OPENAIR

Policy Brief
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L-NET

The Luxembourg Negative Emissions Tariff.

SUMMARY

- **A new legislative proposal for Luxembourg designed to drive investment in carbon dioxide removal (CDR) projects, accelerate project deployment, and bend the cost curve for promising carbon removal technologies.**

LEGISLATION RATIONALE

In 2022 we have reached a broad scientific consensus that the total elimination of future greenhouse gas emissions, even in an accelerated time frame, is no longer sufficient to prevent average global temperature from exceeding 1.5 C this century. In addition to rapid decarbonization of the global economy, and adaptation to inevitably changes to the climate, the global community must also remove excess CO2 and other GhGs from the atmosphere on a gigatonne scale. According to the U.N. Intergovernmental Panel on Climate Change's (IPCC) *Global Warming of 1.5 C Report* (2018):

> *"All pathways [that] limit warming to 1.5C use Carbon Dioxide Removal.... Unless affordable and environmentally and socially acceptable CDR becomes feasible and available at scale well before 2050, pathways to 1.5C will become difficult to realize."*

Consequently, by the middle of this century global **carbon dioxide removal (CR)** capacity must reach billions of tons per year. For this target to be realized the top CDR policy priorities this decade must be to 1.) rapidly increase investment in and deployment of potentially high-magnitude, high-quality CDR technologies; and 2.) drive down unit costs through accelerated scale and learning.

Luxembourg can play a critical leadership role in supporting these linked near-term objectives by establishing a market-based incentive structure that can generate and sustain early demand for CDR and drive investment.

The Luxembourg Negative Emissions Tariff (L-NET) is a new legislative proposal for Luxembourg that aims to implement a new CDR or negative emissions investment acceleration program partially modeled on and adapted from the successful element of the renewable energy feed-in tariff, currently in place in Luxembourg and several other European countries.

L-NET POLICY COMPONENTS

1. OPEN PARTICIPATION FOR ELIGIBLE PROJECTS.

CDR projects that meet eligibility criteria defined by the regulator will be accepted into the program on a first-come-first-served basis following application review and approval. Applications will be accepted and approved during any given year until the annual funding allocation has been exhausted (see Component 6). Annual reallocation of funds on January 1 of each year will coincide with the beginning of a new annual application period.

A minimum threshold of 100 tonnes of CO_2 removal capacity per year will apply to projects as a condition of participation eligibility. Project payments will commence only once the 100 tonne threshold has been reached, after which payments will be transacted on a quarterly basis. Projects that involve the aggregation and common ownership and management of CDR assets that collectively meet or exceed the 100 tonne/year threshold shall be eligible for participation.

The regulator will be responsible for promulgating and modifying eligibility criteria related to all necessary certifications, and safety and performance standards required for technologies, products and solutions proposed for projects. Eligibility criteria shall also include guidelines and requirements related to monitoring, verification and reporting protocols and procedures; as well as methods for quantifying the net climate and environmental benefits of proposed projects via third-party life-cycle analyses. The regulator shall have the authority to disqualify projects on the basis of data made available through such analyses.

2. DIFFERENTIATED ***CO2 VALUE STACK*** TARIFF STRUCTURE.

Participating projects will receive payment for distinct CO_2 services performed during the contract period. Each service is represented as a distinct layer that will be assigned its own specific value (€/CO2 tonne). Layers are mutually inclusive, and can be combined, or 'stacked', in a single compound tariff, depending on the specific characteristics of a participating project.

- **LAYER 1 [COMPULSORY]: Verified removals of CO2 from the atmosphere.**

The project results in verifiable net removals of CO2 from the atmosphere, and the utilization of the latter in the production and/or completion of goods and/or services, and/or the latter's durable storage. **All approved L-NET projects must result in verified removals as a condition of participation.**

- **LAYER 2: Verified durable storage of CO2 for a minimum of 100 years.**

The project results in the verified durable storage of CO2 removed from the atmosphere in materials or geological structures for a minimum period of 100 years. The regulator will assign value of CO2 storage tariffs based on verified storage duration period, awarding higher payments, on a graduated basis, to projects that have been determined to result in storage durations that are greater than the minimum 100 year period.

- **LAYER 3: Verified delivery of additional co-benefits or compliance with special project criteria specified by the regulator.**

The regulator may elect to designate additional payments for:

i. **Verifiable co-benefits** that create social and/or economic value consistent with national objectives and public policy aims.

Ii. **Breakthrough innovations** that represent novel negative emissions methods and opportunities that have been determined by analysis to offer significant potential impacts and benefits vis-a-vis climate change mitigation and environmental quality objectives.

Iii. **Project factors related to deployed capacity and scale**, offering premiums for smaller projects with relatively higher fixed costs associated with construction and/or operation.

Each of the above value categories, or layers, may be combined into a compound tariff for projects that demonstrate delivery or realization of each, per monitoring, reporting and verification criteria established by the regulator.

3. MULTI-YEAR CONTRACTS.

Accepted projects are eligible to enter into payment contracts for a **maximum length of five years.** The payment terms of the contract will be performance-based, and relate to project delivery of one or more of the service categories defined above in Component 1. The regulator shall have the authority to terminate contracts if projects have failed to comply with program rules or meet performance criteria defined by the regulator.

4. TARIFF LEVELS AND DEGRESSION RATES.

The regulator will be directed to establish tariff levels for each of the service categories defined in Component 1 with the objective of supporting predictable compensation for services rendered, and a reasonable return on investment for project owners. Tariff design will be based on the regulator's analysis of the present capital and operating expenditures of different categories of negative emissions and storage technologies and solutions; and will consider the present and future social, economic and environmental benefits that are projected to result from the realization of such projects.

Declining payment levels. In order to adjust for technology cost reductions realized by the carbon removal and carbon utilization sectors over time; incentivize price competitiveness; and mitigate against the risk of overpayment or developer "windfall profits", tariff levels will decline over time in a manner that is transparent and intended to minimize abrupt market uncertainties, disruptions and discontinuities, while also regulating the program's fiscal impact to the Luxembourg taxpayer.

Volumetric block structure. The tariff degression schedule shall be determined by a *volumetric CO2 block structure.* Under this scheme the tariff, or compensation value (€/CO_2 tonne), for each of the service layers defined in Component 2 will be adjusted downward over time as capacity *blocks*, based on the cumulative CO2 removal capacity of participating approved projects, are exhausted through the process of additional approved projects subscribing to the program. Tariff levels and blocks will be set by the regulator based on an analysis of present CDR project costs, value generation, and other factors related to program objectives, such as, but not limited to, capacity deployment and carbon removal and/or utilization targets. The CO2 block program's *first-come-first-served* structure incentivizes first movers and rewards early entrants.

Transparent market-signal. The remaining capacity available for new projects within active blocks, as well as the tariff compensation value for both the current active and next subsequent block, will be published and updated regularly on a website accessible to the public. The CO2 block program's *first-come-first-served* structure will incentivize first movers, reward early entrants, and accelerate CDR investment and project deployment.

5. TECHNOLOGY NEUTRAL: BASED ON "CO2 CHAIN OF CUSTODY" MONITORING, MEASUREMENT, REPORTING AND VERIFICATION (MMRV) STANDARDS.

The L-NET program will not explicitly identify or certify specific eligible CDR technologies, solutions or products. Rather the program's eligibility criteria will be based on standards that require the CO_2 that is removed and/or stored by a participating project to have properties that enable it to be physically monitored, measured, verified and reported through technical methods that are precise, accurate and immediate.

The regulator will establish conditional eligibility/disqualification criteria related to an applicant project's overall environmental and climate life-cycle performance, taking into account both *embodied* and *operational factors*); as well as additional 'do no harm' social and economic criteria.

6. EXTERNAL PROJECT ELIGIBILITY

The L-NET program will permit CDR projects located outside of Luxembourg to participate and receive payment for CDR services rendered. However, the following conditions apply for external project eligibility:

- **Removal *and* storage projects only.** External projects must deliver both L1 (CO2 removal) and L2 (CO2 durable storage) services to be eligible for program participation.
- **Maximum project capacity.** External projects will not exceed a CO2 removal and storage capacity of **10,000 CO_2 tonnes/year.**
- **Minimum Luxembourg ownership and/or investment threshold.** Eligibility for external projects will be limited to projects for which entities or individuals domiciled in Luxembourg possess at least 50% of the ownership stake or share of total investment in the project. The regulator may also consider eligibility for

projects owned and/or implemented by one or more companies physically operating at locations within Luxembourg.

7. FUNDED BY SUPPLEMENT TO EXISTING “TAXE D’ABONNEMENT”

The L-NET program will be funded by a supplemental tax that will be added to Luxembourg’s existing %.05 “taxe d’abonnement” on income earned from investments. An additional %.01 tax will be applied to investments made in high emissions and/or ‘difficult to abate’ sectors designated by the regulator, including oil & gas.

Total annual L-NET project contracts will be capped at the level of revenue gained from this additional CDR levy during the previous fiscal year.

8. LUXEMBOURG CDR TAX EXEMPTIONS.

Coinciding with the implementation of the L-NET program the following changes to the luxembourg tax code will be implemented:

- Special purpose vehicles (SPVs) and other investment instruments that finance carbon dioxide removal and/or utilization projects and companies that are domiciled in Luxembourg will be exempt from taxes on income and wealth.
- Income generated from CDR projects will be taxed at the half of the effective tax rate.
- Funds investing into CDR will have their “taxe d’abonnement” reduced to 0.02% on all eligible investments.

RESOURCES

1. The L-NET Kick-Off Webinar: Objectives, Assumptions & Questions.
2. Backgrounder on the German FIT - it’s policy and social history. An interview with Prof. Joern Hoppman
3. L-NET Straw Proposal Webinar (Jan 6, 2021)
4. The CDR Primer (2020)