



# Smartgrids: a solution for all problems

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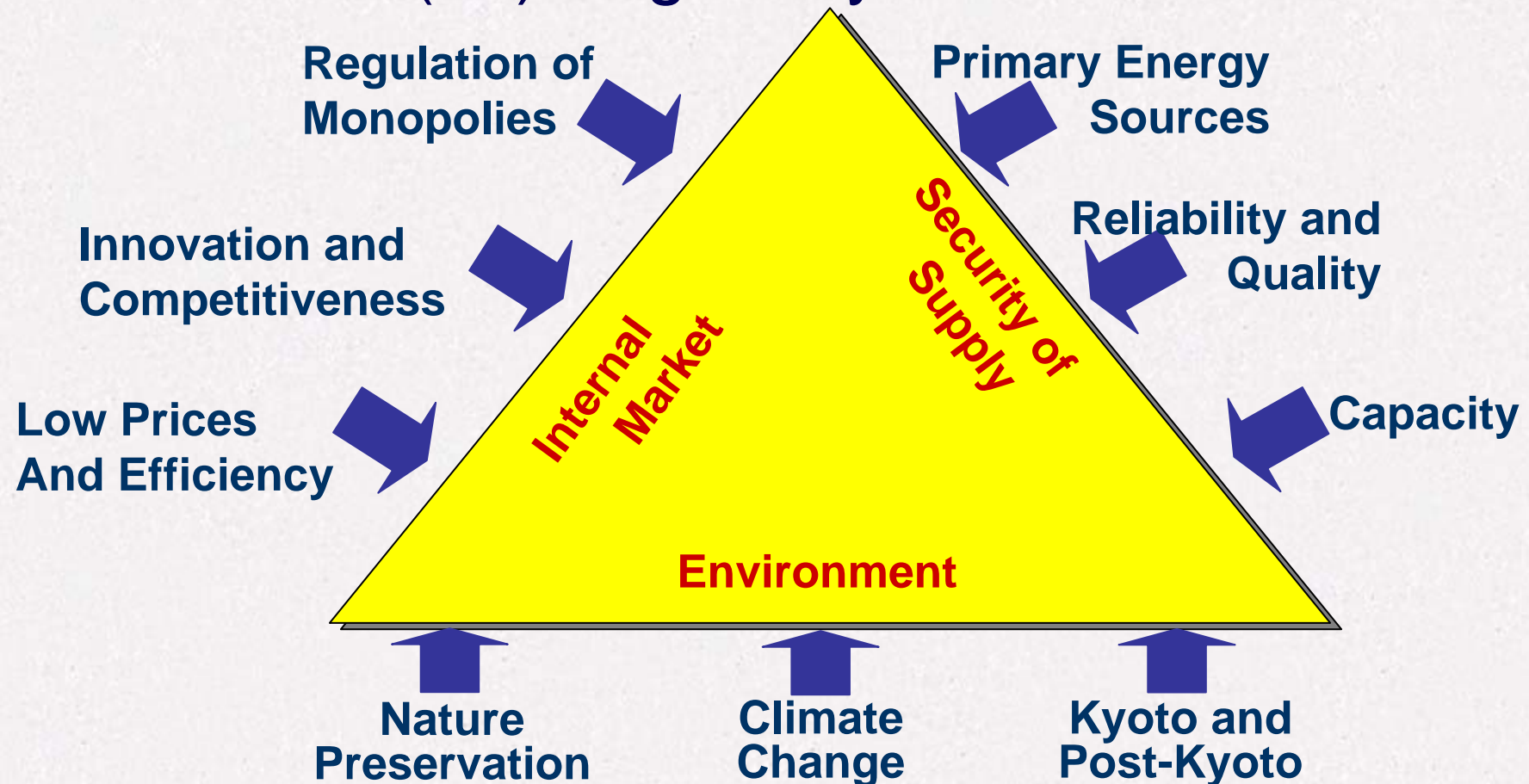
World Forum on Energy Regulation IV  
Athens, Greece

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# Why smartgrids?

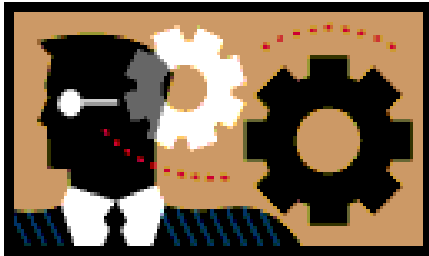


- 20-20-20 (30) targets by “to-morrow”

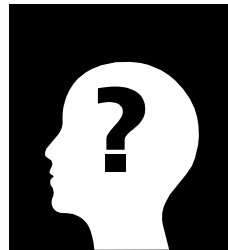


# Stakeholders

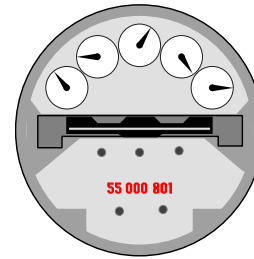
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Technology providers



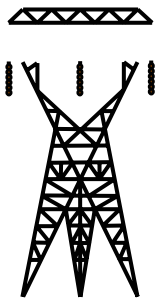
Users



Energy service providers



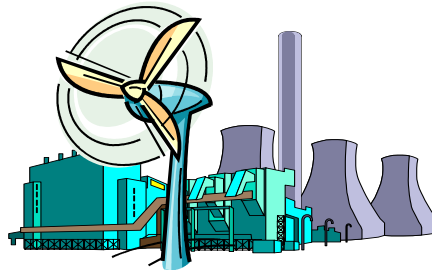
Researchers



Network companies



Traders



Generators



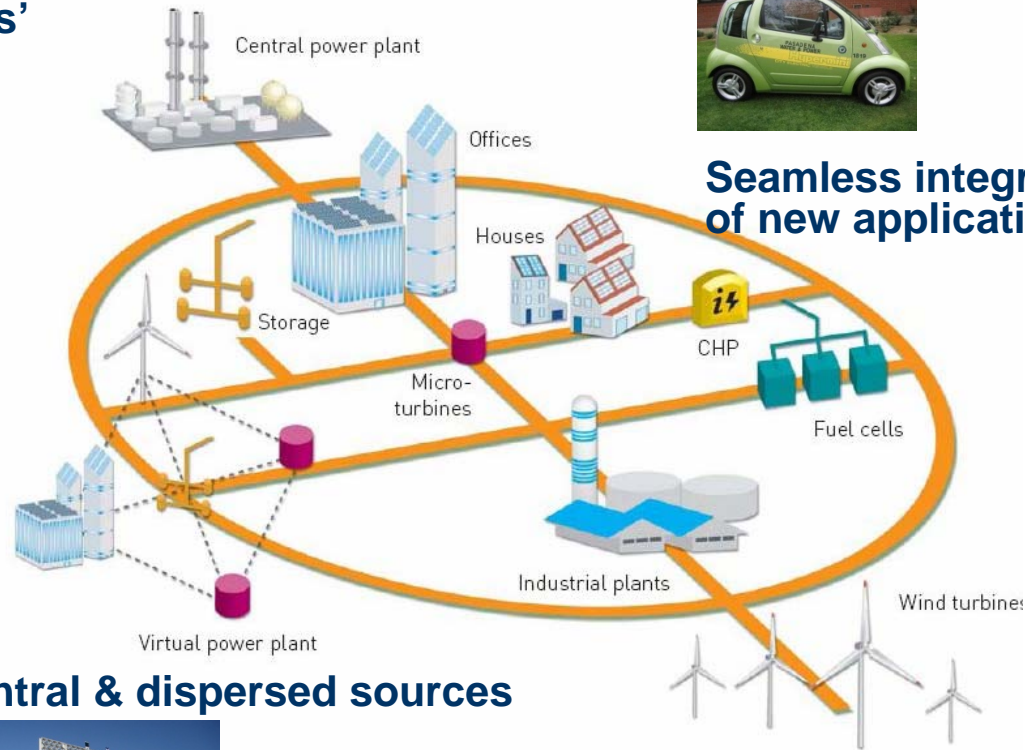
Regulators



Governmental agencies

# How may the future look?

**Multi-directional  
'flows'**



**Central & dispersed sources**



**Seamless integration  
of new applications**

**End user real time  
Information & participation**



**Central & dispersed  
intelligence**



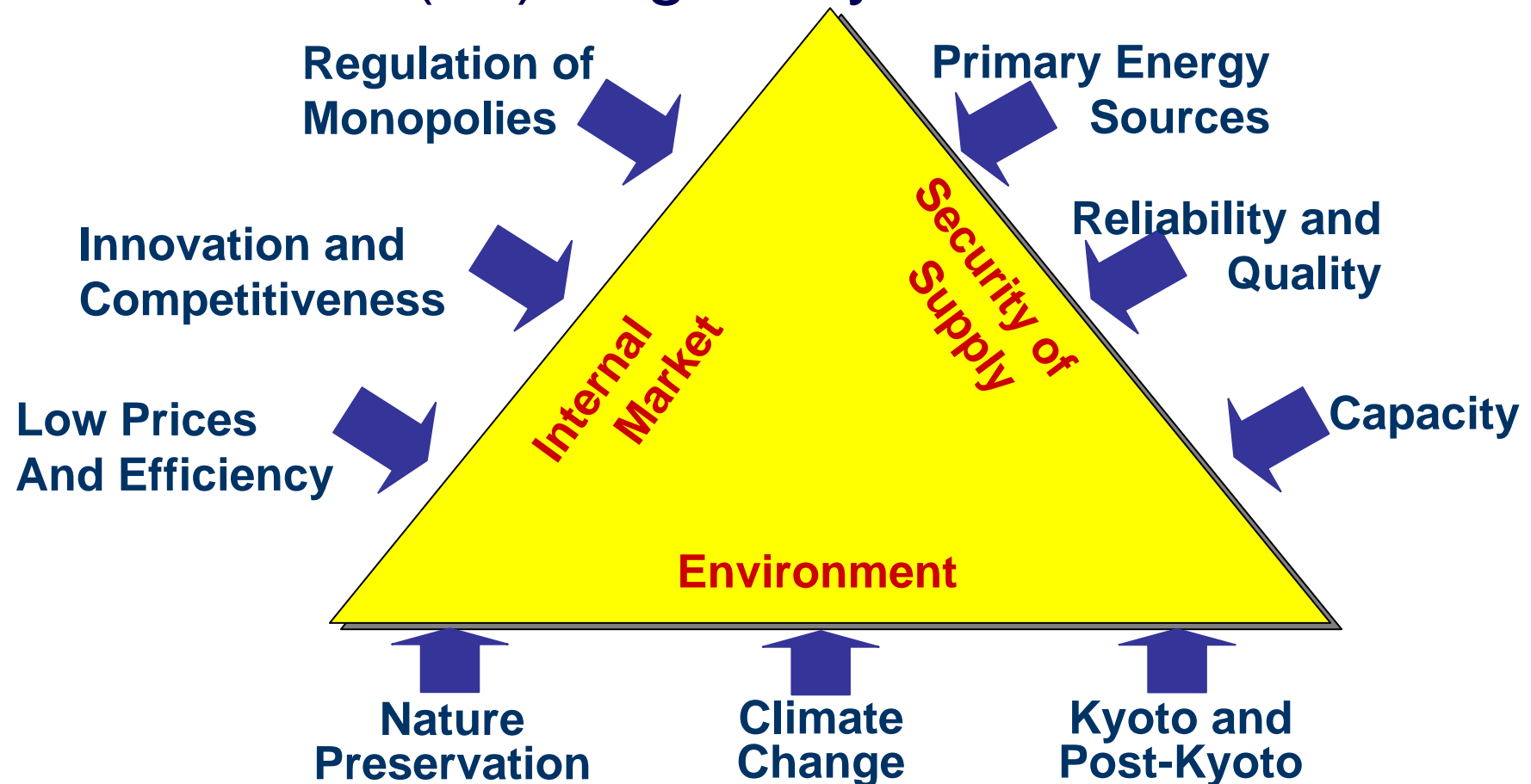
**Smart materials  
and power  
electronics**



# Why smartgrids?

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- 20-20-20 (30) targets by “to-morrow”



# What did the present system cost?

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*To remember:*

- 430 million people served
- 2500 TWh used
- 560 GW installed capacity @ 500€/kW = 280G€
- 230.000 km HV network @ 0.4M€/km = 90G€
- Approx. 5.000.000 km MV+LV network
- 1500€ investment per EU citizen
- Largest man-made system



# Does it work?

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## *Technical miracles of the 20<sup>th</sup> century*

1. **Electrification**
2. Automobile
3. Airplane
4. Safe and Abundant Water
5. Electronics
6. Radio and Television
7. Agricultural Mechanization
8. Computers
9. Telephone
10. Air Conditioning and Refrigeration
11. Interstate Highways
12. Space Exploration
13. Internet
14. Imaging Technologies
15. Household Appliances
16. Health Technologies
17. Petroleum and Gas Technologies
18. Laser and Fiber Optics
19. Nuclear Technologies
20. High Performance Materials



**Still...  
new generation paradigms  
& ageing assets pose a serious challenge...**

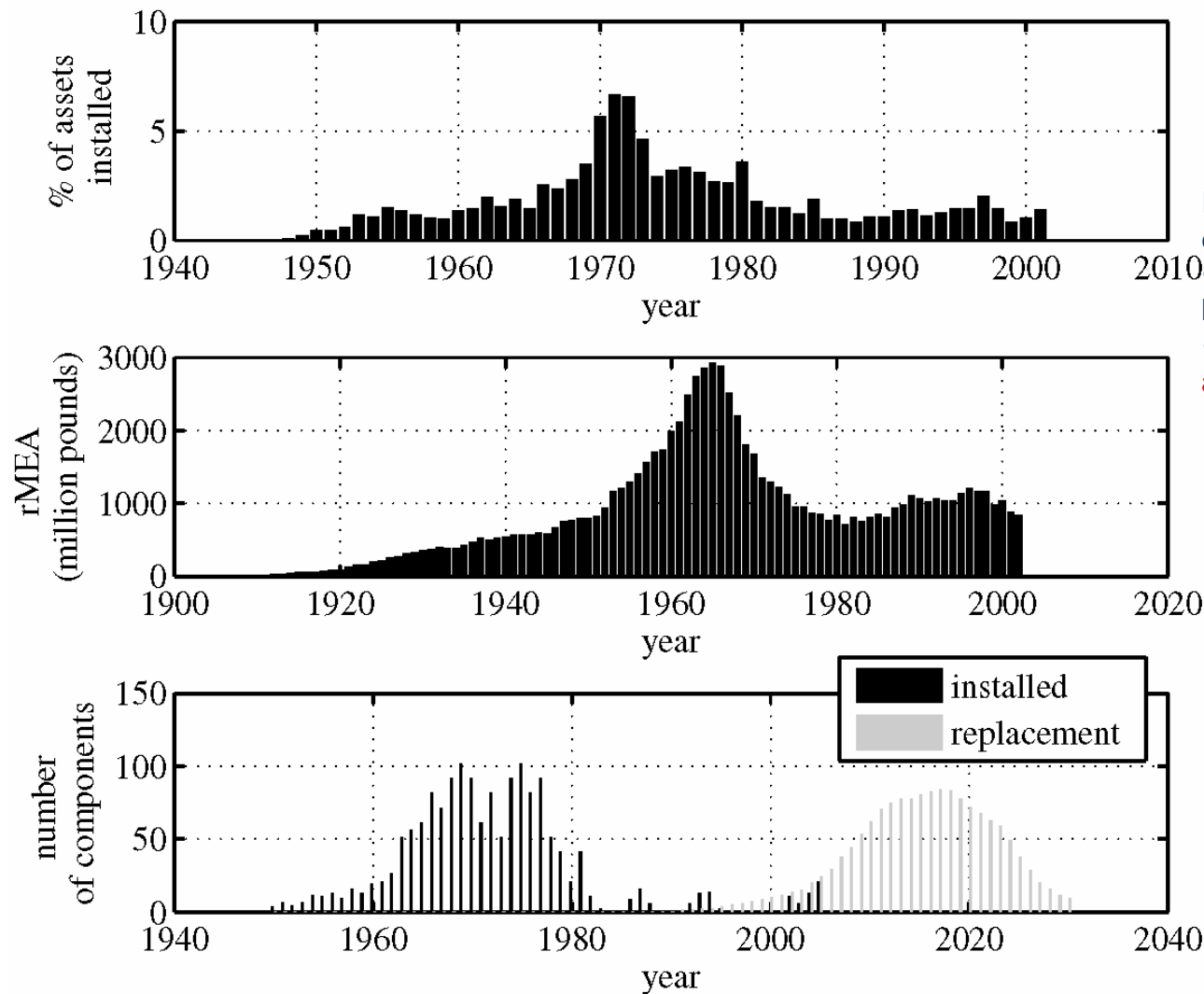
# What will it cost?

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- Demand
  - Growth 2%/year = +1250 TWh until 2030
- Generation
  - Replacement & expansion 900 GW needed until 2030
  - RES 500 GW<sub>peak</sub> needed until 2030
- Transmission & Distribution
  - Ageing assets, expansion and RES+DG integration  
500G€ until 2030 needed
- Markets & Regulation
  - Data + information need > 20G€ investment  
(based on 100€ per connection)



# Money with or without Smartgrids: money needed



Installation wave in European distribution systems in the 60s & 70s  
→ **Replacement wave** expected with business-as-usual approach  
→ Opportunity for **new system architecture and operation** schemes

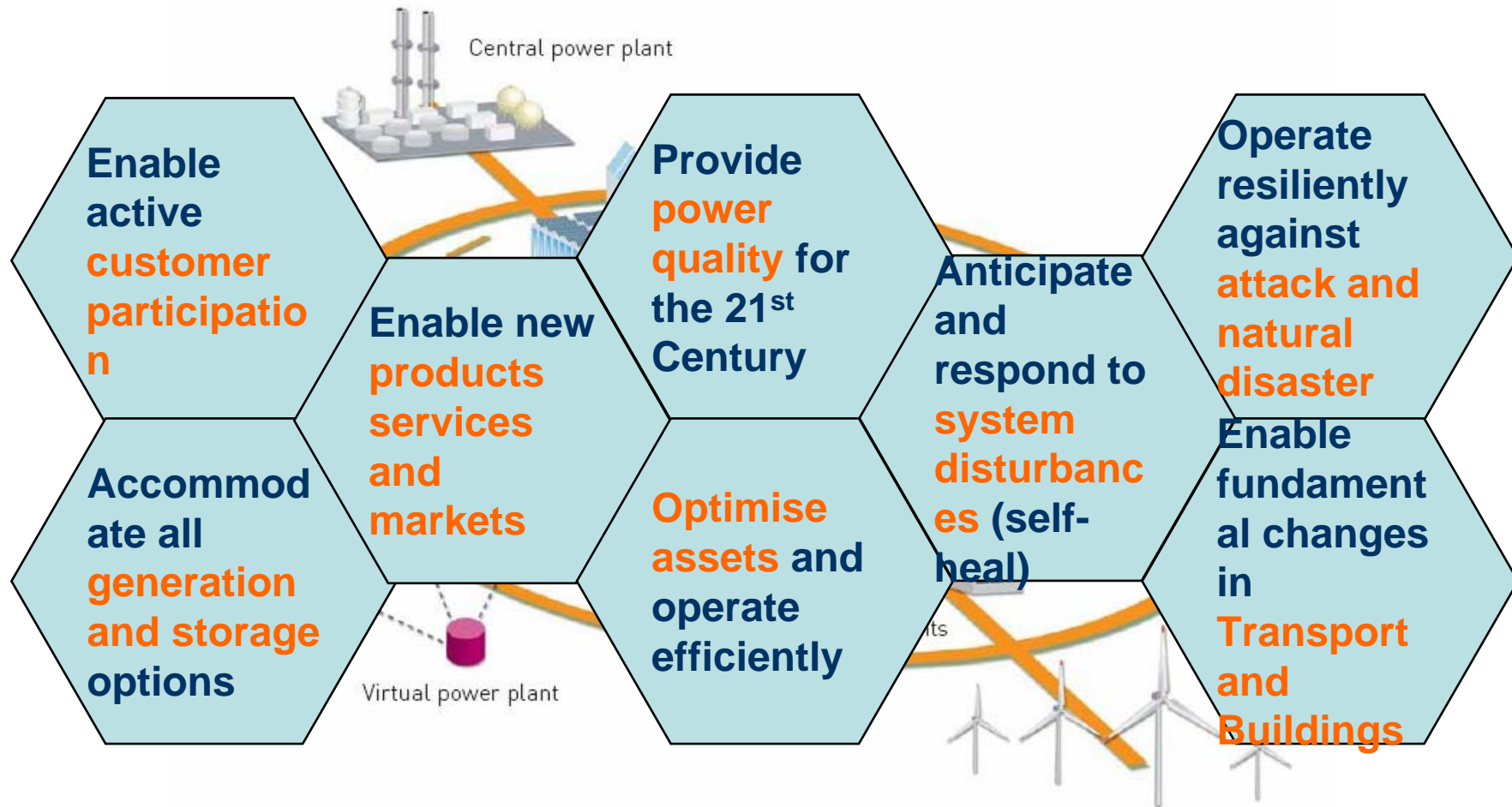
# Customer is key?

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**Smart Grids** extend beyond networks and will embrace **transport**, the **built environment**, the behaviours and engagement of **customers**, and will need **societal acceptance**.

# Value for money



# Conclusion

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- Smartgrids are key in future energy system
- Grid has served society already 100 years
- Investments are needed anyway
- Avoid “more of the same”
- Avoid “value of death”
- Deployment projects needed
- Regulatory framework to assess the customer interest

# Why smartgrids?

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SmartGrids is part of the  
Third Industrial Revolution

The best way to predict your future  
is to create it

(Peter Drucker)