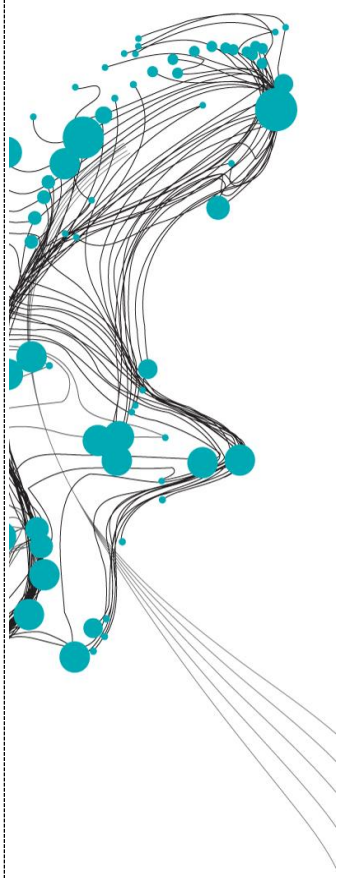
# The role of project-related conditions in spatial integration of energy transition synergies

**A QUALITATIVE COMPARATIVE CASE STUDY OF DUTCH SPATIAL DEVELOPMENT PROJECTS**



Spatial development projects provide great opportunities for integrating energy transition objectives. An integrative project refers here to projects where a synergy is achieved since two or more spatial objectives are combined in a single project to increase the overall net value. Due to the increased complexity associated with implementing ET-synergies, certain project conditions can facilitate or hamper the effectiveness of the integration process. Against this background, this research aims to identify the role of relevant project conditions on the spatial integration of energy transition (ET) synergies.

To determine what conditions potentially influence the effective implementation of ET-synergies, the Institutional Analysis and Development (IAD) framework is used as a theoretical basis. Inspired by the IAD framework, a distinction is made between the internal social structure based on the actor interactions and the external context based on the existing environment. The IAD-definitions were used to conceptualize the integral project context using nine relevant project conditions. The internal context is formed by seven rules: participation (1-boundary); role distribution (2-position); scope of possible synergies (3-scope); allowed actions (4-choice); communication with legislative supervision (5-aggregation); information sharing methods (6-information); and cost distribution timing (7-payoff). The external context is formed by two relevant external variables: the local participants (8-attributes of community) and the project location (9-biophysical conditions). To select empirical indicators and a hypothetical supportive state for all conditions, these nine IAD-conditions were enriched and operationalized with insights from energy transition and climate adaptation integration literature.

To examine which conditions are relevant, a systemic comparison was performed of 19 spatial development projects where synergies with the energy transition were explored. Data were collected on the basis of expert interviews and document analysis. Qualitative data about potentially relevant conditions and the outcome were transformed into fuzzy values (0, 0.3, 0.7 or 1). The relevant conditions were scored compared to the hypotheses, with a case condition identical to the hypothesis obtaining a 1 score. The implementation of the ET-synergies, as the outcome, were scored based on the delays caused and on the contributions to the energy transition achieved.

The systemic comparison of the studied cases shows that effective implementation of ET-synergies is linked to the presence of a supportive pay-off (necessary condition) and the presence of two sufficient pathways: 1) supportive biophysical conditions; or 2) supportive aggregation; information; and community conditions. Sufficiency implies that when all conditions of the pathway are in a supportive state, the ET-synergy will be implemented effectively. All 10 cases where the necessary condition and one of the two sufficient pathways were present have resulted in an effective ET-synergy implementation.

Investigation of cases with low scores on the outcome show that failed implementation of synergies is associated with one of the two following two pathways: 1) the absence of a supportive payoff condition; and 2) the absence of supportive position, scope, and biophysical conditions.

The results particularly show that timely cost-distribution (supportive payoff) plays a crucial role in achieving successful synergies. When the costs related to the synergy are distributed too late into a project, the synergy is not transformed into a concrete objective and tends to remain an ambition. This delay is likely to result in an ineffective integration process. Hence, when project leaders involved in water-related spatial development projects are aiming to effectively implement an ET-synergy, it is recommended to focus on engaging adequate investors early in the project.

*Figure 1 Two examples of energy transtion synergies in the Netherlands (source: Waterschap Vallei en Veluwe)*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