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INTEGRATING CLIMATE POLICY & RENEWABLE TARGETS
Interactions between policy instruments

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Introduction

- It seems clear that carbon prices will not be enough for radically transforming our energy model
- Therefore, most countries are using a two (or three)-pronged strategy:
  - climate policy
  - renewable policy
  - energy efficiency policy
- A good example is the European Union: 20-20 for 2020
- However, these instruments interact significantly and a strong coordination is therefore warranted

Climate policy instruments

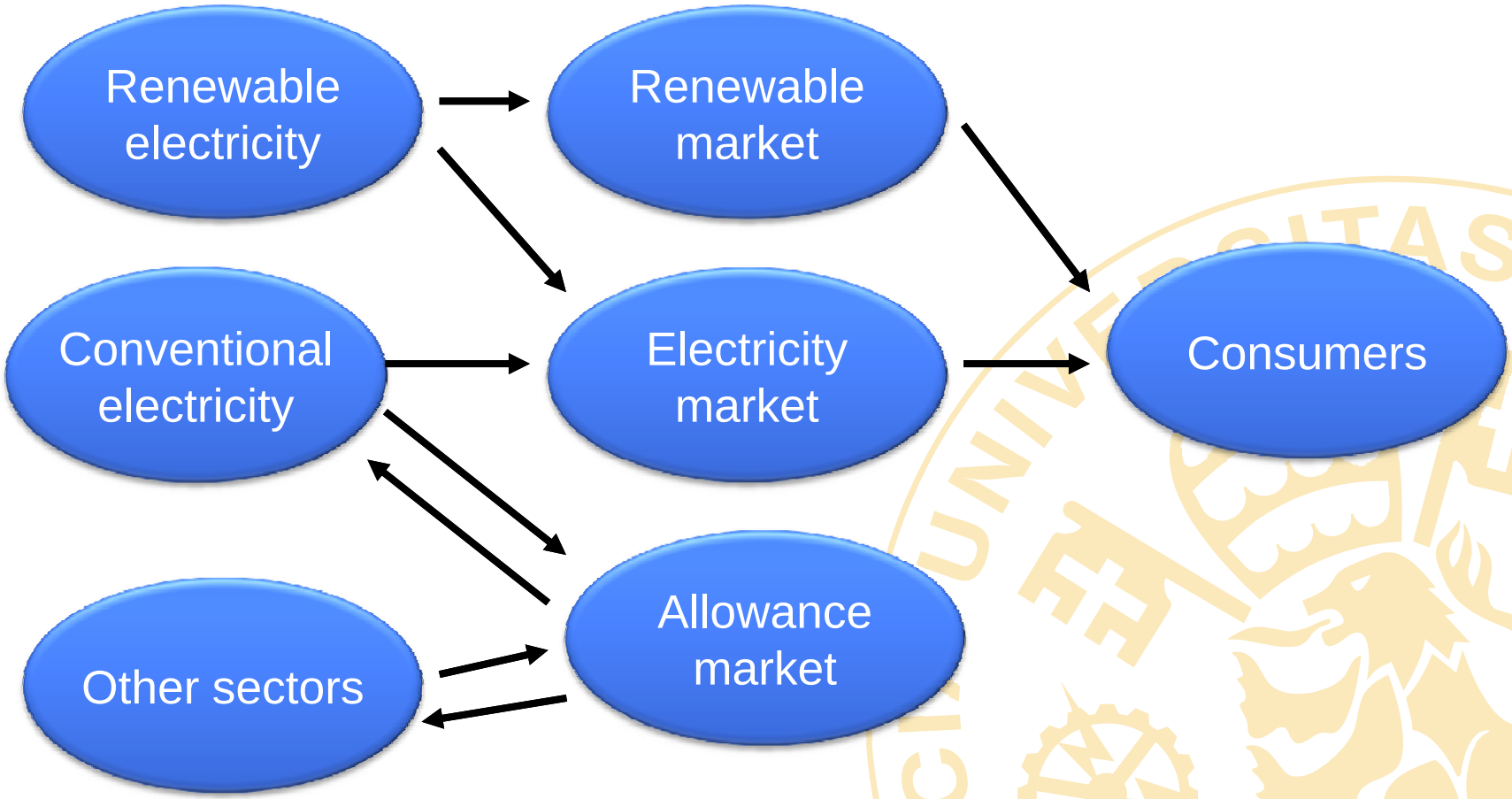
- Cap-and trade systems (or carbon taxes)
- Technology-neutral
- Usually generation-based (facility-specific)
  - But also load-based proposals

RES-promotion instruments

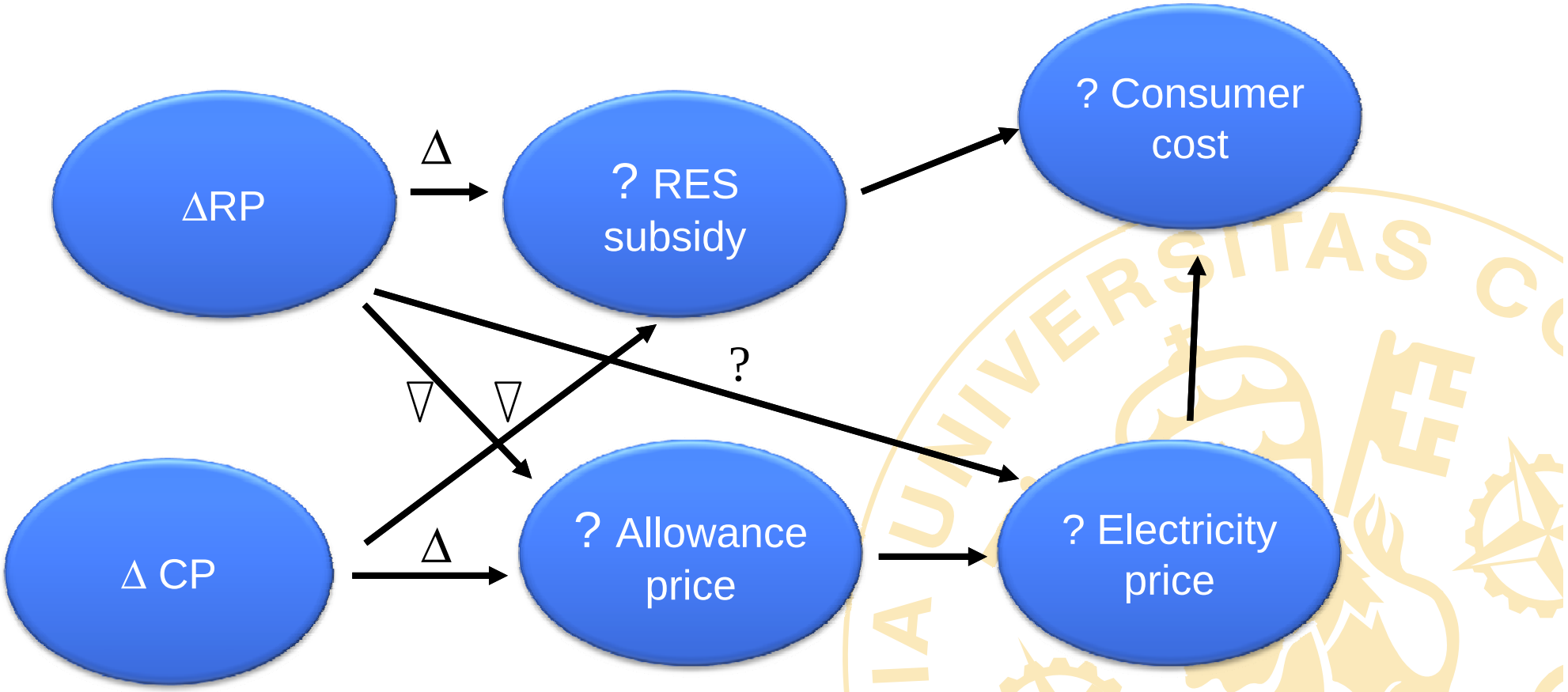
- Feed-in tariffs (FIT) or Tradable Green Certificates (TGC)
- Technology-specific
- Usually load-based (firm-specific)

- May be justified based on other benefits
  - industrial/technology policy
  - rural policy

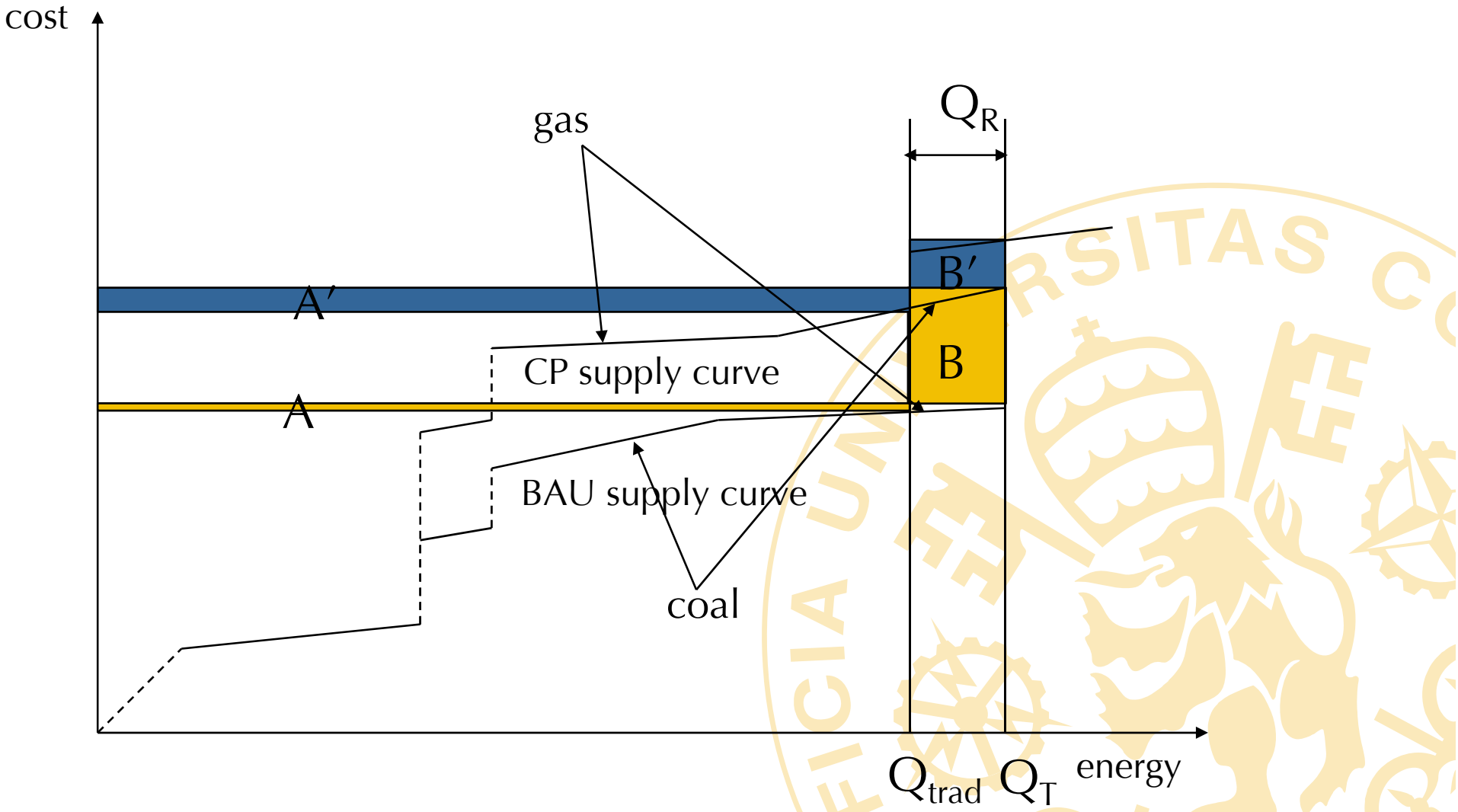
Interactions between CP and RP



The joint impact of CP and RP (I)



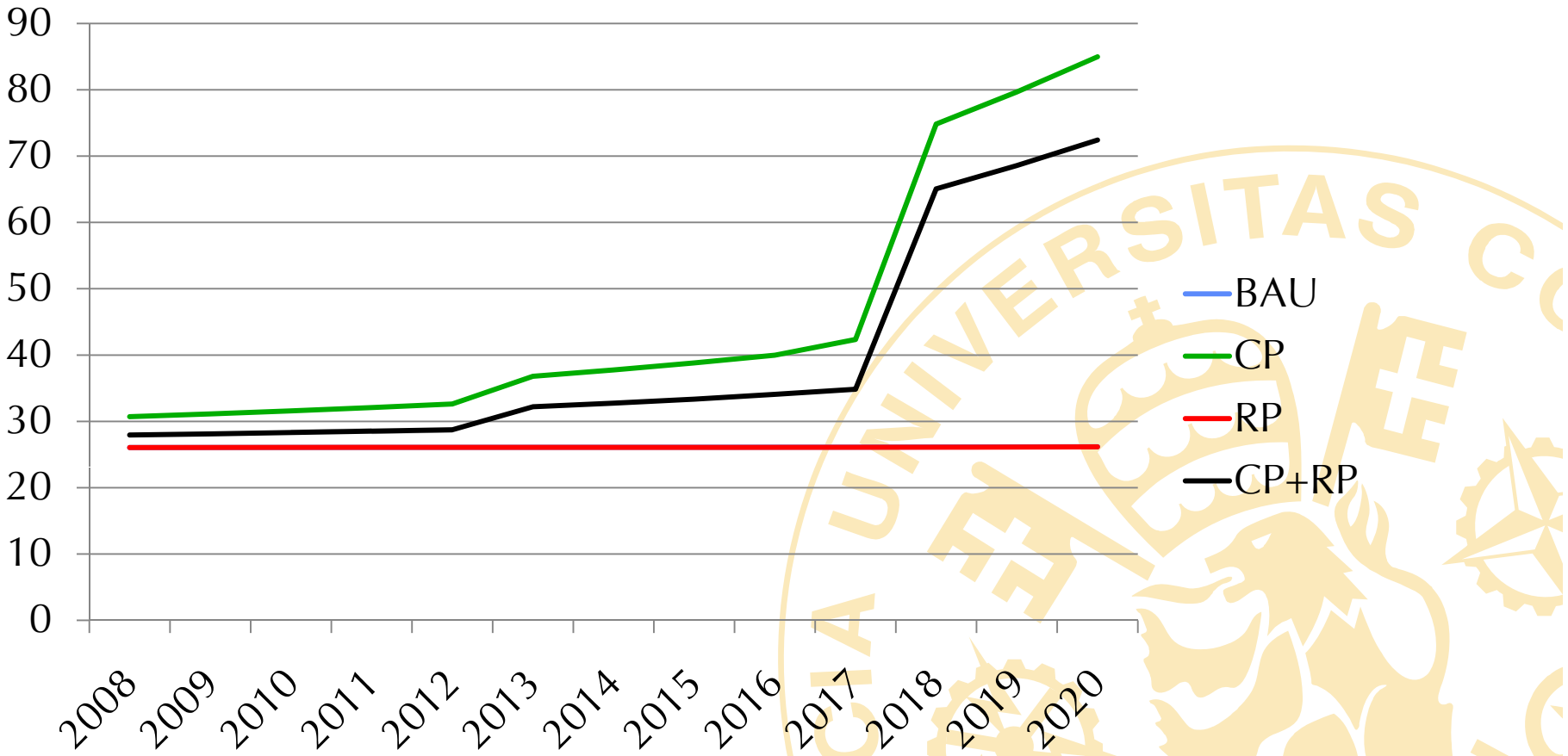
The joint impact of CP and RP (II)



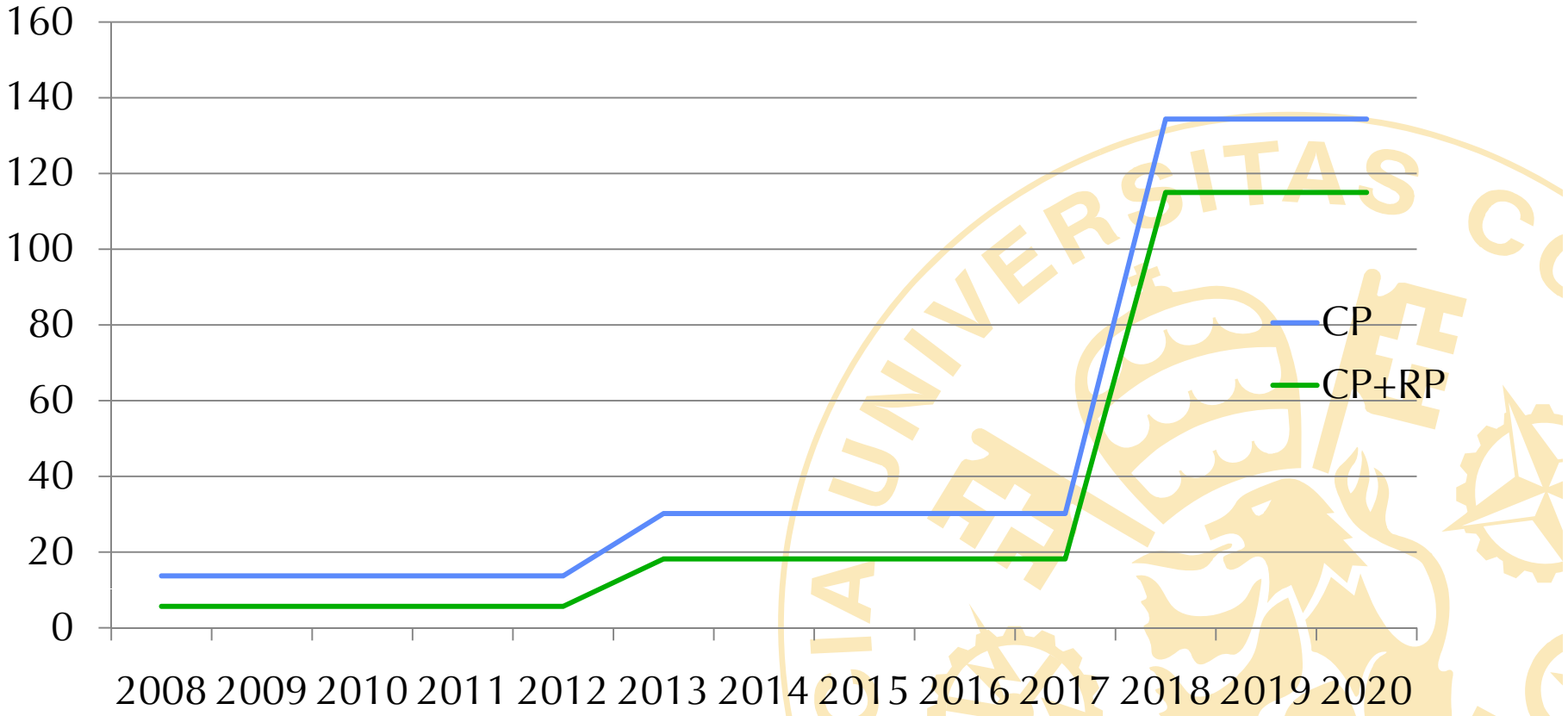
Our simulations

- Generation-expansion model for the Spanish electricity sector, under oligopoly
- Endogenous carbon price
  - current NAPs
  - more stringent reductions in the future
- Tradable green certificates
- Technologies on which to invest
  - GTCC
  - Advanced coal
  - Renewables

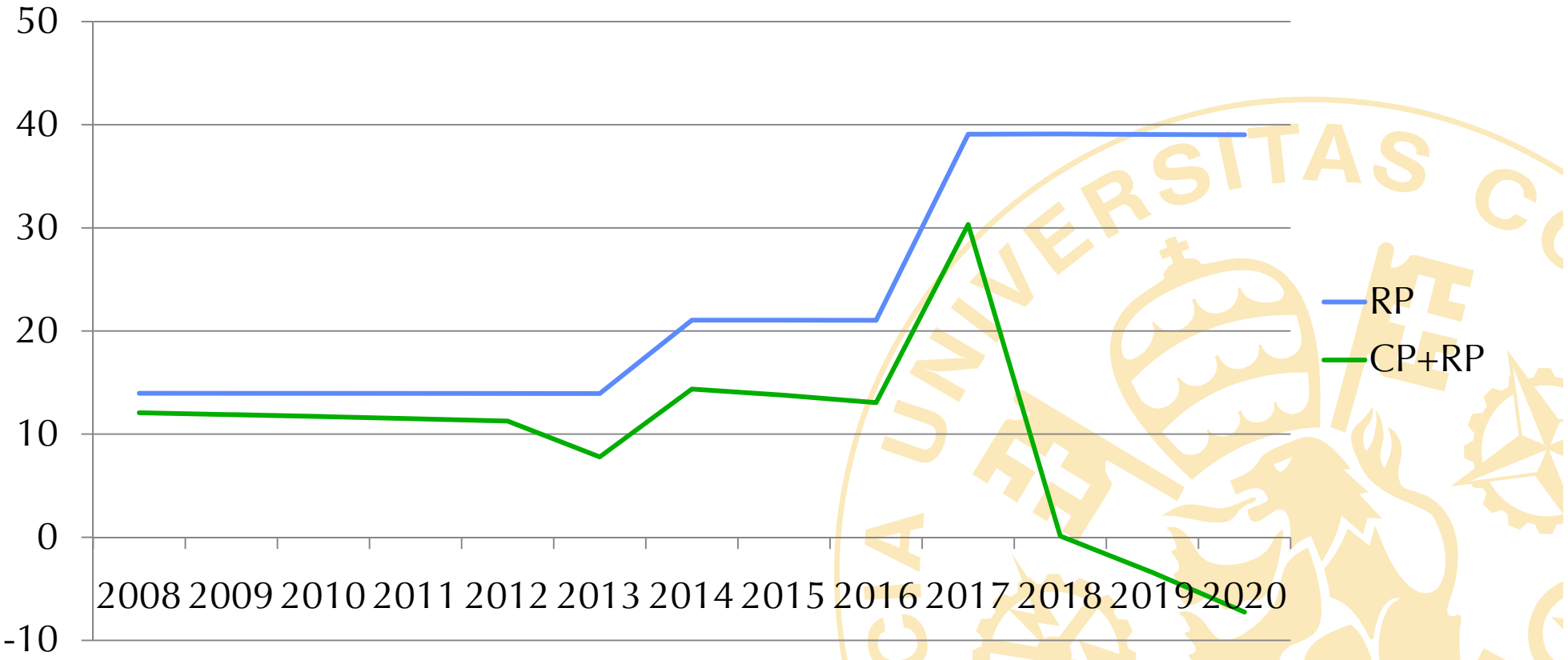
Simulation results: Electricity prices



Simulation results: Carbon prices



Simulation results
RES prices



Simulation results: CO_2 emissions (power sector)

	BAU	CP	RP	CP+RP
2012	110	86	100	84
2020	124	88	105	87
TOTAL 2005-2020	1,480	1,076	1,318	1,067

Simulation results: Costs

	BAU	CP	RP	CP+RP
Production costs	48,300	67,793	52,330	64,731
Consumer costs	80,600	114,015	88,830	107,630
Firms' profits	32,300	46,222	36,500	42,899

Policy implications: One single instrument?

- We assume there are two objectives
  - carbon emissions reductions
  - other benefits of RES
- CP promotes RES
  - but will not be enough
- RP reduces carbon emissions
  - not for capped sectors (unless badly balanced)
  - yes for non-capped, and in a dynamic sense
  - but will not be enough for CP

Policy implications: Costs and prices

- CP increases electricity prices
- RP may reduce them or not
  - reduced electricity demand
  - reduced fuel demand
  - increased market power
- RP may reduce carbon prices (dep. on market size)
- CP may reduce RES quantity, if the RES target is relative
- RP reduces the explicit cost of CP, but may increase the overall cost (depending on the other benefits) and reduces the signal

Policy implications: Cost allocation

- CP costs are paid by the general consumer
- RP costs are paid by the electricity consumer

- Using CP and RP jointly:
  - transfers part of the cost of RES to the general consumer
  - transfer funds from conventional producers (which are taxed) to RES producers
  - decreases windfall profits for conventional producers
  - improves rest of industry competitiveness

Policy implications: Geographical scope

- RES additional benefits: National
- Carbon reduction: Regional
- Security of supply: Regional

- Connected electricity markets complicate this.

Policy implications: FIT vs TGC

- If FITs do not adjust quickly, there may be double-counting
- TGC adjust automatically

- Implications on innovation, and therefore dynamic efficiency and costs

Policy implications: Real-world issues

- CP pass-through may be complicated
- Market power issues (in RP, but also in CP)
- CP design (updating, new entrant and closure rules)

Policy recommendations

- Both instruments must be used
- Coordination among instruments in critical
  - Carbon prices may not be the "right" ones
  - Problems in cost allocation
- Proposal:
  - Account for the CO_2 reduction by RES by reducing the CP cap accordingly
  - Then, additional RES (or EE) will compete in fair terms with other carbon-reduction technologies
  - However, this may be more costly in explicit terms (and therefore not politically attractive)