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9TH INTERNATIONAL FORUM ON ENERGY FOR SUSTAINABLE DEVELOPMENT

12-15 November 2018 Kyiv, Ukraine

ENERGY

Modernising Infrastructure - *Transition* of the Energy Sector

Pathways to Sustainable Energy

13 November 2018, Kyiv

Central issues

Framework for analyzing the transition

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Resolving the legacy:

- Infrastructure, assets = sunk capital
- Social structures: People, jobs, education, social life
- Regional, subregional
- Centers of innovation – centers of regeneration

Technology is changing

- Pace of technological change in energy
- Uncertainty of rate of penetration of new technologies
- Integrating resource efficiency into the planning
- Resiliency of new infrastructure over planning period

Finance under uncertainty

- Restricted funding for fossil technologies
- Incentivize winners and compensate losers
- How big? How long-term the planning period?

Innovative Policies

- Importance of innovative, flexible, holistic policy frameworks
- Sustainable approach: quality of life, energy security, impact

Pathways to Sustainable Energy

Defining "*Sustainable Energy*"

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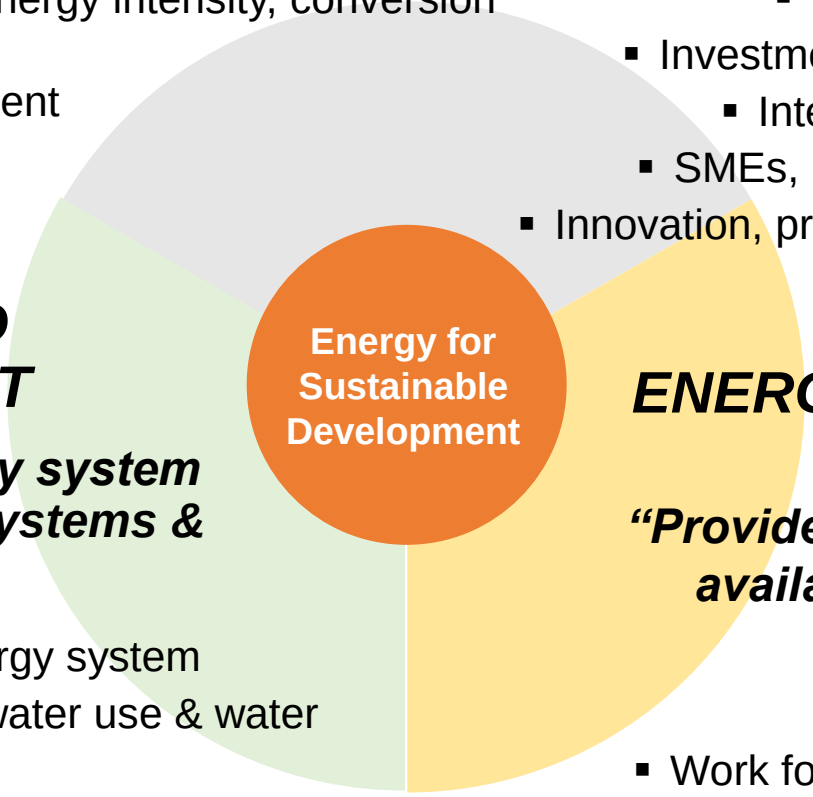
ENERGY SECURITY

"Secure the energy needed for economic development"

- Energy Efficiency (energy intensity of economy, rate of improvement of energy intensity, conversion efficiency)
- Resource management
- Circular economy
- Fuel mix
- Net energy trade
- Investment requirements
- Intellectual property
- SMEs, business models
- Innovation, proactive solutions



ENERGY AND ENVIRONMENT

"Minimize adverse energy system impacts on climate, ecosystems & human health"

- GHG emissions from the energy system
- Energy-related air pollution, water use & water stress
- Cities

ENERGY FOR QUALITY OF LIFE

"Provide affordable energy that is available for all at all times"

- Access to energy services
- Energy affordability
- Work force in population centers, jobs
- Food security (biomass use, agriculture)

Pathways to Sustainable Energy

Identifying choices, tracking progress

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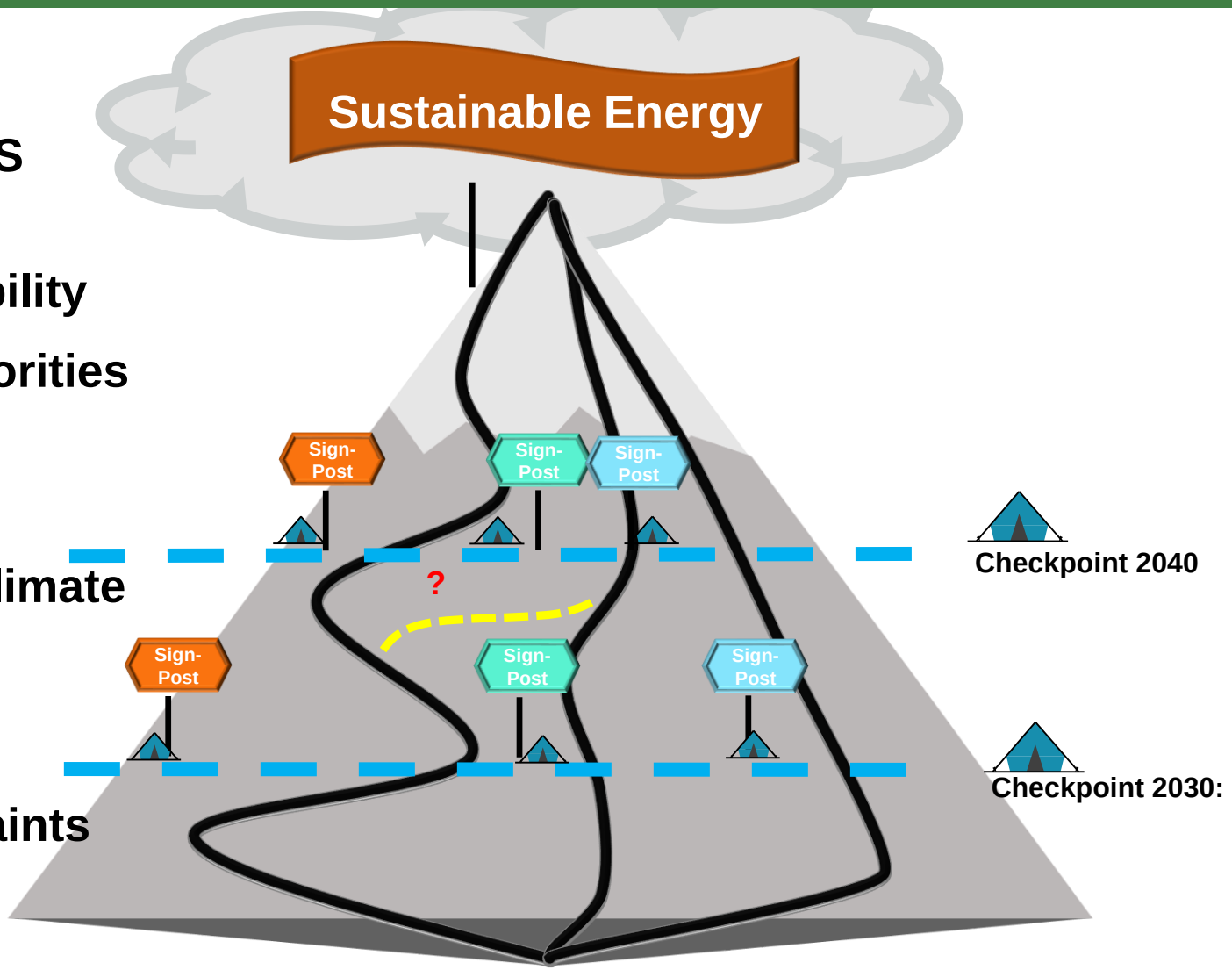
MULTIPLE OPTIONS
depend on

- **Resource availability**
- **Development priorities**
- **Environmental constraints**
- **(Geo-) Political climate**
- **Industrialization**
- **Social aspects**
- **Financial constraints**
- **…**



Same starting point – choice of pathways via different policy options

How Pathways helps develop options for countries on how to achieve Sustainable Energy UNECE Region Project Approach

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- **Country-owned scenario development**
  - Modelling of sustainable energy scenarios to 2050 for countries
  - Updated energy system data; new sub-regional analysis possible
  - Policy and updated technology options for UNECE region
  - Understand what makes economical sense to fix
- **Informed policy dialogue**
  - Adaptive policy pathways build on importance of large industrial complexes: true impact of energy transition
  - Innovation policy agenda
  - Position energy as fundamental enabler for economic development
  - Sub-regional focus via workshops
- **Planning process: Early-warning system**
  - Signposts
  - Choice of Sustainable Energy Targets & Key Performance Indicators

Some modelling examples - UNECE Region

High Fossil Fuel Dependency

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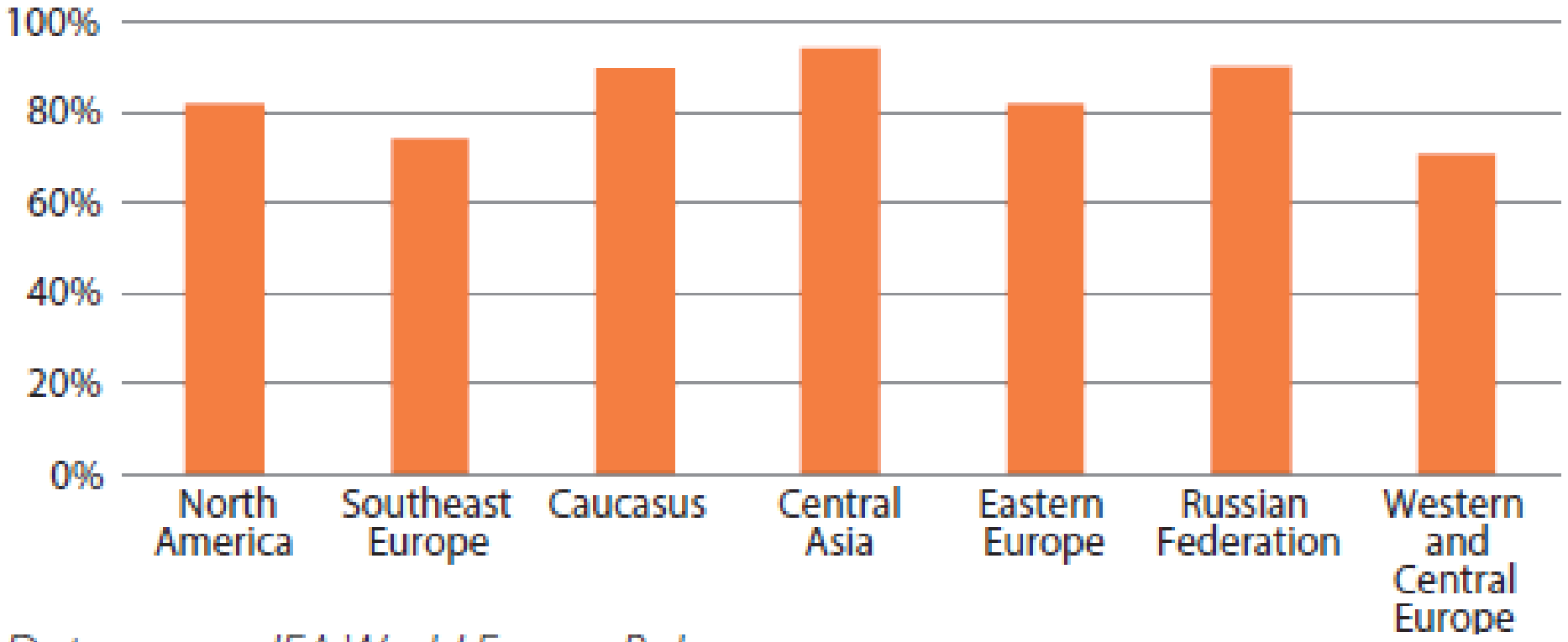
Share of fossil fuels in energy mix (TPES)



Data source: IEA World Energy Balances.

How to move from a fossil fuel based to an economy fueled by clean energy is one of the major challenges for the UNECE region and most of its sub-regions?

Example Modeling Results – change versus base case scenario – Electricity Generation

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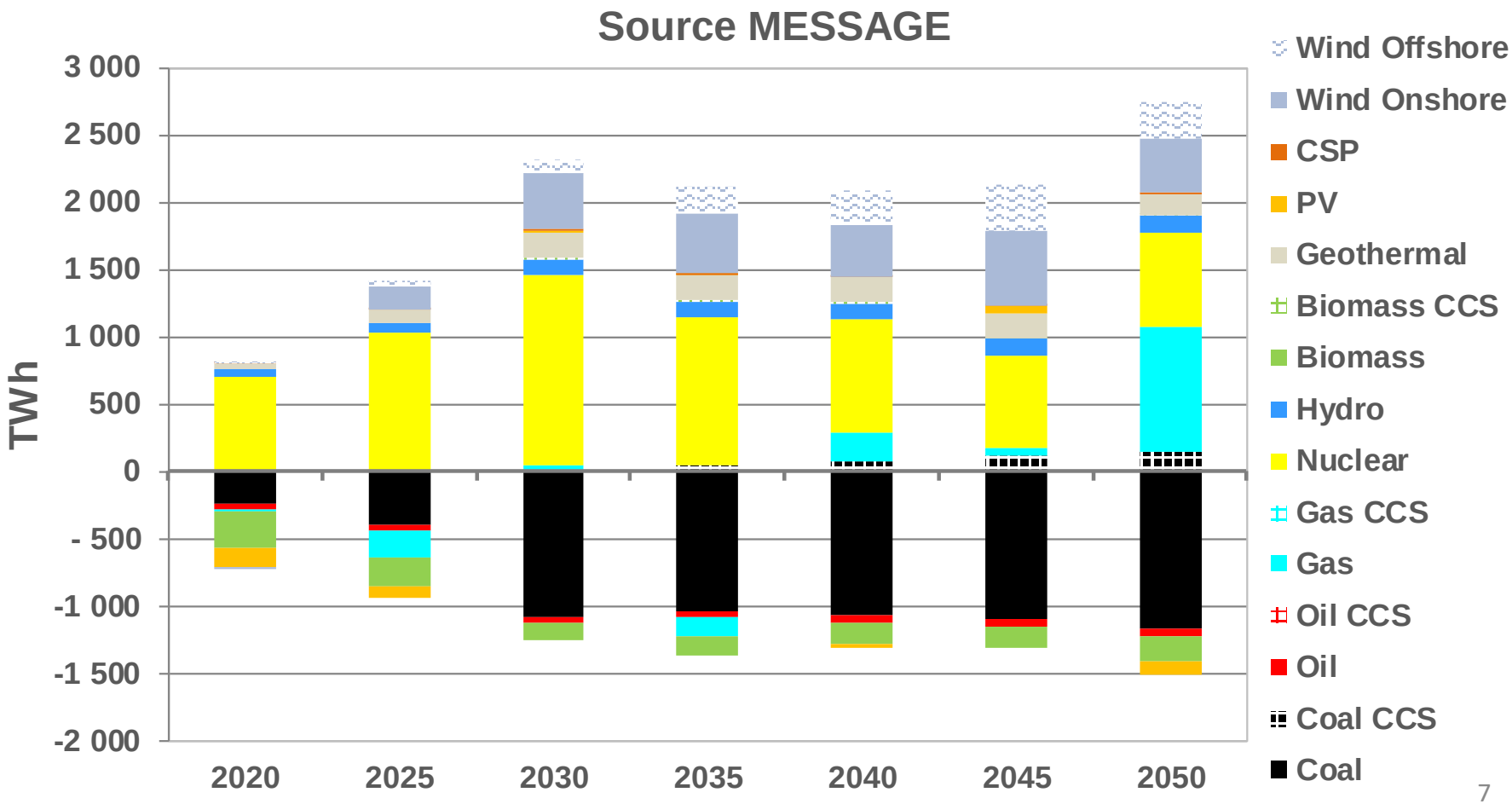
Difference in electricity generation, UNECE NDC versus Reference Scenario



Energy Efficiency

UNECE Group of Experts on Energy Efficiency

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- Optimization of resources (financial and natural)
- No modernization of energy systems without energy efficiency: link between supply and demand side
- Increasing energy efficiency influences renewable energy share
- Need new business models targeting energy efficiency
- “Hook” to financing
  - How to put a price on saved energy
  - Formulate value added for countries
- Task Force on Industrial Energy Efficiency

Central issues

Pathways can help countries in developing innovative policies

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Approach

- It is coming - proactivity
- Innovative *Integrated* Planning
  - E.g. renewable energy, storage, energy efficiency in combination
- Technical solutions are not the only answer
  - *Local* ownership involving education systems
  - Enhanced understanding of technical change and innovation policy
- Issue of large complexes dependent on energy
  - Centers of “regional regeneration”
- In partnership: Lusatia, Kazakhstan, others

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Thank you!

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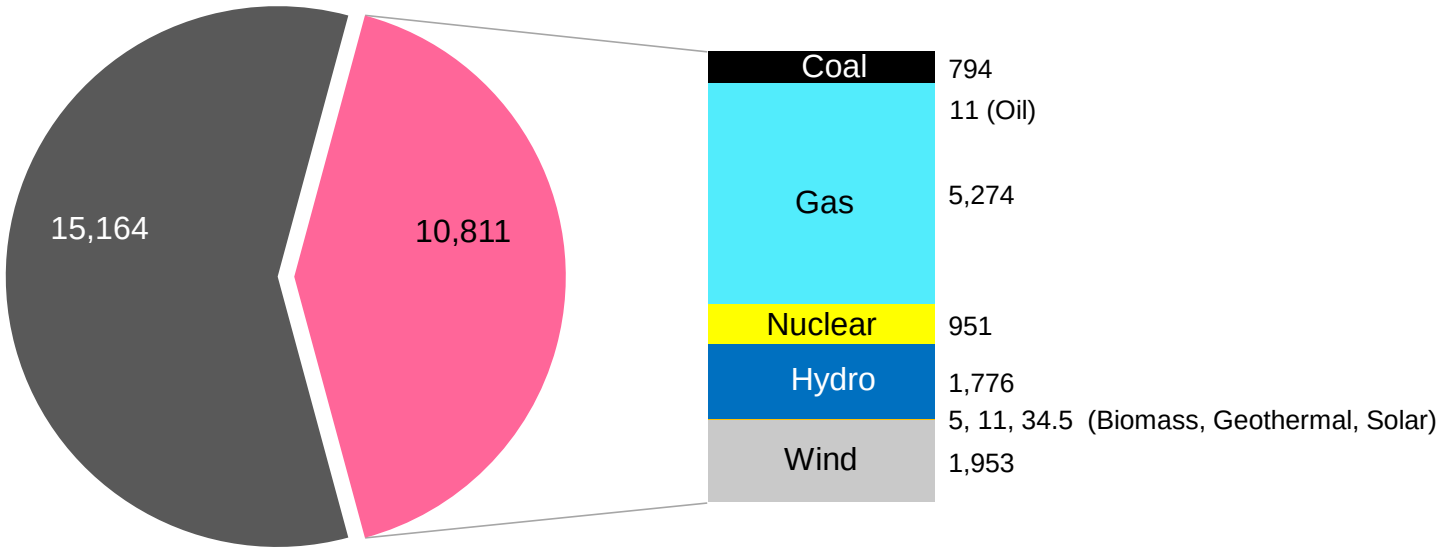
Date 13 I 11 I 2018, Kyiv

Example Modeling Results
Cumulative Energy Sector Investments
"Business As Usual"

UNECE Region - Reference Scenario
2020 – 2050 in billion US$$_{2010}$$ = $25,975 billion

Source MESSAGE

Extraction fossil fuel **Electricity Supply (including T&D)**



Example Modeling Results
Cumulative Energy Sector Investments
"NDC Scenario"

UNECE Region – NDC Scenario
2020 – 2050 in billion US$$_{2010}$$ = $26,672 billion