



Advanced Chemical Technologies for Sustainability

Call for proposals

Eco-efficient Use of Biomass for Bulk and Fine Chemicals Production (TA-Biomass)

2012

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1 Introduction

1.1 Background

The TASC Innovation Programme (Technology Areas for Sustainable Chemistry) is a public-private partnership programme under NWO/ACTS. It comprises the four separate Technology Areas:

- **Low Energy Routes to Bulk Chemicals (TA-Low Energy Routes)**
- **Eco-efficient Use of Biomass for Bulk and Fine Chemicals Production (TA-Biomass)**
- **Syngas, a Switch to Flexible New Feedstock for the Chemical Industry (TA-Syngas)**
- **Comprehensive Analytical Science and Technology (TA-COAST)**

The TASC Programme is co-funded by the Ministry of Economic Affairs, Agriculture & Innovation, by NWO and by the participating private partners.

This brochure contains information about the focus, review procedure and scheduling of research proposals for the *Technology Area Eco-efficient Use of Biomass for Bulk and Fine Chemicals Production* (TA-Biomass).

1.2 Available budget

The TA-Biomass' budget in this first call will be circa M€ 3 (M€ 2 subsidy from government, M€ 1 to be funded by cash and in-kind contributions from private partners (industry, research institutes, SMEs), plus implicit matching in-kind contributions from knowledge institutes (NWO definition, mainly universities)). Applicants are encouraged to submit research project proposals and to involve small and medium sized companies (SMEs) in the proposed projects.

1.3 Validity call for proposals

This call for proposals is valid until the closing date 12-04-2012.

2 Aim

The subjects of the TASC Innovation Programme are aligned with the objectives described in the Business Plan of the National Chemistry Board (Regiegroep Chemie): a 50% reduction of the CO₂ emission by the chemical industry in 25 years' time and a doubling of the contribution of the chemical sector to the GNP in 10 years' time. The TASC programme fits into the Business Plan's Innovation line "Catalysis and Sustainable Processes". The Technology Areas Low Energy Routes, Syngas and Biomass are directly related to the above-mentioned objectives, whereas TA-COAST contributes as an enabling programme for analytical sciences-related application areas.

Currently, many efforts are directed at converting biomass into sustainable fuels, chemicals and energy. Despite notable advances in the field, many challenges still have to be addressed. Although biorefineries are increasingly becoming reality, full valorization of the renewable feed to a palette of products is not yet within reach. Similar to current oil refinery operations, highly integrated biorefineries fully optimized for energy efficiency and resource utilization have to be developed. (Bio)catalyst development, feedstock and process characterization and biomass recovery and fractionation have been identified as major technological barriers for the realization of the full potential of the biorefinery.

Consultation with representatives from the industry led to a consistent view on their topics of interests: 1) Hard-to-convert feedstocks, 2) N-compounds, 3) Furan chemistry, 4) Chiral molecules and 5) Terpenes.

These topics will be studied with five defined integrative approaches:

- Chemocatalysis & Biocatalysis
 - o Non-Noble Metals
 - o Novel Enzymes
- Analytical science in relation to catalytic biomass conversion (in collaboration with TA-COAST)
- Recovery and fractionation
- Non-classic catalytic technologies

More specific information about the research themes can be found in section 6.1.

3 Guidelines for applicants

3.1 Who can apply

All criteria below apply to the main applicants as well as to all co-applicants from knowledge institutes:

Professors, associate professors and assistant professors as well as other researchers can apply if they:

- are employed at a Dutch University or a research institute recognised by NWO¹ and;
- have at least a master's degree in science or engineering or an equivalent qualification and;
- have an employment contract for at least the duration of the application procedure and the duration of the research the grant is applied for. For co-applicants an exception can be made if the applicants can prove that adequate supervision of all researchers for whom funding is applied can be guaranteed for the full duration of the grant.

Each project consortium must include at least two private partners and one knowledge institute. Collaborations between knowledge institutes are recommended. Private partners cannot receive funding and are considered as co-applicants.

For private partners it is required to have R&D activities in The Netherlands. Foreign companies without R&D activities in the Netherlands can participate additionally, but are not taken into account in the minimum requirement of two private partners. The leading principle is that knowledge valorisation should take place in The Netherlands.

3.2 What can be applied for

- The project should employ at least one researcher for at least two years.
- The maximal governmental subsidy that can be requested per research proposal is k€ 600. Private contributions in excess of k€ 300 are welcome but shall not be eligible for matching by governmental subsidy;
- The grant can be used for temporary personnel (PhDs and postdocs only), consumables (fixed amount) and equipment related to the research proposal;
- Personnel costs are subsidised in accordance with the most recent 'Agreement on Employers' responsibilities NWO - VSNU². An estimate of the fixed amounts (including consumables amounting to k€ 15/yr, and bench fee) is: PhD student (4 yr) – k€ 263, postdoc 1 yr – k€ 81, post-doc 2 yr – k€ 164, post-doc 3 yr – k€ 245;

¹ FBR, TNO and GTI's (e.g. ECN) are regarded as private partners.

² Tariffs as of 1 July 2011. The VSNU tariffs include a personal fee for congress travel and fees (bench fee). Documentation VSNU tariffs:

http://www.nwo.nl/nwohome.nsf/pages/NWOP_67QK4E

- Only in exceptional cases the grant may be used to purchase highly specific equipment that is solely applicable in the context of the research proposal. Motivation and specification is necessary and will be evaluated. The maximum eligible equipment costs to be considered for governmental subsidy is k€ 147;
- TA-funded PhD students and postdocs shall be employed by NWO acknowledged knowledge institutes for the duration of the project. However, they are allowed to perform a part of their research work in the laboratories of one or more private-sector project partners through short- and medium-term secondments.

Required contributions private partners

- The private partners in the project contribute in total a minimum of 1/3 of the total expenses to the project;
- SME companies³ (Dutch: MKB; midden- en kleinbedrijf) shall contribute a minimum of 1/3 of the partner's contribution to the project budget in cash. In-kind contributions in excess of 2/3 of the SME's contribution are not eligible for matching of the requested subsidy. Note, the overhead and networking costs (management costs) cannot be matched by in-kind contributions and should be matched in cash additionally (see the examples below and section 6.2 Budget);
- Each private partner (non-SME) contributes largely in cash (minimum of 70% of the private partner's total contribution to the project budget). In-kind contributions in excess of 30% of the private partner's contribution are not eligible for matching of the requested subsidy. Note, the overhead and networking costs (management costs) cannot be matched by in-kind contributions and should be matched in cash additionally (see the examples below and section 6.2 Budget);
- In-kind costs contributed by private partners may comprise:
 - o man hours (up to a maximum of € 100/hour);
 - o materials;
 - o (use of) equipment;
- For further information regarding in-kind contributions by private partners, see 'Regeling in kind bijdragen door private partijen binnen TASC' (section 6.3, in Dutch only);
- Supervising costs or project management costs are only eligible as in-kind contribution in case of active research participation by the intended supervisor or project manager;
- All envisaged in-kind contributions from private partners must be approved by NWO/ACTS before the start of the project;

³ The SME definition used by the European Commission applies. According to this definition SMEs should meet the subsequent criteria:

- less than 250 employees and;
- have an annual turnover which does not exceed M€ 50 and / or have a balance sheet that does not exceed M€ 43;
- in addition, participations ($\geq 25\%$) in and from other companies that relate to the autonomy of the enterprise should be taken into account.

- The in-kind contributions from the private partners shall be accounted for by means of an audit report provided to NWO/ACTS at the end of the project. This requirement does not apply to in-kind contributions of less than k€ 125 per partner.

Required contribution knowledge institute(s)

- The contribution from Knowledge institutes is considered implicit matching of the requested subsidy.

Examples of budgets

All examples involve a hypothetical application requesting one PhD student and k€ 20 equipment.

Example 1: Private partners contribute entirely in cash to the project

BUDGET	k€	CONTRIBUTION BY	k€
1x PhD	263	NWO/Government	200.7
Equipment	20	Private partners	100.3
Total proposed project budget	283	(in cash)	
<i>Overhead and networking costs*</i>	18		
Total expenses	301	Total contributions	301

* 6% is added (cash!) for overhead and networking costs for NWO/ACTS. Round numbers were used.

Note: the total required commitment of the private partners is 1/3 of the total expenses.

Example 2: All private partners are non-SMEs and contribute the minimum in cash (7/10) to the project, plus cash matching to overhead and networking costs

BUDGET	All non-SMEs, k€	CONTRIBUTION BY	All non-SMEs, k€
1x PhD	263	NWO/Government	219.3
Equipment	20	Private partners	109.7
Employee non-SMEs, €100/hour (in-kind)	26.3	of which:	
		min. cash [#]	83.4
		max. in-kind	26.3
Total proposed project budget	309.3		
<i>Overhead and networking costs*</i>	19.7		
Total expenses	329	Total contributions	329

* 6% is added (cash!) for overhead and networking costs for NWO/ACTS. [#] the total required minimal cash commitment of the non-SMEs is $1/3 \times 7/10$ of the total expenses + $1/3$ of the overhead and networking costs. In the example above: k€ 76.8 + k€ 6.6 = k€ 83.4 minimal cash contribution.

Example 3: All private partners are SMEs and contribute the minimum in cash (1/3) to the project, plus cash matching to overhead and networking costs

BUDGET	All SMEs, k€	CONTRIBUTION BY	All SMEs, k€
1x PhD	263	NWO/Government	255.7
Equipment	20	Private partners	127.9
Employee SMEs, €100/hour (in-kind)	77.6	of which:	
		min. cash [#]	50.3
		max. in-kind	77.6
Total proposed project budget	360.6		
Overhead and networking costs*	23		
Total expenses	383.6	Total contributions	383.6

* 6% is added (cash!) for overhead and networking costs for NWO/ACTS. [#] the total required minimal cash commitment of the SMEs is $1/3 \times 1/3$ of the total expenses + $1/3$ of the overhead costs and networking for NWO/ACTS. In the example above: k€ 42.6 + k€ 7.7 = k€ 50.3 minimal cash contribution.

Example 4: Both SMEs and non-SMEs contribute in-kind to the project

In this example the non-SMEs contribute 60% of the total required private contribution and the SMEs contribute 40% of the total required private contribution.

BUDGET	k€	CONTRIBUTION BY	k€
1x PhD	263	NWO/Government	232.6
Equipment	20	Private partners	116.3
Employee SMEs, €100/hour (in-kind)	28.2	of which by SMEs: ⁱ⁾	46.5
		(min. cash	18.3
Employee non-SMEs, €100/hour (in-kind)	16.8	max. in-kind	28.2)
		of which by non-SMEs: ⁱⁱ⁾	69.8
Total proposed project budget	328	(min. cash	53.0
Overhead and networking costs*	20.9	max. in-kind	16.8)
Total expenses	348.9	Total contributions	348.9

* 6% is added (cash!) for overhead and networking costs for NWO/ACTS. i) the total required minimal cash commitment of the SMEs is $0.4 \times 1/3 \times 1/3$ of the total expenses + $0.4 \times 1/3$ of the overhead costs and networking. In the example above: k€ 15.5 + k€ 2.8 = k€ 18.3 minimal cash contribution. ii) the total required minimal cash commitment of the non-SMEs is $0.6 \times 1/3 \times 7/10$ of the total expenses + $0.6 \times 1/3$ of the overhead costs and networking. In the example above: k€ 48.8 + k€ 4.2 = k€ 53 minimal cash contribution.

3.3 When can applications be submitted

The closing date for the submission of pre-proposals is **12-01-2012**, 23:59 hours. The closing date for the submission of proposals is **12-04-2012**, 23:59 hours. Rather information about the procedure can be found in Chapter 4; the timetable is detailed in Section 4.1.

Pre-proposal phase

Pre-proposals are brief research proposals. The pre-proposal phase is not mandatory for applicants who want to be considered for the full proposal phase. Pre-proposals must be submitted in accordance with the guidelines in Section 6.2.

Full proposal phase

Full proposals must be submitted in accordance with the guidelines for the full proposals in Section 6.2. After the deadline, no alterations or additions can be made to the proposal.

3.4 Drawing up an application

- Use the correct application form for drafting the (pre-)proposal. Application forms can be downloaded from the NWO/ACTS website (www.nwo.nl/tasc);
- Applications should be completed in English;
- The layout of the proposal should facilitate its readability. Use a font size of at least 10 points;
- Check section 6.2 for the guidelines for the application form;
- A letter of intent (pre-proposal) or a letter of commitment (full proposal) is compulsory for each participating private partner. An example of a standard letter of intent/commitment can be downloaded from the NWO website (www.nwo.nl/tasc). The letter specifies the cash and in-kind contributions to the project.

3.5 Specific conditions

The [NWO general terms and conditions](#) of NWO Grants apply unless the TA-Biomass Call for proposals provides otherwise. Applications that are granted must start within six months after the date of granting. Appropriate action may be taken by NWO/ACTS in relation to projects that have not yet started by that date.

Partners in granted projects must sign a project agreement between the involved partners from academia, industry and NWO/ACTS before the project can start. See section 6.4 for more details on the regulations for Intellectual Property Rights (in Dutch). A model project agreement will be available on the dedicated website of TASC in due time (www.nwo.nl/tasc).

3.6 Submitting an application

- Proposals (pre- and full proposals) must be submitted via Iris, the electronic grant application system of NWO. The operating procedure and instruction manual for Iris can be found at <http://www.iris.nwo.nl>;
- An application consists of two parts: a factsheet containing the key details of both the applicant and the application, and the research proposal itself;
- The factsheet is completed and submitted electronically using Iris. One of the parts of the factsheet is a summary of maximally ½ page (pre-proposal) or maximally 1 page (full proposal), which is the same as the English scientific summary in the proposal;
- When you electronically submit this factsheet, you also submit the (pre-) proposal as an attachment in pdf-format;
- When filling in the factsheet you can only use ASCII characters ('plain text'). The use of formulas, italics, et cetera on the factsheet is not possible, although these can be used in the research proposal;

- Any annexes to the application (e.g. letter of intent/commitment) should be submitted to NWO via the Iris system as separate PDF documents;
- Please note that the original signed letter of intent/commitment should be sent to NWO by regular mail as well. These original(s) must reach NWO ultimately within two working days after the submission deadline.

4 Assessment procedure

4.1 Procedure

Proposals

Pre- and full proposals are submitted via Iris, the electronic submission system of NWO according to the guidelines (see section 3.6).

Eligibility and suitability check

The programme office will perform an initial eligibility check on the application to verify whether the formal criteria specified in sections 3.1-3.6 are met.

In addition to the formal eligibility criteria, specific attention will be paid to the following eligibility criterion:

- An intended **project manager** must be identified who is affiliated to a private partner. The manager monitors the project progress and is the responsible coordinator for valorisation of the project results.

If an application does not meet all the criteria, the programme office will contact the main applicant. Major shortcomings will lead to rejection of the application.

Composition of assessment committees

The pre-proposals will be assessed by a **Technology Area committee**. This TA-committee is composed of experts from academia and the private sector.

The full research proposals will be assessed by an **independent, international R&D Review Committee** consisting of academic/private sector scientists with relevant expertise. The composition of the committee will be posted on the programme website after the decision making process has been completed.

Once the projects have been awarded funding, the TA-committee will be responsible for monitoring

- the progress of the research initiated;
- the provision of progress reports;
- the quality of knowledge dissemination.

The committees receive policy-related and administrative support from the NWO/ACTS office.

Assessment of pre-proposals

The TA-committee checks the pre-proposals against the description of the scope of the programme (section 6.1) and provides –if of relevance- the applicants with advice to improve their application. Submission of a pre-proposal is not mandatory, though strongly advised.

The applicant will receive the advice of the TA-committee within four to six weeks after the submission deadline of the pre-proposal.

Assessment of full proposals

The full proposals that meet the eligibility criteria will be processed and assessed by the R&D Review Committee (further: RRC).

- The RRC will assess the proposals for all the criteria as specified under section 4.2;
- Applicants will be given the opportunity to respond to the review of the RRC in writing with a rebuttal. Late or excessively long responses will be declared inadmissible and will not be considered in the further assessment;
- The proposals will be ranked by the RRC. The RRC considers all arguments, including the applicant's rebuttal, to arrive at an independent ranking of the proposals.

Decision-making

The Executive Board of ACTS will take a decision on the allocation of funds based on the funding recommendations of the RRC.

Schedule

September 2011	Call, brochure, application forms and guidelines available
12 January 2012	Final deadline for submitting pre-proposals (23:59 h)
February 2012	Applicants are notified about results pre-proposal phase
12 April 2012	Final deadline for submitting full proposals (23:59 h)
May 2012	Assessment by R&D Review Committee (RRC)
June 2012	Opportunity for rebuttal
End of June 2012	Final ranking advice by RRC
July 2012	Funding decisions by Executive Board of ACTS
July 2012	Applicants are notified about funding decisions

Applicants can monitor the progress of the assessment of their project proposal using the project update module in Iris, NWO's electronic grant application system.

4.2 Criteria

The following assessment criteria apply:

1. Fit to the scope of TA-Biomass;
2. Scientific quality of the proposal
 - a. Scientific approach;
 - b. Scientific relevance;
 - c. Feasibility;
 - d. Novelty;
3. Quality of the consortium
 - a. Track record of the academic partners;
 - b. Track record of the relevant private partners;
 - c. Synergy and complementarity of the partnership;
 - d. Availability of infrastructure within the consortium;
4. Valorisation potential
 - a. Quality of the valorisation plan
 - b. Involvement of end users and valorisation partners.

5 Contact and other information

5.1 Contact

5.1.1 Specific questions

For further information, please contact the programme office:

NWO – Chemical & Physical Sciences Division/ ACTS

PO Box 93460

2509 AL The Hague

Email: ta-biomass@nwo.nl

Programme website: www.nwo.nl/tasc

Contact:

Mr Mark Schmets, MSc, tel.: +31 (0)70 344 0537, m.schmets@nwo.nl

5.1.2 Technical questions about the electronic application system Iris

For technical questions about the use of Iris please contact the Iris helpdesk. Please read the Iris manual before consulting the helpdesk.

Website: www.iris.nwo.nl

Contact:

tel: +31 (0)900 696 4747 (Mon-Fri, 11:00-17:00)

Email: iris@nwo.nl

6 Annexes

6.1 Scope of the TA-Biomass: Eco-efficient Use of Biomass for Bulk and Fine Chemicals Production

The TA-Biomass recognizes five research topics: 1) Hard-to-convert feedstocks, 2) N-compounds, 3) Furan chemistry, 4) Chiral molecules and 5) Terpenes. These topics will be studied with the following integrative approaches.

Chemocatalysis & Biocatalysis (Chemo/Bio)

Recalcitrant fractions, such as lignin but also chitin, deserve special attention. Issues that need to be addressed in this respect include, but are certainly not limited to: i) overcoming the general recalcitrance of lignocellulosic biomass, ii) valorization of all components of biomass (cellulose, lignin, hemicelluloses, proteins, lipids), iii) production of single products rather than mixtures of products, iv) selective partial defunctionalisation without losing all (stereo)chemical information contained in the substrate, v) production of bulk and fine chemicals containing heteroatoms other than oxygen.

Proposals need to address these challenges by combining chemocatalytic and biocatalytic approaches. Homogeneous and heterogeneous catalysts can be combined with enzymes or micro-organisms.

Such an integrated hybrid route, whether in one-pot or cascade mode, holds considerable advantages, such as complementary substrate scopes and selectivities.

Non-Noble Metals (Chemo/Bio)

A large number of catalytic solutions to convert biomass (and related products) involve the use of scarcely available metals, which may restrict their future application. The current state-of-the-art transition metal catalysts use often precious 2nd and 3rd row transition metals like Pd, Pt, Ru, Rh, and Ir as the active catalytic metal ingredient. Therefore the aim of this task is the development of alternative metal-based catalysts that do not contain one of the heavier, precious metals mentioned above in their active site, but instead use a metal that is more abundant and that can be accessed in a much easier fashion. These new catalysts should be compatible to a large extent with enzymatic catalysts in order to combine chemo- and biobased catalysts to arrive at the desired molecules from biomass. Proposals need to address the subsequent challenges: i) activity, ii) selectivity, iii) stability and iv) compatibility with enzymatic catalyzed processes.

Novel Enzymes (Chemo/Bio)

To achieve the chemo-enzymatic conversion of bio feedstocks into platform chemicals, novel redox enzymes, C-C bond forming enzymes, and enzymes acting on C-N bonds are necessary. In addition, enzymes that are capable of solubilizing the polymeric feedstocks, such as etherases and oxidohydrolases, need to be made available. These enzymes have to be able to work in concert with homogeneous and heterogeneous chemocatalysts. To make this possible the following criteria have to be met in proposals addressing this approach: i) the chemocatalysts have to be non-precious metals since they are too scarce, ii) metals from the biosphere like iron and similar metals will greatly ease the combination of the two types of catalysis since those metals also occur in nature and they are less deactivating for enzymes, iii) cofactor recycling that allows water to

be the reducing agent, iv) high-level / low costs enzyme production in industrial host organisms

Analytical science in relation to catalytic biomass conversion (in collaboration with TA COAST)

The application of analytical sciences for catalyst research include feedstock characterization, the prediction of product composition or properties from those of the feedstock, the characterization of the catalyst and the catalytic process, the monitoring and control of such catalytic/thermochemical processes and the eventual characterization of the product as well as the stability of catalyst materials in the presence of often harsh biorefinery conditions (e.g. protic solvents and heat). Targets for collaborative research project between this TA and TA COAST are: i) detailed feedstock characterization, ii) high-throughput catalyst screening, iii) in-situ/operando characterization methods for analyzing the treated biomass stream as well as the catalytic material, iv) techniques from chemometrics for knowledge discovery.

Recovery and fractionation

The recovery and fractionation is specifically targeted at the lignin fraction, a polymer of phenolic molecules, and the chitin fraction, a polymer of aminosaccharides. Projects submitted under this approach should address one or more of the subsequent lines of research: i) solvation of biomass in conventional and non-conventional solvents followed by selective separation of the various polymers present in lignocellulose. In this research, the use of homogenous recoverable catalysts that facilitate the recovery and fractionation of biomass can be developed, ii) combining a mild chemical pretreatment of biomass with the use of enzymes for an efficient separation of chitin from biomass and the conversion of nitrogenous chitin chemical substances, iii) pyrolysis of biomass followed by separation of the oil produced into specific groups of monomer and oligomer compounds with similar chemical properties. The pyrolysis can consist of several successive heat treatments in which cheap catalysts are used. The products can also be collected in different steps. The sequential pyrolysis and collection of products are used to obtain an optimum separation of the different product groups.

Non-classic catalytic technologies

Photocatalysis

A promising activation route is photo-activation of a catalyst, but also activation of lignin itself by choosing a suitable wavelength (which is probable, due to presence of aromatic groups in lignin), or eventually a combination of both approaches. Various aspects need investigation, including surface chemistry, process conditions, and reactor concepts to enable effective realization of this process. Smaller molecules such as diphenyl ether, diphenyl methane, etc., which can be further converted into phenols, are of particular interest. Another important challenge in this task is to achieve reactant selectivity.

Electrochemistry

Electrochemistry may offer various conceivable advantages in the catalytic conversion of biomass. The accurate control of the oxidation or reduction potential, both in a static and a dynamic fashion, may well be the most important advantages. This level of control often allows for high selectivity and efficiency at low temperature. Moreover, electrochemical techniques permit the local generation of protons and radicals through the oxidation of

water on the appropriate electrode materials, which may in turn react with “recalcitrant” biomolecules in solution in a controlled way. The concept of “paired electrolysis” combining oxidation and reduction in a single reactor cell may offer substantial advantages. Also the deployment of high-temperature and high-pressure electrochemical reactors in relation to biomass conversions are addressed in this task.

Overview topics and approaches TA-Biomass

Approach Topic	Chemo/Bio combination		TA-COAST		
	Non-noble Metals	Novel Enzymes	Analytical science	Recovery and fractionation	Non-classic cat. tech. (photo, electro)
Hard-to-convert feedstocks		X	X	X	
N-compounds	X	X	X		X
Furan chemistry	X	X	X		
Chiral molecules	X	X	X		X
Terpenes	X	X			

6.2 Guidelines for the application forms

The research proposal must be written in English. The proposal should be comprehensible as an independent entity. Therefore, references to internal documents must be avoided. Only references to ‘open literature’ are permitted. Where reference to a preprint is unavoidable, you are requested to provide a copy of this in electronic form along with the (pre-)proposal so that the assessors can take note of this.

Project details

1 - Basic details of the project

1a – Title of the proposal

A title that is as short as possible but specifies the research for which the grant is requested; the same as entered in the project information screen.

1b - Project acronym

Only where relevant; the same as entered in the project information screen.

1c - Project duration

The project duration is expressed in a total of months. Note that, the maximum project duration is five years (60 months).

2 - Details of the project consortium

2a - Contact details of all applicants

Mention the name and full contact details of the principle investigator (affiliated to a Dutch university or research institute recognised by NWO) who serves also as contact person and is the intended project leader. Also mention the name and contact details of the intended project manager. The project manager should be affiliated to one of the private partners of the project consortium. All private and public co-applicants must be included in the tables.

2b - Letters of intent/commitment

It is compulsory for each private partner to supply a letter of intent in the

pre-proposal phase and a letter of commitment in the full proposal phase. This letter should specify the cash and in-kind contribution(s).

2c - Past performance of applicants

Describe in max. one page per applicant (academic and private) the achievements of the past five years, the main results, (co)financers of the research lines, international position, and collaboration with other research groups. Include a maximum of five relevant publications per applicant, and a total of not more than 25 publications may be listed.

3 - Summaries of the research proposal

3a - Scientific summary (pre-proposal max. ½ page; full proposal max. 1 page)

Describe the objective of the proposal, the approach, and the motivation to perform the proposed research in your research group. Indicate partners that are required to collaborate in the present proposal. Please note, use only 'plain text'/ASCII characters.

3b - Formulation of the main goals of the project

Describe in max. 3 lines what the main goals of the project are.

3c - Popular summary (only in full proposal; preferably in Dutch)

Provide a title, contact details of the PI, and a short summary (50 words maximum, preferably in Dutch) of your proposal that is informative for the general public. If your proposal is granted, this summary may be used for publication purposes.

4 - Classification

4a - Theme(s) of the TA-Biomass project

Please indicate which combination(s) of topic and approach(es) fit your research proposal.

4b - Keywords

List max. 6 relevant keywords for the research proposal.

5 - Other grant applications

If you or any of your co-applicants have submitted a research proposal elsewhere on the same topic as this application, provide relevant information on that proposal. Also include proposals on the same topic submitted by other members of your or your co-applicants' groups.

Research proposal

In the pre-proposal phase: use up to a maximum of 2 pages in total for sections 6-7. In the full proposal phase: use up to a maximum of 5 pages in total for sections 6-7.

6 - Description of the proposed research

The following aspects are to be covered:

- the scientific topic and the anticipated research results;
- method of research;
- scientific significance of the proposed research;
- multidisciplinary collaboration;
- concrete applications that the research is aiming towards;
- relation of the proposed research to comparable research elsewhere.

Use in this section the following arrangement (see the evaluation criteria in chapter 4.2):

6a - Scientific aspects;

6b - Innovative aspects;

6c - Valorisation potential of the proposed research

Describe in what matter the output of the proposed research will initiate or improve valorisation. Give a detailed description on how the collaboration between the academic group(s) and the private partners will take place and what their role is in initiating or improving valorisation. Describe the role of potential end users in the project. If applicable, give a description of the secondment of personnel involved in the project (e.g. describe the work that will be done by the PhD students and post-docs during their secondments with the industrial partners. Also describe how these secondments will contribute to the valorisation of the research);

6d - Transfer of knowledge

Briefly describe how the transfer of knowledge is realised within and outside the project. How are the project results disseminated.

7 - Description of the proposed plan of work

Please indicate roughly how the entire research project is to be phased, in periods. More specifically, you should indicate which activities are likely to be carried out. Indicate roughly which tasks will be undertaken by which members of the research team. The project duration should not exceed five years.

Use in this section the following arrangement:

7a - Project milestones and deliverables

Specify the milestones and deliverables – description, due date and responsible person – throughout the duration of the project;

7b - Description of the consortium

Describe in which manner will be cooperated between the academic and industrial groups.

8 - Literature references

Please refer to 'open' literature only.

Budget**9 - Summary of proposed funding within the total budget**

Please specify the budget for the project in k€. See section 3.2 of the subsidy call text '*Technology Area Eco-efficient Use of Biomass for Bulk and Fine Chemicals Production (TA-Biomass)*' for specific rules and regulations regarding 'In-kind contribution of SMEs and non-SMEs' and eligible costs.

9a - Summary budget table

Please complete the tables in the application form. The form is composed of two components: component A is covering the details of the proposed project budget, component B summarises the private contribution belonging to this proposed project budget and the total expenses (also covering the overhead and networking costs, viz. 6% of total expenses, to be used by the NWO/ACTS office).

The private partners in the project contribute in total a minimum of 1/3 of the total proposed project budget. For more details on the regulations regarding cash/in-kind distribution see section 3.2 of the subsidy call text '*Technology Area Eco-efficient Use of Biomass for Bulk and Fine Chemicals Production (TA-Biomass)*'.

9b - Specification of the financial items listed under 9a

If relevant, motivate and specify the necessity for highly specific equipment that is solely applicable in the context of the research proposal and for which funding is requested. The maximum eligible equipment costs to be

considered for governmental subsidy is k€ 147.

Please specify the in-kind contribution of the private partners (fte, number of hours, number of researchers, period).

6.3 Regeling in kind bijdragen door private partijen binnen TASC (Dutch only)

Definities

1. Private partijen

Als private partijen worden aangemerkt enerzijds ondernemingen (definitie zie 2.) en anderzijds kennisinstellingen die niet tot de door NWO erkende kennisinstellingen behoren (i.e. instellingen die niet bij NWO mogen indienen zoals TNO, ECN, RIKILT, NFI).

2. Onderneming

Activiteit van een organisatorisch verband of een persoon gericht op duurzame deelname aan het economisch verkeer met behulp van arbeid en kapitaal en met oogmerk winst te behalen.

3. MKB

De MKB-definitie van de Europese Commissie wordt gehanteerd. Onder een MKB wordt verstaan een onderneming die:

- minder dan 250 medewerkers heeft, en;
- een omzet heeft die de EUR 50 miljoen niet overstijgt en/of;
- een balanstotaal heeft dat de EUR 43 miljoen niet overstijgt;
- verder dient rekening gehouden te worden met participaties ($\geq 25\%$) in en van andere ondernemingen die effect hebben op de autonomie van de onderneming.

Documentatie: DG Enterprise,

http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/sme-definition/index_en.htm.

Bepalingen

1. Mogelijkheid tot deelname in TASC door private partijen met in kind bijdragen

Private partijen participeren doorgaans in NWO/ACTS onderzoeksprogramma's door middel van een financiële contributie aan het programma- dan wel projectbudget dat door NWO/ACTS toegekend wordt aan onderzoeksgroepen aan kennisinstellingen ten behoeve van de uitvoering van een goedgekeurd onderzoeksvoorstel.

In het TASC programma kunnen private partijen participeren met een gedeeltelijke in kind bijdrage onder de volgende voorwaarden:

- a.
 - voor MKB's dat deze in-kind bijdragen beperkt zijn tot een maximum van 2/3 van hun totale bijdrage aan de onderzoekskosten als vermeld in de door NWO/ACTS goedgekeurde begroting van het project en het overige deel (minimaal 1/3) een financiële (cash) bijdrage is;
 - voor overige private partijen dat de in kind bijdragen beperkt zijn tot een maximum van 30% van hun totale bijdrage aan de onderzoekskosten als vermeld in de door NWO/ACTS goedgekeurde begroting van het project en het overige deel (minimaal 70%) een financiële (cash) bijdrage is;
- b. in kind bijdragen/inspanningen moeten:

- essentieel zijn voor het project;
- opgenomen zijn in de door NWO/ACTS goedgekeurde begroting van de onderzoekskosten van de projectaanvraag waarin de private partij participeert (zie voor in te brengen in kind bijdragen bepaling 3) en vallen binnen één van de onder 3 a t/m c vermelde kostencategorieën.

2. Committing

Indien een private partij zal participeren in het onderzoeksproject met een gedeeltelijke in kind bijdrage zoals hierboven omschreven, zal de private partij zich voor de betreffende in kind bijdrage plus de financiële (cash) bijdrage aan NWO/ACTS committeren. De toegezegde financiële (cash) bijdrage zal door NWO/ACTS in halfjaarlijkse termijnen worden gefactureerd.

3. In te brengen in kind bijdragen

In een onderzoeksproject mogen door private partijen als in kind bijdragen worden ingebracht de volgende rechtstreeks aan het onderzoeksproject toe te rekenen en door de private partij gemaakte kosten (zie ook bepaling 1):

- a. In het kader van het project gewerkte uren:
 - loonkosten, met dien verstande dat wordt uitgegaan van een uurloon, berekend op basis van het jaarloon bij een volledige dienstbetrekking volgens de kolom «loon voor de loonbelasting» van de loonstaat, verhoogd met de wettelijke dan wel de op grond van een individuele of collectieve arbeidsovereenkomst verschuldigde opslagen voor sociale lasten, en van 1650 productieve uren per jaar. Hierover mag een opslag worden opgevoerd voor overige algemene kosten, groot ten hoogste 50 % van de hierboven bedoelde loonkosten. Het hieruit volgende aan het project toe te schrijven uurtarief, inclusief de genoemde 50% opslag voor algemene kosten, is gemaximeerd op € 100. Inbreng van kosten voor begeleiding of voor projectmanagement is mogelijk bij actieve deelname van de beoogde begeleider of projectmanager aan het onderzoeksproject (zie onder 1b);
- b. Kosten van te verbruiken materialen en hulpmiddelen, gebaseerd op de oorspronkelijke aanschafprijzen;
- c. Gebruik van apparatuur en machines
 - Kosten van aanschaf en gebruik van machines en apparatuur, met dien verstande dat wordt uitgegaan van de aan het project toe te rekenen afschrijvingskosten, berekend op basis van de oorspronkelijke aanschafprijzen en een afschrijvingstermijn van tenminste vijf jaar; kosten van consumables en onderhoud tijdens de gebruiksperiode;
 - Kosten van aanschaf en gebruik van machines en apparatuur die niet uitsluitend voor het project zijn aangeschaft, worden slechts als projectbijdragen op de voet van het hier bovenstaande naar rato in aanmerking genomen, indien een door middel van een sluitende tijdschrijving, vastgestelde urenverantwoording per machine respectievelijk van de apparatuur aanwezig is;
 - In-kind bijdragen in de vorm van korting op de normale aanschafprijs in het economisch verkeer (list-prijs) van machines en apparatuur. De korting dient dan minimaal 25% van de listprijs te bedragen. De kosten die ten laste gebracht worden van het apparatuurbudget van het project bedragen dan de listprijs verminderd met die korting.

4. Verantwoording van in kind bijdragen

Private partijen dienen hun in kind bijdragen aan NWO/ACTS te verantwoorden middels een opgave van ingebrachte kosten, te verstrekken aan NWO/ACTS binnen drie maanden na afloop van het onderzoeksproject waaraan de in kind bijdrage is geleverd. De aanvraag tot vaststelling van de in kind bijdrage dient tegelijkertijd met de aanvraag tot subsidievaststelling door de universitaire partner(s) te worden ingediend, vergezeld van een gezamenlijke eindrapportage. Indien de te verantwoorden in kind bijdrage hoger is dan k€ 125 dient een accountantsverklaring te worden aangeleverd; in andere gevallen volstaat een schriftelijke verklaring van de procuratiehouder dat de ingebrachte in kind inspanningen daadwerkelijk aan het project zijn toe te schrijven.

Indien de private partij die zich met een in kind bijdrage aan een onderzoeksproject heeft gecommiteerd (een deel van) deze in kind bijdrage uiteindelijk niet inbrengt dan wel niet kan verantwoorden, zal NWO/ACTS deze private partij factureren voor (dit deel van) de in kind bijdrage zodat de totaal toegezegde bijdrage gestand wordt gedaan.

6.4 IP- en kennistransferregeling in het kader van TASC (Dutch only)

Partijen die met elkaar deelnemen in een onderzoeksproject zullen vóór de aanvang van het project komen tot een schriftelijke opgave aan NWO/ACTS van de achtergrondkennis die zij voor gebruik in een project beschikbaar willen stellen. NWO/ACTS zal de van partijen verkregen opgaven in een bijlage plaatsen van het te sluiten *Project Agreement*. Tijdens het project kan aanvullende achtergrondkennis worden ingebracht.

Ingebrachte achtergrondkennis blijft eigendom van de inbrengende partij (hierna: de Verstreckende partij) en mag door de ontvangende partij(en) enkel en alleen binnen het project gebruikt worden in het kader van de doelstellingen van het onderzoek. De Verstreckende partij zal de benodigde achtergrondkennis, op een desbetreffend schriftelijk verzoek, kosteloos beschikbaar stellen aan de verzoekende partij door middel van een niet-overdraagbare niet-exclusieve licentie voor de duur van het project. Daarbij voorziet de Verstreckende partij de ontvangende partij(en) naar beste eer en geweten van alle relevante informatie over de betreffende achtergrondkennis, waaronder een verklaring dat de kennis vrij is van claims van derden, of, zo deze claims bestaan, welke beperkingen op het gebruik van de kennis en op een mogelijke verdere exploitatie daarvan rusten.

De resultaten binnen een onderzoeksproject komen in eerste instantie toe aan NWO/ACTS. NWO/ACTS stelt zich daarbij op als intermediair en streeft zelf geen octrooiportfolio na. Indien binnen een project sprake is van een vinding, hebben de deelnemende projectpartijen het eerste recht ('first right of refusal') om deze vinding op hun naam en kosten te (laten) beschermen en vervolgens een octrooi hierop te verwerven tegen een marktconforme vergoeding aan NWO/ACTS. De richtlijn voor de maximale hoogte van deze vergoeding vormen de gemaakte (sub)projectkosten die tot de betreffende vinding hebben geleid, onder aftrek van de relatieve private bijdrage aan die kosten. Partijen zullen met NWO/ACTS onderhandelen over de uiteindelijke hoogte van de vergoeding, alsook over een eventuele fasering van de betaling, en hierover binnen vier maanden na aanvang van de onderhandelingen overeenstemming bereiken, waarna een octrooiaanvraag kan worden ingediend. Voor MKB-partijen bestaat de mogelijkheid tot korting op de te betalen vergoeding door verrekening van de kosten voor de verkrijging van *Intellectual Property* (IP) met de overeen te komen vergoeding. De vergoeding vloeit via NWO/ACTS terug

naar de betrokken projectpartij waar de vinding is gedaan voor verder onderzoek in het kader van het onderwerp/programma.

Indien meerdere projectpartijen geïnteresseerd zijn om dezelfde vinding te (laten) beschermen en een octrooi te verwerven, komen deze onderling, zo mogelijk al voorafgaand aan de start van het project, overeen welke partij(en) de uiteindelijke eigenaar(s) wordt/worden. Mocht hierover geen overeenstemming worden bereikt, dan zal NWO/ACTS na afzonderlijk overleg met de betrokken projectpartijen een beslissing nemen omtrent het recht op octrooieren.

Resultaten worden door de projectpartijen niet gepubliceerd dan wel op andere wijze openbaar gemaakt dan na schriftelijke toestemming door de andere projectpartijen. Betrokken partijen zullen uiterlijk vier weken na het verzoek tot publiceren schriftelijk reageren. Indien partijen binnen deze periode niet schriftelijk gereageerd hebben mag dit als een toestemming worden beschouwd. De partijen kunnen binnen twee maanden na het verzoek tot publiceren wijzigingen verlangen om hun belangen met betrekking tot de octrooieerbaarheid van de resultaten te beschermen, echter zonder de wetenschappelijke integriteit van de publicerende partij in gevaar te brengen. Indien de resultaten aanleiding geven tot een concrete mogelijkheid voor een octrooiaanvraag, kan de publicatie voor ten hoogste negen maanden na het verzoek tot publiceren worden opgehouden teneinde de gelegenheid te geven de resultaten te beschermen.

Bij de indiening van een projectvoorstel in het kader van het TASC programma verklaren de partijen dat zij kennis hebben genomen van de in dit document beschreven TASC IP-en kennistransferregeling. Vóór de start van het project zullen zij samen met NWO/ACTS een *Project Agreement* afsluiten over IP en kennistransfer, alsook over andere zaken zoals financiering, voortgangsevaluatie en vertrouwelijkheid (zie hiervoor het model *Project Agreement* dat t.z.t. beschikbaar komt op de site).

Het afsluiten van een *Project Agreement* tussen NWO/ACTS en de projectpartijen is één van de voorwaarden voor subsidieverlening aan het betreffende project.

Published by:
Netherlands Organisation
for Scientific Research

Visitor's address:
Anna van Saksenlaan 51
2593 HW The Hague

August 2011



Netherlands Organisation for Scientific Research