



# National energy network company

## NAT-EN

**ROLE PURPOSE (CORE BUSINESS) :** To produce and distribute electricity and gas

**POSSIBLE ACTIONS (PROJECTS) :** AGRO-F, BATT, BIOGAS, GEO, H-IND, HYDRO, PSPT, PTG, PV-RETAIL, REINFOR, SOLAR-F, WIND-T

**RESOURCES :** Financial power; storage capacities through long distance transfer of electricity (REINFOR)

**CONSTRAINTS** High operating expenses

**KNOW-HOW AND EXPERTISE :** Producing and distributing energy on a national scale

**INITIAL FINANCIAL CAPACITY (K€) :** 30 000 (related to local actions)

**OPERATING EXPENSES (K€) :** 6 000 (related to local actions)

### INTERACTIONS WITH OTHER ACTORS

LA	Planning authorizations; Funding
NGO	Legal action from NGO
PC	PV-RETAIL
LOC-EN	Storage through REINFOR; Co-investment
FARM	Land; farm input for AGRO-F and BIOGAS
DEV	Electricity storage for D-LuxG and D-AffG

### RECOMMENDED STRATEGY

NAT-EN operates on a national scale with more financial means than the local company LOC-EN but also with higher operating expenses for which they tend to favour big and profitable projects. The national operator is not motivated by the idea of local energy self-sufficiency but by profit-making as any company.

Their interconnection with the national energy grid enables them to transfer locally produced intermittent energy towards other territories or to store it in faraway reservoirs. But for this to be possible they must reinforce electric lines (REINFOR). As lines reinforcement doesn't bring in itself additional revenues they should try to share the investment with others.

### POSSIBLE ACTIONS FOR NAT-EN

AGROFUEL		WIND TURBINES	
	Producing agrofuel from rapeseed <b>TYPE:</b> Continuous energy production (Pc)		7 Wind turbines uphill <b>TYPE:</b> Intermittent energy production (Pi)
AGRO_F	<b>OTHER ENTREPRENEUR(S) :</b> LOC-EN	WIND-T	<b>OTHER ENTREPRENEUR(S) :</b> LOC-EN
<b>INVESTMENT COST (K€) :</b> 700 <b>GROSS ANNUAL INCOME :</b> 5% (175 K€ per 5-year term) <b>ENERGY PRODUCED (MWh / year) :</b> 2 000 <b>PREREQUISITE FACILITIES :</b> R-FIELD <b>LOCATION :</b> 1 plot <b>JOBS CREATED LOCALLY :</b> 3		<b>INVESTMENT COST (K€) :</b> 8 000 <b>GROSS ANNUAL INCOME :</b> 8% (3 200 K€ per 5-year term) <b>ENERGY PRODUCED (MWh / year) :</b> 13 000 <b>PREREQUISITE FACILITIES :</b> Storage capacity 1 083 MWh <b>LOCATION :</b> 3 plots on a hill (column N) <b>JOBS CREATED LOCALLY :</b> 4	

## ELECTRICITY STORAGE BATTERIES



*Electricity storing capacity through batteries*  
**TYPE:** Energy storage (St)

**OTHER ENTREPRENEUR(S) :** LOC-EN

**INVESTMENT COST (K€) :** 700  
**GROSS ANNUAL INCOME :** -2% (-70 K€ per 5-year term)  
**ENERGY STORED (MWh) :** 320  
**PREREQUISITE FACILITIES :** none  
**LOCATION :** 1 plot  
**JOBS CREATED LOCALLY :** 3

## GEO THERMAL ENERGY



*Recuperating heat from the ground*  
**TYPE:** Continuous energy production (Pc)

**OTHER ENTREPRENEUR(S) :** LOC-EN

**INVESTMENT COST (K€) :** 500  
**GROSS ANNUAL INCOME :** 8% (200 K€ per 5-year term)  
**ENERGY PRODUCED (MWh / year) :** 2 000  
**PREREQUISITE FACILITIES :** none  
**LOCATION :** 1 plot  
**JOBS CREATED LOCALLY :** 4

## HYDROKINETIC TURBINE IN THE RIVER



*Hydrokinetic turbines immersed in the river*  
**TYPE:** Continuous energy production (Pc)

**OTHER ENTREPRENEUR(S) :** LOC-EN

**INVESTMENT COST (K€) :** 2 000  
**GROSS ANNUAL INCOME :** 5% (500 K€ per 5-year term)  
**ENERGY PRODUCED (MWh / year) :** 1 000  
**PREREQUISITE FACILITIES :** none  
**LOCATION :** In the river (no plot required). Risk to biodiversity.  
**JOBS CREATED LOCALLY :** 4

## POWER TO GAS



*Energy storage between Summer and Winter through producing hydrogen with electricity (water electrolysis)*  
**TYPE:** Energy storage (St)

**OTHER ENTREPRENEUR(S) :** LOC-EN

**INVESTMENT COST (K€) :** 1 100  
**GROSS ANNUAL INCOME :** -2% (-110 K€ per 5-year term)  
**ENERGY STORED (MWh) :** 270  
**PREREQUISITE FACILITIES :** none  
**LOCATION :** 1 plot  
**JOBS CREATED LOCALLY :** 3

## SOLAR FARM



*Solar panels either on wasteland (including quarry) or on farming land*  
**TYPE:** Intermittent energy production (Pi)

**OTHER ENTREPRENEUR(S) :** LOC-EN

**INVESTMENT COST (K€) :** 2 000  
**GROSS ANNUAL INCOME :** 8% (800 K€ per 5-year term)  
**ENERGY PRODUCED (MWh / year) :** 2 800  
**PREREQUISITE FACILITIES :** Storage capacity 233 MWh  
**LOCATION :** 1 plot (wasteland, farmland, disused quarry J3)  
**JOBS CREATED LOCALLY :** 3

## BIOGAS



*Production of biogas from biomass*  
**TYPE:** Continuous energy production (Pc)

**OTHER ENTREPRENEUR(S) :** LOC-EN

**INVESTMENT COST (K€) :** 18 000  
**GROSS ANNUAL INCOME :** 6% (5 400 K€ per 5-year term)  
**ENERGY PRODUCED (MWh / year) :** 10 000  
**PREREQUISITE FACILITIES :** ANIMAL  
**LOCATION :** One plot in rural area (including farmland). Odours in the neighbourhood (risk of residents opposition).  
**JOBS CREATED LOCALLY :** 3

## HEAT ORIGINATING FROM INDUSTRY



*Recuperating heat from industrial process and injecting it in the Urban heating network*  
**TYPE:** Continuous energy production (Pc)

**OTHER ENTREPRENEUR(S) :** none

**INVESTMENT COST (K€) :** 700  
**GROSS ANNUAL INCOME :** 8% (280 K€ per 5-year term)  
**ENERGY PRODUCED (MWh / year) :** 2 000  
**PREREQUISITE FACILITIES :** IND-PR  
**LOCATION :** IND-PR  
**JOBS CREATED LOCALLY :** 4

## PUMPED STORAGE POWER STATION



*Storage facility: two successive dams with a sufficient level difference between the two*  
**TYPE:** Energy storage (St)

**OTHER ENTREPRENEUR(S) :** LOC-EN

**INVESTMENT COST (K€) :** 1 000  
**GROSS ANNUAL INCOME :** -2% (-100 K€ per 5-year term)  
**ENERGY STORED (MWh) :** 250  
**PREREQUISITE FACILITIES :** none  
**LOCATION :** 2 plots with altitude difference : N and [M or L]  
**JOBS CREATED LOCALLY :** 3

## PHOTOVOLTAIC PANELS ON HYPERMARKET ROOF SPACE



*PV panels on 10 000 m<sup>2</sup> flat roof space*  
**TYPE:** Intermittent energy production (Pi)

**OTHER ENTREPRENEUR(S) :** LOC-EN

**INVESTMENT COST (K€) :** 1 400  
**GROSS ANNUAL INCOME :** 8% (560 K€ per 5-year term)  
**ENERGY PRODUCED (MWh / year) :** 1 800  
**PREREQUISITE FACILITIES :** HYPER; Storage capacity 150 MWh  
**LOCATION :** HYPER  
**JOBS CREATED LOCALLY :** 5

## REINFORCEMENT OF HIGH VOLTAGE ELECTRICITY NETWORK



*Reinforcing electric lines to allow outward transfer of renewable excess energy locally produced (wind turbines, solar panels)*  
**TYPE:** Energy storage (St)

**OTHER ENTREPRENEUR(S) :** none

**INVESTMENT COST (K€) :** 1 100  
**GROSS ANNUAL INCOME :** -2% (-110 K€ per 5-year term)  
**ENERGY STORED (MWh) :** 1 030  
**PREREQUISITE FACILITIES :** none  
**LOCATION :** No location constraint. Risk of neighbours opposition due to damage to the landscape.  
**JOBS CREATED LOCALLY :** 0