



# StableWood

New solutions and technologies for heating of buildings with low heating demand: Stable heat release and distribution from batch combustion of wood

[www.sintef.no/StableWood](http://www.sintef.no/StableWood)

This newsletter focuses on the latest dissemination efforts related to StableWood results.

## Presentation of results from Stable-Wood on various arenas

### On the WWW

Biomass in the form of pellets is still a very good option when old oil boilers are to be phased out!

Article written by Morten Seljeskog and Øyvind Skreiberg, SINTEF Energy Research

"That particle emissions from heating with pellets in modern pellet boilers are much higher than for oil boilers is a truth that is ripe for modification. When considering the use of pellets or wood for heating of households, whether phasing out of old oil heating systems or new installations, one should certainly make observations as precisely the authors of the report NILU OR 51/2013 made. Speaking of neutrality, it should be noted that the report referred to at [www.forskning.no](http://www.forskning.no) is a commissioned report for the Asthma and Allergy Association, which is reflected in that things are set slightly at the tip and often negatively angled to highlight special interests."



"The best modern pellet boilers on the market today have significantly lower emissions than the figures referred to in that report, with particulate emissions as low as 0.2 g/kg. It should also be mentioned that the best pellet stoves currently available have particulate emissions as low as 0.5 g/kg. This is respectively 85% and 62% lower than the number NILU has used in its calculations."  
"The alternative to central heating systems, are point source heating solutions; wood burning, pellet stoves and heat pumps if one assumes that the use of electric resistance heaters is reprehensible. Heat pumps are a great solution if you ever need to use electricity. If you want to be 100% renewable, bioenergy is currently the best solution, where pellet boilers / furnaces is the recommended solution when particulate emissions are of high priority. Biomass represents an alternative renewable energy source, CO2 neutral in the long-term and secure (supply) which can be procured locally and which certainly will be part of the future global energy supply." .....

<http://nobio.no/nyheter/175-biomasse-i-form-av-pellets-er-et-godt-alternativ-naar-oljefyr-skal-fases-ut/#175>

<http://www.tekniskenyheter.no/index.php/8-bioenergi/124-pellets-et-godt-alternativ>

### The stupidest law ever written

SINTEF justifies the change-out of old stoves in an article on the net.

... "Researcher Morten Seljeskog at SINTEF say whether the stove can meet emissions requirements will depend on age and type of stove. When SINTEF tested stoves several years ago, it was shown that old stoves can produce 10 times as much emissions as new,



## StableWood

- a Knowledge-building Project with User Involvement (KMB) co-funded by the Norwegian Research Council in the RENERGI-programme.  
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more combustion efficient stoves. - At SINTEF we do not believe that any of the furnaces manufactured before 1940 can come close to modern stoves in terms of emissions, he said. If you want to use wood as the main source for heating, Seljeskog believes you should set the old wood stove aside as decoration and invest in a new one. - We recommend replacing the stoves instead of installing so-called afterburn-ers, he said."

<http://www.klikk.no/bolig/inspirasjon/article887786.ece>

### On the national TV

"Forbruker-inspektørene" is one of NRKs (Norwegian Broadcasting Corporation) more popular consumer affairs shows. The 15th of February a whole show was dedicated to wood and wood stoves. Questions raised were what kind of wood should one fire with - and what should certainly not be thrown into the stove? The program provided tips and advice on wood stoves, old and new and also had a look at some nifty stove related gadgets. Jøtul had the additional benefit of getting to show both their factory, production line as well as some of their latest stove models.

<http://tv.nrk.no/serie/forbrukerinspektoerene/mdhp11000314/15-01-2014>



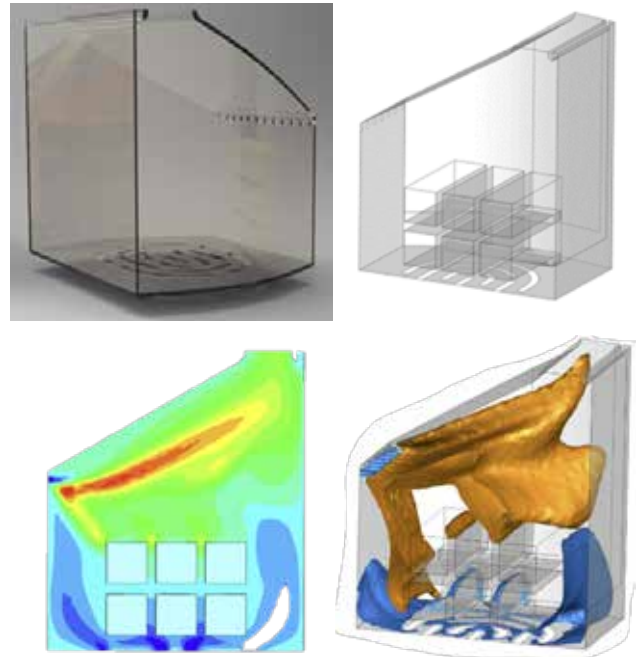
## StableWood highlights

The project has since its initiation provided not only the planned deliverables but also much additional material and media publicity, as listed in the following table

<p><b>Extra and PhD</b>                  Vedforbrenning og ildstedprosjekter ved SINTEF Energi med fokus på StableWood NORRSK VARMEs første årsmøte presentasjon</p> <p><b>Achieving low emissions and stable heat release from wood stoves and fireplaces firing at low load</b> Nordic Bioenergy 2011 publication</p> <p><b>Pelletsovnar og vedovnar i lavenergibygg - utfordringer og muligheter</b> Bioenergidagene 2011 presentasjon</p>
<p><b>Transient fuel models for batch combustion of wood</b> RERC 2012 presentation</p> <p><b>Transient fuel models for wood log combustion</b> 20th European Biomass Conference presentation</p> <p><b>Environmental and energetic performance history and further improvement potential for wood stoves</b> 20th European Biomass conference publication</p> <p><b>On the proper integration of wood stoves in passive houses: Investigation using detailed dynamic simulations</b> Energy and Buildings 59:203-213.</p> <p><b>Ny og lovende teknologi for akkumulering av varme fra vedovnar</b> Bioenergidagene 2012 presentasjon</p>
<p><b>Nytt fra vedforskningen</b> NORRSK VARMEs årsmøte presentasjon</p> <p><b>Bioenergy opportunities in low-energy buildings - The case of wood stoves</b> Nordic Baltic Bioenergy 2013 presentation</p> <p><b>Transient wood-log stove modeling integrating detailed combustion physics</b> 21st European Biomass conference presentation</p> <p><b>Stable heat release and distribution from batch combustion of wood</b> 21st European Biomass conference publication</p> <p><b>On the Integration of Wood Stoves in Norwegian Passive Houses: investigations using dynamic simulations</b> CLIMA 2013 publication</p> <p><b>Pipe og ildsted opp fra asken!</b> Bygg Reis Deg 2013 presentasjon</p> <p><b>On the proper integration of wood stoves in passive houses under cold climates</b> Energy and Buildings 72:87-95.</p>
<p><b>Bioenergy future</b> Pan European Networks Government 9. February 2014, pp. 90-91.</p> <p><b>NOx emissions from wood stoves – a CFD modeling approach</b> 22nd European Biomass Conference publication</p> <p><b>Simulation of the Indoor Thermal Environment in Passive Houses heated using Wood Stoves: comparison between thermal dynamic simulations and CFD.</b> 1st International Workshop on CFD and Biomass Thermochemical Conversion publication</p> <p><b>Modeling of the Indoor Thermal Comfort in Passive Houses heated by Wood Stoves</b> System Simulation in Buildings 2014 publication</p> <p><b>Proper indoor climate by the adoption of advanced wood-burning stoves?</b> ROOMVENT 2014 publication</p>

Also much progress, especially in terms of publications, has been made in term of understanding wood stove room integration into modern low-energy and passive houses.

Finally, as the project runs towards its finalization by the end of 2014, good progress has also been made in one of the last main project activities, related to CFD simulations. This subject is part of SINTEF's future strategic work to be able to progress even further into the detailed understanding and description of the physics behind stove behavior. This will be of great help in the development of future stoves both emission wise and to reduce the time to production from the prototype stage.



## New stove development project!

The project 'Almost Zero Emission Wood Stoves, AZEWS 2014-2016, has been granted by the Research Council of Norway. The main goal for each of the individual industry partners is to translate knowledge into specific prototypes with the aim of finalizing these into market ready products by the end of this project.

Transient wood-log stove modeling integrating detailed combustion physics

21st European Biomass Conference & Exhibition  
17-19 June 2013

Bioenergy opportunities in low-energy buildings - The case of wood stoves

Nordic Baltic Bioenergy 2013  
21-22 May 2013

**Modeling of the Indoor Thermal Comfort in Passive Houses heated by Wood Stoves**

Laurent Georges<sup>1</sup>, Øyvind Skreiberg<sup>2</sup>

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**Energy and Buildings**

Journal homepage: [www.elsevier.com/locate/energy](http://www.elsevier.com/locate/energy)

**On the proper integration of wood stoves in passive houses: Investigation using detailed dynamic simulations**

Laurent Georges<sup>1</sup>, Øyvind Skreiberg<sup>2</sup>, Vojislav Novakovic<sup>3</sup>

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**118 millioner til miljøvennlig energi**

Forskningsrådet bevilger 118 millioner kroner til 21 innovasjonsprosjekter innen energiforskning i næringslivet. Prosjektene spenner vidt, fra underverns strømkabler og vannkraft til solcellesilikon og energilagring.

Forskningsrådets ENERGI-program fikk 34 søknader til årets utlysning av innovasjonsprosjekter i næringslivet. Programstyret valgte 13 søknader til å gi støtte til 21 av søknadene.

Store industribedrifter berøres via prosjekter. Norske leverandører bidrar til energiproduksjonen. Prosjektene er fordelt i ulike områder, og inkluderer blant annet utnyttelse av underprodukt, nye miljøvennlige strømkabler, alluvsproduksjon og omstilling av vindturbiner.

Det pågår en omstilling av energiproduksjonen i hele Europa, og det er behov for å utvikle nye teknologier.

**Partner**

DOVRE AS  
JOTUL ASA  
GRANT KLEBER  
SINTEF Energy Research

**235757\* ALMOST ZERO EMISSION WOOD STOVES DOVRE AS**

Prosjektavtale: SINTEF

Prosjektperiode: 2014-2016

Handlingstiltak	Beskrivelse
1	Utvikling av prototypen
2	Utvikling av prototypen
3	Utvikling av prototypen
4	Utvikling av prototypen
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20	Utvikling av prototypen
21	Utvikling av prototypen

**ROOMVENT 2014**

19th International Conference on Air Distribution in Rooms: New challenges, strategies and solutions in modern buildings and their control in operation.

**Proper indoor climate by the adoption of advanced wood-burning stoves?**

## Status Standardization Mai 2014

SINTEF currently follows the following ongoing standardization activities:

- Ecodesign
- Nordic Ecolabel
- CEN TC 295 WG6
- CEN TC 295 WG5
- CEN TC 295 WG7
- EN-PME-TEST

SINTEF has recently been granted additional funds from the Norwegian Environment Agency to extend this activity in 2014. WG7 will now be followed up more extensively.

## Laurent Georges becomes associate professor at NTNU

Researcher Laurent Georges at NTNU has been contributing to StableWood through a number of joint publications with FME Zero Emission Buildings related to thermal comfort when using wood stoves in low-energy and passive houses. His success in this and other fields and his general competence has earned him an associate professor position at the Department of Energy and Process Engineering at NTNU from this summer, where he also will continue to contribute to the wood stove area.

## Upcoming events

The most important upcoming event related to StableWood activities is

1. **The 1st International Workshop on CFD and Biomass Thermochemical Conversion, 30th September, 2014, DBFZ in Leipzig, Germany.**

StableWood with friends have submitted several abstracts for this event:

- Mette Bugge, Nils E. L. Haugen, Øyvind Skreiberg, Morten Seljeskog. CFD modelling of NOx emissions from wood stoves.
- Morten Seljeskog, Øyvind Skreiberg. Batch combustion of logs in wood stoves – Transient fuel models and modelling of the fuel decomposition and products composition as input to CFD gas phase calculations.
- Øyvind Skreiberg, Morten Seljeskog. Batch combustion of logs in wood stoves – Transient modelling for generation of input to CFD modelling of stoves and thermal comfort simulations.
- Laurent Georges, Øyvind Skreiberg. Simulation of the Indoor Thermal Environment in Passive Houses heated using Wood Stoves: comparison between thermal dynamic simulations and CFD.
- Nils Erlend L. Haugen, Reginald E. Mitchell, Matt Tilghman. Transient simulations of biomass char gasification.
- Mette Bugge, Øyvind Skreiberg, Ehsan Houshfar, Nils E. L. Haugen, Terese Løvås. CFD simulations of staged biomass grate fired combustion with an emphasis on NOx emissions.

<http://www.dbfz.de/workshop-cfd/>

2. **ROOMVENT 2014, 19-22 October 2014, Sao Paulo, Brazil**
3. **System Simulation in Buildings 2014 (SSB2014), 10-12 December, Liege, Belgium**

