PLAN. INNOVATE. ENGAGE.

Introductory plenary session

Dynamic Modelling Energy Pathways

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Manage the regional transition over time

CASE: Dutch Island, 3500 inhabitants, tourism,

onshore and nearshore gas production

Partners: Local government, DSO, utility, gas

production company, local energy

cooperation

Ambition: Reduce CO2 footprint to zero by 2035

Challenge: Electrification of industry, local

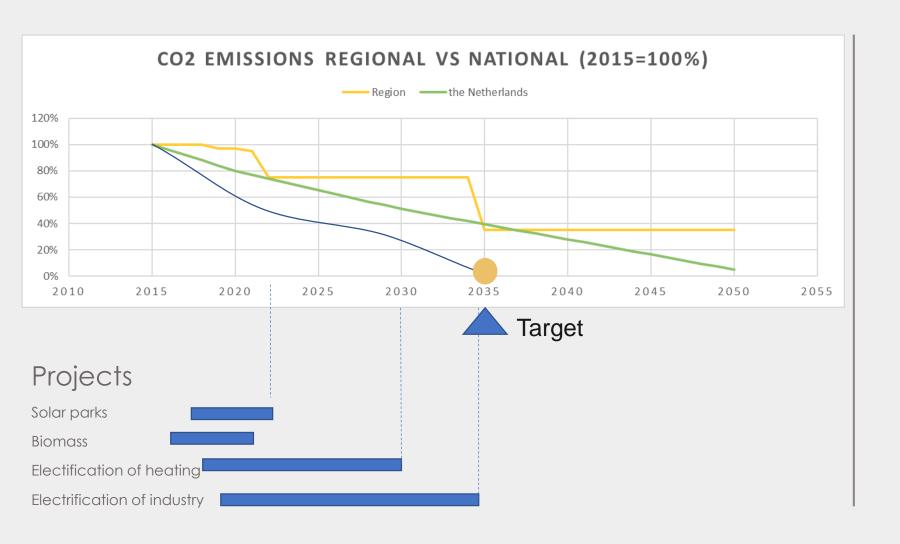
renewable sources, connection to the

mainland, system integration





ETIP SNET ME Insight CO₂ reductions in timeline



Objectives:

Map **effect** of transition projects onto CO2 ambitions of the island in the timeframe to 2050



Key exploitable results addressing energy system integration

TRANSITION PROGRAM: TIMELINE MODELING & TRACKING

TNO innovation for life

INFORMATION BASE





ENERGY SYSTEM
DESCRIPTION LANGUAGE

- Describe all relevant aspects of the energy sytem: energy profiles, infrastructure topology, and energy assets
- Using the de-facto standard ESDL, developed by TNO
- Read more >

MODEL TRANSITION PROGRAM





WEB-BASED ENERGY SYSTEM MODELING

- Model different system configurations in a timeline as a result of the finished and planned projects in the program
- Use ESDL elements: energy assets, topology information, energy profiles

SIMULATE SYSTEM BEHAVIOUR





ENERGY SYSTEM SIMULATOR

- Simulate behaviour of systems in the timeline
- Energy balance over time
- Interactions between energy carriers
- Load on transport infrastructures
-) Impact of storage

TRACK PROGRAM PROGRESS



ENERGY PROGRAM TRACKING

- Match impact of program with ambitions
- Select relevant KPIs
- Set targets for KPIs
- Match program simulation results to KPIs
- Visualise program with ambitions

ESDL

Language developed for uniform definition of energy system: ESDL

GEO-MAPEDITOR

Interactive Geographic interface to define energy systems: topology, assets, profiles, sectors

ESSIM

Profile based energy system simulator over multiple energy vectors and infrastructures

TRACKING and TRACING

Translate simulation results to KPI's on energy, environment, finances and social impact



Lessons learned and barriers to innovation deployment

Key success factors for steps in the transition

- factual insight in certain KPI's (co2, costs) are required for sound decision making
- factual insight in the effect of scenario choices helps to manage the transition
- projects should result in sustainable businesses and business models

Barriers

- Barriers in regulation are often imagined
- Regulation should help to stimulate the transition in a certain direction
- Sustainable business models without subsidies are still scarce



Deployment prospects of the most promising solutions

- The approach (ESDL, MAPEDITOR, ESSIM and KPI calculations) is applicable to a wide scale of regions
 - Going from scenario development to infrastructure impact and KPI quantification
 - Applicable in Dutch Regional Energy Strategies (RES)

- Tools are made available
 - ESDL is open source: available on GitHub
 - Simulation tools will become available via TNO partners



Needs for future R&I activities coming out of the project

- Broader validation of the approach, also internationally
 - validation of KPI's
- enhance tooling for KPI calculation
- H2020: energy islands / geographical islands calls