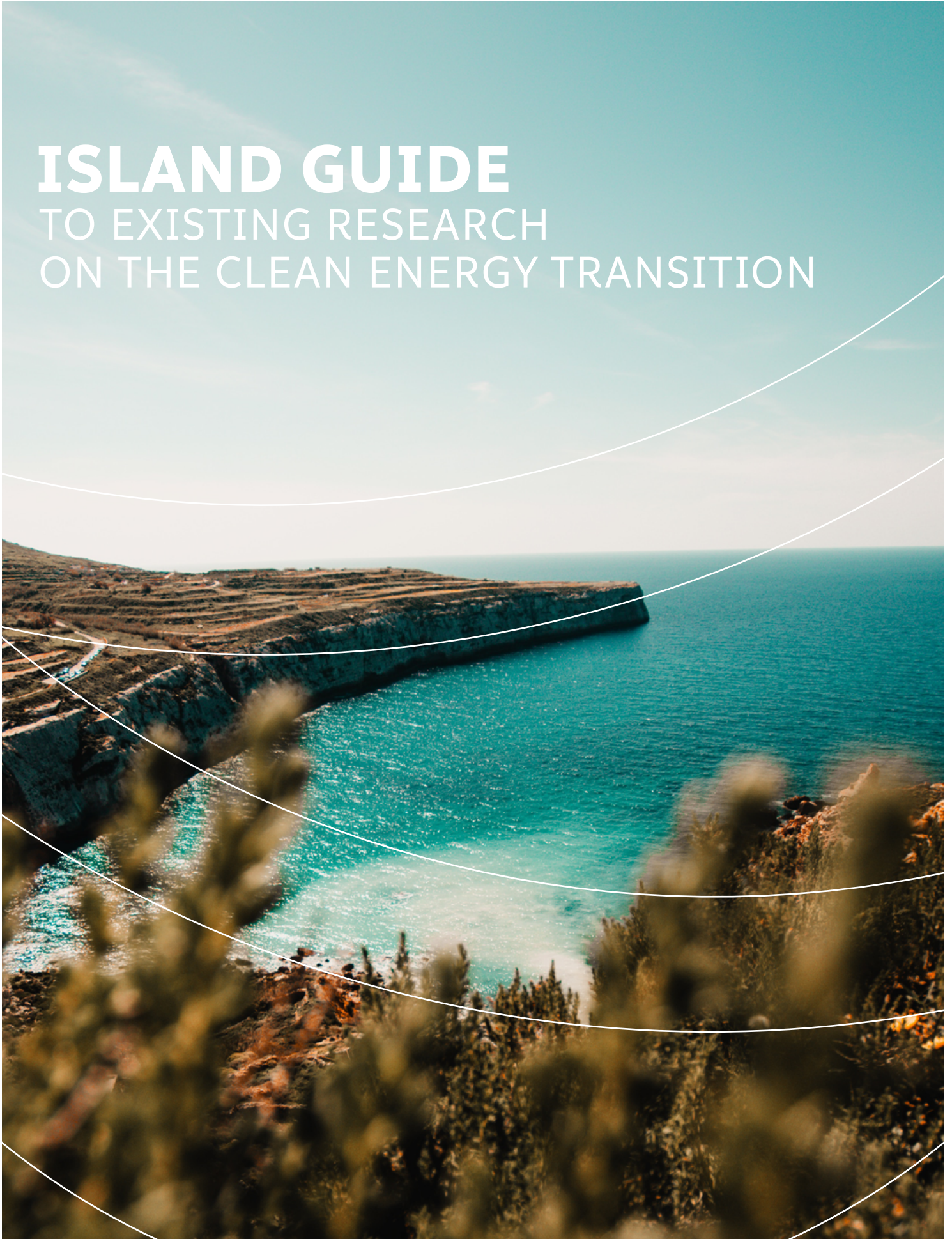


# ISLAND GUIDE

TO EXISTING RESEARCH  
ON THE CLEAN ENERGY TRANSITION



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## Introduction

This document provides an overview of open-access research relevant to the clean energy transition, with a specific focus on islands. Highlighting a number of technologies and transition approaches to advance the transition on islands, this guide aims to provide island communities and transition leaders with resources that contain information about the necessity of the clean energy transition, and show how it can be done in a way that benefits the local community, economy, and environment. It includes step-by-step guides for starting and advancing a clean energy transition where local actors – including local authorities, citizens, businesses and academia – play a central role and co-design the future of their own island.

In addition to the relevant open-access resources, this document includes some relevant subscription-based research, as well as an open-source research portal, for further reading.

This guide is one of several publications by the Clean Energy for EU Islands Secretariat to support islands in their clean energy transition.

For more information and to contact the Secretariat, please consult [www.euislands.eu](http://www.euislands.eu) or mail us at [info@euislands.eu](mailto:info@euislands.eu)

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### CLEAN ENERGY FOR EU ISLANDS

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## How to plan a clean energy transition

### HOW TO ACHIEVE 100% RENEWABLE ENERGY

**AUTHORS** The World Future Council

**PUBLISHED** 2014

**LANGUAGE** English

**SUMMARY** The goal of fully transitioning the world's total energy mix toward renewable energy sources is no longer a utopian ideal: it is being achieved in a number of places around the world today. This **policy handbook** takes a closer look at these early pioneers to provide inspiration and concrete examples to other jurisdictions that are aiming to embark on the same transformation. It analyzes **case studies to identify drivers, barriers as well as facilitating factors** and, from these, it derives policy recommendations to finally enable their transfer to other jurisdictions around the world.



### ISLANDS PLAYBOOK

**AUTHOR** Energy Transition Initiative (an initiative of the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy)

**PUBLISHED** 2015

**LANGUAGE** English (easy to understand, very well structured)

**SUMMARY** The Islands Playbook provides an **action-oriented guide** to successfully initiating, planning, and completing a transition to an energy system that primarily relies on local resources to eliminate a dependence on one or two imported fuels. Along with describing the steps on the path toward a comprehensive energy transition, the Playbook includes lessons learned from efforts undertaken by Hawaii, the US Virgin Islands, and other— primarily island—communities who recognized that single sources of fuel unnecessarily constrained their ability to realize sustainability, economic development, and other goals. The Playbook also **includes templates and blank worksheets for some of the activities described**, which can be copied or distributed electronically when needed. These are designed, as is much of the Playbook, to **organize an ongoing, constructive dialogue about a community's energy future** and how to make that future a reality.



### TRANSITION MANAGEMENT IN THE URBAN CONTEXT

**AUTHOR** Dutch Research Institute for Transitions (DRIFT), Erasmus University Rotterdam

**PUBLISHED** 2014

**LANGUAGE** Academic English (quite complex and elaborate)

**SUMMARY** This manual offers an introduction to transition management, illustrated by the experiences in five different urban contexts. It provides food for thought on **key aspects to take into account when starting a clean energy transition in an urban context**, and provides **practical examples** from Ghent, Montreuil, Ludwigsburg, Aberdeen and Rotterdam. A useful introduction to transition management and how it can work.



## Transition approaches and technologies by topic

### SMART ISLANDS PROJECTS AND STRATEGIES

**AUTHOR** Friedrich Ebert Stiftung

**PUBLISHED** 2016

**LANGUAGE** English

**TAGS** **smart grids**

**SUMMARY** A documentation of **smart projects and strategies implemented by 35 European islands** and showcased during the 1st Smart Islands Forum, 21-22 June 2016 in Athens. Lighthouse projects include examples from Croatia, Cyprus, Denmark, Finland, France, Germany, Greece, Italy, Malta, The Netherlands, Spain, Sweden and the United Kingdom. This publication includes information about the islands, a brief introduction to their challenges and **specific smart energy projects implemented**.



### RENEWABLE MICROGRIDS PROFILES FROM ISLANDS AND REMOTE COMMUNITIES ACROSS THE GLOBE

**AUTHOR** Rocky Mountain Institute/Carbon War Room

**PUBLISHED** 2015

**LANGUAGE** English

**TAGS** **wind, storage, energy efficiency, solar**

**SUMMARY** The pathways pursued by islands and remote communities to **develop renewable microgrids** provide **examples of how communities might embark on a similar transition**. From the cases studied, the authors have identified several lessons learned in order to help guide decision making within communities currently considering a transition from oil to renewables.



### BUURTBATTERIJ A NEIGHBOURHOOD BATTERY AND ITS IMPACT ON THE ENERGY TRANSITION

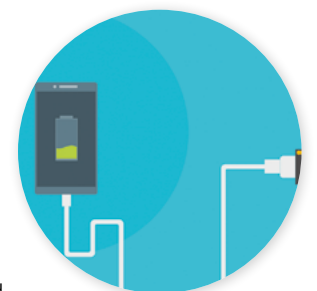
**AUTHOR** A. Proka

**PUBLISHED** 2017

**LANGUAGE** English

**TAGS** **solar, storage, community**

**SUMMARY** Energy storage has been expected to improve the working conditions and the stress-resistance of the grid, making it more secure, reliable and responsive, in the face of an increasing diffusion of renewables. What are the **societal costs and benefits of neighbourhood storage**? What value does it offer, and to whom? How could a neighbourhood battery influence the **business model** of an energy cooperative? Using Alliander's neighbourhood battery as a case, this report presents the main findings from an exploratory research on the **potential transformative impact of local energy storage in the energy transition**.



## Transition approaches and technologies by topic

### CASE STUDY REPORT – DENMARK

#### FINDINGS FROM CASE STUDIES OF PROJECT ZERO, RENEWABLE ENERGY ISLAND SAM SØ AND INNOVATION FUR (GREEN COM)

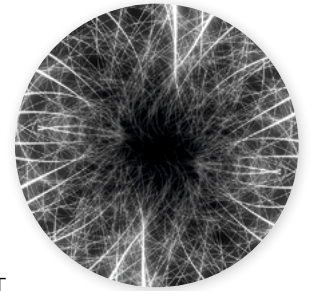
**AUTHORS** Toke Haunstrup Christensen, Freja Friis

**PUBLISHED** 2017

**LANGUAGE** English

**TAGS** **smart grid, energy efficiency, solar, heating, community**

**SUMMARY** First findings from the Danish research project “Match” under the ERA-NET Smart Grid program, based on case studies from the 3 Danish Islands; Fur, Samsø and Als. The aim of MATCH is to explore **how to design and implement comprehensive smart grid solutions** that take into account the complexity of factors influencing the effectiveness and success of smart grid **initiatives targeted at small consumers.**



### WATER SAVING CHALLENGE

#### A SMART GUIDE TO WATER MANAGEMENT

**AUTHORS** Group of the Progressive Alliance of Socialists & Democrats in the European Parliament

**PUBLISHED** 2017

**LANGUAGE** English

**TAGS** **water**

**SUMMARY** Water management often makes up a large portion of the emissions on islands and hence plays an important role in the decarbonisation process. During 2017, a group of eight European islands focused on water saving. Some of them were forced to turn off the water on certain days of the week, or at night. These islands discovered that **it is possible to cut their freshwater consumption by 10 to 55 percent.** The amount of water saved per year on these eight islands with a total resident population of less than 8,000 people was 200 million litres, **which in turn saves 470,000 kWh and 42,000 kg of CO2 emissions.**



### SELF-CONSUMPTION GUIDE

**AUTHORS** Institute for Energy Diversification and Energy Efficiency (IDAE)

**PUBLISHED** 2019

**LANGUAGE** Spanish

**TAGS** **solar energy efficiency community**

**SUMMARY** This Guide describes the steps necessary for the processing of electricity generation facilities both for individual **self-consumption** facilities, as well as for installations in collective self-consumption. It is aimed at the general public, but more specifically at companies that install self-consumption systems. As progress is made in the development of self-consumption, this guide will be updated to collect as much detail as possible the modifications that arise in the processing of the facilities.



## Transition approaches and technologies by topic

### ENERGY ACADEMY 2020

The Energy Academy 2020 is an **e-learning programme** aiming to improve European island communities and administrations' capacity with the view to assist them start, complete or revise their sustainable energy plan for decreasing their dependency on fossil fuels and reduce their CO2 emissions in a way that brings benefits for the island. The target group is **local stakeholders**, which includes citizens, municipal employees and professionals on the island or connected in some way to the island, which are keen to assist the island in the energy planning process.



### THE COVENANT OF MAYORS RESOURCE LIBRARY AND SIGNATORY DATABASE

<b>AUTHORS</b>	The Covenant Community and the Covenant of Mayors Office
<b>PUBLISHED</b>	Started in 2008 as a constant growing database
<b>LANGUAGES</b>	All EU languages
<b>SUMMARY</b>	<p>The <a href="#">support section</a> of the Covenant of Mayors consists of inspirations ranging from stakeholder engagement to technical examples of project implementation, as well as emission inventory guidance for developing your decarbonisation plan.</p> <p>The <a href="#">library</a> consists of publications from the Covenant of Mayors Office as well as from the Joint Research Centre of the European Commission. Often publications come in several EU languages. From the Covenant of Mayors website, you can access most of the active signatories plans when browsing the <a href="#">Covenant community</a>. The website further includes a list of more than 6,000 good practices from the Covenant signatories on how they reduce their emissions. Note that these databases are all built on information from the Signatories of the Covenant of Mayors and may therefore vary in quality and length.</p>



## How to engage your local community

### COMMUNITY ENERGY BROADENING THE OWNERSHIP OF RENEWABLES

**AUTHOR** IRENA Coalition for Action

**PUBLISHED** 2018

**LANGUAGE** English

**TAGS** **community engagement**

**SUMMARY** A good and short **introduction to the concept of community energy projects**, with benefits, challenges and actions to promote community-owned projects. **Helpful especially for municipalities** wishing to engage their citizens in renewable energy projects.

**COMMUNITY ENERGY:**

BROADENING THE OWNERSHIP  
OF RENEWABLES

### COMMUNITY POWER MODEL LEGAL FRAMEWORKS FOR CITIZEN-OWNED RENEWABLE ENERGY

**AUTHORS** Josh Roberts, Frances Bodman, Robert Rybski

**PUBLISHED** 2014

**LANGUAGE** English

**TAGS** **community engagement, financing, law**

**SUMMARY** A good approach and model for different types of community-owned energy projects. The focus of the publication is on **different legal forms of cooperatives, financial schemes and a number of good practices**.



### COMMUNITY-OWNED RENEWABLE ENERGY A HOW TO GUIDE

**AUTHORS** Jarra Hicks, Nicky Ison, Jack Gilding, Franziska Mey

**PUBLISHED** 2014

**LANGUAGE** English

**TAGS** **community engagement**

**SUMMARY** A short, practical, **step-by-step guide for starting up a community renewable energy project**, based on experiences from Australia.





## How to engage your local community

### STATISTICAL EVIDENCE ON THE ROLE OF ENERGY COOPERATIVES FOR THE ENERGY TRANSITION IN EUROPEAN COUNTRIES

**AUTHORS** August Wierling, Valeria Jana Schwanitz, Jan Pedro Zeiß, Celine Bout, Chiara Candelise, Winston Gilcrease, Jay Sterling Gregg

**PUBLISHED** 2018

**LANGUAGE** English

**TAGS** **community engagement**

**SUMMARY** This paper provides **empirical evidence of activities by energy cooperatives in the field of renewable energy in four different European countries**. It draws from a database consisting of 2671 entries, contrasting results from current literature, concluding that energy cooperatives are important enablers of the energy transition.



### SMART ENERGY FOR THE END-USER A FEASIBILITY STUDY FROM SAMSO, DENMARK

**AUTHORS** Jan Jantzen, Michael Kristensen, Toke Haunstrup Christensen

**PUBLISHED** 2017

**LANGUAGE** English

**TAGS** **community engagement, energy efficiency**

**SUMMARY** A good example of **smart energy use with three target groups of end-users: farmers, shop owners, and households**. The study shows that cattle farmers that can shift their energy demand in time. Shops are willing to save energy during the night and on days when they are closed, and we found 11% savings on average with little or no investments at all. House owners can often save at least 5% with little or no investments at all.



### LEADING FROM THE NICHE INSIGHTS FROM A STRATEGIC DIALOGUE OF RENEWABLE ENERGY COOPERATIVES IN THE NETHERLANDS

**AUTHORS** A. Proka, D. Loorbach, M. Hisschemöller

**PUBLISHED** 2018

**LANGUAGE** English

**TAGS** **community engagement**

**SUMMARY** Renewable energy cooperatives envision and manifest an alternative way of organising within the energy system (and beyond). This paper presents **insights from a strategic dialogue** co-organised with the Dutch national interest group of renewable energy cooperatives “ODE Decentraal”. The researchers used transition management as action research methodology to organise the dialogue to **understand and support the transformative potential of the cooperative energy movement**.



## How to engage your local community

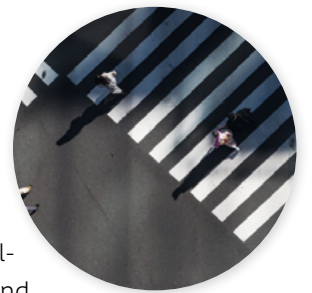
### GUIDE FOR DEVELOPING INSTRUMENTS TO FOSTER ENERGY COMMUNITIES

**AUTHORS** Institute for Energy Diversification and Energy Efficiency (IDAE)  
**PUBLISHED** 2019  
**LANGUAGE** Spanish  
**TAGS** **community engagement**  
**SUMMARY** A **practical guide** for fostering more dynamic energy markets in an urban context, by means of **actively involving citizens and local businesses in the clean energy transition**. The document analyses challenges and opportunities in the **Spanish context**.



### DECENTRALISED COOPERATION TO ACHIEVE THE 2030 AGENDA

**AUTHORS** Conference of Peripheral Maritime Regions (CPMR), PLATFORMA  
**PUBLISHED** 2018  
**LANGUAGES** English, French  
**TAGS** **community engagement**  
**SUMMARY** This document aims to reinforce the new and innovative landscape and alliances for **decentralised cooperation, in the context of the 2030** Agenda and the EU answer to the territorial dimension. It provides insights into the roles of public authorities, businesses, academia and civil society in the energy transition process.



### UNLEASHING THE POWER OF COMMUNITY ENERGY

**AUTHORS** EnergyCities, Friends of the Earth Europe, Greenpeace, REScoop.eu  
**PUBLISHED** 2019  
**LANGUAGE** English, Spanish, French  
**TAGS** **community engagement, law**  
**SUMMARY** This booklet **explains how new EU renewable energy legislation could be used to unleash a wave of fossil-free community energy across Europe**. Bringing examples from across Europe, it shows how the new EU renewable energy directive - which enshrines new rights for communities, local authorities and citizens to generate and sell their own energy - can help to remove barriers to community renewables. It **gives practical steps and resources for action**.



## How to engage your local community

### ROUGH GUIDE TO ENGAGING COMMUNITIES IN ENERGY NETWORK INNOVATION

**AUTHORS** Energy Networks Association, RegenSW

**PUBLISHED** n/a

**LANGUAGE** English

**TAGS** **community engagement**

**SUMMARY** This guide is for communities and distribution network operators. It **explores how DNOs can positively engage local communities in innovation** and how communities can get themselves into the best position to grasp the opportunity.



### SUSTAINABLE ENERGY COMMUNITIES HANDBOOK

**AUTHORS** Sustainable Energy Authority Ireland

**PUBLISHED** 2018

**LANGUAGE** English

**TAGS** **community engagement**

**SUMMARY** Simple and **hands-on guidebook for energy communities in Ireland.**



### ABERDEEN IN TRANSITION JOURNEY TOWARDS 2050

**AUTHORS** Aberdeen City Council

**PUBLISHED** 2013

**LANGUAGE** English

**TAGS** **community engagement**

**SUMMARY** Some interesting points to keep in mind for maintaining high levels of (emotional) energy throughout the transition process. Read-only version, no download possible.



### GUIDE TO COMMUNITY ENERGY STRATEGIC PLANNING

**AUTHORS** US Department of Energy

**PUBLISHED** 2013

**LANGUAGE** English

**TAGS** **community engagement**

**SUMMARY** This guide introduces the Community Energy Strategic Plan (CESP) approach, a **step-by-step process for creating a robust strategic energy plan for your government and community** that can help save money, create local jobs, and improve our national security. Aimed at local governments and community stakeholders, it offers tools and tips to complete each step and **highlights examples from successful planning efforts** around the US.



## Additional Resources

The below research can be useful additional background literature on the clean energy transition on islands. Please note that these resources are all subscription-based and do not represent a direct recommendation from the Clean Energy for EU Islands Secretariat.

Additional open access resources are available via the [Zenodo portal](#).

### [Technical and economic evaluation of the integration of a wind-hydro system in El Hierro island.](#)

**AUTHORS** F. J. Garcia Latorre, J. J. Quintana, I. de la Nuez **PUBLISHED** 2019

### [Optimisation of demand response in electric power systems, a review.](#)

**AUTHOR** R. Jordehi **PUBLISHED** 2019

### [On demand: Can demand response live up to expectations in managing electricity systems?](#)

**AUTHORS** B. Parrish, R. Gross, P. Heptonstall **PUBLISHED** 2019

### [Comparing electricity storage technologies for small insular grids.](#)

**AUTHORS** D. A. Katsaprakakis, E. Dakanali **PUBLISHED** 2018

### [A roadmap for rapid decarbonization.](#)

**AUTHORS** Rockström, Gaffney, Rogelj, et al. **PUBLISHED** 2017

### [Tilos, the first autonomous renewable green island in Mediterranean: A Horizon 2020 project.](#)

**AUTHORS** G. Notton, M.-L. Nivet, F. Motte, C. Voyant, A. Fouilloy, D. Zafirakis **PUBLISHED** 2017

### [Energy Supply Sustainability For Island Nations: A Study on 8 Global Islands.](#)

**AUTHORS** A. Ioannidis, K. J. Chalvatzis **PUBLISHED** 2017

### [Service Region Design for Urban Electric Vehicle Sharing Systems.](#)

**AUTHORS** L. He, H.-Y. Mak, Y. Rong, Z.-J. M. Shen **PUBLISHED** 2017

### [Noninterconnected Island Systems: The Greek Case.](#)

**AUTHOR** N. Hatziargyriou, I. Margaritis, I. Stavropoulou, S. Papathanassiou, A. Dimeas **PUBLISHED** 2017

### [A review of renewable energy utilization in islands.](#)

**AUTHORS** Y. Kuang, Y. Zhang, B. Zhou, C. Li, Y. Cao, L. Li, L. Zeng **PUBLISHED** 2016.

### [Distributed Coordination of Electric Vehicles providing V2G Regulation Services.](#)

**AUTHORS** E. L. Karfopoulos, K. A. Panourgias, N. Hatziargyriou **PUBLISHED** 2016

### [Integration of electric vehicles in smart grid:](#)

### [A review on vehicle to grid technologies and optimization techniques.](#)

**AUTHORS** K. M. Tan, V. K. Ramachandramurthy, J. Y. Yong **PUBLISHED** 2016

## Additional Resources

### [Hybrid power plants in non-interconnected insular systems.](#)

**AUTHOR** D. A. Katsaparakakis **PUBLISHED** 2016

### [Wide scale penetration of renewable electricity in the Greek energy system in view of the European decarbonization targets for 2050.](#)

**AUTHORS** K. Tigas, G. Giannakidis, J. Mantzaris, D. Lalas, N. Sakellaris, C. Nakos, A. T. Alexandridis **PUBLISHED** 2015

### [Renewable energy cooperatives as gatekeepers or facilitators? Recent developments in Germany and a multidisciplinary research agenda.](#)

**AUTHORS** Ö. Yildiz, J. Rommel, S. Debor, L. Holstenkamp, F. Meye, J.R. Müller, J. Radtke, J. Rognl **PUBLISHED** 2015

### [Near zero energy islands in the Mediterranean: Supporting policies and local obstacles.](#)

**AUTHORS** E. R. Sanseverino, R. R. Sanseverino, S. Favuzza, V. Vaccaro **PUBLISHED** 2014

### [Assessment of wave energy in the Canary Islands.](#)

**AUTHORS** M. Gonçalves, P. Martinho, C. G. Soares **PUBLISHED** 2014

### [A review of the environmental and human impacts from wind parks. A case study for the Prefecture of Lasithi, Crete.](#)

**AUTHOR** D. A. Katsaparakakis **PUBLISHED** 2012

### [Investigating the energy autonomy of very small non-interconnected islands: A case study: Agathonisi, Greece.](#)

**AUTHORS** K. Kaldellis, A. Gkikaki, E. Kaldelli, M. Kapsali **PUBLISHED** 2012

### [The social metabolism of a world tourism power. The Balearic case from the bubble to the great crisis.](#)

**AUTHOR** I. Murray **PUBLISHED** 2012

### [Wave energy pattern around the Madeira Islands.](#)

**AUTHORS** E. Rusu, C. G. Soares **PUBLISHED** 2012

### [Wave energy assessments in the Azores islands.](#)

**AUTHORS** L. Rusu, C. G. Soares **PUBLISHED** 2012

### [Optimum sizing of photovoltaic-energy storage systems for autonomous small islands.](#)

**AUTHORA** J. K. Kaldellis, D. Zafirakis, E. Kondili **PUBLISHED** 2010

### [Energy use, CO2 emissions and waste throughout the life cycle of a sample of hotels in the Balearic Islands.](#)

**AUTHORS** B. Rosselló-Batle, A. Moià, A. Cladera, V. Martínez **PUBLISHED** 2010

## Additional Resources

[Cost benefit analysis of a photovoltaic – energy storage electrification solution for remote islands.](#)

**AUTHORS** J. K. Kaldellis, D. Zafirakis, E. L. Kaldelli, K. Kavadias **PUBLISHED** 2009

[Sustainable energy planning by using multi-criteria analysis application in the island of Crete.](#)

**AUTHORS** T. Tsoutsos, M. Drandaki, N. Frantzeskaki, E. Iosifidis, I. Kiosses **PUBLISHED** 2009

[Hydrogen as an energy vector in the islands' energy supply.](#)

**AUTHORS** G. Krajačić, R. Martins, A. Busuttill, N. Duić, M. da Graça Carvalho **PUBLISHED** 2008

[Renewislands – Renewable energy solutions for islands.](#)

**AUTHORS** F. Chen, N. Duic, L. Manuel Alves, M. da Graça Carvalho **PUBLISHED** 2007

[Small island states and territories: sustainable development issues and strategies – challenges for changing islands in a changing world.](#)

**AUTHOR** C. H. Douglas **PUBLISHED** 2006

[Wind powered pumped hydro storage systems, a means of increasing the penetration of renewable energy in the Canary Islands.](#)

**AUTHORS** C. Bueno, J. A. Carta **PUBLISHED** 2006