



Ministry of Higher Education  
and Science

Danish Agency for Science  
and Higher Education

# “The Scandinavian Case”

## Nordic Neutron Science Program

Grenoble 15/6 2017

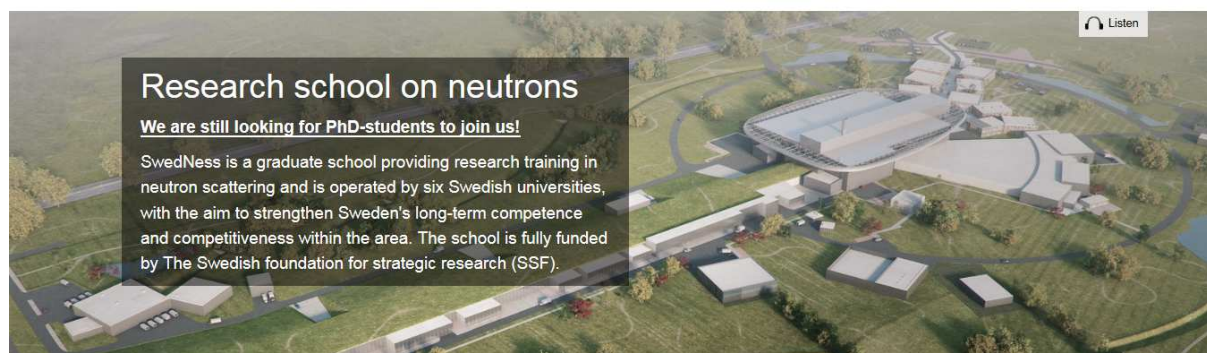
Fredrik Melander

## Project Research Grant Neutron scattering



The aim of a research project grant is to allow researchers the freedom to identify the research idea, methods and implementation steps, and to solve a specific research task within a limited period of time. The aim of this call is to enable for researchers and research groups to participate in the development of instrumentation, for example sample environments or software, or as beamline scientist, so that they can participate as early users/expert users when the European Spallation Source, ESS, starts its early operations.

The Swedish Research Council supports basic research of the highest scientific quality in national competition.



19-06-2017

# Content

- Nordic collaboration (Nordic Council of Ministers/NordForsk)
- Updated snapshot of the Nordic Neutron Community
- Joint Nordic Neutron Science program (2015-19)
  - Networks
  - PhD's
  - Research School
  - Post-doc fellowships
- Danish ESS-strategy



# Nordic region and cooperation



## Nordic region

Five countries and three autonomous areas

Eight time zones, 26 million people, many languages,  
10-12th largest economy globally

## Nordic political cooperation

Nordic Council (1952)  
Cooperation platform for parliamentarians

Nordic Council of Ministers (NCM) (1971)  
Official governmental co-operation body

## Nordic research cooperation

NordForsk founded by NCM (2005)  
To enhance quality, impact and cost-efficiency of Nordic research and  
research infrastructure collaboration



# About NordForsk



# NordForsk

- Provides funding for Nordic cross-border research collaboration
- **Annual budget**
  - From NCM: 120 MDKK/year (16 MEUR)
  - From national research funding organisations: 320 MNOK (2015)
  - varies according to which programs each country participates
- **Funding concept**
  - At least 3 Nordic countries (for the larger programs)
  - Funding collaboration between national research councils, NordForsk and NCM
  - Common pot/"no juste retur"/variable geometry
  - Joint international evaluation of proposal, the best are funded

**Key words:** trust-based collaboration, long history of collaborations on all levels of the research system, close personal relations and networks

# Cross-border research collaboration



## Ongoing research programmes

- Joint Nordic Neutron Science Programme
- Nordic Programme on Health and Welfare
- Education for Tomorrow
- Green Growth Research and Innovation Programme
- Nordic Bioeconomy Programme
- Nordic Societal Security Programme
- Responsible Development of the Arctic
- Gender in the Nordic Research and Innovation Area

# Survey to Nordic universities in 2015

Form of cooperation	Definition	Examples given (No) *
Strategic partnerships	Long-term agreements between two or more universities, including shared strategic aims and different forms of cooperation with named universities.	29
Research infrastructure	Cooperation with a distinct infrastructure component.	35
Nordic centres	Institutions which have the word "Nordic" in their name, are funded by sources from other Nordic countries, host unique research infrastructures which are used by other Nordic actors, or otherwise have a pronounced Nordic profile.	34 (+11 national/international research centres including Nordic partners)
Researcher mobility	Various mobility agreements, including staff and student exchange, but also joint positions and visiting professors.	30
Doctoral education	Various arrangements for educating PhDs, including e.g. cotutelle agreements, double degrees, research schools, research courses.	43
Nordic networks	Activities named "network" or described by respondent as a network activity.	133
Research projects	Researcher-driven, fixed-term cooperation on specific research issues.	158
International cooperation	Various forms of cooperation in which Nordic universities participate with or without a "Nordic focus", including for example 16 networks under the University of the Arctic.	>180
Other	The category of "other" includes e.g. examples in which the form of cooperation is not possible to specify based on the data given, university cooperation in which research is not the focus (e.g. 24 Nordplus networks, 10 Nordic master's programmes and 6 ERASMUS networks), and cooperation between individual researchers which is outside the scope of this study. The category "other" is included in the total number of examples given, but no further analysis has been performed.	<100



# Co-publications: example from Finland

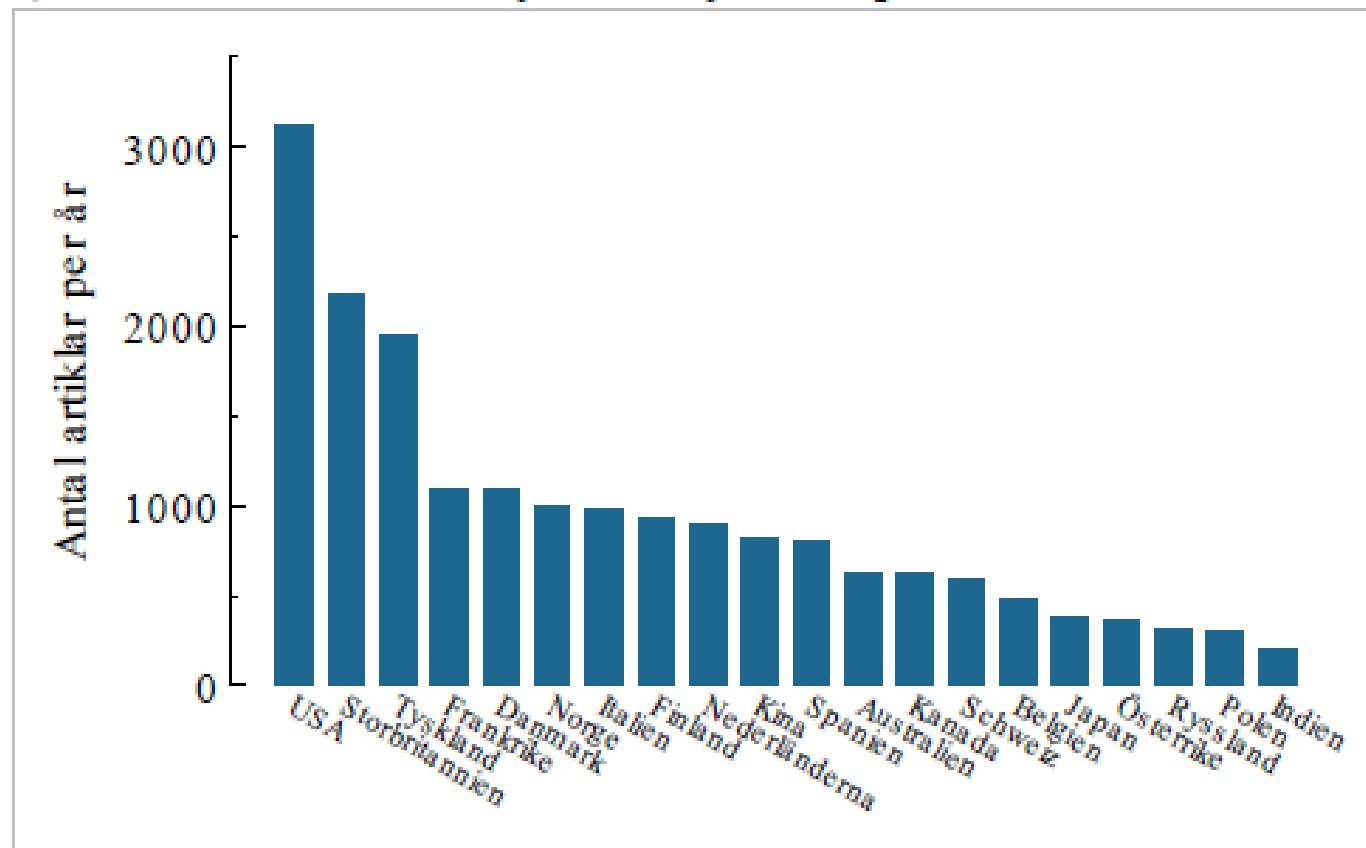
**Table 3.3.** The number of Finnish co-publications with authors from various country groups and their share in international co-authorship.

Number of publications*	1990–1993		1994–1997		1998–2001		2002–2005		2006–2009	
Nordic countries	1,052	24%	1,943	25%	3,100	25%	3,611	25%	4,808	26%
EU15+Switzerland	1,691	38%	3,075	40%	5,675	47%	7,227	50%	9,925	54%
Other European	483	11%	838	11%	1,311	11%	1,425	10%	2,260	12%
Baltic countries	32	1%	249	3%	390	3%	472	3%	659	4%
Russia	415	9%	735	10%	1,109	9%	1,132	8%	1,509	8%
Africa	69	2%	101	1%	140	1%	187	1%	294	2%
Asia	346	8%	746	10%	1,229	10%	1,612	11%	2,638	14%
Australia & Oceania	92	2%	191	2%	403	3%	503	3%	896	5%
North America	1,577	35%	2,816	36%	3,989	33%	4,521	31%	5,590	30%
Central and South America	96	2%	233	3%	280	2%	357	2%	481	3%
1 country group	3,586	81%	5,842	76%	8,775	72%	10,030	70%	11,987	65%
2 country groups	632	14%	1,285	17%	2,406	20%	3,106	22%	4,200	23%
Min. 3 country groups	234	5%	598	8%	983	8%	1,286	9%	2,251	12%
<b>Total</b>	<b>4,452</b>	<b>100%</b>	<b>7,725</b>	<b>100%</b>	<b>12,164</b>	<b>100%</b>	<b>14,422</b>	<b>100%</b>	<b>18,438</b>	<b>100%</b>



# CO-publications: Example from Sweden

## *A) De länder som svenska forskare oftast sampublicerar med*



# Nordic Neutron Science Program: timeline and aim



- Initiated by DK in 2013 as part of our ESS-preparations
- Prepared by a joint nordic working group (analysis, program planning etc) 2013-2015, pre-phase funded by NordForsk
- Approved by NordForsk Board summer 2015
- Original funding partners: NordForsk, DASTI, RCN and Swedish Research Council
- Kick off conference december 2015 during DK presidency in NCM
- New partner: Swedish foundation for strategic research (SSF)
  
- Budget: ~ 65 MNOK
- Program aim: Capacity building: increase the number of neutron users in the Nordic region and increase competence in neutron scattering, with a special focus on young scientists, new user fields and communities.

# Neutron based publications in the Nordics 2006-2016: Stable growth and high quality

Year/ country	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016*	SUM
DK	35 (18)	35 (23)	34 (15)	34 (28)	34 (21)	57 (30)	42 (23)	41 (20)	60 (20)	64 (35)	24 (7)	<b>460 (240)</b>
N	20 (6)	22 (7)	24 (3)	20 (6)	10 (4)	25 (10)	22 (6)	16 (8)	13 (9)	25 (8)	9 (3)	<b>206 (70)</b>
S	54 (13)	51 (16)	50 (23)	45 (24)	51 (30)	60 (21)	59 (28)	58 (31)	63 (28)	82 (30)	50 (21)	<b>623 (265)</b>
FI	4 (2)	10 (5)	11 (2)	7 (1)	7 (5)	10 (5)	11 (4)	6 (3)	12 (6)	11 (3)	5 (2)	<b>94 (38)</b>
IS	1 (0)	1 (0)	0 (0)	0 (0)	0 (0)	1 (0)	0 (0)	1 (1)	2 (2)	0 (0)	0 (0)	<b>6 (3)</b>
ES	2 (0)	2 (0)	1 (0)	0 (0)	0 (0)	1 (0)	8 (3)	7 (7)	3 (2)	15 (13)	5 (2)	<b>44 (27)</b>
LV	2 (0)	1 (0)	4 (0)	3 (0)	2 (0)	2 (0)	1 (0)	2 (1)	0 (0)	3 (0)	0 (0)	<b>20 (1)</b>
LI	1 (0)	2 (0)	1 (0)	4 (0)	4 (1)	1 (0)	1 (0)	3 (2)	0 (0)	2 (0)	0 (0)	<b>19 (3)</b>
double count	6 (3)	9 (3)	12 (2)	8 (5)	13 (6)	28 (11)	15 (5)	16 (8)	17 (5)	29 (12)	9 (4)	<b>162 (64)</b>
<b>SUM</b>	<b>113 (36)</b>	<b>115 (48)</b>	<b>113 (41)</b>	<b>105 (54)</b>	<b>95 (55)</b>	<b>129 (55)</b>	<b>129 (59)</b>	<b>118 (65)</b>	<b>136 (62)</b>	<b>173 (77)</b>	<b>84 (31)</b>	<b>1310 (583)</b>

# Size and composition:

## Few "expert", many young/new users

Author type	Infrequent (2-4)	Frequent (5-9)	Expert (10+)	SUM
Denmark	81	26	11	118
Norway	37	3	3	43
Sweden, excl. ESS	59	18	6	83
Sweden, ESS only	65	11	6	82
Finland	9	2	0	11
Iceland	1	0	0	1
Estonia	7	1	1	9
Latvia	1	0	0	1
Lithuania	3	0	0	3
<b>SUM</b>	<b>263</b>	<b>61</b>	<b>27</b>	<b>351</b>

# Different focus areas...

Category	Hardmatter Structure	Materials Dynamics	Magnetic structure	Magnetic dynamics	Soft matter	Geology, engineering	Biological sciences	Instrumen- tation	SUM
<b>ILL coll.</b>	<b>5a</b>	<b>6+7</b>	<b>5b</b>	<b>4</b>	<b>9</b>	<b>1 (1st part)</b>	<b>8</b>	<b>1 (2nd part)</b>	<b>-</b>
Denmark	70 (28)	37 (17)	75 (58)	82 (61)	71 (40)	5 (2)	49 (20)	71 (14)	<b>460 (240)</b>
Norway	107 (33)	17 (2)	17 (8)	5 (4)	42 (15)	4 (2)	8 (3)	6 (3)	<b>206 (70)</b>
Sweden	176 (62)	58 (39)	79 (41)	26 (22)	124 (51)	20 (8)	65 (25)	75 (17)	<b>623 (265)</b>
Finland	28 (14)	10 (6)	17 (5)	3 (0)	20 (8)	6 (3)	9 (1)	1 (1)	<b>94 (38)</b>
Iceland		3 (3)	2 (0)		1 (0)				<b>6 (3)</b>
Estonia	11 (8)	5 (2)	9 (8)	16 (9)	1 (0)		2 (0)		<b>44 (27)</b>
Latvia	3 (0)	2 (1)	7 (0)			2 (0)		6 (0)	<b>20 (1)</b>
Lithuania	3 (0)	1 (0)	1 (0)	1 (0)	8 (2)	1 (0)	4 (1)		<b>19 (3)</b>
- double count	37 (17)	17 (9)	15 (9)	7 (4)	29 (7)	4 (3)	19 (8)	34 (7)	<b>162 (64)</b>
<b>SUM</b>	<b>361 (128)</b>	<b>116 (61)</b>	<b>192 (111)</b>	<b>126 (92)</b>	<b>238 (109)</b>	<b>34 (12)</b>	<b>118 (42)</b>	<b>125 (28)</b>	<b>1310 (583)</b>

## ...also reflected in use of techniques

Category	Powder diffract.	Single crystal diffract.	Stress-strain diffract	SANS	Reflec-tometry	Inelastic scattering	Imaging	Review, book, old data	Instru-mentation	Theory	SUM
Denmark	50 (17)	44 (34)	1 (0)	83 (45)	19 (12)	97 (54)	7 (5)	26 (11)	56 (7)	77 (55)	460 (240)
Norway	98 (28)	7 (3)	1 (1)	44 (15)	4 (4)	14 (2)	1 (0)	12 (4)	5 (2)	20 (11)	206 (70)
Sweden	177 (56)	19 (10)	12 (4)	94 (42)	82 (35)	69 (39)	10 (6)	40 (17)	54 (8)	66 (48)	623 (265)
Finland	27 (10)	11 (3)	1 (1)	15 (7)	2 (0)	6 (3)	1 (1)	9 (3)	1 (1)	21 (9)	94 (38)
Iceland	2 (0)									4 (3)	6 (3)
Estonia	21 (15)	3 (3)		1 (0)		7 (4)				12 (5)	44 (27)
Latvia	4 (0)			3 (0)	1 (0)	1 (0)	2 (0)	1 (0)	6 (0)	2 (1)	20 (1)
Lithuania	4 (0)		1 (0)	3 (1)	8 (2)	1 (0)		1 (0)		1 (0)	19 (3)
- double count	36 (12)	11 (5)	1 (1)	26 (11)	13 (6)	23 (7)	6 (5)	6 (3)	26 (3)	14 (11)	162 (64)
<b>SUM</b>	<b>347 (114)</b>	<b>73 (48)</b>	<b>15 (5)</b>	<b>217 (99)</b>	<b>103 (47)</b>	<b>172 (95)</b>	<b>15 (7)</b>	<b>83 (32)</b>	<b>96 (15)</b>	<b>189 (121)</b>	<b>1310 (583)</b>

ILL, ISIS and PSI is vital to the whole Nordic community!

Kjeller is important for the norwegian community

~ 25% of Nordic and DK publications are based on experiments at ILL

Source		DK	N	S	FI	IS	ES	LV	LI	Double count	SUM
ESS	S	19	2	18				2		12	29
Kjeller	N	8	82	4	2					14	82
ILL	F	109	21	145	16		10	4	3	41	267
ISIS	UK	33	21	122	8	2	3		3	20	172
PSI	CH	111	16	32	2		11	1	1	23	151
FRM2	D	19	4	20	3				3	5	44
HZB	D	21	4	19	2		3	7		7	49
LLB	F	4	3	13	9		1	3	1	2	32
BNC	H	5	2	2	3						12
Delft	NL	4		6						3	7
Rez	CZ	1	1	7	1					1	9
Dubna	RUS		5	3	2		3	3		1	15
Zarechnyi	RUS			3							3
PNPI	RUS				1						1
(GKSS)	(D)	7	7	17	1				1	6	27
(Studsvik)	(S)	3	5	64						7	65
(Jülich)	(D)	2	1	6	2						11
(DR3)	(DK)	3		1						1	3
SNS	US	13	2	13	1		1			3	27
NIST	US	18	5	18			2		5	1	47
HFIR	US	7		3							10
LANL	US	6	3	9	5					2	21
MURR	US	2									2
Chalk River	CAN	2									2
(IPNS)	(US)	4		1	2						7
J-PARC	JAP			1	1						2
KEK	JAP	2			1						3
ANSTO	AUS	7	1	9	1					1	17
Dhruva	IND			3							3
IRR-1	ISR			2							2
<b>SUM</b>	-	<b>410</b>	<b>185</b>	<b>541</b>	<b>63</b>	<b>2</b>	<b>34</b>	<b>20</b>	<b>17</b>	<b>148</b>	<b>1122</b>



# Organization



- All call prepared by a program committee (PC) with representatives from all funding agencies
- Facilitated and published by NordForsk
- All proposals evaluated by international peer-review panel
- Funding decision prepared by PC and final decision taken by the Board of NordForsk





## NNSP (so far...)

42 MNOK to research projects to support PhD's 2017-2020 (~65 MNOK incl. Co-funding)

2 MNOK to Networks

8 MNOK to NNSP School: 2017-2020 (Ca 13 MNOK incl. Co-funding)



# NNSP, participants

31 Universities; 2 Facilities; 49 departments/institutes;

- Denmark; 7 institutions; 14 departments
- Norway; 6 institutions; 9 departments
- Sweden; 9 institutions; 10 departments
- Finland; 7 institutions; 9 departments
- Iceland; 1 institution; 1 department
  
- Estonia; 2 institutions; 3 departments
- Latvia; 2 institutions; 2 departments
- Lithuania; 1 institution; 1 department

• The program includes 200+ researchers



# NNSP, science projects for PhD's

Granted November 2016

Each project is 7 MNOK and contains partners from DK, N, S

- Magnetic frustration under pressure, Patrik Helenius (KTH)
- Functional hydrides, Torben Jensen (AU)
- Neutrons for heat storage, Didier Blanchard (DTU)
- Antimicrobial peptides, Reidar Lund (UiO)
- Structure of membrane proteins in solution, Marie Skepö (LU)
- Water selectivity of aquaporins, Karin Lindkvist (LU)

In total, around 20 new PhD's in the Nordics

# The NNSP School

## (Project leader: Kim Lefmann)

This project contains three key elements:

1. A **coordinating umbrella** activity with contact to other relevant national, regional, and European activities. This activity will include attraction of new user groups and industry within the region and will serve as a common collaboration platform, also reaching out to other current initiatives with similar goals.
2. A **Nordic/Baltic Neutron School** with a broad scope of teaching and training activities to educate and train Ph.D. students and post docs from both experienced and inexperienced user groups.
3. **Topical networks**, connecting research communities across the region to build critical mass in specialized fields and areas. These networks will play an important role both in the specialized teaching and in attracting new neutron user groups from academia and industry.

The activities will be open for all academic and industrial research groups from all five Nordic Countries, as well as the three Baltic countries.

# New call recently published

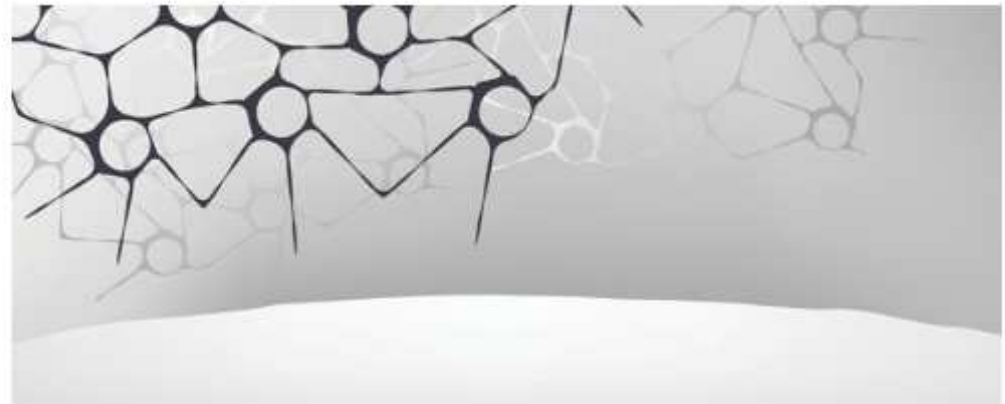
The main purpose of the call is to promote long-term capacity-building, international mobility and excellence by supporting the next generation of Nordic neutron users.

Open call:

- ~ 5 new Post doc positions at international facilities
- New or established user groups
- Thematically open
- All techniques (instr development, methods, data etc)
- Focus on internationally leading facilities like ILL



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## Call for Proposals: International Postdoctoral Research Fellowships within the Nordic Neutron Science Programme

28.03.2017

**NordForsk announces 10 million NOK for international postdoctoral research fellowships within the Nordic Neutron Science Programme. Apply by 30 August 2017.**

The European Spallation Source (ESS) facility is presently under construction in Lund, Sweden, and the NordForsk programme on neutron science aims to help build Nordic capacity and expertise in order to take advantage of the new opportunities ESS will present.

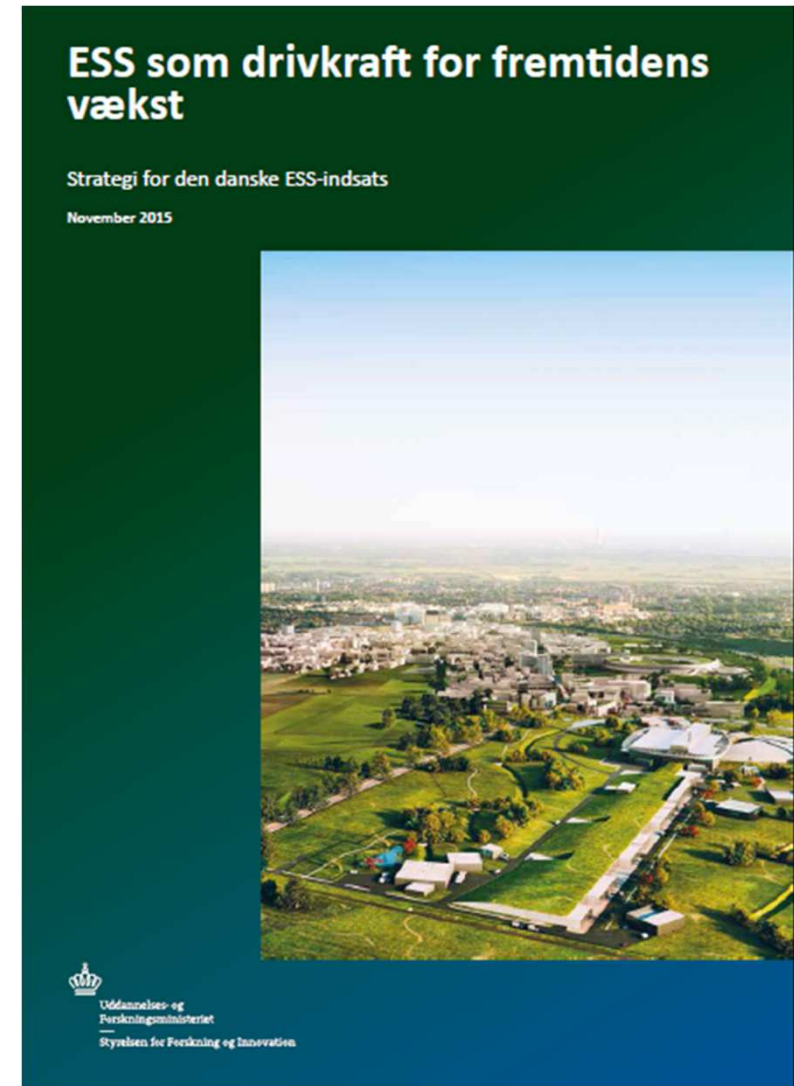
# National ESS- Strategy

In 2014, The Minister for Higher Education and Science appointed a strategy group with representatives from the major universities, industry, Copenhagen municipality and Capital Region Copenhagen and other key players to jointly develop a long-term national ESS-strategy

**Key question: *How can we realize the full potentials embedded in Denmark co-hosting the ESS?***

The Strategy was handed over to the Minister in November 2015

**We are, in addition, currently working on a new strategy for use of x-ray, neutron and FEL facilities with 10 year perspective.**



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## Capacity building

- 3 times as many neutron users in 2025  
(100 ➡ 300)

## Lighthouse environments

- 3-5 internationally recognized lighthouses (based on excellence) in strategic areas

## Bridge-building to ESS

- 30 ESS-staff and 20 ESS PhD's linked to DK-universities
- Involvement in ESS instrument-program etc

## Involving Danish business

- Industry portals,
- Efficient access for companies, Industrial User Office at ESS etc



## High-tech suppliers ("Big Science")

- Regional cluster of high-tech suppliers:  
Goal: 750 MDKK in orders until 2025



## Anchoring ESS in Denmark

- Securing flexible mobility in the region
- HR-collaborations with ESS
- Branding, attracting industries, etc

