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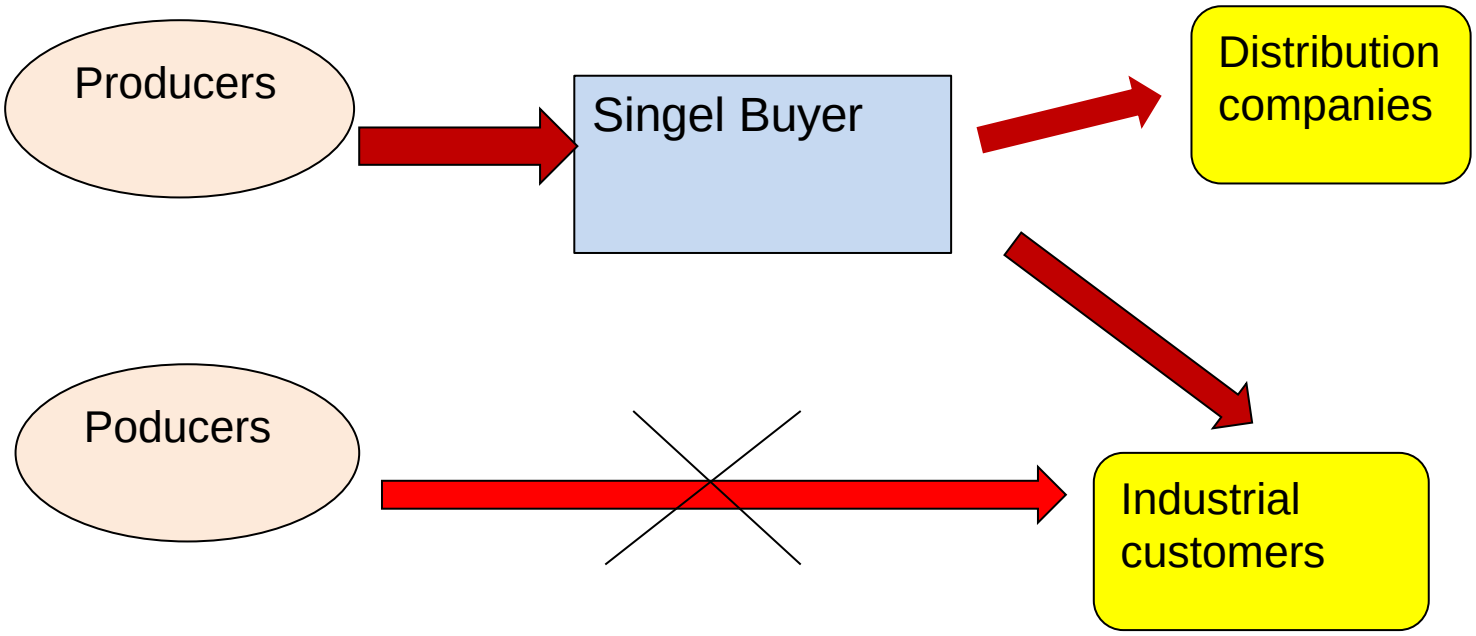
Nepal, November 2018

Export and Power Purchase Agreements, - feasability studies, and development of transmission and distribution grids.


Producers
Singel Buyer
Distribution companies
Poducers
Industrial customers

Issues related to power purchase agreements

- The need of a PPA to facilitate financing
- Use of model contracts for small scale hydro
- The challenges with take-or-pay contracts
- The term av the PPA
- The challenges of the future: tariff flexibility differentiated for peak-power compared with base load.
- Alternative markets
- Delivery point

The price

- **Capacity fee based on the capacity made available to the Buyer.**
- **Energy fee – related to the energy delivered**
- **Price escalation provisions.**
- **Right to renegotiation of the price (hardship).**
- **The currency issues**

Price = $\{\frac{ME \div NDE}{CE}\}$ x DX

ME = Metered Energy for such contract month

NDE = amount of electric energy not dispatched by the Buyer, calculated according to the following

$\sum \{AC \div DiC) x\ H_t$

AC = available capacity

DiC = capacity requested by buyer

H_t = the number hours covered in dispatch instruction such contract month during which the project has been partially dispatched or not dispatched.

CE = The contract energy for such Contract month

DC = the amount of demand change for such contract month

Price = (TOPE ÷ PC) x CCR

TOPE = Take-or-Pay energy in kWh in the billing period which is derived from annual TOPE as agreed

PC = Payment credit for such billing period.

CCR = Capital Cost Recovery Charge Rate applicable for such billing period.

The obligations related to the PPA

- Take-or-pay (take-and-pay)
- Limits to this obligation – giving some flexibility to the buyer (forward)
- If the take-or-pay obligation is agreed to be for instance 95 %, the seller must have alternatives for selling the remaining generation either to the offtaker to a lower price, - or to other offtakers

Contractual flexibility

- **Peak power, versus mid-merit, firm power and base load**
- **The difference in value should be reflected in the off-take profile.**
- **Sometimes this is a benefit not paid for in a marked with single buyers or monopolies as offtakers.**
- **The hydrology risk ???**

Availability of the power plant related to the PPA

- **The availability will be defined in the PPA, (in the range between 92 – 98 % of defined capacity of the power plant).**
- **In case the availability will be less than agreed the seller has to pay penalties**
- **In case of the availability is better than agreed the seller may in most cases claim a bonus.**

Other issues related to PPA

- **Limits to the obligation to deliver under a take-or-pay obligations:**
  - **Force Majeure**
  - **Hardship**

  In case of default of the off-taker (a singel buyer) :
  - **Exclusive right to sell directe to selected / dedicated end-users**

  State guarantees if the single buyer is a state owned entity ????

Crucial PPA issues

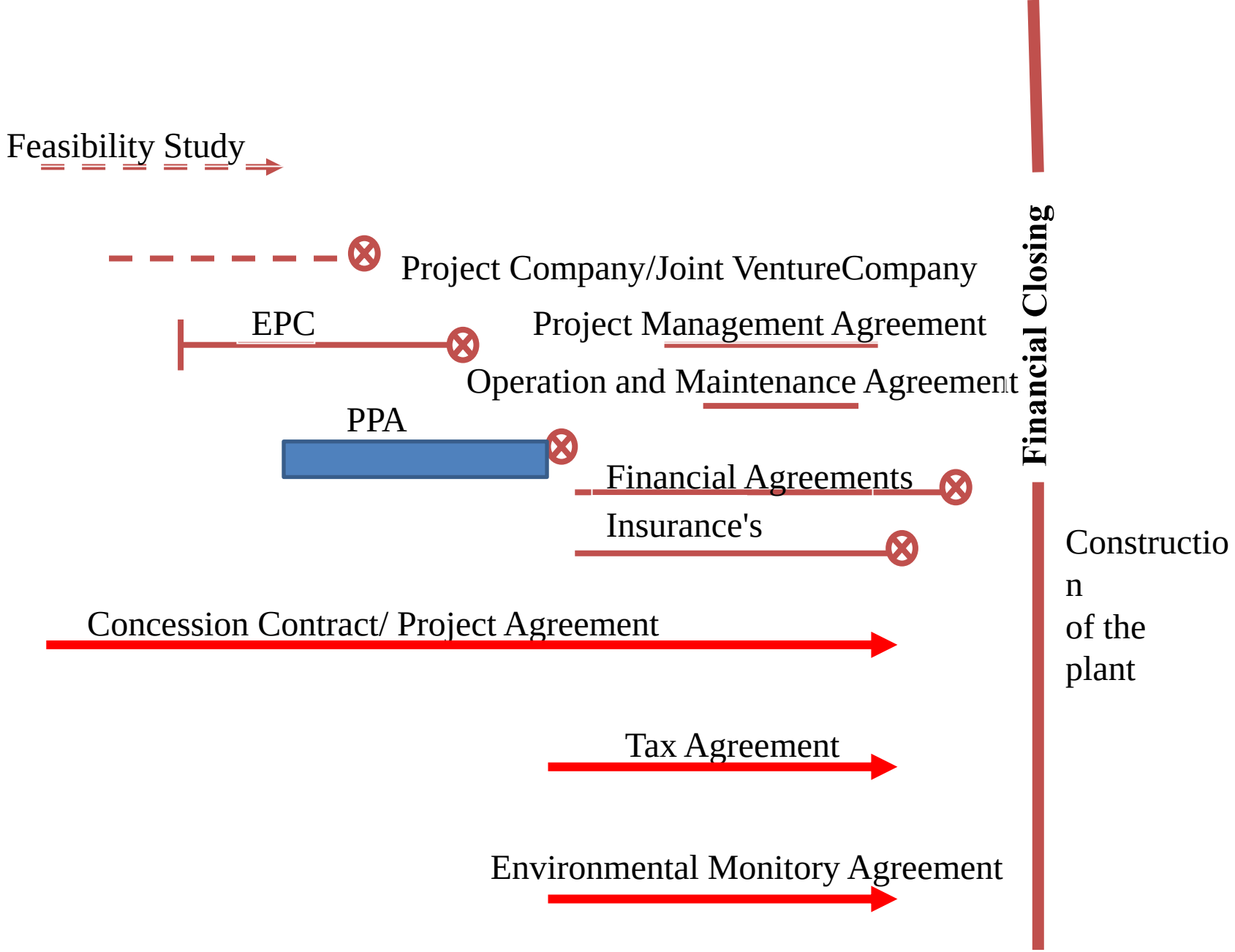
- **The duration of the PPA**
- **Tariff flexibility (peak-power and dry/wet season – or price tied to the price of industrial products)**
- **Tariff based on avoided cost based on alternatives**
- **Long term PPA and deregulation of the electricity market**
- **The alternative market – export or industrial off-takers**
- **The need of State guarantees/ Credit comfort letters.**

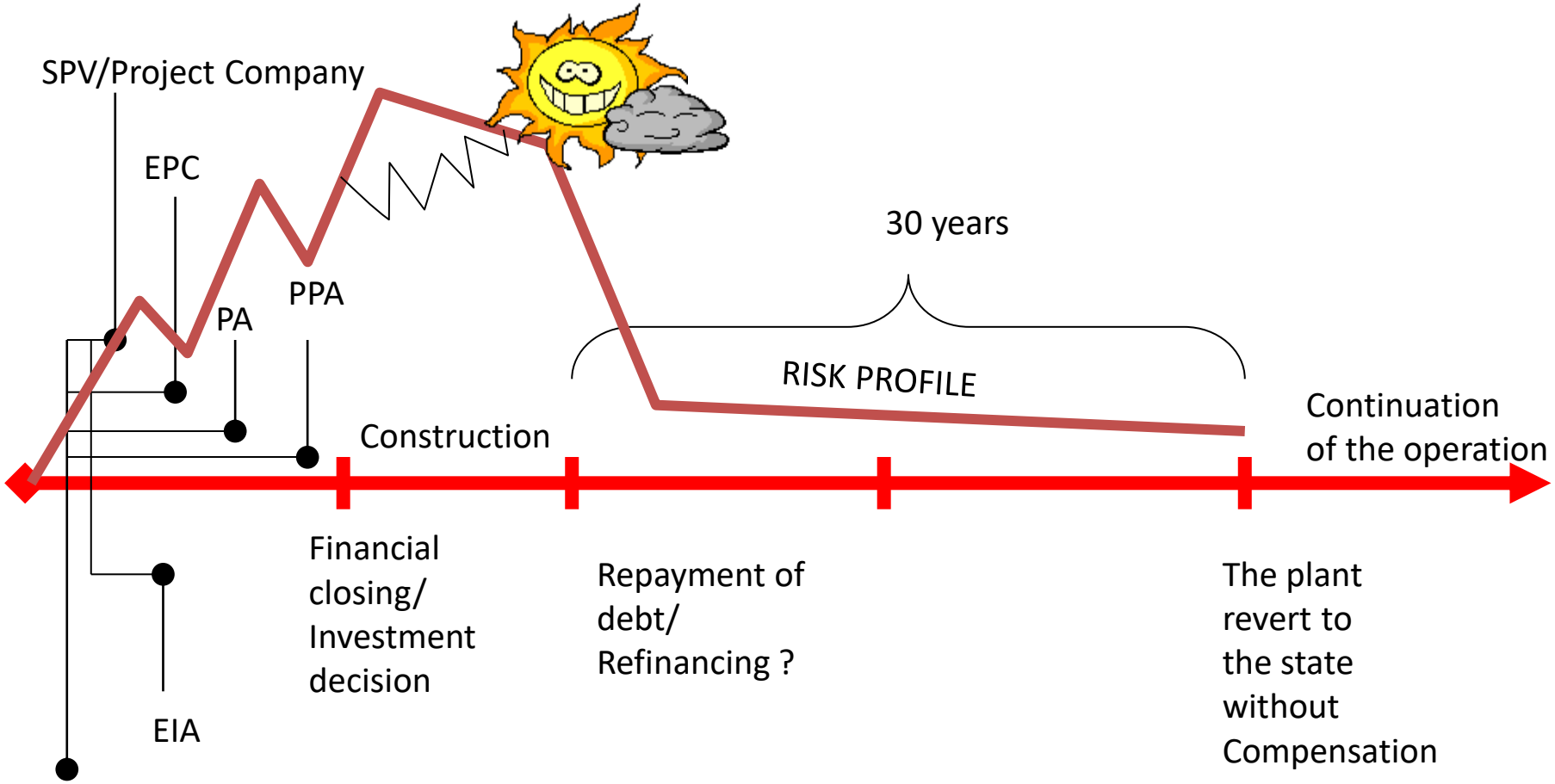
Basic assumptions

- **Power Purchase Agreements will be based on new generation projects.**
- **The costs of the transmission facilities will be crucial important.**
- **This is different from for instance the North European market, where an existing infrastructure to a large extent is already in place.**

Golden rules for negot iations of a PPA

- Important to conclude a balanced and fair deal
- Win-win solutions
- The need of flexibility in long-term PPAs
- Changes in the marked situation
- Willingnes to make compromises
- Never underestimate the other party

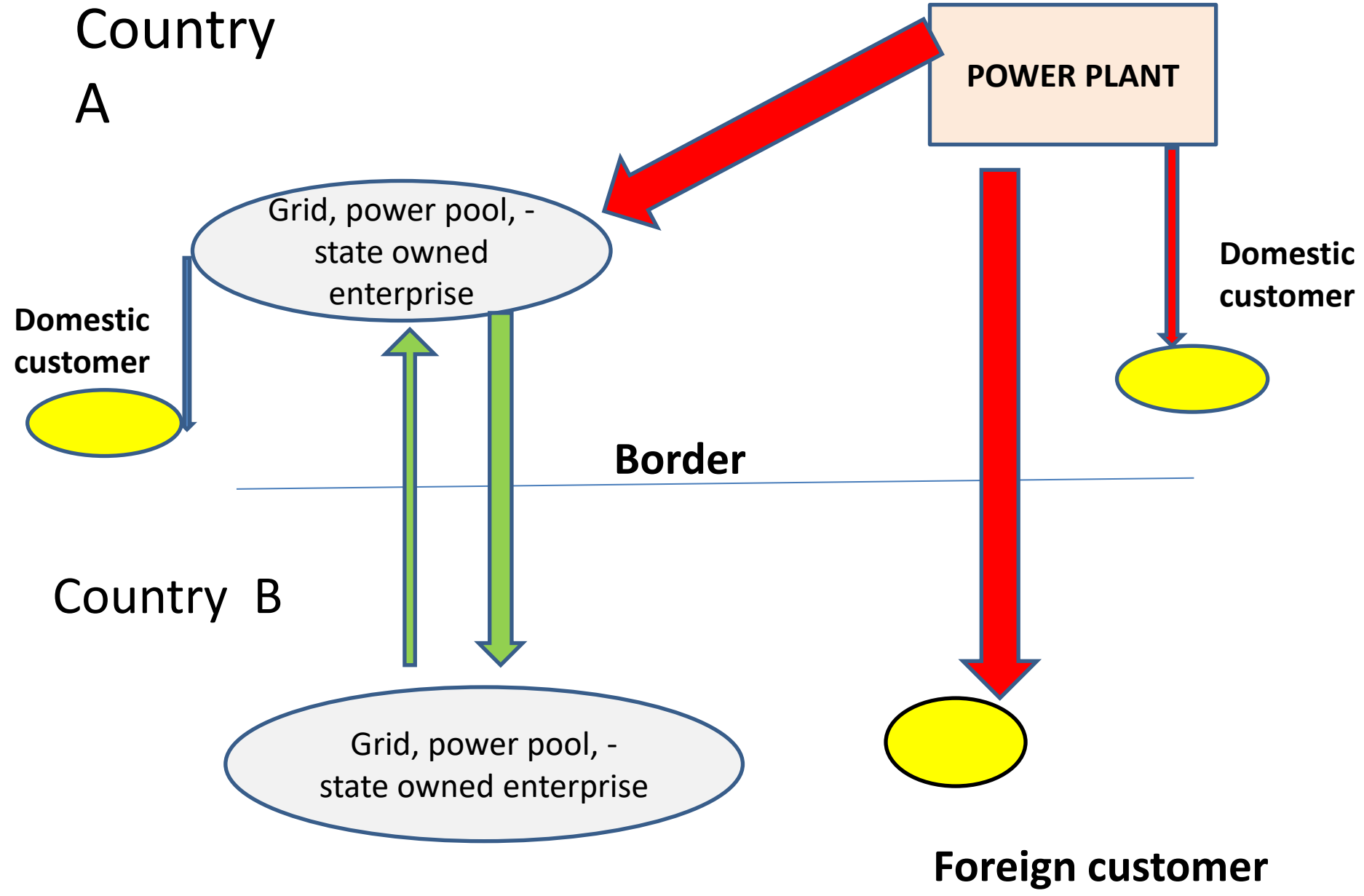

Feasibility Study
Project Company/Joint VentureCompany
EPC
Project Management Agreement
Operation and Maintenance Agreement
PPA
Financial Agreements
Insurance's
Financial Closing
Constructio
n
of the
plant
Concession Contract/ Project Agreement
Tax Agreement
Environmental Monitory Agreement


SPV/Project Company
EPC
PA
PPA
30 years
RISK PROFILE
Construction
Continuation
of the operation
Financial
closing/
Investment
decision
Repayment of
debt/
Refinancing ?
The plant
revert to
the state
without
Compensation
EIA
Feasibility
study
5-8 years
3-5 years
8-15 years
?


Power Export
Agreements (PPA)

Basic condition for export

- **Construction of transmission facilities owned and operated by legal entities acceptable to both countries.**
- **Establishment of a legal and regulatory framework in all countries involved in the trade**
- **Conclusion of Power Purchase or Power Exchange agreements**


Country A
POWER PLANT
Grid, power pool, - state owned enterprise
Domestic customer
Domestic customer
Border
Country B
Grid, power pool, - state owned enterprise
Foreign customer

The challenges of cross-boarder trading

- Trust in a long-lasting commercial cooperation
- Reciprocity –tariff system and taxes
- Currency risks
- Benefits related to security of supply
- Short terms versus long-term agreements
- Point of delivery
- Measurements and meetering
- National pride – related to issues like governing law, language, disputes
- The legal boiler-plate (Liability, hardship, force majeure and default)

Crucial issues

- Political issues (like water management)
- The economy of the project

Political issues may be:

- **Government to government agreements or treaties, encouraging power export.**
- **Requirements of shareholding of investors from both the exporting and the importing country.**
- **Requirements of shareholding of state owned enterprises.**

CRUCIAL: the parties options and alternatives

Other Sellers or Buyers

Other domestic solutions

The timing and cost of alternative solutions

The option to wait

Important aspects of export agreements

- The purchase price
- Duration of the agreement
- Risk management
- Transmission solutions
- The role of hydropower in a market dominated by thermal power
- Legal issues
- Default and termination
- Arrangements for project financing.

Crucial issues for political consideration

- **To what extent should building of new generation capacity be based on foreign (and private) investments ?**
- **To what extent should export be given priority before domestic supply ?**
- **To what extent shall export be delivered from dedicated plants – or as an alternative from the system/ grid of the exporting country.**

Crucial issues for political consideration

- **Who should own and operate the transmission facilities to the delivery point ?**
- **What should be the basic elements in the price formula ?**
- **What should be the size of domestic ownership in such power plants ?**

The starting point

Buyers perspective

- **To pay a price based on cost pluss related to the construction of the powerplant and the transmission line.**

The Sellers perspective

To get a price based on the expected market value of the supply in the Buyers market, or based on Buyers avoided costs

The price

- **Capacity fee based on the capacity made available to the Buyer.**
- **Energy fee – related to the energy delivered**
- **The flexibility related to dispatch**
- **Price escalation provisions.**
- **Right to renegotiation of the price (hardship).**

Basic issues (1)

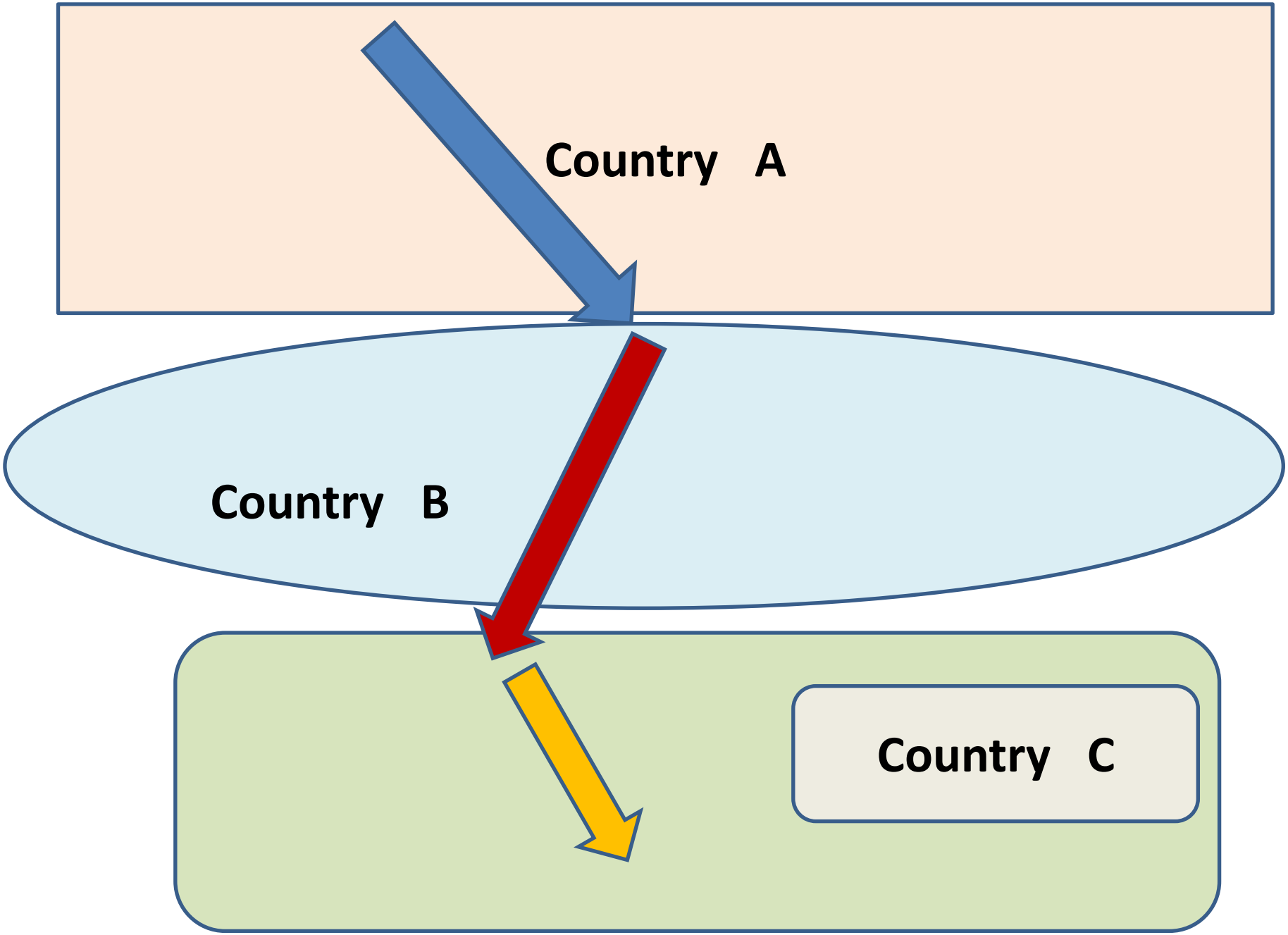
- **Price difference between base-load and peak-power (pump-storage)**
- **Interdependence between countries in the perspective of national security of supply**
- **Mutual benefits related to power exchange between different systems (hydro power versus thermal power)**
- **Regional markets will make the electricity supply and ESI more efficient**

Basic issues (2)

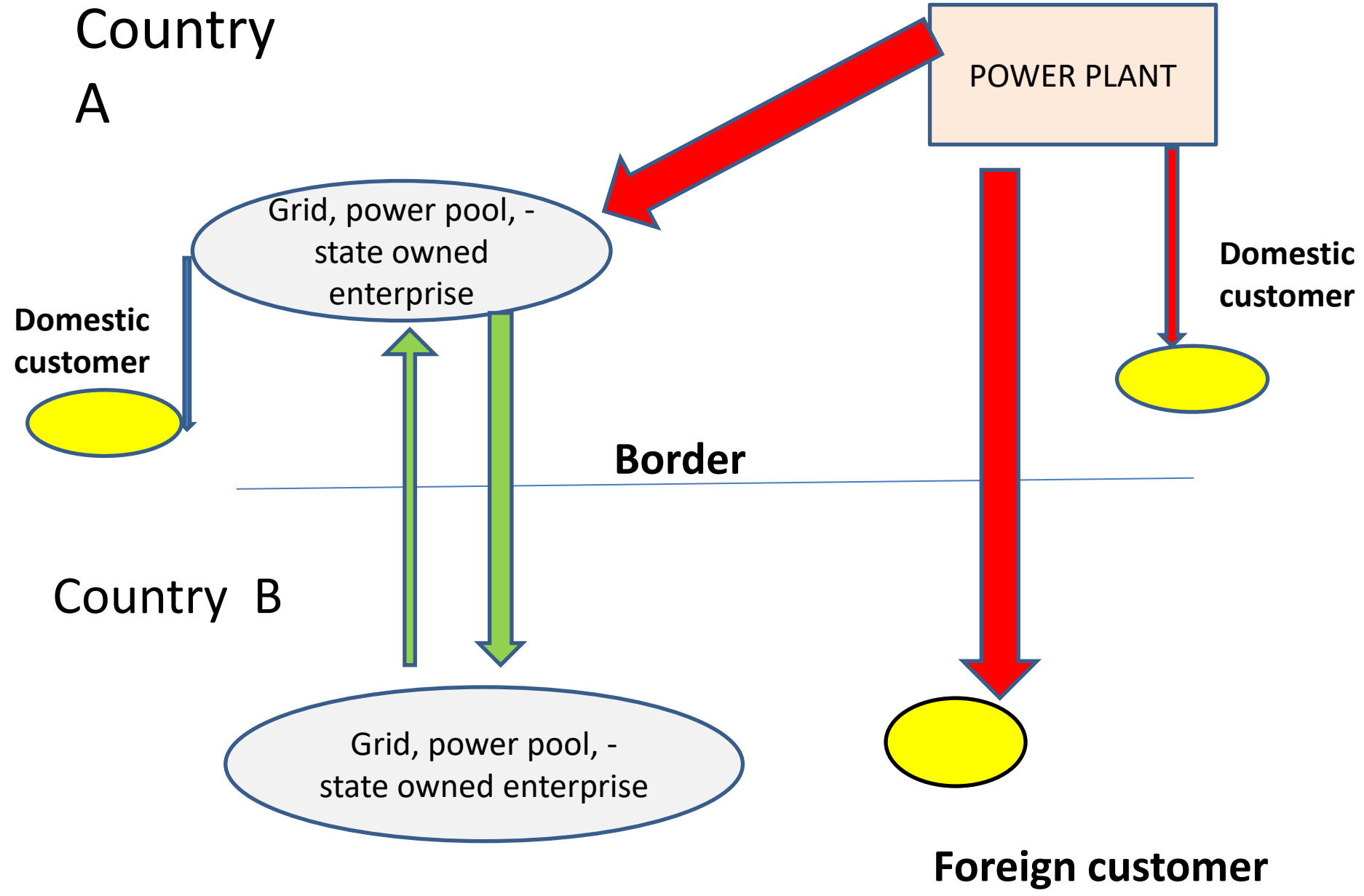
- **Power export or power exchange will require granting of permits, concessions and licenses in at least two countries and two jurisdictions.**
- **The issue of transit-countries for transmission lines. (Botswana, Denmark)**
- **The national security of supply in emergency situations. (even in case of a national deficit)**
- **AC versus DC transmission lines (Mozambique)**

Basics (3)

- **The challenges of constructing a transmission line dedicated for export, related to the challenges related to building a national grid**
- **Water management issues related to operation of water reservoirs dedicated for peak power supply (Norway)**


Country A
Country B
Country C


Power Exchange Agreements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POWER PLANT
Grid, power pool, - state owned enterprise
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Domestic customer
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Grid, power pool, - state owned enterprise
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Headlines for a power exchange agreement (Norway – Europe as a model)

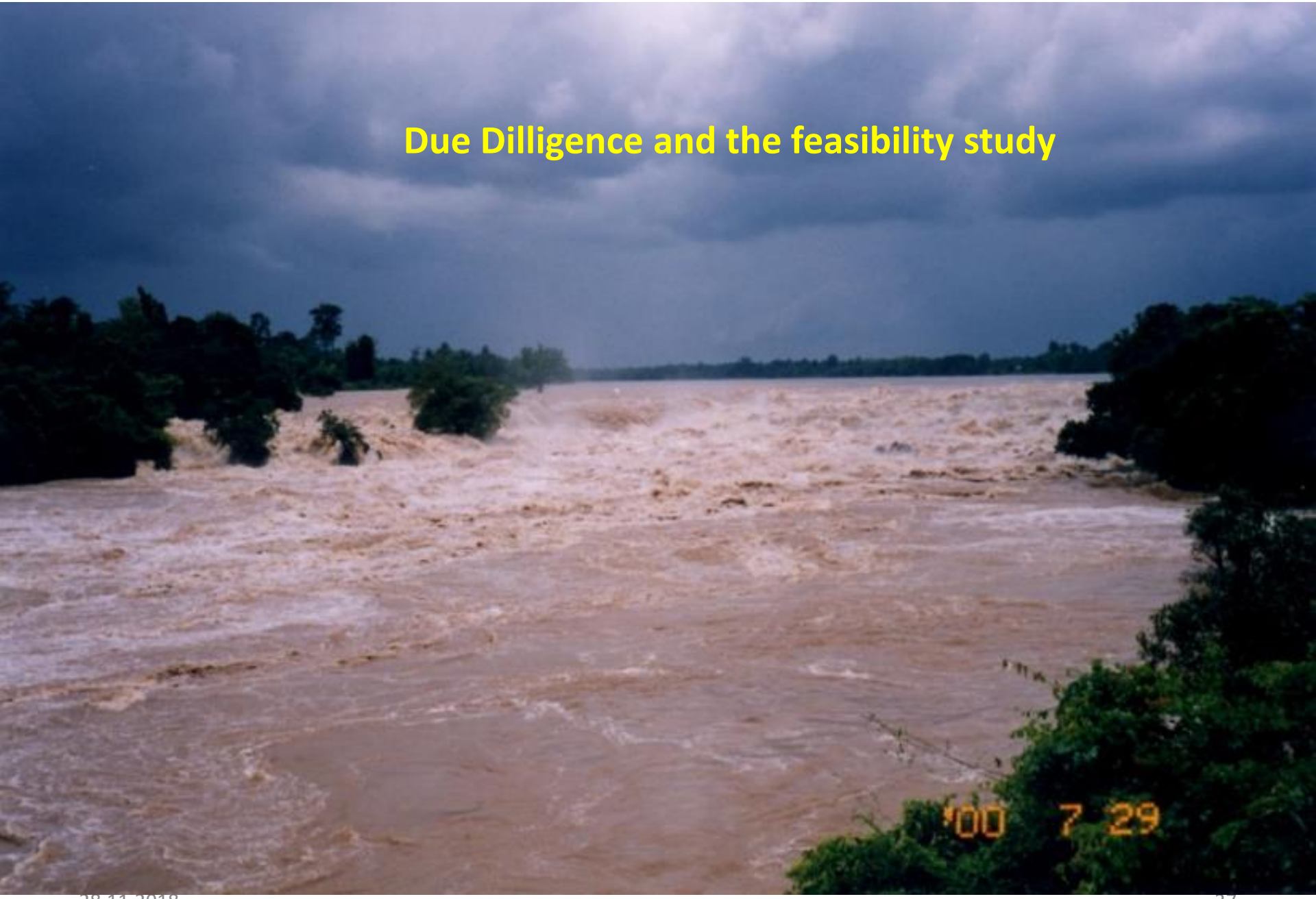
1. Object
2. Definitions
3. Representations and Warranties
4. Approvals and Licenses
5. Duration and Termination

Headlines for power exchange agreement (2)

6. **Exchange of Electric power and Energy**
   - **The DC/ or AC link**
   - **Place of Delivery, risk of transmission and operation agreement**
   - **Long term fixed sale by exporting country**
   - **Long term optional sale by exporting country**
   - **Medium term exchange of electric power and energy.**
   - **Short term exchange of power and energy**

Headlines for power exchange (3)

7. **Taxes (tax-agreements)**
8. **Invocing and terms of payment**
9. **Capacity and availability of the link**
10. **Confidentiality**
11. **Default**
12. **Force Majeure**
13. **Hardship**
14. **Miscellaneous (language, information, governing law, disputes, assignment etc.)**


Due Dilligence and the feasibility study
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What is the difference between a Due Diligence and a bankable feasilibity study ?

They are both related to the decision making connected to whether or not the investors will make the investment, - and the banks will provide the funding.

What will a Due Diligence include ?

- **Assessment of:**
  - **Technical aspects**
  - **Commercial aspects**
  - **Financial aspects**
  - **Legal aspects**
  - **Environmental aspects**

What should the feasibility study contain

- Summing up of technical, economic and environmental issues related to implementation of the project
- List of all contracts needed (contract structure)
- Management Agreement
- Funding
- Projected cash flow statement
- The market
- Environmental issues
- Concession/ license – and PA

Feasibility Study

- **Technical - economic** studies supplemented by ESIA to verify technical and economic viability and environmental and social acceptability
- Topography
  - Ground survey
  - Satellite images
  - LiDAR (Light Detection and Ranging)
- **Geology and geotechnical**
  - Seismic refraction survey
  - Geoelectric survey
  - Core drilling
  - Lab tests
- **Hydrology**
  - Mean flow of long time series
  - Extreme flows (min and max)
  - Ecological flow
- Transportation studies
  - Road survey

- Availability of construction materials and skilled labour
- Design
  - Quantities
  - Weight and size
- Constructability
- **Cost estimates**
- **Financial analysis**

Environmental and Social Issues

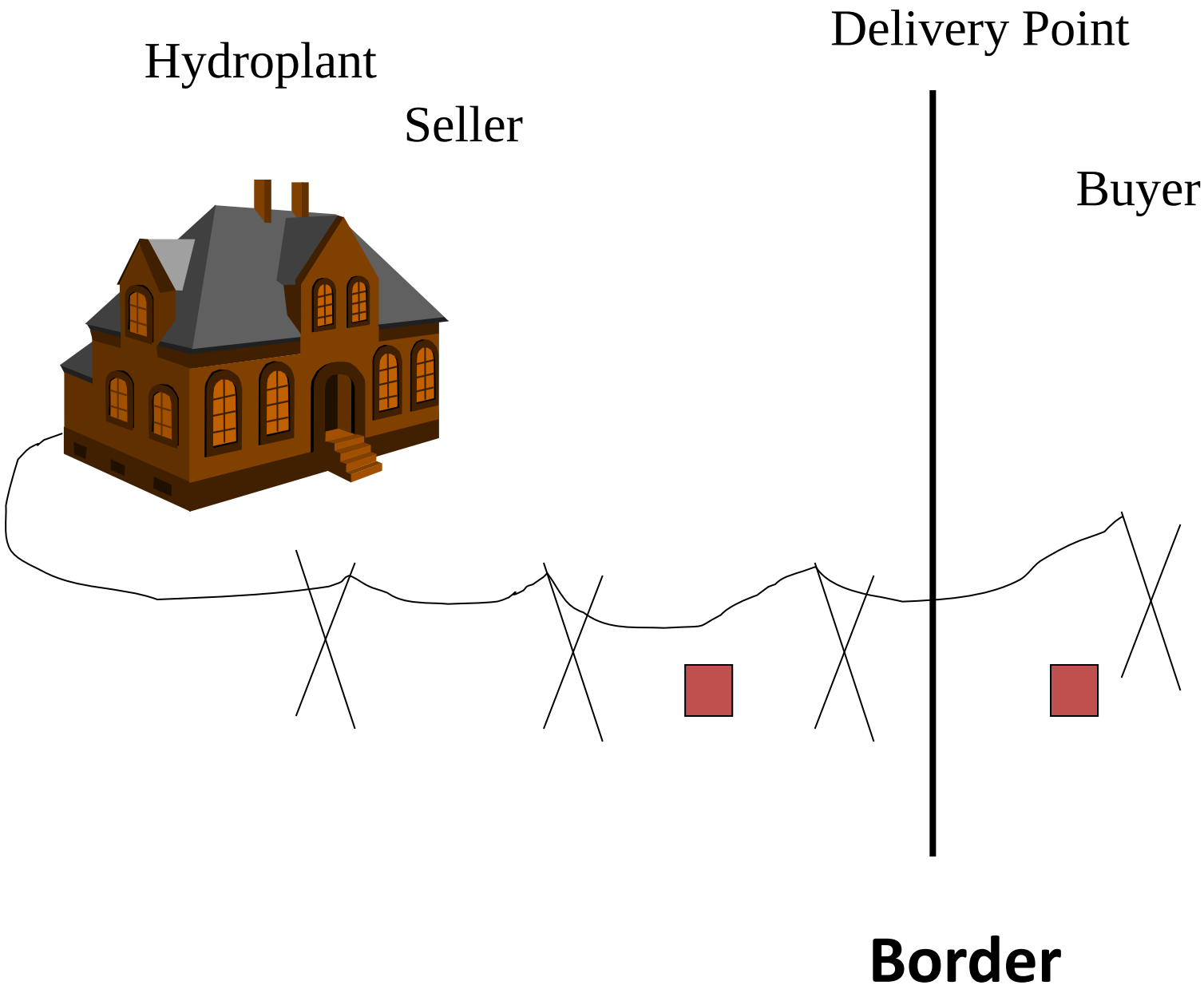
- Water resources
  - Ecological flow
  - Inundated area
- Wildlife
  - Noise
  - Trails cut-off
  - Reduced habitat
  - Availability of water
  - Exposed to hunting
- Aquatic life
  - Dam = barrier
  - Spawning area
  - Reservoir vs river

- Population
  - Affected; directly, indirectly
  - Minorities
  - Resettlement
  - Partly inundated property
- Improved access
  - Benefit to local population
  - Illegal logging
  - Illegal hunting
- Reservoirs
  - Recreation
  - Transport
  - Flood mitigation


Transmission / distribution

Transmission

- **Infrastructure to be funded by the Goverment of by the hydro power project ?**
- **System responsibility (TSO or an Independent System Operator ?)**
- **DC/AC solutions**
- **Use of interconnections between countries**
- **Regional grids**
- **Power Exchange Agreements - (wet versus dry season)**
- **Third Party Access (TPA) to use of transmission facilities (CC)**


Hydroplant
Seller
Delivery Point
Buyer
Border

Nordel's højspændingsnet

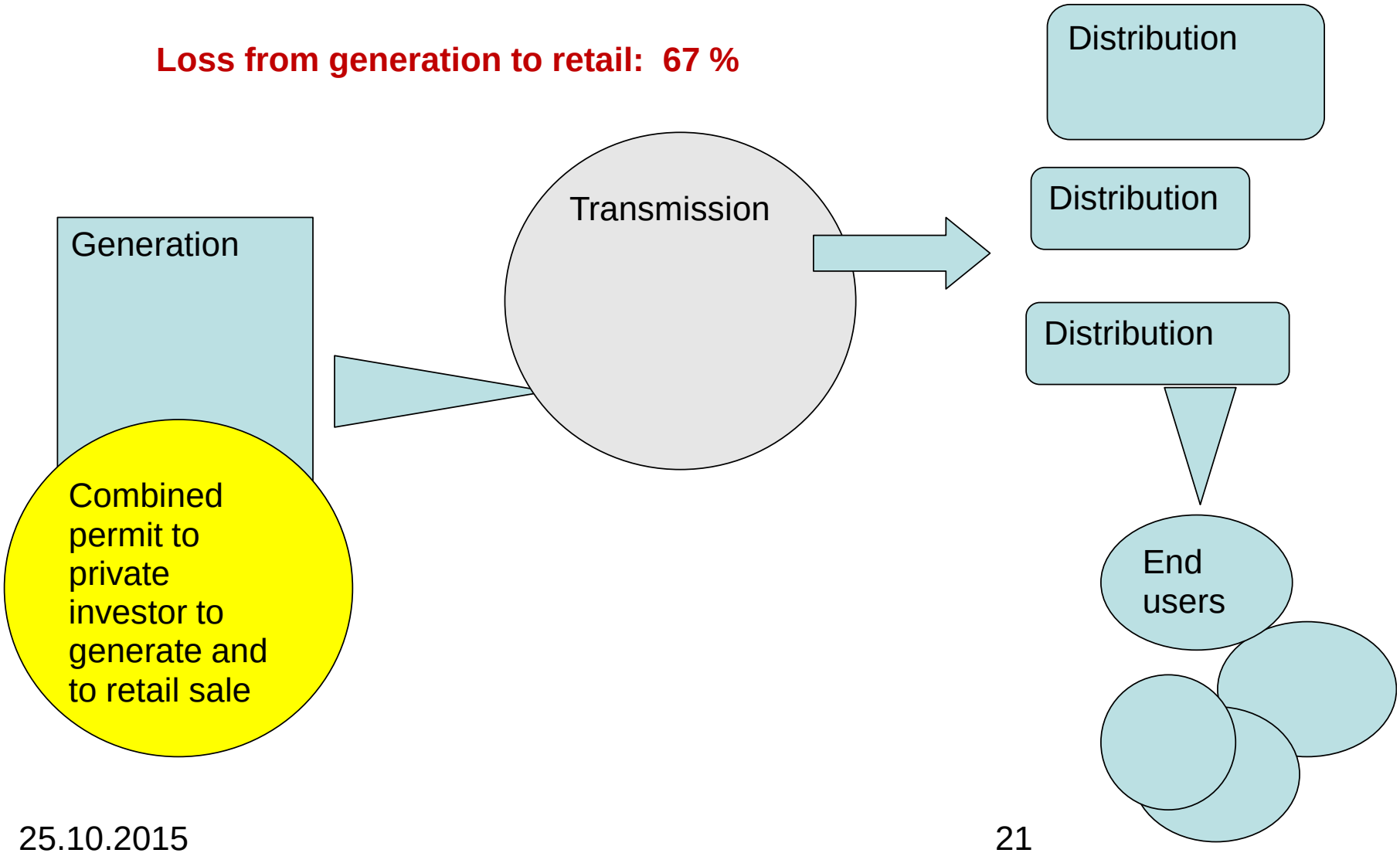
Distribution

- **Could distribution be privatized ?**
- **The obligation to connect new end-users**
- **Tariffs – reflecting difference in value between peak load and base load**
- **How should the tariff be decided ?**
- **Theft of electricity – and collection of money for supplied electricity**
- **AMS – and issues related to reading of meetering equipment**

Distribution

- **Off-grid solutions**
- **Prepayment cards**
- **Collection of payment for electricity supply**
- **Automatic meetering systems**
- **Payment for new connections**
- **Development of the low tention grid is crucial important for a deregulation of the electricity supply industry**

Loss from generation to retail: 67 %




WALKERS
TALKERS

Thank you for your attention