# Proposal of policies and/or recommendations for governments in the business models applications.

## Deliverable 4.3

## *Contractor Report with country specific conclusions and recommendations*

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# 1 INTRODUCTORY REMARKS

The selected business model has been contrasted with the regulatory review in Task 3.2 for the barriers and obstacles specifically applicable to the implementation of the business cases. This allows to further assess the viability of the selected business cases not only in terms of economic and ecological performance but also in terms of regulatory implementation and will help to disregard the cases that present the most difficult barriers to overcome.

The business model reported by UNICAN presents a benchmark analysis by country, necessities, and technology. Also, the business case identifies new partners (i.e., technology suppliers), average values for NRAs service categories, and stakeholders involved, with the identification of roles, risks, and constraints.

## 1.1 Purpose of the report

The objective of the report and work is, based on the results from the previous tasks identifying the barriers and obstacles for the NRAs to become active in the energy market. Looking towards implementing the business models identified earlier as the most promising, strategies are proposed that will enable NRAs to take on the identified role within the model according to current regulation.

If the role to be assigned to the NRAs to optimally implement the business model is not possible for to take on due to barriers on regulation, policy recommendations have been made in order to remove/ease these barriers based on the lessons learnt and best practices from other countries. The recommendations are limited to proposed changes on the barriers identified. The aim of the report is not to give legal advice to NRAs.

## 1.2 Methodology

Arup identified the applicable regulations at EU level and national level for each of the target countries analysing the "National energy and climate plans" as a result of the (EU) 2018/2001 and their respective energy market/sector laws.

Once identified the applicable regulation and its implications, these were evaluated in detail to prepare a so called "red flag report" highlighting the "threats" that the NRAs would face in their aims to become energy producers and retailers. These threats were categorized in a grading system based on whether they are inevitable barriers rendering the process impossible or if they pose difficulties that can be sorted through different (possibly less effective) structures. Arup conducted an update of the latest legislation and policies barriers when possible.

The mentioned work has been used as a base to identify the barriers and opportunities applying to each of the business cases identified by UNICAN, attached in Annex 1.

# 2 STUDY BETWEEN BUSINESS MODELS AND CURRENT REGULATORY FRAMEWORK BARRIERS - BELGIUM

## 2.1 National long-term strategies

The regulatory framework can be summarized in the following five key points.

1. Plans and future objectives:
    - Belgium is transitioning to a climate-neutral society by 2050.
        - This is being achieved through the National Energy and Climate Plan.
        - This plan is being implemented at both federal and regional levels.
    - Decarbonization is a key objective, with a target to reduce GHG emissions by 35% by 2030.
    - Energy efficiency is also a priority, and Belgium has committed to contributing to the EU target of 32.5% by 2030.
    - Energy security is being addressed by reducing dependence on gas, promoting renewable energy, and managing energy imports due to the nuclear phase-out.
    - Research and innovation are key areas of focus.
2. Support schemes specific for the Flemish Region:
    - A policy framework has been developed for the crowdfunding of investments in renewable energy generation, including a solar guide.
    - Low-cost energy loans have been expanded.
    - Green certificates are available to support renewable energy, with around EUR 1.1 billion available annually.
    - Low-interest or interest-free loans are available for a specific target group needing financial support, with a budget of EUR 55 million per year, and banks are being encouraged to grant energy loans.
    - Incentives are available for solar water heating and heat pumps, with system operator incentives for solar water heaters (around EUR 4 million per year), and for heat pumps and water heaters with heat pumps (around EUR 3 million and EUR 1.8 million per year respectively).
    - Investment aid is available for small- and medium-sized wind turbines, with a budget of EUR 4.2 million per year.
3. Regulations:
    - Standardization of specifications has been developed to encourage public authorities to allow third parties to install photovoltaic systems on the roofs of their public buildings.

- Options for speeding up the time taken to process planning applications are being explored, and a wind energy guide has been developed to reinforce and increase the uptake in wind energy.
- The introduction of a single environmental permit, rather than separate environmental permit and planning permission, is being explored.
- Project studies have been launched to facilitate the roll-out of renewable energy installations, such as the Energielandschappen project, SIG studies into wind modelling and scenario analyses for the installation of wind turbines, the Atelier Diepe Geothermie, and the role of spatial planning in the energy and climate transition.

4. Renewable energy communities and self-consumers
   - There is no clear definition of a renewable self-consumer in Flemish legislation, but self-consumption has been regulated for a long time in Flanders. Households that have PV panels on their roofs are now called prosumers by the grid operator and the regulator (Campos Inês, 2020).
   - Self-consumers can participate in energy markets directly or through aggregators. In all regions of Belgium, it is possible to receive compensation for the surplus of self-generated electricity (with a reduction in the electricity bill, as the electricity meter counts back when energy is injected in the grid), through a net-metering scheme applicable to installed capacities equal to or lower than 10 kW (Art. V.2.4.2 Technical Regulation, 2015).
   - To sell electricity to the grid, the self-consumer must have a meter that provides a distribution system operator (DSO) or a supplier with precise data on self-production and consumption (quarterly meter, taking measures every 15 min), and the amount injected in the grid.
5. Mainstreaming renewable energy in the transport sector
   - General:
     - Flanders has included targets for clean vehicles, although there are limited specific measures for aviation and shipping.
     - There are high targets for both food-based and "advanced" biofuels.
     - The federal government will assess the adequacy of company car policies for climate objectives, with some mentions of urban planning improvements.
   - Cars and vans:
     - Flanders aims to have all new cars be "clean" by 2030, with half being zero-emissions.

        - Under the term "clean," they include hybrids and biofuels, which are not considered clean.
        - Flanders also aims for 30% of new vans to be "clean" by 2030, which may be insufficient.
    - The region has set a target for 5% of trucks to be "clean" by 2030, which is positive but insufficient.
- Public transport and slow modes:
    - Rail transport is recognized as having the potential to improve both passenger and freight transport, with mentions of network optimization, but more details are needed.
    - The goal is to have a 20% biking share of commuting travel, but there are no details on how to achieve this.

## 2.2 Identified Opportunities

Under the current and foreseeable regulation, several opportunities were identified and discussed in the stakeholder workshops held in October 2022. The concepts of Energy sharing and Energy communities were discussed and some specific examples were proposed. The key opportunity that stood oud was a grid balancing application based on BESS on backup generators, specifically: customer-side renewable energy business model (demand model). More details about the business case can be found in Annex 1.

- Value creation: coastal water control and regain dry ground.
- Organizing: joint-venture with pumping company
- Strategy implementation: specialized in customer segment.
- Monetization: price negotiated.
- Joint – venture with pumping company
- NRA is in a joint venture with a specialized pumping company for dewatering, sewer bypass, flood control, high tides, storm waters, or severe weather events. Customers are city authorities to regain dry ground. Facilities use large-volume pumps in systems of dams, levees, and barriers to prevent water movement. The facilities help control the tide against climate change.
- Complementary, pumping facilities can be installed in NRAs roads for drying purposes on electricity self-consumption basis (savings instead of sales incomes).

Potential customers:

The following key potential customers can be considered: Waterway authority; Bus fleet companies (PV, container BESS); Water management authority; Pumping for managing water

tables with pumping stations (water from land to river to prevent flooding); Locks and bridges; Water treatment (for example Aquafin).

Key opportunities:

There are several opportunities associated with using pumped hydro pumping which include:

- Facilitating the integration of renewable energy: As the use of renewable energy sources such as wind and solar power increases, the need for energy storage systems like pumped hydro storage becomes more important. By providing a way to store excess renewable energy when it is generated and release it back into the grid when it is needed, pumped hydro storage can help to facilitate the integration of renewable energy into the grid.
- Enhancing grid stability and reliability: Grid balancing is critical for ensuring grid stability and reliability. By providing a flexible and responsive energy storage solution, pumped hydro storage can help to balance the grid and ensure that electricity is delivered to customers consistently and at a stable voltage.
- Providing grid services and generating revenue: In addition to balancing the grid, pumped hydro storage can provide a range of other grid services, such as frequency regulation and voltage support. These services can be monetized and provide a source of revenue for system operators and owners.
- Creating jobs and economic development: The development, construction, and operation of pumped hydro storage facilities can create jobs and spur economic development in local communities. Additionally, pumped hydro storage can provide a reliable source of revenue for communities that host these facilities, helping to support local economies.
- Addressing climate change: Pumped hydro storage is a low-carbon technology that can help to reduce greenhouse gas emissions and mitigate the effects of climate change. By facilitating the integration of renewable energy sources, pumped hydro storage can play an important role in efforts to address climate change.

Overall, pumped hydro storage represents a significant opportunity for improving the stability and reliability of the grid, facilitating the integration of renewable energy, and supporting economic development while addressing climate change. Other opportunities include managing grid capacity constraints in certain areas, flexibility solutions for peak shaving, storage, backup, energy sharing, when production and consumption are not at the same place.

Key partners:

The following key partners could be involved: Waterway Authority; Grid operator; Electricity aggregators; Energy Traders; Energy storage providers, and Policy makers.

## 2.3 Identified Barriers

The barriers to grid balancing can vary depending on the specific context and region, barriers could include:

- Lack of infrastructure: Grid balancing requires a complex and robust infrastructure, including transmission lines, substations, and energy storage systems. In some regions, the infrastructure may be inadequate or outdated, which can make it difficult to balance the grid effectively.
- Regulatory barriers: Grid balancing involves coordinating the activities of multiple market participants, including grid operators, energy traders, and aggregators. Regulatory barriers, such as outdated regulations or conflicting rules and standards, can hinder the ability of these participants to work together effectively.
- Technical challenges: Grid balancing requires real-time monitoring and control of the electricity system, which can be technically challenging. In some cases, there may be issues with data quality, communication protocols, or the interoperability of different systems, which can make it difficult to balance the grid effectively.
- Lack of incentives: In some cases, there may be a lack of incentives for market participants to provide grid balancing services. For example, energy storage providers may not be able to recoup the full costs of their investments in energy storage systems, which can make it difficult to attract investment in these technologies.
- Cost: Grid balancing can be expensive, particularly in regions with high levels of renewable energy generation or other factors that make it difficult to balance the grid. These costs can be passed on to customers, which can make it difficult to achieve widespread adoption of grid balancing technologies and services.
- Addressing these barriers will require a coordinated effort from policymakers, grid operators, market participants, and other stakeholders. This may involve investments in infrastructure, updates to regulations and standards, improvements in data quality and communication protocols, and the development of new financial incentives and business models.

## 2.4 Recommendations

Recommendations for enhancing the success of the business model could include:

- Investing in pumped storage infrastructure: Building new pumped hydro storage facilities or expanding existing ones can help to increase the availability of energy storage and improve grid balancing. Policymakers can provide incentives to encourage private investment in these facilities, and grid operators can work to integrate pumped hydro storage into their grid management systems.
- Developing business models that incentivize pumped hydro storage: Grid operators can develop business models that incentivize the use of pumped hydro storage for grid balancing. For example, they can offer financial incentives to energy storage providers who offer services such as frequency regulation or voltage support.
- Promoting energy efficiency and demand-side management: Energy efficiency and demand-side management can help to reduce overall demand for electricity and make it easier to balance the grid. Policymakers can promote energy efficiency measures such as building retrofits, and grid operators can offer demand response programs that incentivize customers to reduce their electricity consumption during times of high demand.
- Developing regulations and standards that support grid balancing: Regulations and standards can play an important role in supporting grid balancing. Policymakers can work to update regulations to support the integration of renewable energy sources and energy storage technologies like pumped hydro storage and develop standards to ensure interoperability between different energy storage systems.
- Increasing public awareness and education: Public awareness and education can help to build support for pumped hydro storage and other grid balancing technologies. Policymakers can work to increase public awareness of the benefits of pumped hydro storage and other energy storage technologies and provide resources to help customers better understand their energy usage and participate in demand response programs.

By implementing these recommendations, policymakers, grid operators, and energy providers can help to increase the success of the business models, which could result in a more stable and reliable electricity supply, increased use of renewable energy sources, and greater energy efficiency.

# 3 STUDY BETWEEN BUSINESS MODELS AND CURRENT REGULATORY FRAMEWORK BARRIERS - GERMANY

## 3.1 National long-term strategies

As set out in the Climate Action Plan 2020, Germany is committed to achieving a 65% reduction in GHG emissions by 2030, 88% to 90% reduction by 2040 (compared to 1990 levels), and to achieving climate-neutral economy by 2045.

The government announced plans to phase out coal-fired power plants by 2038, to expand support for electric vehicles and charging infrastructure, and to increase funding for energy-efficient buildings and industrial processes. The government also introduced a new carbon pricing scheme, which puts a price for sectors not covered by the EU Emissions Trading System.

A climate strategy for transport will address emissions from cars, light and heavy commercial vehicles and issues related to GHG-free energy supply, the requisite infrastructure, and the interlinking of sectors (through electric mobility). The energy supply for roads and rail transport will be based on biofuels and as far as possible on electricity from renewable sources and other GHG-neutral vehicle fuels.

## 3.2 Identified Opportunities

- Support schemes for energy from renewable sources.

  Electricity generated from renewable energy sources is supported through a sliding feed-in premium determined in auctions for installed generation capacity according to "Erneuerbare Energie Gesetz" EEG (§22 EEG 2023). Installations with a capacity less than 1MW (wind and solar) or 150 kW (biomass) are exempted from the tender process (§22 EEG 2021).

- Incentive for PV close to the highways.

  §48 Art. 1 Nr. 3c) aa) EEG 2021: PV plants receive guaranteed feed-in tariff per kWh if they are built within 200m of a highway. 15m minimum distance for plants is required, § 9 Abs. 1 Nr. 1 Bundesfernstraßengesetz increases this distance to 40m if the local development plan does not state otherwise. Therefore, the minimum distance might vary locally depending on each region development plan.

- Power Purchase Agreements (PPA).

  Issues affecting renewable power purchase agreements (PPA) have been resolved in 2021 and are expected to continue to make PPAs an increasingly attractive option for renewable energy producers and consumers. There is an opportunity of doing a PPA scheme in between the NRA's and the business in the rest areas.

- Renewable Energy Communities.

  Even that in Germany there is a historical context of Energy Communities, Renewable Energy Communities have not been fully defined according to the European regulatory framework. The future definition might suppose an opportunity for increasing shared energy generation.

- Other provisions on renewable energy in the transport sector.

  Greenhouse gas emission trading in Germany shall enable operators of electric charging infrastructure to capture additional income. Revenues are estimated to be 20 to 60 cent per kWh of charged electricity. This would significantly boost charging infrastructure and could positively influence the project.

- Installation of PV on noise barriers.

  A special scheme was designed under §48 Art. 2 EEG 2023. PV plants on or at noise barriers received guaranteed feed-in tariff dependent on the installed capacity.

  1. up to and including an installed capacity of 10 kilowatts 8.6 cents per kilowatt-hour,
  2. up to and including an installed capacity of 40 kilowatts 7.5 cents per kilowatt hour, and
  3. up to and including an installed capacity of 1 megawatt 6.2 cents per kilowatt-hour.

- Installation of PV on parking places and resting areas.

  A tender pilot project took place in 2022 for integrated PV on parking sites. If conditions are prone, NRA could use the resting/parking areas along the roads for installing PV including close to the business along the road.

- Integration Of Electromobility into The Electricity Network.

  The conditions under which operators of charging stations are well defined. Operators of charging stations in Germany need to notify the grid operator before connecting them to the grid. The rules for the connection have been published by Association of Electrical Engineers.

## 3.3 Identified Barriers

- Incentive for PV close to the highways.

  §48 Art. 1 Nr. 3c) aa) EEG 2021: PV plants receive guaranteed feed-in tariff per kWh if they are built within 200m of a highway. 15m minimum distance for plants is required. § 9 Abs. 1 Nr. 1 Bundesfernstraßengesetz increases this distance to 40m if the local development plan does not state otherwise. The minimum distance might vary locally depending on each region development plan. Minimum distance might be a barrier for the NRA's. Securing land close to the highways might be more difficult as more competition is expected because of the incentive tariff.

- Simple-notification procedure for grid connections.

  Projects with a capacity of more than 10.8 kW go through standard connection approval process. This could potentially present a barrier as RE projects by the NRAs could exceed 10.8 kW (The upper capacity limit shall be confirmed against the latest legislation).

## 3.4 Recommendations

- Incentive for PV close to the highways.

  Follow-up with local administrations on the possibility for the NRA's to install PV on the edges of the highways and the conditions under which this could be done.

- Renewable Energy Communities.

  Even that in Germany there is a historical context of Energy Communities, Renewable Energy Communities have not been fully defined according to the European regulatory framework. The future definition might suppose an opportunity for increasing shared energy generation.

# 4 STUDY BETWEEN BUSINESS MODELS AND CURRENT REGULATORY FRAMEWORK BARRIERS - IRELAND

## 4.1 National long-term strategies

As set out in the Climate Action Plan 2023, Ireland is committed to achieving a 51% reduction in GHG emissions from 2021 to 2030 (compared to 2018 levels), and to achieving net-zero emissions no later than 2050; with legally binding requirements to achieve these objectives set out in legislation. This is achieved by implementing the carbon budgets (April 2022) and sectoral emissions ceilings agreed by Government in July 2022.

It is currently projected there will be a 17% decrease in greenhouse gas (GHG) emissions by 2030, with additional measures within the plan, projecting a 33.2% decrease e.g. not achieving 51% reduction target. However, the Government recognises that they will not be in a position to identify all the emerging technologies, changing scientific consensus or policies to meet the full ambition yet, and this would require a further allocation within the overall carbon budgets as the decade progresses.

## 4.2 Identified Opportunities

- Opportunities for energy generators/ producers

  This business case could allow energy generators/ producers an alternative route to market for their renewable electricity whereby they can sell their electricity to supplier/ retailer/ private entity and have their Guarantees of Origin (GoOs) transferred automatically. This could afford greater flexibility in technologies and timelines as it would sit outside of the Renewable Electricity Support Scheme (RESS) which, as previously highlighted, has strict conditions associated with the allowable types of technology and specific auction windows.

  This would require energy generators/ producers to sign Corporate Power Purchase Agreements (CPPAs) to sell their electricity over long term timelines for a set price e.g. provide a guaranteed return. In March 2022, DECC published Renewable Electricity Corporate Power Purchase Agreements Roadmap. This sets out the pathway for increasing uptake of CPPAs in Ireland including guidance from the EU Commission on removing barriers to CPPAs, inclusion of reporting on measuring and promoting uptake of CPPAs within the National Energy and Climate Plan (NECP). The Climate Action Plan 2023 commits to the Sustainable Energy Authority of Ireland (SEAI), the Commission for Regulation of Utilities (CRU), and the System Operators, working with Large Energy Users (LEUs) and enterprise development agencies to increase the demand flexibility of LEUs through enhanced reporting and matching of demand with usage of lower carbon energy sources, including increased transparency of emissions

data, and regulatory incentives and disincentives. Furthermore, Ireland aims to meet at least 15% of Ireland's 2030 electricity demand from renewable sources through CPPAs.

- Opportunities for energy distributors

  In order to avail of the grid to transport electricity from the energy generator/ producer site to the end user site, a grid connection is required. If the connection is transmission e.g. between 110kV and 400kV, the connection agreement is with the transmission system operator (TSO), EirGrid. If the connection is distribution e.g. between 230V and 38kV, the connection agreement is with the distribution system operator (DSO), ESB Networks. These energy distributors (EirGrid and ESB Networks) charge connection costs and grid operation and maintenance charges for access to this facility. TSO and DSO specifications require grid infrastructure to be laid in road/ along the road network. Therefore, NRA's could get profit of the existing grid along the roads, or capacity upgrades. Capacity upgrades and additional infrastructure will require collaboration with other utilities e.g. water mains, telecoms and gas network, to ensure there is sufficient space to construct these facilities.

- Opportunities for energy suppliers/ retailers

  This business case could offer an opportunity for energy supplier/ retailers to sign CPPAs to buy electricity over long term timelines for a set price e.g. provide cost certainty. It could also allow energy suppliers/ retailers an alternative route to access the market for securing GoOs from energy generators/ producers via these CPPAs. See above for more on CPPA Roadmap.

- Opportunities for regional/ local governments

  As set out in Climate Action Plan 2023, the targeted emissions abatement (compared to 2018 reference year) for the transport sector is 50%. This business case could help regional/ local governments achieve carbon emission reduction targets in the transport sector by connecting renewable electricity generators/ producers with consumers. Additionally, *Electrification and Vehicle Technology* change is expected to abate 4.74Mt$CO_2$eq across all modes of transport by 2030, therefore making available more sources of renewable electricity by which to charge these vehicles will support this target.

- Opportunities for road-side businesses and ESG certified companies

  This business case could offer an opportunity for road-side businesses and ESG certified companies to decarbonise their operations and achieve corporate carbon emissions reduction targets. It may also provide cost certainty through adoption of CPPAs to buy renewable electricity over long term timelines for a set price.

- Opportunities for NRA toll road users

  Fleet electrification remains a key emissions abatement measure in the medium term for Ireland. ESB ecars[1] is currently expanding and enhancing the charging network across Ireland, in part funded by the Irish Government's Climate Action Fund. In 2019, ESB introduced pricing plans to access the network and since then more than 90% of network users have downloaded the ecars connect app. This business model could offer the continued supply of renewable electricity required to expand and support the charging infrastructure along the road network.

## 4.3 Identified Barriers

- Barriers for energy generators/ producers

  At present, grid connections can be time consuming and dependant on significant investment in the grid infrastructure. The TSO/DSO will determine the maximum export capacity (MEC) that a generator can export onto the electricity network, based on the available spare grid capacity on the network for new generation. Grid capacity is the "space" on the network to accommodate a new generation project. It can be considered that the electricity network is made up of multiple layers. Each layer must be assessed to determine if there is available capacity for new generation. If there is not availability, then the generator will have to pay for the network to be upgraded. The cost of this upgrade could potentially make a project unviable. If there is not grid capacity on the transmission system, then the output of the generator may be reduced at times. This is known as network constraints, or curtailment. If network constraints are expected to be high, it will also impact on the economic viability of the project. All generators greater than 1MW in size can be constrained down by EirGrid. Currently generators less than 1MW are not controllable by EirGrid and therefore do not experience constraints.

  Renewable generators connected into a demand customer's premises is referred to as autoproduction generation. Current ESB Networks policy only allows auto-production generation located onsite, or on a directly adjacent site to be connected into the demand customers premises. A connection crossing third party lands, including public roads, is referred to as a private network. Private networks are currently prohibited under policy and legislation. There is an action in the Climate Action Plan 2023 to review the private connection policy and revise legislation if necessary.

  Smart grid technologies can help to create more capacity on the distribution and transmission system.

[1] ESB ecars was established in 2010 to roll out the public charging infrastructure for electric vehicles (EVs) across Ireland and to support the introduction and demand for electric vehicles nationally. ESB operates and maintains over 1,350 public charge points across the island of Ireland.

This can include technologies to help manage demand such as smart meters and smart protection schemes to manage generation. Currently, the DSO ESB Networks plan connections for renewable generators based on the worse case scenarios. This is lowest demand and highest renewable output. ESB Networks are currently looking into how to move towards a managed network where the output of demand and generation can be monitored and where possible controlled. Moving to a smart grid operational model would assist with further penetration of renewables on the distribution grid. The TSO, EirGrid already operate a smart transmission network. This has helped allow up to 75% of Ireland's demand to be met from renewable generation at times. The smart changes to the transmission system over the last decade were completed under the DS3 (Delivering a Secure, Sustainable Electricity System) programme. There will be an extension of the DS3 programme to help with the future changes required to accommodate even higher levels of renewable generation on the Irish system.

- Barriers for energy distributors

  As set out above, there is likely to be a requirement for significant investment in grid infrastructure arising from this business model. Both the TSO and DSO specifications require grid infrastructure to be laid in road/ along the road network. Capacity upgrades and additional infrastructure will require collaboration with other utilities e.g. water mains, telecoms and gas network, to ensure there is sufficient space to construct these facilities.

- Barriers for road users

  For road users, to date, the roll out of charging infrastructure and renewable refuelling infrastructure is slow. The ESB ecars initiative, as set out above, is starting to address this, however the EV charging network will have to increase to support the growth of EVs at the rate required and develop fast-charging infrastructure to stay ahead of demand.

## 4.4 Recommendations

As can been seen from the opportunities and barriers identified above, collaboration with the existing DSO and TSO will be integral to the successful implementation of a business case of this nature. The DSO/ TSO roles and responsibilities will need to be clearly understood and defined to ensure buy in is achieved and there is active participation in this business case.
Existing policies at EU level and Irish level are broadly in favour of this business case. However, some key policies and frameworks are yet to be functionally implemented, making a concrete timeline for implementation of this business case difficult to determine. Keeping up to date on development of the following legislation and polices is recommended:

- Renewable Electricity Corporate Power Purchase Agreements Roadmap.
- Private Connection Policy.
- Actions pertaining to transport and electricity sectors within the Climate Action Plan 2023.

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# ANNEX 1: BELGIUM CANVAS BUSINESS CASE BY UNICAN

Customer-Side Renewable Energy Business Model (Demand Model).

VALUE CREATION: Coastal water control and regain dry ground.
ORGANIZING: Joint-venture with pumping company.
STRATEGY IMPLEMENTATION: specialized in customer segment.
MONETIZATION: price negotiated.
LOCATION: Belgium.

Joint – venture with pumping company.

NRA is in a joint venture with a specialized pumping company for dewatering, sewer bypass, flood control, high tides, storm waters, or severe weather events. Customers are city authorities to regain dry ground. Facilities use large-volume pumps in systems of dams, levees, and barriers to prevent water movement. The facilities help ebb the tide against Climate Change.
Complementary, pumping facilities can be installed in NRAs roads for drying purposes on electricity self-consumption basis (savings instead of sales incomes).

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<tr><th colspan="5">ENROAD'S BUSINESS MODEL CANVAS. CASE 2 – PUMPING JOINT-VENTURE</th></tr>
<tr><td rowspan="2">KEY PARTNERS<br><br>Water pumps supplier<br>City governments</td><td>KEY ACTIVITIES<br><br>Energy production<br>Energy storage<br>Pumping engineering</td><td rowspan="2">VALUE PROPOSITION<br><br>Permanent installation for flood control in roads and cities<br>Certified Free GHG emissions electricity</td><td>CUSTOMER RELATIONSHIPS<br><br>Direct selling with city authorities</td><td rowspan="2">CUSTOMER SEGMENTS<br><br>Coastal cities (Coastal roads)</td></tr>
<tr><td>KEY RESOURCES<br><br>RE facility<br>Pumps</td><td>CHANNELS<br><br>Potential clients lists (cities)</td></tr>
<tr><td colspan="2">COST STRUCTURE<br><br>See costs list from ENROAD's Software<br>Network connection cost (eletricity tolls)<br>Pumping company fee</td><td colspan="3">REVENUE STREAMS<br><br>Annual fee<br>Electricity expenses savings</td></tr>
</table>

# ANNEX 2: GERMANY CANVAS BUSINESS CASE BY UNICAN

Customer-Side Renewable Energy Business Model (Demand Model).

VALUE CREATION: Electric car charging station.
ORGANIZING: charging facility and bar/restaurant.
STRATEGY IMPLEMENTATION: low cost & fast charging for logistic companies with electric vehicles.
MONETIZATION: electricity and bar/restaurant sales.
LOCATION: Germany.

Electric Car Charging Station.

NRA (or its company) build an electric car charging station. Since charging time is longer than traditional thermal cars, installation includes a restaurant and a bar. Furthermore, company should have agreements with logistic companies for charge scheduling for minimum times and cost.

<table>
<tr><th colspan="5">ENROAD'S BUSINESS MODEL CANVAS. CASE 3 – ELECTRIC CAR CHARGING STATION</th></tr>
<tr><td rowspan="2">KEY PARTNERS<br><br>Logistic companies with electric vehicles</td><td>KEY ACTIVITIES<br><br>Energy production<br>Energy storage<br>Restaurant & bar (franchises)</td><td rowspan="2">VALUE PROPOSITION<br><br>Scheduling in advance<br>Fast charging<br>Certified Free GHG emissions electricity</td><td>CUSTOMER RELATIONSHIPS<br><br>On road direct advertising based on panels</td><td rowspan="2">CUSTOMER SEGMENTS<br><br>Electric car owners and drivers<br>Logistic companies with electric vehicles</td></tr>
<tr><td>KEY RESOURCES<br><br>Staff<br>Fast charging equipment</td><td>CHANNELS<br><br>Online scheduling</td></tr>
<tr><td colspan="2">COST STRUCTURE<br><br>See costs list from ENROAD's Software<br>Network connection cost (electricity tolls)<br>Restaurant and bar (or franchises) costs</td><td colspan="3">REVENUE STREAMS<br><br>Electricity sales<br>Restaurant and bar (or franchises) sales</td></tr>
</table>

# ANNEX 3: IRELAND CANVAS BUSINESS CASE BY UNICAN

Utility-Side Renewable Energy Business Model (Supply Model)

VALUE CREATION: Free GHG electricity.
ORGANIZING: online selling.
STRATEGY IMPLEMENTATION: customers along roads.
MONETIZATION: energy sales.
LOCATION: Ireland.

Energy production connected to the network.

NRA, directly or with partners, distributes electricity along the road for sustainable companies and consumers in a deployment and with the collaboration of regional and local government, reinforcing their policies and programs for sustainability and Sustainable Development Goals (SDG).
NRA action creates value because incorporates them in the NRA image and strategy.

<table>
<tr><th colspan="5">ENROAD'S BUSINESS MODEL CANVAS. CASE 1 – SALE OF ELECTRICITY</th></tr>
<tr><td rowspan="2">KEY PARTNERS<br><br>Energy retailers<br>Regional/local governments</td><td>KEY ACTIVITIES<br><br>Energy production<br>Energy distribution</td><td rowspan="2">VALUE PROPOSITION<br><br>Certified Free GHG emissions electricity</td><td>CUSTOMER RELATIONSHIPS<br><br>Personal online profiles to purchase in the long-term electricity</td><td rowspan="2">CUSTOMER SEGMENTS<br><br>Along roads businesses<br>Electricity distributors and retailers<br>NRAs' Toll Roads drivers<br>ESG Certified companies</td></tr>
<tr><td>KEY RESOURCES<br><br>RE facility</td><td>CHANNELS<br><br>Media advertising<br>Toll signs<br>Road panel images</td></tr>
<tr><td colspan="2">COST STRUCTURE<br><br>See costs list from ENROAD's Software<br>Network connection cost (electricity tolls)</td><td colspan="3">REVENUE STREAMS<br><br>Listed prices based on energy market</td></tr>
</table>