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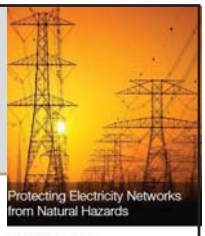
27th OSCE Economic and Environmental Forum
"Promoting economic progress and security in the OSCE area through energy co-operation, new technologies, good governance and connectivity in the digital era"
SECOND PREPARATORY MEETING
Bratislava, 27-28 May 2019
Venue: Crowne Plaza Hotel Bratislava, Bratislava

Session III: Protecting Energy Networks from Natural and Man-Made Disaste rs

Introducing the OSCE CEIP Digital Training Platform

Lubomir Tomik, Center for Energy Systems, www. Cesys.sk

Risks related to CEI



- Human Factor : 80% of all events
  - Human unintentional
    - Human failure of Control room operator……
    - Maintenance crew…….
    - Human-intentional
  - **Cyberterorizmus, Destruction, manipulation**
  - Natural disasters :
  - Heavy rains
  - earthquakes
  - Land slides
  - floodings
  - avalanches
  - storms
  - Extreme temp…
  - Technical failures,
  - Line break, Tower break, Transformator

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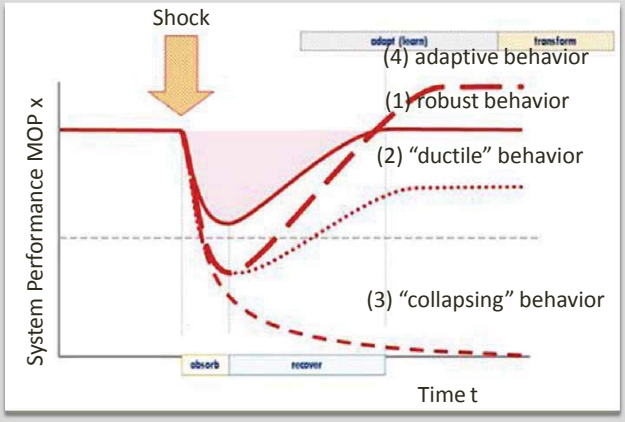
Protection of CEI



Four essential patterns,
(1)absorbing a shock without collapsing,
(2)recovering from a shock,
(3) System "Kaput" failure

(4)adapting through self-organization and learning, and eventually transforming into a different system by altering structures, functions and feedback loops.

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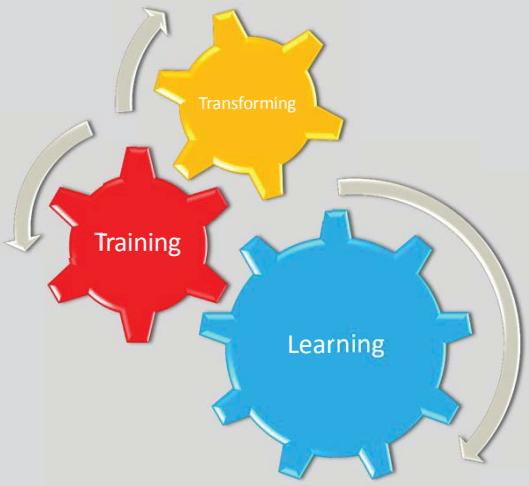
How to ensure adaptive behavior of the CEI system?



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Target groups for CEI training

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Training for CEI Target groups

Training methods depend on complexity of the problem

- manuals and books
- videos
- simulators
- training camps & facilities

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Training for CEI
Target groups

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- gamification

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Training for CEI
Target groups

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Situation in critical events are very complex and expensive

How to make trainings useful and effective?

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OSCE response and activity plan

- In December 2018 , Feasibility study was elaborated on "Setting up a Virtual Competency & Training Centre on the Protection of Critical Energy Networks from Natural and Man-Made Disasters to be based in Bratislava“

as a results

Concept for Knowledge network for Capacity building in the area of the protection of critical energy networks from natural and man/made disasters including cyber attacks

Authors:

Lubomir Tomik

Nadejda Komendantova

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Recommendations from Feasibility Study

- 1. At first to continue to develop modules for Moodle e learning platform also with specialization on Cyber-attacks we estimate to develop at first phase about 20 modules covering basic knowledge.

- 2. To start developing PoCEN application in VR Figurama technology as is suggested in table for VR Figurama technology

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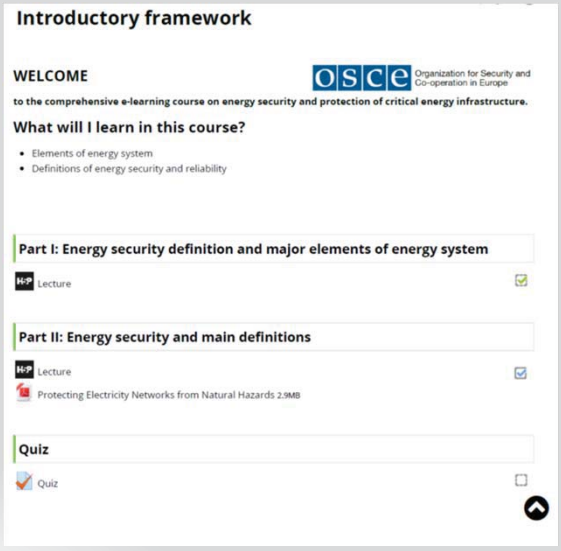
Pilot course and introductory lesson



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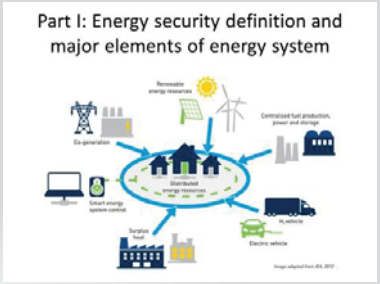
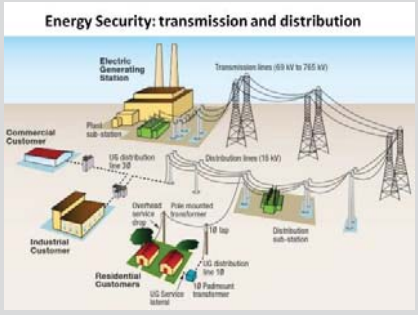
First level of PoCEN as planned

- 20 modules in MOODLE platform serving as e/learning course in area of Critical Energy infrastructure with focus on Eletricity Networks





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Second level of PoCEN 3D Virtual Experience

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Reality of Virtual Reality

Training captures key interactions from real life.

Supports not only animated characters but virtual copies of real people (avatars):

- People
- Firemen

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- Security staff, military

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Reality of Virtual Reality

Training captures key interactions from real life.

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- People
- Firemen
- Security staff, military
- Commanders incl. Commander in Chief

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"Much can be learned in play that will afterwards be of use when the circumstances demand it."

Retention

don't only show people how - let them do it themselves thrue games and scenarios
80% retention rate even after a year of training

Personalisation and easy content adaptibility

it's easy to set up personalized processes and follow how each individual progresses

Fun and motivation

people can train according to their own schedules and repeat it
as many times they would like

Didactica Magna
By John Amos Comenius (1592-1671) born in Moravia

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Comenius portrait from Rembrandt

VR Training advantage

Easy worldwide access

training can be accessed regardless of time (24/7/365) and place

Scalability

easy to change and improve training schemes

Cost effective

experience real life situations that would otherwise be too dangerous or too expensive to organize

Wide range of supported hardware

smartphones, tablets, computers, smart TV,
VR and AR hardware

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Training features VR training

- No special place is necessary
- Scenarios
  different scenarios with parallel story lines
- Exploration
- Optional levels of realism (schematic - photoreallistic)
- Point of view
  of the person or any other focus
- Visualization of invisible events
  electro-magnetic fields, projectile tracks, fire water tracks
- Repeat any part of the experience and improve responses

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Biofeedback and neurofeedback used in VR training

BFB and NFB process:
Monitoring:
- Breathing, blood pressure, hearth freq. Temperature, EMG, in real time

Evaluation:
- Personal psychological profile
- Stress resilience

Training:
According Personal profile specific training program set up for each trainee

Elimination:
- stress collapses, human failures

Optimization:
- performance and decision process during stress situations

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Project PoCEN

Due to complexity of the protection project is divided to 2 levels

1.level

feasibility study, e learning modules CEIP

2. level

data collection, creating of 3D virtual world, special parts of software , developing scenarios, testing, training in VR, implementing methods BFB & NFB (Biofeedback and Neurofeedback)

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