29.9.2018

# HOW DOES INNOVATION BOOST ENERGY TRANSITION IN FINLAND

**JARMO HEINONEN** 



## Finland

- Population: 5.4 million, 15.8 inhabitants per km<sup>2</sup>
- 188.000 lakes
- 80% of land area covered by forest



#### According to the environmental performance index 2016, Finland is the greenest country in the world!

Finland was ranked #2 according to The Global Cleantech Innovation Index 2017



Finland's climate and energy policy targets for 2030

- phase out the use of coal for energy
- increase the share of renewable energy to over 50 %
- halve the domestic use of imported oil
- increase share of renewable transport fuels up to 40 %
- Increase share of transport biofuels to 30 per cent

## THEMES AND GOALS

Towards joint innovation, invest-in and export-promoting service packages\*



BUSINESS FINLAND

#### Cleantech Focus Areas - 2018



#### Business Finland Funding for Energy and Environment Related Projects



# Smart Energy



## Smart Energy Programme

- Smart Energy Programme 2017-2021
- Budget 100Meur
- Connectivity and integration are driving new energy technologies, industry structures and business models with sustainability at the core

26/09/2018

**Smart Energy** 

# SMART ENERGY – Program

#### Focus segments



Focus countries Vietnam, China, India, Arab Emirates, South Africa, Chile, Mexico, Canada

BUSINESS FINLAND



## Smart energy connection

5G ULTRA-FAST EDGE LOW-LATENCY REALTIME

Super IoT CONNECTED DEVICES

INTEROPERABILITY SENSING BASED OPS

10

Data AI SMART OPERATION

INSIGHT FROM DATA SITUATION CONTEXT

## RADIO

ANALYTICS

Smart Energy

26/09/2018

### Otaniemi Smart Energy Platform

#### Piloting new energy services in Otaniemi

- Focus areas
  - Energy data for new applications and services
  - Energy efficient and renewable Otaniemi
  - Real-time monitorable and controllable area

#### • Objectives

- Internationally recognised pilot side
- Showcase for Finnish competences
- Living lab with real customers involved
- Ecosystem lasting and developing over time



#### 26/09/2018



# FINLAND

## Smart Energy Platform

## Unique location, Åland islands Comprehansive but small enough

- Excellent wind and solar conditions
- 80% of electricity imported
- Self-governed
- Full society of 30 000 citizens
- Readiness up to 125  $\%~\text{RES}_{\rm e}$
- 0.5% of Finnish GDP, electricity consumption, population etc.



26/09/2018





# BATTERIES FROM FINLAND

### Finland is well positioned for battery storage growth

Raw materials	Chemicals, compounds	Components	Battery cells	Battery modules / packs	OEM / end users
<ul> <li>Production in Finland:</li> <li>Cobalt (only EU country w/ own Co production, known resources exceed 445.000 t)</li> <li>Nickel 20.000 tpa</li> <li>Planned production:</li> <li>Lithium (Keliber, 2020)</li> <li>Graphite (Fennoscandian Resources, 2020s)</li> </ul>	<ul> <li>Operating in Finland:</li> <li>Norilsk Nickel world biggest Ni producer -&gt; 30% of production refined in Finland</li> <li>Freeport Cobalt world biggest producer Co chemicals, 10.000 tpa</li> <li>Planned production:</li> <li>Terrafame announced 200 MUSD investment to Ni and Co battery chemicals</li> </ul>	<i>NOTE:</i> • Finland has advanindustry with good • Battery recycling a development area good competence	ced chemical d talent pool an emerging a – Finland has s	Operating in Finland: • CATL / Valmet Automotive	<ul> <li>Vehicles:</li> <li>Valmet Automotive for cars (capability)</li> <li>Linkker for buses</li> <li>Utilities:</li> <li>Fortum (2 MW pilot)</li> <li>Helen (1,2 MW pilot)</li> <li>Others, examples:</li> <li>Avant and Rocla for industrial loaders</li> <li>Kalmar for straddle carriers</li> </ul>



## BATTERIES FROM FINLAND OBJECTIVES



To create an internationally competitive battery ecosystem in Finland



To grow leading technological solutions, battery solutions and service suppliers in Finland



To develop leading battery recycling technologies and solutions



To attract battery production and international RDI centres into Finland - IIF



To ensure constant Business Finland services in Finland and in the global markets



### RECENTLY SUPPORTED INNOVATIONS BY BUSINESS FINLAND IN BATTERY SECTOR

Battery sector funding 2014-> 90 projects 30 million euros

Battery sector and related industries funding 2014-> 170 projects 55 million euros

### **Project consortium BATCircle**



