

Overview of Thailand Integrated Energy Blueprint

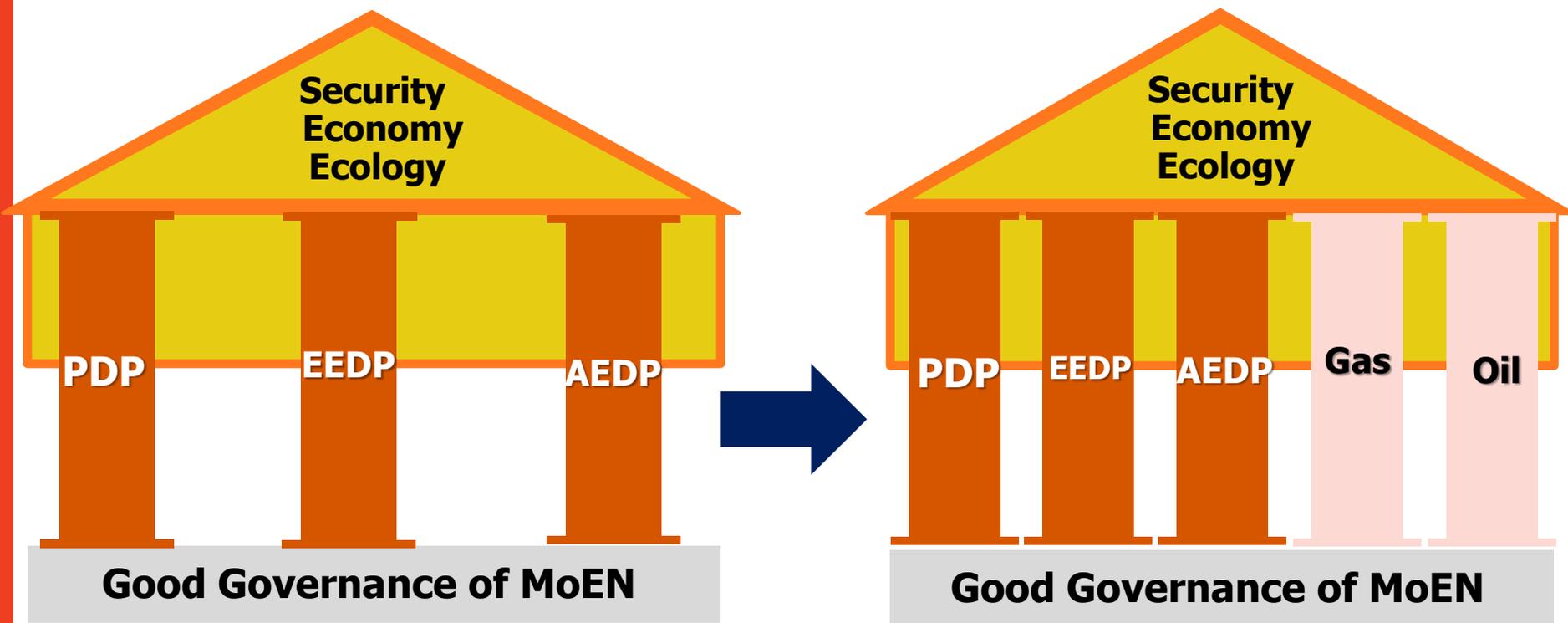
Dr. Twarath Sutabutr,
Deputy Permanent Secretary
Ministry of Energy, Thailand
10th – 11th June 2015



Outline

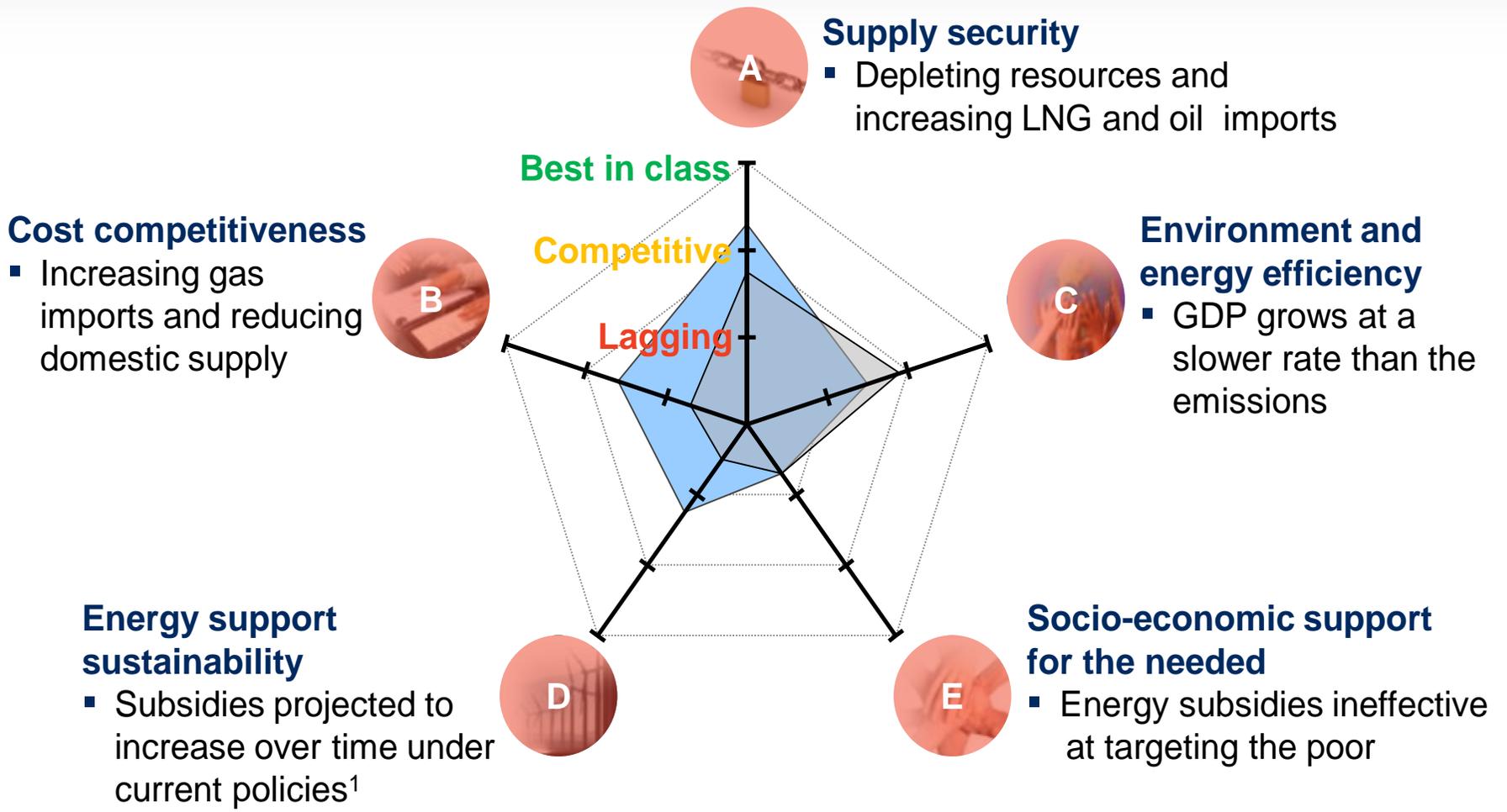
- **TIEB: Thailand's Energy Sector and its challenges**
- **Enhancing competitiveness along the 5 dimensions**
- **Bold moves to change the landscape of energy sector**
- **5 master plans as the pillars of energy development**

Thailand Integrated Energy Blueprint



Assessment of Thailand's current energy status and evolution trajectory relative to international benchmarks

 2035 (legacy plans)
 2012



¹ Forecast based on maintaining current level of fuel subsidies per unit of fuel consumed

SOURCE: Team analysis, LEAP data, IEA energy balances, IEA emission factors

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Thailand's opportunities in light of emerging technology, market conditions and resource base

Thailand resource base

- **Biomass/biofuels:** Abundant agricultural feedstock
- **Solar PV:** Good irradiation
- **Hydropower, Oil & Gas:** Proximity to countries with untapped resources (Laos, Myanmar, Cambodia)



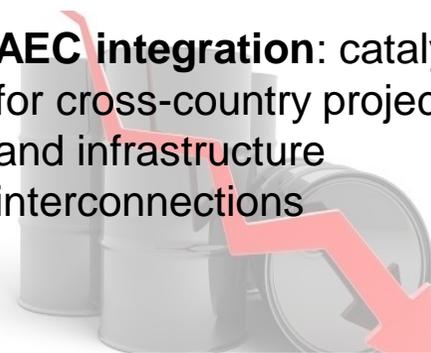
Technology

- **Renewable power:** Rapidly declining cost of solar
- **Biofuels:** Prospects of 2nd/3rd generation biofuels
- **Coal power:** High efficiency, low emissions clean coal technology now on-stream
- **Oil & Gas:** Breakthroughs in extraction and recovery

Window of opportunity for Thailand

Market conditions

- **Oil price decline** and growing momentum for **subsidy reform** across ASEAN
- **AEC integration:** catalyst for cross-country projects and infrastructure interconnections



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Plans need to include “bold moves” to shape Thailand outcomes

		Description	Impact
Energy Efficiency		<ul style="list-style-type: none"> Remove subsidies to convey market price signal Accelerate EE execution via benchmarking, accountability and enforcement 	<ul style="list-style-type: none"> Achieve 30% energy intensity reduction (vs. 0.5% p.a. increase over last 10 years)
Conventional power (PDP)		<ul style="list-style-type: none"> Rebalance power mix with clean coal technology deployment for half of all new thermal plants 	<ul style="list-style-type: none"> Reach 30% coal in power mix vs. 20% today 20% clean coal vs. only normal coal today
Renewables (AEDP)		<ul style="list-style-type: none"> Three pronged approach for cost effective scale up of renewables: <ul style="list-style-type: none"> Drive: Biomass and waste Pace: Solar Monitor: Wind 	<ul style="list-style-type: none"> Achieve cost < LNG parity for 20% RES share in power mix (vs. ~8% today)
Biofuels (AEDP)		<ul style="list-style-type: none"> Improve yield to limit imports and benefit rural community 	<ul style="list-style-type: none"> ~20% substitution in transport (vs. 4% today) Up to THB 50 Bln/y GDP impact
Oil & Gas		<ul style="list-style-type: none"> Counter production decline with E&P activity stimulus policies (“Reimagine Gulf of Thailand”) 	<ul style="list-style-type: none"> Limit domestic gas decline rate at ~2-5% p.a. (vs. -11% BAU)
Economics		<ul style="list-style-type: none"> Channel subsidies directly to target segments in need 	<ul style="list-style-type: none"> Unleash THB ~380B for productive use

Each “bold move” will contribute to shaping Thailand’s energy outcomes

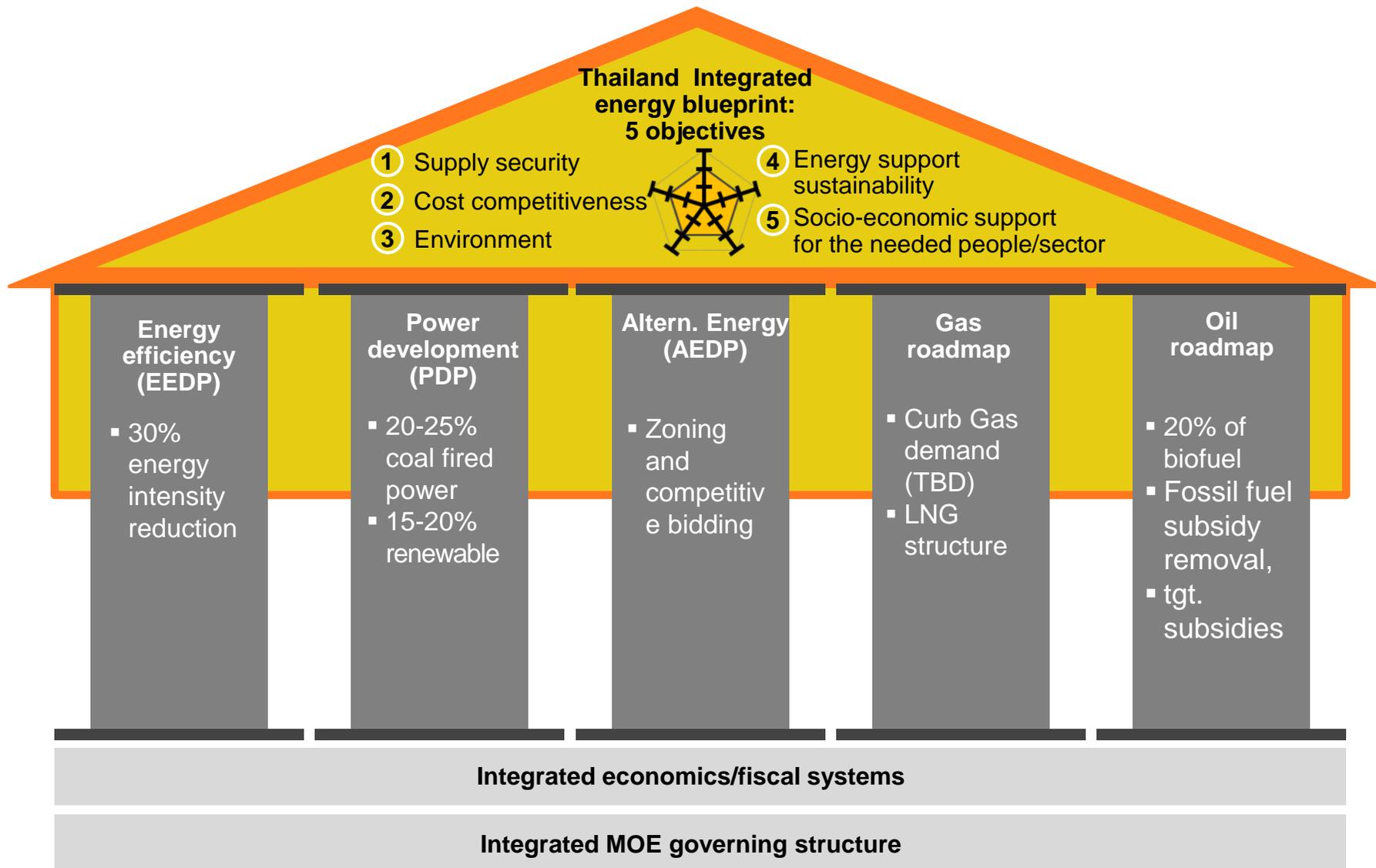
“Delta moves”	Impact on energy system				
	A) Supply security (% net imports)	B) Cost competitiveness (USD/TOE)	C) Environment (tCO2e/Mn GDP PPP)	D) Budget sustainability (% of GDP)	E) Support for the needed (% subsidies to poor)
Former plans 2036	63%	750	213	1.9%	~20%
Accelerate EE	← Delta moves in enforcement and accountability; no change in target →			-1.8%	
Rebalance power mix	~0	-33	+3		
Cost-effective renewables	-3 p.p.	-18	-7		
Bio-hub development	+1 p.p.	+2	+4	-0.1 p.p.	Accounted in subsidies reform
Reimagine Gulf of Thailand	-13 p.p.	-21			
Subsidies reform					+50 p.p.
Optimized 2036	48%	680	213	0.1%	~65%

Recalibrated target : 44% oil substitution to 19%

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Summary of Thailand Integrated Energy Blueprint

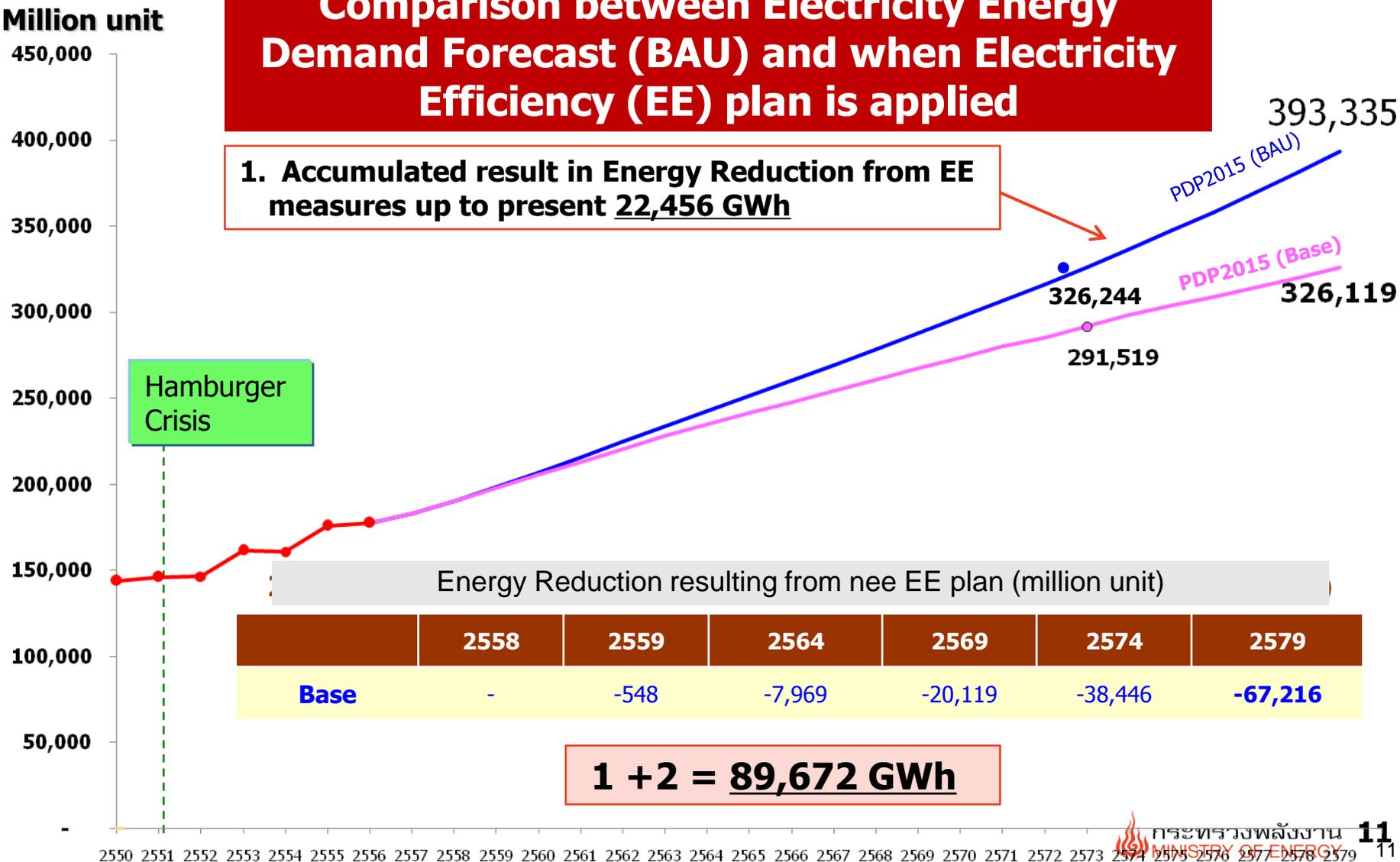


Summary of PDP 2015

Demand Forecast for Electricity 2016-2036

Comparison between Electricity Energy Demand Forecast (BAU) and when Electricity Efficiency (EE) plan is applied

1. Accumulated result in Energy Reduction from EE measures up to present 22,456 GWh



1 + 2 = 89,672 GWh

Summary of PDP 2015

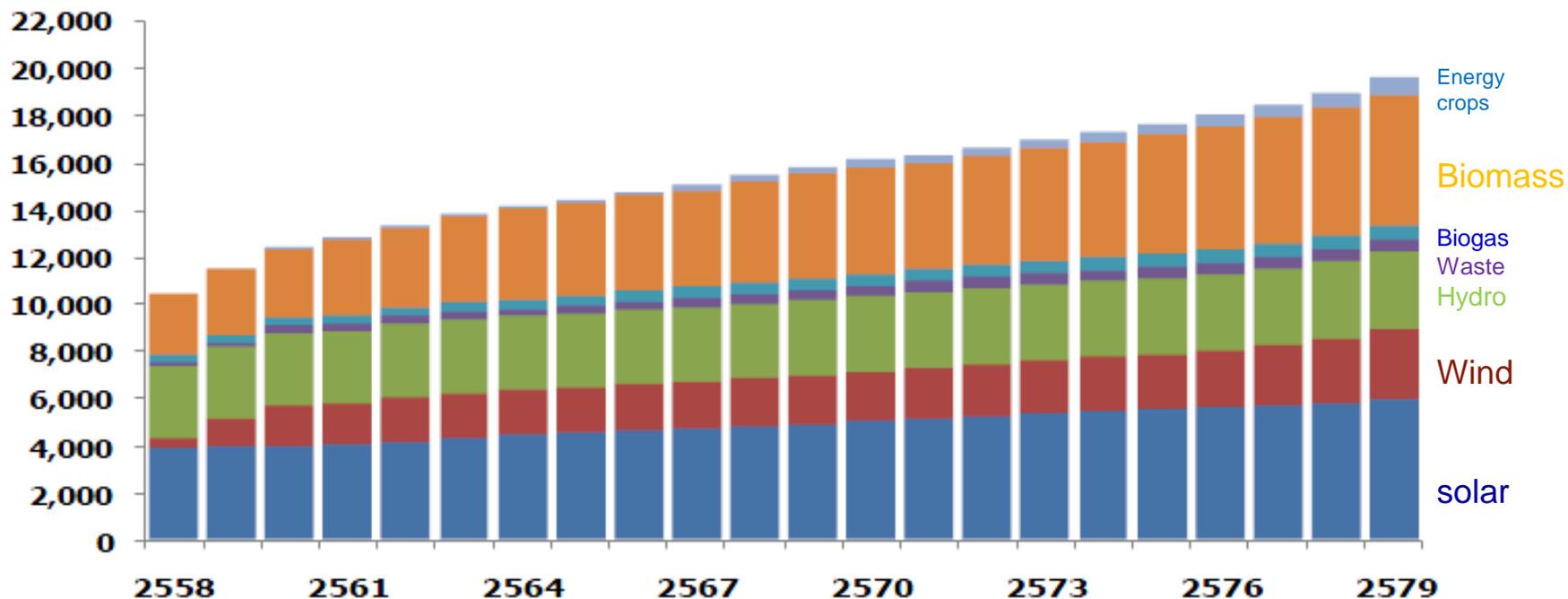
Estimated fuel mix (percentage)

PDP 2015				PDP2010 Rev.3
Fuel type	September 2014	2026	2036	2030
Purchasing from neighbouring countries	7	10-15	15 – 20	10
Clean coal and lignite	20	20-25	20 – 25	19
Renewable Energy	8	10-20	15 – 20	8
Natural Gas	64	45-50	30 – 40	58
Nuclear	-	-	0 – 5	5
Diesel/ Fuel Oil	1	-	-	-
Total	100	100	100	100

Target of Alternative Energy Development Plan (AEDP)

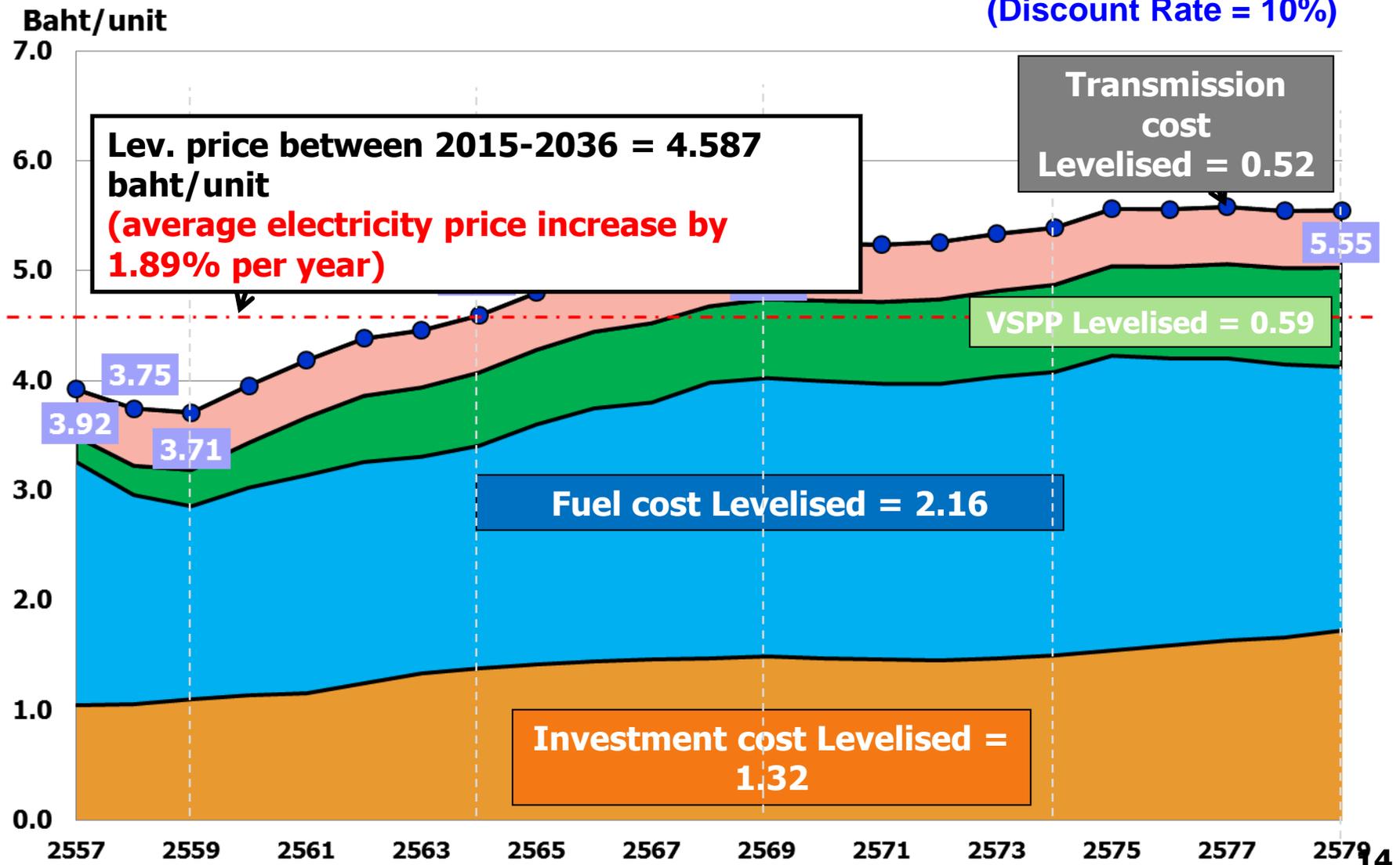
Type	Waste	Biomass	Biogas	Hydro	Wind	Solar	Energy crops	Total
Installed capacity 2014	48	2,199	226	3,016	220	1,570	-	<u>7,279</u>
Installed capacity 2036	501	5,570	600	3,282	3,002	6,000	680	<u>19,635</u>

Megawatt



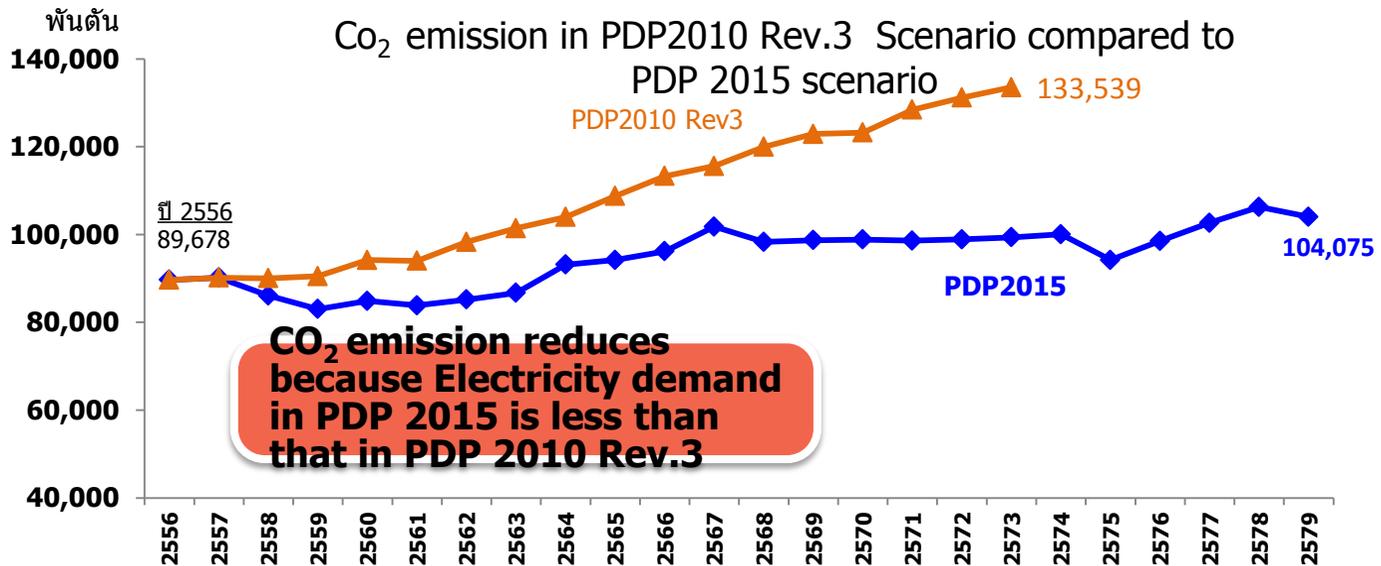
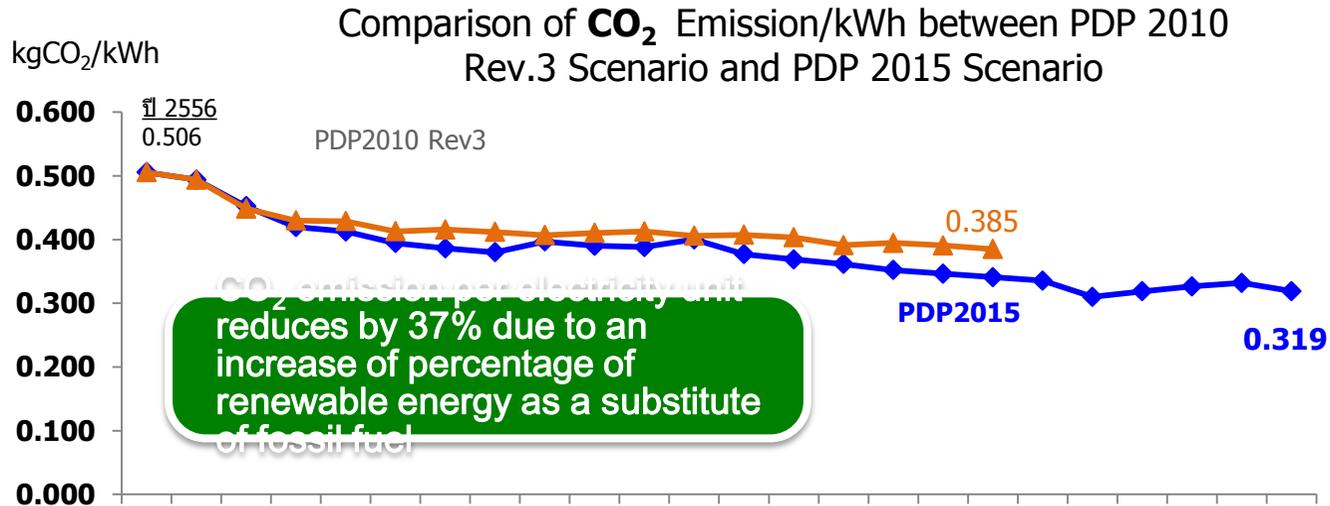
Summary of PDP 2015

Estimated retail electricity price



Summary of PDP 2015

CO₂ Emission



Incorporating “bold moves” will make Thailand internationally competitive along the five energy dimensions

Outcome of plans

Oil & Gas

- Domestic gas @ ~2% decline rate i.e. 2.2 bcf/d in 2036

EEDP

- 30% energy intensity reduction
- Fossil fuel subsidy removal, tgt. subsidies

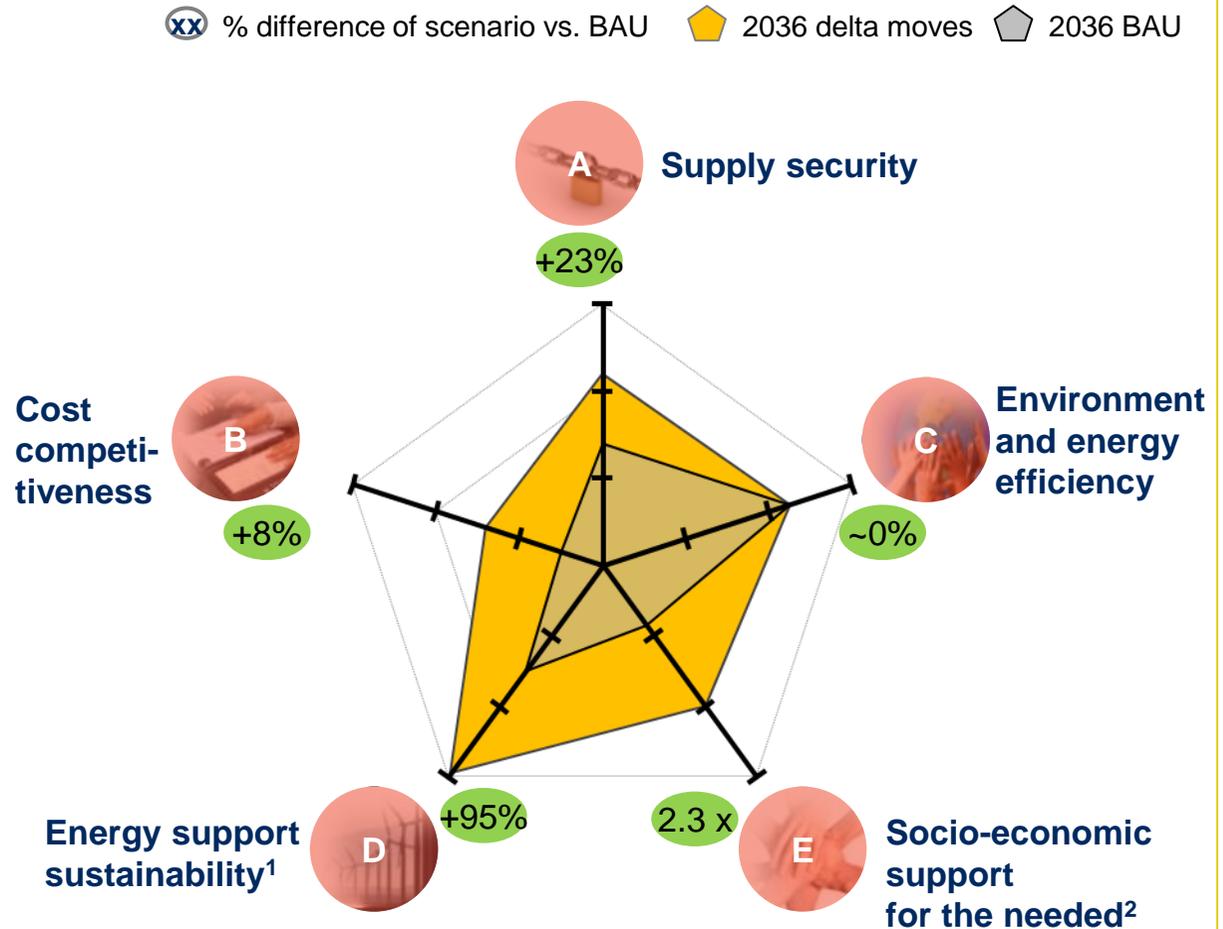
PDP

- (conventional power)
- 30% coal fired power

AEDP

- 20% RES generation
- 19% oil demand met by biofuels @ cost parity

Impact on energy system



1 Assuming fossil fuel subsidies are removed, but renewables are still subsidised; estimates based on Brazil case study

2 Assuming similar average success rate as other targeted subsidy schemes such as Bolsa Familia in Brazil



กระทรวงพลังงาน
MINISTRY OF ENERGY

Thank you

