



NCPC
NATIONAL CLEANER PRODUCTION CENTRE
— SOUTH AFRICA —



Resource Efficient and Cleaner
Production / Energy Efficiency

Training Courses



National Cleaner Production Centre South Africa

www.ncpc.co.za



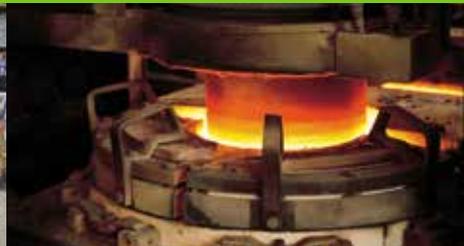
the dti

Department:
Trade and Industry
REPUBLIC OF SOUTH AFRICA

CSIR
our future through science

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The **National Cleaner Production Centre South Africa** is a government programme, reporting to the Department of Trade and Industry (**the dti**), that drives the transition of South African industry towards a low carbon economy through appropriate resource efficient and cleaner production interventions.

The NCPC-SA's mission is to drive resource efficient and cleaner production in industrial and selected commercial sectors **by equipping industry** to do business in an efficient, sustainable and competitive manner, contributing to a low carbon and green economy.

Suitably skilled manpower is critical to the sustainability of RECP initiatives in industry and the successful transition to a greener economy.

To address this need, the NCPC-SA has developed capacity building and skills programmes, many of them in partnership with United Nations Industrial Development Organisation (UNIDO).

Training highlights (2010 – 2016):

3 900 Professionals trained

182 Experts trained

92 Local trainers developed



Courses Offered

Subsidised training courses are offered in Pretoria, Durban, Cape Town and Port Elizabeth. Company training sessions can be arranged on request.

- **RECP training** is based on the UNIDO/UNEP toolkit and equips trainees with the skills required to conduct RECP assessments and implementation in companies. RECP methodologies include the
- **Energy Management Systems training programme** – Presents a methodological, organised approach to managing energy usage, based on the SANS/ISO50001 standard. It is aimed at individuals who are responsible for developing and implementing energy management systems in companies.
- **Energy Systems Optimisation training programmes** – Include courses on a number of energy systems, including Compressed Air, Fans, Pumps, Steam and Motors. They combine theoretical and practical components as well as appropriate software toolkits.

Pretoria / Cape Town



EM101

- **2-day** introductory classroom training



Energy Management

- **End User**
2-day classroom training
- **Expert Level**
classroom and in-plant training over a number of months



EnPMI

- **2-day** classroom training



NCPC-SA TRAINING PROGRAMME

/ Durban / Port Elizabeth as well as in-house training on request



Industrial Energy Efficiency Systems Optimisation

- **ESO Introductory Courses**

1-day classroom training

- **ESO End User**

2-day classroom training

- **Expert Level classroom and in-plant training** over a number of months



Fan Systems



Pump Systems



Motor Systems



Steam Systems



Compressed Air Systems



Refrigeration Systems (2017)



Chiller Systems (2017)



Solar Thermal (2018)



Resource Efficient and Cleaner Production (RECP)

- **End User**

2-day classroom training

- **Expert Level**

classroom and in-plant training over a number of months



Industrial Water Efficiency

Coming in 2018

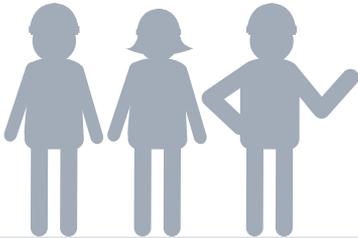


EM101



Energy Management 101

EM101 | Duration: 2 days



The **Energy Management 101 (EM101)** course is presented for those interested in entering the NCPC-SA suite of training programmes. It is a general introduction to the energy efficiency field and energy system optimisation (ESO).

In this course, the basic concepts and principles of energy are presented. It will provide you with the necessary background to start performing energy calculations in the energy field.

HIGHLIGHTS OF THE COURSE:

- how to analyse your electricity account
- fundamentals of electrical power
- thermal systems
- performance measurement
- legal and legislative considerations in energy systems



Need to know:

- Can be completed before or after the End User training.
- Is a pre-requisite to attending any of the Expert Level programmes.
- Successful completion of a test will be required before a candidate can apply for Expert Level training.
- **Exemption** – candidates accepted to an NCPC-SA Expert Level Programme prior to 2017 and those candidates with a three year degree and four years of relevant experience may apply for exemption from the EM101 course.



Energy System Optimisation (ESO) Introductory Courses

Duration: 1 day | *Day 1 of 3 – in conjunction with 2-day End User ESO*

The **Introductory** courses to each ESO training programme are presented as a 1-day course that immediately precedes the 2-day End User course in every specific system.

These courses are aimed at providing an overview of the benefits of system optimisation in that specific discipline.

During each introductory course the relevant system will be introduced, basic principles of the system explained and case studies presented on the successes of optimising such a system. Guidance will be provided as to further levels of training that can be provided to different role players at a facility.



Need to know:

- Are presented “back to back” with the End User courses (over 3 days)
- Are a pre-requisite for access to the End User courses in each discipline, unless exemption is granted
- **Exemption** – candidates who already completed the relevant End User course prior to 2017 and those candidates with a three year degree and four years of relevant experience may apply for exemption.



Who should attend?

The course is designed to benefit financial managers, process and production managers as well as maintenance staff and technicians.

Did you know?

Companies that participate in the NCPC-SA service offerings such as assessments, internship or training candidate plants **qualify for 2 complimentary seats** on the EM101 and introductory courses.





End User Training

Duration: 2 days | All disciplines



The **End User** training will provide technical professionals with the knowledge and tools necessary to initiate resource efficient and cleaner production (RECP), energy management systems (EnMS) and energy systems optimisation (ESO) interventions, as well as a holistic understanding of the benefits and processes of RECP, EnMS and ESO.

As from 2017, all End User courses will be followed by a test which will serve as an acceptance test to the Expert Level training. This test, together with the successfully completed Energy Management 101 course and screening of a candidate's CV for their suitability will constitute the requirements to enter the relevant Expert Level programme.



Need to know:

- End User courses will be followed by a test.
- Courses are offered in Pretoria, Durban, Cape Town and Port Elizabeth, according to a pre-determined calendar of training events



Training calendar is on www.ncpc.co.za



Direct questions to ncpcGreenSkills@csir.co.za



Did you know?

Companies that participate in the NCPC-SA service offerings such as assessments, internship or training candidate plants **qualify for 2 complimentary seats** on the End User courses.



In-house training sessions

can be arranged on request. These training events are charged at a flat rate regardless of the number of delegates.

A group of up to 25 delegates can be trained at a company's own venue.

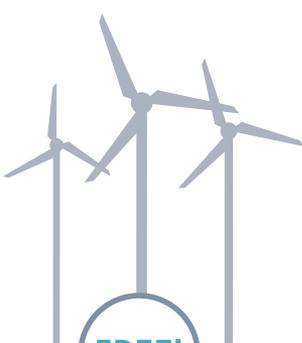
You may contact the Skills Development team for more details.



Expert Level Training

The **Expert Level** training programme comprises theoretical and in-company practical modules spread over a number of months.

- Candidates will need to first complete the end user level training in the relevant discipline.
- Expert candidates become UNIDO certified energy experts with international recognition.
- Practical in-plant work forms a key component of the training and will determine the duration, but most experts train for 9 to 12 months.



FREE!

Did you know?

Your company can qualify for **one complimentary seat** in the relevant expert level training by:

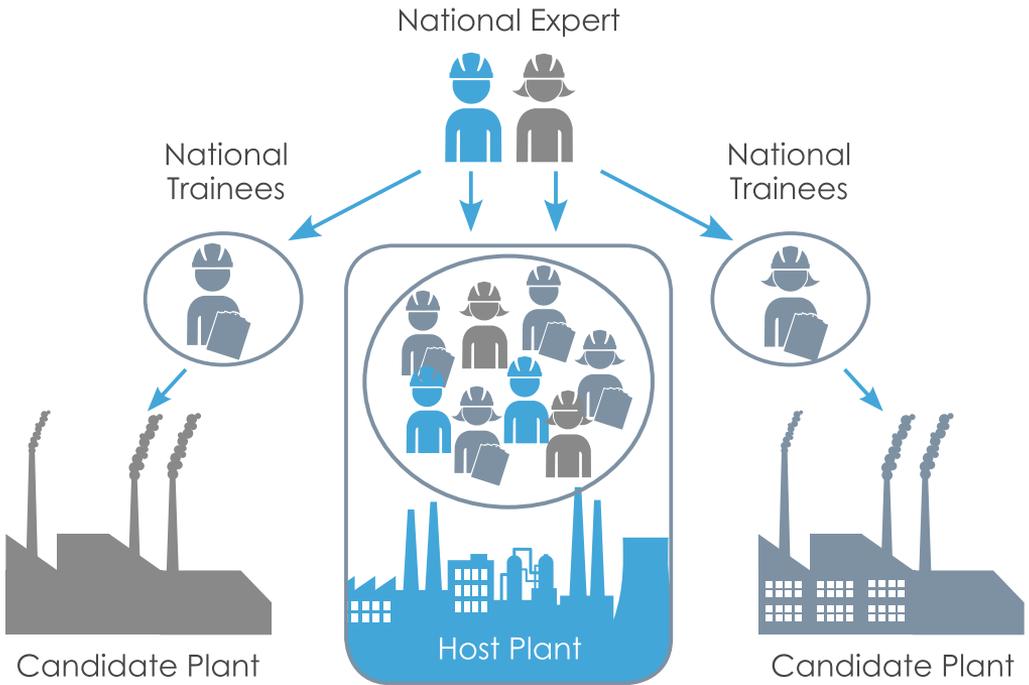
- Registering as a host or candidate plant for Expert Level training OR,
- Signing to host a NCPC-SA RECP intern OR,
- Agreeing to be the site of an NCPC-SA case study for publication (demonstration plant)

“The practical real world content of the NCPC-SA courses has made the successful application of skills learned very easy. I highly recommend the training to anybody involved in industry.”

(EE expert)



TRAINING METHODOLOGY





Resource Efficient & Cleaner Production (RECP)

A systematic and integrated approach to managing energy, water, environmental and financial resources, eliminating or minimising waste and emissions to the environment, on a sustainable and cost-effective basis.

RECP methodologies look at enhancing the means to meet human needs while respecting the ecological carrying capacity of the earth by producing more wellbeing with less material consumption.

RECP is measured by the reduction of the resource use and the environmental impact from materials, emissions, and accidental releases per unit of production, trade, and consumption of goods and services over their full life cycles.

- The **End User** course equips trainees with the knowledge, understanding and tools that will enable them to initiate the development and implementation of RECP.
- The **Expert Level** course is aimed at equipping delegates with the necessary knowledge, skills and tools to support the adoption and implementation of RECP in industry. Delegates will gain practical experience in implementing and reviewing RECP, as well as being able to report on its performance.



Watch our introductory videos on
YouTube or **www.ncpc.co.za**:

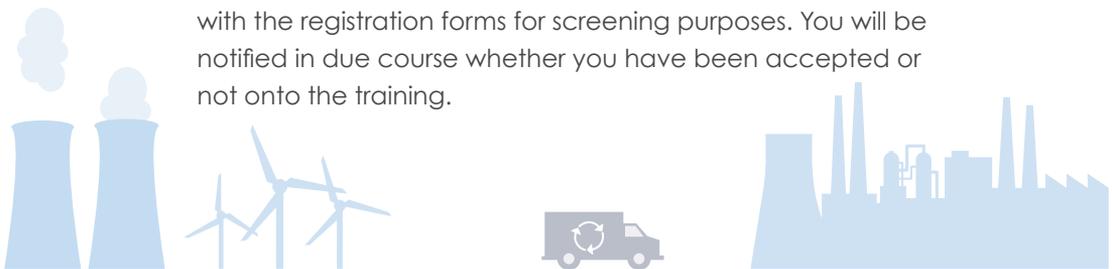
What is RECP? • Implementing RECP
How to do an RECP Assessment



MINIMUM REQUIREMENTS FOR THE RECP EXPERT LEVEL COURSE:

- Successfully completed the Energy Management 101 course (or be granted exemption)
- Successfully completed the RECP 2-day End User training.
- A 3-year degree in **environmental science** or any **engineering** discipline combined with 4 years' experience as one of the following:
 - Environmental Manager
 - Plant Engineer
 - Energy Manager
 - Energy Efficiency Practitioner
 - Sustainability Manager
 - Industrial Efficiency Manager
 - Environmental Sustainability or Energy Consultant

All CV's and proof of qualifications must be submitted together with the registration forms for screening purposes. You will be notified in due course whether you have been accepted or not onto the training.





Energy Management Systems (EnMS)



This programme presents a methodological, organised approach to managing energy usage, based on the **SANS/ISO 50001** standard. It is aimed at individuals who are responsible for developing and implementing energy management systems in their companies.

- The **End User** course equips trainees with the knowledge, understanding and tools that will enable them to initiate the development and implementation of an EnMS that is aligned with ISO 50001.
- The **Expert Level** course is aimed at equipping delegates with the necessary knowledge, skills and tools to support the adoption and implementation of EnMS in industry. Delegates will gain practical experience in implementing and reviewing an EnMS, as well as being able to report on its performance.



How to implement an Energy Management System aligned to ISO 50001

(www.ncpc.co.za RECP Toolkit videos)

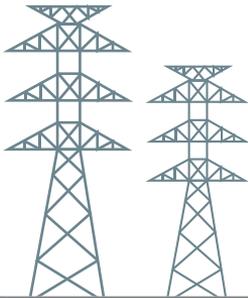


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partnership with



MINIMUM REQUIREMENTS FOR EnMS EXPERT LEVEL COURSES

- Successfully completed the Energy Management 101 course (or be granted exemption)
- Completed the 2-day End User training in EnMS
- A 3-year degree in **environmental science** or any **engineering** discipline combined with 4 years' experience as one of the following:
 - Environmental Manager
 - Plant Engineer
 - Energy Manager
 - Energy Efficiency Practitioner
 - Sustainability Manager
 - Industrial Efficiency Manager
 - Environmental Sustainability or Energy Consultant



All CV's and proof of qualifications must be submitted together with the registration forms for screening purposes. You will be notified in due course whether you have been accepted or not onto the training.





The Energy Systems Optimisation (ESO) Training Programme

The ESO systems are:



Fan Systems
Optimisation (FSO)



Compressed Air Systems
Optimisation (CASO)



Motor Systems
Optimisation (MSO)



Steam Systems
Optimisation (SSO)



Pump Systems
Optimisation (PSO)

This programme or group of training courses includes system specific courses on a number of energy systems. Each discipline consists of the following courses:

- **Introductory** (1 day – see page 5)
- **End User** (2 days – see page 6)
- **Expert Level** (theoretical and in-plant training over a number of months – see page 8)

The **Introductory course** is presented as a 1-day course that immediately precedes the 2-day end user course. It will provide an overview of the benefits of system optimisation in that specific discipline. For more details, see page 5.



Motor Systems Optimisation (ESO Motors)

The **End User** course consolidates enterprise personnel's understanding of motor system optimisation (MSO) and promotes their technical capacity for MSO-orientated actions. It enables delegates to initiate the development and implementation of MSO measures and projects in their own companies.

No Expert Level course is currently offered in this discipline as it is adequately covered through other applications such as Fans and Pumps.





Fan Systems Optimisation (ESO Fans)

The **End User** course provides delegates with a comprehension of and technical capacity for fan system optimisation (FSO). It enables delegates to initiate the development and implementation of FSO measures and projects in their own companies.

The **Expert Level** course equips delegates with the necessary knowledge, skills and tools to support the adoption and implementation of FSO in industry by technically assisting enterprises and coaching facility personnel on FSO project development. It includes fan system assessment, the identification of optimisation measures, and the development and implementation of operational improvements.



Compressed Air System Optimisation (ESO Comp Air)

The **End User** course provides delegates with a technical capacity for compressed air system optimisation (CASO) and enables them to initiate the development and implementation of CASO measures. Delegates will be able to identify potential optimisation opportunities, and determine how to achieve efficiency through appropriate applications.

The **Expert Level** course equips national experts with the knowledge, skills and tools needed to support the adoption and implementation of CASO in industry by technically assisting enterprises and coaching facility personnel on CASO project development and implementation. The course includes two sessions of 3 days each interspersed with 2 or 3 weeks of data logging. Both sessions are presented at a host site where practical knowledge will be gained in assessing compressed air systems.





The Energy Systems Optimisation (ESO) Training Programme



Pump Systems Optimisation (ESO Pumps)

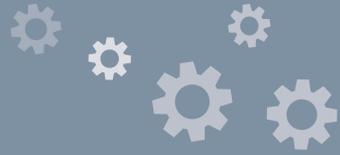
The **End User** course enables delegates to recognise the benefits of pump system optimisation (PSO) by learning how to assess pump systems and identify potential optimisation opportunities, and determine how to achieve cost savings and energy efficiency through the appropriate application of pumps in new and existing systems, different control methods, and maintenance and operational best practices. They will also learn to make cost calculations and quantitatively assess pump systems and potential improvement opportunities. This will enable them to initiate the development and implementation of PSO measures and projects.

The **Expert Level** equips candidates with the knowledge, skills and tools needed to support implementation on PSO in industry by technically assisting enterprises and coaching facility personnel in PSO project development and implementation, as well as conducting PSO user training on pump system assessment, the identification of optimisation measures, and the development and implementation of operational improvements.



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Steam Systems Optimisation (ESO Steam)

The **End User** course provides delegates with in-depth technical information on undertaking an industrial steam system energy assessment and making improvements to industrial steam systems. In addition, it provides hands-on training in the use of steam system optimisation (SSO) tools in the field, while doing an industrial steam system energy assessment.

The **Expert Level** course trains delegates to support the adoption and implementation of SSO in industry. National SSO experts provide technical assistance to enterprises and coach facility personnel on SSO development and implementation. The trained national experts work with enterprises to establish and implement SSO that delivers sustainable energy performance improvements and best practices.

Experts will be equipped with the skills required to promote SSO in industry and build the basic SSO development and implementation capacity of enterprise personnel.

COMING SOON!



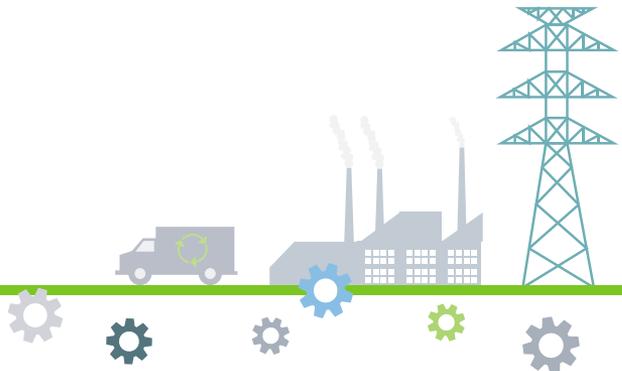
Chillers



Refrigeration



Solar Thermal





EnPMI ISO50006

Duration: 2 days

The **Energy Performance Management Indicators** (EnPMI) course is presented as a 2-day course on performance measurement and performance indicators used in energy management. The course focusses on the benefits of employing regression as a performance measurement tool in a facility's energy management programme and delves into the technical development of baselines.

It is aimed at technical staff interested in Energy Management and ISO 50001 and is strongly recommended for technical staff tasked with implementing Energy Management Systems as well as Resource Efficient and Cleaner Production.

Did you know?

Companies that participate in the NCPC-SA service offerings such as assessments, internship or training candidate plants qualify for **2 complimentary seats** on the EnPMI course.



Benefits for delegates

- Delegates of the energy efficiency End User courses can **receive continued professional development (CPD) points** from the Engineering Council of South Africa (ECSA).
- Delegates of the RECP training will soon be able to **apply for CPD accreditation** (process of application underway).
- Experts have the opportunity to **train as** a local and international (UNIDO-accredited) **trainers**.
- Graduates will be able to apply for **recognition** for **prior learning (RPL)** if working towards the newly registered energy efficiency qualifications on the **National Qualification Framework** (NQF level 6 and 8 respectively).

What our delegates have to say

“**Excellent** Course. Good training – keep it up. Thanks again and looking forward to the **Expert Level Training.**”

Thank you for the fantastic training, I have a **deeper understanding** of the **EnMS tool** and how to implement it going forward.

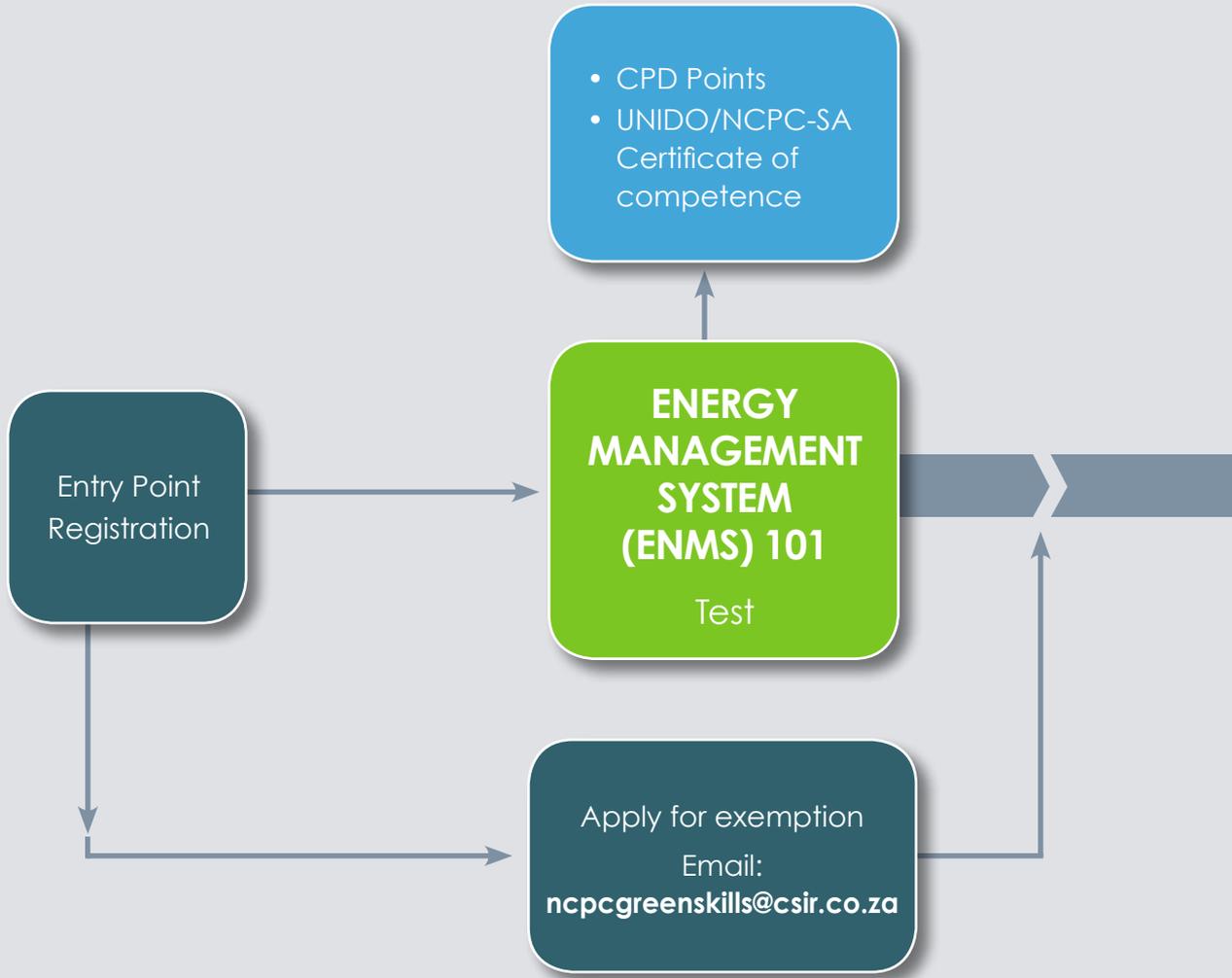
“**Very informative, thank you.**”

“Information provided was in **simple terms** that were **easy to follow and understand.**”

“**Training was very interesting and relevant.**”



Learning Process – EnMS and RECP



- CPD Points
- UNIDO/ NCPC-SA Certificate of competence

- Opportunity to register as an NCPC-SA consultant in area of specialisation
- CPD Points
- UNIDO/NCPC-SA Certificate of competence

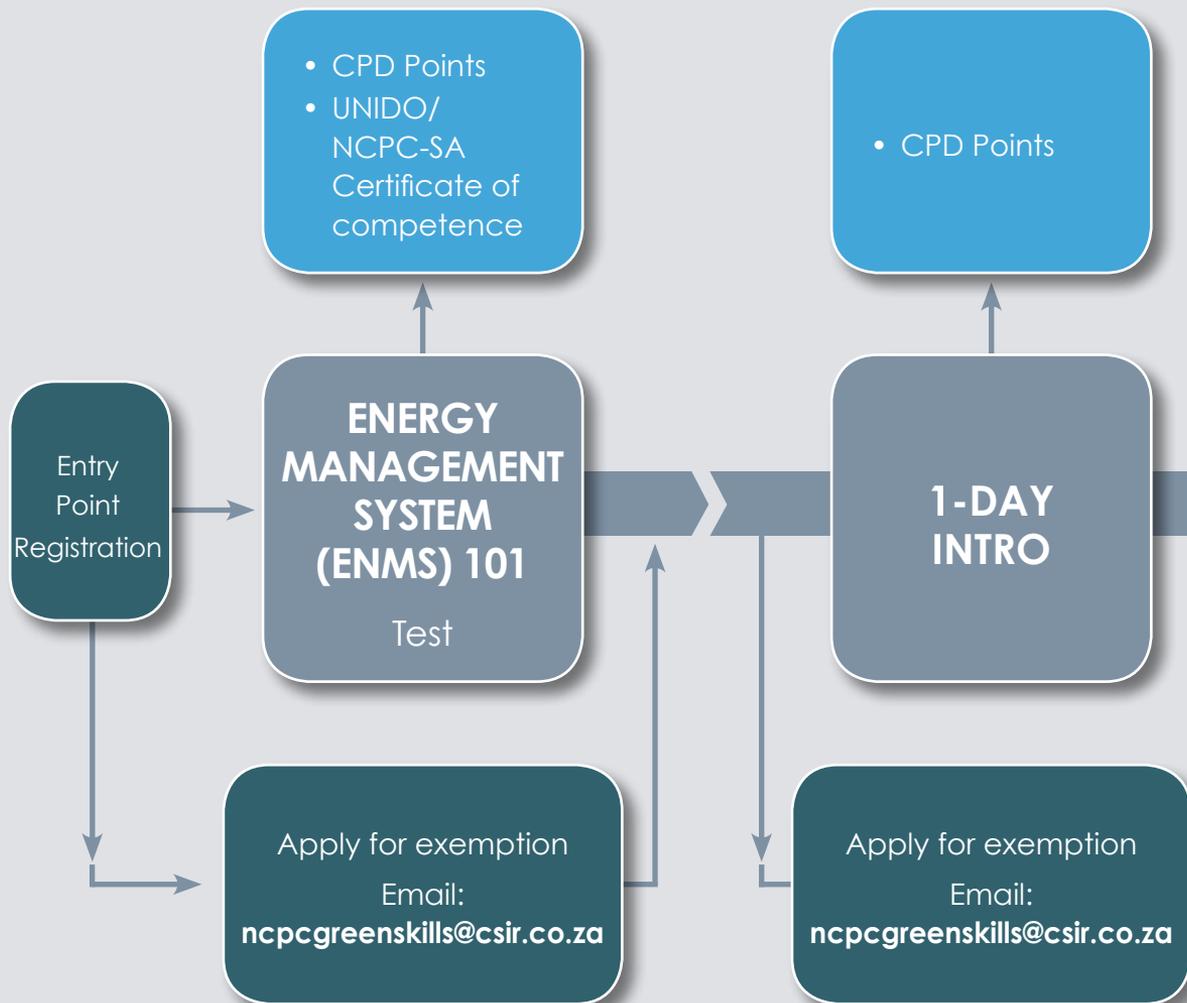
**2-DAY
END USER
Test**

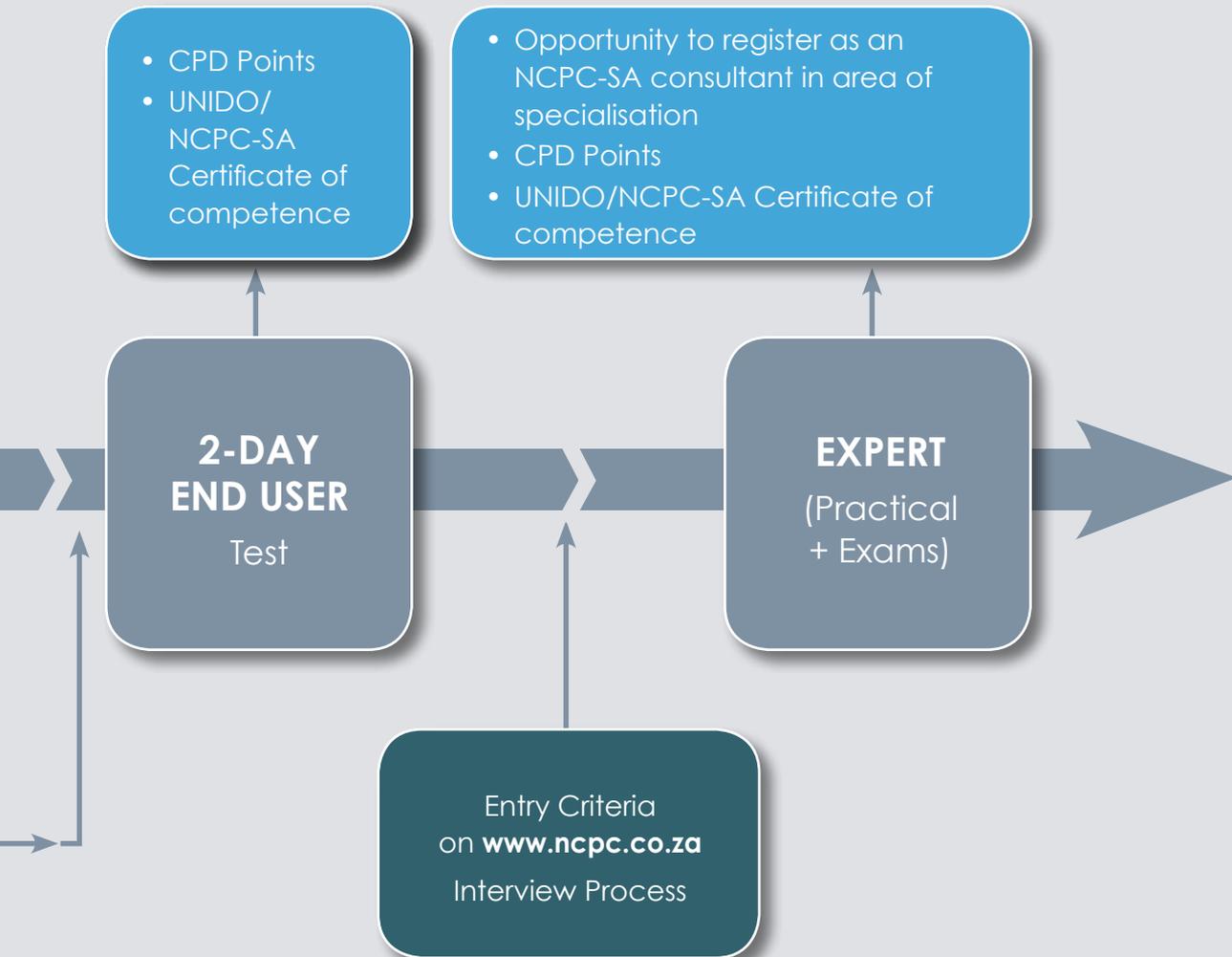
**EXPERT LEVEL
(1 YEAR)**
(Practical
+ Exams)

Entry Criteria
on www.ncpc.co.za
Interview Process



Learning Process – Energy Systems Optimisation





- CPD Points
- UNIDO/NCPC-SA Certificate of competence

- Opportunity to register as an NCPC-SA consultant in area of specialisation
- CPD Points
- UNIDO/NCPC-SA Certificate of competence

**2-DAY
END USER**
Test

EXPERT
(Practical
+ Exams)

Entry Criteria
on www.ncpc.co.za
Interview Process



How to register



To register for our training courses, delegates are required to create a profile on our website **www.ncpc.co.za**.

Once a profile has been created, you will be able to register for a course.

1

STEP 1: Create a user profile

Visit our website **www.ncpc.co.za**, and click on Skills Development. You will be able to create your profile by following the steps on the How to Register link.

2

STEP 2: Course bookings

Once you have activated your profile, you are now able to register for a training course. Please ensure that you select the correct date and location. Many of our training courses are offered simultaneously in more than one region.

We have included a Group registration option, for individuals and companies who book on behalf of their members.

3

STEP 3: Confirmation and Next steps

Once you have successfully registered, you will receive a confirmation email. Our skills development coordinators will also contact you with more information and payment details.

Costs

Costs Whilst the NCPC-SA training courses are highly subsidised by funds from **the dti** and international partners such as UNIDO, there are fees payable.



Visit www.ncpc.co.za for the latest prices of each course.





Should you have any challenges with the online registration portal, please send an email to **ncpcgreenskills@csir.co.za**.

For more enquiries

Pretoria:

Siphe Ngobese | 012 841 2246 | SNgobese@csir.co.za

Cape Town:

Mthobeli Lithiko | 021 658 2776 | MLithiko@csir.co.za

Durban:

Nontobeko Gcabashe | 031 242 2319 | NGcabashe@csir.co.za

Scan the code for easy
access to NCPC-SA
training pages



www.ncpc.co.za

www.ncpc.co.za/training-courses





How to contact us

For more information or enquiries about the services of the NCPC-SA,
please visit our website or contact us on:

Pretoria: +27 12 841 3772 **Cape Town:** +27 21 658 2776 **Durban:** +27 31 242 2441

Email: ncpc@csir.co.za | ncpcGreenSkills@csir.co.za



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