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From Tracking Progress to Pathways to Sustainable Energy

Regional Workshop on Development of National Sustainable Energy Policies Multi-stakeholder consultations

29 September 2017, Geneva

GTF: UNECE Progress in Sustainable Energy

Access to the Preliminary Version

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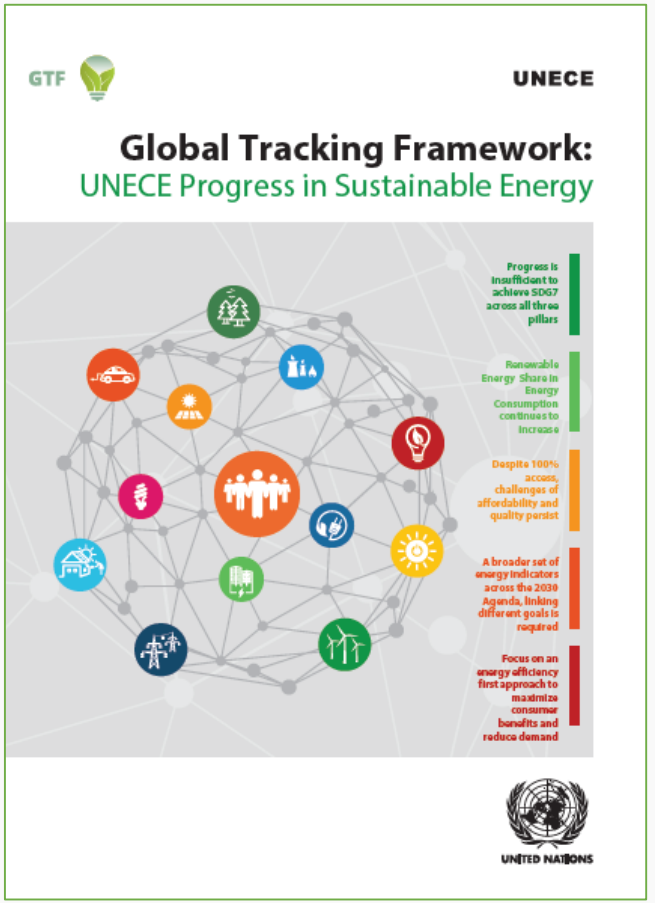
Download

https://www.unece.org/fileadmin/DAM/energy/se/pdfs/comm26/Room_documents/CSE_26_2017_INF_9.pdf

(Room Document Inf.9 of 26th CSE session)

Final Consultation

Further feedback received before 16 October 2017 will be considered for inclusion into the report.



Broadening the Set of Indicators

Tracking Progress for Energy for Sustainable Development

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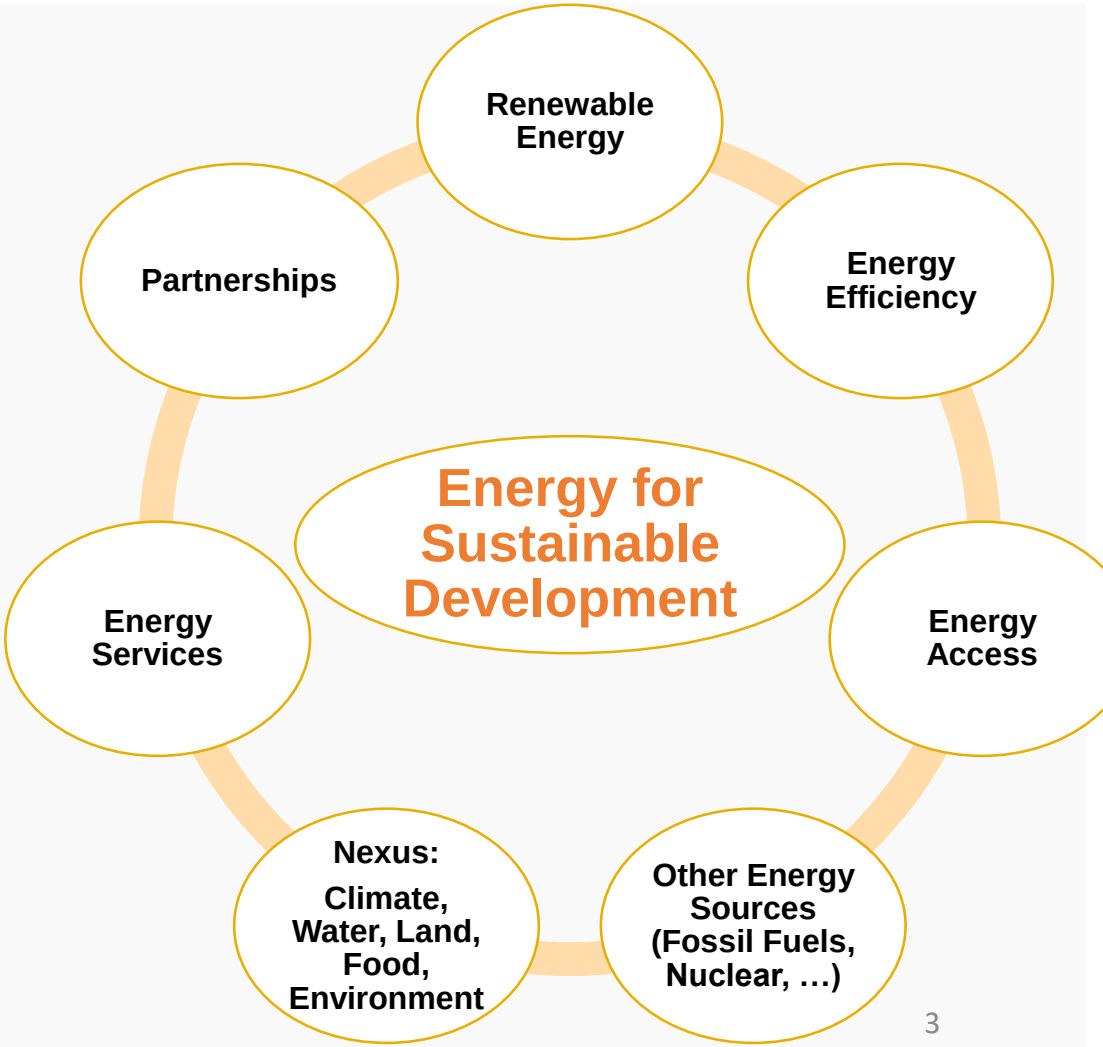
SDG7 Review at the High-Level Political Forum (HLPF)

Defining energy indicators **beyond SDG7** that allow a more holistic assessment of progress, while making the linkages to **other energy-related SDGs**.

For more details: See Annex 5 in the GTF report.



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Pathways to Sustainable Energy
Project Implementation

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Trends
May 2017 – Dec 2017

Sustainable Energy Storylines
- Definition of trends & uncertainties
- Narrative Descriptions

Research Questions (Case Studies, Deep Dives)
- Definition of particular thematic or sub-regional aspects, policies
- Definition of research questions

Technology Assessment
- Trends and cost evaluations for sustainable energy technology options

Energy Policies Research
- Current policies
- Other polices (NDCs, energy related)

Analysis
June 2017 – Oct 2018

Modell preparation
- Definition of Input Assumptions (drivers) & Indicators (energy security, climate, quality of life, etc.)
- Adaptation of SSP datasets based on (new) data requirements
- Quantfication of SE target
- Model development / finalisation

Modelling / Assessment
- Energy scenarios: energy supply, demand, technology mix, costs, climate budget, etc.
- Modelling / testing of policy options
- Topical / Sub-regional deep dives

Policy options
- 2-3 Policy energy expert workshops

Results
Feb 2018 – Q2/3 2019

Adaptive Policy Pathways
- Policy Briefs
- Policy dialogues

Case Studies / Deep Dives Results
- 3-5 selected SE Scenarios

Technology Pathways
Portfolio, Roadmap

Early-Warning System
- Defining KPIs
- Concept development

Engagement of Energy Expert Community

- Storylines
- Technology trends
- Policies

- Defining assumptions / indicators
- Developing policy options
- Policy energy expert workshops

- Outreach
- Policy dialogues

DRAFT Research Questions

Draft Deep Dives & Case Studies* (Technology, Policy, Regional)

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Focal question: How can countries attain sustainable energy by 2050?

I What is the optimal energy-mix for different sub-regions within the UNECE region in order to help achieve the 2030 Agenda and create a sustainable energy system?

- Sub-regional energy trade / Regional cooperation
- Geopolitical consequences by increased RE upscaling / SE transition (tbd)
  - Deep dive: Country leadership

II What can be drivers for the transition towards a sustainable energy system?

- **Policies** (energy efficiency as enabler, price on carbon/internatisation of externalities along the energy value chain)
- Quantum leap of technologies: which techologies could be potential game changers?
  - Energy storage technologies, infrastructure needs, and society change
  - RE: Grid integration; Competitiveness of RE compared to FF; cost development (resources, technologies)
  - How can FF support the uptake of RE for the transitionary period towards a sustainable energy system?: Synergies of RE and FF; Deep Dive: Synergies of RE & NG; the role of CCS; methane leakage
  - Others
- Infrastructure
- Finance / Investments
  - Investment requirements to attain certain level of RE, change of investment patterns for transition

III How to track progress towards achieving and for maintaining a sustainable energy system?

- Key performance indicators for continuous improvement & feedback-loop
- „Early warning“ system

*Case Study: Further analysis of an existing national, sub-regional, sectoral case; Deep Dive: Further analysis of modeling results as part of a research question.

Target Definition: Sustainable Energy

Three pillars

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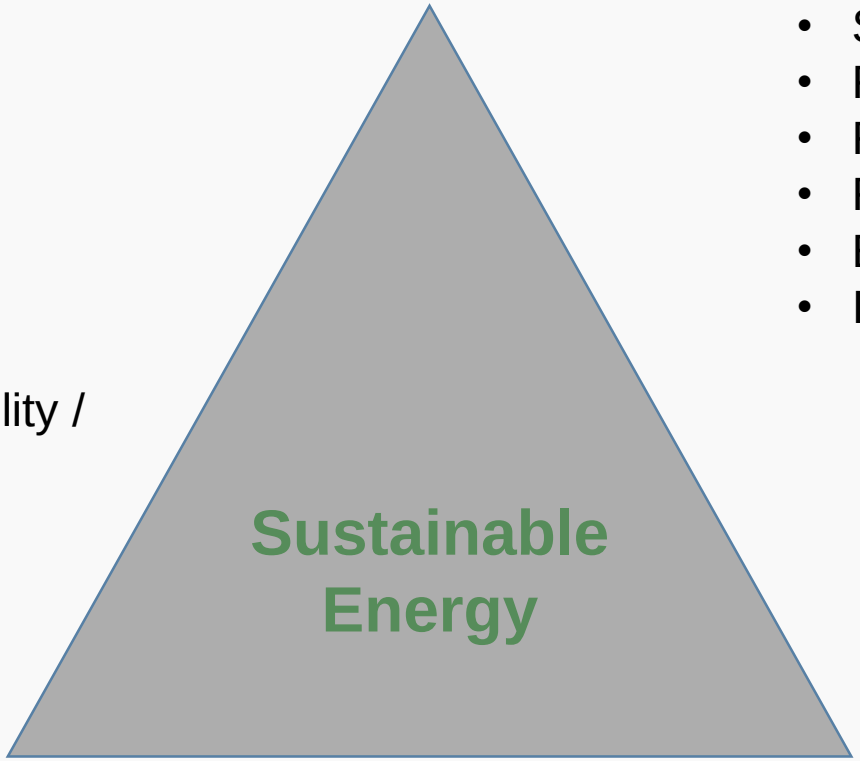
Energy Security

- Energy Intensity (Final, primary)
- Share of RE
- Resilience
- Robustness
- Reliability
- Energy imports vs. Exports
- Investment requirements



- Energy affordability / prices
- Physical energy Access
- Energy Services

Energy for Quality of Life

- Carbon intensity of GDP & of energy
- Air pollution
- Land use
- Water use
- Waste produced

Environmental Protection

Building the Scenarios
Metrics (Outputs)

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Energy security

- Primary and final energy prices: *USD/GJ*
- Energy expenditures: *price * consumption*
- Energy imports: *share of energy consumption*
- Energy exports: *share of GDP*
- ***Others?***

Quality of life

- Energy consumption per capita: *EJ per capita per year*
- Energy services per capita: *efficiency-adjusted energy consumption*
- GDP per capita: *USD/person*
- Food security:
  - Expenditures: *(consumption * prices)/GDP*
  - Nutrition: *share of calories from staple foods*
  - Distributional effects: *share of population at risk of hunger*
- Reliance on solid cooking fuels*: *share of population*
- Other potential measures (specific metrics TBD)*: distributional impacts, access
- ***Others?***

Building the Scenarios
Metrics (Outputs)

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Environmental Protection

- Renewable energy: *share of primary energy from renewable sources*
- LCA impacts*
  - Land occupation of energy technologies, excluding bioenergy supply
  - Eutrophication
  - Mineral resource depletion
  - Release of ionizing radiation
  - Human toxicity
  - Ecotoxicity
- Land cover: *thousand hectares forest, other protected lands, …*
- Irrigation: *share irrigated cropland*
- Water deficit*: *demand/supply*
- Global average temperature change: *degrees C above preindustrial*
- GHG emissions/concentrations: *CO_2, CH_4, NMVOC, …*
- Non-GHG pollutant emissions/concentrations: *SO_2, NO_X, PM2.5, NH_3,*

- ***Others?***

Scenario Methodology
Integrated Assessment Model

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Objective: To enable exploration of the two axes that form the basis for the UNECE storylines

- Technological innovation in the energy sector
- Degree of international cooperation on the Sustainable Development Goals

Scenario design composed of three stages: Proposal

- Base scenario, no policy new interventions
- Base scenario + National Determined Contributions (NDCs)
- Base + NDCs + (multiple) sensitivities around development of energy technologies and energy trade
- Base + NDCs + sensitivities + policy = 2°C in 2100

Scenario Design
Integrated Assessment Model

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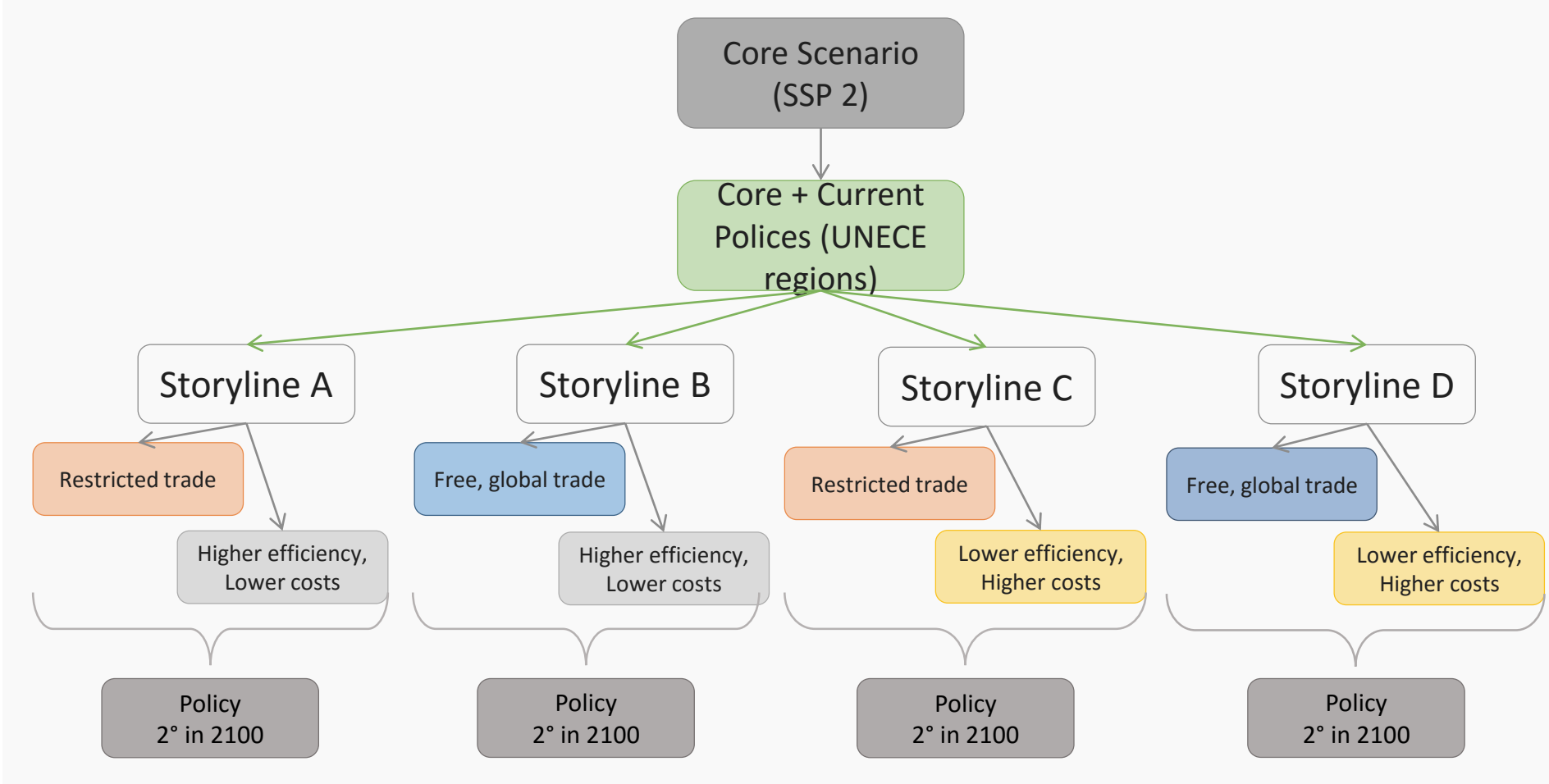

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Thank you!

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