

# Adjustment of Tariffs 电价调整

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CONSULTING & IT



ENERGIE



UMWELT



WASSER & INFRASTRUKTUR

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对运行中的电厂进行电价调整

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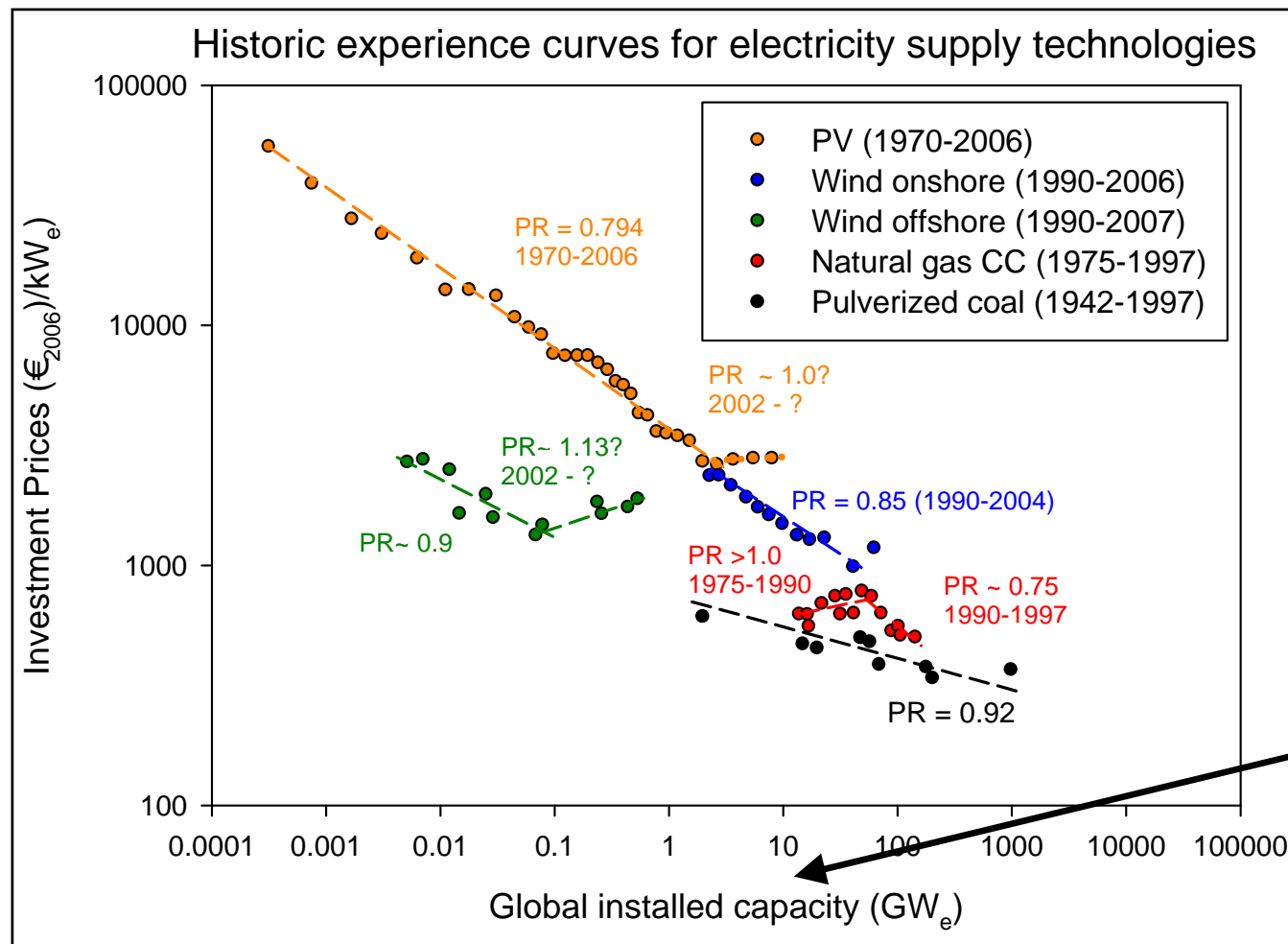
电价回顾



# Background – Learning Curve I 背景—经验曲线I

Renewable energy technologies usually features large cost reduction potentials →  
 New plants are generating cheaper than existing plants

可再生能源发电技术发展代表着成本下降趋势 → 新建电厂的成本低于已建成的电厂

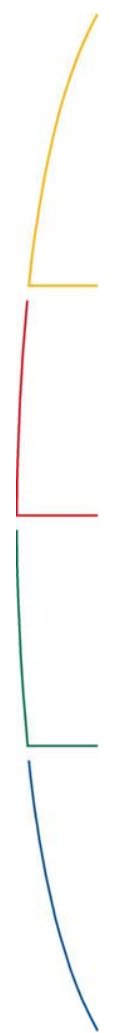
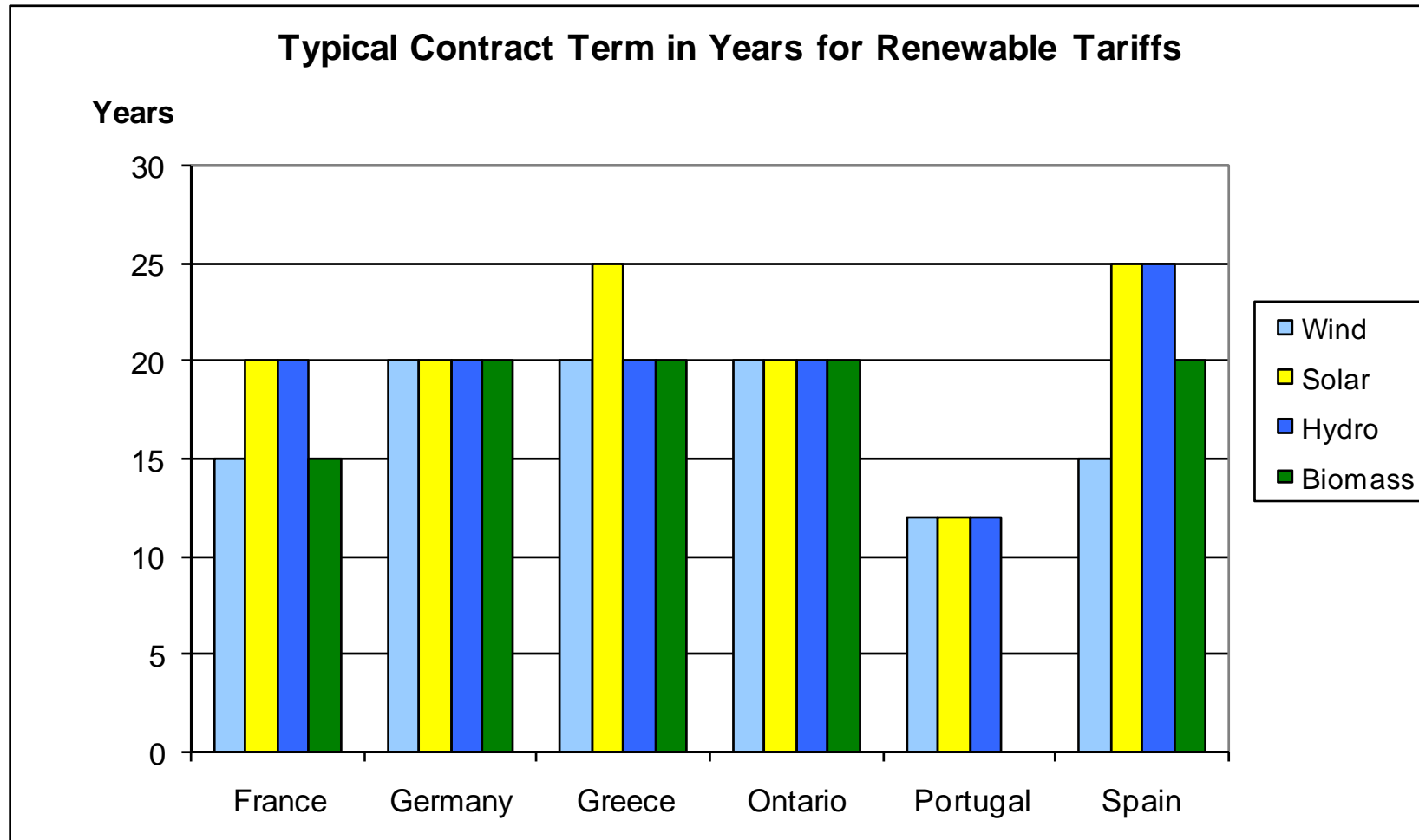


**National vs. global learning!**

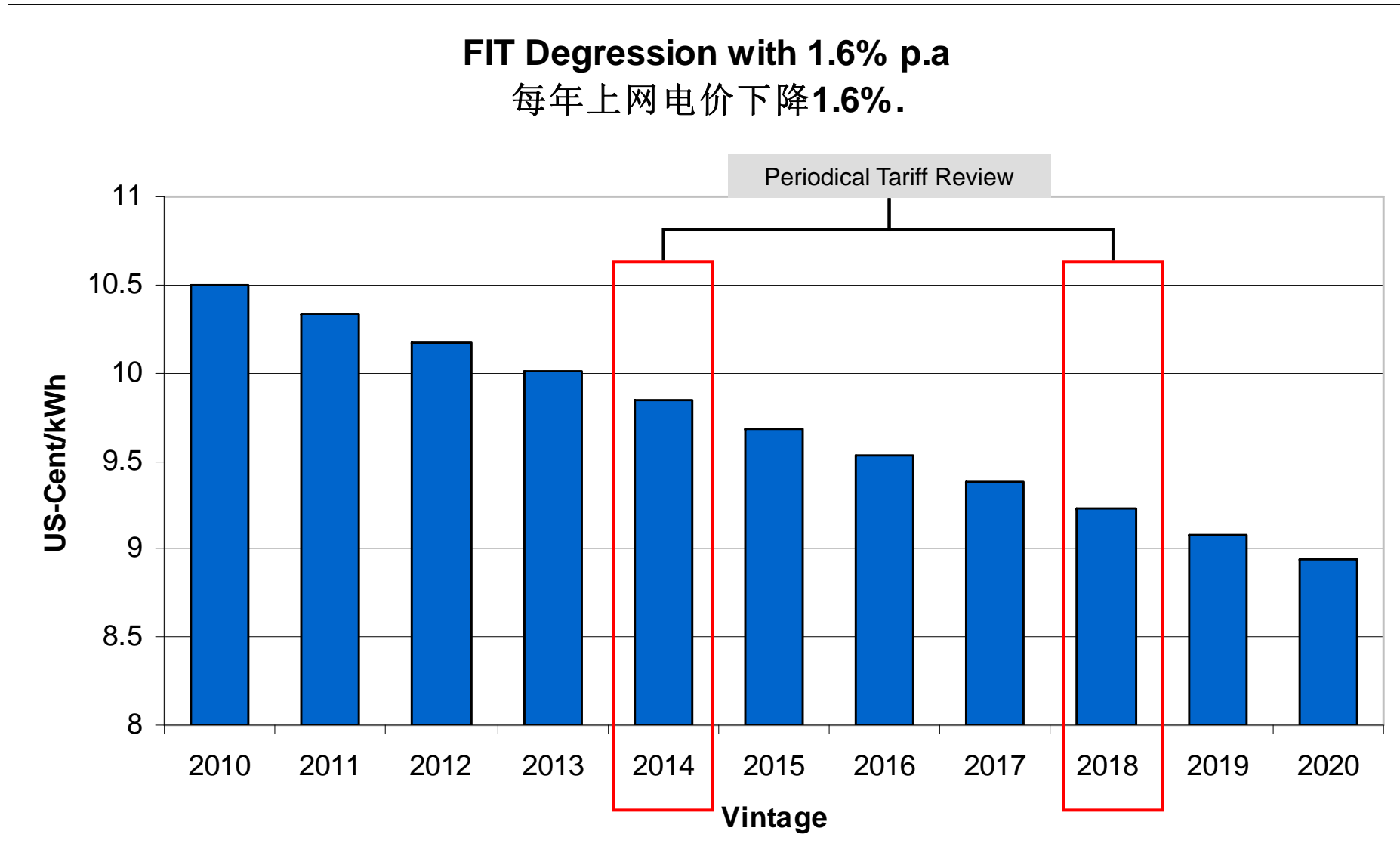
Source: Junginger et al. 2010

# Background – Price Risk 背景-价格风险

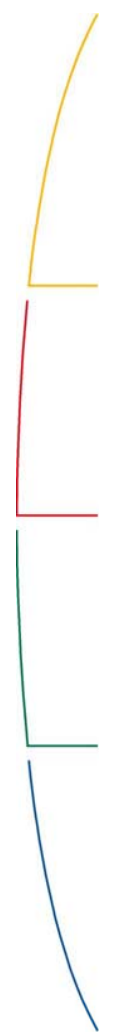
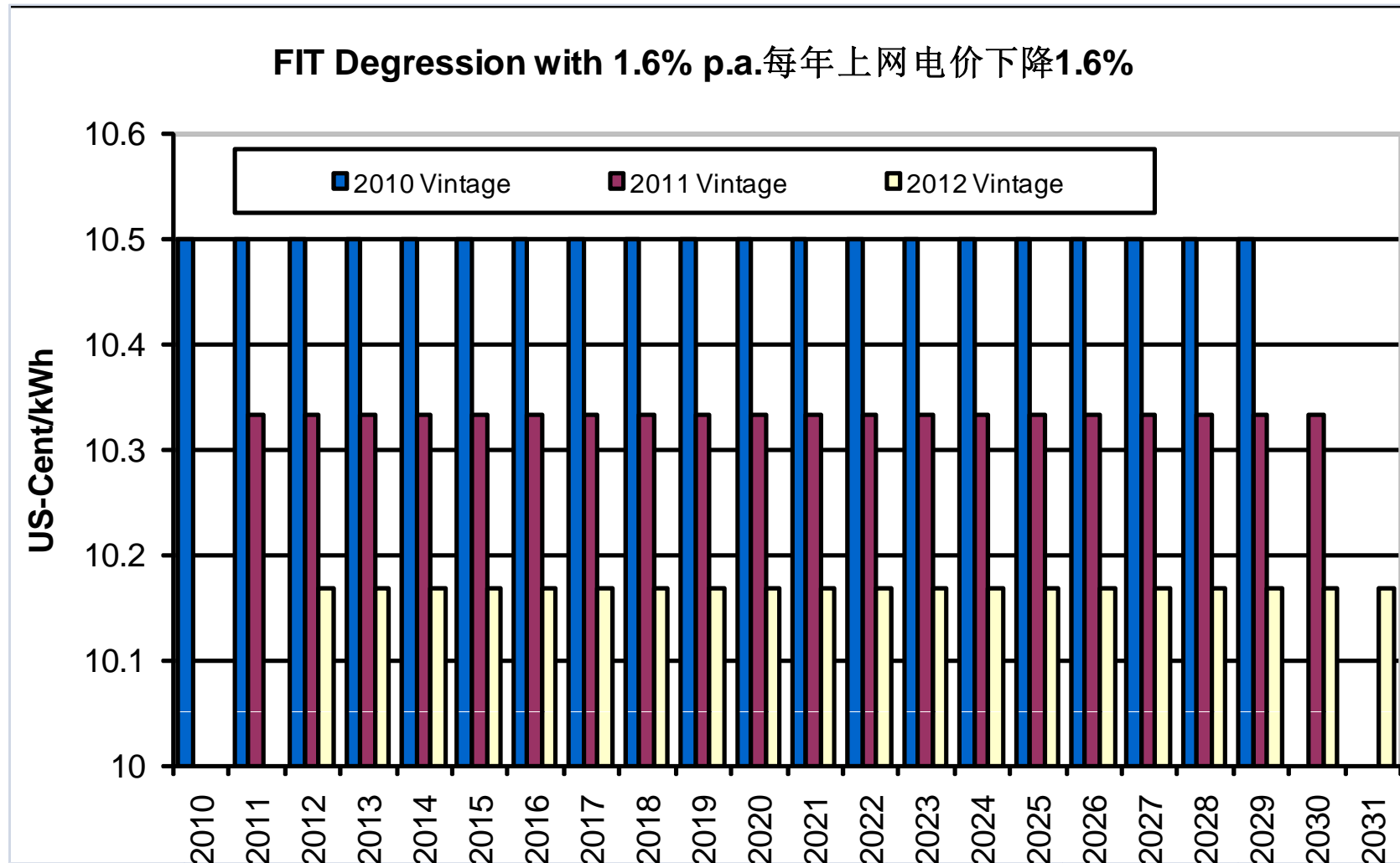
Feed-In tariffs provide long-term contracts over a long time → price risks  
 强制上网电价政策提供了长期的售电合同 → 价格风险



Degression rates for new power plants 电厂上网电价下降率

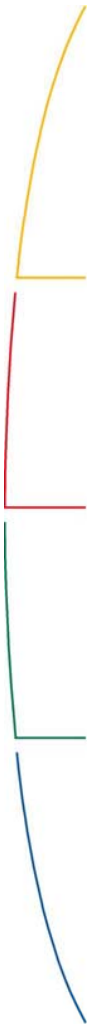


## Degression rates for new power plants 新建电厂上网电价下降率



# Degression Factors for Wind Power

Country	Tariff adaption mechanisms for new installations
Austria	Regarding new plants, the amount of compensation is gradually reduced. The amount of price reduction is re-calculated every year
Czech Republic	The level of remuneration for new installations is set annually by the Energy Regulatory Office. These tariffs cannot decrease by more than 5% in relation to the year before
Estonia	Statutory law does not provide for an adaptation mechanism
France	The decrees on the Feed-In Tariff for the single technologies (arrêtés) all provide for annual adjustments to inflation of the tariffs for new systems. Tariff degression of 2% annually is applied for electricity from new wind turbines from the year 2008 on.
Germany	The annual percentage degression for tariffs and bonuses for electricity generated from wind energy a) from offshore installations shall be 5.0% from the year 2015 onwards, and b) from other installations shall be 1.0%.
Italy	Payments will be reduced by 2 or 4% for systems commissioned in 2009 or 2010. Systems commissioned later than 2010 will be subject to a new decree setting a new amount. If the new decree is not enacted, the amount set for 2010 shall apply.



## Degression Factors for Wind Power 风电电价递减系数

国家	新增装机容量的电价调整机制
奥地利	针对新建的风电场，补贴额度递减，电价减少的额度每年重新计算。
捷克	新建风电场的补贴额度每年由能源管理办公室确定。电价不能少于前一年的5%。
爱沙尼亚	成文法中没有电价调整机制
法国	法令中针对各种技术有明确的规定，根据每年电价通胀制定了年度调整机制。从2008年起对新建风电场开始实行电价每年递减2%。
德国	风电电价和补偿递减率：从2015年起，海上风电每年递减5.0%，其他装机每年递减1.0%。
意大利	在2009年和2010年新建的风电场收入减少2%或4%。2010年之后新安装的系统取决于新颁布的法令。如果新法令不能执行，则减少的额度按照2010年的标准计算。



## Depression Factors with national vs. global learning

递减系数：国内与国际经验比较

$$d = x \cdot d_v + (1 - x) \cdot d_g = 0.3 \cdot 2\% + 0.7 \cdot 1.5\% = 1.6\%$$

with

*d*: annual depression rate of the tariff for new plants

*x*: domestic cost share of components and services

*d<sub>v</sub>*: assumed depression rate of domestic components and services

*d<sub>g</sub>*: assumed depression rate of components and services purchased on global markets

## Tying Degression Factors to Capacity Deployment

### 递减系数与容量增长的关系

Example Degression factor of PV in Germany in 2012 以德国2012年光伏装机为例

PV capacity additions in 2011 2011年新增光伏发电装机	Degression Factor 递减系数
< 1500 MW	1,5%/a
1500 - 2000 MW	4.0%/a
2000 – 2500 MW	6.5%/a
2500 – 3500 MW	9.0%/a
3500 – 4500 MW	12%/a
4500 – 5500 MW	15%/a
5500 – 6500 MW	18%/a
> 6500 MW	21%/a

- **Creates uncertainty for investors**

对投资者而言增加了不确定性

- **Learning mostly driven by global markets**

经验效应主要由国际市场推动

- **Limits the additional costs through a „soft“ cap**

通过一个“软”帽子限制了新增成本

Source: www.res-legal.eu

## Inflation adjustment for existing plants

对于运行中的电厂进行通货膨胀调整

$$T_i = (0.7 + 0.3 \cdot \frac{I_i}{I_a}) \cdot T_a$$

with

*0.7: Share of tariff not effected by inflation*

*0.3: Share of tariff effected by inflation*

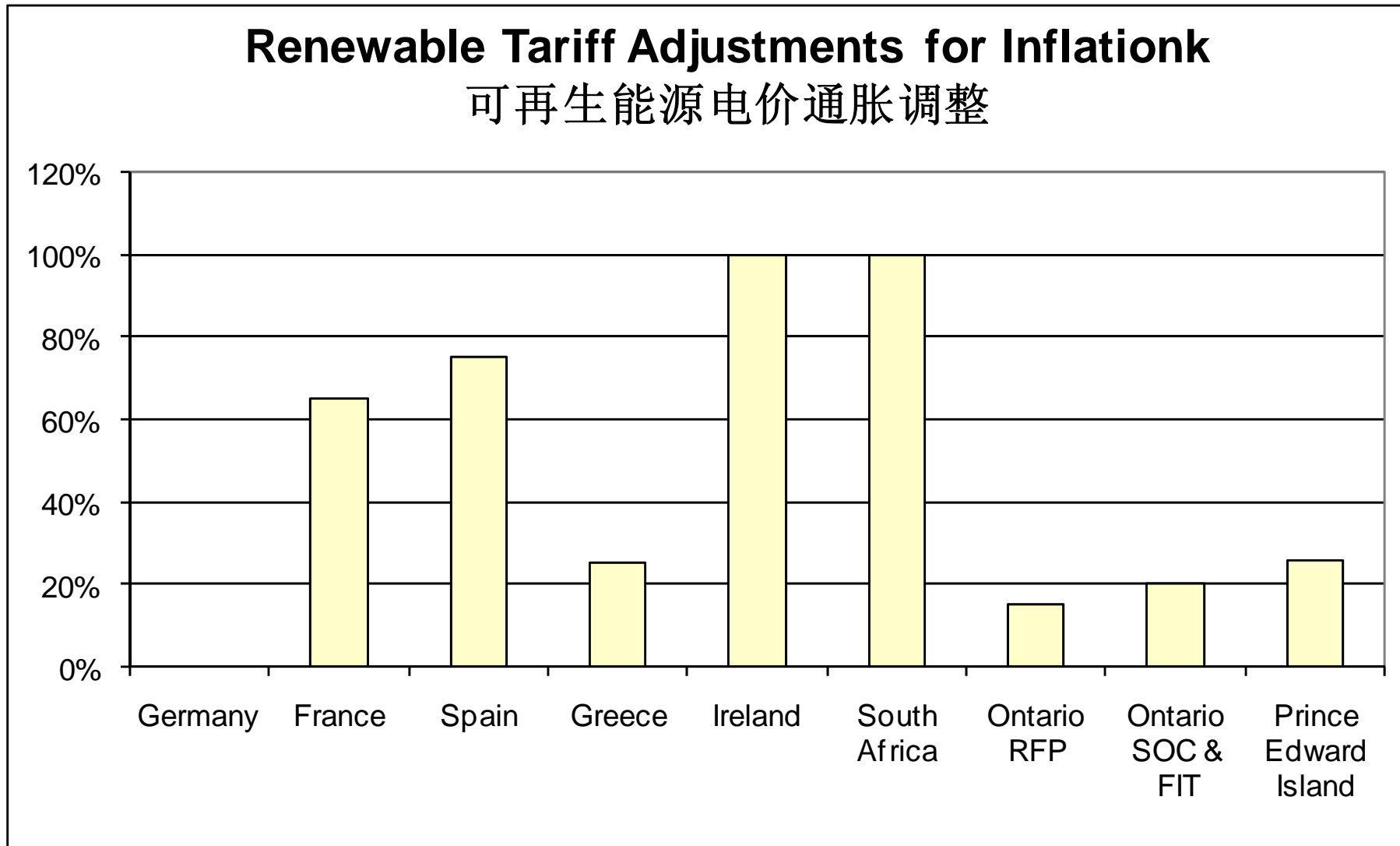
*T<sub>i</sub>: Feed in tariff in year i of operation of an individual plant*

*I<sub>i</sub>: Domestic consumer price index in year i of operation of an individual plant*

*I<sub>a</sub>: Domestic consumer price index in year a start of operation of an individual plant*

*T<sub>a</sub>: Feed in tariff in year a start of operation of an individual plant*

# Share of Inflation adjusted Tariff 电价通胀调整比率



Source: Wind Works

## Typical Recommendations for Tariff Adjustments

- For the effectiveness of a Feed-in Tariff some provisions as well as periodic adjustments or revisions are necessary in order to anticipate changes of economic or technologic framework conditions and adapt the tariff accordingly.
- The adjustments should apply to newly commissioned plants only.
- Inflation should be considered with a fixed tariff adaption rule.
- Learning Effects and Economies of Scale should be split up according to their occurrence and calculated correspondingly: on the domestic or on an international market.
- Unforeseeable circumstances can be taken into account by reviewing the tariff every four years.

## 电价调整的建议

- 就保持上网电价的有效性而言，适时修改相关条款是非常必要的，这样可以预测经济或技术环境的变化并根据具体情况适时调整电价。
- 调整的范围应只针对新运行的电厂。
- 固定电价机制需要考虑通胀因素。
- 经验效应和规模经济需要根据不同市场情况分别计算：国内市场和国际市场。
- 每四年评估电价政策时可以将不可预见的因素考虑在内

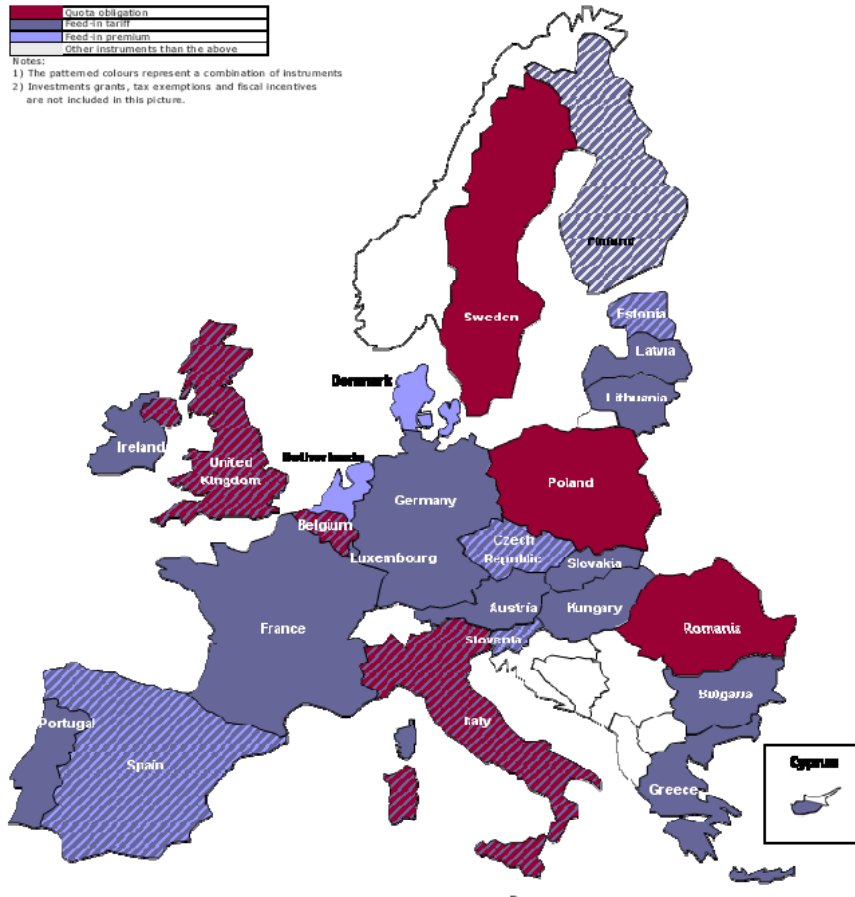
# Reserve Slides

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# Dominating support schemes for RE-Electricity in the EU

## 欧洲实施的可再生能源电力支持政策和机制



- Minimum Price Standards/FIT  
最低电价标准/强制上网电价政策
- RPS/ Quota / TGC  
配额/绿色交易证书
- MPS and RPS/Quota / TGC  
最低电价标准/配额/绿色交易证书
- Tax incentives / Investment grants  
税收激励政策/投资赠款
- Other system  
其他政策

A clear majority of EU countries uses feed-in tariffs as main instrument  
 6 countries have implemented a quota obligation with TGCs

绝大多数欧盟成员国实施强制上网电价政策作为主要政策手段，6个国家已经开始执行可再生能源配额制



## Degression Factor 递减系数

Germany 2010:

2010年德国

- Wind 风电: 1%
- Solar 太阳能发电: 9%
- Small Hydro 小水电: 1%
- Biogas 沼气: 1,5 %
- Landfill Gas 垃圾填埋气: 1,5 %

Source: Wind Works