



Nanotechnology: Small is beautiful but is it safe?

Joint ANEC/BEUC position

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Executive Summary

Nanotechnologies are a range of technologies that use materials on an incredibly small scale. One nanometre is a millionth of a millimetre. Materials at this small scale present different properties compared to “bigger” particles (eg.: greater reactivity and mobility in the human body) and are increasingly being used by industrial sectors to create new products or applications. Nanomaterials are already used in various products available on the EU market such as food, cosmetics, textiles, electric appliances and medicines. In the cosmetic sector for instance, some manufacturers use nanomaterials to produce a sunscreen that is clear, rather than white when it is applied, or to produce anti-ageing creams which are claimed to be more efficient.

We acknowledge that nanotechnologies have a potential to offer benefits in particular to consumers and the environment. They could be used to improve the resource and energy efficiency of appliances, the storage capacity and loading time of batteries, lead to new medical treatment opportunities or products of better performance. However, these technologies and materials may also present new risks which have never been evaluated. We are therefore concerned about the increasing number of products containing nanomaterials which are already and will be sold on the EU market without having been subject to a proper safety assessment. This paper aims at presenting the consumer point of view on nanotechnologies and nanomaterials.

We call for:

- **clear definitions of nanomaterials and nanotechnologies** as the lack of definitions leads to legal uncertainties and hampers the development of regulatory requirements;
- the **precautionary principle to be applied** in the field of nanotechnologies;
- the **safety of nanomaterials to be assessed** by knowledgeable independent scientific committees before they can be used in consumer products with which consumers come in direct, close or regular contact or in products leading to discharges to the environment;
- **adequate safety and risk assessment methodologies** taking account of all characteristics of nanomaterials;
- **existing European legislation relevant to nanotechnologies to be adapted** in order to safeguard consumer health and safety, as well as the environment.
- **legal safety requirements to be adapted or established** (eg. limit values for certain nanomaterials in products) and standardisation to be only used to establish test methods and other technical specifications;
- **increased transparency about the use of nanomaterials** and **labelling of consumer products containing nanomaterials** in particular products with which consumers come in direct, close or regular contact;
- **effective participatory processes** in order to allow citizens to fully engage into decisions which will have an impact on their everyday life.

Introduction

Nanotechnologies are a range of technologies that use materials on an incredibly small scale (1nm = 10^{-9} m). Nanomaterials present new properties compared to “bigger” materials (eg.: greater reactivity and mobility in the human body) and are more and more often used by industrial sectors to create new products or applications. There are an increasing number of products containing nanomaterials available on the market such as food products and packaging, cosmetics, textiles, appliances and medicines.

We acknowledge that nanotechnologies and nanomaterials have the potential to offer huge benefits to our society, industry and the environment. For instance, nanomaterials could help improve medical treatments or improve the environmental performance of products. However, these materials may also present new risks for health and the environment which have never been evaluated. We are therefore concerned about the increasing number of products containing nanomaterials which are already and will be sold on the EU market without having been subject to a proper safety assessment.

1. Clear definitions are needed

There are no agreed definitions of nanomaterials and nanotechnologies at European or international level. This leads to differences in interpretation and legal uncertainty and prevent regulators from developing for instance notification systems of nanomaterials and labelling requirements. Although we acknowledge and welcome that definitions of nanomaterials have recently been adopted by the European Parliament in the new Regulation for cosmetic products¹ and the Regulation on novel foods², we are concerned by the lack of coherence between the two definitions. **We therefore call for the European Commission to adopt harmonised definitions when defining regulatory requirements applicable to nanomaterials.** These definitions should be coherent with those developed by independent bodies, such as the EU Scientific Committees.

When developing a definition for nanomaterial, it is therefore crucial not to strictly limit the size range to 100nm. Moreover, the definition should include agglomerates and aggregates which often have physiochemical properties that may pose safety concerns. The EU Scientific Committee on Emerging and Newly Identified Risks (SCENIHR) recently stated that the definition of nanomaterials may need to be tweaked to include particles which are above 100nm, in particular larger agglomerates and aggregates and suggested for this reason a specific surface area of >60

¹ The European Parliament endorsed the negotiated text agreed in trialogue on a new Regulation on cosmetic products (recast) on 24 March 2009.

² The European Parliament voted in first reading on the Commission’s proposal on novel foods on 25 March 2009.

m²/g material as an additional criterion (the value of 60 m²/g corresponds to the specific surface area of 100nm solid spheres of unit density)³. The approach to go beyond 100 nm has already been followed by some other institutions such as the Federal Office for Public Health (FOPH) and the Federal Office for the Environment (FOEN) in Switzerland which recommend that 500nm is used as the limit of the nanoscale, in order to avoid excluding any nano-specific risks⁴. In any case, any definitions which have already been⁵ or will be introduced in specific legislation may have to be adapted, if it appears to be necessary, when a wider agreement on definitions is reached.

This paper will address engineered nanomaterials as opposed to nanomaterials which naturally occur in the environment, although the latter may also raise concerns for health and the environment.

2. Ensure the safety of nanomaterials in products

We acknowledge that there may be potential benefits of nanotechnologies and nanomaterials for consumers. We would like to stress that our organisations do not oppose the development and placing on the market of products containing nanomaterials. Nanotechnologies may for instance improve the energy, resource and cost efficiency of appliances, the storage capacity and loading time of batteries, lead to new medical treatment opportunities or products of better performance.

However, unless the lack of scientific understanding and proper risk assessment about the potential risks presented by nanomaterials is addressed as a priority, in particular by regulators, consumers and consumer organisations will not be able to appreciate and support these benefits.

2.1. Pre-market safety assessment

Consumer organisations are concerned about the increasing number of products containing nanomaterials which come onto the EU market without having been subject to a proper safety assessment. This is confirmed by the preliminary inventory made by ANEC and BEUC with the help of our member organisations (see annex I)⁶. We are particularly concerned about products containing free nanomaterials or nanomaterials which are not properly fixed in the material of the

³ Risk Assessment of Products of Nanotechnologies, SCENIHR Opinion adopted on 19 January 2009: http://ec.europa.eu/health/ph_risk/committees/04_scenihr/docs/scenihr_o_023.pdf.

⁴ <http://www.bag.admin.ch/themen/chemikalien/00228/00510/05626/index.html?lang=en>

⁵ See definition introduced in the recently adopted Regulation on cosmetic products.

⁶ The ANEC/BEUC inventory shows examples of 100 products containing nanomaterials which are available for consumers in the EU. Research was carried out between 31 October 2008 and 23 April 2009 through search on the internet and in shops. The inventory only contains products that are actually being promoted as containing nanomaterials.

product and that may be released during the product life-cycle, thus resulting in exposure of consumers and/or the environment.

In this context, products containing nanomaterials with which consumers come in direct or regular contact, such as cosmetics (eg. sunscreens), food, household products (eg. cleaning products, sprays for shoes), clothing/textiles, as well as products which lead to discharges to the environment should be given particular attention. All routes of exposure should be considered, including inhalation, dermal contact, ingestion, eye contact and injection and other kinds of exposure routes, and release and distribution through air, soil or water.

We therefore **call for the precautionary principle to be applied** in the field of nanotechnology. We ask for **the safety of (free) nanomaterials to be assessed by knowledgeable independent scientific committees** (eg. EU scientific committees) before they can be used in consumer products with which consumers come in direct, close or regular contact⁷ or in products leading to discharges to the environment. Only those nanomaterials which have been assessed as safe for health and the environment should be allowed to be used. The safety of products containing nanomaterials which are already available on the EU should be urgently assessed and the products should be withdrawn from the market if they are not safe for human health and the environment.

Finally, we are concerned that most of the research which has been carried out so far has been oriented towards innovation and new applications. We therefore call for the Commission to prioritise research towards safety, health and environmental risks of nanomaterials, which could then be used for risk assessment procedures. We also believe that wider public consultations on research needs priorities of European citizens would allow scientific institutions in helping to deliver public policy objectives for science and the welfare of society. It would also increase public confidence in, and understanding of, research programmes and the use of research findings in policy-making and shed a light on how consumers engage with scientific developments which can have an impact in their everyday's lives, such as nanotechnologies. The issue of nanotechnology would be ideal to implement the science in society programme from the EU Commission, entrusted with DG Research.

3. Develop adequate safety assessment methodologies

Manufactured nanomaterials exhibit new features such as an increased reactivity⁸. Moreover, the small material size - together with other parameters such as the chemical modification of the surface - can result in greater uptake and mobility of the nanomaterial in the (human) body:

⁷ eg. cosmetic / personal care products, detergents / cleaning products, clothes and textiles, toys and food products and food contact materials.

⁸ Tendency of a substance to react with its surrounding or with other substances.

some nanomaterials have been shown to cross biological membranes that larger sized particles normally cannot, such as the blood-brain barrier⁹.

Hence, nanomaterials may present (eco-)toxicological effects and pose new risks compared to their larger counterparts. Increasing scientific evidence demonstrates that nanosized materials can be dangerous for human health and the environment. Unfortunately, traditional risk assessment methodologies are not adequate for taking account of all characteristics of nanomaterials. Scientists are working to determine what physicochemical properties will be most important in determining ecological and toxicological properties of nanomaterials¹⁰. The existing body of scientific knowledge is not sufficient and it is certain that much broader (eco-)toxicity assessment methods, with new parameters, are required. This has been confirmed by the EU Scientific Committee on Emerging and Newly Identified Risks (SCENIHR)¹¹, according to which the methodologies to assess exposure to manufactured nanomaterials to consumers and the environment and the identification of potential hazards require further development. Effective risk assessment is also confounded by an inability to conduct effective exposure assessment. Considering the huge lack of data regarding potential risks posed by nanomaterials for human health and the environment, **we call for specific test methods to nanomaterials to be developed as soon as possible**. Alternatives to animal testing should be given priority.

4. Address regulatory needs

Given the rapid development and use of nanotechnologies, it is of the utmost importance to adapt regulatory measures to nanotechnologies in order to safeguard consumer health and safety, as well as the environment.

We were disappointed by the weak recommendations which were made by the European Commission in its recent Communication on nanomaterials¹². The Commission is not acknowledging and addressing the regulatory deficits which have been identified by various parties including scientific institutions, civil society organisations and governmental organisations as well as the need to review existing legislation, which has been clearly demonstrated, with the necessary urgency¹³. In particular, we do not share the Commission's position that current

⁹ See Nanotechnology in medical applications: possible risks for human health, RIVM report 265001002/2005.

¹⁰ eg. Maynard et al., Safe Handling of Nanotechnology, Nature 444, 267-69 (16 November 2006); Oberdorster et al., Nanotoxicology: an emerging discipline evolving from studies of ultrafine particles, Environmental Health Perspectives 113-7, 823-839 (2005).

¹¹ Risk Assessment of Products of Nanotechnologies, SCENIHR Opinion of 19 January 2009: http://ec.europa.eu/health/ph_risk/committees/04_scenihr/docs/scenihr_o_023.pdf

¹² Communication from the European Commission to the European Parliament, the Council and the European Economic and Social Committee – Regulatory aspects of nanomaterials – COM(2008) 366, 17 June 2008.

¹³ See the Governmental reviews of regulation including the reviews of the Department for Trade and Industry (DTI), Dec 2006; of the Health and Safety Executive and the Food Standards Agency. See also

legislation already covers the potential risks related to nanomaterials and that there is only a need to improve the implementation of current legislation to ensure that the protection of health, safety and the environment is enhanced. It is also contradictory that the Commission deplores the lack of data available regarding the uses of nanomaterials but at the same time, does not consider the need to impose regulatory obligations on manufacturers to disclose such information.

Furthermore, it is unacceptable that the Commission shifts the responsibility for risk from industry to national market surveillance authorities. It requires national market surveillance authorities to intervene in cases where particular risks are identified with products containing nanomaterials which are already on the market. The safety of nanomaterials used in products should be ensured before products are placed on the market. Moreover, shifting completely the responsibility to Member States to take actions against products containing nanomaterials which are not safe for health or the environment will lead to an absurd situation where, in absence of clear-cut regulatory provisions, national authorities would have to prove that certain materials are unsafe. Given the lack of toxicological knowledge, this is an almost impossible task which involves enormous costs. In the absence of data proving that a nanomaterial is safe, to place such nanomaterial on the market, resulting in exposure for humans and the environment is unacceptable. In addition, this goes completely against the recent political will to make the industry responsible for assessing and managing the risks posed by chemicals (i.e. reverse the burden of proof on the industry), as done in the REACH Regulation¹⁴. We consider that the **“no data - no market” principle as defined in the REACH Regulation should be implemented for all applications of nanomaterials in products**. If manufacturers or importers fail to provide the data required proving that the nanomaterials they use in products are safe for human health and the environment at all stages of their life cycle, they should not be allowed to place their products on the market.

We are convinced that **regulatory measures ought to be urgently taken without further delay to protect health, safety and the environment**. Existing EU legislation needs to be reviewed and adapted to ensure that the potential risks related to nanomaterials are adequately addressed. Considering the above, we strongly welcome the European Parliament's recent Resolution on nanomaterials¹⁵ in which MEPs pledged for a safe and sustainable approach to nanomaterials. We fully support the assessment that “the value of the Commission Communication on “Regulatory aspects of nanomaterials” is rather limited” and the disagreement

related research, such as A.Franco et al.: Limits and prospects of the “incremental approach” and the European legislation on the management of risks related to nanomaterials, *Regulatory Toxicology and Pharmacology* 48(2007), 171-183. The Royal Society and The Royal Academy of Engineering also recommended that a review of regulatory gaps be carried out. Three Government reviews have been carried out: by the Department for Trade and Industry (DTI), by the Health and Safety Executive and by the Food Standards Agency.

¹⁴ Regulation (EC) No 1907/2006 on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH).

¹⁵ Resolution on Regulatory aspects of nanomaterials adopted by the European Parliament on 24 April 2009.

with the conclusions drawn by the Commission. We share the Parliament's call on the Commission to review all relevant legislation within two years. In particular, we support their call for the Commission to evaluate then need to review the legislation most relevant to nanotechnologies including REACH, waste legislation and worker protection legislation. We would like to stress that product safety and consumer protection legislation are also of utmost importance.

We will make below recommendations about how some of most consumer relevant legislative instruments should be adapted to ensure a high level of safety for consumers.

4.1. REACH

We urge the Commission to amend the REACH Regulation to ensure a proper registration and assessment of nanomaterials.

First, nanomaterials should be treated as new substances under REACH (i.e. any registration or approval valid for larger sized particles – “bulk materials” - of the same substance would not be considered sufficient for nanomaterials). This was already recommended by The UK Royal Society and The Royal Academy of Engineering in 2004¹⁶.

Second, the tonnage threshold of 1 tonne per year above which substances have to be registered by industry may be higher than the production volume of many nanomaterials. One way to adapt REACH to nanomaterials would be to define a lower specific mass threshold and / or unit (for instance surface area per volume) above which nanomaterials would have to be registered. Another option could be to impose a simplified registration system for nanomaterials, produced below the current annual registration volume of 1 tonne, with reduced information requirements as already exists for chemical substances used for the purpose of Product and Process Oriented Research and Development (PPORD) under REACH. Both options have been proposed by REACH Competent Authorities in a meeting in December 2008¹⁷.

Third, Article 7 of REACH which addresses the registration and notification of substances in articles must be adapted to nanomaterials. We believe that the use of nanomaterials in articles should be notified whatever the quantities in which the substance is present in those articles and whether or not it is intended to be released.

¹⁶ Nanoscience and nanotechnologies: opportunities and uncertainties, July 2004:
<http://www.nanotec.org.uk/report/chapter10.pdf>

¹⁷ See Follow-up to the 6th Meeting of the REACH Competent Authorities for the implementation of Regulation (EC) 1907/2006 (REACH) 15-16 December 2008:
http://ec.europa.eu/enterprise/newsroom/cf/document.cfm?action=display&doc_id=2368&userservice_id=1&request.id=0

Furthermore, the volume threshold of 10 tonnes per annum above which a chemical safety assessment¹⁸ (CSA) has to be conducted and a chemical safety report¹⁹ (CSR) developed as part of a registration application is also inadequate for nanomaterials. We consider that a chemical safety assessment should be required for all nanomaterials which would have been registered. More importantly, we consider that the chemical safety assessment of a nanomaterial, contrary to that of a “normal” substance, should systematically include an exposure assessment and a risk characterisation, even if the registrant did not conclude that the nanomaterial meets the criteria for classification as dangerous in accordance with Directive 67/548/EEC or is assessed to be a bio-accumulative and toxic (PBT) or very persistent and very bio-accumulative (vPvB) substance. This will ensure that a proper risk assessment will be performed.

Further discussion is needed on conditions for requiring authorisation of nanomaterials.

Finally, Annexes IV and V of REACH which list substances which are exempted from the registration requirements need to be adapted in order to ensure that no nanomaterials are included.

Above all, adapted test methods ought to be developed as soon as possible in order to ensure that REACH adequately covers nanomaterials.

4.2. Product safety legislation

The General Product Safety Directive²⁰ (GPSD) covers products intended or likely to be used by consumers unless these products are covered by more specific directives, eg. for toys, electrical equipment, machinery, personal protective equipment, construction products, medical devices and several others. All these product-specific directives follow the so-called “New Approach”, which means that they contain only “essential safety requirements” and leave it to the standards bodies, which are private organisations, to elaborate detailed specifications based on standardisation mandates by the European Commission. This framework (i.e. GPSD and product-specific legislation) does not adequately take into account “normal” chemical hazards which are typically just briefly touched upon in some of the directives. The GPSD for instance just calls for only “safe” products to be placed on the market and leaves it to industry and authorities to interpret what this precisely means. No suitable instruments (such as a comitology procedure, use of opinions of scientific committees) are available to establish legal limit values for chemicals in products let alone to take any measures with respect to nano ingredients. We believe that fundamental changes are needed with respect to this framework to properly address chemical hazards

¹⁸ According to REACH, the chemical safety assessment of a substance includes a human health hazard assessment, a physicochemical hazard assessment, an environmental hazard assessment and a persistent, bio-accumulative and toxic (PBT) and very persistent and very bio-accumulative (vPvB) assessment.

¹⁹ The chemical safety report is the report documenting the chemical safety assessment.

²⁰ Directive 2001/95/EC.

including nanomaterials. In particular, the comitology procedure should be used to set up limit values for nanomaterials in products.

4.3. Cosmetics Regulation

Cosmetic products containing nanomaterials are already widely available on the European market, for example in sun protection products, anti-aging creams... despite unanswered questions about their safety and the absence of specific legislative safety requirements. We therefore welcomed the vote of 24 March 2009 of the European Parliament which confirmed the first reading agreement reached between Parliament and Council on a new regulation on cosmetic products (recast of the existing Directive²¹). For the first time, nanomaterials are addressed in EU legislation. Although very narrow (only insoluble or bio-persistent nanomaterials are included), a definition of nanomaterial has been introduced in the Regulation. Moreover, manufacturers will have to notify the European Commission of the use of nanomaterials in products. In addition, when nanomaterials are used for certain specific purposes (colourings, preservatives or UV filters), their safety will have to be evaluated before they are allowed onto the market. Finally, we are pleased that nanomaterials will have to be clearly labelled in the list of ingredients of a product and that a catalogue of all cosmetic products which contain nanomaterials will be made public.

We now expect the Commission to ensure a proper implementation and enforcement of the Regulation. We call on the Commission to use the notification procedure effectively and Member States to back up the labelling of products with clear consumer information. We also call for the definition of nanomaterials which has been introduced in the Regulation to be kept under review and to be adapted as soon as a definition is agreed at the European level or internationally.

4.4. Food legislation

Food Additives

The food additives Regulation adopted in 2008 makes reference to nanotechnology²². It states that, for an additive where there is a change in the particle size, for example through nanotechnology, a new evaluation would be required from the European Food Safety Authority (EFSA). We welcome the fact that, under such circumstances, an additive is considered a new additive and therefore needs a new entry in the Community lists before it can be put on the market (Article 12). In the new Regulation it is stated that the approval of additives should also take account of the precautionary principle.

²¹ Directive 76/768/EEC on cosmetic products.

²² Regulation (EC) No 1333/2008 on food additives.

Clarification is needed however on how the Commission will determine whether a food additive is nano or not as there is no definition within the text. We call for the application of the proposed definition contained within the updated Novel Foods Regulation to be applied in this case. There is also a lack of transparency as to how nano additives which are already on the market will be dealt with and we call on the Commission to clarify this issue. We also call for clarification as to whether or not nano additives would be required to be labelled (both those intended for sale to the final consumer and those which are not intended for sale to the final consumer).

Novel Foods

There are no specific criteria to consider particle size under the current Novel Foods Regulation²³. However, the assessment of the novel food or novel food ingredient²⁴ includes details of the composition, nutritional value, metabolism, intended use and the level of microbiological and chemical contaminants.

The Novel Foods Regulation is currently being updated and specifically makes reference to nanomaterials. We are pleased that a definition for nanomaterials has been proposed based on recently published EFSA and SCENIHR opinions. We believe that this is an important step forward as it will make it easier for information exchange on current and future commercial applications of nanomaterials in the food area. We also welcome the addition that any nanomaterial must be assessed and authorized before it can be marketed. Another positive addition is the need for pre-market authorisation for nanomaterials used in the production process but not present in the final product. We welcome this important clarification in the text as in the past industry has not declared materials used in the production process which they said were not present in the final product.

Regarding the labelling of nanomaterials in food, there should be mandatory labelling of the nano-content of food products in the list of ingredients: the name of the food ingredient in nano form should be followed by the word “nano” in brackets. This would be coherent with the mandatory labelling requirements for nanomaterials introduced in the recently adopted Cosmetics Regulation, This is a critical point which should be addressed in the final Regulation.

Other food related legislation

Within the area of food, other applications for nanomaterials and nanotechnologies should be closely looked at and relevant legislation might need to be adapted in order to ensure a high level of safety for consumers. Packaging and materials in contact with food²⁵ in particular constitute the largest share of the current and short-term predicted markets for nanotechnologies. Many food

²³ Regulation (EC) No 258/97 on novel foods and novel food ingredients.

²⁴ Novel foods are foods and food ingredients that have not been used for human consumption to a significant degree within the Community before 15 May 1997.

²⁵ eg. Regulation 1935/2004 on materials and articles intended to come into contact with food.

supplement products are already available over the internet. It is also claimed that nanotechnologies offer many other advantages in the food sector from production/processing technology to improved traceability and product security. There are also claims that nanotechnologies can be used to modify organoleptic properties of a food and can increase absorption of nutrients.

Although the area of food is already relatively highly regulated with a requirement for pre-market assessment of many of these products (eg. food contact materials, food supplements and additives), greater clarity is still needed about requirements in relation to ingredients in nano form. It has to be clear that even if a substance has already been assessed in conventional form, it will need reassessment. As with all consumer products, we are very concerned, particularly in light of EFSA's opinion on the Potential Risks Arising from Nanoscience and Nanotechnologies in Food and Feed Safety²⁶, that there are key knowledge gaps and uncertainties that will make risk assessments very difficult. This is compounded by the lack of data on potential exposure.

The food area also reinforces the broader need to ensure that legislative requirements can be practically implemented by risk assessors, risk managers and also enforcement officers who have the day-to-day responsibility for ensuring compliance within Member States, but are unlikely to be familiar with the issues raised by nanomaterials.

5. Standardisation work

Public interests in standardisation are currently marginalised, especially at the international level. This leads to a lack of balanced representation, which cannot ensure a high level of protection for citizens and the environment. Standardisation is a useful tool to establish test methodologies and other technical specifications in the field of nanotechnologies. However it should certainly not be used to resolve highly political issues, eg. the setting of limit values for chemicals. In parallel, there is a need to establish fundamental rules such as limit values for specific nanomaterials in consumer products in legislation. Comitology procedures should also be used when there is the need to rapidly adapt regulatory provisions to new scientific and technological developments, as it is the case for nanotechnologies.

At the international level, ISO Technical Committee (TC) 229 deals with standardization of nanotechnologies and developed, among other things, a definition of nanoparticles as 'approximately 1 to 100nm'²⁷. At the European level CEN TC 352 is also dealing with nanotechnologies, with specific tasks being classification, terminology and nomenclature, basic

²⁶ Scientific Opinion of the Scientific Committee on a request from the European Commission on the Potential Risks Arising from Nanoscience and Nanotechnologies on Food and Feed Safety. The EFSA Journal (2009) 958, 1-39

²⁷ ISO TR 27687.

metrology, measurement and characterisation (including procedures for calibration), health, safety and environmental issues. It set up a dedicated group to elaborate a guide to labelling of manufactured nanoparticles and products²⁸. The guide should cover both business to consumers and business to business products. We will soon review the work programme of both ISO and CEN to identify consumer relevant work items and elaborate a position on the CEN labelling proposal to ensure that any guidance given to manufacturers of nanomaterials or products containing nanomaterials provides at least the name and amount or concentration of the nanomaterials.

6. Transparency and traceability

Today there is a serious lack of information on which products using nanotechnologies are already on the market, in the pipeline or at the research stage. More transparency regarding the uses and applications of nanomaterials is needed. In some Member States (eg. in the UK), voluntary reporting schemes calling on industry to volunteer information on the use of nanomaterials have been established but have not been very successful²⁹. We therefore call on the introduction of **a mandatory notification of all nanomaterials** which are used in products - whatever the nature of the product - before products can be placed on the market and for those products already on the market. Industry should also provide the identification and specification of the substance, the quantity in which the substance is used, the toxicological profile of the substance and relevant safety data, information about the test methodologies used and finally, reasonably foreseeable exposure conditions.

We welcome as a first step that according to the new Cosmetics Regulation, the Commission is required to create a catalogue of all nanomaterials used in cosmetic products. However, **we urge the Commission, with the help of Member States, to set up an extensive inventory of all nanomaterials** used in all products already available on the market, with which consumers come in direct, close or regular contact, and products which lead to discharges into the environment.

This inventory would have to be made publicly available. Such an inventory would not only be in line with the public's right to know but would also ensure a proper evaluation of exposure of humans and the environment to nanomaterials.

We therefore welcome DG SANCO's plans³⁰ to seek collaboration with other European Commission services, EFSA and other EU Agencies to investigate the feasibility of an EU-wide inventory of

²⁸ CEN TC 352 WG2 PG1

²⁹ The UK scheme received only 12 submissions in 2 years.

³⁰ Follow-up to the 2nd Nanotechnology Safety for success dialogue: top ten actions to launch by Easter 2009 (http://ec.europa.eu/health/ph_risk/ev_20081002_en.htm).

nanotechnology-based products. We invite the Commission to effectively cooperate with Member States and with other countries outside the EU in order to take into account existing databases³¹.

Finally, it must be ensured that no misleading claims and advertising can be made on the use of nanomaterials. Any claims industry makes about health, safety and/or environmental aspects of products containing nanomaterials should be scientifically substantiated.

7. Product labelling

Today, it is almost impossible for consumers to identify products which contain or have been made using nanomaterials. For instance, many cosmetic products make no reference to nanomaterials on the packaging, although they do use them, whereas others refer to the use of nanomaterials in their list of ingredients. On the other hand, it has been found that some manufacturers make specific marketing claims or advertisements about their products containing nanomaterials. This was confirmed by a report published by BEUC member organisation Which? in the UK in November 2008: the report highlighted that many nanomaterials including some which have already raised particular concern (nanosilver, fullerenes nanozinc oxide and nanotitanium dioxide) are already used in cosmetic products sold on the EU market but are not always labelled. This presents a confusing situation for consumers and the authorities who cannot identify products which contain nanomaterials. Of course a definition of what is a nanomaterial ought to be developed first, as labelling is hampered by the lack of a definition.

In this context, in the case of products which contain a list of ingredients on the label (such as food), **we call for the name of the ingredient in nano form to be followed by the word 'nano' in brackets in the ingredients' list.** We welcome that this will be made mandatory for cosmetic products when the new Cosmetics Regulation will enter into force. This would help consumers identify which products contain nanomaterials and make informed choices, in particular whilst there are uncertainties around health and environmental impacts of nanomaterials. However, **for products that do not contain a list of ingredients, the need for labelling should be evaluated on a case-by-case basis taking into account the level of consumer exposure.** The format of the labelling would also have to be decided on a case-by-case basis.

In addition, for all categories of products, the presence of nanomaterials should be indicated in the product technical files and/or the safety data sheets. It would allow governments and competent bodies to assess those products which are most likely to be of greatest concern based on current understanding and would allow for proper exposure assessments to be carried out. This labelling requirement should be particularly applied to products which lead to discharges into the

³¹ Such as the Nanotechnology Consumer Products Inventory of the Woodrow Wilson International Center for Scholars: <http://www.nanotechproject.org/inventories/consumer/>

environment, where appropriate, under the framework of the applicable legislation (RoHS³², WEEE³³). This would have to be decided on a case-by-case basis.

Above all, we want to stress that labelling requirements for products should not at all be considered sufficient or be regarded as an acceptable substitute for more far reaching measures such as obligatory pre-market safety assessment systems. Regulatory measures ought to be initiated to prevent exposure of consumers and the environment to potentially dangerous nanomaterials. Requiring only labelling requirements for products might lead to shifting the responsibility on consumers to be exposed or not and is thus not acceptable. Moreover, labelling requirements need to be backed up with broader consumer information about nanotechnologies and nanomaterials.

8. Public engagement

Many studies have already been undertaken to identify what European citizens know about nanotechnologies and nanomaterials and their perception of them (see Annex II). Most of them have shown that there is a huge lack of knowledge amongst citizens and in particular consumers about nanotechnology, the use of nanomaterials and the potential risks.

There is therefore a need for the Commission and Member States to undertake an EU-wide public debate on nanotechnologies. Although these are new scientific and technology developments and are highly technical, these technologies present ethical, legal, social aspects³⁴ and should be considered as major democratic challenges. Effective participatory processes ought to be developed in order to ensure transparency, awareness and accountability in policy making and to allow citizens to fully engage into decisions which will have an impact on their everyday life. This should also feed into the research agenda and influence developments. The Commission and Member States need to ensure that the voice of groups representing public interests is properly taken into account.

The discussion on nanotechnologies and nanomaterials should not be restricted to aspects of human health or environmental risk assessment. There are additional aspects which are to be considered such as the question of how society can effectively be involved in the development of science and technology in a democratic manner rather than leaving it entirely to business and the market. Also ethical issues need to be discussed.

³² Directive 2002/95/EC on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

³³ Directive 2002/96/EC on waste electrical and electronic equipment.

³⁴ So-called ELSA aspects i.e. What will our society look like with nanotechnology in the future? Are there any negative environmental or health impacts? Will the products be profitable for all? Whom will the technology benefit or harm? What are the ethical problems? For more information, see: ftp://ftp.cordis.europa.eu/pub/nanotechnology/docs/elsa_governance_nano.pdf



In order to prepare such public debates, it might be useful to establish and/or make use of independent bodies dedicated to nanotechnologies, both at the national and European levels. The purpose would be to gather knowledge on nanotechnology, their risks and benefits, and disseminate this knowledge to the public and businesses in an easily understandable manner. In other words, to translate scientific information into a language which would be easier to understand for all.

The outcomes of public debates on nanotechnologies should be taken into account in order to inform consumers and address any areas of potential concern such as in the case of short and long term impact on human health and the environment. Transparency, including openness about uncertainties and knowledge gaps, is essential for public trust in nanotechnology

9. Anticipating future generation technologies

The US Environmental Protection Agency (EPA), among others, predicts that future nanotechnologies will converge with other forms of technology thereby leading to new generation nanomaterials, products and technologies (2nd, 3rd, 4th generation...) on the global market. It is therefore important to try to anticipate the development of nanotechnologies in order to ensure that future-generation nanomaterials are safe for health and the environment. Government funding for research should also recognise the current cross-disciplinary knowledge gaps and anticipate future knowledge needs, such as risk assessment technologies for nanobiotechnology.

Annex I – Non-exhaustive BEUC and ANEC inventory of products claiming to contain nanoparticles available on the EU market³⁵

PRODUCTS INTENDED TO BE USED BY CHILDREN			
Company	Country of origin	Product	Characteristics and product claims
Korres	Greece	Sunscreen emulsion for children SPF 30	Sunscreen for children with filters of titanium dioxide.
Pure Plushy Inc.	USA (available in the EU)	Donny the dog – Anti-microbial stuffed toy	As the first anti-microbial toy it is said to protect the product and child against bacteria, mites and mould and kill odour-causing bacteria. It is also claimed to be safer for children with asthma and allergies.
Banana Boat	USA (available in the EU)	Kids Tear Free Sun SPF 30	Sunscreen that claims to use titanium dioxide (AvoTriplex) to protect kids from a broad spectrum of UVA/UVB

³⁵ Methodology used: The ANEC/BEUC inventory shows examples of 100 products containing nanomaterials which are available for consumers in the EU. Research was carried out between 31 October 2008 and 23 April 2009 through search on the internet and in shops. The inventory only contains products that are actually being promoted as containing nanomaterials. Disclaimer: due to the frequent update and possible obsolescence of web pages, no web addresses are provided in this paper.

Pure Plushy Inc.	USA (available in the EU)	Benny the Bear – Antimicrobial stuffed toy	As the first anti-microbial toy it protects the product and child against bacteria, mites and mould and kills odour-causing bacteria. It is also claimed to be safer for children with asthma and allergies.
Korres	Greece	Sunscreen emulsion SPF30	Sunscreen for children with filter of titanium dioxide.

COSMETIC PRODUCTS			
Company	Country of origin	Product	Characteristics and product claims
NanBabies	USA (available in the EU)	BioSafe Hand and Face kit	A kit consisting of hand wipe, spray with nanocrystalline silver and facemask that is said to protect you from airborne virus and bacteria as well as from viruses.
Chanel	France	Precision Blanc Essentiel Nanolotion	A lotion that claims to moisturise and lighten the skin.
Nucelle	USA (available in the EU)	SunSense™ SPF 30+ Sunscreen	Nanotechnology Z-cote HP1 nanosized zink oxide protects the skin from the sun with less application needed compared to other sunscreen products.

Dr Brandt	USA (available in the EU)	Lineless Essentials	Skincare range that contains fullerenes, described as “radical sponges that stop the action UVA and UVB by absorbing free radicals”.
Chantecaille	France	Nano Gold Energizing Cream	This facial cream uses 24-karat gold nanoparticles. It states: “this extraordinary cream consistently replenishes skin’s energy using nanotechnology to safely deliver the power of pure gold. By promoting cell metabolism and stimulation collagen production, skin retains optimal health and youthful vitality”.
Beyond Skin Science	USA (available in the EU)	Eternalist Anti-aging System	Skincare range that uses nanotechnology to penetrate the outer layer of the skin to deliver the active ingredients to the cells, that is microemulsion “special nanoparticles”
Korres	Greece	Red Vine Hair Sun Protector	Claims that the concentrated substance carried by nanoparticles, protects the hair from the damaging sun with protective UV filters carried by nano particles.
Sundance	Switzerland (available in the EU)	Sunscreen product	Contains nano-titanium dioxide
Theramed	Austria	S.O.S Sensitiv (toothpaste)	Claimed to repair teeth if there are small holes
Dr. Best	Germany	Toothbrush	Contains nanosilver

N.V Perricone M.D	UK	Men's fitness line	Men's skin care range that contains fullerenes. The manufacturer claims that it "provides superior anti-aging benefits and protection".
AGERA medical formula	UK	Agera nano eye lift	Anti-aging eye cream. "This product provides the delicate eye area with the latest in anti-ageing skin care technology".
Rosactive	UK	Biomixyl Treatment Kit	This anti-aging kit's formula is based on nano protein
PureLogicol International	UK	Purelogicol Instant Lip Plumper	This lip treatment is said to plump and define the lips through its MVS-Lips™ nanotechnology
Tracie Martyn	UK	Shakti resculpting body lotion	Shaping body cream. "we have again merged science and nature using nano-technology to deliver natural black currant lipids deep into the skin for moisturization".
Klein Becker	USA (available in the EU)	StriVEctin-NE Self-Heating hand NanoExfoliant	Exfoliant for hands. "Our thermo-active NanoExfoliating technology delivers substantial dermabrasive proerities without causing lasting redness or damaging the skin"
Salcura	UK	Zeoderm Skin Repair System	This skin system claims to effectively remove dryness, thereby being "suitable and safe" for people with different kinds of skin problems. It has "no known sideeffects". Its active substance is Zeolite Clinoptiolites (ZeomaZ Patented)

LEOREX	Israel/USA (available in the EU)	LEOREX Booster Hypoallergenic Anti-wrinkle nano-booster	This cream treatment is said to through the nano silica network ensure slow release of nourishing materials. "the nanoparticles scavage free radicals and toxins, mechanically pull and flatten the wrinkles"
KOSÉ® Corporation	Japan (available in the EU)	Rutina nanoforce (5 products)	
NV Perricone M.D.	USA (available in the EU)	Men's skin fitness shave cream with fullerene technology	Men's shaving cream containing fullerenes.
KOSÉ® Corporation	Japan (available in the EU)	Rutina nano-white	
La Prairie	Switzerland (available in the EU)	Caviar Ampoules	A nanoemulsion is said to enable the patented substance to penetrate the skin for a brighter skin with less wrinkles.
Lancome®	France	Hydra zen® cream (SPÉCIAL PEAUX SÈCHES)	In this cream substances combined with nano encapsulated Triceramides, this skin cream claims to restore and renew skin's healthy look.
Lancome®	France	RÉNERGIE MORPHOLIFT (3 products)	
L'Oreal®	France	RevitaLift® Double Lifting	This face cream contains Nanosomes of Pro-Retinol A. "The first double-action cream that instantly re-tautens the skin and the appearance of wrinkles".

Arbonne International, LLC	USA (available in the EU)	NutriMinC® RE ⁹	
Arbonne International, LLC	USA (available in the EU)	NutriMenC™ RE ⁹	
Beyond Skin Science, LLC™	USA (available in the EU)	Eternalis™ (several products)	
Enprani®	Korea (available in the EU)	Innermost (8 products)	
DERMAdoctor®	USA (available in the EU)	POUTlandish Hyper Moisturizing Lip Paint & Treatment	
MyChelle Dermaceuticals	USA (available in the EU)	Revitalizing Night Cream	
SIRCUIT®	USA (available in the EU)	SIRCUIT®WHITE OUT	This cream contains both fullersomes™ and titanium dioxide.
SIRCUIT® Cosmeceuticals inc.	USA (available in the EU)	SIRCUIT®O.M.G.™ serum	
SIRCUIT® COSMECEUTICALS INC.	USA (available in the EU)	SIRCUIT®Sircuit Addict™	
Zelens Dermatological (UK) Ltd.	UK	Zelens® Fullerene C-60 Day and Night Cream	
AmerElite Solutions®	USA (available in the EU)	The CollagenFusion™ Botanical Skin Care System (6 products)	

MOXIE for men	USA (available in the EU)	D-fence™, Antioxidant Moisturizer with SPF 17	The trademark for this product is Zin Clear™, "nanotechnology ingredient that provides FULL UVB/UVA protection".
Ishizawa Laboratories Co., Ltd.	Japan (available in the EU)	Nanoce Moisture Liquid Foundation	
G.M.Collin	France	Soothing Moisturizing Lotion Nanoemulsion 10 ⁻⁹	
G.M.Collin	France	Sun Veil SPF 15 Urban Protection	
AmorePacific®	Korea (available in the EU)	TIME RESPONSE® Skin Renewal Crème	
L'anza	USA (available in the EU)	L'anza healing moisture tanamu cream shampoo	Deeply moisturises the hair through a nanotechnology Keratin Healing System™
Greenyarn LLC.	USA (available in the EU)	Soft cloth mask	
Alfaparf	Italy	Shampoo	Shampoo with "Active power hair Nanotech-solutions"
Dr Peter Proctor	USA (available in the EU)	Nano Shampoo	Shampoo and hair loss treatment
Chanel	France	Précision Calming Emulsion	Cream containing a nanoemulsion
Marie Louise	USA (available in the EU)	Marie Louise Vital Nanoemulsion	"Marie Louise applies the latest technology to nano-sized ingredients and seals them in triple-layered capsules of vitamin A, Vitamin C and Vitamin A. As each layer sheds in different layers of the skin incrementally"

Dior	France	Extreme wear flawless make-up FPS 25	This powder foundation claims to have a unique formula based on “micro-airy nano network” for perfect complexion.
JUVENA	Switzerland (available in the EU)	DNA Skin Optimizer SPF 20 Cream	By using 40 nanometers size ingredients the manufacture claims to be able to deliver the active substance to the cells promote anti-aging.
Lancome	France	Hydra Flash Bronzer daily face moisturizer	One of the ingredients in this self tanning lotion is nanosized vitamin E.
StHerbs	Thailand (available in the EU)	Stherb Nano Breast Serum	“Stherb nano breast serum is the is the combination of nano particles of the latest nanotechnology with the phyto estrogens herb extract, Pueraria Mirifica”
Stherb	Thailand (available in the EU)	Stherb Anti-Cellulite Nano cream	Stherb Anti-Cellulite Nano cream

FOOD PRODUCTS			
Company	Country of origin	Product	Characteristics / product claims
Pharmanex	USA (available in the EU)	NanoCoQ10®	Nutritional supplement. Through nanotechnology improvement, consumers are told to be expecting cardiovascular, antioxidant and cognitive benefits.
Dr Mercola	USA (available in	B-12 Energy	Nutritional supplement. Through Nanotechnology the spray is said to deliver the nutrition to the body for

	the EU)	Booster spray	fast and easy absorption.
Purest Colloids	USA (available in the EU)	MesoGold®	“All natural mineral supplement of colloidal gold”, liquid.
Purest Colloids	USA (available in the EU)	MesoSilver®	“All natural mineral supplement in the form of nanoparticle colloidal silver”.
Muscle Tech	USA (available in the EU)	MuscleTech® naNO VAPOR™	This muscle building supplement is said to increase the muscle mass for unrestrained size and inhuman strength. The nanoparticles (naNO VAPOR) formula is also described as “immensely powerful particles that violently invade cells, triggering raw, untamed increases in muscle size and strength”
Alocost	Sweden	Nano- magnesium	Nutritional supplement magnesium. They claim that by making the magnesium negatively charged instead of its naturally positive being, the body can absorb the nano-magnesium in a much higher level than possible before.
Solgar	USA (available in the EU)	Solgar NutriNano CoQ10	With the help of nanotechnology this supplement is said to be more effective than regular CoQ10
Squeezy	USA (available in the EU)	Squeezy nano energized mineral gel	This nano gel, to be used after physical activity, contains more than 20 minerals. Because of the small size of particles the minerals are transported directly to the body’s cells.



MuscleTech	USA (available in the EU)	Cell-Tech Hardcore	Muscle building supplement. "A portion of this explosive, scientifically engineered creatine blend has Nano-Diffuse™ technology to hyper-accelerate the musclebuilding process".
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OTHER PRODUCTS			
Company	Country of origin	Product	Characteristics / Product claims
BOSCH	Germany	Refrigerator KGP 36390	The natural silver, AntiBacteria by AgION claims to prevent growth of bacteria inside the refrigerator.
NanoSys	Switzerland (available in the EU)	Nano perl 119	Protective spray for wood. Protects the material from water and UV radiation.
NanoSys	Switzerland (available in the EU)	Nano-Cotta	Protection spray protects terra cotta from aging from calcium oxide and mould.
NanoSys	Switzerland (available in the EU)	Nano Click	Protective spray for parquet floors.
Melvo	Germany	Coxy Super Protector	Shoe protector spray containing nanoparticles
Eurochem	UK	Nanowash 66 car shampoo	"A special blend of nano particles, waxes and detergents for the effective cleaning of all vehicle body types." "The more you use this product the stronger the nano

			particle build up on all surfaces”
AgActive	UK	100% cotton sheet set	“Our sheets have been proven to kill over 99% of bacteria including MRSA”
Neff	UK	Refrigerator K5654	This refrigerator contains a antibacterial system, Silverclean
Gore	USA (available in the EU)	Elixir® Guitar Strings	Guitar strings coated with microthin nanoweb® coating.
Timberland	USA (available in the EU)	Shoes Annapolis	Shoes Agion™ treated footbed to inhibit growth of odour casing bacteria’s.
Percenta Europe Ltd	Germany	Textile protector and window cleaning	Seals and conserves fabrics and leather, water and dirt resistant.
Babyliss	UK	BaByliss Paris Pro 230° Sol-Gel Nano	Hair straighter with nanotechnological coating
BaByliss	UK	Pro Sleek expert nano straightener 230	Hair straighter with nanotechnological coating

Deichmann	Germany	Nano Sport Impregnation spray	Tiny nano particles are said to protect shoes from wetness and stains.
Samsung	UK	Washing Machine Silver Nano WFJ145NS	Washing machine that claims to sterilize over 650 types of bacteria thanks to its Silver Nano Sterilization System
Carter-Wallace	USA (available in the EU)	FirstResponse Home pregnancy test	This home pregnancy test uses gold particles to help the user read tests more easily and get answers earlier
AgActive	UK	AgActive towel	The cotton towel is treated with SilverSure that is claimed to assure that “the towel stays bacterial and odours free no matter how long between washes”.
Acticoat	UK	Acticoat Antimicrobial Barrier Dressing	Antimicrobial barrier dressings for use over wounds. Uses patented silver technology – SILCRYST Nanocrystalline
Pilkington	UK	Pilkington Active Self-Cleaning Glass	A glass coated with photoactive film that claims to clean itself. First because of the organic dirt reacts with daylight and breaks down, secondly, rain that hits it does not form droplets but rather a sheet that cleans the remaining dirt without leaving marks.

Apple/Samsung	USA (available in the EU)	iPod Nano	Apple's iPod uses a NAND flash memory. This semiconductor manufacturing method has a precision below 100 nm and it is partly due to this that enables the iPod nano's small size.
Nanotex	USA (available in the EU)	Nanotech Coolest Comfort	This fabric manufacturer claims that through nanotechnology each fiber has been fundamentally transformed. This is said to give the fabrics characteristics as balancing body temperature, retains fabrics natural softness and allows fabric to breath naturally.
Nigrin	Germany	Window cleaner for cars windscreen cleaner	The active nanoscaled substances contained is said to make the windows more cleaner
Alpina	Germany	AirClean (Indoorcolor)	Wall paint with nano titanium dioxide – sold in "do it yourself" shops
Kiwi	Germany	Super Protector	Protects shoes against water using nanoparticles
SoleFresh™	UK	SoleFresh™ Nano Silver® socks	Claimed to prevent foot odour, they prevent athlete's foot, itching, chilblains and heel cracks - which are prone to infection for people with diabetes. Claimed to be non toxic, non allergic, natural and safe.
Emsal	Germany/	Ground- maintenance	Household product

	Austria		
JUIC	Australia (available in the EU)	Couga Table tennis racquet	Nanotechnology in rubber is claimed to make the ball go faster
STIGA	Sweden	Hybrid wood table tennis racquet	Uses nanotechnology by carbon nanotubes in the blade
Sealit Nano	Sweden	Textile and leather conservation (textile och läderkonserverin g)	Nano spray that protects all kinds of textiles such as sofas or clothing.
Sealit nano	Sweden	Multi conservation (multikonserveri ng)	Product that protects from dirt and liquids when applied to most surfaces in a household
Wenko-wenslo	Germany	Nano surface protector	Protects all kinds of garden equipment from dirt and stains.
Wenko-wenslo	Germany	Nano stone cleaner	“Preserve the look of stone surfaces for up to one year with one application of the Nano Stone Cleaner. Simply brush on – no extra cleaning needed.” Product offers from the Independent, the Guardian,
Lands’ End	UK	Men’s no-iron comfort-waist plain front chinos	Made with Nano-Tex™ finish that resists spills and wrinkles

Sealit nano	Sweden	Nano sponge (nanosvamp)	With small pores mixed with normal size ones, this nanosponge is said to be able to even remove chewing gum and paint.
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Annex II - Consumer perception in Europe (including Switzerland)

In Germany

The Federation of German Consumer Centers (vzbv) commissioned a study last year, "Nanotechnologies: What consumers want to know"³⁶. One result of this study is that 64 of 100 surveyed consumers have a positive approach concerning nanotechnologies. Only five percent of the respondents had a negative approach. Consumers express their intention to buy "nano-products" but only if it is clear that the products are safe and information about the risk questions are available. Consumers want to be informed about nanotechnologies and the products. The information being available now is not enough.

While for the vzbv study only 100 consumers were interviewed, another German survey from the Federal Institute of Risk Assessment in 2007 made a representative survey of 1000 consumers. 66 % of the respondents believe that there are more advantages than risks. In general the consumer perception is positive but it depends on the area where nanotechnologies are applied. In the food sector, nanotechnologies have a negative image especially nanoparticles. The negative image does also apply for other application areas with close contact to the human body such as cosmetics, toiletries. The perception is also negative when nanotechnologies are applied to the "military" (because consumers have a negative perception of the military). According the BfR survey most of the consumers (87% of the interviewees) are frightened of negative health effects. In other application areas the consumer perception is positive especially when nanotechnologies pledge technical innovations. Examples for these innovations are improvements in the treatment of diseases or environmental protection, better use of energy resources, more convenience or more security.

In the United Kingdom

A Which? survey in October 2008 found that only 45% had heard of the technology³⁷. In November 2007, Which? conducted a citizen's panel³⁸ to gain a better understanding of consumer reactions. The key issues raised by the panellists were:

³⁶ www.vzbv.de

³⁷ Which? face to face survey of 877 adults aged 16+ representative of adults in the UK, October 2008.

³⁸ Opinion Leader Research conducted a Citizens' Panel on behalf of Which? with 14 members of the public. Panellists were selected broadly to reflect the general public and sat for three days from 29th November – 1st December 2007. The venue was Birmingham University and panellists were recruited from Birmingham and the wider West Midlands area. Expert witnesses were called upon to explain nanotechnologies, the overall benefits and issues, applications in particular areas (including benefits and issues) and the policies and controls in place. The Panel was overseen by a steering group, with a range of expertise and interests, who advised on the approach, agenda and selection of witnesses (see www.which.co.uk/nanotechnologies for full details)

Safety – there was concern that there are already products on the market when scientists are uncertain of the safety of the nanomaterials involved.

Lack of regulation – There was consensus that self-regulation is inadequate and concern that no regulations specifically to deal with issues raised by nanotechnologies appeared to exist.

Information – there were concerns that there are currently no requirements to inform consumers about products using nanotechnologies – but panellists also acknowledged that this information would not be useful unless the public were given broader information.

In Denmark

A qualitative survey performed by the Information Centre for Environment & Health in the autumn of 2007 showed that the public is most concerned about inhaling, ingesting, and coming in contact with free nanoparticles, but contamination of the environment is also of concern. The survey also showed that people are more afraid of risks they cannot control.

The public gets most of its knowledge from the media, although they say they do not trust the media as a reliable source for information. They have some trust in government but little trust in industry. The Danish public has the greatest amount of trust in NGO's for reliable information and protection of their interests.

In April 2008, the Danish Consumer Council conducted a nationwide survey aiming to find out the general public's opinion on nanotechnology. The results were that the Danish population was optimistic about nanotechnology: 73% of the respondents said that they are either positive or very positive about nanotechnology. The survey also showed that people know very little about nanotechnology and that acceptance of nanotechnology varies by application. People say they would be likely to use nanotechnology in medicine and electronics but least likely to use nanotechnology in personal care and food products. The perception of nanotechnology is heavily dependent upon knowledge: interviewees who claimed to be more familiar with nanotechnology had a more positive opinion of it.

In Switzerland

The Center for Technology Assessment TA-SWISS organised a publifocus on "Nanotechnologies and what they mean for health and the environment"³⁹ which ended in December 2006. The findings are that public awareness in Switzerland was very low and that an early social dialogue

³⁹ See final report Public reactions to nanotechnology in Switzerland, Nov 2006: http://www.ta-swiss.ch/a/nano_pfna/2006_TAP8_Nanotechnologien_e.pdf; http://www.ta-swiss.ch/f/them_nano_nafo.html



on new technologies is of great value, in particular when citizens are personally affected by the technologies. Participants in the moderated debates say they are willing to see the benefits of nanotechnologies in particular in medicine and in environmental protection as well as in simplification of household tasks (eg. less cleaning). However, they are concerned about potential health and environment risks which may be posed by free nanoparticles, in particular during the disposal phase of products. They are especially worried about the use of nanoparticles in food products. Finally, participants make an urgent plea for product declaration as they are not willing to purchase products containing nanoparticles without knowing it.