SESSION: Systemic security

Systemic solutions for distribution and transmission grid with the use of renewable sources

Rainer Hinrichs-Rahlwes, EREF Vice-President

5 INTERNATIONAL RENEWABLE ENERGY CONGRESS

greenPOWER 2014

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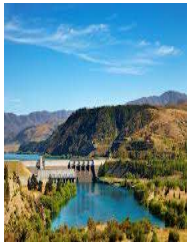
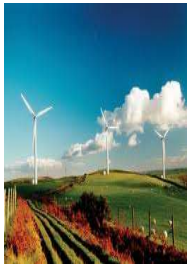
About EREF





- Federation of associations from EU Member States, working in the sector of energy produced from renewable sources
- Voice of Independent Producers of Energy from Renewables
- Promoting non-discriminatory access to the energy market
- Cooperating with national and European RE-associations for a stable and reliable policy framework in Europe until and beyond 2020
- Advocating ambitious and legally binding targets and framework for 2030 (RE – EE – GHG)

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Structure

I. **Development of Europe's Energy Mix**

II. Grids today

III. Flexible systems for the future

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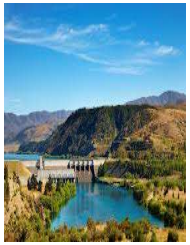
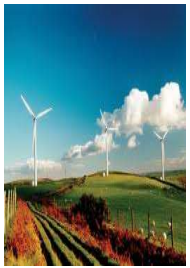
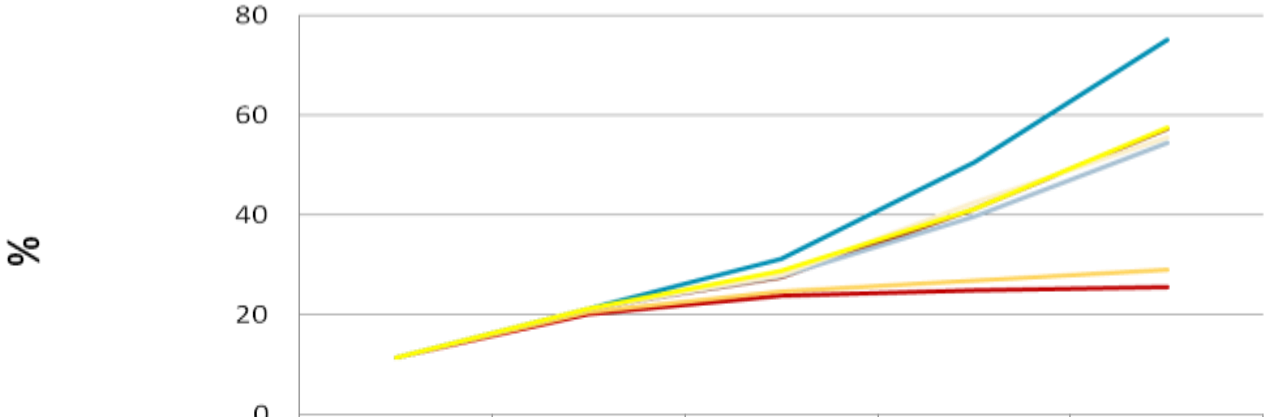
EC Energy Roadmap 2050: High Shares of RES in all Scenarios







	2010	2020	2030	2040	2050
Reference	11,4	20,1	23,9	25	25,5
CPI	11,4	20,6	24,7	27	29
Energy Efficiency	11,4	21,3	27,6	41,3	57,3
Diversified supply technologies	11,4	21,3	27,7	39,8	54,6
High RES	11,4	21,3	31,2	50,6	75,2
Delayed CCS	11,4	21,3	28	42,6	55,7
Low Nuclear	11,4	21,2	28,8	41,3	57,3

Source: European Commission, Energy Roadmap 2050, Graph: EREC

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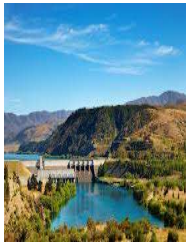
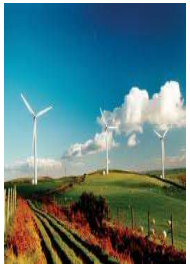
Renewable Energies are mature





- **Renewables reduce Dependency on Energy Imports**
  → RES are domestic energy sources
- **Significant contribution to Security of Energy Supply**
  → Wide range of proven and mature RE technologies
  → Different technologies and resources are available
- **Renewables mitigate Price Volatility of Fossil Fuels**
  → RE-technologies have high cost decreases
  → Wind, solar and geothermal energy are free
- **Renewables are mature and reliable technologies against Climate Change**
  → RES are (nearly) carbon free or carbon neutral

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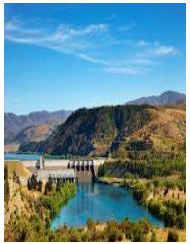
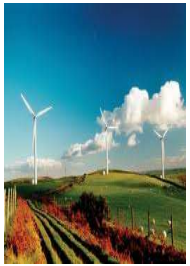
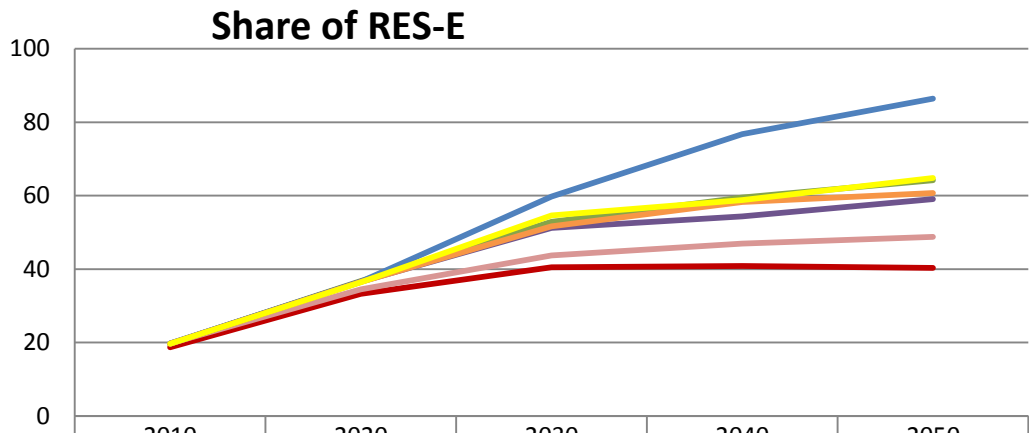
EC Energy Roadmap 2050: **RES Dominating Power Sector**







	2010	2020	2030	2040	2050
Reference	18.7	33.3	40.5	40.9	40.3
CPI	19.8	34.5	43.7	47	48.8
Energy Efficiency	19.7	36.8	52.9	59.5	64.2
Diversified supply technologies	19.7	36.6	51.2	54.4	59.1
High RES	19.8	36.6	59.8	76.8	86.4
Delayed CCS	19.7	36.5	51.7	58.3	60.7
Low Nuclear	19.7	36.4	54.6	58.8	64.8

Source: European Commission, Energy Roadmap 2050, Graph: EREC

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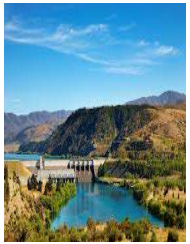
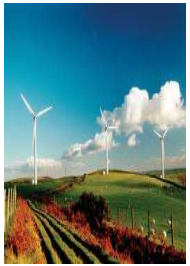
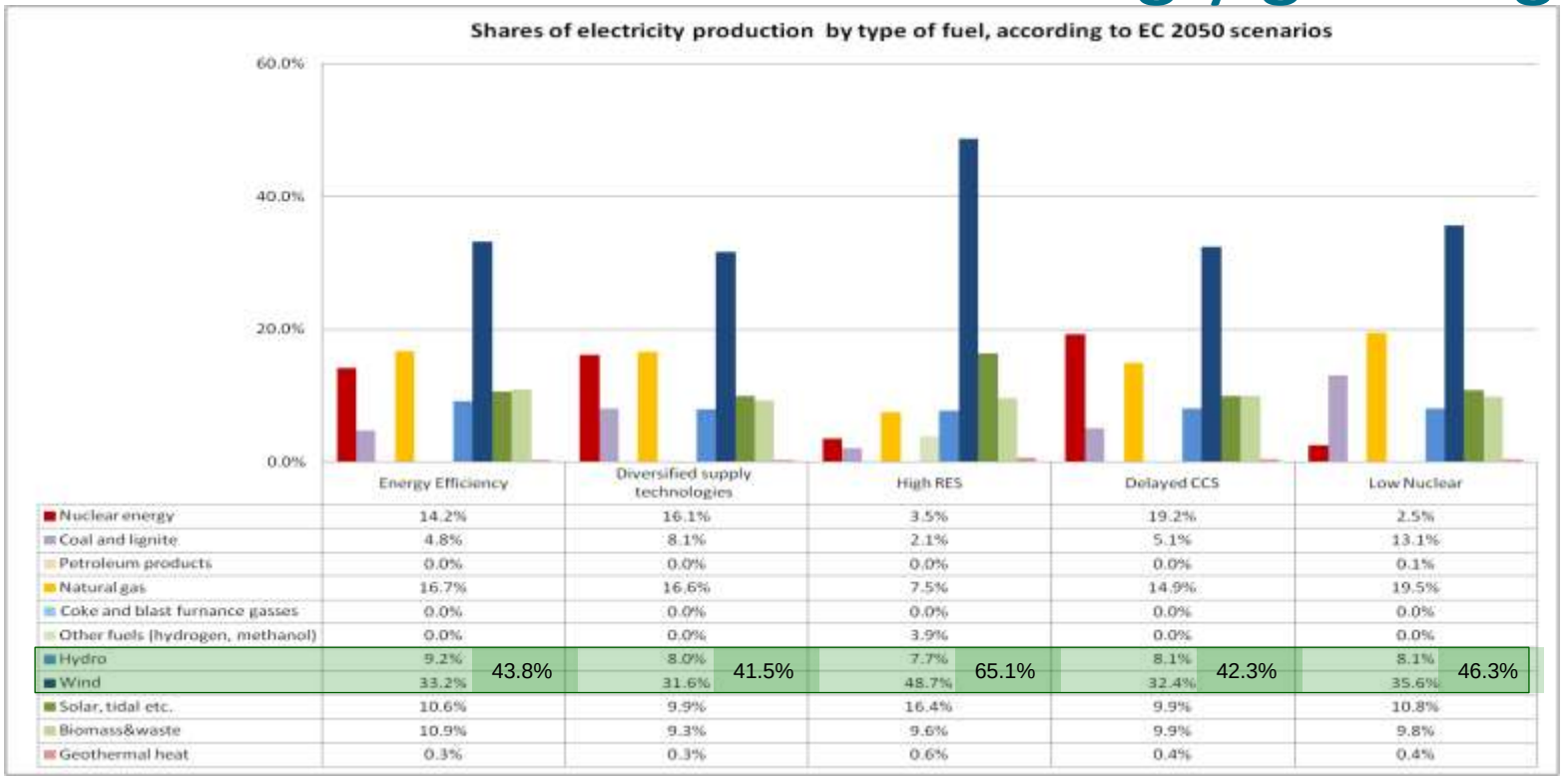
Variable Renewables strongly growing







	Energy Efficiency		Diversified supply technologies		High RES		Delayed CCS		Low Nuclear	
Nuclear energy	14.2%		16.1%		3.5%		19.2%		2.5%	
Coal and lignite	4.8%		8.1%		2.1%		5.1%		13.1%	
Petroleum products	0.0%		0.0%		0.0%		0.0%		0.1%	
Natural gas	16.7%		16.6%		7.5%		14.9%		19.5%	
Coke and blast furnance gasses	0.0%		0.0%		0.0%		0.0%		0.0%	
Other fuels (hydrogen, methanol)	0.0%		0.0%		3.9%		0.0%		0.0%	
Hydro	9.2%	43.8%	8.0%	41.5%	7.7%	65.1%	8.1%	42.3%	8.1%	46.3%
Wind	33.2%		31.6%		48.7%		32.4%		35.6%	
Solar, tidal etc.	10.6%		9.9%		16.4%		9.9%		10.8%	
Biomass&waste	10.9%		9.3%		9.6%		9.9%		9.8%	
Geothermal heat	0.3%		0.3%		0.6%		0.4%		0.4%	

Source: European Commission, Energy Roadmap 2050, Graph: EREC

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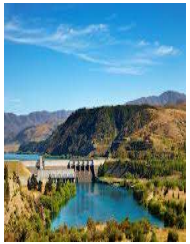
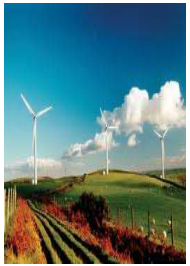
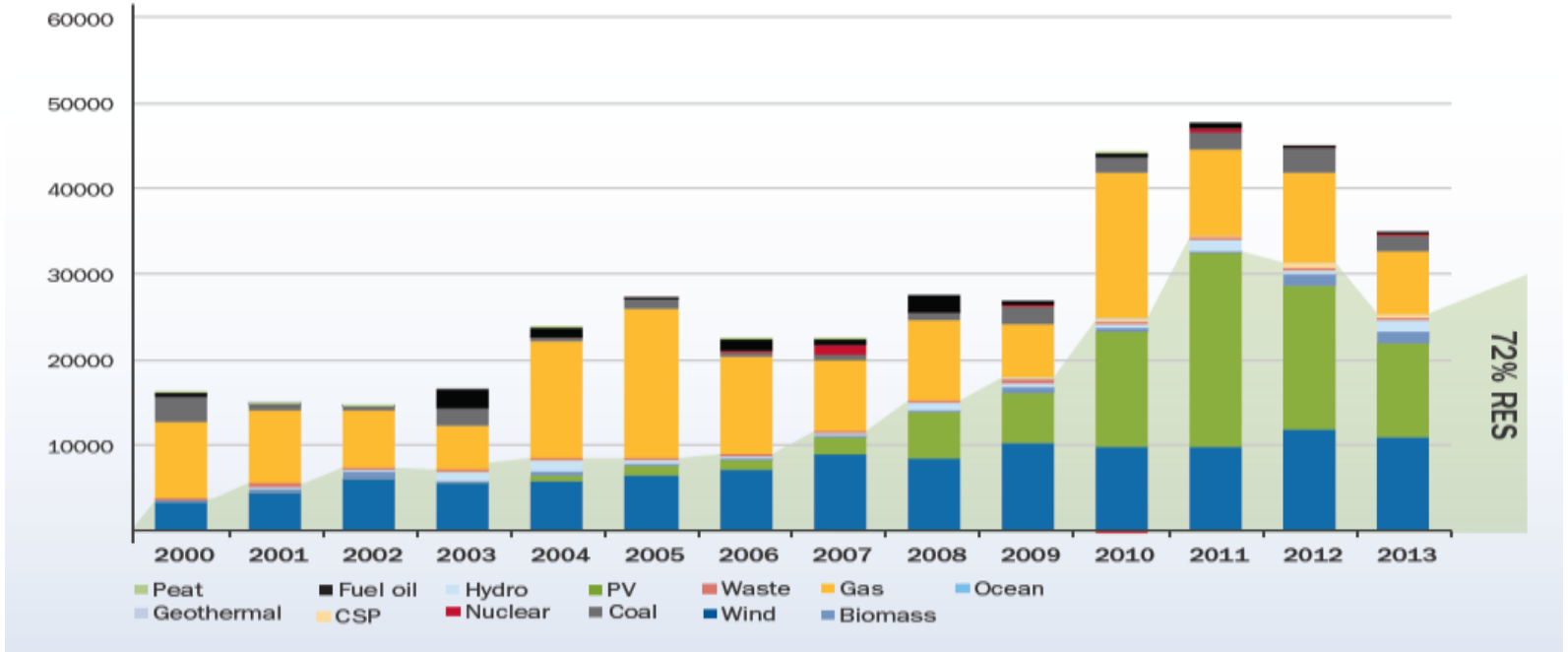
New EU Power Capacity
(per year in MW)







Source: EWEA – Wind in Power: Annual Statistics 2013

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Structure

I. Development of Europe’s Energy Mix

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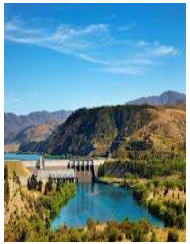
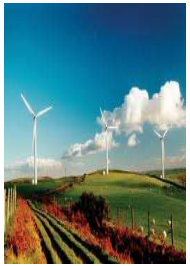
Old, tired, inflexible, insufficient: Europe's Grid today





- In most Member States, the grids are still able to accommodate all renewables fed in.
  → But shares of renewables are increasing.
- Member States and grid operators have not fully accepted their responsibilities to manage the transition to a renewables based power system.
- **Lack of cooperation between transmission and distribution level**
- **Lack of interconnections on transmission level**
- **Lack of (smart) grid management**

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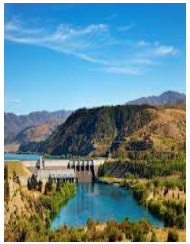
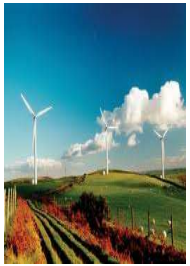
A Major Obstacle for the Transition: Inflexible Baseload





- Increasing shares of **variable Renewables (VRE)** increase the **need for flexible capacities**.
- New **inflexible capacities** increase the need for new **power lines** and/or **curtailing** of power plants and thus increase the system **costs**

☝ **Member States continue to plan new coal & nuclear ("baseload") power plants**, thus limiting grid capacity and availability for VRE.

☝ **Lock-in of "baseload"** is incompatible with smart and flexible power systems of the future.

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WHY is this a PROBLEM?

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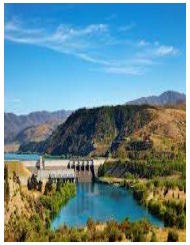
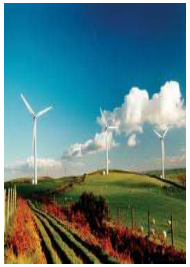
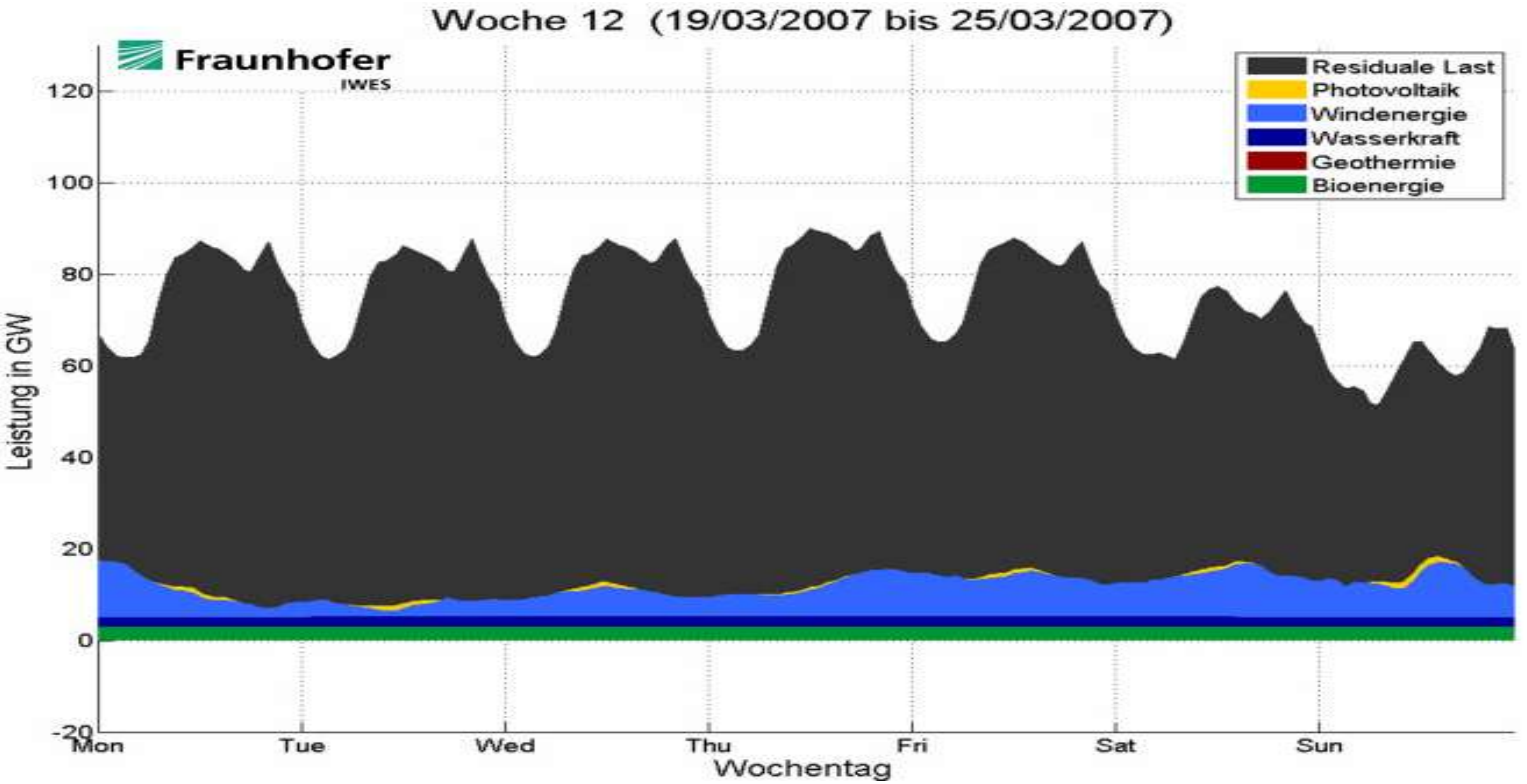
(Example: Germany 2007)

Logic of the Power System: Demand, Supply, Residual Load







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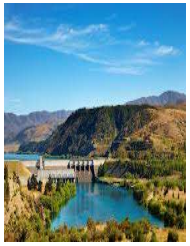
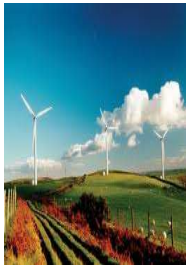
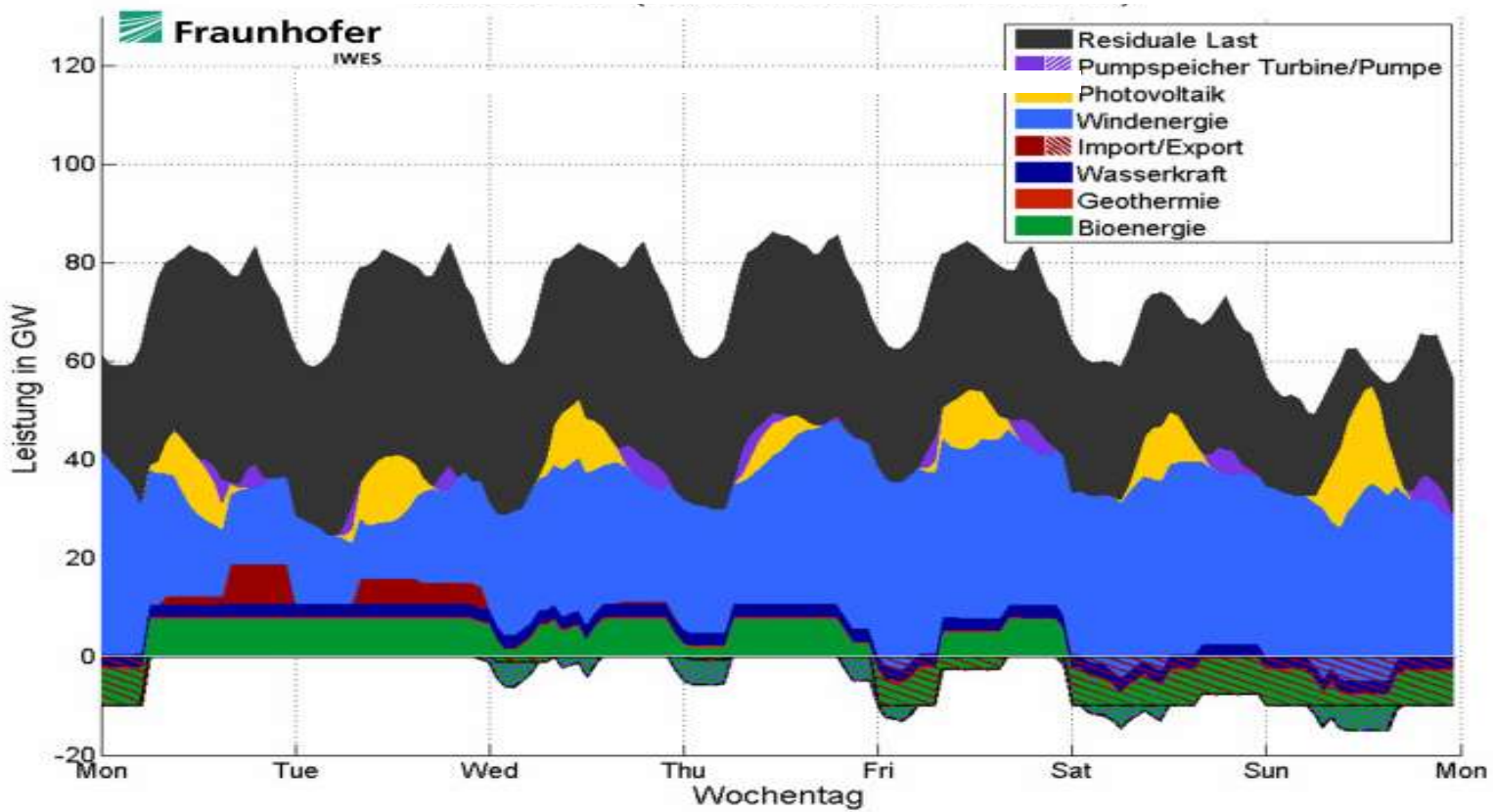
… towards >50% Renewables







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HOW can it be DONE?

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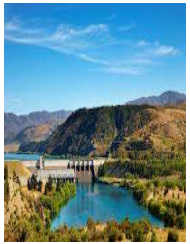
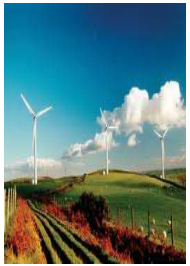
To be Designed for Renewables: the Future Grid





- High shares of **variable power sources**
  → Wind and solar power: „baseload “ of the future.
- Large scale **cross-border** energy trading,
- Improved **power flow controls** at transmission level
  → e.g. HVDC, flexible AC transmission systems
- Strong **across-regions-deployment** of various RES
  → Modern Distribution Grids needed
  → Cross-border grid ancillary services
  → Interaction of dispersed generation
  → Regional interconnection and local distribution
  → Mini- and micro-grids to be integrated
  → Demand side integration

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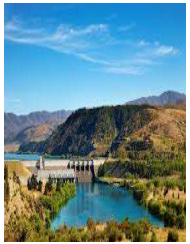
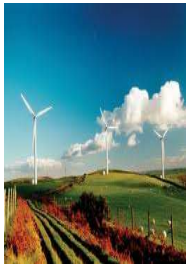
From Integrating Renewables to System Transformation





- Transformation towards a renewables-based energy system requires **clear policy decisions** and interaction between **all three sectors** (electricity, heating & cooling and transport).
- Transformation requires faster **grid extension and/or enhancement** on all levels – domestic and cross-boarder.
- Infrastructure needs to be adjusted to a **smart mix of decentralized and centralized** and more **variable power generation**.

Major obstacles to be overcome:

- Public acceptance & support
- Planning approval procedure delays
- Political and economic shortcomings of grid regulation

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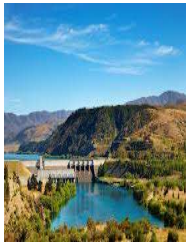
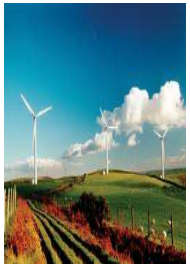
Three Policy Recommendations





- A **clear vision** for the future energy mix (100% RE) and for the energy system of the future – integrating all sectors and all sources of RE, centralized and decentralized, large and small.
- Remaining **barriers** for swift planning and implementation have **to be removed** – incentives and financing rules to be adjusted.
- **Clear and unambiguous policy decisions** for smooth and rapid **system transformation** – in particular smart grid enhancement (and extension where needed).

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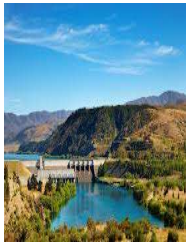
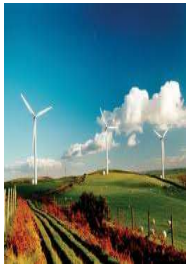
Curing the deficits





- → Improve energy **infrastructure**
- → Developing **flexibility-driven** energy **market design**
- → **Completing Internal Energy Market** including fair access for independent and new market players
- → Effective **carbon pricing**: ETS-relaunch (and tax)
- → **Convergence** of national **RES-support policies**
- → **Phasing-out** conventional and nuclear **subsidies**

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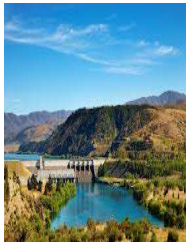
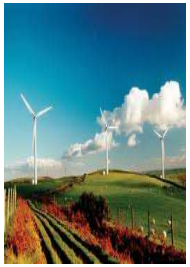
Strong Policies for Renewables





Remove policy uncertainty

- **New and strong political commitment** to **Renewable Energy & Efficiency** instead of “low carbon energy mix”
- Fully implement **2020** targets
- Agree on integrated Climate and Energy Framework **2030**
- Include binding and mutually reinforcing **ambitious targets** for GHG-reduction, Energy Efficiency and Renewable Energy (EU- and national targets)

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Dziękuję bardzo!

Thank you!

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