



Energy Policy
and Planning Office

MINISTRY OF ENERGY

Overview of Thailand Integrated Energy Blueprint

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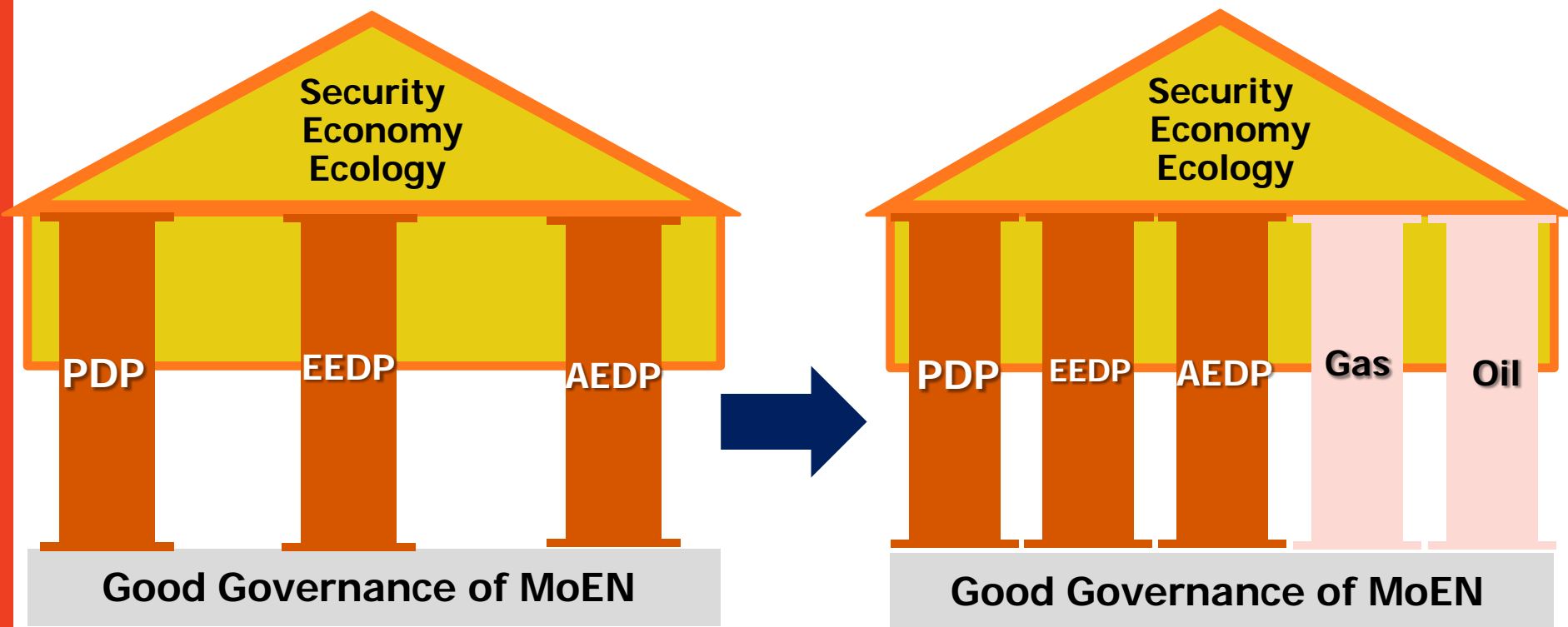


Outline

- **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**

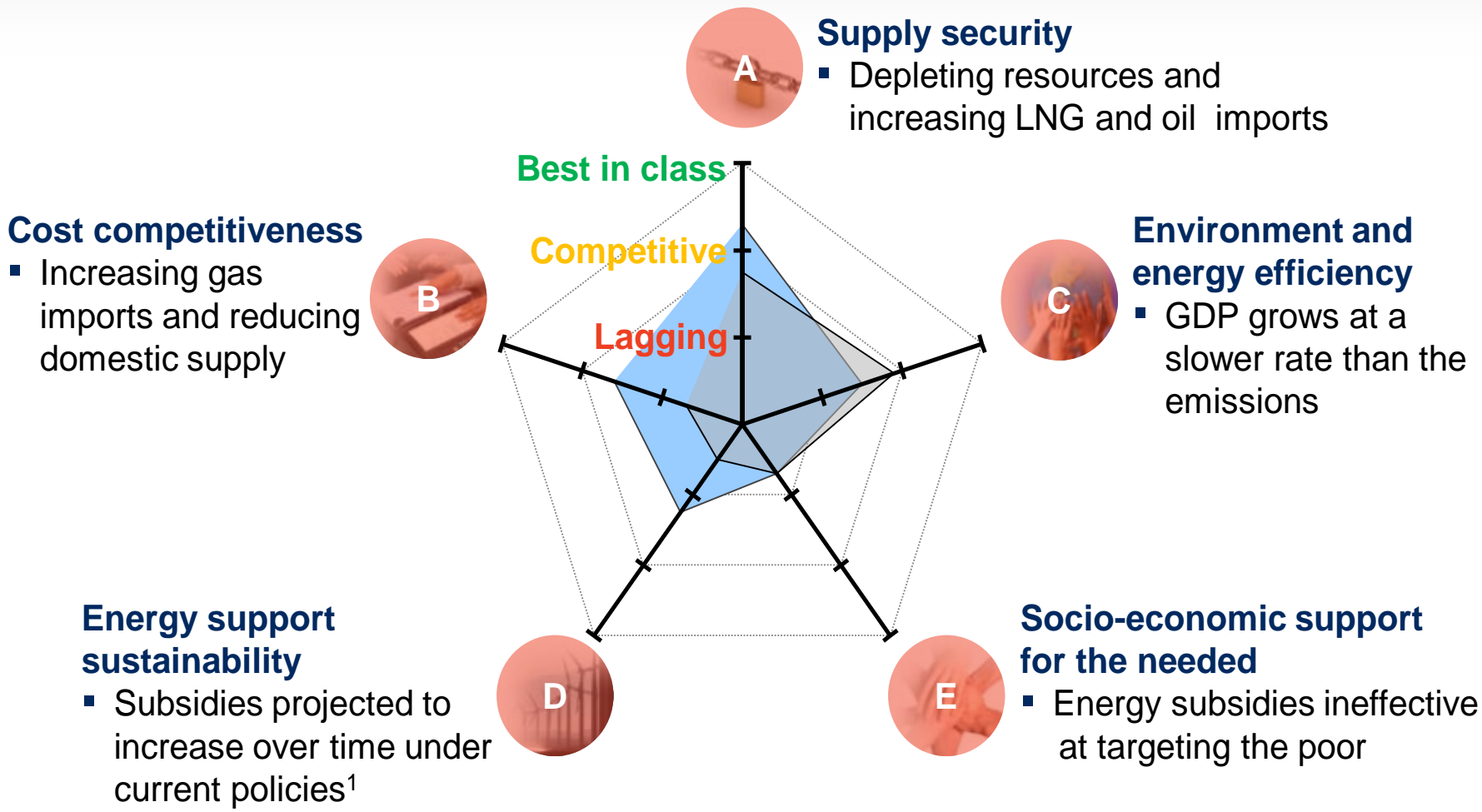


Thailand Integrated Energy Blueprint



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

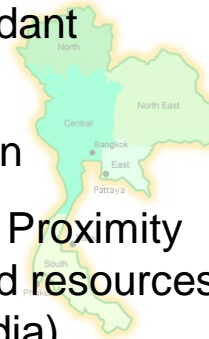
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Thailand's opportunities in light of emerging technology, market conditions and resource base

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

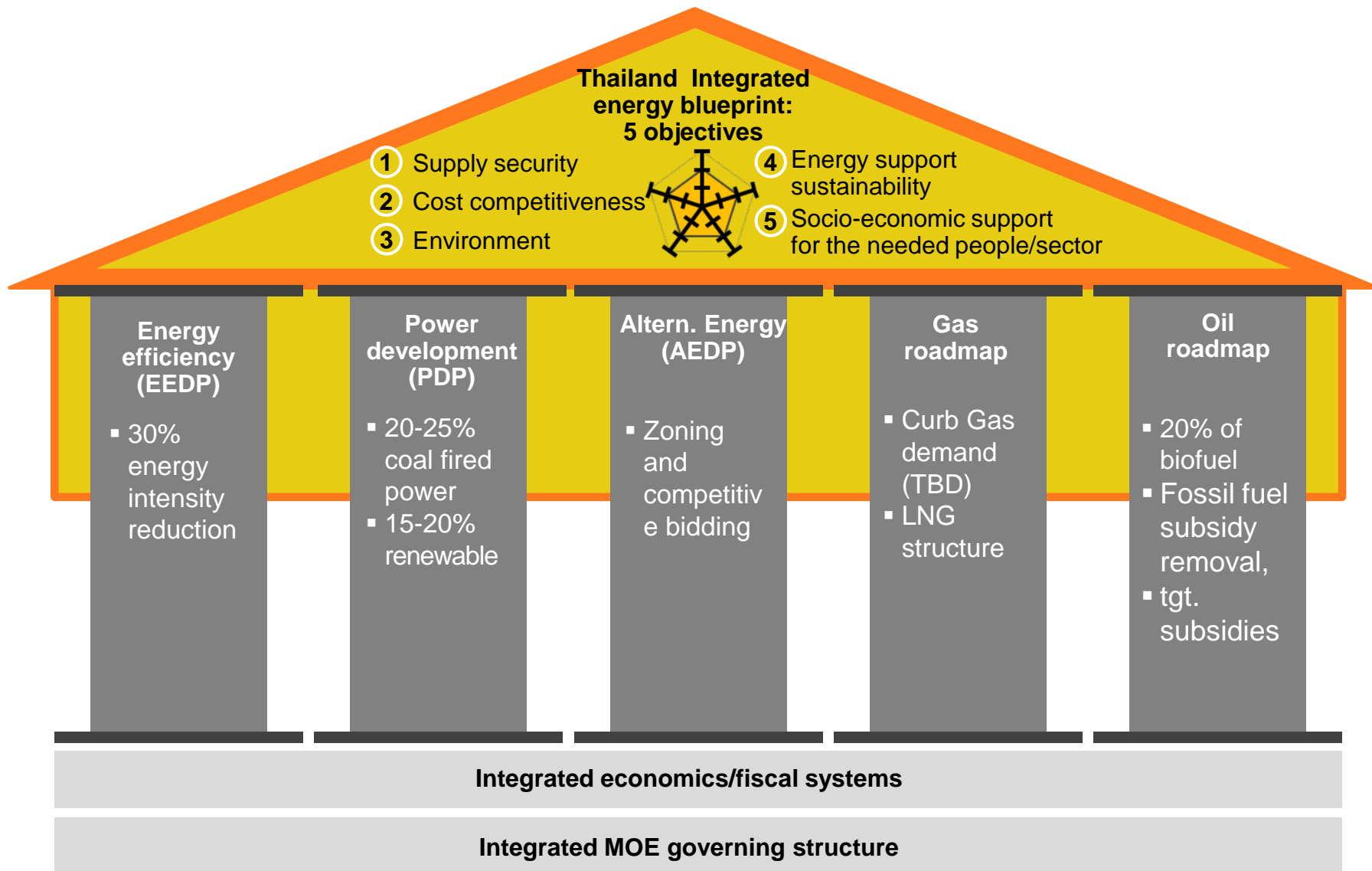
“Delta moves”	Impact on energy system				
	A) Supply security (% net imports)	B) Cost competitiveness (USD/TOE)	C) Environment (tCO2e/Mn GDP PPP)	D) Budget sustainability (% of GDP)	E) Support for the needed (% subsidies to poor)
Former plans 2036	63%	750	213	1.9%	~20%
Accelerate EE	← Delta moves in 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%

Outline

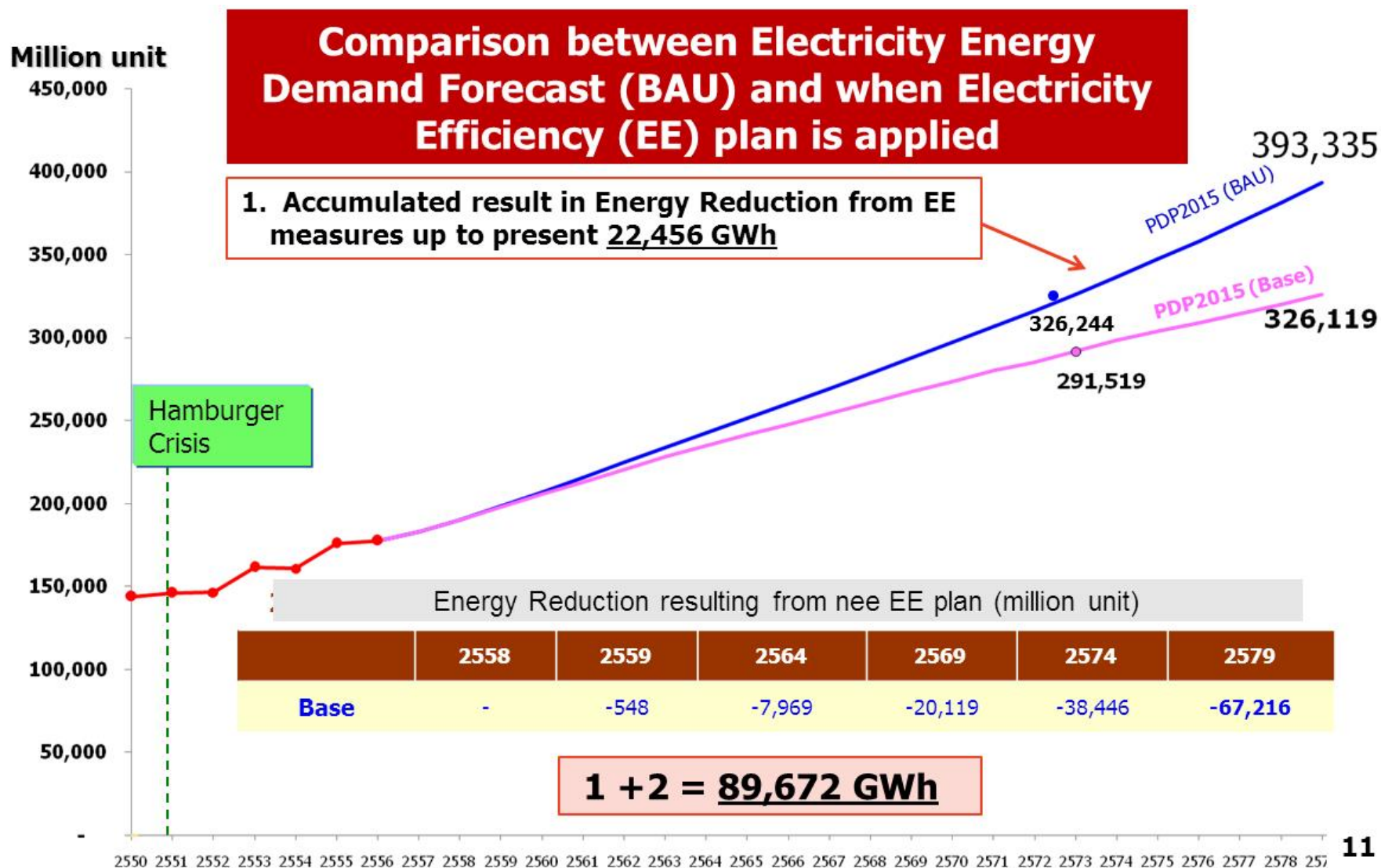
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Summary of Thailand Integrated Energy Blueprint





Demand Forecast for Electricity 2016-2036





Estimated fuel mix (percentage)

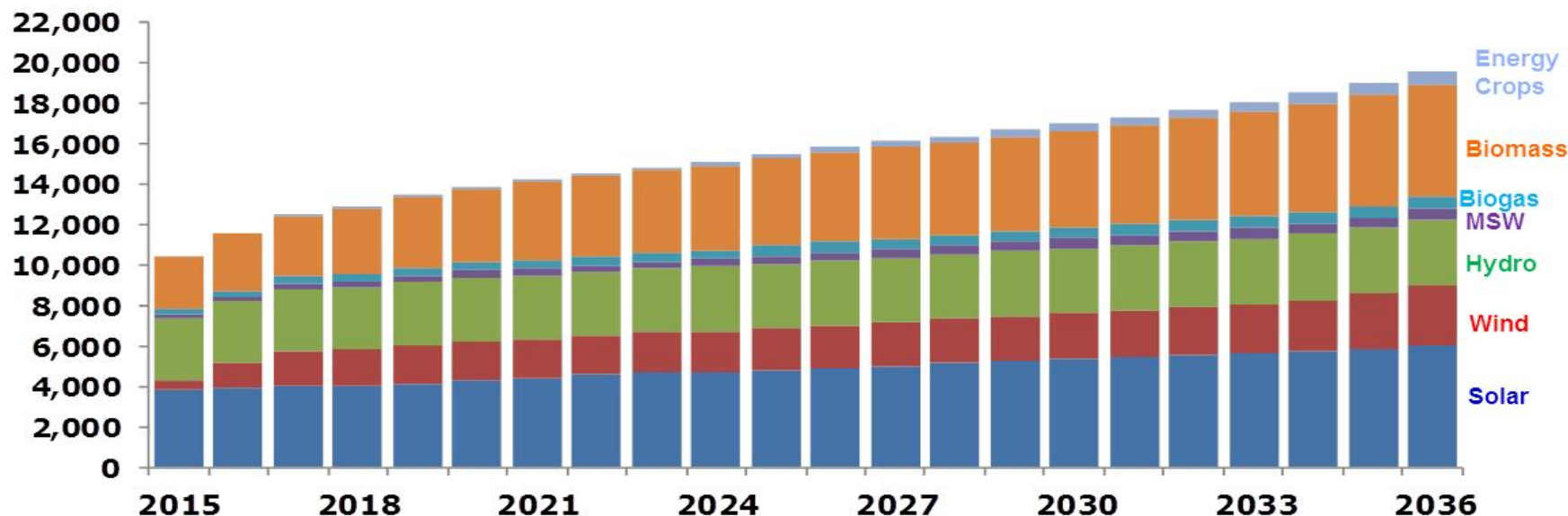
PDP 2015				PDP2010 Rev.3
Fuel type	September 2014	2026	2036	2030
Purchasing from neighbouring countries	7	10-15	15 – 20	10
Clean coal and lignite	20	20-25	20 – 25	19
Renewable Energy	8	10-20	15 – 20	8
Natural Gas	64	45-50	30 – 40	58
Nuclear	-	-	0 – 5	5
Diesel/ Fuel Oil	1	-	-	-
Total	100	100	100	100



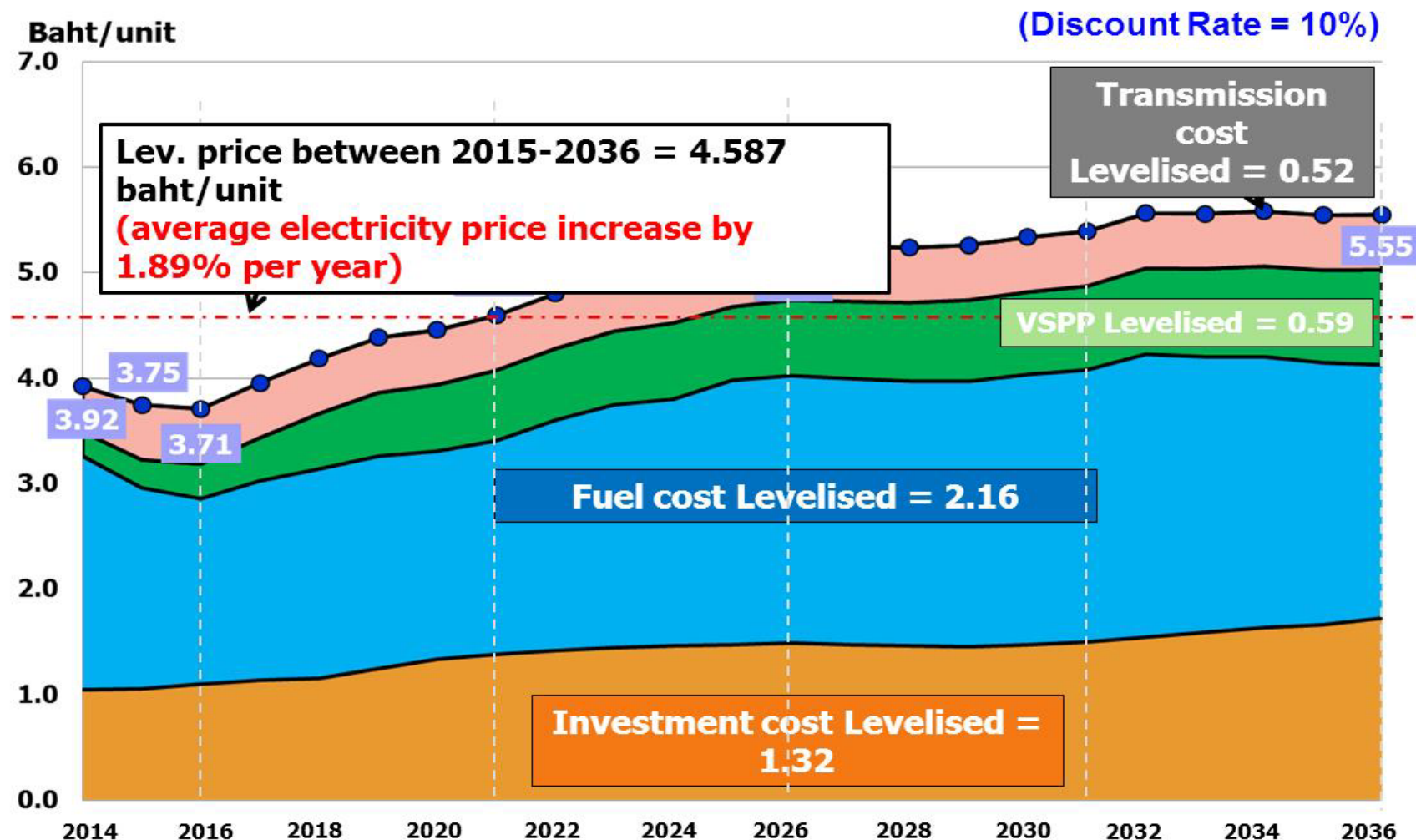
Alternative Energy Target

Type	Solar	Wind	Hydro	Mini Hydro (<12MW)	MSW	Biogas	Energy Crops	Biomass	<u>Total</u>
<u>Installed Capacity 2014</u>	1,298.5	224.5	2,906.4	142	65.7	311.5	-	2,541.8	<u>7,490.4</u>
<u>Installed Capacity 2036</u>	6,000	3,002	2,906.4	376	500	600	680	5,570	<u>19,634.4</u>

Megawatts



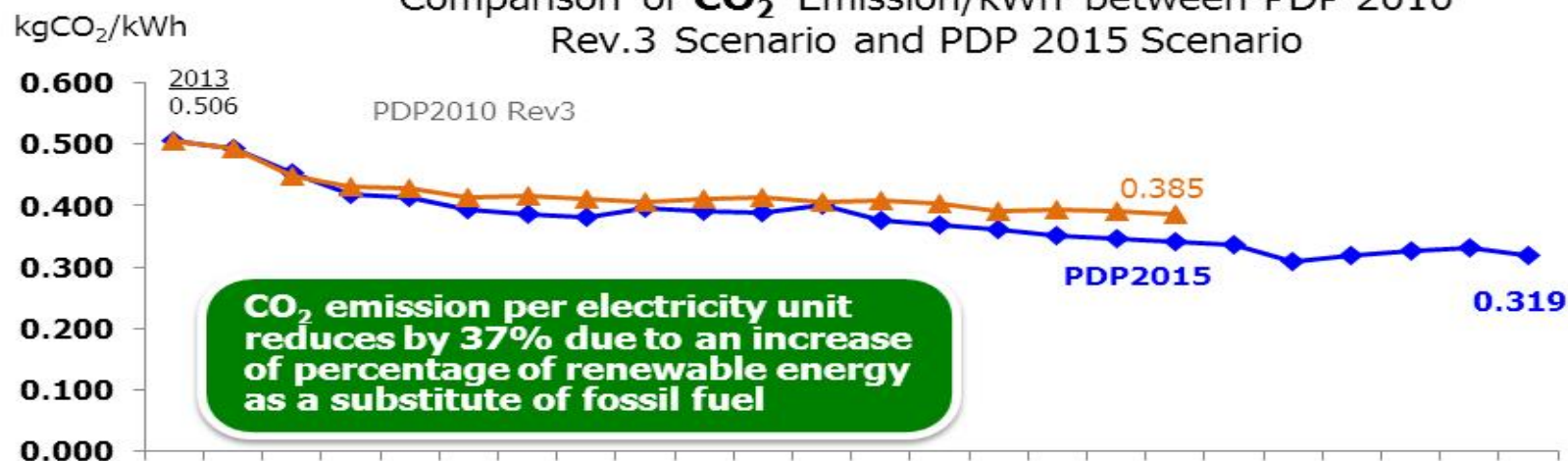
Estimated retail electricity price



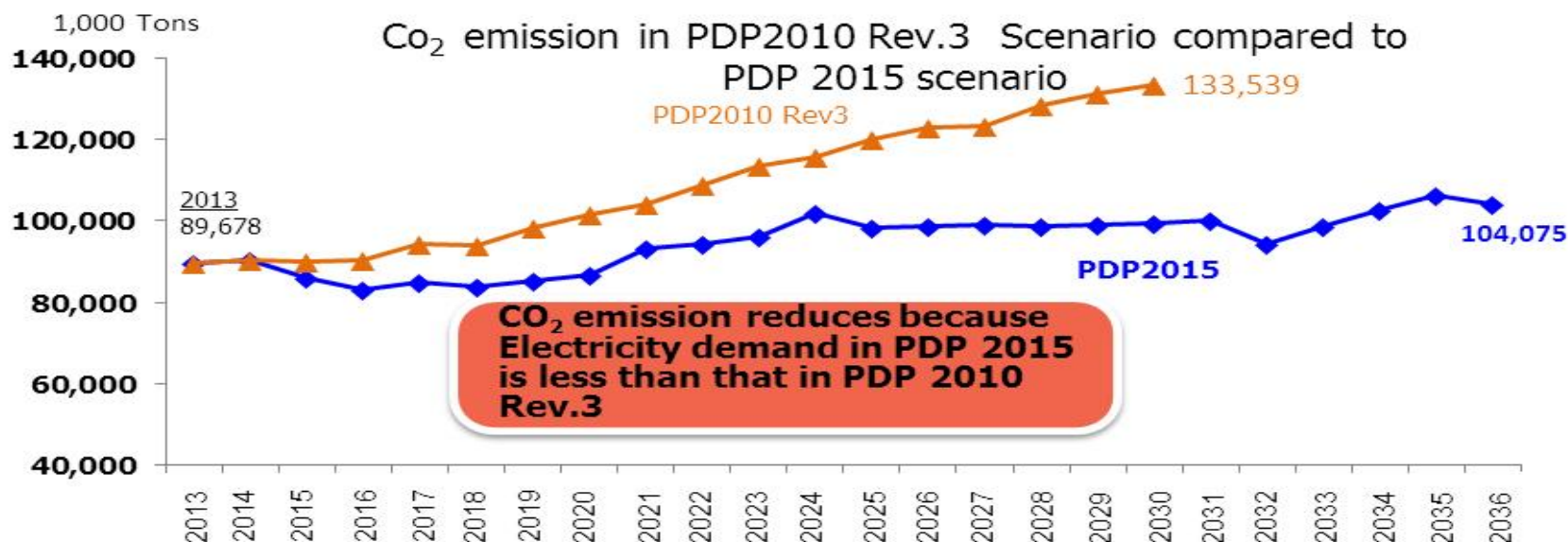


CO₂ Emission

Comparison of **CO₂** Emission/kWh between PDP 2010 Rev.3 Scenario and PDP 2015 Scenario



Co₂ emission in PDP2010 Rev.3 Scenario compared to PDP 2015 scenario



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

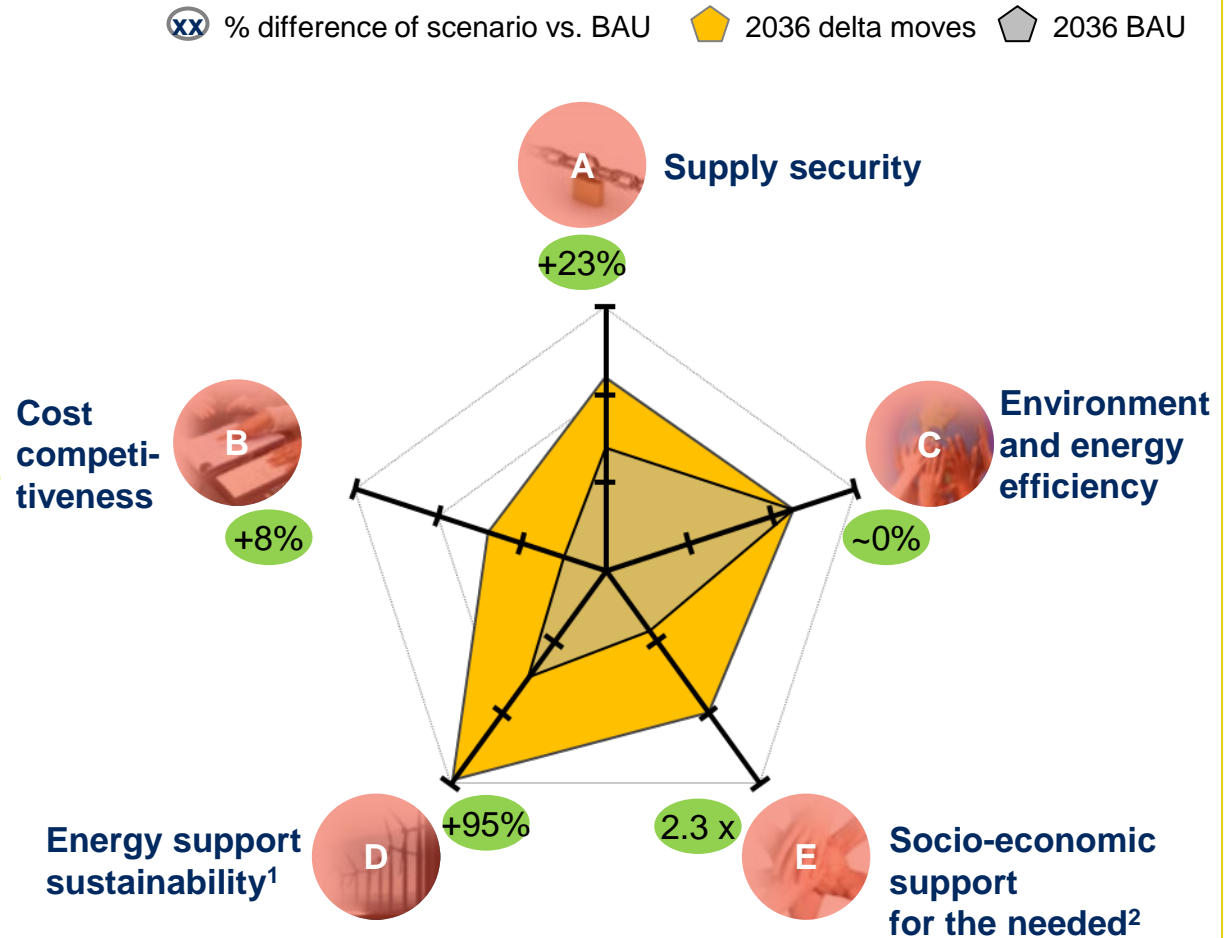
PDP

- (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



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Thank you

