Project description

« REDUCING EMISSIONS FROM AIR CONDITIONNERS IN INDIA »

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CAMPAIGN FOR NATURAL REFRIGERANT GASES

GENEVA, NOVEMBER 21, 2012

2.5 million ACs sold in 2011 in India, 20% yearly growth rate **(Photo Kuni Takahashi)**

Noe21 is the french acronym for New Economic Orientation for the 21st Century
Independent NGO specialized in solutions to climate change
Member of the European Environmental Bureau and Climate Action Network-Europe
Member of Alliance pour le climat (Suisse)
Accredited to the UNFCCC, UN Framework Convention on Climate Change
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Summary

Context: Climate campaigns overlook a major contributor to greenhouse gas emissions: synthetic refrigerant gases (fluorinated, or "f" gases), mostly used in refrigerators and air conditioners. If nothing is done to replace these by clean alternatives, these gases could account for 20 to 40% of all carbon equivalent emissions by 2050.

With natural refrigerant compatible appliances arriving on the market, a replacement for f gases is now available. The impact on global warming by each molecule is 300 times lower than the least harmful f gas and 1100 times less harmful than average f gases, which currently monopolize the AC sector. It is thus crucial to accelerate the uptake of ACs using natural refrigerants.

Overall objective: Promoting cleaner and more efficient ACs that are starting to be commercialised in India by an Indian manufacturer as a world première. Even though the new generation of ACs, running on natural refrigerants (HC), have a one year payback period for their 10% increase in initial cost, even though they reduce running costs by at least 20% as compared to best in class available ACs, their uptake needs to be helped by a campaign that will make the alternative known in decisive sectors of the economy.

Main activities and outputs:

The projects' first phase is being implemented from October to end of March 2013. It contains two stages:

1. Top->down: Introduce the issue of greener and more efficient ACs and have it included into curiculas of architecture schools and continuous training workshops;
2. Bottom->up: Bolster and organise apartment purchaser demand for greener flats with cheaper running costs, forward this demand towards developers and general contractors.

During a field trip to Mumbai and Delhi in September and October, the applicants' staff secured ties with two Indian environmental NGOs: no2co2 and Vasudha foundation, respectively based in Mumbai and New Delhi.

The second phase of the project will carry a local adaptation of the program to Hyderabad, India, as well as in Vietnam, another emerging economy with high AC purchase growth rate where the new ACs will be launched.

Expected impacts: The intended general impact of the project is, through market forces, to minimize the demand for F gases and to accelerate the phasing in of natural refrigerants. Currently the Montreal protocol and the Kyoto protocol have not been able to plan a needed deadline for the planned phasing out of fluorinated gases. However progress can be achieved by.

Local partners: Contracted partners: Vivek Gilani, environmental engineer, co-founder and president of the no2co2 Project; Srinivas Krishnaswami, Head of Vasudha foundation. Other partners: TERI, The Energy and Resources Institute, Delhi. The Indian Minister of power sent a letter of support for the applicants' project.

International partners: Canton of Geneva; Oak Foundation; Environmental Investigation Agency; Shecco.

Overall budget for the first two stages of the project: 160’000 CHF

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Contents

1. Context

1.1 The challenge

Currently, 2,5 million household air conditioners (A/Cs) are sold annually in India. The annual sales growth rate has risen to 20%. All A/Cs sold in India today run on synthetic refrigerant gases: fluorinated gases, or F gases, namely HCFCs or HFCs. HFCs do not deplete the ozone layer like CFCs and HCFCs used to, but each F gas molecule is a mega-green house gas, with a global warming potential equal to 1,810 to 2,100 molecules of CO2. Fluorocarbons are potent industrial global warming gases (PIGGs), responsible for 12.9% of manmade global warming[1]

The use of f-gases worldwide is booming. While the first two generations of f-gases (CFCs and HCFCs) are set to be eliminated under the UN's Montreal protocol to protect the ozone layer, the third generation of F gases, HFCs are quickly being phased in. HFCs, like previous gases chosen to replace CFCs, are harmless for the ozone layer but are mega greenhouse gases. If nothing is done to reduce the spread of HFCs, this gas could account for 20 to 40% of all carbon equivalent emissions by 2050 (Figure 1), thereby harming the current efforts to reduce overall greenhouse gas emissions.

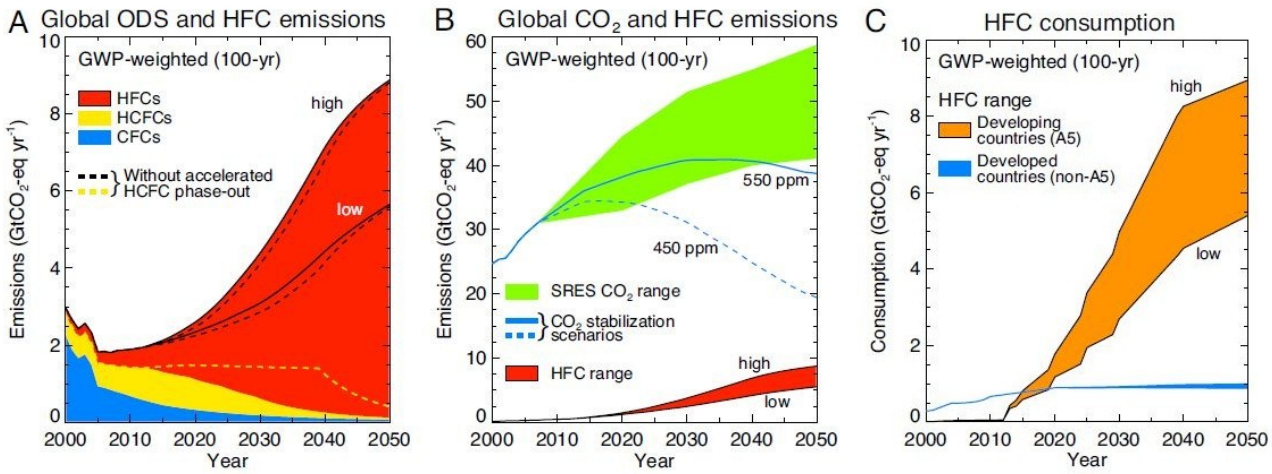

Figure 1:

A: Worldwide emissions of ozone-depleting substances (ODS) and HFCs,

B: Global emissions of CO_2 and HFCs,

C: HFC consumption for the period 2000-2050.

CFC data include all the main ODS in the Montreal Protocol except HCFCs. Emissions from different gas types are multiplied by their respective global warming potential (GWP) to calculate emissions in $GtCO_2$ / year. (According Velders et al., 2009).

While this problem is growing, with natural refrigerants (see section 1.2 below), an alternative solution, competitive and tried, is readily available on the market and needs to be phased in, in order to phase out F gases. This has already been achieved in the 1990s with the mainstreaming of 100% natural refrigerant "Greenfreeze" refrigerators running on isobutane. The same switch has to yet to be accomplished with the worlds' second largest sector for F gas uses: air conditionning. This current Noé21 program created a network of

[1] [1] Climate Change 2007:The Fourth Assessment Report of the IPCC

Indian environmental NGOs who, with funding brought in by Noé21, work to insure for a succesful uptake of natural refriogerant A/Cs in the Indian market.

The global warming potential of natural refrigerants is from 1'800 to 2'100 times lower than F-gases. Within the European Union in particular and since several years, investments made by A/C manufacturers and by end users are already switching to natural gas appliances. Today, A/C manufacturers in high economic growth countries are heavily investing in new A/C production lines. Two options are open to them: HFC A/C manufacturing plants, or natural gas A/C manufacturing plants. They can either wait to switch towards natural gas A/Cs when a hoped for binding UN Convention will come into force to phase out HFCs, or directly opt for natural gas A/C production lines and take part in the industry's switch to cleaner technologies supplying more energy efficient appliances. This leapfrogging to the best available technology in the AC sector is what our prgram aims at.

1.2 A solution

In early 2012, a new generation of A/Cs running on natural gas HC-290 (hydrocarbon) was introduced. Beside the application of an inoffensive refrigerant, their energy efficiency is 10 to 15% better than those operating with HFCs, thereby adding value to the final consumer and relieving the country of the additional energy demand in terms of additional coal, nuclear or hydro power plants. The new AC line has been graded in the upper rating 5 stars (out of 5), with best performance coefficient (COP) on the market, surpassing the Go Indian governments' Bureau of Energy Efficiency standards for 2014. This advantage in terms of energy efficiency will be critical to consumers, for whom A/C induced consumption is the heaviest burden on their electricity bills.

Noe21, an independent NGO founded in 2004 focusing on the evaluation and promotion of solutions to reduce greenhouse gas emissions, identified the cost effective replacement of fluorinated gases by low GWP gases as a ripened "low-hanging fruit" in the climate change campaign.

The successful introduction of natural gas air conditioners in India may have a very useful influence on investment choices made by competing manufacturers in India and in other fast growing and export dependent economies. If the market launch is successful in India, competitors will not want to see this new market segment grow without them. Since India is more a market economy that China and its climate is reputed to be hot and humid, competitors see that market as a testing ground for new products.

To make the market introduction of natural gas A/Cs a success in India, Noe21 believes a parallel marketing campaign needs to be installed to forward the green and energy efficient added value the new ACs offer. To forward this message, environmental NGOS are the most credible opinion emitters available. Every manufacturer nowadays presents its product as environmentally friendly, so it makes things difficult for opinion makers and consumers to make a difference. This is why Noe21 is teaming up with Indian environmental NGOs (ENGOs) to lead a green push making the right choice in AC buying a climat eissue as well as a wallet issue.

2. General direction

2.1 Goals

The overall objective is to minimize the increase in greenhouse gas emissions associated with the booming development of air conditioning in India. This objective is to be reached by promoting cleaner and more energy efficient ACs in cionsumer behaviour.

2.2 Approach

Noe21 chose to use a market approach in this campaign, for several reasons detailed below.

Following the success in 2010/2011 of the international campaign on refrigerants HCFC22, and in which we took an active part, the Noe21 team wanted to use its experience and the close ties established with its network of experts, engineers and NGOs in order to go further in finding pragmatic solutions to limit GHG emissions.

For this campaign we draw inspiration from prior experiences in transitioning to technological solutions with natural gases. In 2011, we met campaigners from the British NGO Environmental Investigation Agency (EIA) in London. EIA led a remarkable campaign in the UK with supermarket chains, leading them to adopt refrigeration systems operating on natural gases[2]. A more similar campaign in the same line of technological progress is of course the greenfreeze breakthrough in the refrigerating sector, which is now a leading technology. Discussing the issue with the leading F gas campaign counsellor from Greenpeace International comforted our work on a promotion campaign for natural gas A/Cs.

These positive experiences strengthened us in our decision to adopt a bottom-up strategy rather than to act on the international regulatory framework to ban fluorinated gases. We believe that the replacement of greenhouse gas intensive technologies occurs when better technologies are proven to be effective in the market place. This bottom-up approach is also complementary with the work that others perform at annual UN negotiations, with the hope that successful local experiences will weigh on the international consensus. The advantage of proceeding in this way can also be in terms of the time required for such a campaign compared to the time necessary for an international consensus to be reached. Also, serious obstacles are encountered during international negotiations when countries with vested interests in highly polluting technologies have leisure to prolong the discussions phase.

The presence of manufacturers and organised interests who opted for the natural gas A/Cs will facilitate the development of renewed national as well as international regulatory framework in favour of natural gas technologies.

For these reasons, we believe that the approach chosen by Noe21 from its inception, characterized by consultation with stakeholders at large and the search for solutions, is

[2] See : http://www.eia-international.org/chillingfacts1, http://www.eia-international.org/chilling-facts, http://www.eia-international.org/chilling-facts-iii

relevant and effective to achieve the objectives of this campaign[3].

2.3 Global impact

The intended impact of the project is to reduce greenhouse gases emissions by both avoiding the use of F gases and by reducing future energy needs (coal and uranium power plants) thanks to the introduction of more energy efficient ACs. The air conditioning sector is responsible for the major part of world F gas emissions as well as for the largest part of energy demand by households in hot and humid climat ecountries. This program aims at phasing out F gases in ACs and at increasing the energy efficiency in this major demand sector.

A success for new natural gas ACs in India would facilitate their market introduction in other emerging countries where AC sales are also growing at a fast rate. Most booming economies are situated in hot and sometimes humid climate countries, so as economic growth swells the number of families that can afford ACs, global energy demand and GHG emissions soar. The goal of the program is not just India, but India seen as a showcase for other high growth markets to imitate. What is seen to work in India in terms of air-cooling will be seen as capable of working in other countries.

3. Project description

Work on the program occurs from October 2012 through to march 2013 (hopefully more if finances allow).

From September to October, Noe21 F gas team members (see team members profiles in attached file) meet selected Indian ENGOs management to finalise and secure previously established contacts.

On October 1, Shecco, (see Partners, p.8), send in a listing to reach our target audience in Mumbai, consisting of professionals who have the strongest influence on AC purchasing choices by end-use customers. This audience consists of developpers, architects, interior decorators, energy consultants, exclusive air conditioner Sales and Service Dealers (SSD, which controls large chunk of AC business, around 20% of it).

End October to end march, in close networking with Noe21 F gas team, the selected ENGOs start implementing 5 different means by which the target audience will receive the message "AC purchasing choice is a climate issue and a domestic energy bill issue".

Means to reach our target audience:

Program website for referral and to learn more; Feature articles in specialised media; Press releases; NGO with consumer union media event with photo-op; presence at professional workshops and services dealers meetings; direct mailing campaign; advertisement on specialised websites, etc.

3.1 Local partners

No2CO_2, Mumbai, Maharashtra. No2CO_2 provides new tools to empower consumers helping them to reduce their climate footprint. While advocating a bottom-up approach, No2CO2 also recognizes the top-down interventions from governments, industries and policy as essential. For this program, Vivek Gilani and his team are working on introducing the issue

[3] see : (http://www.noe21.org/site/index.php/fr/qui-sommes-nous-/charte)

of efficent cooling in architecture school textbooks and is studying with scholars the potential for a retrifiting program of old A/Cs. www.no2co2.in

Vasudha Foundation New Delhi. Vasudha Foundation promotes just and sustainable models of energy for India by focusing on energy efficient technologies and renewable energy. VFor this program, the Vasudha team will write and send e-newsletters on efficient cooling issues to a listing of key persons and organisations. Vasudha will also lobby green leaning developpers. www.vasudha-india.org

Shecco, Brussels (BE). Shecco is a Marketing & Communication expert supporting the introduction of climate friendly technologies in the refrigerant and cooling sectors. With their valuable expertise and an extensive network especially in Asia, they are established a list of core people and entities forming our target group. www.shecco.com

Webly Web Designs New Delhi. Webly was chosen to design and build the *efficient cooling* website, and to optimize its position through search engines. www.webley.in

TERRE Policy Centre, Pune, Maharashtra. We have been in close contact with TERRE President Vinitaa Apte and its founder, Rajendra Shende who formerly headed the UNEP Ozone unit for several years. He is a leading authority on the issue and has a considerable network as well as experience from which we have benefitted to design the present project. www.terrepolicycentre.org

WWF India, New Delhi. We are currently in discussion with WWF India to define in which way we will be partnering. Currently we have a very good mutual understanding, also due to our close collaboration with WWF Switzerland and WWF Geneva. www.wwfindia.org

GODREJ and Boyce, Mumbai, Maharashtra, India. Godrej is the only Indian manufacturer of natural gas ACs. They were already the industry pioneers for the first market launch of natural gas refrigerators (Greenfreeze) in collaboration with Greenpeace International. We are in close contact with assistant Marketing Vice President at Godrej, M. Ramesh Chembath. www.godrej.com

3.2 Means

The Geneva canton Service of International Solidarity funds the project with 50'000 CHF (41'400 Euros)

Oak Foundation, Geneva, funds the project with 25'000 CHF (20'700 Euros)

Noe21 co-funds the project with 12'000 CHF (9'900 Euros)

We also welcome voluntary co-funding by our partner ENGOs. Fundraising is continuing to finance an extension of the program in other Indian states.

3.3 Temporality, steps and collaboration

This project aims at increasing the chance for HC 290 AC to replace current A/C technology in future consumer choices. India was chosen as a global showcase for its hot and humid climate and the exemplary role it can play on other high-growth countries. Success during the first year of marketing in India will give the best signals to investors in other countries. If successful in India, investment by manufacturers made in new production units will be directed towards the assembly lines for of A/Cs running on natural gas. This also applies to importers who will turn to A/Cs operating with natural gas.

The first stage is the consultation of specialised stakeholders, such as institutes working on reducing greenhouse gas emissions, government partners, technicians, clusters of retailers, architects, interior decorators, with whom in large part we are already in contact with. This step involves visiting each prospective partner in India. Through these meetings, noe21 NGO partners evaluate how the implementation of the program should take place. This prospective evaluation by local stakeholders will last three weeks and will be completed in October 2012.

During the same period, a retailers survey will be conducted to better understand perceptions and demands regarding A/Cs. These perceptions need to be well understood in order for the Noe21 team and partners to play a useful role in the market. Pre-existing surveys need to be rounded up and studied and the need for the new study has to be defined precisely. Shecco has already indicated its interest in conducting this survey.

The completion stage will consist in identifying and meeting cluster opinion leaders to recommend natural gas A/Cs to their clients. This implementation project will start in late October 2012 and will end in April 2013.

In May 2013 Noe21 will carry out an assessment of the project with a written report, to assess the results and list lessons learned for the second phase of the project, consisting in replicating the shift towards natural gas A/Cs in other high economic growth rate countries.

3.4 Region of intervention

Mumbai, Pune and Delhi (NCT). More Indian states will be covered providing additional funding is obtained.

3.5 Other actors

The target group consists of the largest opinion leaders of A/C. This program is aimed at increasing their knowledge of natural gas A/Cs as the best in class technology and to make them recommend and choose these devices for their next development as well as for the replacement of old A/Cs.

Apart from the partner NGOs, we will seek to mobilise organizations that have an influence on public opinion in questions related to the environment to promote the use of ozone & climate friendly refrigerants and energy efficient appliances. Representatives of several actors from relevant areas will be associated with the project as organization and resource persons. Some of these organizations and experts have already agreed to participate as steering partners:

Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), Bonn (DE)

GIZ's experience dealing with new A/Cs and refrigerators in several countries (Namibia, Swaziland, China, ...) is important to learn from. We have been in contact with Daniel Colbourne, a consultant for GIZ, he very usefully commented on the first versions of our program description.

Earthcool Company, Ware (UK)

Institute founded by Nicholas Cox, independent expert and advisor in the subtleties of natural and synthetic refrigerants. We consult regularly already since the beginning of our work on fluorinated gases.

Environmental Investigation Agency, London & Washington

Noe21 met the campaign manager of the F-Gas EIA in London during the design phase of the project and met the lawyer of the EIA, U.S. office. The EIA conducted a remarkable campaign aiming at supermarket chains in England, which led to a shift from these towards cooling systems using only natural refrigerating gases. The EIA campaign is an inspiration for this project.

Indian Society of Heating, Refrigerating and Air Conditioning Engineers (ISHRAE), New Delhi (IN)

The knowledge and influence of ISHRAE cannot be neglected. No contacts have been established yet. The use in meeting ISHRAE or not will have to be discussed with Godrej beforehand.

The United Nations Industrial Development Organization (UNIDO), Geneva

UNIDO has already worked on the issue of fluorinated gases in the Clean Development Mechanism (CDM) with INFRAS. Their advice and contacts will be useful in India.

UNEP - Ozone Action Branch, Paris (FR)

Ozone Action program is a coordinated international support to monitor the implementation of the agreements of the Montreal Protocol while having a critical look at the climate impacts of fluorinated gases. We have already consulted former Head of the branch, Rajendra Shende, who will make his contacts in the branch available to us.

REEEP, New Dehli (Asia & India secretariat)

"The Renewable Energy & Efficiency Partnership (REEEP)" mission is to accelerate the integration of renewable energy and energy efficient technologies. Their approach combines electrification programs with reducing energy demand. This is a major outcome for a successful uptake of HC290 A/Cs, which is usually neglected: a needed decrease in the forecast for energy consumption in an energy tight future scenario for India.

4. Efficient cooling team in Switzerland and India

Team members in Switzerland responsible trowards financers (see attached bios):

- **Philippe de Rougemont**, President and co-founder of Noe21, Geneva
- **Chaïm Nissim**, Secretary general and co-founder of Noe21, EPFL engineer, Geneva
- **Felix Dalang**, PhD, chemist, scientific adviser of Noe21, Geneva

Team members in India working as program partners and implementers

- **Vivek Gilani**, Environmental Engineer, Cbalance, Mumbai
- **Jyoti Awasthi**, Programme Head Vasudha Foundation, New Delhi
- **Srinivas Krishnaswami**, Economist, Vasudha Foundation, New Delhi

5. Noe21 consultative committee

This project was developed with support and guidance by several specialists in different fields. The consultative committee is informal, it does not meet and decide, since it is Noe21 who is entrusted by its donors to carry out the program as announced. However the

"committee members" as we call them, did and will continue to have an important role as advisors. The Noe21 list of advisers is available in Appendix 3.

6. Budget and financing

The total cost of this project is estimated at CHF 160'000.

The funding reached as of end of september and on which we will establish the program, first phase, is 82'000 CHF (67'800 Euros).

The contribution by Noe21 is CHF 12'000. Several organizations are solicited for funding. The International Solidarity Service of the Canton of Geneva as well as Oak foundation contributed to a total of CHF 75'000. Other funds have been solicited and we are waiting for their reply: the Foundation Albert II of Monaco (Switzerland), CDKN, GEF SGP (UNDP), International Climate Initiative (PRE) and the 1796 Foundation (Switzerland).

A budget and a financing plan are attached to this project document.

Resources already mobilized by Noe21 for the project design is estimated at 15,000 CHF (equity) and are not included in the budget.

We will not wait to complete the budget before starting the program but Noe21 back office is still working on additional funding.

Annex 1: About Noe21

noé21: acronym for New Economic Orientation for the 21st Century

Noé21 is an independent association of public utility founded in 2003 and based in Geneva, whose mission is to identify, evaluate and promote solutions to climate change, with a constructive approach.

Noé21 is a competence centre in the sense that it retains a critical look at the solutions it evaluated, and it focuses on both behaviour change, innovative technology solutions and market instruments.

Noé21 is an organization in action, because it is committed to promoting and implementing the solutions it evaluated by influencing public policy, but also through seminars, carrying out research mandates and informing the general public.

Noé21 is a member of the Alliance for Climate, the European Office of Environment and Climate Action Network Europe CAN-E. Noé21 is accredited to the United Nations Framework Convention on Climate Change (UNFCCC).

Noe21 accomplishments (highlights)

2006: "CO2: Tomorrow I Quit". Short film explaining the making of the climate crisis and focusing on the Ecological Tax Reform as a market based solution. French and English versions.

http://www.noe21.org/site/index.php/en/section-blog/46-videos/58-co2n-demain-jarrete

2007, 2008, 2011 and 2012: Noe21 organizes seminars in collaboration with continuing education "Forest and Landscape" (www.fowala.ch) with the aim of supporting the transfer of knowledge in the field of the forest and of its management.

http://www.noe21.org/site/index.php/en/section-blog/35-etudes/60-bois-et-co2

2008: "The Solutions are Waiting". A 5 minute animation and two Flash Player presentations explaining the solutions to mitigate greenhouse gas emissions. Copyleft. French and English versions.

www.noe21.org/solutions/

2008 to present: Several research mandates on Energy Demand Side Management for the Geneva energy utility SIG, for the Geneva International Airport and for WWF Geneva.

www.noe21.org/site/index.php/en/section-blog/35-etudes/130-gestiondeladem andedenergie

2009: "HFC23 campaign". Noe21 participated closely in the successful campaign to ban harmful CDM credits allocated for HFC-23 burning at the EU level.

www.noe21.org/site/index.php/en/section-blog/43-campagnes/64-credits-carbone-hfc-23

2009: "Managing Energy Demand", a Noe21 International conference organised in Bern with speakers from the USA and several european countries, 110 participants

http://www.amiando.com/managing-energy-demand-09.html

2009 & 2011: "Climate Action Plan for Geneva ". Noé21 elaborated a multi sector Climate Action Plan designing local policies capable of implementing IPCC recommendations for industrialized countries. (-40% CO2 by 2020 and -95% by 2050).

www.noe21.org/site/index.php/en/section-blog/35-etudes/47-plan-climat-cantonalcantonal

2011: Noé21 organized a workshop with international speakers on Smart Grids on Friday April 15, 2011 at Energissima, the national convention and exhibition for renewable energies and environmental technologies.

www.noe21.org/site/index.php/en/news/3/102-energissima

2012 : "Estimated cost of the thermal renovation of all buildings in the Geneva canton". This groundbreaking study by Noe21 occupied a specialised Noe21 team for 6 months with consultation of many specialists. For the first time an until recently vague ambition to reach a state of the art thermal insulation for all buildings is now put down to paper, Copyleft as usual and triggering a debate in Geneva.

www.noe21.org/site/index.php/en/section-blog/35-etudes/126-projetcepic

Noe21 Charter

1. Noé21 is an environmental group, part NGO, part engineer office. Noe21 reviews and promotes solutions to the climate emergency.

2. Noé21 is a plural group, where complementary technical skills among its staff are considered fertile ground, and the diversity of philosophical opinions are welcome. Noe21 programs will favour decentralized solutions based on fostering behaviour change, enhancing energy efficiency and technical solutions. However, short term technical solutions on the climate front that are detrimental to the environment on other grounds or who could delay sustainable climate solutions, such as nuclear power plants, carbon capture and storage, coal liquefaction, etc. will not be included in our basket of solutions. However if in the future any of these solutions demonstrate an environmentally affordable balance, we would be ready to endorse.

3. For a 95% reduction of GHG emissions in industrialized countries by 2050 (IPCC recommendations) not only will we need renewable energy sources, but also energy savings and behaviour changes.

4. We live in a market economy that already has several regulations in place. We favour solutions that switch regulation so they aim at integrating all costs incurred, including environmental costs.

5. To design and implement the solutions we study, dialogue is paramount. NGOs, employers, labour unions, scientists, bankers, industrialists and governments must work together, each within its field of competence. Noe21 acts to enhance stakeholder dialogue in the climate campaign.

"Noe21 works on an indispensable task, too seldomly taken in by NGOs, it analyzes and makes readily available to the public a clear understanding of market tools capable of limiting GHG emissions"

Eero Yrjö Koskinen
Director
Finnish association for nature conservancy (30'000 members). Helsinki

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Member of
European Environmental Bureau EEB, Brussels
Climate Action Network Europe CAN E, Brussels
Climate Alliance (Switzerland), Zurich
Accredited NGO to the UNFCCC, Bonn

Annex 2: List of consultants for the program

Noe21 can count on the experienced advice of a pannel composed of specialists from a variety of organizations. Noe21 was in contact with members of the advisory board several times about the issue of natural gas used in industrial refrigeration and air conditioning.

List open for completion and modification

MASSON Nina, Head of Market Research, shecco, Brussels (BE)

CHASSEROT Marc, Managing Director, shecco, Brussels (BE)

COHR PACHAI Alexander, Technology Manager, Johnson Controls, Hojberg (DK)

COLBOURNE Daniel, Independent Consultant c/o GIZ Proklima, Stratford-upon-Avon (UK)

COX Nicholas, Sustainability Consultant and Managing director, Earthcool Ltd, Ware (UK)

HOARE Brent, Executive Director Green Cooling Association, Katoomba (AUS)

KESSLER Stefan, INFRAS, Zürich (CH)

MATE Janos, Ozone Policy Consultant at Greenpeace International, Vancouver (CA)

SHENDE Rajendra M., Consultant, Former Head of Ozone Action Branch, UNEP, Paris (FR)

WALVARENS Fionnuala, Campaign Manager, Environmental Investigation Agency (EIA), London (UK)

FARAH Rédha, Geologist, Scientific Advisor, Noe21, Geneva (CH)

LAEDERACH Aarti, Economist, Scientific Advisor, Noe21, Geneva (CH)

WELCH Denise, Biologist, Scientific Advisor, Noe21, Geneva (CH)

Annex 3: Selected bibliography

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