular economy principles



Study diagram

# Labor Market Trends

- The demand for professionals with expertise in sustainability and circular economy principles is growing across various industries, including manufacturing, construction, energy, transportation, and waste management.

- Job opportunities exist in areas such as sustainable design, green building, waste reduction and management, renewable energy, and environmental consulting.

- Employers are seeking individuals with a strong understanding of sustainability concepts and practical experience in implementing circular economy strategies.

Skill Sets in Demand

- Technical Skills:
    - Sustainable design and engineering
    - Life cycle assessment and environmental impact analysis
    - Waste reduction and recycling techniques
    - Renewable energy technologies and energy efficiency measures
- Soft Skills:
    - Critical thinking and problem-solving
    - Collaboration and teamwork
    - Communication and stakeholder engagement
    - Project management and leadership

# Training Needs Analysis

- VET programs play a crucial role in preparing individuals for careers in sustainability and circular economy principles.
- There is a need for VET institutions to develop specialized training programs that cover a wide range of sustainability concepts and practical skills.
- Hands-on training, case studies, and real-world projects are essential for providing students with the experience and expertise needed to succeed in the field.

## Recommendations;

- Enhance collaboration between VET institutions, industry stakeholders, and government agencies to ensure alignment with labor market needs.
- Develop specialized training programs that cover a wide range of sustainability concepts and practical skills, incorporating hands-on learning and industry partnerships.
- Promote awareness of career opportunities in sustainability and the circular economy and the value of vocational education and training in preparing individuals for rewarding and impactful careers.
- Invest in faculty development and infrastructure to support the delivery of high-quality sustainability training programs.

## Q&A

- Open floor for questions and discussions.



VET4GREEN
Developing Capacities in the Area of VET for
Green Energy Transition in Sub-Saharan Africa



Co-funded by the
European Union

# Policy and Regulatory Frameworks in Green Energy

We will explore how policy and regulatory measures drive the demand for skilled workers in the green energy sector and shape the curriculum and training programs offered by VET institutions.

## Importance of Policy and Regulation;

- Policy and regulatory frameworks provide a critical foundation for the growth and development of the green energy sector.
- They create market incentives, set targets, and establish standards to promote renewable energy adoption and sustainability.



**VET4GREEN**
Developing Capacities in the Area of VET for Green Energy Transition in Sub-Saharan Africa

Co-funded by the European Union

# Renewable Energy Targets

- Many governments set renewable energy targets to increase the share of renewable energy in the energy mix.

- These targets create a demand for skilled workers in areas such as solar panel installation, wind turbine maintenance, and energy efficiency upgrades.

## Feed-in Tariffs (FiTs) and Incentive Programs

- Feed-in tariffs and incentive programs provide financial support to renewable energy projects.
- Skilled workers are needed to design, install, and maintain renewable energy systems that qualify for these incentives.

## Net Metering and Grid Integration
- Net metering policies enable consumers to offset their electricity bills by generating renewable energy.
- Skilled technicians are required to install and maintain solar panels, wind turbines, and other distributed energy resources for grid integration.

## Renewable Energy Standards and Compliance
- Renewable energy standards and compliance requirements drive demand for skilled workers in renewable energy project development and operations.
- VET programs need to incorporate training on regulatory compliance, permitting processes, and environmental assessments.

**VET4GREEN**
Developing Capacities in the Area of VET for
Green Energy Transition in Sub-Saharan Africa

Co-funded by the
European Union

# Training Needs Analysis

- VET institutions play a crucial role in meeting the demand for skilled workers in the green energy sector.
- Training programs need to be updated regularly to reflect cha[...] regulations, and technology in the renewable energy industry.

Curriculum Development and Industry Partnerships

- Collaboration between VET institutions and industry partners is essential for developing relevant curriculum and training programs.
- Industry input ensures that graduates have the skills and knowledge needed to meet the demands of the green energy labor market.

Q&A
- Open floor for questions and discussions.



Industry    Academia

**VET4GREEN**
Developing Capacities in the Area of VET for
Green Energy Transition in Sub-Saharan Africa

Co-funded by the
European Union

# İntroduction to ICT and Digital Transformation

What is ICT?

ICT, or Information Communication Technology refers to the parts of those systems that intersect with or impact communication services. This includes the data centres acting as hubs for information as well as the infrastructure underlying all kinds of data transmission.

**Components of ICT**

The term information and communications technology (ICT) is generally accepted to mean all technologies that, combined, allow people and organizations to interact in the digital world.

CLOUD COMPUTING
SOFTWARE
HARDWARE
INTERNET ACCESS
DATA
COMMUNICATIONS TECHNOLOGY
TRANSACTIONS

## Key Components of Digital Transformation

- Digital Platforms: Technologies that enable the creation, delivery, and consumption of digital products and services, such as cloud computing, mobile applications, and e-commerce platforms.

- Data Analytics: Techniques for analyzing large volumes of data to extract insights and inform decision-making, including data mining, machine learning, and predictive analytics.

- Automation: Use of technology to automate repetitive tasks and processes, increasing efficiency and reducing human error.

- Internet of Things (IoT): Connected devices and sensors that collect and exchange data over the internet, enabling automation and real-tim

**VET4GREEN**
Developing Capacities in the Area of VET for Green Energy Transition in Sub-Saharan Africa

Co-funded by the European Union

# Labor Market Trends

- Digital transformation is driving changes in the labor market, creating demand for new skills and competencies.
- Employers are seeking individuals with expertise in areas such as data analysis, digital marketing, cybersecurity, software development, and project management.
- The demand for digital skills is expected to continue growing as organizations embrace digital technologies to stay competitive.

**Implications for Vocational Education and Training (VET)**

- VET programs play a crucial role in preparing individuals for careers in the digital economy.
- There is a need for VET institutions to adapt their curriculum and training programs to align with the evolving needs of the labor market.
- Hands-on training, industry partnerships, and real-world projects are essential for providing students with the practical skills and experience needed to succeed in the digital workforce.



Industry Collaboration

- Collaboration between VET institutions and industry partners is crucial for ensuring that training programs are aligned with industry needs.
- Industry partnerships can provide input on curriculum development, offer internships and apprenticeships, and provide access to real-world projects and case studies.



VET4GREEN
Developing Capacities in the Area of VET for Green Energy Transition in Sub-Saharan Africa

Q&A

- Open floor for questions and discussions.



Co-funded by the European Union

# Cybersecurity and Data Protection

- Today, we'll explore the importance of cybersecurity and data protection in the digital age and the skills needed to address the growing threats in the labor market.



## Understanding Cybersecurity and Data Protection

- Cybersecurity involves protecting computer systems, networks, and data from unauthorized access, attacks, and breaches.
- Data protection refers to safeguarding sensitive information and ensuring compliance with privacy regulations to prevent unauthorized disclosure or misuse.



VET4GREEN
Developing Capacities in the Area of VET for
Green Energy Transition in Sub-Saharan Africa



Co-funded by the
European Union

# Importance of Cybersecurity and Data Protection

- Cyberattacks and data breaches pose significant risks to organizations, including financial loss, reputational damage, and legal consequences.
- Ensuring cybersecurity and data protection is essential for maintaining trust with customers, protecting intellectual property, and complying with regulatory requirements.

Labor Market Trends

- The demand for cybersecurity and data protection professionals is growing rapidly in response to the increasing frequency and sophistication of cyber threats.

- Employers are seeking individuals with expertise in areas such as network security, incident response, risk management, and compliance.

Implications for Vocational Education and Training (VET)

- VET programs play a crucial role in preparing individuals for careers in cybersecurity and data protection.
- There is a need for VET institutions to develop specialized training programs that cover a wide range of cybersecurity topics and practical skills.
- Hands-on training, simulations, and real-world scenarios are essential for providing students with the experience needed to address cybersecurity challenges effectively.

**VET4GREEN**
Developing Capacities in the Area of VET for Green Energy Transition in Sub-Saharan Africa

Co-funded by the European Union

# Cloud Computing and Infrastructure Management

- Cloud computing involves delivering computing services over the internet, including storage, processing power, and applications, without the need for on-premises hardware or infrastructure.

- Cloud services are typically provided by third-party providers on a pay-as-you-go basis, offering scalability, flexibility, and cost-effectiveness.
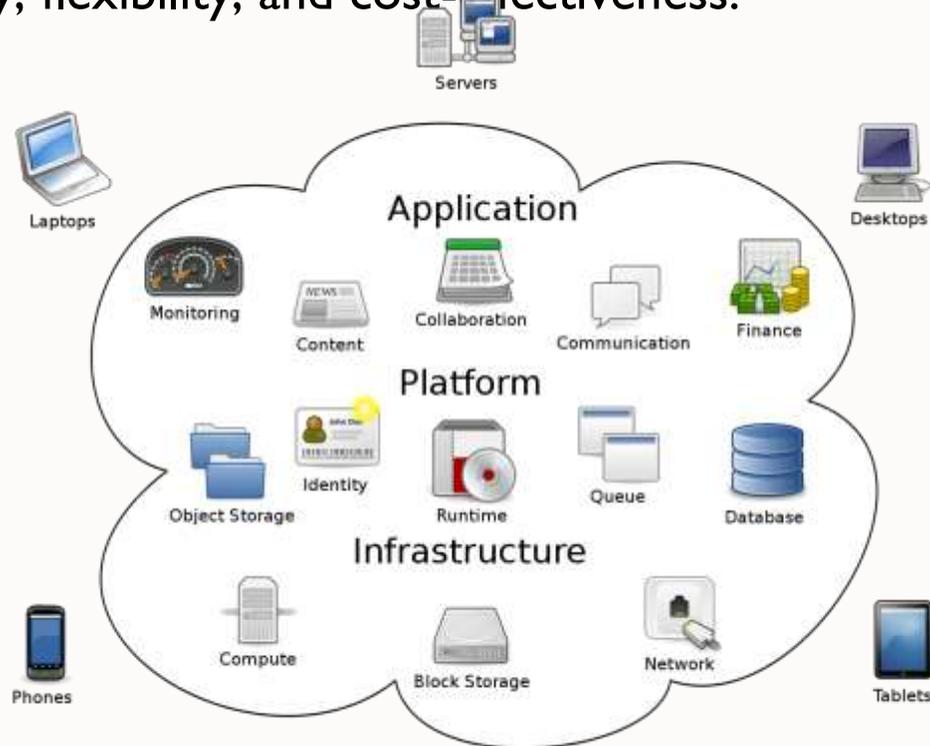
# Emerging Technologies and Future Trends in ICT

## Key emerging technologies

- Artificial Intelligence (AI) and Machine Learning: Algorithms and systems that mimic human cognitive functions to perform tasks such as data analysis, pattern recognition, and decision-making.

- Internet of Things (IoT): Network of interconnected devices and sensors that collect and exchange data, enabling automation, monitoring, and control in various domains.

- Blockchain: Distributed ledger technology that enables secure and transparent transactions without the need for intermediaries, with applications in finance, supply chain, and healthcare.

- Augmented Reality (AR) and Virtual Reality (VR): Immersive technologies that overlay digital content onto the physical world (AR) or create simulated environments (VR) for training, entertainment, and education.

- 5G and Next-Generation Networks: High-speed, low-latency networks that enable faster data transmission and support a wide range of connected devices and applications.

**VET4GREEN**
Developing Capacities in the Area of VET for
Green Energy Transition in Sub-Saharan Africa

Co-funded by the
European Union

1. What are the key components of a computer system, and how do they interact with each other?
2. Can you explain the difference between hardware and software in the context of ICT?
3. How does data transmission occur in a computer network, and what are the different types of network topologies?
4. What is the role of protocols in communication over the internet, and can you provide examples of commonly used protocols?
5. How does cloud computing work, and what are the benefits and challenges associated with cloud-based services?
6. What are the main principles of cybersecurity, and how can individuals and organizations protect themselves from cyber threats?
7. Can you explain the concept of artificial intelligence (AI) and its applications in various fields?
8. What are the emerging trends in ICT?
9. How do data analytics and big data technologies enable organizations to gain insights and make data-driven decisions?
10. What ethical considerations should be taken into account when developing and deploying new technologies in ICT?

# Future Trends in ICT

- **Edge Computing**: Involves processing data closer to the source or "edge" of the network, resulting in faster response times, reduced latency, and optimized bandwidth usage.
- **Quantum Computing**: Utilizes principles of quantum mechanics to achieve exponentially faster processing speeds and solve complex problems that classical computers struggle with.
- **Biotechnology and Bioinformatics**: Integrates biology, computing, and information technology to advance healthcare, agriculture, and environmental sustainability through genomics, personalized medicine, and synthetic biology.
- **Cybersecurity and Privacy Enhancements**: Focuses on developing advanced security measures, encryption techniques, and privacy-preserving technologies to safeguard data and mitigate cyber threats in our increasingly interconnected world.



**VET4GREEN**
Developing Capacities in the Area of VET for
Green Energy Transition in Sub-Saharan Africa

Co-funded by the
European Union

# Thank you for your attention!

**VET4GREEN**
Developing Capacities in the Area of VET for Green Energy Transition in Sub-Saharan Africa

Co-funded by the European Union