

TRANSITIONING TOWARDS ENERGY EFFICIENCY: THE CASE OF GERMANY

Alexander Ochs, SD Strategies

Astana, Kazakhstan - 11 August 2017

OUTLINE

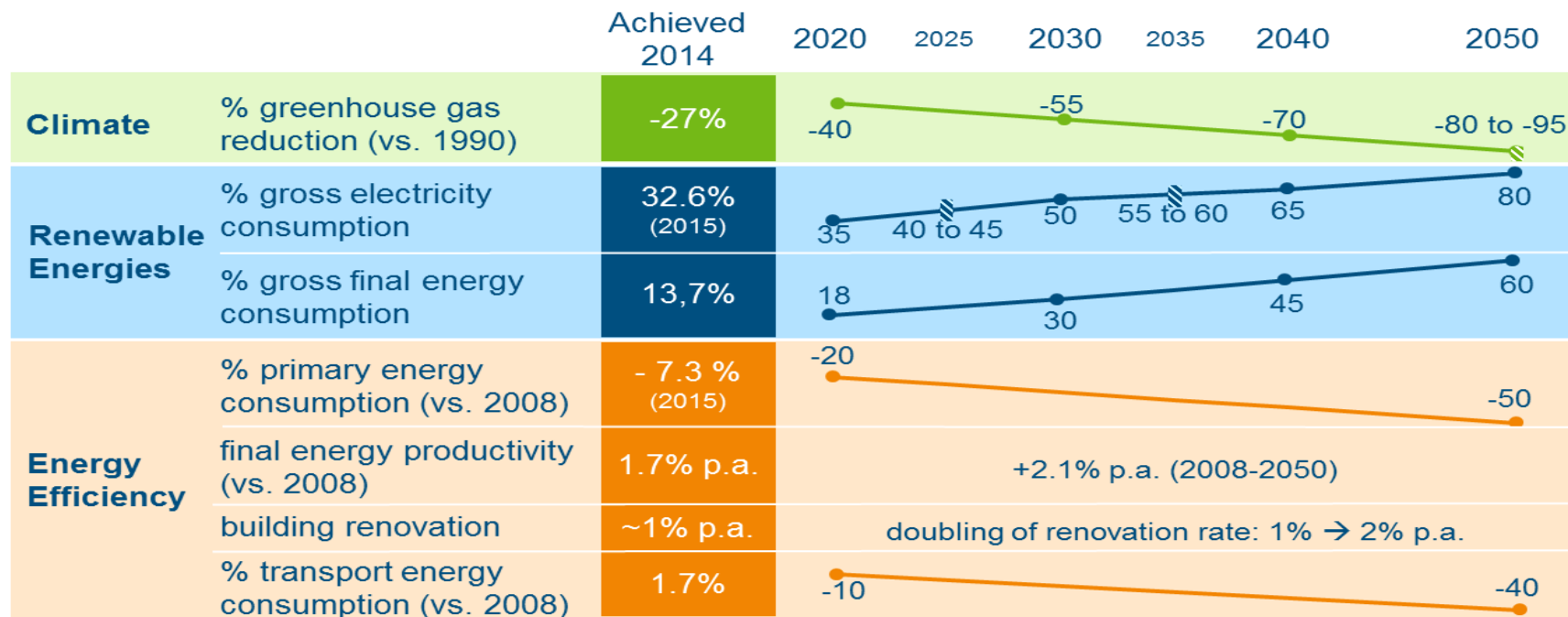
1. The German 'Energiewende':
The RE Success Story
2. Energy Efficiency in the
'Energiewende'
3. Impacts & Conclusions



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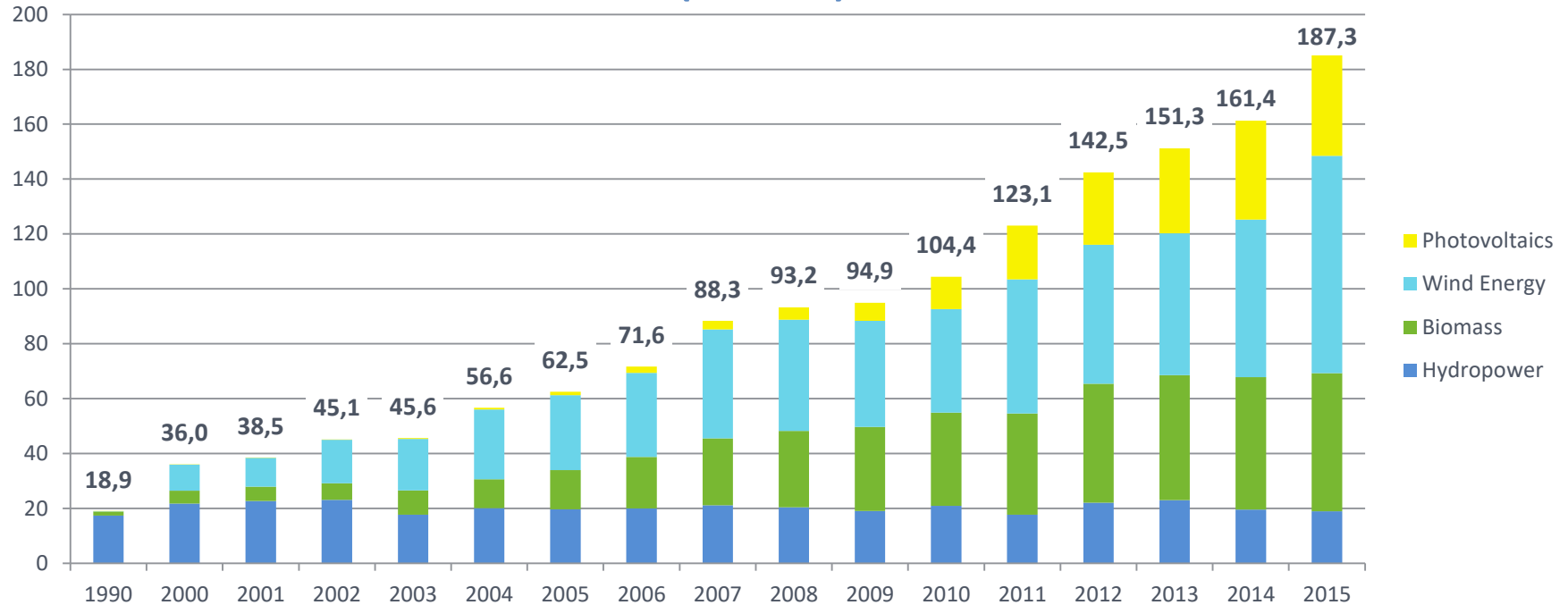


THE GERMAN ENERGIEWENDE: TARGETS TO 2050



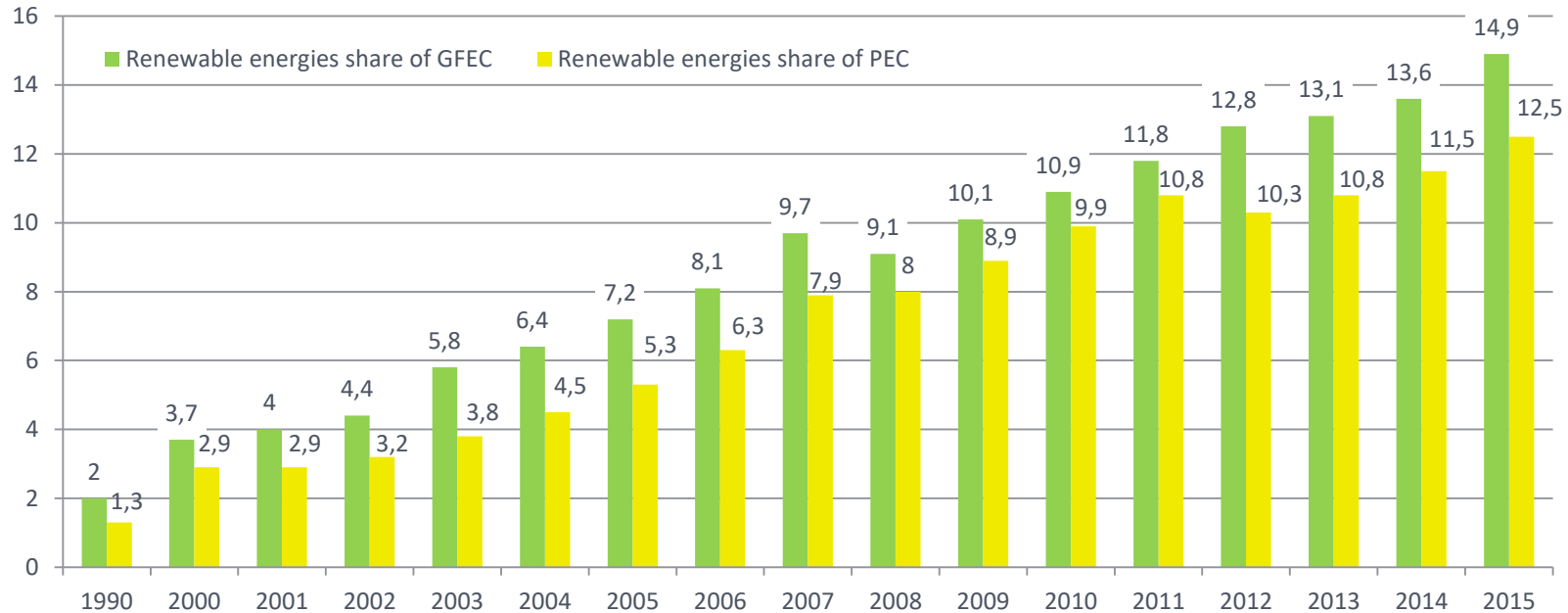
From: BMWi 2017. Source: Federal Government 2010, BMU/BMWi 2014, BMWi 2015, AGEE-Stat 2014, AGEE 2015, BMWi 2016

ELECTRICITY GENERATION FROM RENEWABLE SOURCES IN GERMANY (TWH)



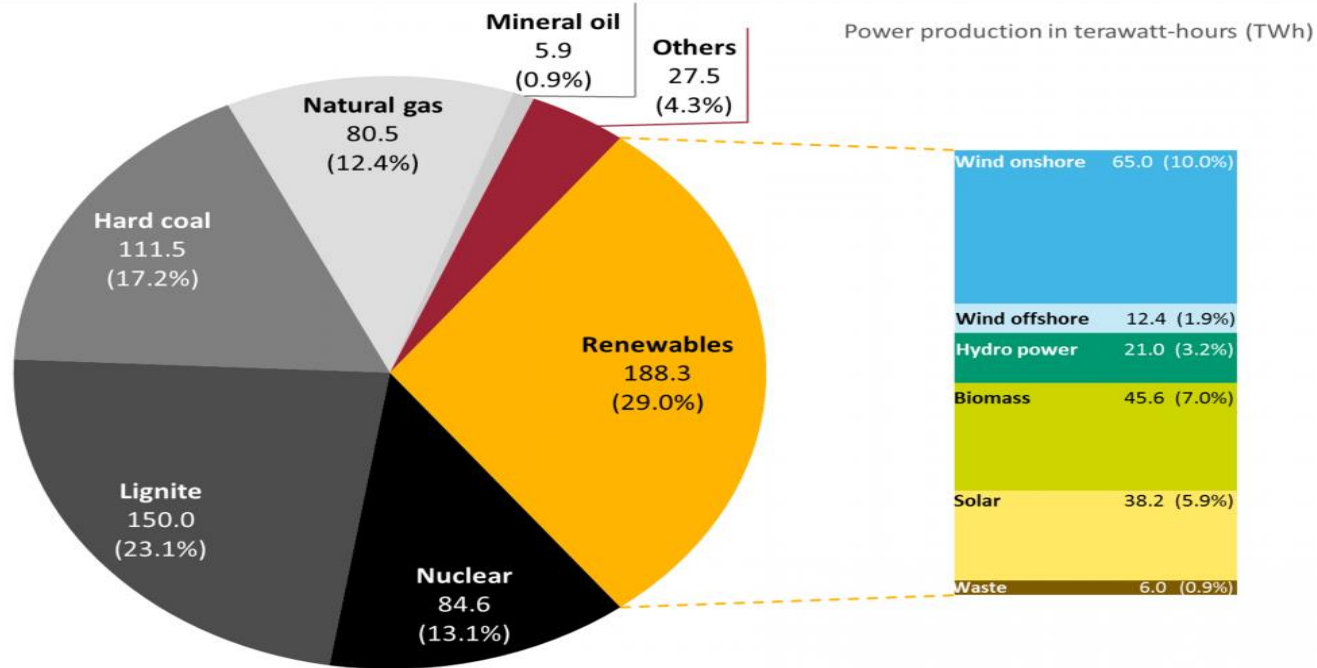
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RENEWABLE ENERGY SHARES OF FINAL AND PRIMARY ENERGY CONSUMPTION IN GERMANY (%)



© SD STRATEGIES 2017. Source: Federal Ministry for Economic Affairs and Energy (BMWi) 2016

THE ELECTRICITY MIX IN GERMANY 2016



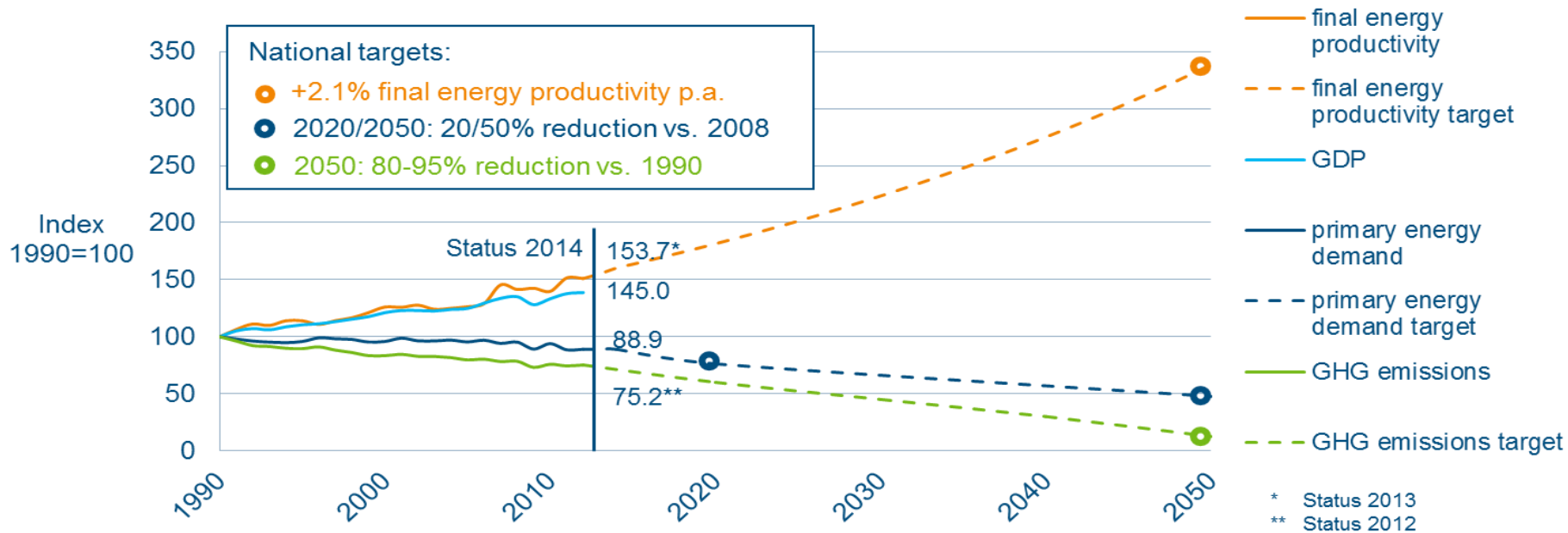
From: Clean Energy Wire, 2017. Source: AG Energiebilanzen 2017

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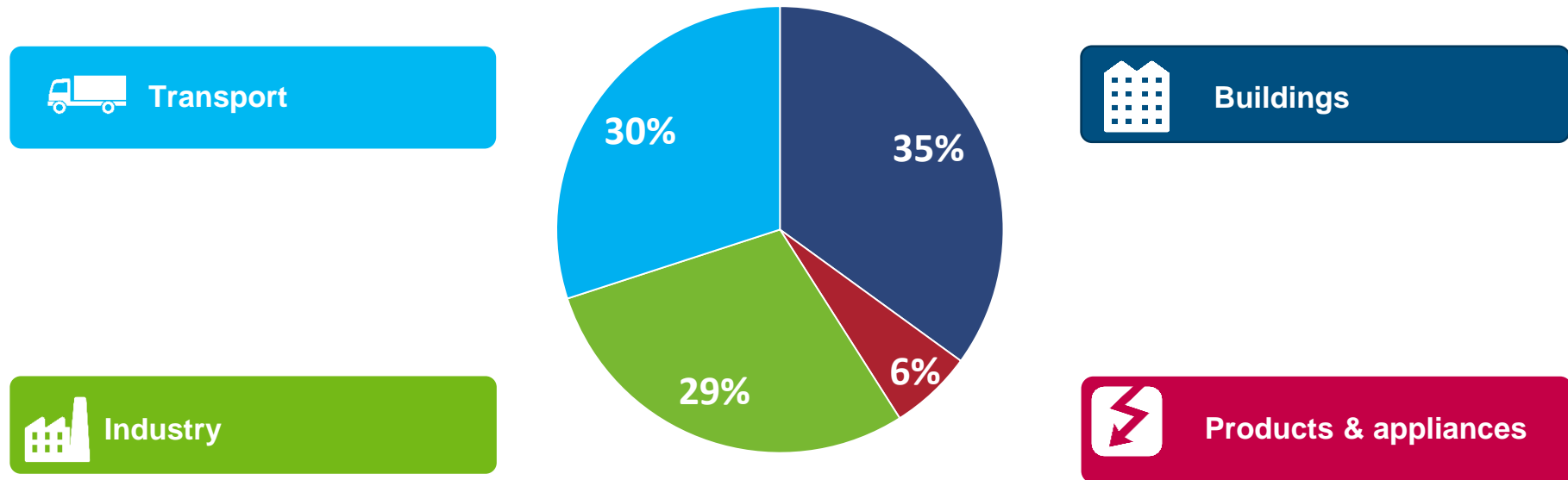


GERMANY'S EFFICIENCY TARGETS



Source: Ecofys 2015

SECTORAL SHARES OF FINAL ENERGY CONSUMPTION



Source: Ecofys 2015 based on AGEb, 2014, BMWi 2014, dena 2011

NATIONAL ACTION PLAN ON ENERGY EFFICIENCY AS PART OF THE ENERGIEWENDE: 3 KEY PILLARS



1. Stepping up energy efficiency
in **buildings**



2. Energy efficiency as a return and
business model



3. **Individual** responsibility for energy
efficiency

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CENTRAL SHORT TERM MEASURES OF NAPE



Introducing new competitive tendering for energy efficiency



Raising funding for building renovation (CO₂ Building Renovation Programme)



Introducing tax incentives for efficiency measures in the building sector supported by the Federal Government and state governments



Setting up energy efficiency networks together with business and industry

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ENERGY EFFICIENCY = ECONOMIC EFFICIENCY

- Investment in accelerated energy efficiency yields **increasing cost savings**, up to **€ 46.5 bn**, and **+1.0% GDP in 2050**
- Germany **avoided \$US 30 bn of fossil fuel imports** in 2014
- Decoupling growth and consumption**
 - Primary Energy Productivity + **1.7% p.a**
 - Economic Output + **1.4% p.a**
 - Primary Energy Consumption – **0.3% p.a**

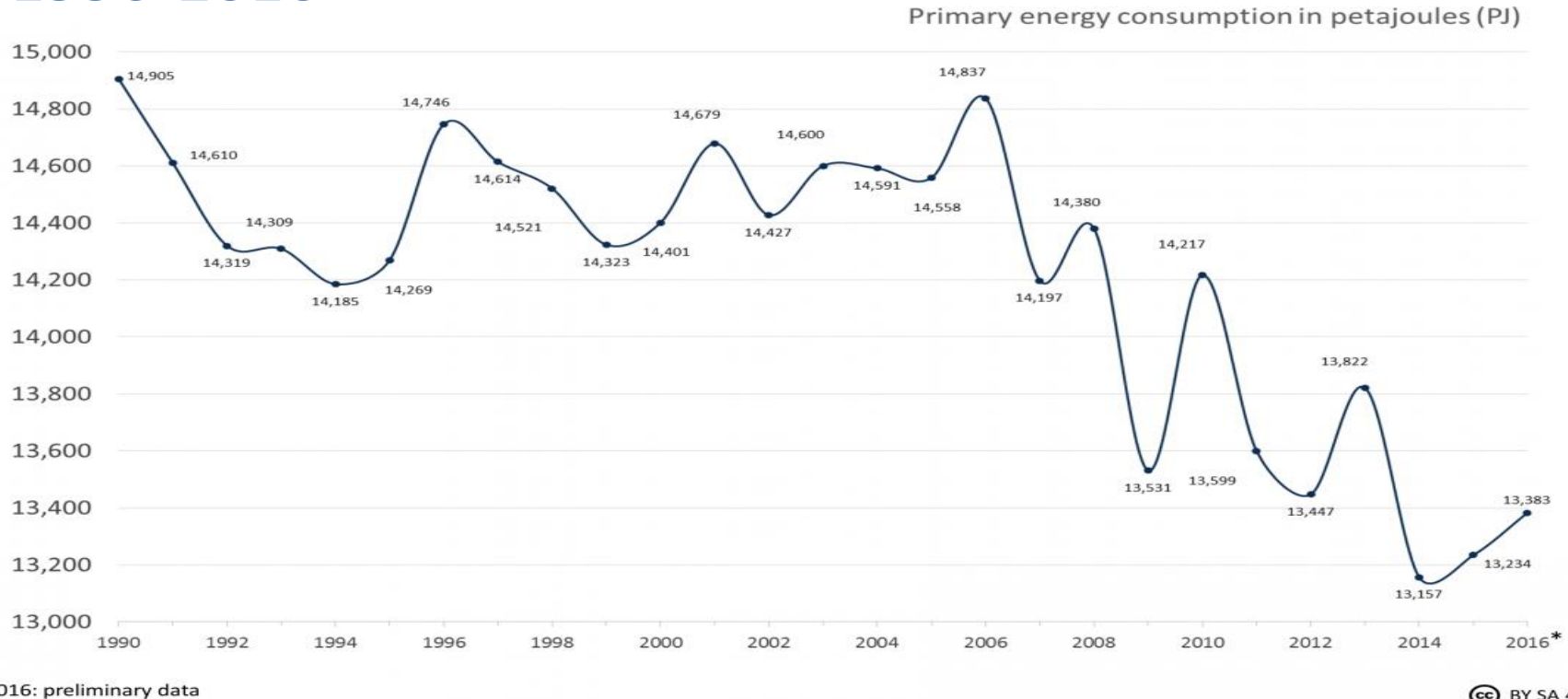
Investment for Accelerated Increase in Energy Efficiency and Additional Energy Cost Savings

Differences between modernization and reference scenarios in billion euros (at 2000 prices)

	2020	2030	2050
Energy upgrades to residential buildings			
Investment	7.4	9	14
Energy cost savings	3.8	11.1	32
Measures in other sectors			
Investment	4.2	4.7	4.7
Energy cost savings	6.4	9.3	14.5
Total			
Investment	11.6	13.8	18.7
Energy cost savings	10.2	20.4	46.5

Source: DIW Berlin, 2014

PRIMARY ENERGY CONSUMPTION IN GERMANY 1990-2016



From: Clean Energy Wire, 2017. Source: AG Energiebilanzen 2017

FUTURE EE POTENTIALS IN DIFFERENT SECTORS

SPECIFIC MEASURES:



Quality assurance and optimising of energy consulting	4.0 PJ
Incentive programme for energy-efficient renovation	up to 40 PJ
Continuation and increased funding of the CO2 building modernisation programme	12.5 PJ
Promoting "energy performance contracting"	5.5-10 PJ
National energy-efficiency label for old heating installations	10.0 PJ

32-76.5 PJ
savings



National top runner initiative	85.0 PJ
Pilot programme for energy savings meters	-

85 PJ
savings



Introduction of a competitive tendering scheme for energy efficiency	26-51.5 PJ
Upgrading the KfW energy efficiency programmes	29.5 PJ
Energy efficiency networks initiative	74.5 PJ
Obligation to perform energy audits for non-SMEs	50.5 PJ

180.5-206 PJ
savings

From: BMWi, 2017. Source: Ecofys 2015 based on BMWi 2014

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JOB CREATION THROUGH EE IN DIFFERENT SECTORS

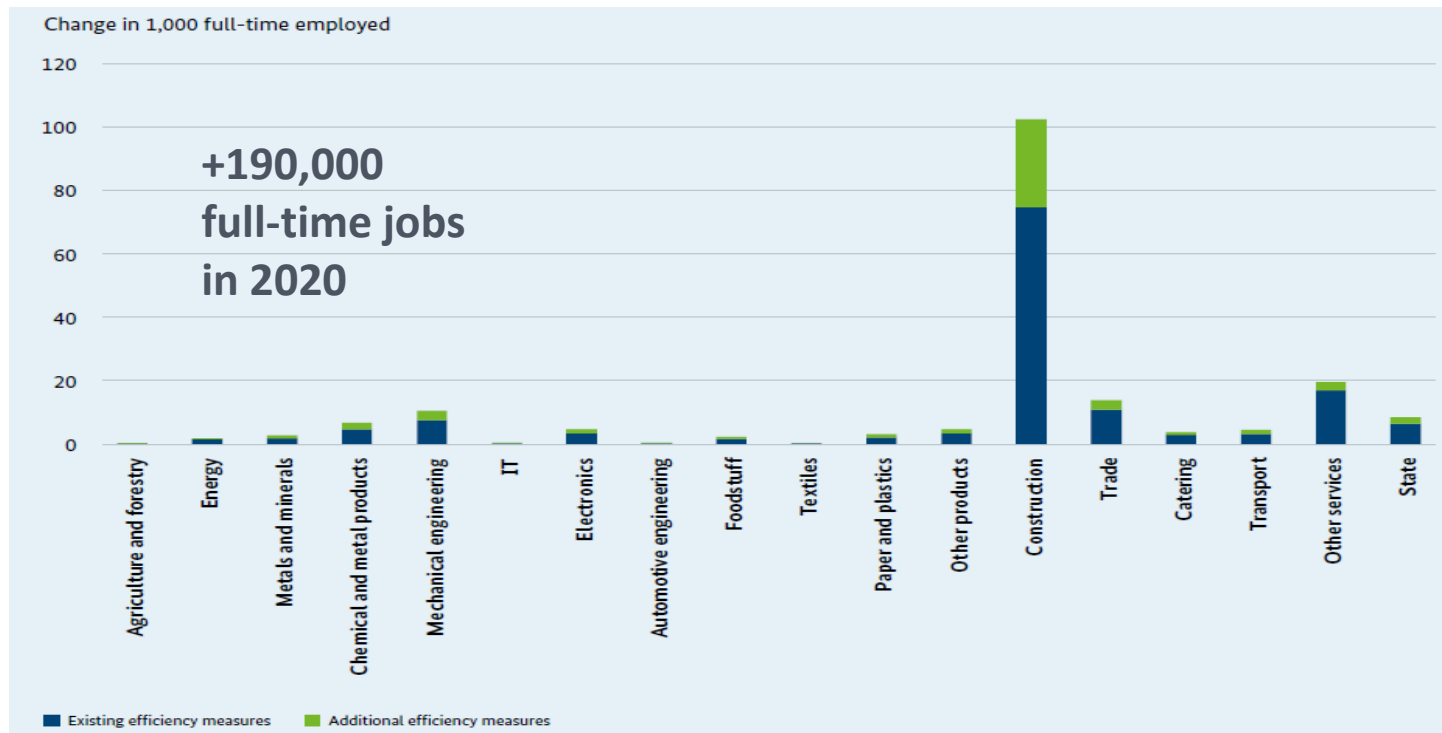
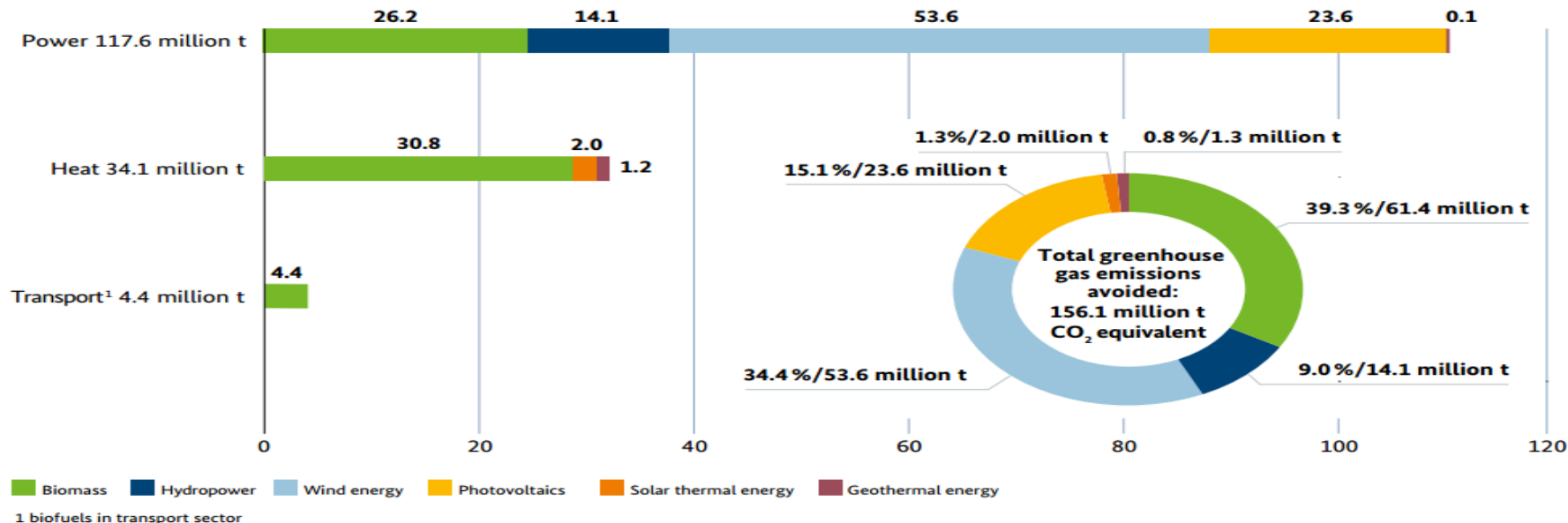


Figure from: BMWi, 'Green Paper on Energy Efficiency', 2016.
Sources: Ecofys/Fraunhofer ISI/IREES/Öko-Institut/BMWi, 2016

ENERGIEWENDE GHG EMISSIONS IMPACTS

Net balance of GHG emissions avoided through use of renewable energy in 2015

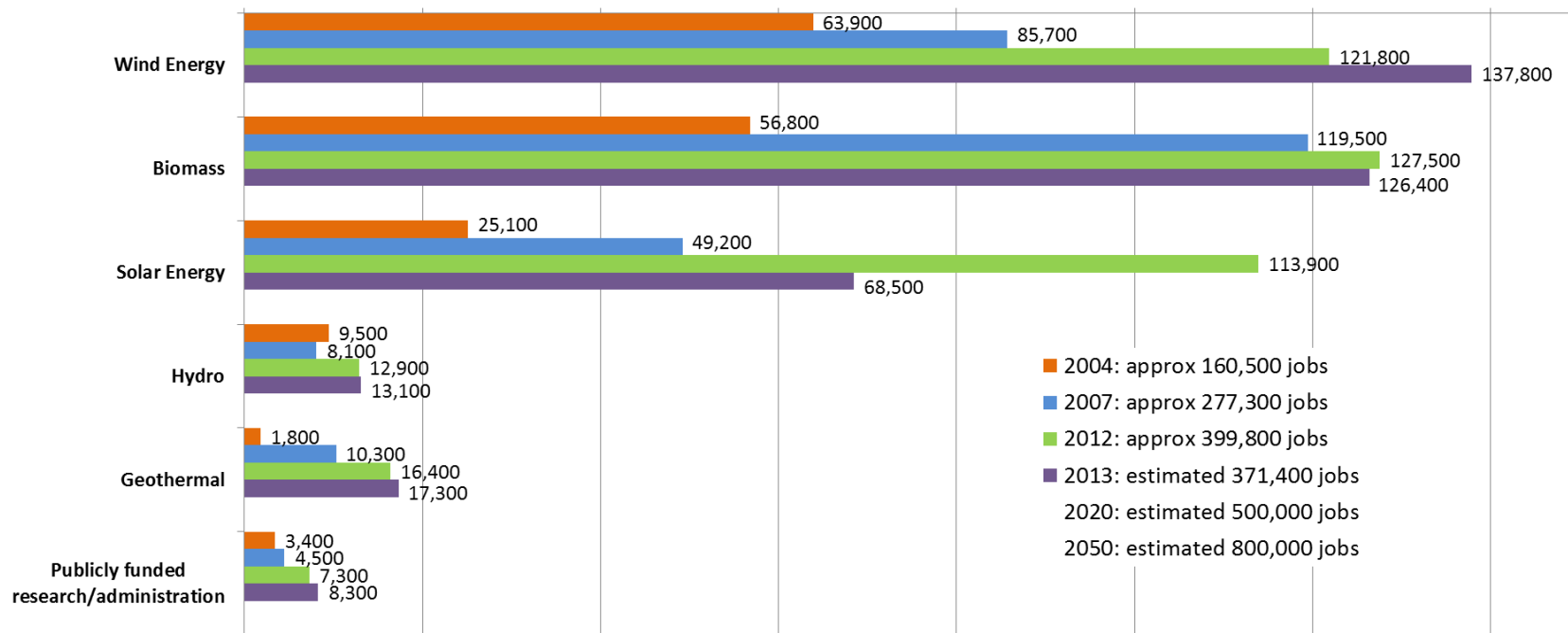
million t CO₂ equivalent



From: BMWi, 'Renewable Energy Sources in Figures', 2016. Source: UBA, based on sources quoted therein. 2014

ENERGIEWENDE IMPACTS: DIRECT JOBS

Jobs created per renewable energy technology



© SD STRATEGIES 2017. Sources: BMWi, Germany.info

CONCLUSIONS

- Decoupling of economic development and energy consumption is possible
- Immediate upfront costs vs. long-term savings
- Danger of rebound effects & low energy prices
- Importance of policies
 - Support programs & incentives exhausted?
 - Need for tighter regulation and/or financial instruments
- Future opportunities through digitalization
- Need for integrated, comprehensive approach:
 - Supply, consumption, transmission & distribution, storage
 - Power, transport, economic sectors

THANK YOU

Alexander Ochs, SD Strategies
ochs@sd-strategies.com

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OBSTACLES AND ENABLERS: INDUSTRIAL EFFICIENCY

Barriers



- Amortization requirements
- Operational write-offs
- Financing
- Upfront-investment
- Lack of information and time

Enablers



- Energy audits
- Energy management systems
- Energy efficiency networks
- Grants for cross-cutting technologies and energy efficient production processes
- Competitive tendering
- KfW grants and loans