European Photovoltaic Industry Association

ENSTO-E / EPIA bilateral meeting
Madrid, 9 January 2012

EPIA's views on ENTSO-E Network Code for Generators

Outlook

- EPIA presentation
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- Compliance procedure
- Adaptation of the Network Code over time

EPIA presentation

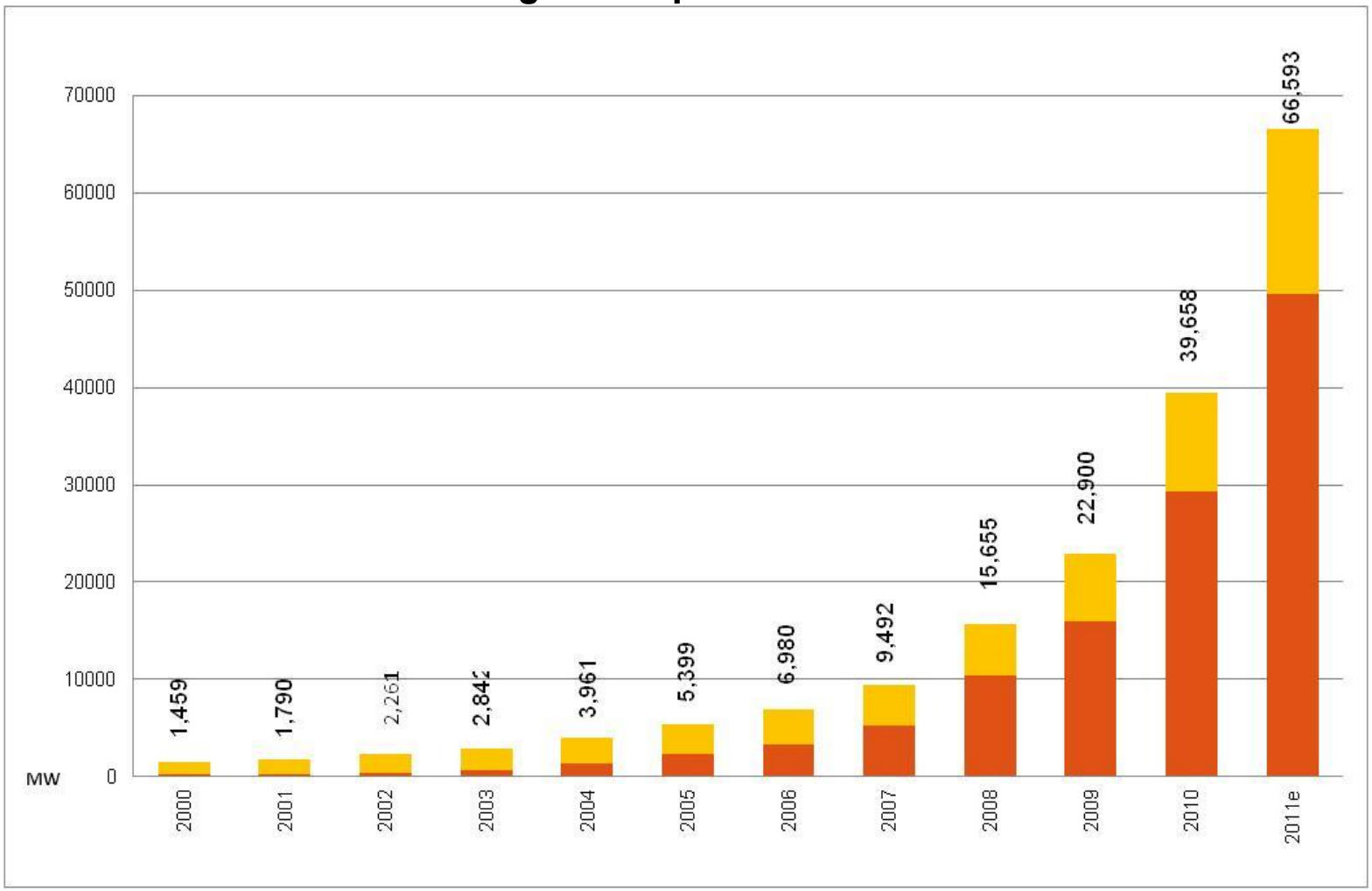
EPIA – the European Photovoltaic Industry Association – is the world's largest photovoltaic industry association, with members active along the whole solar PV value chain. EPIA's mission is to give its global membership a distinct and effective voice in the European market.

- Represents 90% of the EU market.
- More than 250 members.
- Represents the whole value chain from Silicon feedstock to system developers, equipment suppliers, utilities, research centers.
- More than 25 years experience (created in 1985).

Context – Market Outlook 2011 (1)

Evolution of global cumulative installed capacity worldwide (MW).

Orange: Europe / Yellow: RoW



Context – Market Outlook 2011 (2)

	Country	2011 Newly connected capacity(MW)	2011 Cumulative installed capacity (MW)
1	Italy	10,300	13,794
2	Germany	5,500	22,693
3	China	2,000	2,893
4	USA	1,600	4,128
5	France	1,500	2,525
6	Japan	1,100	4,722
7	Australia	700	1,204
8	United Kingdom	700	766
9	Belgium	550	1,510
10	Spain	400	4,184
11	Greece	350	556
	Slovakia	350	495
13	Canada	300	500
	India	300	460
15	Ukraine	140	140
16	Israel	130	200
	Rest of the World	1,015	5,823
	Total	**26,935**	**66,593**

20.2 GW of newly PV installed capacity in Europe in 2011

DISCLAIMER: Please note that the figures provided in this document are forecasts based on several sources, including official bodies, companies and national PV associations. They will be reviewed and complemented when accurate information becomes available. All figures are based on EPIA knowledge at the time of publication.

Scope

Scope (1)

PRINCIPLE

The Network Code (NC) is pursuing several objectives. For the PV industry, one of them should be to ensure a progressive harmonisation of boundary conditions in order to reduce product variants and to ensure a cost-effective penetration of renewables.

HOW?

- This should be achieved with through:
  - The NC itself for some specific requirements for which a clear EU added value can be demonstrated (e.g. frequency management for types A and B);
  - Direct reference to standardisation in order to capitalise on the experience gained so far and to provide legal security for the investors (For example the work undertaken so far by the WG3 of the TC8X);
- If reference to standardisation could not be included the NC should only focus on a limited number of requirements.

Scope (2)

- Type classification:
  - Current type classification introduces uncertainty for the PV industry and the generators:
    - The definition of the exact threshold is left to each relevant System Operator.
    - Current type classification does not match the typical differentiation between generating units based on the voltage level (200 kW PV installation could be both connected at the LV or MV).

- EPIA believes that the type classification should be based on harmonised minimum and maximum thresholds and should match the typical differentiation between low, medium and high voltage level.

- EPIA supports the classification proposed by Eurelectric:
  - Type A: 1 kW → 1 MW connected to LV or MV
  - Type B: 1 MW → 10 MW connected to MV
  - Type C : >10 MW connected to HV
  - Type D: unlimited connected to EHV

- If reference to standardisation could not be included, a clear differenciation should be made between LV and MV.

Scope (3)

- **Applicability of requirements to existing generators**
  - 50.2 Hz, lessons learnt:
    - Harmonisation of frequency support settings at EU level for future generators is necessary;
    - Automatic retroactive application to <u>all</u> existing generating units is not cost-effective;
    - In a cost-effective approach, only <u>partial</u> retrofitting is needed;
    - Raises the question of cost-sharing of retrofitting.

→ EPIA strongly supports ENTSO-E's approach but considers that more clarity should be provided on:

- The parameters that will be used by the relevant TSO when conducting the Cost-Benefit Analysis (CBA) and their relative weighting;
- The geographical scope that will serve as a basis for the CBA (regional, national, European);
- The timeline for the conduction of the CBA (including the public consultation);
- The impact of the CBA on the retrofitting requirements:
  - The principle of optimisation between the highest overall efficiency and lowest total cost for involved parties shall be reaffirmed:
  - Clear burden sharing rules shall be defined, taking into account the **real beneficiaries of the retrofitting.**

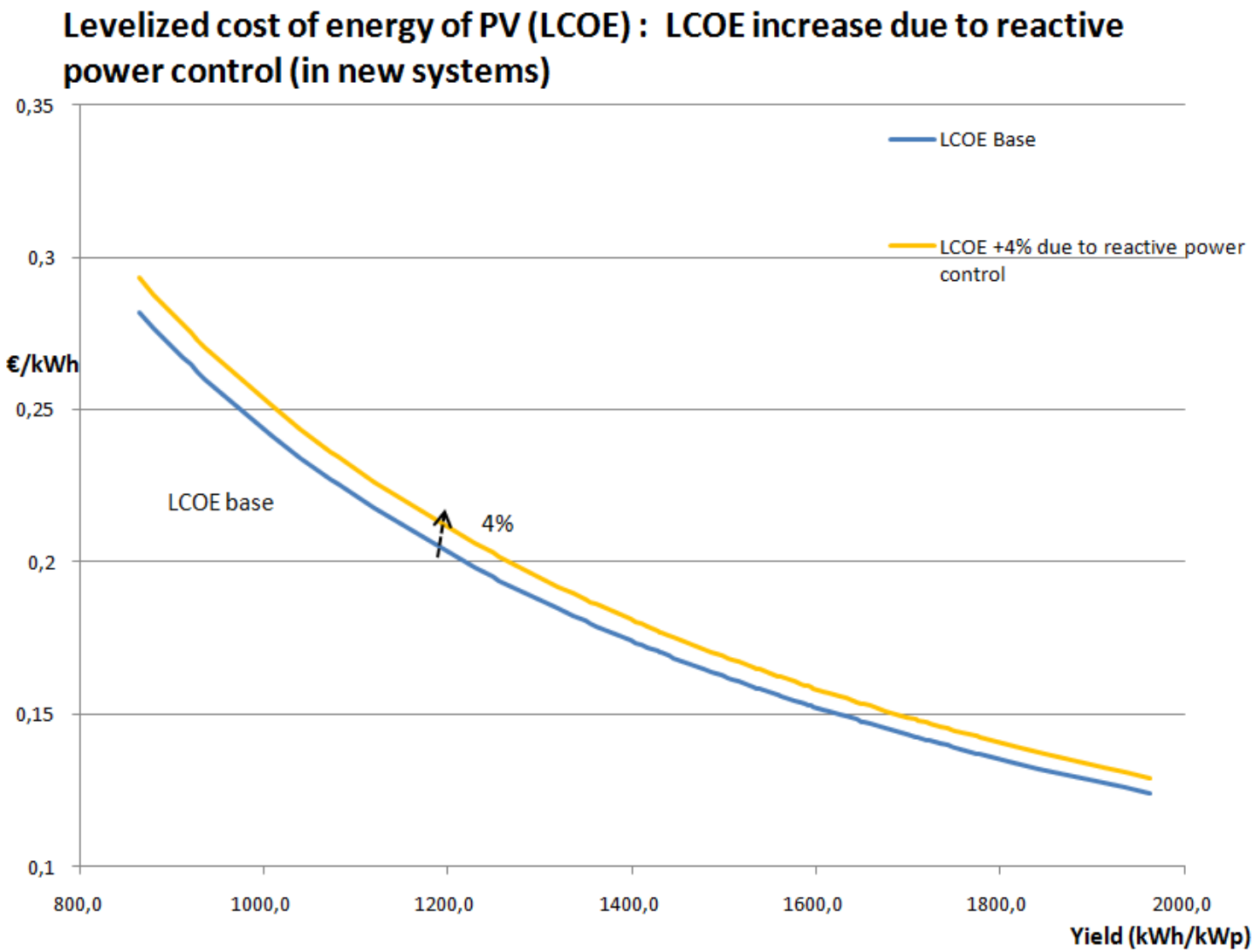
Technical requirements for PV

Reactive power control for type A and B units (Art 14 and 15)

- **New Systems:**
  - Can be fulfilled by inverter oversizing.
  - Inverter oversizing would increase the inverter costs by 10-20% and result in 1-2% cost increase of the overall system.
  - The additional operational costs would be about 2%.
  - **For small PV systems (3.6 kW, 16A single phase) the effort to implement the ability to provide reactive power is disproportional compared to the system size, system costs and the generated benefit.**

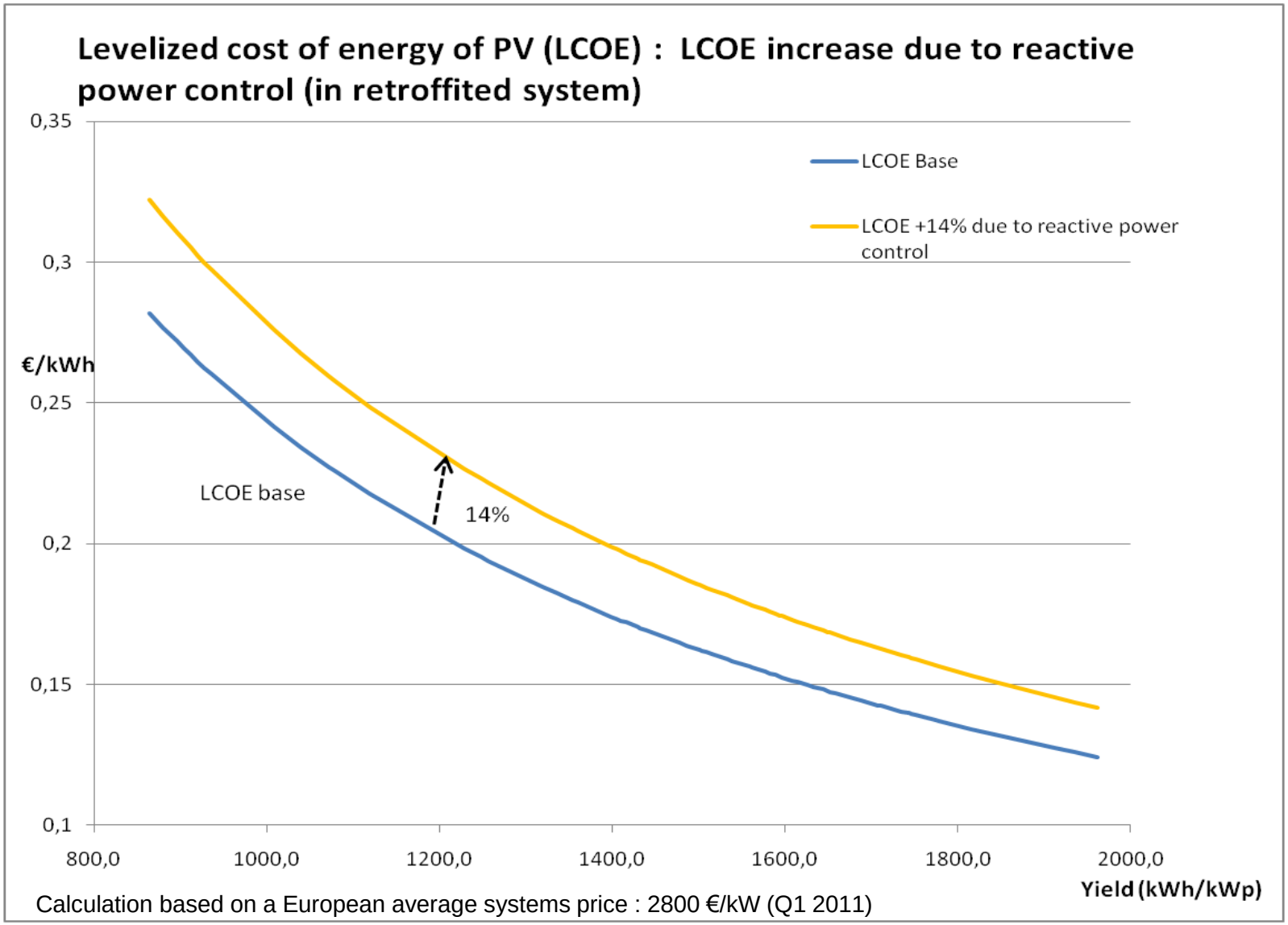
- **Existing systems:**
  - To install a new inverter (with reactive power capability) would be 110-120% inverter costs and thus 11-12% of the overall system costs.
  - Without retrofitting, the active power would have to be reduced to provide reactive power.

Cost impact analysis for new Type A and B systems



Calculation based on a European average systems price : 2800 €/kW (Q1 2011)

Cost impact analysis for existing Type A and B systems



Calculation based on a European average systems price : 2800 €/kW (Q1 2011)

Reactive power control for type A and B units (Art 14 and 15)

Conclusions

- For **16A single phase systems** (< 3,6 kW), EPIA believes that reactive power provision should not be asked for.
  - → This exemption (for new and existing systems) shall be introduced in Article 14.

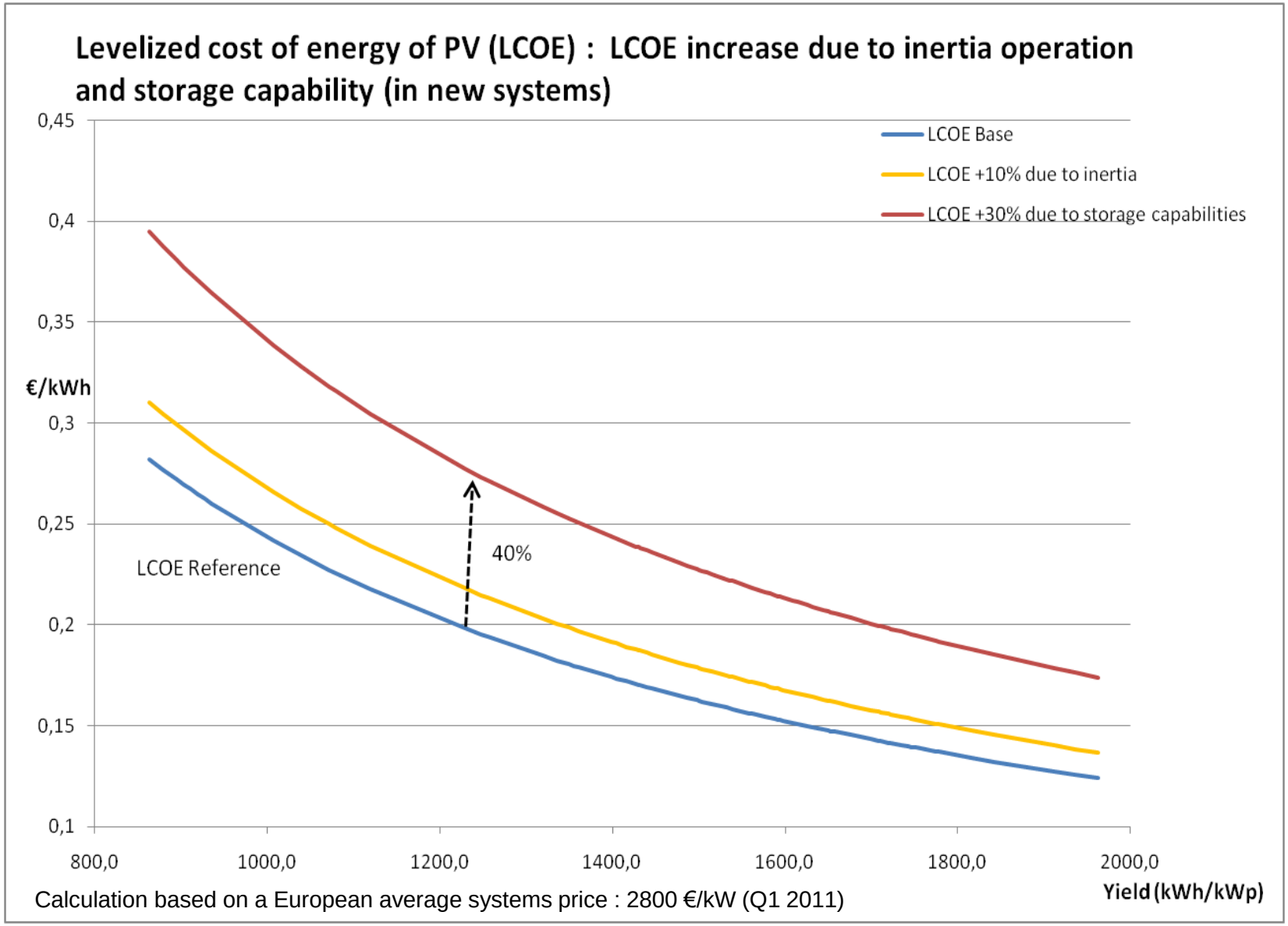
- For **systems above 3.6 kW**, EPIA believes that more clarity is needed on the procedure to be applied.
  - → Given the enormous number of existing plants potentially covered, it should be made clear in the text that the capability for the relevant system operator to require the provision of reactive power should be subject to an impact assessment.

Synthetic Inertia (Art 9.2 b) and c) and 16.2 a))

- **High costs and not yet State of the Art:**
  - Synthetic inertia by PV systems is subject to several research projects. It is not commercially available.
  - Either an electrical storage is needed or the system has to run permanently below the maximum power.

→ The costs of both options are extremely high. Preliminary costs estimates 40 % of additional investment costs for the overall system, including the cost of storage capability.

Inertia: cost impact analysis for Type C and D systems



Black Start Capability and Feed-in management (Art 7.1d and Art 9.4)

- **Provision of black start service by all generators**
  - Today black start capacity is not provided by all generators – also not by all conventional generators. The TSO chooses the most appropriate generators and pays for the service.
  - Black start has to be provided any time with full nominal system power (even at night). Thus, a storage with the output capacity of the full PV system would have to be installed. This would be very expensive.

→ It is unreasonable that all generators provide black start capability. Even in a system with 100% PV and Wind only a certain amount of generators would have to provide this service.

→ To add this capability to PV is extremely expensive.

- **Feed-in management requirement for type A units**
  - No remote control device available at competitive prices for small PV systems.
  - Large administrative and technical costs for the relevant DSOs.

→ Would have a huge impact on small generators in terms of overall system costs (up to 15% for a household PV system) and on the operation costs of distribution grids.

Conclusions

- It is not clear how the requirements are applied for variable primary energy sources.
- Providing inertia and black start capability through PV systems would imply extremely high compliance costs.
- EPIA asks for more clarity on the criteria that might be used by the relevant system operator for demanding inertia, black start capability and feed-in management to both the new and existing generating units.
- In addition the requirement should be based on the current standardisation in order to capitalize on the experience gained so far and to provide legal security for the investors.
- Otherwise, these requirements should be not covered by the NC.

Compliance procedure and simulation models (Art 24.4, 9.5 c) and 32)

- EPIA welcomes the introduction of a type-testing option for types A and B based on Manufacturer's Data and Performance Type Certificate (MD&PTC).
- However, EPIA considers the requirement to register the MD&PTC with the Relevant Network Operators as too burdensome and asks for its deletion.
- EPIA considers that the added value of compliance simulation for PV systems still needs to be demonstrated.

Adaptation of the Network Code over time

- NC requirements should enable technology development to be taken into account and cope with evolutions in generation mix.

- Adaptation procedure of the NC should be clarified:
  - Current NC might enter into force in 2017;
  - Electricity mix and technologies are evolving rapidly (eg. Driven by 50.2 Hz)
  - Revision/adaptation of the NC should be foreseen in the text itself;
  - Should the NC revision undergo a **comitology procedure**, it should <u>ensure proper involvement of all stakeholders</u>.

  ⇒ Making direct reference to standardisation for technical requirements would allow for higher flexibility of the NC.

Conclusions

The quality of the Network Code (NC) relies on:

- A progressive harmonisation of boundary conditions capitalising on the experience gained by standardisation in order to reduce product variants and to ensure a cost-effective penetration of renewables.
- A type classification based on harmonised minimum and maximum thresholds and matching the typical differentiation between low, medium and high voltage level.
- The implementation of a clear costs-benefits approach, both for the existing an new units.
- An effective and realistic compliance procedure (type testing).
- A clearly defined revision procedure.
- A strong involvement of all stakeholders.

EPIA

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