Renewable energy policy –

What comes after Feed-in Tariffs?

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Theses

I. Despite the strong cost reduction of RES technologies targets and support schemes will still be needed until 2030

II. The focus of further RES development will shift from further cost reduction to improving market integration and increasing market value

III. Demand oriented RES generation, demand side flexibility, sector coupling and participation of RES and DSM in balancing markets will be key

IV. Feed-in premiums can facilitate demand driven RES generation at minimum risk for investors

V. RES support should continue at moderately negative prices

VI. Auctions can help for competitive price setting – but auction design should maximize implementation rates and limit risks for bidders

Main elements of RES policy in the EU

- Targets for 2020: Binding targets (also on Member State level):
  - 20% RES in final energy → ~35% RES-E in gross electricity demand
  - 10% RES in transport
  - Targets are binding at Member State level
- Target for 2030:
  - 27 % in final energy
  - Targets are binding only at EU level
- Support schemes (state aid guidelines) & market design:
  - Auctions to determine remuneration level
  - Premium systems to support market compatibility – no premium payment during negative prices
  - Technology neutrality
  - Opening of national support schemes

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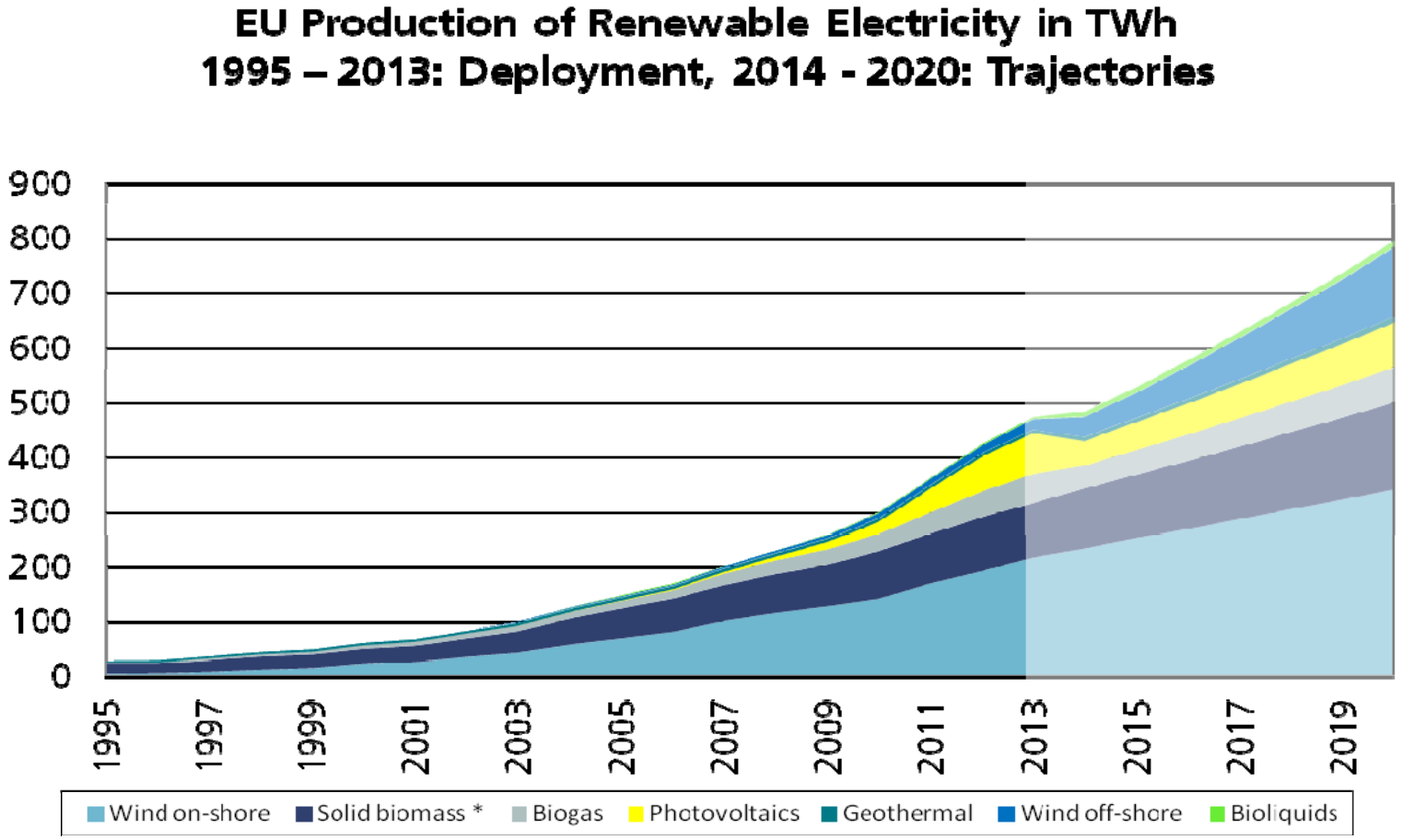
Historic and planned development of renewable electricity in the EU



Source: DIA-CORE project

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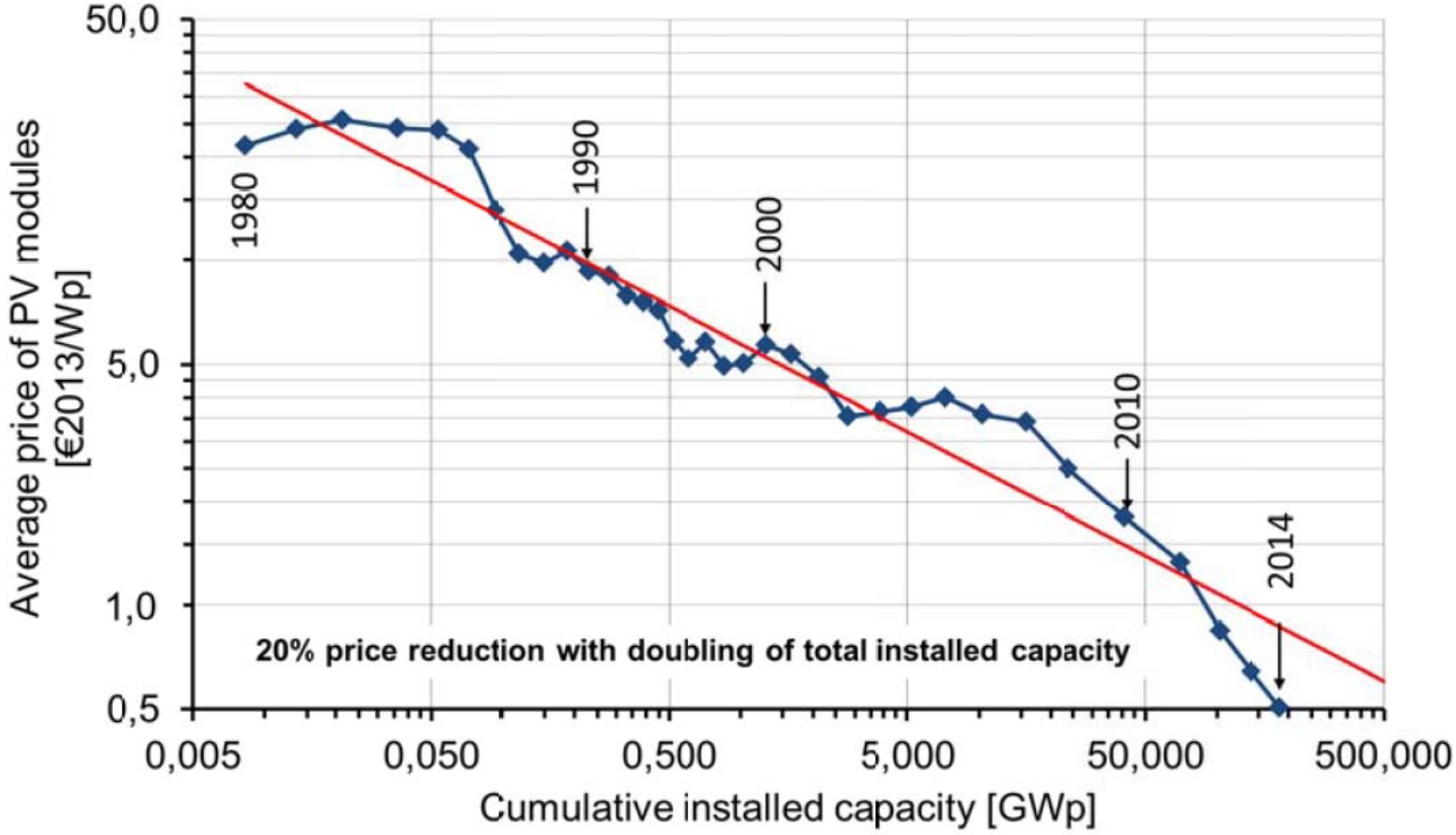
During the last decades costs of RES have degreased sharply

Development of PV module prices as most prominent example:



Source: Fraunhofer ISE

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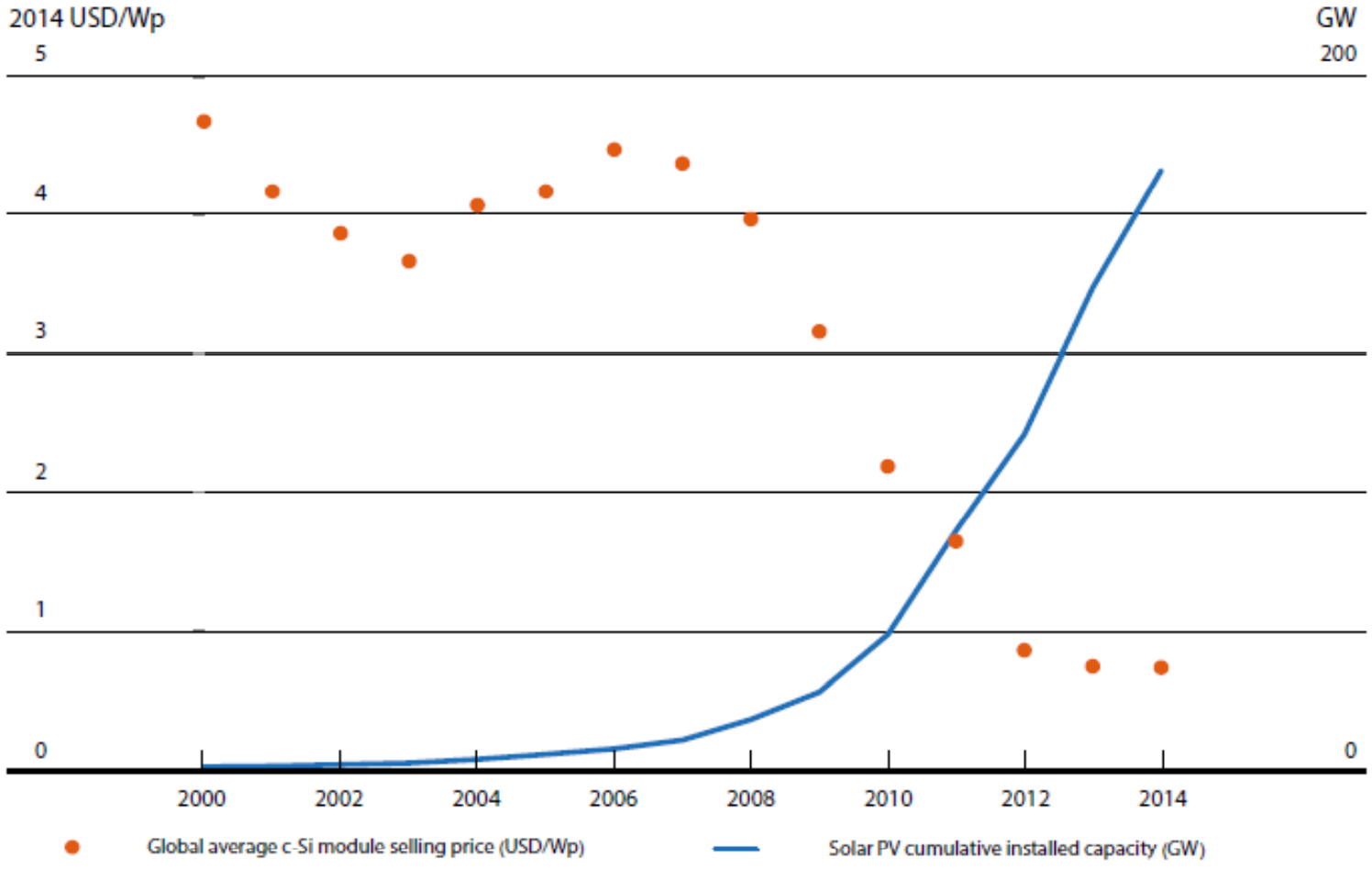

Source IRENA, 2015; pvXchange, 2014

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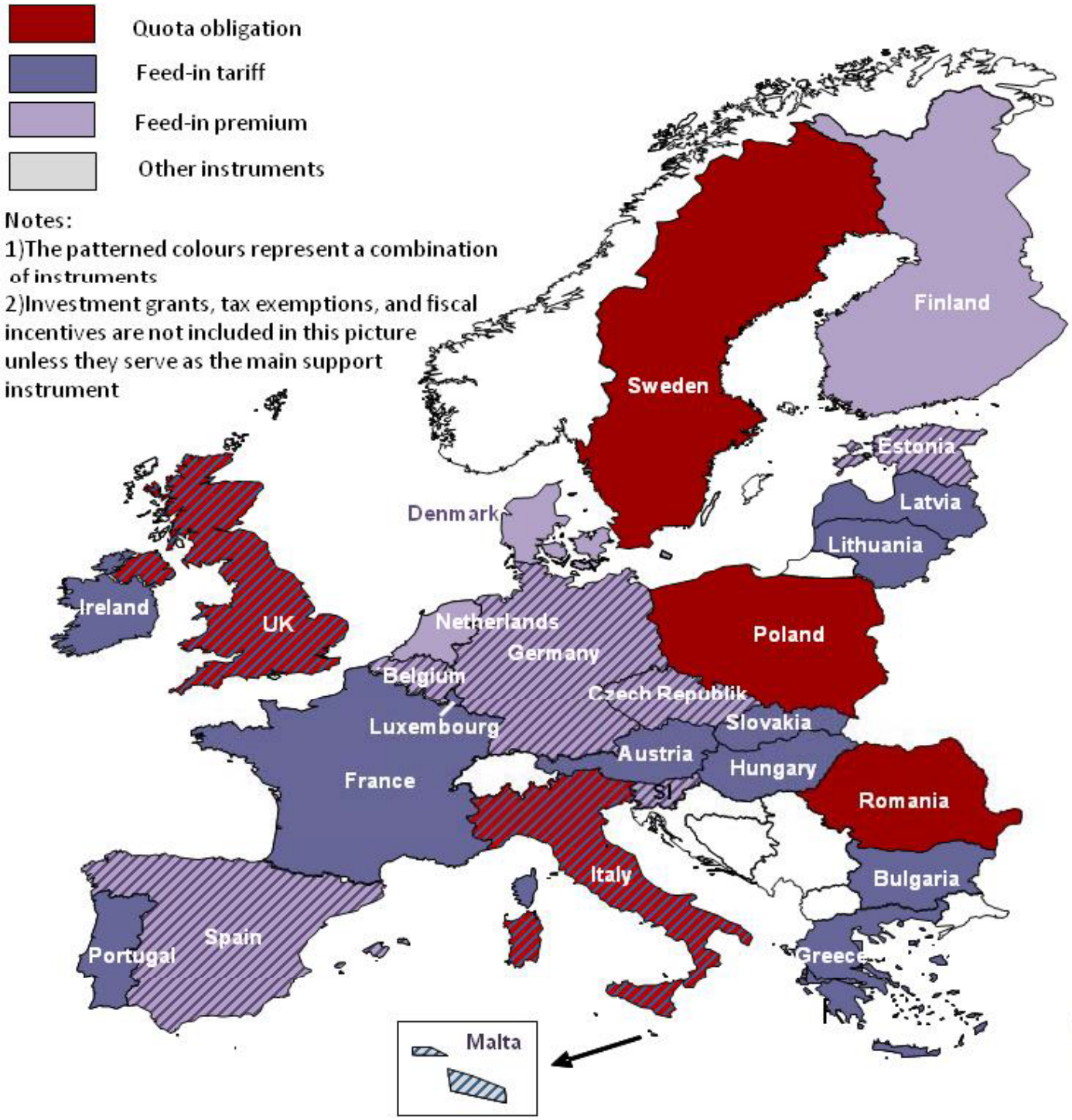

Source:
RE-SHAPING

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Prices of Feed-in tariffs roughly followed cost development - Case of Gernamy

Source Solarwirtschaft 2014

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Pros and cons of main RES-E support schemes

Auction-based floating premium

Feed-in premium with electricity price index (floating premium)

Banded quota models offering long term contracts

Fixed Feed-in traiffs

Technology neutral quota models

+ low investment risk
+ high technology diversity
+ low windfall profits for mature technologies
+ broad spectrum of investors
- low compatibility with electricity markets
- limited elements for competitive price setting

+ high compatibility with electricity markets
+ competition between generators
- high risks and uncertainties (prices and market growth)
- low incentives for less mature technologies
- windfall profits

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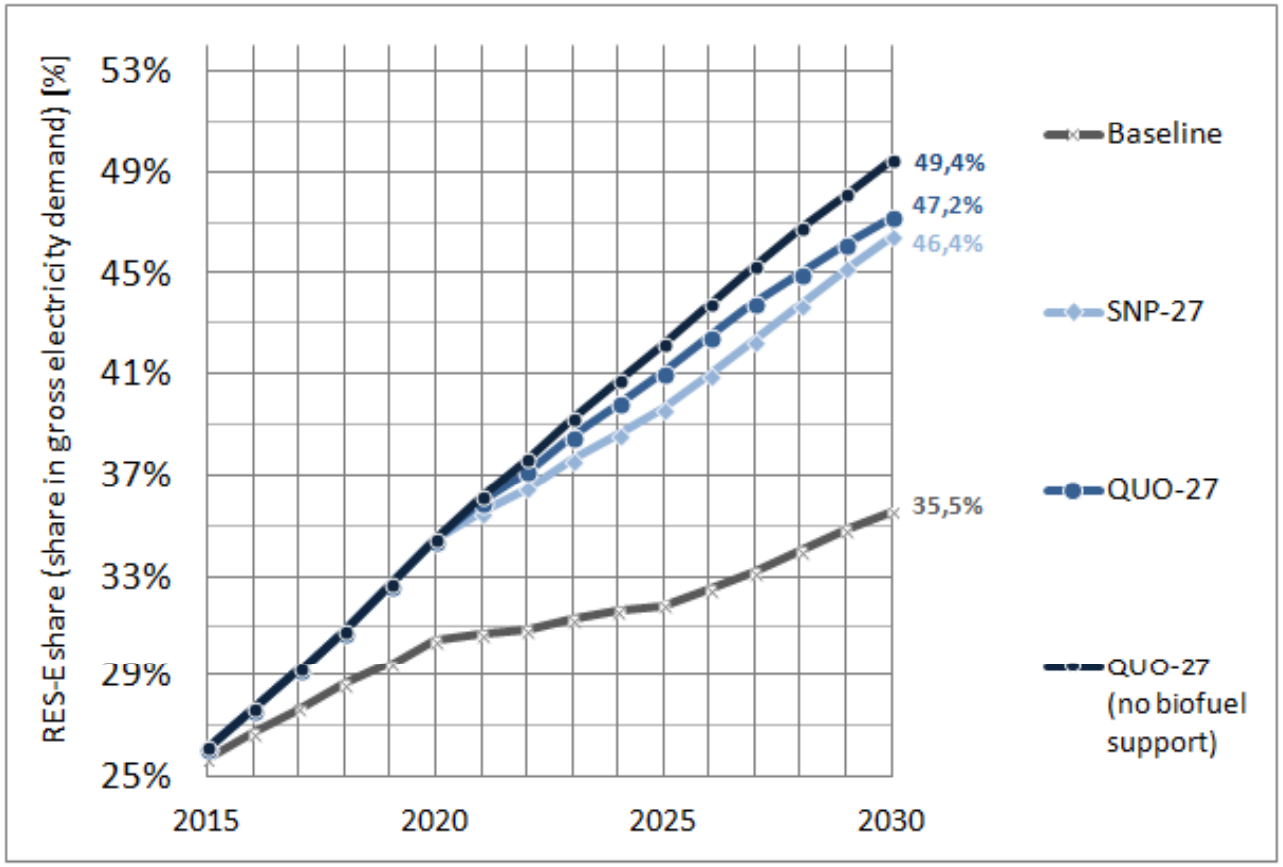
What does a 27% RES target in final energy mean for the electricity sector?

A RES share of 46% - 50% for RES-electricity is consistent with a 27% RES share in final energy.



SNP-27: Strengthened National Policies leading to 27% RES

QUO-27: Quota of 27% RES

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No support for RES-T biofuels

Source: DIA-CORE project

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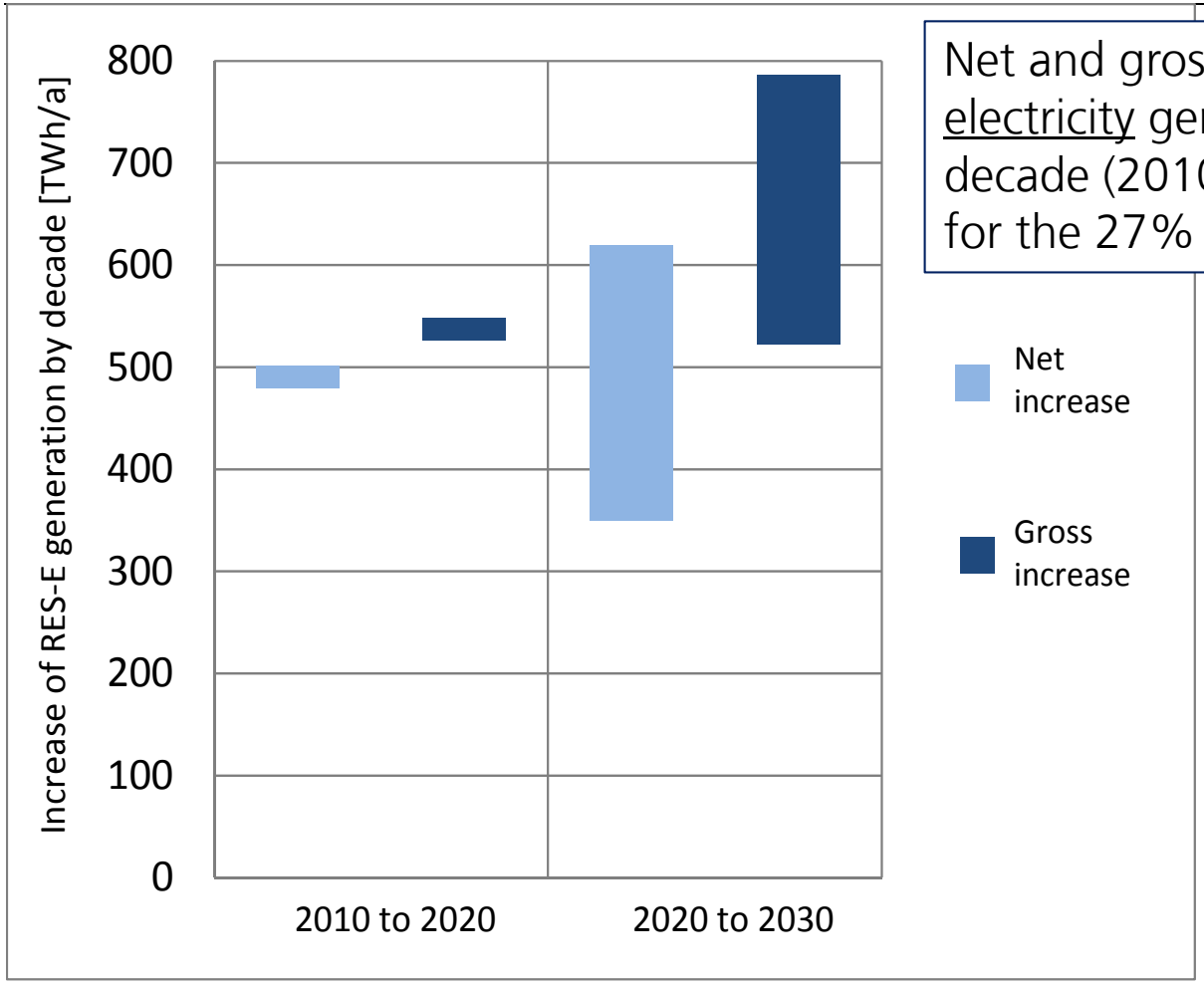
Ambition level of 2030 target on EU-28 level
- net versus gross increase of *RES-E* generation



Net and gross increase of renewable <u>electricity</u> generation at EU level by decade (2010-2020 vs. 2020-2030) for the 27% RES target

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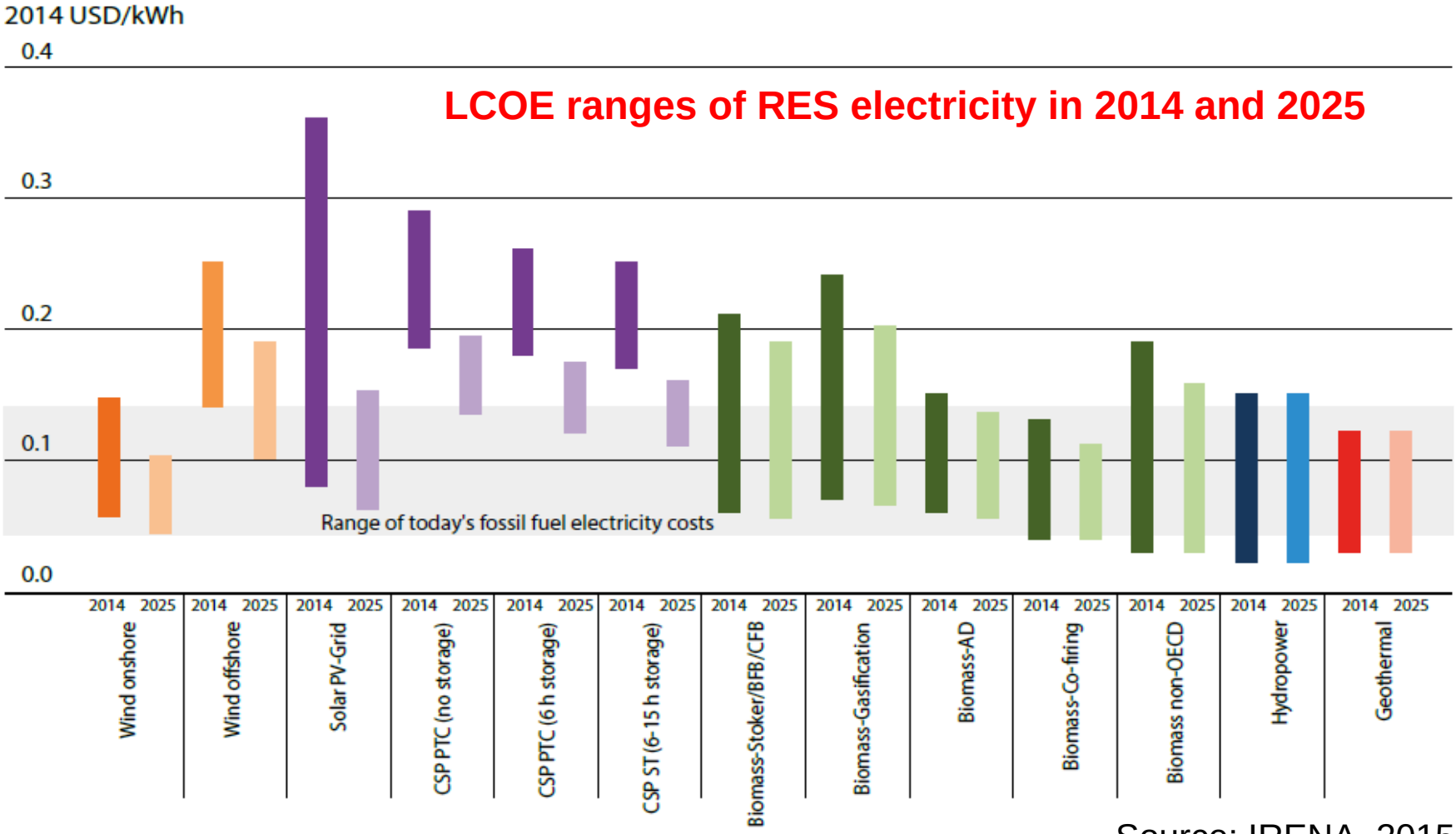
In terms of levelised cost of electricity some RES technologies are cost competitive by 2020



Source: IRENA, 2015

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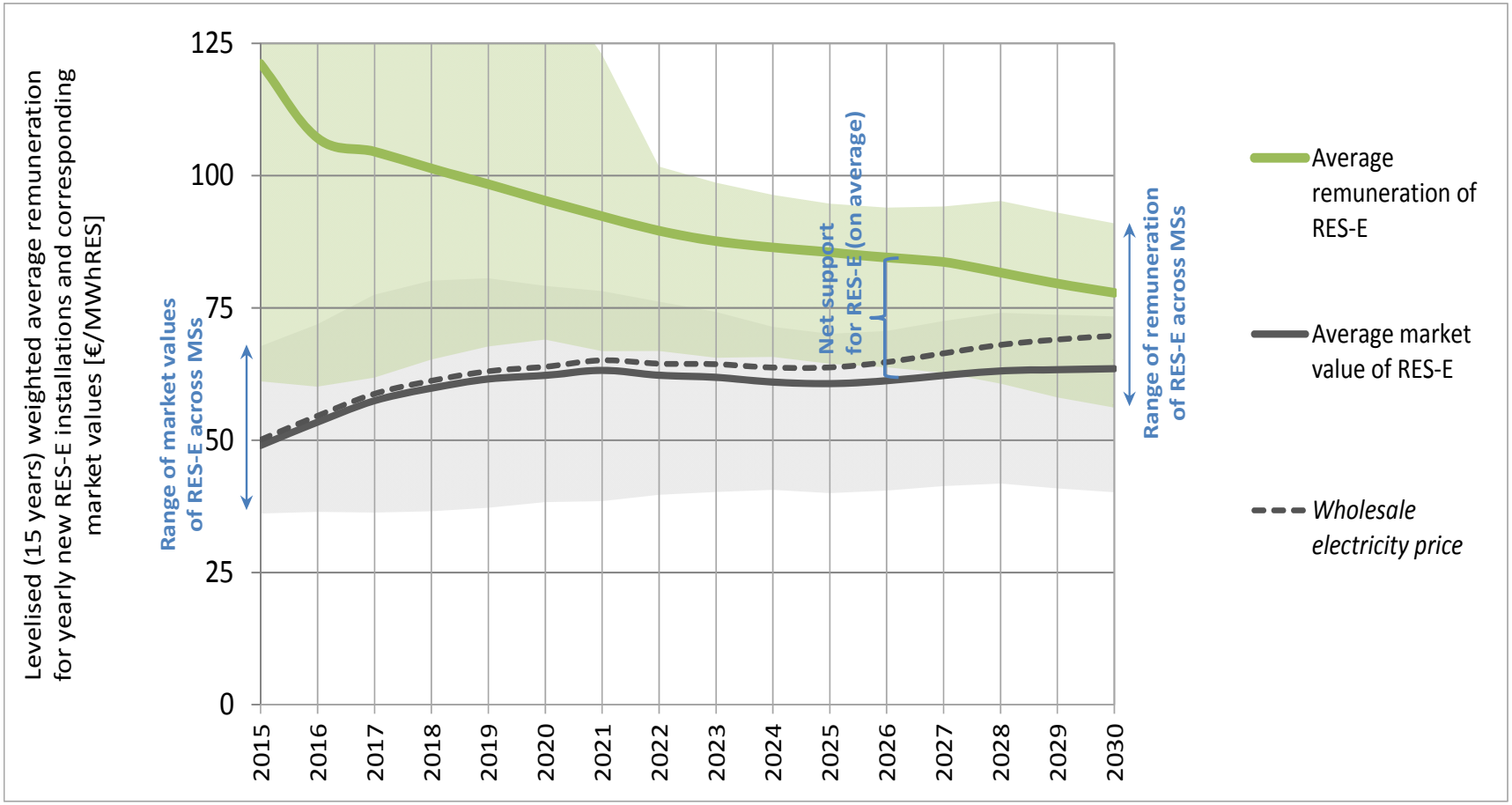
… But decreasing market value of wind and solar requires moderate support premium



Source: Towards-2030 project

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Motivation to use tender/auctions

- In feed-in systems: Determination of tariffs based on administrative tariff setting

  (based on LCOE and political negotiation processes)
- Involves risk of excessive or insufficient support, if real costs are not well-known
- Increase of cost-effectiveness requires competitive price formation
- Auctions / tender offer an option to introduce elements of competitive price formation if conditions for successful auctions are fulfilled
- Volume control: tender /auctions used to allocate financing to different technologies
- Use of auctions in electricity sector common, their use for RES-support has increased considerably in recent years
- In practice, combining auctions/tender with FIT/FIP is typical

Challenges of using tender/auctions

- **Ensuring realistic bids**
  - Risk of underbidding (lack of information or strategic behaviour)
  - High prices due to collusive behaviour
- **Ensuring high implementation rates and timely implementation of projects**
  - Risk of reduced effectiveness due to non-realisation
  - Penalties required to ensure high implementation rate
  - Winning projects are often delayed or not implemented (e.g. former NFFO UK, Brazil)
- **Ensuring continuity of support**
  - Possibility of stop and go cycles
- **Limiting risks for bidders**
  - High risks for bidders lead to low number of participants and/or high risk premiums

Specific criteria for a integrating markets and renewables

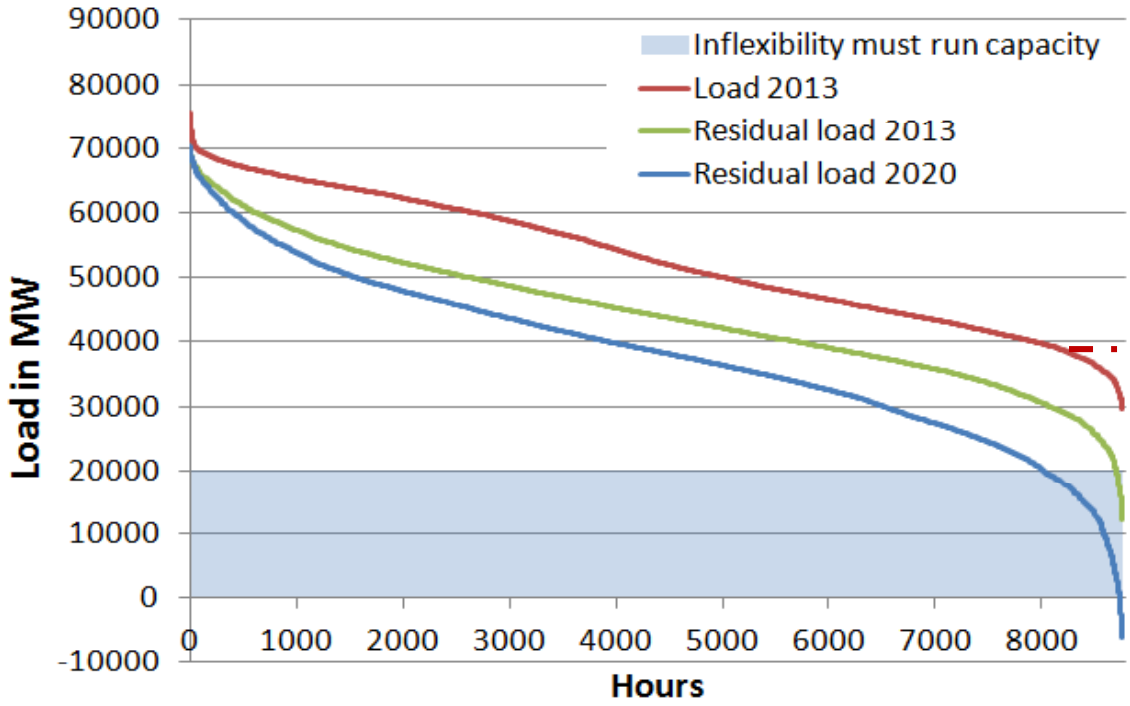
"Adapt market design to renewables and support schemes to markets"*

- "A functioning market with appropriately defined price zones would thus signal where and when electricity should be generated from renewable sources."*
- Where? → Investment decision
  - low generation costs of renewables → best resources and low capital costs
  - high market value → balanced spatial and technological RES distribution
  - high public acceptance → avoid hot spots
- When? → Dispatch decision
  - As long as targets exist: whenever the electricity price is higher than the negative green value of renewables (i.e. negative value of premium or green certificates)

* COM(2015) 340 final
Launching the public consultation process on a new energy market design

Challenges of high shares of renewable energy

Example: residual load in Germany now and in 2020



Shift demand to periods of high supply

"Must- run" capacity needs to be reduced

RES curtailment is least economic option

Price spreads will increase in future power systems and RES plants need to adapt to changes in demand.

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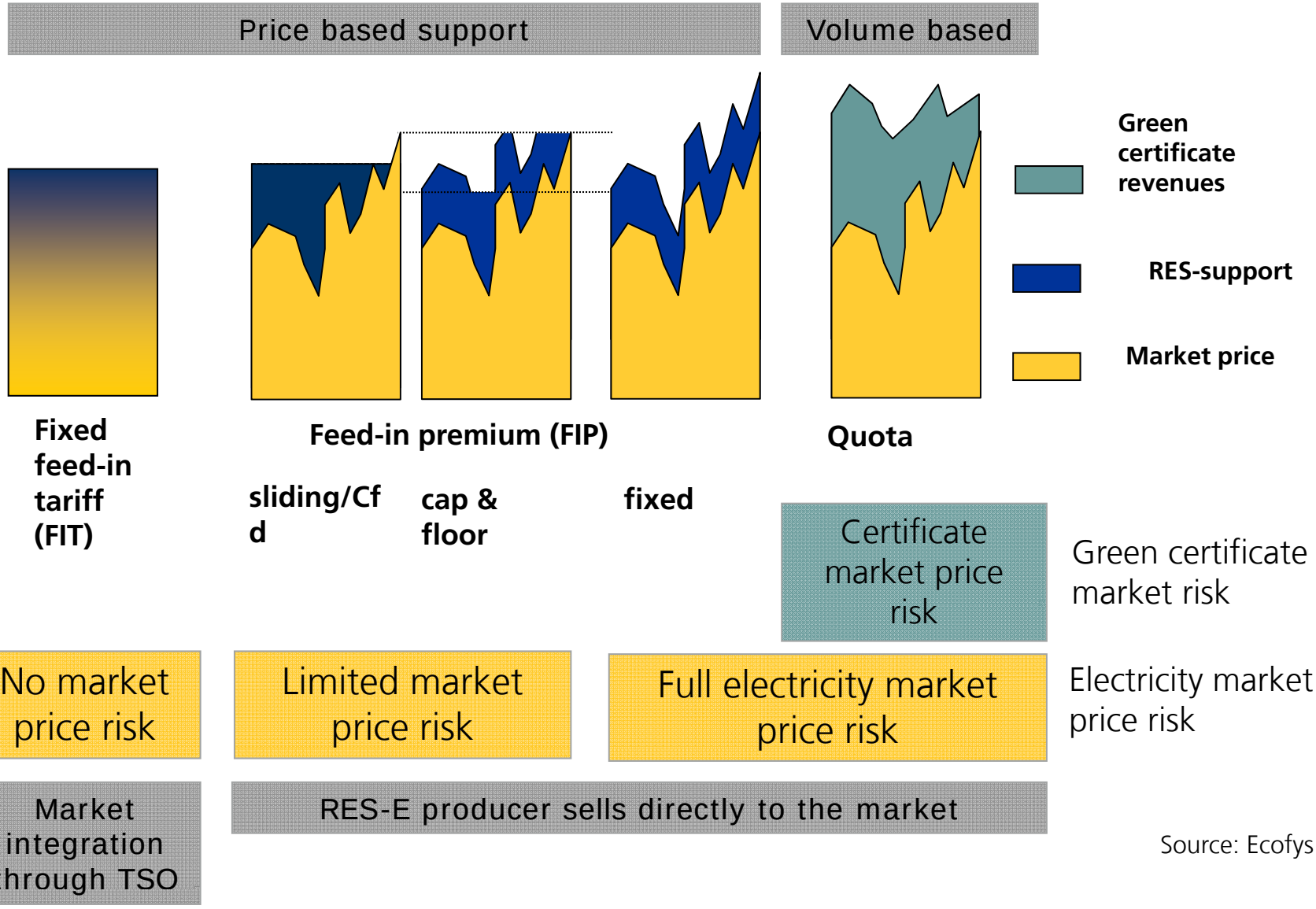

Source: Ecofys

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Comparison of FIP design elements

	DE	DK	FIN	IT	NL	UK
Cap + Floor	NO	NO	NO	NO	NO	NO
Sliding	YES	YES wind-on	YES	YES	YES	YES
Reference price Adjustment	Monthly	Hourly	every 3 months	Hourly / monthly	Annually	Hourly / Season
Profile factor	YES	NO	NO	NO	(YES)	NO
Management Premium	YES (existing plants)	YES	NO	NO	(YES)	NO

Summary

Market and policy design for renewables - main conclusions

I. Facilitate policy and industry learning by providing a stable support scheme for RES technologies in the first place (long term contracts!)

II. Provide blueprint for successful and best practice implementation of
   - Methodologies for feed-in tariff / strike price determination (administrative)
   - Implementation of auctions if bidding procedures are feasible
   - Premium design to facilitate market integration

III. Provide all necessary regulations to support the participation of RES and DSM in balancing markets (e.g. adapt prequalification requirements)

IV. Do not force technology neutrality yet, because
   a) Long term power system optimization may require a diversified supply portfolio, which is not reflected by current price signals
   b) Technology costs still differ substantially → risk of increasing policy costs

V. Be cautious with a opening of national support schemes in order to allow the coordinated planning of grid and generation assets as well as public acceptance

Let’s make the European Union the world leader in renewable energy!

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