



## **Capacity building for successful District Heating**

Torben Kirkegaard, Chief Education Officer,

Energy and Climate Academy

# Why do we send our children to school ?

To learn about life, facts, our past and our future..

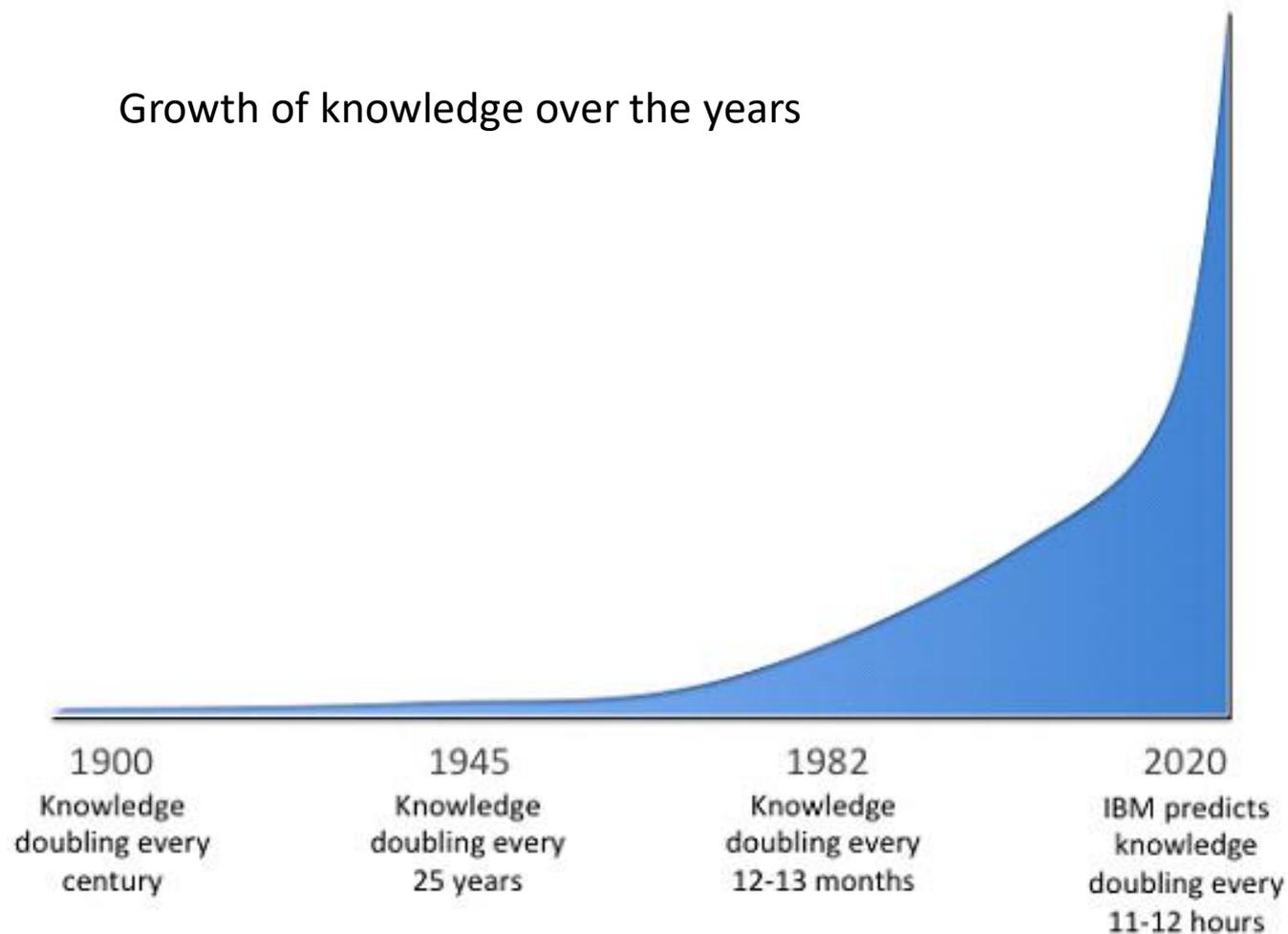
Without knowledge - no progres

We use huge amounts of money every year on education from the young children to university level.

At the same time we have a tendency to stop our education when we have reached a certain level of knowledge and got a job.

.. And this is not the right way...

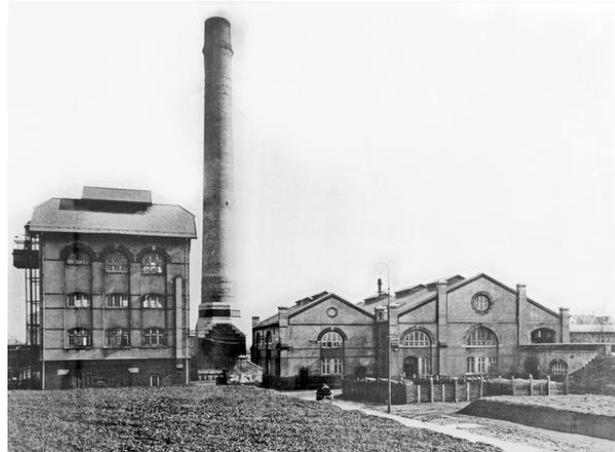
## Growth of knowledge over the years



To keep up with our professional job and develop ourselves, we must update and expand our knowledge and experience every day.



H.C Andersen, 1805



First District Heating in Denmark, 1903



Victor Axelsen,  
World Best 2022

# Even when you come from a small country you can make great achievements

In Denmark we have developed District Heating for more than 100 years.

We have failed many times, but we learned from our mistakes and through the years we have gained knowledge and experience.

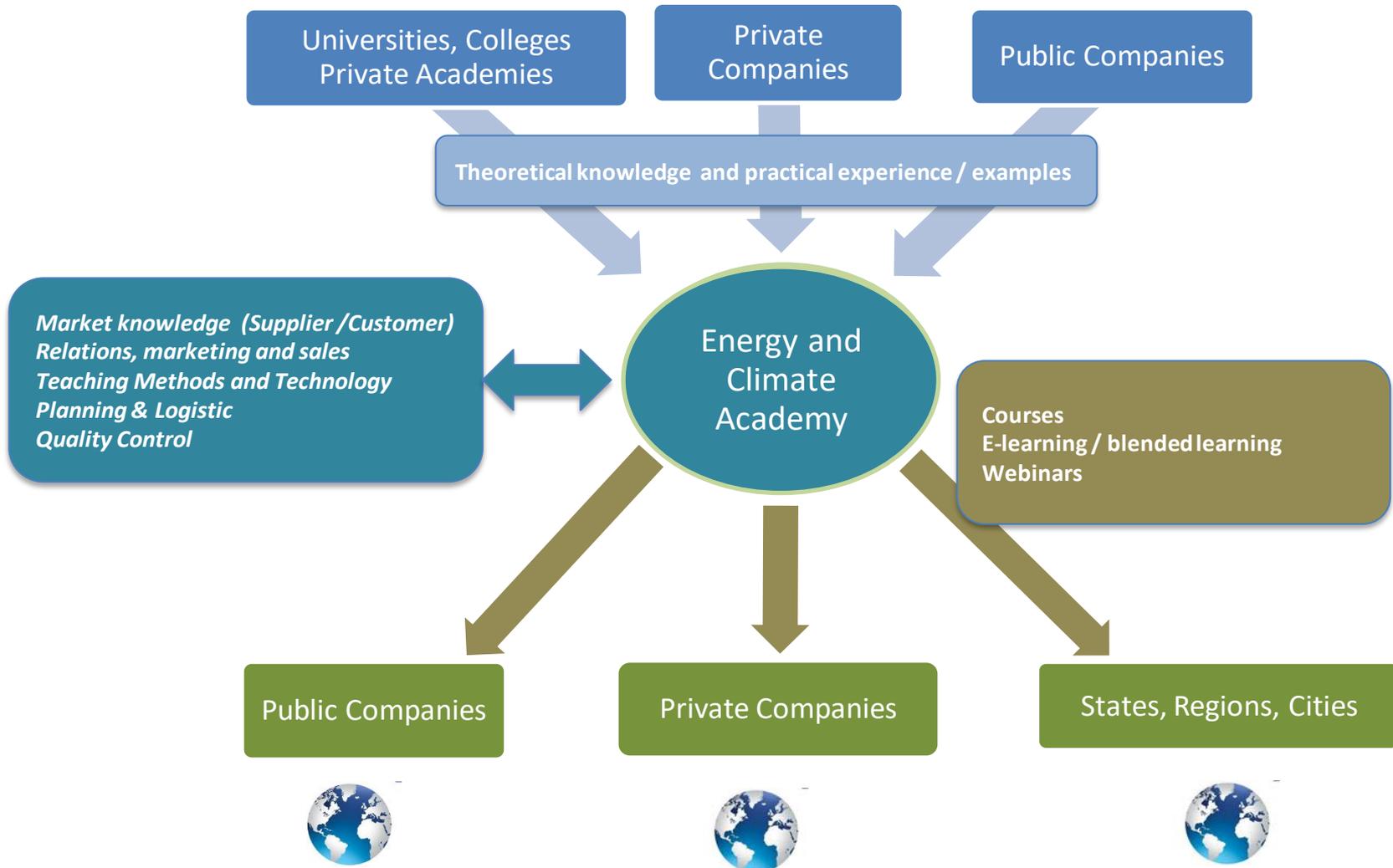
Today we have some of the most efficient DH systems in the world and we are happy to share our knowledge and experience with you.

Energy and Climate Academy offers short, post-graduate courses for managers, engineers, specialists, civil servants and others.

At our courses we always combine theory with experience and virtual site visits

At Energy and Climate Academy we collaborate with the best experts and executives from leading universities, companies and utilities.

## World Class lecturers and practical experience



20 hours of compressed impartial On-line and On-demand training course

## ***District Heating: Energy Efficiency for Urban Areas***

Theme	Lecturer
<p><b>Introduction and welcome webinar - 60 min live webinar</b></p> <p>Introduction to District heating. Morten will give a presentation on the district heating developments until today with a focus on the situation in Denmark and a look out to other countries. Introduction to: From 1st generation to modern 4th generation, Role of cities and national government, The Danish business &amp; ownership model, Economy. In short it is an introduction to DH in Denmark with a bit of international perspective and how DH plays an imperative role in the green transition.</p> <p>How to benefit most from this course – how to get most value Questions, comments and guidance</p>	<p><b>Morten Jordt Duedahl</b>, Business Development Manager, DBDH <a href="#">LinkedIn Profile</a> <i>Morten has worked in promoting district heating internationally for many years. His focus today is primarily Western Europe. He holds a substantial knowledge about economy, business models and general promotion of DH.</i></p> <p><b>Milan Jungic</b>, Product Portfolio Management Director at Danfoss <a href="#">LinkedIn Profile</a></p> <p><b>Torben Kirkegaard</b>, Founder and Chief Education Officer of Energy and Climate Academy <a href="#">LinkedIn Profile</a></p>
<p><b>Lesson A - Planning and development</b></p> <p>Proper planning is the key to a well-functioning DH system – no matter if it is large scale, city wide systems or you plan for a smaller community project.</p> <p>Catarina will share her experience on how to involve important stakeholders, what are the requirements for making good planning and give some hints to how to get started. In other words, how to bring the idea from some initial discussion to something doable that can be built.</p>	<p><b>Jacob Sten Petersen</b>, <a href="#">LinkedIn Profile</a></p> <p><i>Business manager Energy &amp; Industry at MOE A/S, Zealand division.</i></p> <p><i>Project manager, mechanical Engineer with responsibility for energy consumption, emission and energy saving projects.</i></p>
<p><b>Lesson B - How to produce District Heating today and in the future</b></p> <p>The fuel for district heating systems has developed a lot over the years – starting with waste incineration, to bunker oil and today modern district heating systems is a vital part of the rush for sustainability.</p> <p>This video will cover areas such as classic fuel sources, sustainability, energy sources of the future, integration of multiple sources and not least demonstrate the importance of flexibility and a strong focus on economy.</p> <p style="text-align: center;">~ 7 ~</p>	<p><b>Lars Gullev</b>, Managing Director at VEKS (Transmission Company) <a href="#">LinkedIn Profile</a> <i>Extensive experience in management training for managers in the Bulgarian, Hungarian, Estonian, Russian and Chinese district heating sector.</i></p> <p><i>Participated with presentation of papers at district heating conferences, symposiums etc. in more than 20 countries</i></p>

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<p><b>Lesson C - Modern efficient piping systems</b></p> <p>The core asset in a district heating system is the pipe network. It must last for decades; it must be ready for all future requirements and at the same time it takes up a large portion of the budget. It cannot be stressed how important the right choice of pipe systems is.</p> <p>Here we will focus on modern district heating pipes and what they can do, how to protect the pipe systems from corrosion and leakages with alarm systems. Heat loss is an important part of a pipe system and will be discussed and finally the impact of low temperature system will be highlighted.</p>	<p><b>Bjarne K. Jepsen</b>, Senior Engineer, LOGSTOR. <a href="#">LinkedIn Profile</a></p> <p><i>28 years of experience and teaching in pre-insulated DH pipes.</i></p> <p>Peter Jorsal, Product &amp; Academy Manager, LOGSTOR <a href="#">LinkedIn profile</a></p>
<p><b>Lesson D – Pumps &amp; controls</b></p> <p>Some of the issues + many more in this lesson:</p> <p>Centrifugal pumps – moving water</p> <p>Why pumps? why they are important? And Basic Pump parameters Matching Design flow and pressure – duty point</p> <p>Pump performance control - Dealing with variable demand - Variable heat demand</p> <p>Adjusting pump performance</p> <p>Temp. optimization using pumps – practical use of control mode Why optimising temperatures? Mixing - temp control mode</p> <p>Pressure boosting - pressure control mode</p>	<p><b>Marek Rykiel</b>, Senior Application Engineer, Grundfos <a href="#">LinkedIn Profile</a></p> <p><i>15 years of experience in the pump industry.</i></p>
<p><b>Lesson E - Heat Pumps</b></p> <ul style="list-style-type: none"> <li>• Intro and Background</li> <li>• Working Principles</li> <li>• Applications</li> <li>• Examples ~ 8</li> <li>• Optimisation ~</li> </ul>	<p><b>Bjarke Paaske</b>, Project Manager IESenergy <a href="#">LinkedIn Profile</a></p>

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# ***District Heating: Energy Efficiency for Urban Areas***

### **Lesson F - End users – the customers**

The end user – the customer – the citizen – many terms for the same. It is the persons and institutions who are actually benefitting from the system and at the same time must pay the bill for the heat and the heating system – the key person to keep happy.

The meter, well-functioning metering and billing systems together with reliable end user installations is key to making the system function year after year and not least to optimize the system on an on-going basis. With the data from meters modern DH companies today ensure optimization of installations and thus help save money for the customer, make the right investment decision and save energy. Today we also talk about heat as a service.

**Anders Falkeborg**, Product Manager, Kamstrup

[LinkedIn Profile](#)

*Anders has been working as a product manager for heat and cooling meters at the Danish company Kamstrup A/S since 2015. Prior to joining Kamstrup A/S Anders worked as a service technician and has a background as both electrician and electronics engineer.*

### **Lesson G - District Heating in the future**

District heating has been around for more than 100 years but is still demonstrating its ability to be competitive to alternative solutions and live up to the changed expectation – from low cost heat go an active player in the green transition. Will this continue?

In the future we expect an increased integration with the electricity system and other fluctuating renewables. There will be increased demand for energy efficiency. Nis will share how modern, 4th generation District Heating System has proven to be the answer also to today's carbon agenda.

**Nis Bertelsen**, PHD fellow, Aalborg University

[LinkedIn Profile](#)

*His research focus is on the uptake of renewables within European heat markets, analysing and modelling technical potentials, market structures and regulative environments to promote low-carbon energy systems*

### **Lesson H - Business models stake holder engagement**

Technical solution has been in the forefront for the development of modern district heating solutions and it still is. But what many cities and communities struggle with today is much more how to get their economic model fitted to deliver the many results that are expected e.g. low heat prices, green transition, job creation, low risk.

In this video different ownership models will be looked at and it will be shown how they deliver different results. In principle there are two models – the commercial ESCO solutions and a municipal lead district heating company – how do they function and what results will each of them deliver? Here we also take a look at consumer owned systems (Co-Op's) and how to develop city wide systems in contrary to smaller standalone systems.

**Morten Jordt Duedahl**, DBDH

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## ***District Heating: Energy Efficiency for Urban Areas***

### **Lesson I – Geothermal Energy and District Heating**

In more than 99% of the volume of the earth, the temperature is over 1,000 ° C. The energy content of the Earth's hot interior is thus several hundred million times the energy content of the Earth's total coal, oil, and gas reserves. The geothermal potential in many countries is great, due to favourable geological conditions, and district heating companies have yet to utilize this energy resource.

Geothermal projects are, however, technically challenging, and district heating companies typically do not have the competences to develop geothermal projects.

This lesson will cover the latest news and also give a thorough introduction to the subject.

**Lars Andersen**, GEOOP

[LinkedIn Profile](#)

*Founder of GEOOP (Geothermal Operating Company) in 2016. Experienced Chief Executive Officer with a demonstrated history of working in the oil & energy industry. Strong business development professional skilled in Drilling, Workover, Gas, Petroleum, and Geothermal Energy.*

### **Lesson J – PtX and District Heating (under development)**

Power-to-X (PtX) is closely tied to the green transition in the transport of goods by road, sea and air, as well as the production of carbon-neutral fertiliser for agriculture and carbon-neutral forms of products such as steel, plastic and chemical products.

There is no doubt that district heating has an important part to play in a PtX strategy. Recycling heat from PtX can help to supply people with cheaper green-heating, but there are also significant advantages to society in terms of the value that PtX and district heating can generate in other sectors. Selling waste heat from PtX processes for district heating could improve the competitiveness of PtX plants.

~ 10

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**Hanne Kortegaard**, Project Development Manager, DBDH

PhD and expert in sector integration and system analyses centered on green electricity and heating systems. Long-time experience in developing methods and models to answer new questions.

[LinkedIn Profile](#)

**Jørgen Nielsen**, CEO of TVIS Transmission Net (123 km)

Executive manager in Denmark, Sweden and Finland within the energy sector during the last 11 years. Comprehensive experience from boards, advisory boards and committees. Manager in the consultant and energy sector for 15 years. Project manager with experience from Russia, Eastern Europe, Asia, Euro

[LinkedIn Profile](#)

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<p><b>Lesson K – Hydrogen is hot - very hot! Podcast</b> Morten Jordt Duedahl is discussing the role of hydrogen with two experts</p>	<p><b>Jørgen Nielsen, CEO of TVIS Transmission Net (123 km)</b> Executive manager in Denmark, Sweden and Finland within the energy sector during the last 11 years. Comprehensive experience from boards, advisory boards and committees. <b>Oddgeir Gudmundsson, Director Danfoss</b> Experienced Director with a demonstrated history of working in the mechanical or industrial engineering industry. Skilled in Analytics, Energy Efficiency, Project Management, and Matlab. Strong professional with a Doctor of Philosophy (PhD) focused in Mechanical and Industrial Engineering from University of Iceland. <a href="#">LinkedIn Profile</a></p>
<p><b>Lesson L. Site visit to Aalborg District Heating Company</b> Enjoy a guided video tour to Aalborg district heating company where we will visit the control room, a street where pipes are being laid, an industry supplying surplus heat, a family having a district heating installation and learn from the discussions between Morten and Jesper. Our guides today are Jesper, manager of Aalborg District Heating Company (the 4<sup>th</sup> largest city in Denmark with widespread DH) and Morten from DBDH – both equipped with helmet-cams. Jesper will share how he plans for the future, how he includes new heat sources, how new areas will be added and also shed light on the practical daily operation and work in a DH company. Look forward to a free-styling, helmet-cam driven tour of a district heating company</p>	<p><b>Jesper Møller Larsen, Aalborg DH Company</b> <a href="#">LinkedIn Profile</a> <i>Managing director Aalborg Energy group: Aalborg Heat A/S, Aalborg Gas, Aalborg District Cooling A/S, Aalborg Energycenter A/S.</i></p> <p><b>Morten Jordt Duedahl, DBDH</b></p>
<p><b>Lesson M: Site Visits and interviews:</b> 15 short videos where different cities present different initiatives together with companies and customers ~ 11 ~</p>	<p><b>Various presenters</b></p>

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### **Wrap up and Q&A Webinar - 60 Min Live webinar**

Take part in a live Q & A session where questions to all the videos and directly to DH practitioner Jesper from Aalborg can be asked. Jesper, Morten and Torben will be your host today. Here we will also share ideas for further readings invite you to come to Denmark for a real visit to a DH system.

**Jesper Møller Larsen**, Aalborg DH Company

**Morten Jordt Duedahl**, DBDH

**Torben Kirkegaard**, ECA

## Video about our learning platform and courses

<https://www.youtube.com/watch?v=PrxwjA88Rxw&list=PLWL6hWzXFQ4abyf9yq8XYWG0BxnXQdmvH&index=3>

<https://shop.aprendio.io/collections/energy-and-climate-academy>

<https://go.aprendio.io/ilp/pages/login.jsf?faces-redirect=true&client=Aprendio>

# At our District Heating Course you will among others meet:



Morten Duedahl, DBDH



Lars Gullev, VEKS



Milan Jungic, Danfoss



Jesper Larsen, verdo



ENERGY AND  
CLIMATE  
ACADEMY

**offers post graduate courses in various subjects**

**Energy and Climate Executive Programme** for private and public companies.

Partner: Massachusetts Institute of Technology (MIT) Sloan

**District Heating**

Partners: DBDH, Aalborg University, COWI, Danfoss, Logstor, Grundfos a.o.

**Wind Energy.**

Partners: DONG Wind Power, MHI Vestas, Siemens Wind Power and others

**Water Management**

Partners: Danish Water and Wastewater Association (DANVA) and others

## Open Courses / Customized courses

The **open** DH course is designed for **participants** from public and private companies, organizations, cities and regions that want an in-depth introduction to District Heating: • Politicians • Planners • Advisers • Engineers • Lawyers • Economists • Technicians • Managers

**Content:** • History and development of District Heating • Planning • Business models • Energy sources • The modern piping system • Operation and optimization • Interchanges / end user installations • The future • Getting started with your own District Heating project • Implementation • Future systems • Site visits

### **Customized courses:**

Together with our customer we design and develop courses specific to the wishes and needs for the customer.

We also cooperate with organizations and universities outside Denmark in order to secure knowledge transfer to the local partners, e.g. Tsinghua University



If you think education is expensive, try  
ignorance

Derek Bok, Harvard

## Contact

Chief Education Officer Torben Kirkegaard,

[tki@energyandclimateacademy.com](mailto:tki@energyandclimateacademy.com), +45 3023 7636