



RES-Hospitals: Towards zero carbon hospitals with renewable energy systems

Roberto Traversari





Factsheet RES Hospitals (1)

Project partners:

1. ASL AT (Azienda Sanitaria Locale di Asti), Italy - Project Coordinator
2. Optimat, Scotland
3. BIOEF (Basque Foundation for Health Research and Innovation), Spain
4. ECHAA (European Centre for Health Assets and Architecture)
5. TNO, The Netherlands
6. Sucha Beskidzka Hospital, Poland
7. SIAIS (Società Italiana dell' Architettura e dell' Ingegneria per la Sanita), Italy



Factsheet RES Hospitals (2)

Associate Members

1. ARS (Agence Régionale de Santé) - Ile de France, Paris, France
2. Health Facilities Scotland, Glasgow, Scotland
3. National Directorate of Estates, Dublin, Ireland
4. Health Services Management Training Centre-Semmellweis university of Budapest, Hungary



Factsheet RES Hospitals (3)

Country	Participating hospitals (n=17):
Italy	Cardinale Massaia, San Camillo, Sant' Orsola and Versilia
Netherlands	Rijnstate, Gelre and Tweesteden
Spain	Cruces, Galdakao and Gorliz
Poland	Sucha Beskidzka Hospitals, MiŚlenice Hospital, Wadowice Hospital
France	AP-HP Avicenne Hospital
Hungary	Zala country Hospital
Ireland	Saint James Hospital
Scotland	Raigmore Hospital



Goal of the project

- › Focus on non technical barriers to implement RES
- › For the participating hospitals
 - › Investment plan for 50% RES in 2020
 - › Roadmap towards Zero Carbon (scope 2)
- › Dissemination through RES guide for European Hospitals
- › Web side with information for energy managers in hospitals (www.res-hospitals.eu)
 - › Examples of RES in hospitals
 - › Presentations and articles
 - › Etc.



RES Hospitals: Mission and Tasks

- Reduce energy consumption of the 15,000 hospitals in Europe
- Increase their energy self-sufficiency through renewable energy sources
 - thus supporting the EU2020 Energy targets
- Explore the barriers to reducing energy consumption and investing in renewable energy systems: 'Benchmarks'
- Develop 'Best practice case studies'
- Develop 'Roadmaps for zero carbon hospitals and Investment plans for pilot hospitals'
- Develop 'RES Guide for European Hospitals'



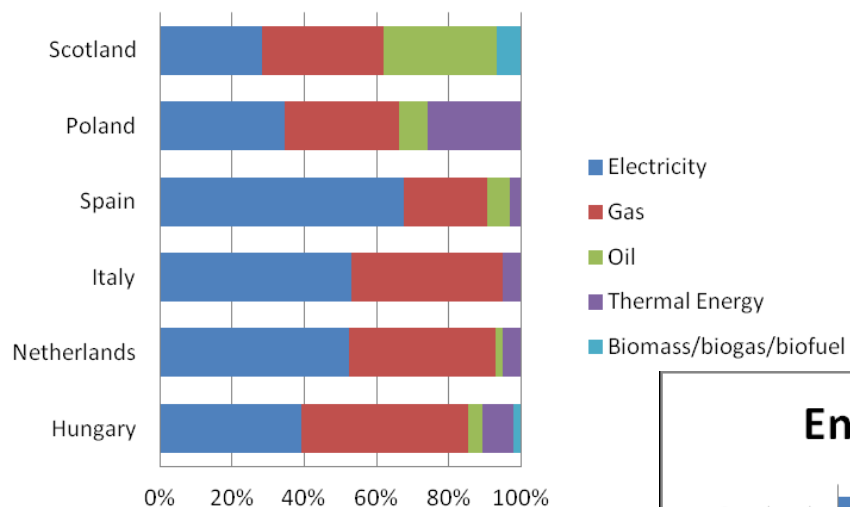
Country surveys

Country	Completed Surveys
Hungary	40
The Netherlands	34
Poland	33
Spain	21
Italy	13
France	12
UK/Scotland	10
Total	163

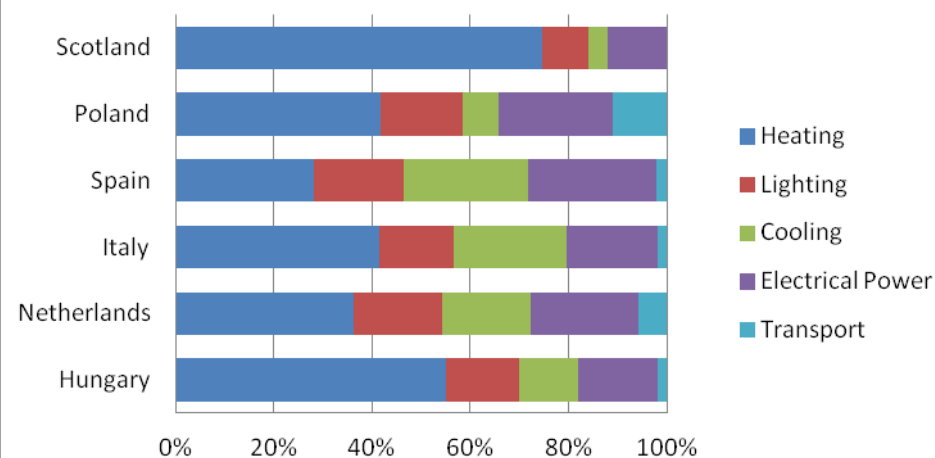


Energy Consumption

Energy Consumption - Source



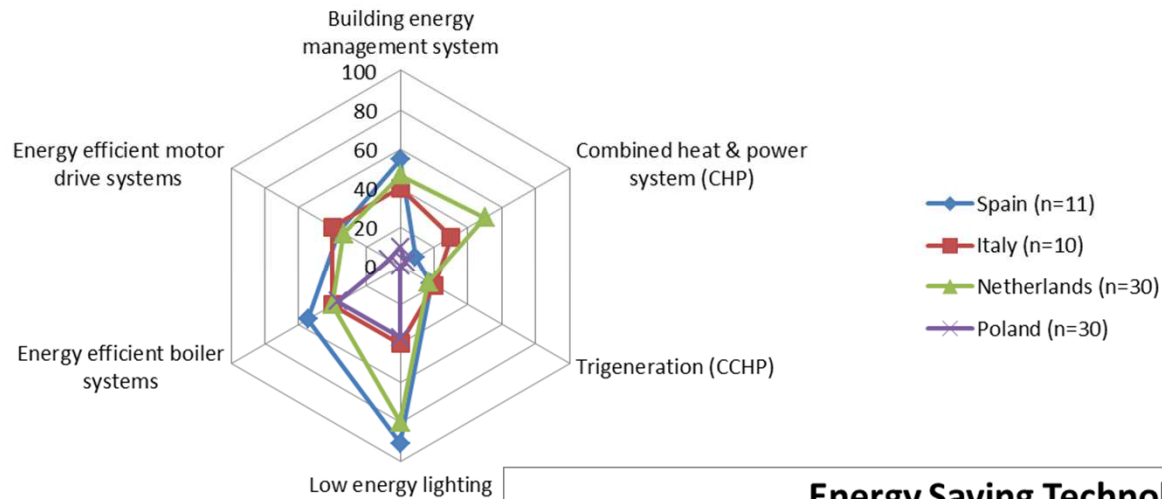
Energy Consumption - Application



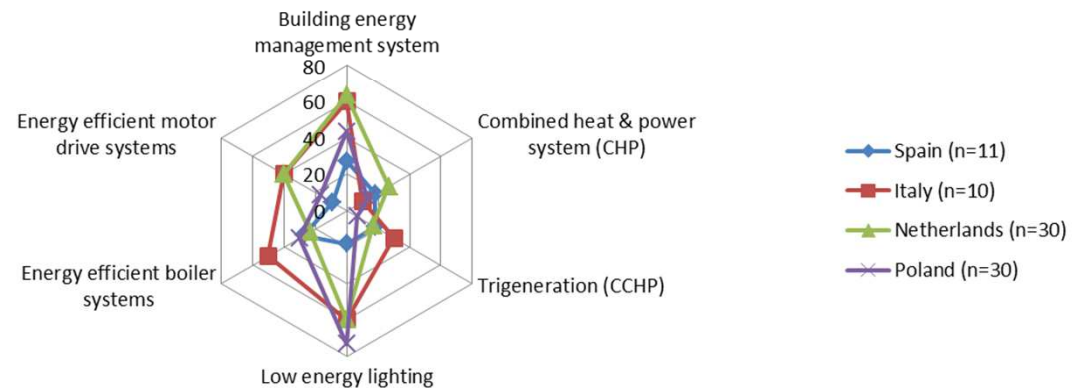


Energy Saving Technologies

Energy Saving Technologies - Past Investment



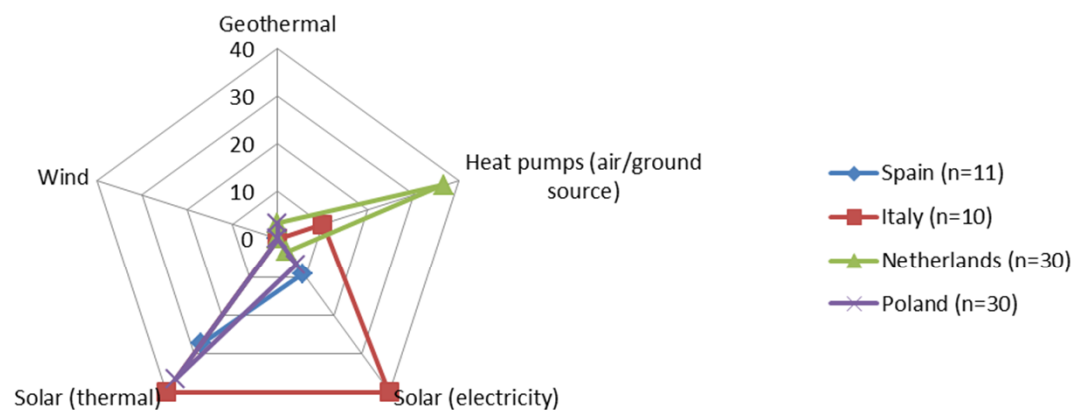
Energy Saving Technologies - Planned Future Investment



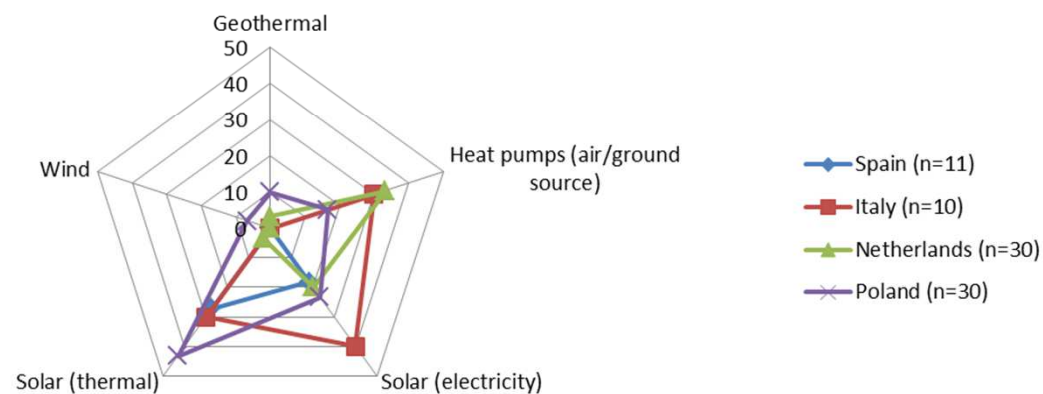


Renewable Energy Production

Renewable Energy Production - Past Investment



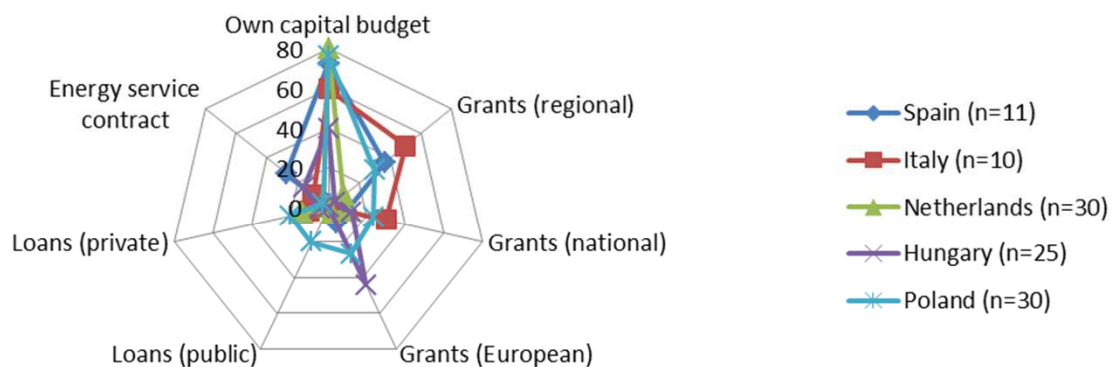
Renewable Energy Production - Planned Future Investment



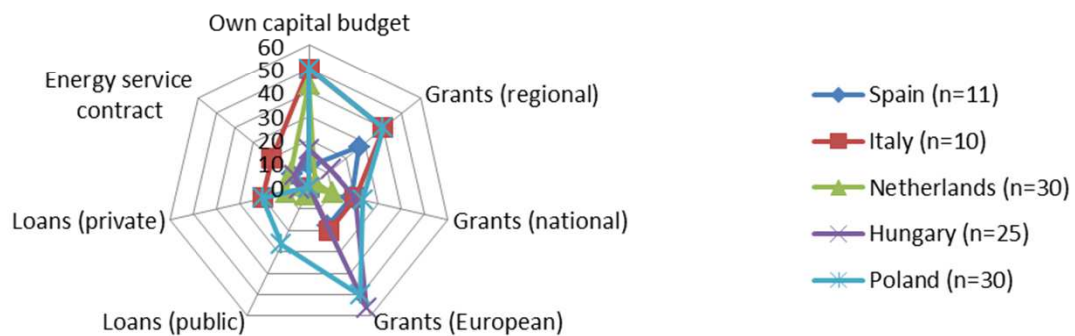


Sources of funding

Sources of Funding for Investment - Past

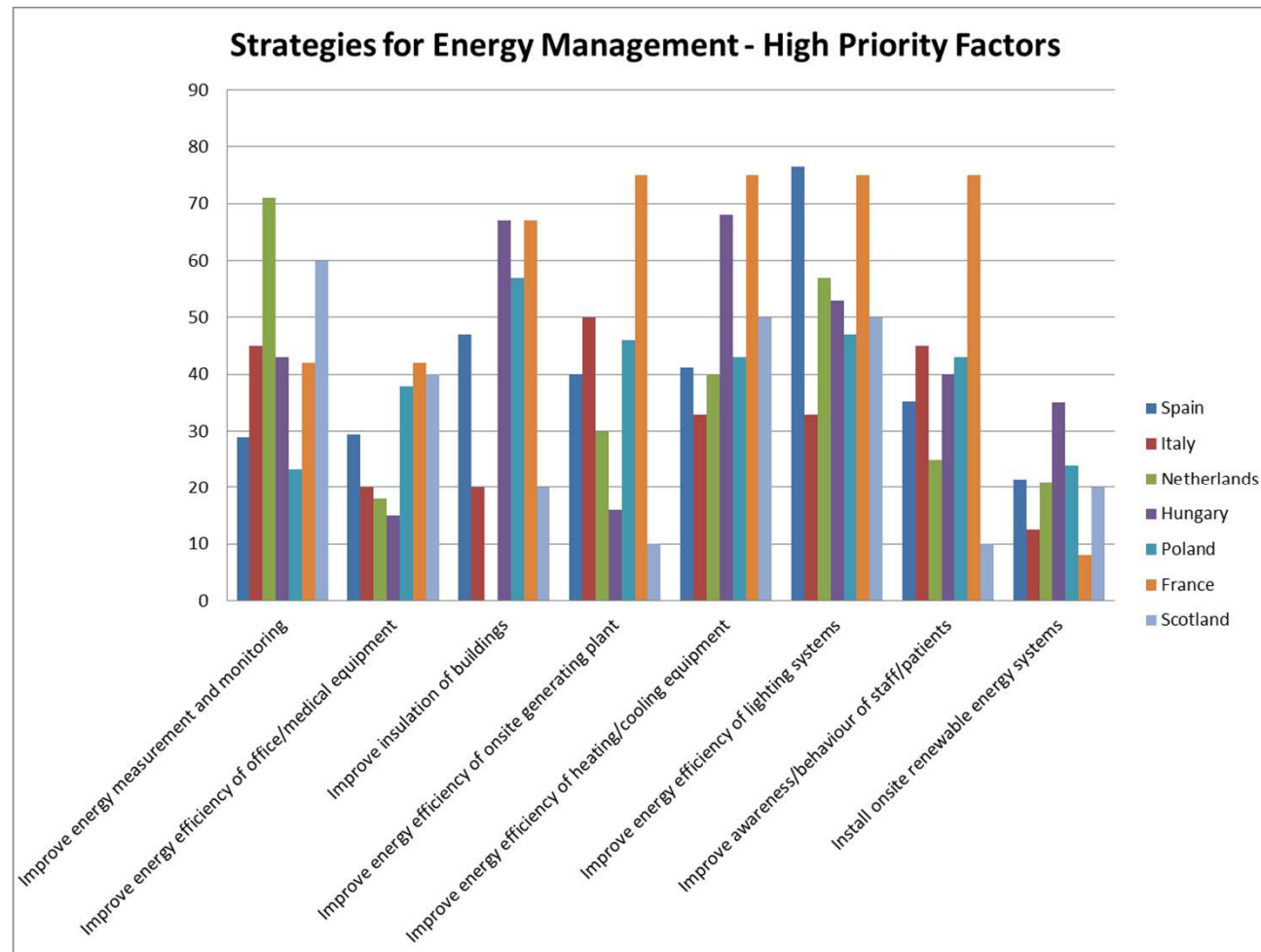


Sources of Funding for Investment - Future



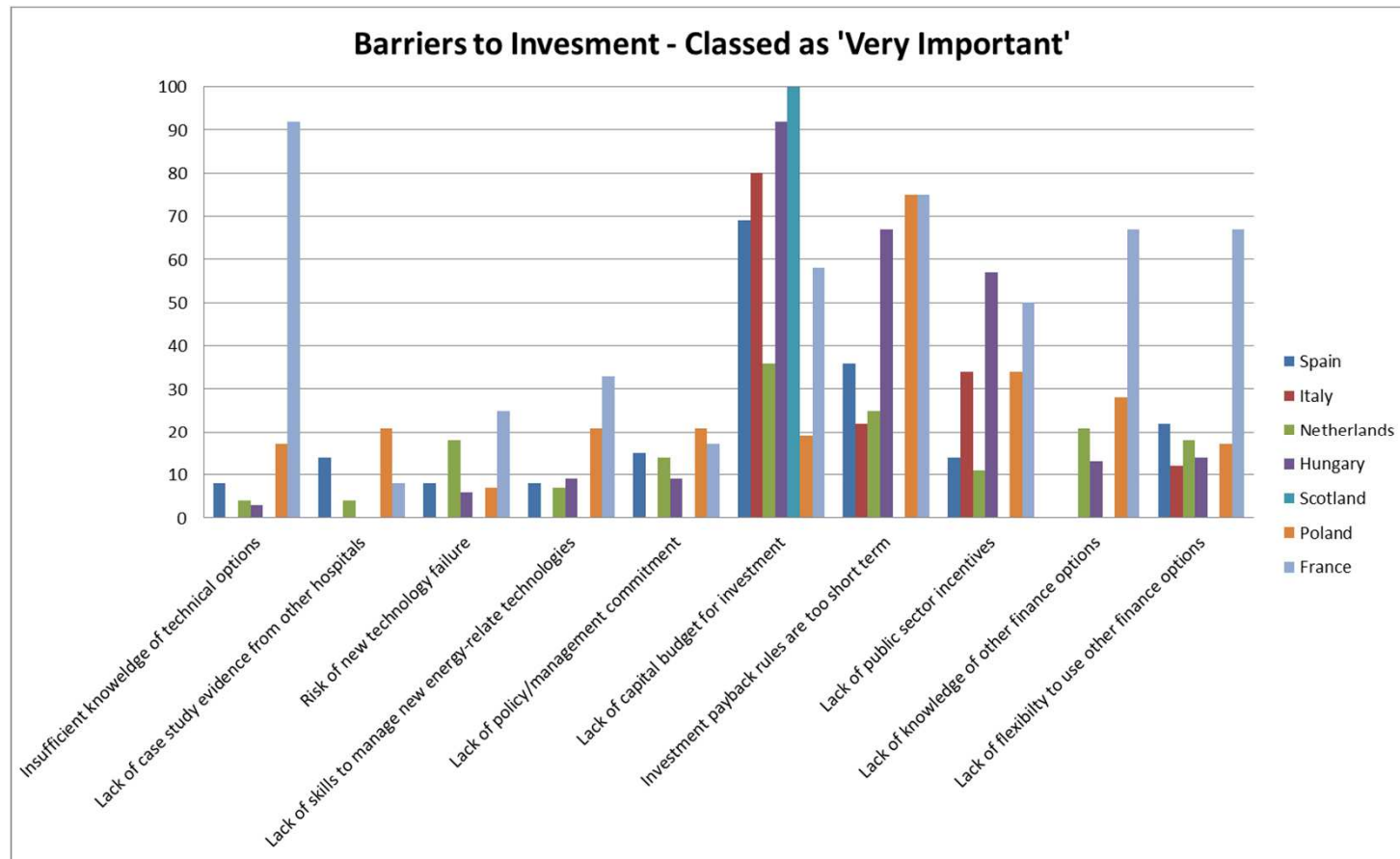


Strategies for Energy Management



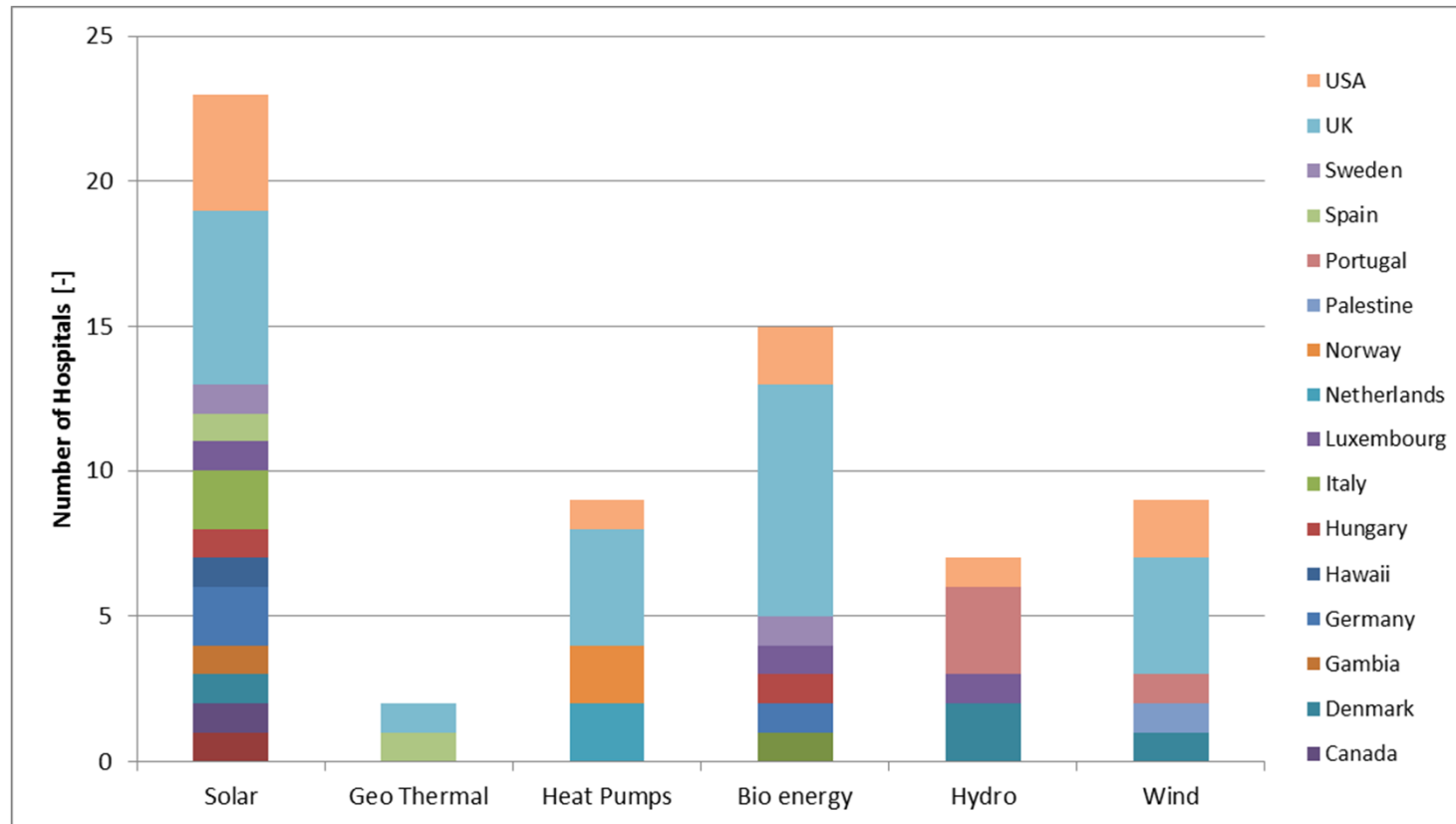


Barriers to invest in RES



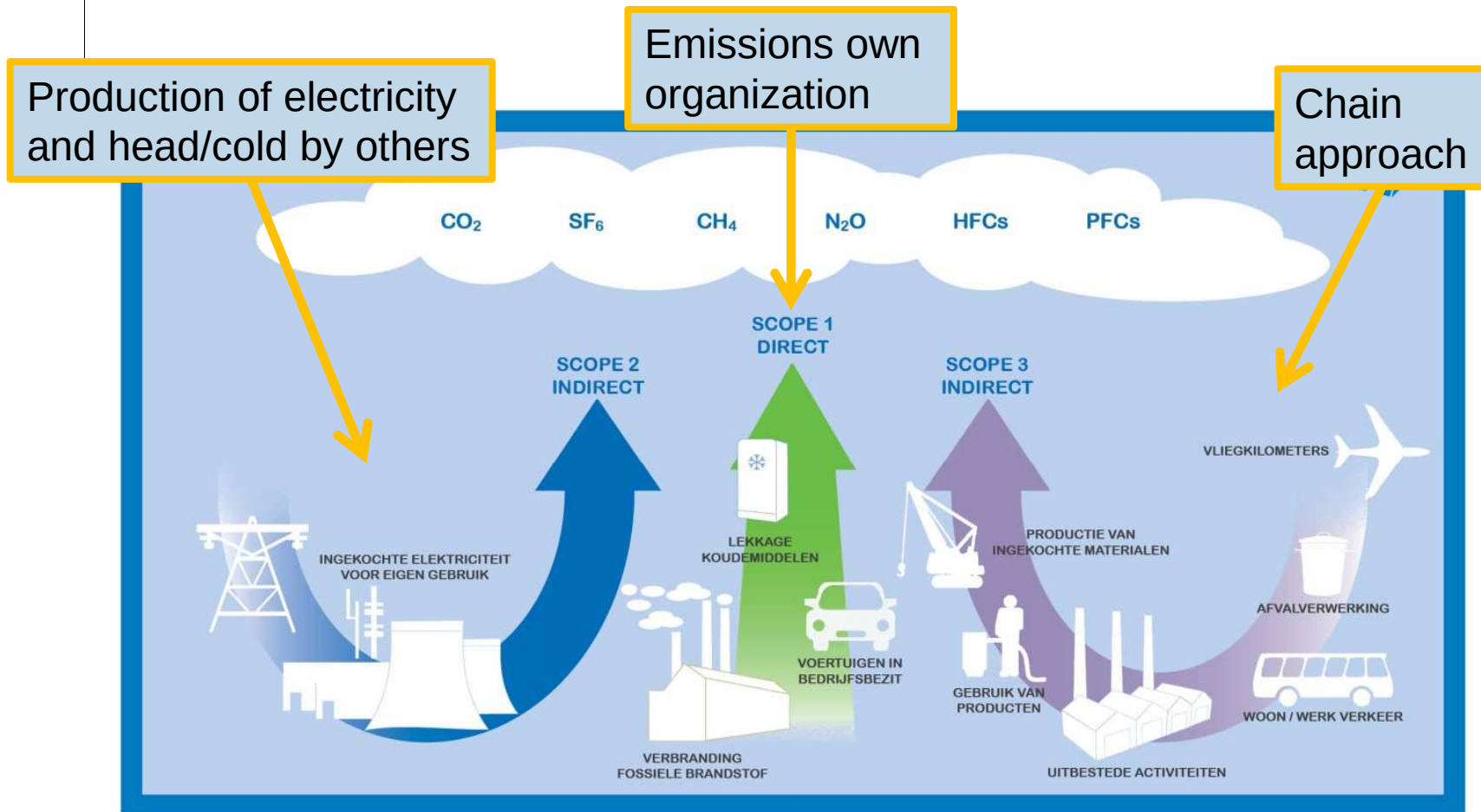


Examples of RES in hospitals



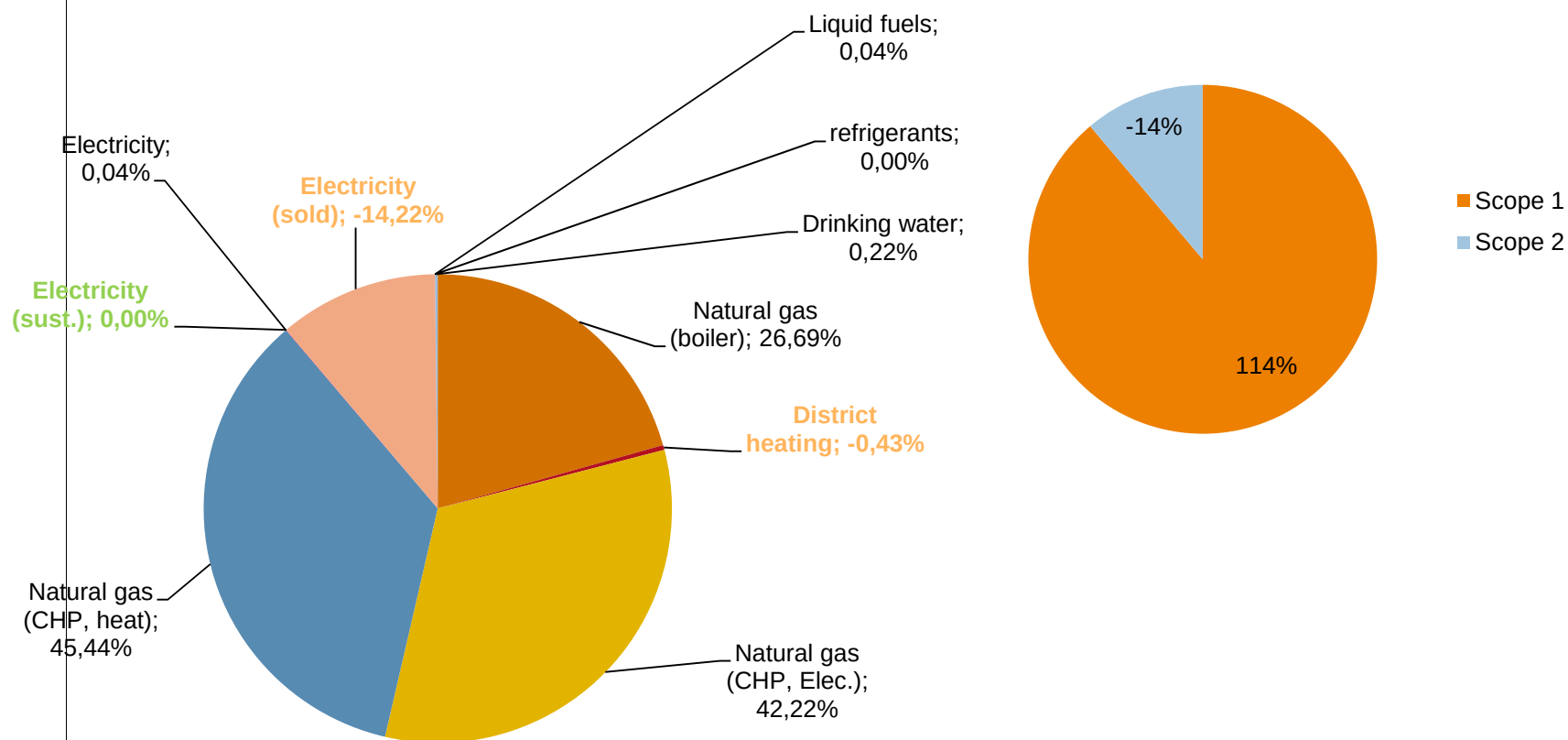


Greenhouse Gas protocol





Carbon footprint (hospital with CHP and export of heat)





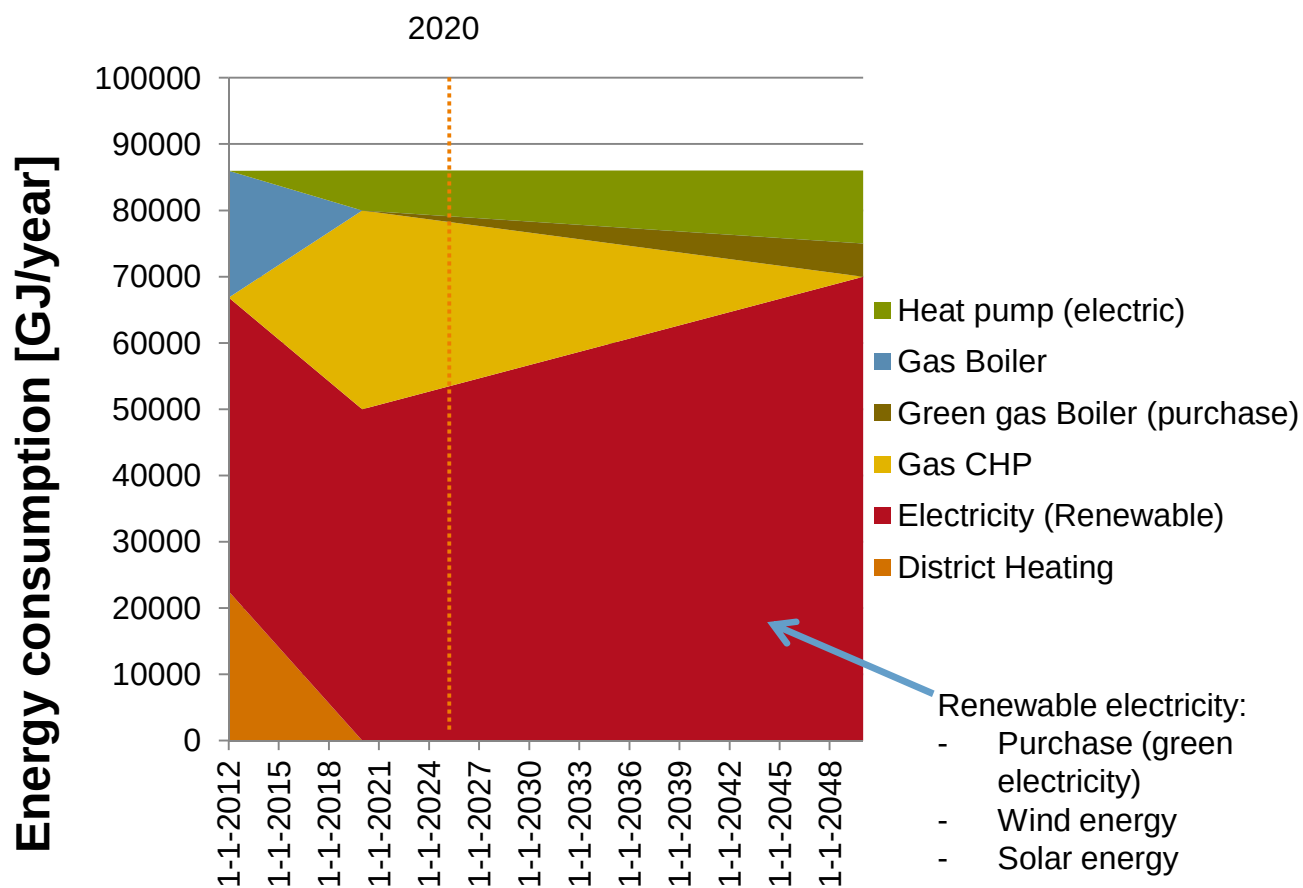
Barriers for RES options

Overview of the different RES options and limitations RES option	Steps to analyse the possibilities			
	Technical limitation	Limitations by legislation	Financial limitation	Other limitation
Wind Turbines	Yes	Yes	Yes	Yes
Solar Thermal Collectors (heat)	No	No	Yes	No
Solar Thermal Collectors (electric power)	No	No	Yes	Yes
Photovoltaic Panels	No	No	Yes	No
Air Source Heat pumps	Yes	No	Yes/no	No
Ground Source Heat pumps	Yes	No	No	No
Water Source Heat pumps	Yes	No	No	Yes
Geothermal (deep underground, depth > 0,5 km)	No	No	No	Yes
Geothermal (deep underground, depth > 4,0 km)	Yes	No	Yes	Yes
Geothermal (Heat and cold storage)	No	Yes	Yes/no	yes
Hydropower Systems	Yes	Yes		n.a.
Wave Power systems	Yes	?		n.a.
Tide Power Systems energy	Yes	?		n.a.
Biomass boilers/Stoves	Yes	Yes	Yes	Yes
Biomass Energy from (waste) digestion	Yes	Yes	Yes	Yes
Biofuels (liquid/gas from digestion)	Yes	Yes	Yes	No
<i>Sustainable district heating and cooling</i>	Yes	?	?	?

Source: <http://www.erec.org/renewable-energy.html> and EU directive on promoting use of energy from renewable sources (2009/28/EC)



Example of a zero carbon roadmap





Investment plans for 50% RES in 2020

Country	# hosp.	Solar	Geo Thermal	Heat Pumps	Bio Energy	Hydro	Wind
Italy	4	3		2	3		
Netherlands	3		2				1
Spain	3	1			3		1
Poland	3	1		1	1		
France	1	1			1		
Hungary	1		1				
Ireland	1						
Scotland	1				1		
<i>Total</i>	<i>16</i>	<i>6</i>	<i>3</i>	<i>3</i>	<i>9</i>		<i>2</i>



Lessons learned up to now:

- › Most effective and sustainable investment is to invest in not using energy (prevent waste of energy)
- › Purchase green (sustainable) energy (if available) can be very effective
- › Different countries have differed financially attractive solutions for RES. This is mainly based on the local situation (tariffs and legislation)
- › Zero carbon roadmap with only one RES options is not feasible



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RES-Hospitals

TNO innovation
for life

<http://www.res-hospitals.eu/>



Welcome

Welcome to the website of the RES-Hospitals project. In recognising the need for all hospitals to focus on reducing energy consumption and to become self-sufficient by generating their own energy from renewable energy sources, this project aims to provide European hospital stakeholders with the tools to make the best energy-related decisions.

We invite you to find out more about who we are, what we do and how we work. More importantly, we encourage you to be actively involved with this organic resource which will allow for the sharing of knowledge and ideas between individuals and groups.

If you have a more specific enquiry not covered here then please don't hesitate to make contact directly [here](#).

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UK Department of Energy and Climate Change Announcements | Renewable energy is powering forward in the UK, according to the 2012 update to the Renewable Energy Roadmap published today by Energy Secretary Edward Davey. [Read More...](#)

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EU Renewable Energy Strategy | The European Commission is preparing a Renewable Energy Strategy.... [Read More...](#)

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Résumé

Roberto Traversari (1967) graduated with distinction from the Hogeschool Utrecht where he studied General Operational Technology. His working life within TNO focuses especially on research and development in the field of air conditioning systems and components. He is also active in energy reduction and sustainable technologies including heat pumps and heat pump systems. After completing his MBA he led the department of cold, heat and fitting techniques at TNO for a long time. Lately he has been active in the physical environment of the hot floor where he considers himself a myth buster. He researches the performance of air conditioning systems with respect to cleanliness, operational costs, sustainability and logistics. He is active in several national and international committees and working groups.