

PV Systems in Japan



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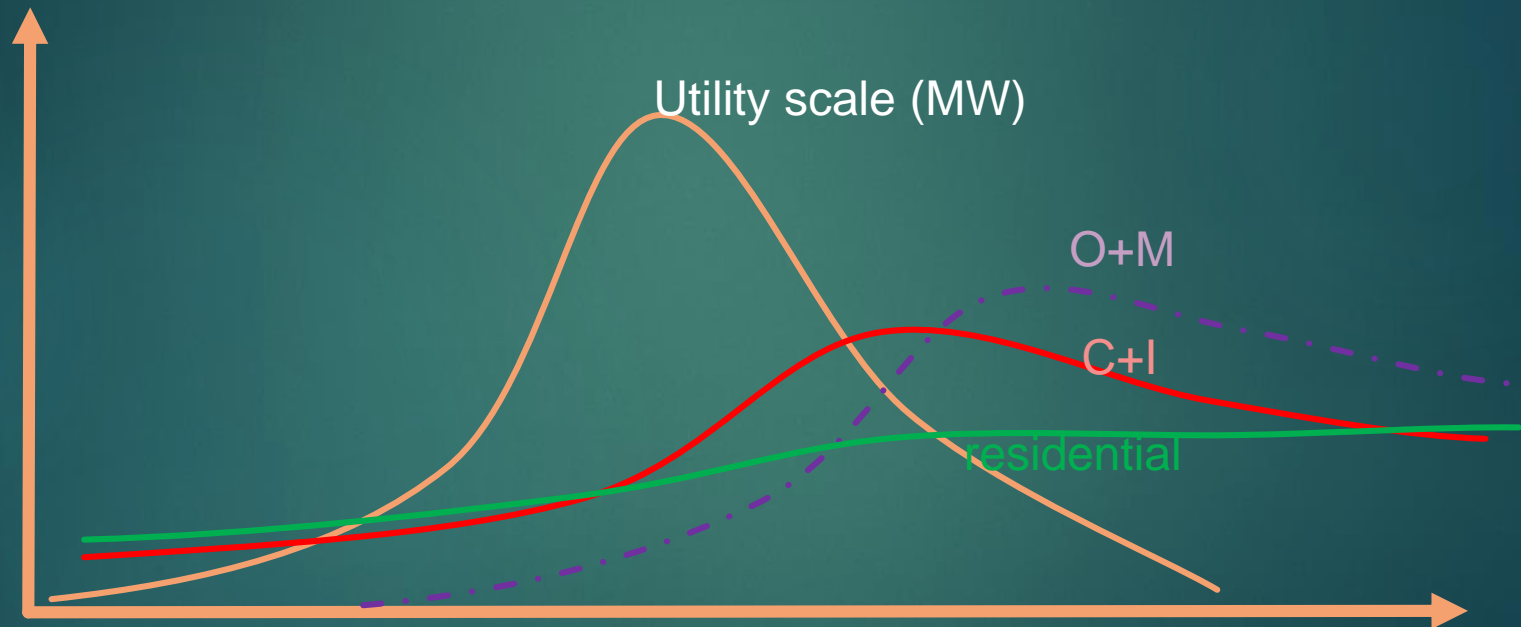
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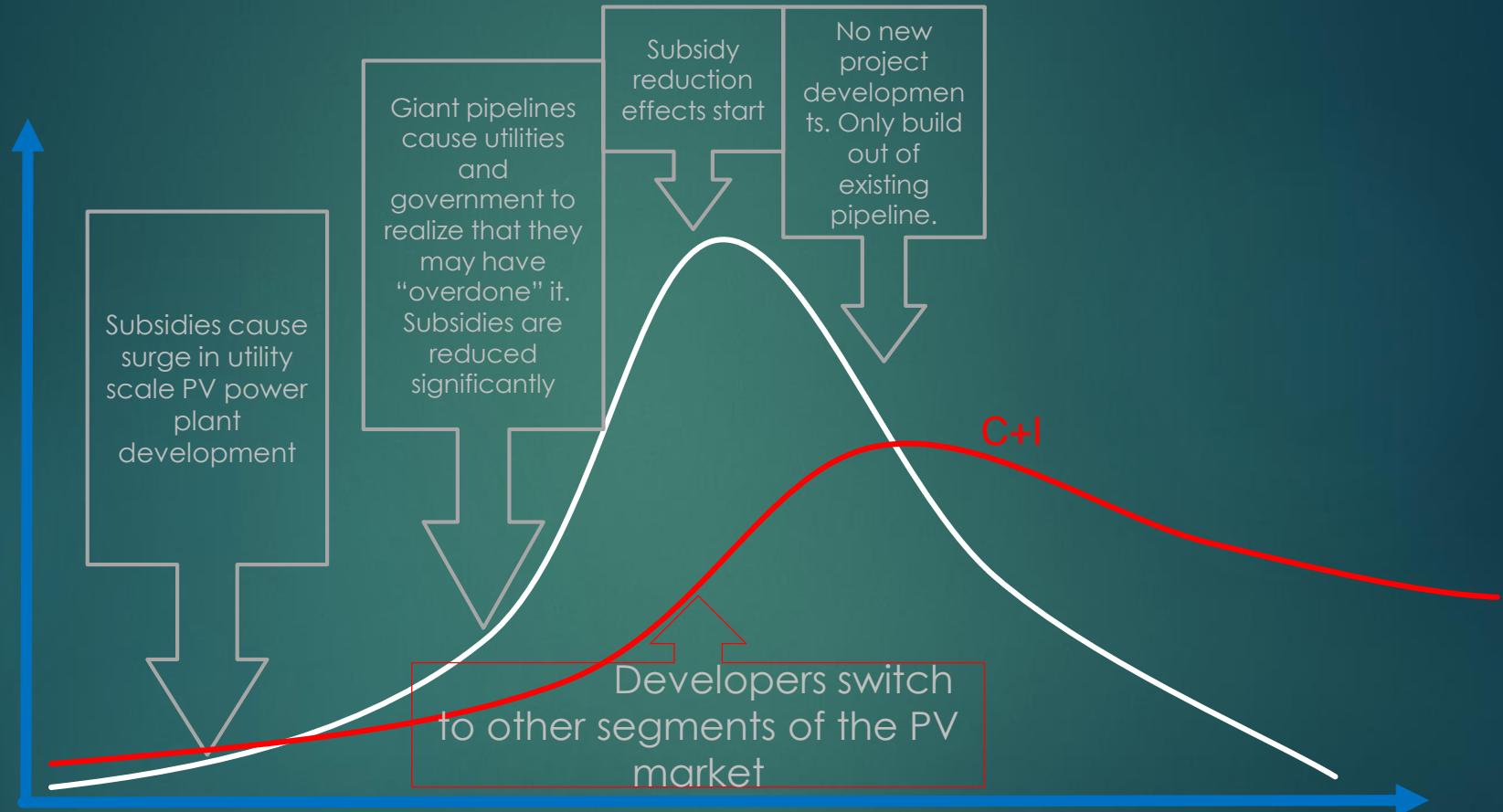
Oct 25th 2018

Typical Market Development under subsidies

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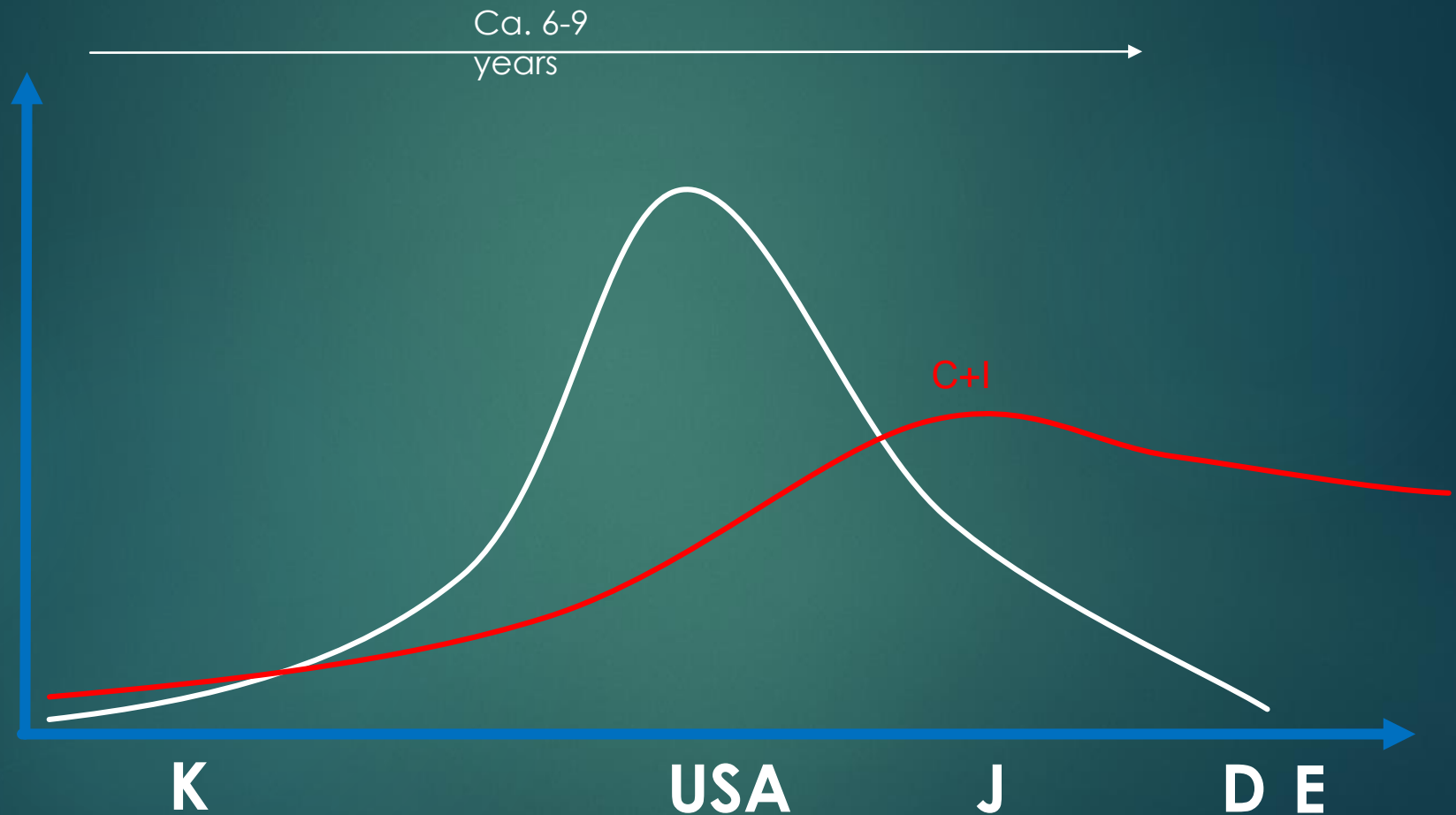


Subdivisions in national markets: R / C&I / utility scale

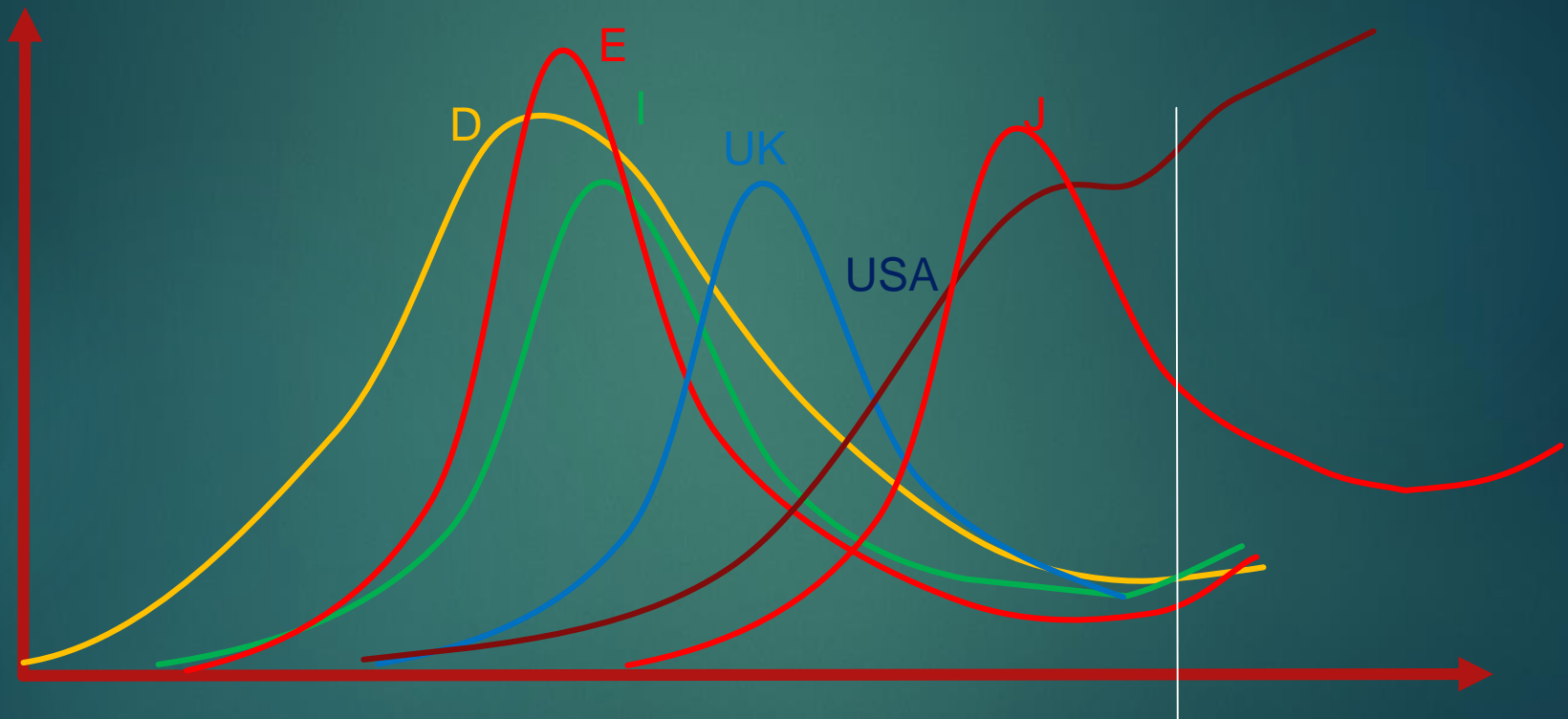


Where in the development curve are the various countries?

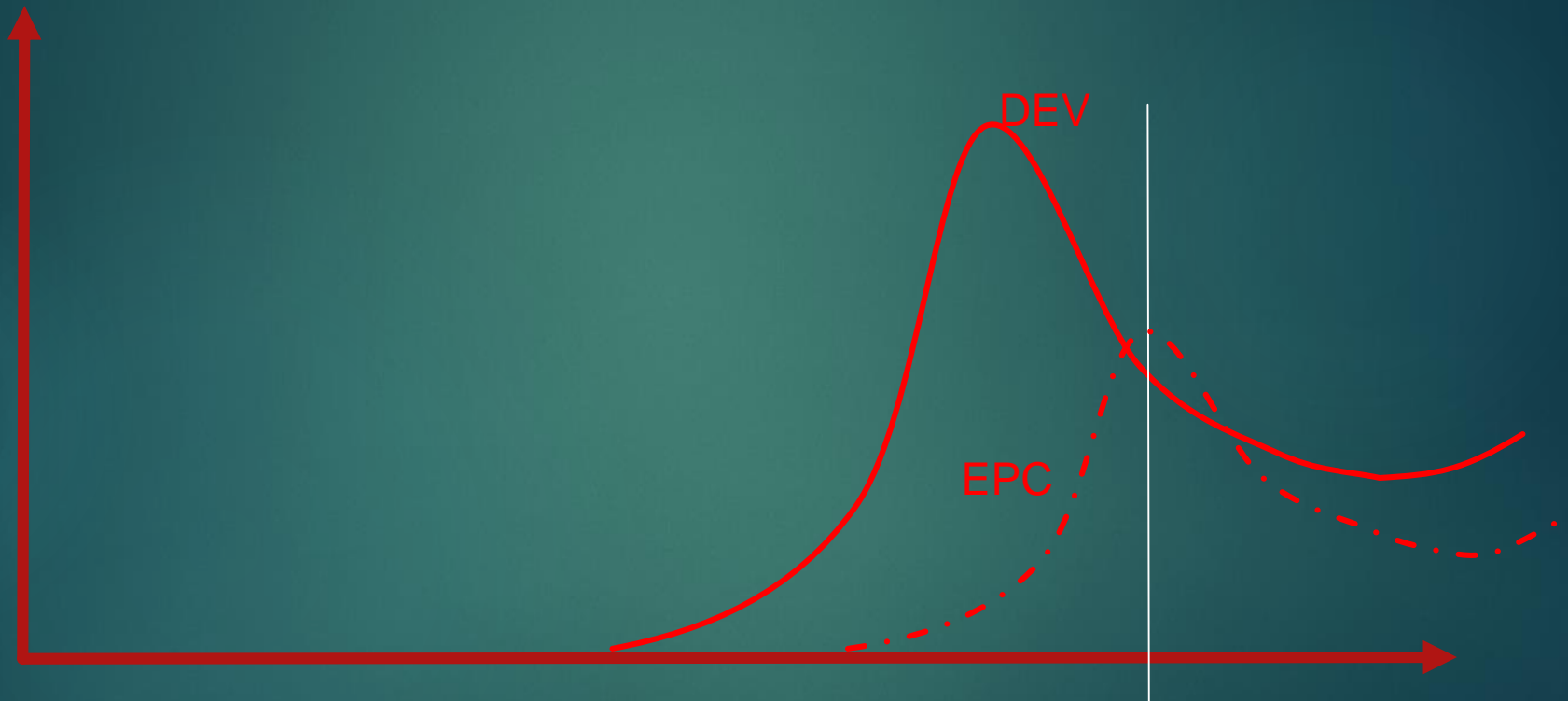
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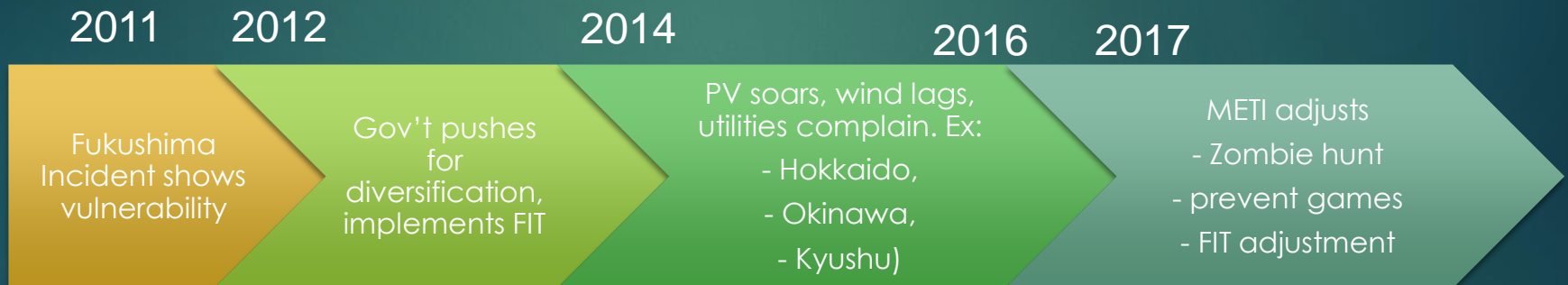
The cycle...



...is changing now

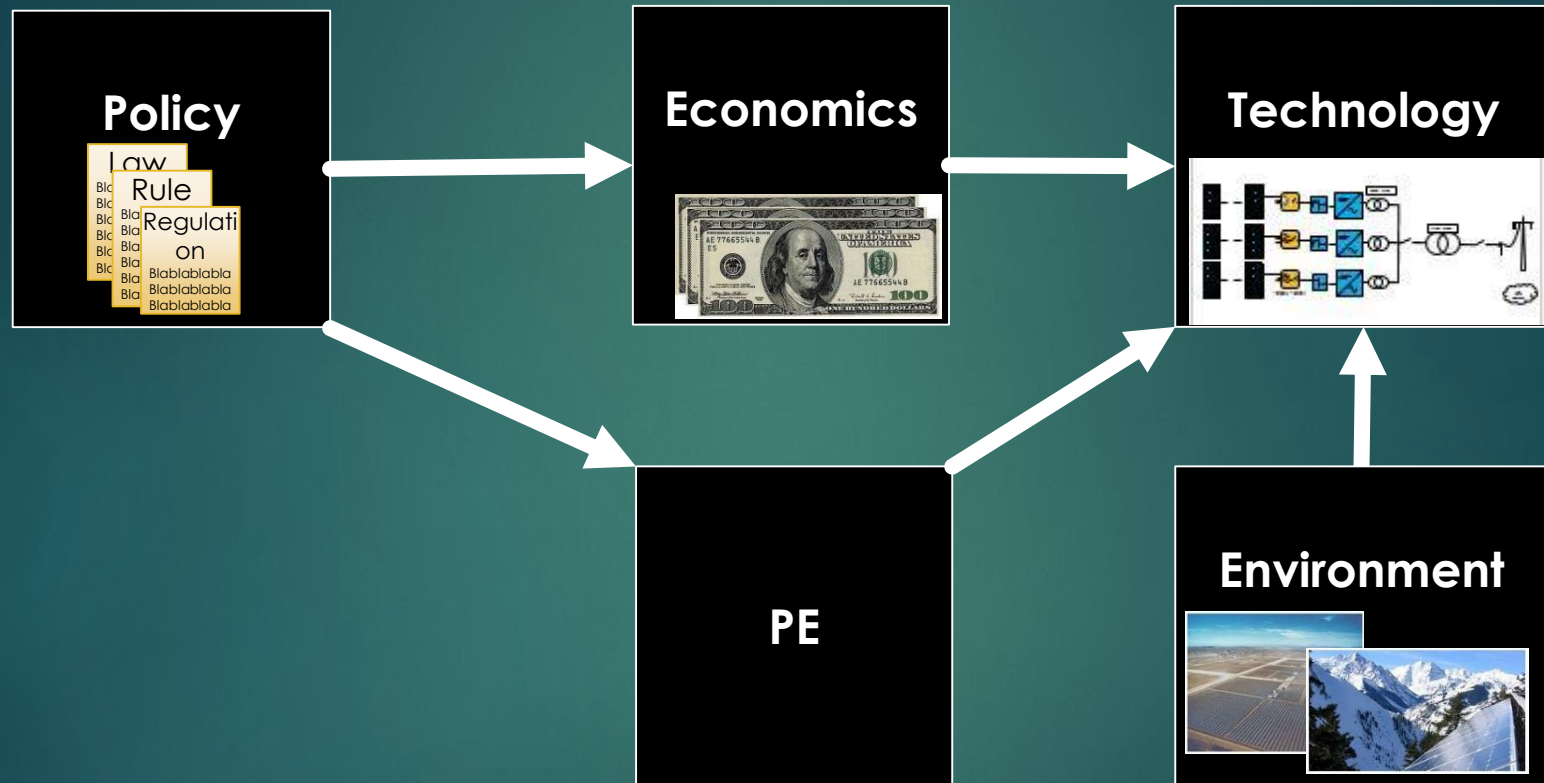


FIT - purpose



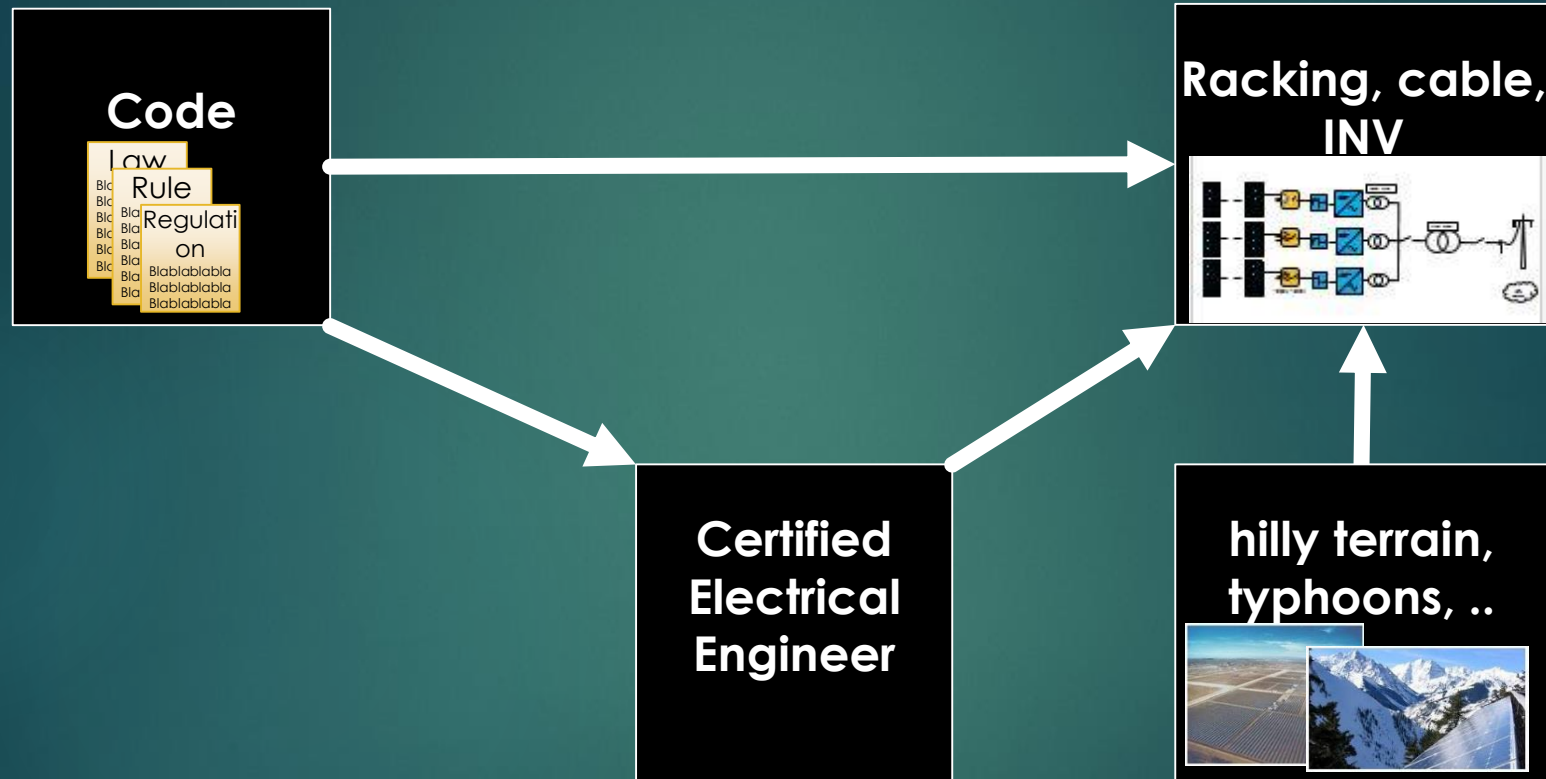
Who or what influences system design?

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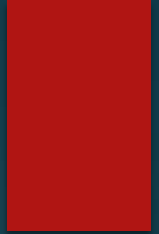


Who or what influences system design?

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System Design



1000V vs 1500V comparison (diagram & table)

Increase of strings to achieve the 1500V

Present

V DC Max = 1.000V



1 MW

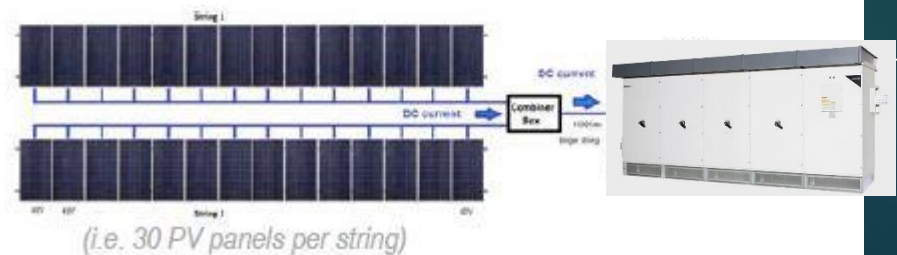


Future

V DC max = 1.500V

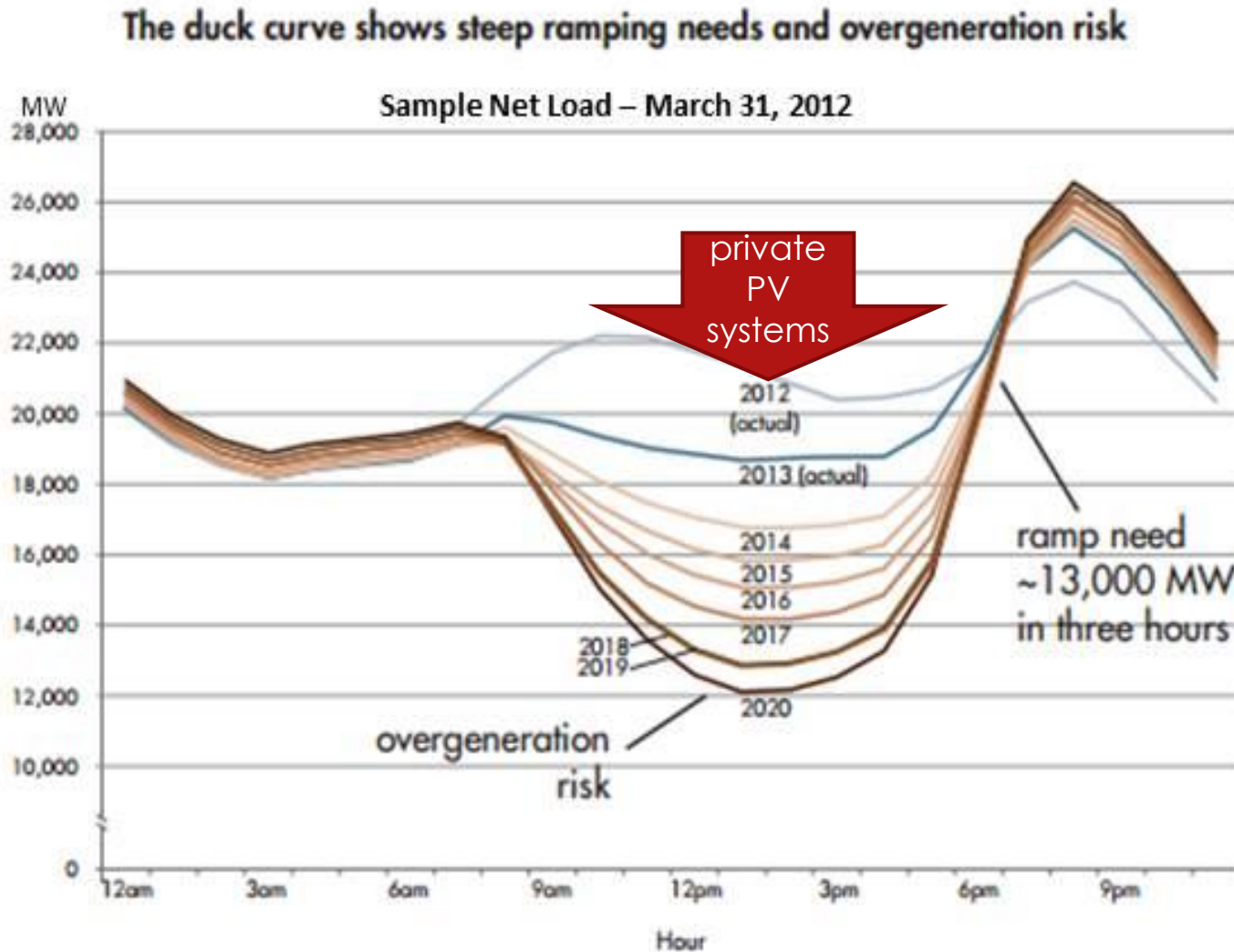


1.5 MW



The Duck curve

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(from the California Independent System Operator)

Hokkaido: batteries required

Okinawa: batteries required

Kyushu: curtailments started in 2017

Kyushu-Honshu: excess renewable energy between regions started in 2018

TEPCO: Negawatts purchase started in 2018

Chubu, TEPCO, Hokkaido, etc.: Blockchain P2P trading test phases have begun
Deregulation entering final phase.

Impact of the environment on layout



The US still has lots of room
The Duck curve has brought noon prices to zero (or less)
-> modules may face a bit to the West (not 180 South)
-> trackers
-> batteries



The German subsidies have disappeared and large spaces are no longer made available as the farm land is protected. We are seeing large numbers of string inverter systems, recently



The Japanese systems are only now starting to switch to 1500V,
Flat land is gone
Subsidies are disappearing
We are seeing string inverter systems gain market share

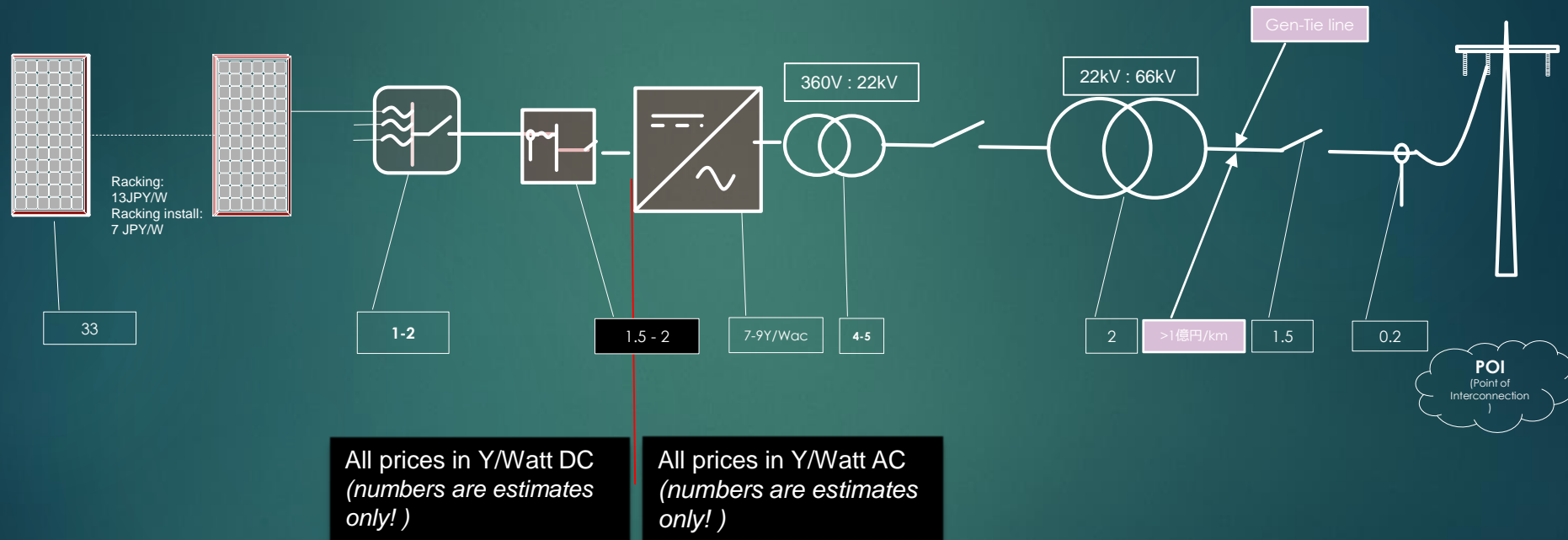
Tends – simplified: Typical System Architecture

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	Typical system size	typ. DC voltage	Predominant inverter	Predominant support structure
Germany	▶ <100kW	▶ 1500V	▶ String	• fixed
SW USA	▶ 20-50MW	▶ 1500V	▶ Central	• tracker
Japan	▶ 2MW	▶ 1000V	▶ Central (->string)	• Fixed - (bldg. code)

Prices in Japan [JPY/W]

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civil:

5-25 ?

mech. inst.:

15 ?

el. inst.:

18 ?

THANK YOU!

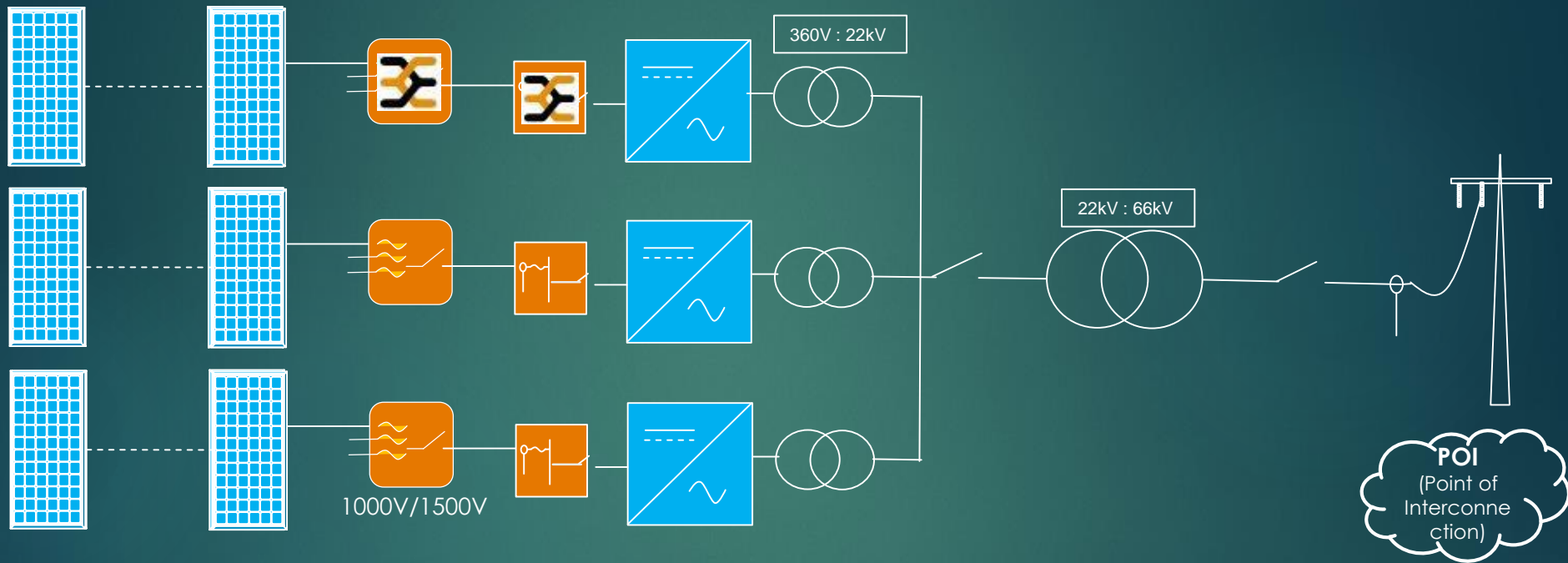
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Please fill in the following survey (by 10/27):

https://mbs.az1.qualtrics.com/jfe/form/SV_efXwhiEsGQXNk57?Q_CHL=social&Q_SocialSource=linkedin

Central Inverter System



String Inverter System

