



**Seminar on
African Electrical Interconnection**

**Module 4 – Integrated Operational
Planning: Optimal Conditions**



Looking for a “multi-win” solution



A joint project can only be successful if a stable solution is found that convinces every participant that his particular effort is worthwhile

It requires an accurate assessment of the **costs-benefits balance**, a **fair distribution of benefits** and, most of all, a high degree of **mutual trust**



Module 4 – Integrated Operational Planning: Optimal Conditions



Index:

- 1. Costs and Benefits of Joint Planning**
- 2. Distribution of Surpluses**
- 3. Working Together: the Longer Term**



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Index:

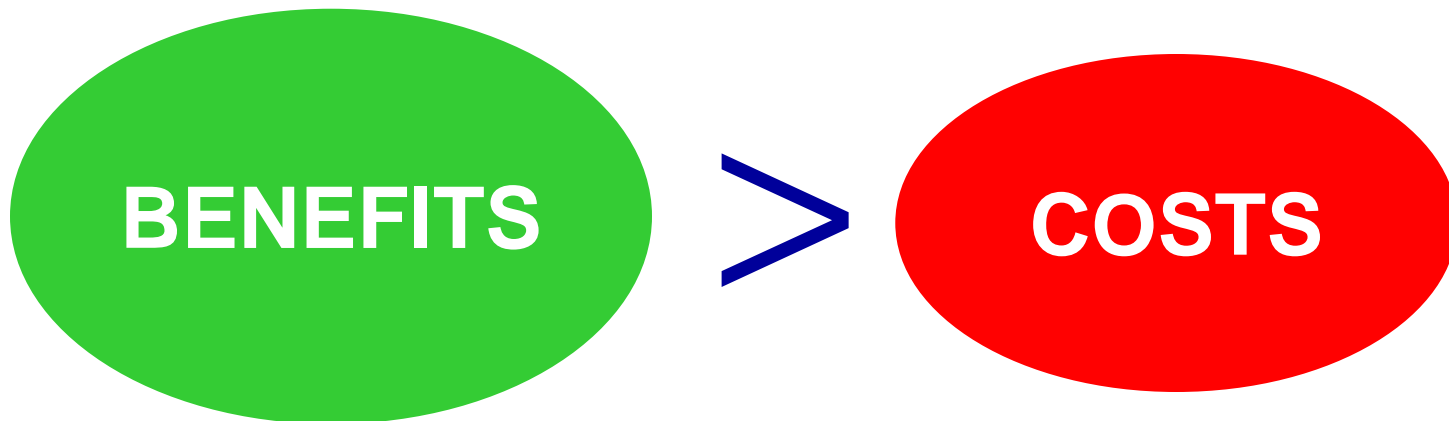
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Joint Planning? Yes, but.....



Joint planning is not a target in itself.
PROs and CONs must be carefully evaluated, in order to verify the existence and, most of all, the real achievability of net profits for all the involved players





Highly probable costs



- **Planning costs**

Usually the smallest ones. Can be contained through a clear vision of what is to be achieved by means of the joint project.

- **Construction costs**

A joint project for regional electricity cooperation usually requires the construction of infrastructures.



Possible costs



- **Loss of monopolies**

- some parties can lose their “monopoly rent”, since it could be not compatible with the joint project;
- costs for monopolists must be recognised, identified and acknowledged, in order to secure their voluntary participation in the project;
- usually compensated through transfer payments in favour of the monopolists

- **Loss of customers**

Some participants can lose market shares. They are usually compensated through transfer payments.



The benefits



- **Use of efficient generation**

A major factor that can easily be achieved through the rationalisation of the aggregate generation system.

- **Lowering of reserve capacity**

The enlargement of a synchronous system reduces the requirements of the overall reserve and represents one of the most significant benefits of interconnection.

However, the altered generation patterns can change the probability of power failure: it must be taken into account and quantified.

- **Gain of customers**

If some participants loose customers, it is likely that some other participants gain customers.

The overall result could not be zero, since the increased efficiency of the system can lead to an overall increasing recourse to electricity.



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Initial distribution of surpluses



Each party involved in the joint plan bears its own costs and reaps its benefits: the difference between them represents the *payoff* of that party.

The situation where the parties have their own *payoffs* and no form of compensation has been implemented is called
INITIAL DISTRIBUTION

It is clear that the case where everyone gets a payoff worse than that he would have get without the joint project is not acceptable. Should such a situation occur, the project would be abandoned.



Distribution of surpluses: the issue



After the initial distribution has been determined, a compensation scheme can be implemented in order to achieve a fair and shareable **FINAL DISTRIBUTION** of profits. This step presents two main problems:

- The assessment of *payoffs* is not always easy (e.g. estimating the monetary effect of loss of monopoly rents). Nevertheless, benefits and losses must be quantified.
- The methodology adopted for the transfer payments must be clear, transparent and, most of all, shared by all involved parties.

Different
SOLUTION CONCEPTS,
i.e. different notions of what constitutes a “good” final
distribution, can be taken into account



Distribution of surpluses: solution concepts



Solution concepts:

- can involve techniques relevant to cooperative game theory, the joint project being assimilated to a “game”;
- are based on the principle that every participants gets at least what he would also get without participating;
- aim at identifying the contribution of every participant in order to ensure stability of the joint project, i.e. to make it unattractive for any sub-group of participants to leave the joint project and go on their own.



Design of transfer payments



A fair and shared design of transfer payments is required in order to arrive at a stable solution. Direct money transfers among parties would be the easiest way to realize it, but this procedure is often difficult and may even present legal hindrances. Two possible approaches can be taken into account:

- pricing agreement on the use of the system of a Transmission System Operator (TSO);
- agreement on access to cheaper electricity and on retaining captive customers for some parties.

Regulatory Authorities can generally be expected to approve these schemes

It is important to involve the regulator at an early stage as a party in the project



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The day after....



Even if the final distribution after the first phase (i.e. direct completion of the joint project) is stable, it is possible that some benefits and costs incur repeatedly over time. Then, some of the procedures, needed to achieve a final distribution, must be repeated.

In order to manage this situation, all future effects could be incorporated into the first evaluation.

This implies that all parties are able to make binding commitments for the future, but it could be difficult to be done (e.g. if international relations are involved)



Conflicts and compliance



Possible solutions:

- One of the parties involved in the project is designated to settle conflicts and monitor compliance.
- All the participants in the joint project establish **a new legal entity** with the power to settle conflicts and monitor compliance. This solution could be very efficient, and should be taken into account in any RECI project.



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