The Importance of a Country's Welding Industry, Its National Welding Capability (NWC) and Their Significance to the UN Sustainable Development Goals (SDGs)

Long Report – Volume 2: Potential NWC and SDGs Welding Industry Projects and Resources

Edited by *Chris Smallbone*

The Importance of a Country's Welding Industry, Its National Welding Capability (NWC) and Their Significance to the UN Sustainable Development Goals (SDGs)

https://iiwelding.org/iiw-jointothefuture/iiw-and-sustainable-development/

Short Report

Long Report Volume 1: NWC and SDGs Interconnected and Interdependent in the Welding Industry

Long Report Volume 2: Potential National Welding Capability Welding Industry Projects and Resources

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Foreword

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The International Institute of Welding (IIW) was founded in 1948 by the Welding institutes or societies of 13 countries that considered it crucial to make more rapid scientific and technical progress in welding possible on a global basis [1]. Its membership today comprises welding organisations from 51 countries worldwide.

IIW provides a unique cooperative and collaborative platform for experts, practitioners and policy makers in the welding and related industries to share not only technical information and innovation, but knowhow in all areas affecting a country's ability to achieve sustainable development in a sustainable environment and fulfil their responsibilities in a cooperative and converging global community.

As the world population continues to grow, the pressures on manufacturing, infrastructure and power generation, not to mention basic needs such as food, water, shelter and education, have become enormous common challenges. The welding industry is a significant global industry and, together with welding as an enabling technology, it plays a critical role in the world's ability to cope with these pressures and changes and drive significant progress.

The IIW community is dedicated to the concept of helping all countries build their own sustainable welding capabilities to meet these challenges and improve the quality of life for their people and all mankind. The IIW Project "Establishing a National Welding Capability (NWC) in a Country" is a means of achieving this [4].

This report, which is split into a Short Report and a Long Report, is an outcome of the IIW National Welding Capability (NWC) Project. It provides guidance, including practical ideas and recommendations, on how a country's welding industry can improve its national welding capability and simultaneously progress targeted UN Sustainable Development Goals (SDGs) as well as complement other initiatives being taken by governments, aid agencies, industry and like-minded organisations.

It is hoped that the guidance, ideas and recommendations in the report will lead to enhanced cooperation and collaboration between countries, governments, industries, aid agencies and organisations in mutually beneficial projects to enhance the NWCs and SDGs.

Besides improving the quality of life for so many, the rewards for involvement by individuals and companies will be immense.

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"With the four attributes of **ENTHUSIASM, PERSISTENCE, COOPERATION & COLLABORATION**
we can all work together in an excellent team effort to improve the quality of life globally."

Chris Smallbone, IIW President 2005-2008, IIW Fellow

Long Report – Volume 2: Potential NWC and SDGs Welding Industry Projects and Resources

Executive Summary

This report highlights the crucial role that a country's national welding capability (NWC) can play through its welding industry in progressing the 17 UN Sustainable Development Goals (SDGs) and 2030 Agenda in the country.

It will serve as a reference point and catalyst for governments and organisations in industry, research and development, education and training, qualification and certification, technology transfer as well as standards-making and regulatory bodies to cooperate and collaborate in progressing both the NWC and SDGs in a country.

The 51 member country International Institute of Welding (IIW) and present regional organisations have potential roles in addressing the existing specific regional disparities through establishing global partnerships and enthusiastic collaboration to progress the SDGs.

The period set by the UN to achieve the targets for the SDGs by 2030 has now passed 50% with the global targets currently achieved falling well short for many reasons.

This report gives a number of specific recommendations on how the welding industry in a country, and globally, can improve on this particularly by prioritising the strategies and projects to be implemented particularly in relation to the resources available in the country so that the resources and efforts are devoted to do the most good.

In this regard, examples of possible welding industry projects for each SDG are shown in Section 7 of the Long Report which will result in mutually beneficial outcomes being realised for all parties in improving the National Welding Capability, progressing the Sustainable Development Goals and improving the quality of life for all.

Note: All numbered references in the text are listed in Section 2 of Volume 2 of the Long Report.

IIW Vision, Mission and Core Values

Vision

The leading global welding community linking industry, research and education

Mission

Advance welding and joining through a worldwide network

Core Values

IIW is committed to the advancement of welding and joining for a safer and sustainable world

IIW operates based on mutual respect for diversity, culture and languages

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Volume 2

1. Potential Welding Industry Projects to Progress UN SDGs

1.1 Introduction

Improving a country's national welding capability will have a significant effect on improving all its UN Sustainable Development Goals and this will hopefully be promoted by the UN and implemented in many countries. https://www.scielo.br/j/si/a/tDWHcwCpMB3tFYY4xTXWZWt/?lang=en [4].

With the assistance of people around the world with the experience and knowledge on implementing the NWC Project building blocks, an organisation with the correct people, with the right team, culture, drive and enthusiasm, could build the optimal NWC for a country and help improve prioritised targeted SDGs in that country.

- Since this will require cooperation and collaboration between many people and organisations, a national organisation (not for profit) could be suitable as the leader of such an NWC project in a country.
- The role of engineering in achieving each of the 17 SDGs is highlighted in the UNESCO Engineering Report titled "Engineering for Sustainable Development: Delivering on the Sustainable Development Goals" published on 4 March, 2021 [7].
- When one considers the networks which the IIW, its 51 Member countries, universities, colleges, research organisations and companies involved in welding have as the leading international welding organisation, it can bring all the available welding resources to assist in achieving the SDGs and have a remarkable positive effect globally on all countries [16].
- Various national UN SDG reports have been compiled in various countries to act as a catalyst, with the national welding capability as a basis, to create a quantum leap in the amount of projects within each SDG which each country and its welding Industry networks could undertake in cooperation and collaboration with Governments, industry and aid agencies to achieve the UN SDGs by 2030 [19], [28], [104], [130], [131], [135], [137].
- It is hoped that the national reports will stimulate ideas amongst Governments and the international welding community to draw up mutually beneficial strategies and action plans to improve their SDGs many of which are interlinked.
- The Covid-19 Pandemic has brought major challenges to all countries in particular the poorer developing countries. To achieve the optimal NWC in each country as well as contribute to the SDGs, it is becoming even more important on how to assist countries with both concrete ideas and practical support. The quality of life in all countries will benefit from this.
- Since improving both the NWC and SDGs involves working with individual industries, one approach is to use an Industry Sectoral Project (ISP) strategy to cover both aspects.
- This ISP will involve conducting needs analyses, finding solutions and implementing information transfer and will involve working directly with leading firms, SMEs, supply chains, E, T, Q, C, R&D and technology specialists in an NWC/SDG Support Centres (SCs) Network to help them:
  - analyse and define the key challenges, opportunities and requirements that will govern the competitiveness of the country's capability in each industry sector and identify specific areas where welding, joining and fabrication innovation and technology needs to be upgraded and transferred to improve both companies and the country's competitive advantage and market performance in that sector including the effects on progressing the SDGs [16];
  - select ISP activities to meet the identified needs, demonstrate the innovation and technologies to be implemented and identify how the solutions can be implemented, document the activities of the demonstrations and outcomes, disseminate the ISP activities to the wider industry and plan activities for future actions needed, including research, development, education, training, qualification, certification and standards development which will also continually progress the SDGs [16];
  - capture all the appropriate information in transfer mechanisms such as key Expert Technology Tools (ETTs), Technical Guidance Notes (TGNs) and Standards for each technology/sector application/SDG and facilitate the ongoing transfer, uptake, tailored application and skills development by industry in

each of the welding/joining/fabrication technologies/practices and SDGs identified through the ISP.

- Some of the welding industry sectors identified in the SDGs include food, rail, road transport, water, pressure equipment, building and construction, energy, pipelines, marine platforms, pharmaceutical and medical devices. ISPs have been successfully implemented in countries such as the UK, Australia, Germany, Canada and USA and outcomes could be transferred into interested countries throughout the world.
  To succeed it is essential that one must:
- Prioritise the strategies and projects to be implemented so that the resources and efforts are devoted to do the most good and beneficial outcomes will be realised in improving the NWC and progressing the SDGs.
- Use the initiative to stimulate cooperation and collaboration both within and between countries at governmental, organisational and individual levels to prioritise and target SDGs in conjunction with their welding industries.
- Use a targeted, prioritised industry sectoral project approach both for the NWC and for a number of SDGs, not a "scattergun" approach.
- continually show the value of, and return on, the efforts by all parties for the country.
- work nationally and internationally directly with:
  - Leading firms,
  - Small and Medium-sized Enterprises,
  - Supply Chains,
  - Education, Training, Qualification and Certification Organisations
  - Research and Development (R&D) Organisations
  - Technology Specialists in an NWC/SDG Support Centres (SCs) Network
  - Government departments, regulators and standards bodies
- The potential projects mentioned in the tables are simply examples which can be amended to suit a country's needs. At the end of each list of potential projects in a table, the reader of the report is encouraged to add their own ideas of potential projects. A potential project under one SDG, or a variation on it, may also have benefits for use with other SDGs.

1.2 Structure and Tables of Potential Projects Within a Flagship Programme

- Shown below are tables of potential projects which could be conducted by a country's welding industry to both build up the country's national welding capability but also improve appropriate UN SDGs.
- Under each SDG, it shows potential **Welding Industry Roles** which could be fulfilled by the welding industry in a country.
- In the table under each SDG **Welding Industry Role**, each potential project has an item number linked to the number of the SDG. For example, SDG 1/1 is simply SDG number 1 potential project 1. The projects are not in any particular order of priority.
- In the extreme right hand column, possible sources of obtaining ideas and resources for that project both practical and financial from somewhere in the world are shown.
- Government or industry programmes which would be useful for a project are also shown. Mentioning past and current programmes from various countries is also useful since they could be used for ideas and programmes in other countries.
- In the right hand column, the reference numbers shown are those in Section 2 References and Links of this report.

SDG 1 – End Poverty in All Its Forms Everywhere

Welding Industry Roles: The welding industry would help to create employment opportunities including making more people aware of such opportunities and personal upliftment

Item #	Possible Project	Examples of Potential Resources, Government and Industry Programmes
SDG 1/1	Show the value of welding to the economy of the country, its contribution to improving quality of life including the present and potential contribution of the national welding organisation and the welding related industries.	• AWS, Reference [13] • HERA, References [21], [22], [214] • CRC-MW&J, Reference [82] • DVS, Reference [14] • Department of Trade and Industry UK in 2000, Reference [15] • Emmanuel Gyasi, References [89], [220] • EWI, Reference [86] • CWB Group, 2022 Industry Report, Reference [81]
SDG 1/2	Conduct a technology needs analysis of the welding related industries of the country including requirements for human resources, facilities etc.	• CRC-MW&J Report, Reference [82] • EWI, Reference [86] • Industry Sectoral Projects, References [144], [216] • CWB Group, Canadian Welding Industry Employment and Salary Report, Reference [182]
SDG 1/3	Create a report to show how the introduction of Industry 4.0 to the country is anticipated to give unprecedented transformation to its industry including a significant boost to GDP, introduce new and appropriate technologies, saving time, boosting productivity, reducing waste, expanding business models and being more responsive to fast changing environmental and consumer demands.	• HERA, Reference [21] • OzWeld Technology Support Centres Network Model, Reference [39]
SDG 1/4	Conduct an analysis of the population distribution of the country in terms of region, age, gender, education, salaries, employment numbers and categories etc and the potential for employment in welding related industries and projects over the next 5 to 20 year periods.	• Government Departments-Statistics • Weld-Ed National Centre for Welding Education and Training, Reference [151] • AWJ Vol 51 2006, Reference [168] • AWS Welding Workforce Data, Reference [197]

Item #	Possible Project	Examples of Potential Resources, Government and Industry Programmes
SDG 1/5	Prepare a report showing the predicted numbers of welding related personnel at each level required in each formal industry sector and each region of the country over the next 5 to 20 years. The report will also be used as a basis for the implementation of other projects in the SDGs.	• Weld-Ed National Centre for Welding Education and Training, Reference [151] • AWJ Vol 51 2006, Reference [168] • AWS Plummer Lecture, Reference [36] • DVS, Reference [14] • Material producing companies and associations • Government Departments-Statistics • CWB Group, Canadian Welding Industry Employment and Salary Report, Reference [182]
SDG 1/6	Prepare a report showing the estimated numbers of welding related personnel at each level required in the informal economy in the country over the next 5 to 20 years. The report will be used as a basis for the implementation of other projects in the SDGs.	• Government departments-Statistics • Weld-Ed National Centre for Welding Education and Training, Reference [151] • AWJ Vol 51 2006, Reference [168] • CWB Group, Canadian Welding Industry Employment and Salary Report, Reference [182]
SDG 1/7	Analyse each government, aid agency and industry programme in the country aimed at poverty reduction and recommend a plan on how the welding industry can be involved and contribute to such programmes.	• Government Departments • Aid Agencies, Appendix 3.8 • Industry programmes.
SDG 1/8	Analyse poverty reduction programmes existing outside the country and recommend to government and industry how such programmes could benefit the country with involvement of the welding industry.	• Aid agencies, Appendix 3.8. • Programmes in other countries.
SDG 1/9	The welding industry implements a Flagship "National Welding Capability" programme and takes the leading advocacy role in promoting improving the national welding capability and progressing the SDGs.	• Flagship Programmes, Reference [152]
SDG 1/10	Identify and analyse Skill Development requirements for welders in individual States/Regions depending on the types of industry.	• PMKVY Reference [224]
SDG 1/11	Each reader to continue to create additional projects to meet the country's needs.	

SDG 2 – End Hunger, Achieve Food Security and Improved Nutrition, and Promote Sustainable Agriculture

Welding Industry Roles: The welding industry will help ensure that the necessary facilities, technologies and skills are available to design, manufacture, build, repair and maintain the appropriate plant and equipment for the food growing, processing, storage, transport and distribution activities.

Item #	Possible Project	Examples of Potential Resources, Government and Industry Programmes
SDG 2/1	Implement a plan to work closely with government and industry organisations both prior to, and after, a decision has been made to establish **Industry Sectoral Projects (ISP)** to increase local production of fertilisers, food production and food processing as well as food storage and transportation ensuring the reliability of plant and equipment as well as the reliability and integrity of the food itself thus contributing to food security.	• NWC and SDG Flagship Programme Lead Organisation • ISPs, References [144], [216]
SDG 2/2	Analyse, create and implement a plan for transferring welding and joining technologies needed to contribute to meeting objectives of local production of fertilisers, food production, food processing and storage including examples such as those developed and implemented by IIW Members in their welding industry networks.	• ISP Food Security Plant, References [144], [216] • OzWeld Technology Support Centres Network Model, Reference [39].
SDG 2/3	Analyse, create and implement a plan for transferring welding and joining technologies needed to contribute to meeting objectives of transporting food including examples such as those developed and implemented by IIW Members in their welding industry networks.	• ISP Food Transport, References [144], [216] • OzWeld Technology Support Centres Network Model, Reference [39]
SDG 2/4	Analyse, create and implement a plan for transferring welding and joining technologies needed to contribute to meeting objectives of local production and maintenance of agricultural equipment including examples such as those developed and implemented by IIW Members in their welding industry networks.	• ISP Agricultural Equipment, References [144], [216] • OzWeld Technology Support Centres Model Network, Reference [39]
SDG 2/5	Implement a plan to ensure that there are sufficient competent companies which use and benefit from improved welding fabrication and construction technologies to manufacture, construct and maintain the various types of plant required for the production of fertilisers, food processing and storage.	• ISP Food Security Plant, References [144], [216] • IIW MCS ISO 3834, Reference [34] • Material Producers • Material Associations

Item #	Possible Project	Examples of Potential Resources, Government and Industry Programmes
SDG 2/6	Implement a plan to ensure that there are sufficient competent companies which use and benefit from improved welding fabrication and construction technologies to manufacture, construct and maintain the various transport networks and infrastructure to take food to markets including rail links and complementary coaches, refrigerated vans/containers and rolling stock to transport fresh produce to consumer centres.	• ISP Food Transport, References [144], [216] • IIW MCS ISO 3834, Reference [34] • Material Producers • Material Associations • Railway Associations
SDG 2/7	Implement a plan to ensure that there are sufficient competent companies which use and benefit from improved welding fabrication and construction technologies to manufacture, construct and maintain the various types of agricultural equipment required.	• ISP Agricultural Equipment, References [144], [216] • IIW MCS ISO 3834, Reference [34] • Material Producers • Material Associations
SDG 2/8	Implement a plan with associated industry organisations to create a competent network of companies to manufacture, construct and maintain grain storage facilities with sufficient storage space and appropriate environmental conditions to prevent wastage of food grain.	• ISP Food Storage, References [144], [216] • IIW MCS ISO 3834, Reference [34] • Material Producers • Material Associations
SDG 2/9	Implement a plan to ensure that a competent workforce exists in the areas where plant construction such as for fertilisers, food processing and storage infrastructure amongst others needs to be carried out.	• ISP Food Security Plant, References [144], [216] • IIW IAB, Reference [34] • Material Producers • Material Associations
SDG 2/10	Implement a plan to ensure that a competent workforce exists in the areas where construction of transportation links and infrastructure amongst others needs to be carried out.	• ISP Food Transport, References [144], [216] • IIW IAB, Reference [34] • Material Producers • Material Associations
SDG 2/11	Implement a plan to ensure that a competent workforce exists in the areas where agricultural equipment needs to be produced.	• ISP Agricultural Equipment, References [144], [216] • IIW IAB, Reference [34] • Material Producers • Material Associations
SDG 2/12	Implement a plan to ensure that a competent workforce exists in the areas where agricultural equipment needs to be maintained.	• ISP Agricultural Equipment, References [144], [216] • IIW IAB, Reference [34] • Material Producers • Material Associations

Item #	Possible Project	Examples of Potential Resources, Government and Industry Programmes
SDG 2/13	Create and/or obtain resources required to train people to operate an SMME (Small, Medium and Micro Enterprise) and incorporate into, or make complementary to, the welding training courses for the different levels of personnel.	● NPI South Africa, Reference [56] ● Australian State Governments' booklets
SDG 2/14	Create and implement plans for promoting "start-ups" in many areas both urban and rural in the welding related fields including youth acquiring basic skills in welding through to engineering personnel with degrees and diplomas.	● NPI South Africa, Reference [56] ● Australian State Governments ● Skills Regional Programmes, References [60], [61] ● IIW-India, Reference [159]
SDG 2/15	Train as many people as possible in the appropriate welding skills for any eventuality which may arise in agricultural regions as well as using the skills for non-agricultural purposes as well as developing other businesses.	● VET Colleges ● Skills Regional Programmes, References [60], [61]
SDG 2/16	Implement a plan to ensure that there are sufficient competent companies to manufacture and maintain sufficient cooking equipment to cater for the many people including children who rely on communal cooked food, often their only meal of the day, cooked in automatic machinery manufactured out of stainless steel.	● IIW ISO MCS 3834, Reference [34] ● Industry Associations for Materials and Construction
SDG 2/17	Introduce mobile welding training schools to service rural areas.	● Lincoln Electric, Reference [154] ● Mississippi Department of Corrections, Reference [27]
SDG 2/18	Introduce a mobile welding careers unit to service both urban and rural areas across the country.	● AWS, Reference [26] ● CWB Group, Reference [92]
SDG 2/19	Each reader to continue to create additional projects to meet the country's needs.	

SDG 3 – Ensure Healthy Lives and Promote Well-Being for All at All Ages

Welding Industry Roles: The welding industry will help ensure that the necessary facilities, technologies and skills are available to design, manufacture, build, repair and maintain the appropriate plant and equipment for pharmaceutical, medical devices, medical gases and radioisotopes manufacture, transport, installation and distribution activities.

Item #	Possible Project	Examples of Potential Resources, Government and Industry Programmes
SDG 3/1	Implement a plan to work closely with government and industry organisations both prior to, and after, a decision has been made to establish an **Industry Sectoral Project (ISP)** to increase local production of radioisotopes for medical purposes.	• ISP Radioisotopes, References [144], [216] • IAEA, Appendix 3.8 • Industry Associations for Medical Devices • Industry Associations for Materials • Industry Associations for Plant Construction • Government Departments • IIW Members, Reference [34]
SDG 3/2	Implement a plan to work closely with government and industry organisations both prior to, and after, a decision has been made to establish an **Industry Sectoral Project (ISP)** to increase local production of medical devices.	• ISP Medical Devices, References [144], [216] • IIW Members, Reference [34] • Industry Associations for Medical Devices • Industry Associations for Materials • Government Departments
SDG 3/3	Implement a plan to work closely with government and industry organisations both prior to, and after, a decision has been made to establish an **Industry Sectoral Project (ISP)** to increase local production of medical gas systems and facilities.	• ISP Medical Gas Systems, References [144], [216] • IIW Members, Reference [34] • Industry Associations for Medical Gas Systems • Industry Associations for Materials • Government Departments
SDG 3/4	Analyse, create and implement a plan for transferring welding and joining technologies needed to contribute to meeting objectives of local manufacturing of various medical devices including examples such as those developed and implemented by IIW Members in their welding industry networks.	• ISP Medical Devices, References [144], [216] • OzWeld Technology Support Centres Network Model, Reference [39]

Item #	Possible Project	Examples of Potential Resources, Government and Industry Programmes
SDG 3/5	Analyse, create and implement a plan for transferring welding and joining technologies needed to contribute to meeting objectives of local manufacturing of various medical gas equipment and systems including examples such as those developed and implemented by IIW Members in their welding industry networks.	• ISP Medical Gas Systems, References [144], [216] • OzWeld Technology Support Centres Network Model, Reference [39]
SDG 3/6	Analyse, create and implement a plan for transferring welding and joining technologies needed to contribute to meeting objectives of local manufacturing of radioisotopes including equipment and systems including examples such as those developed and implemented by IIW Members in their welding industry networks.	• ISP Radioisotopes, References [144], [216] • OzWeld Technology Support Centres Network Model, Reference [39]
SDG 3/7	Analyse, create and implement a national plan to ensure that people involved in formal welding related industries are protected from a health and safety viewpoint including mental health.	• IIW, Reference [34] • AWS, Reference [147] • TWI Ltd, Reference [150] • CWB Group, Reference [92] • DVS, Reference [149] • Welding Supply Companies, References [124], [125] • Government Regulatory Departments • References [205], [206], [207]
SDG 3/8	Analyse, create and implement a national plan to ensure that people involved in the informal welding related industry are protected from a health and safety viewpoint including mental health.	• IIW, Reference [34] • AWS, Reference [147] • TWI Ltd, Reference [150] • CWB Group, Reference [92] • DVS, Reference [149] • Welding Supply Companies References [124], [125] • Government Regulatory Departments • References [205], [206], [207]
SDG 3/9	Develop and implement specifications to ensure the integrity and reliability of the plant and equipment to produce pharmaceuticals, medical devices, medical gases and medical radioisotopes.	• ISO, Reference [122] • National Standards Organisations • IAEA, Appendix 3.8 • Gas Supply Companies • Pharmaceutical Companies • Government Departments
SDG 3/10	Identify and implement a plan to ensure that the required number of competent companies as well as appropriate welding related technologies for manufacturing, installing and maintaining medical gas equipment into the national networks of hospitals and medical facilities are available.	• ISP Medical Gas Systems, References [144], [216] • IIW MCS ISO 3834, Reference [34] • ISO 14731 • Gas supply companies • Governments Departments

Item #	Possible Project	Examples of Potential Resources, Government and Industry Programmes
SDG 3/11	Implement a plan to ensure that a competent workforce exists in the areas where manufacture, installation, maintenance and repairs of medical gas equipment and systems need to be carried out.	• ISP Medical Gas Systems, References [144], [216] • IIW IAB, Reference [34] • ISO 14731 • VET Colleges • Gas production Industry
SDG 3/12	Establish an ISP for the pharmaceutical Industry and identify and implement a plan to ensure that the required number of competent companies as well as appropriate welding related technologies to be able to build, repair and maintain the relevant plant, facilities, infrastructure and equipment for the pharmaceutical industry are available.	• ISP Pharmaceutical Industry, References [144], [216] • IIW MCS ISO 3834, Reference [34] • ISO 14731 • Pharmaceutical Industry • Government Departments
SDG 3/13	Implement a plan to ensure that a competent workforce exists in the areas where the manufacture, construction, maintenance and repair of pharmaceutical plant, facilities, infrastructure and equipment needs to be carried out.	• ISP Pharmaceutical Industry, References [144], [216] • ISO 14731 • IIW IAB, Reference [34] • VET Colleges • Pharmaceutical Industry
SDG 3/14	Identify and implement the required number of competent companies as well as appropriate welding related technologies to be able to build, repair and maintain the relevant plant, facilities, infrastructure and equipment for the radioisotope industry are available.	• ISP Radioisotopes, References [144], [216] • IIW MCS ISO 3834, Reference [34] • ISO 14731 • IAEA Appendix 3.8 • Government Department
SDG 3/15	Implement a plan to ensure that a competent workforce exists in the areas where the manufacture, construction, maintenance and repair of plant, facilities, infrastructure and equipment for radioisotopes needs to be carried out.	• ISP Radioisotopes, References [144], [216] • ISO 14731 • IIW IAB, Reference [34] • VET Colleges • IAEA Appendix 3.8 • CWB Group Nuclear Industry Project [183]
SDG 3/16	Identify and implement the required number of competent companies as well as appropriate welding related technologies to be able to build, repair and maintain the relevant plant, facilities, infrastructure and equipment for the specific medical devices industry.	• ISP Medical Devices, References [144], [216] • IIW ISO MCS 3834, Reference [34]
SDG 3/17	Implement a plan to ensure that a competent workforce exists in the areas where the manufacture, construction, maintenance and repair of plant, facilities, infrastructure and equipment for the specific medical devices needs to be carried out.	• ISP Medical Devices, References [144], [216] • IIW IAB, Reference [34]
SDG 3/18	Analyse, create and implement a national plan to ensure that people involved in the informal and formal welding related industries are protected from injuries to their eyes.	• Ghana Reference [225].
SDG 3/19	Each reader to continue to create additional projects to meet the country's needs.	

SDG 4 – Ensure Inclusive and Equitable Quality Education and Promote Lifelong Learning Opportunities For All

Welding Industry Roles: The welding industry will help ensure that the necessary training and education facilities and resources will be available to provide the required numbers of people able to transfer the necessary technologies and skills to design, manufacture, build, repair and maintain the appropriate, infrastructure, plant and equipment for the country.

Item #	Possible Project	Examples of Potential Resources, Government and Industry Programmes
SDG 4/1	Investigate, recommend and implement measures that will ensure that the optimum education and training is performed to produce outcomes to meet the needs of the different welding-related industry sectors in the country including skills levels and career paths and routes for people including helping ensure lifelong learning opportunities.	• References [34], [35], [36], [37], [38], [39], [40], [41] • Reference [195]
SDG 4/2	Establish and operate networks to bring industry and all levels of government together to supply the E&T, skills and career paths to create viable industry sectors and overcome constraints as well as fostering partnerships between Small, Medium Enterprises (SMEs), larger firms and training providers.	• References [39], [40], [41] • UNIDO Report, Reference [203]
SDG 4/3	Implement programmes to upgrade the competency levels of welding instructors at training centres and companies to world's best practice to improve efficiencies as well as ensuring the latest and best training resources and facilities are available for their use.	• References [43], [44], [45] • DVS VWTS welding instructor, Reference [149] • Reference [222]
SDG 4/4	Implement programmes to assist secondary schools to develop and support educational programming, capital equipment, consumables and protective equipment that create and upgrade quality learning environments in school technology programs.	• References [35], [46], [47], [92], [147], [149] • Reference [222]
SDG 4/5	Link in with the Government initiatives to provide secondary students with improved career paths from school to work, including part-time apprenticeships and traineeships including training of school teachers and provision of training resources on these initiatives.	• References [35], [46], [47] • VET Colleges • Universities • CWB Group, Reference [185] • Reference [222]

Item #	Possible Project	Examples of Potential Resources, Government and Industry Programmes
SDG 4/6	Establish formal Foundations to provide training and career paths to disadvantaged individuals across the broad spectrum of welding specialisations and allied technologies as a joint effort between the colleges and industry giving as many young people as possible a chance in life, while at the same time doing as much as possible to alleviate the skills shortage in the country.	• AWS Foundation, Reference [147] • CWB Foundation, Reference [92] • SAIW, Reference [164] • HERA, Reference [104] • Reference [222]
SDG 4/7	To engage youth from elementary and secondary ages across the country, introduce a new inexpensive welding simulator program which will use virtual and augmented reality to allow students to try welding in a safe, controlled environment whilst learning about career opportunities in welding and related skilled trades and include this in **Train-the-Trainer** programmes.	• CWB Group, Reference [92] • DVS, Reference [149], [177] • Emmanuel Gyasi, Reference [221] • Miller Electric, Reference [155] • Lincoln Electric, References [154], [176] • The Metaverse, References [237], [240] • Reference [222]
SDG 4/8	Make an agreement with appropriate organisations to access newly developed and improved online, hybrid or in person welding curriculum which can be integrated into established programmes or used to build and deliver new programmes thus enabling educational institutions and training providers to give students better content and help them achieve their academic goals as well as helping organisations improve the skills of their employees.	• CWB Group, References [46] • AWS, Reference [47] • DVS, References [35], [179], [180] • GSI, Reference [178] • Miller Electric, Reference [155] • Lincoln Electric, Reference [154]
SDG 4/9	Implement programmes based on Educators Conferences and "Train-the-Trainer" programmes,	• CWB Foundation, Reference [186] • AWS, Reference [147] • TWI AWFTE, References [153], [233] • DVS, Reference [149]
SDG 4/10	Implement and/or expand the International Institute of Welding (IIW) Education, Training, Qualification and Certification programmes to ensure world class personnel will be available in the welding industry in a country.	• IIW-IAB, Reference [34] • VET Colleges • Universities • DVS, Reference [196]
SDG 4/11	Implement and/or expand the International Institute of Welding (IIW) IIW Manufacturers Certification Scheme According to ISO 3834 (IIW MCS ISO 3834) to ensure world class companies will be available in the welding industry in a country.	• IIW IAB, Reference [34] • IIW MCS ISO 3834, Reference [34]
SDG 4/12	Implement a plan to ensure that local companies satisfy, or are approved to, the appropriate national programmes called up in project specifications.	• CWB Group, Reference [92] • AWS/ANSI, Reference [147] • IIW ANBCCs, Reference [34]
SDG 4/13	Implement a plan to ensure that local companies satisfy, or are approved to, the appropriate overseas or ISO standards called up in project specifications.	• ISO 3834, ISO 14731, ISO 9712, ISO 17024, ISO 17021, ISO 14001, ISO 45011 • ASME (USA), Reference [163] • EU Standards

Item #	Possible Project	Examples of Potential Resources, Government and Industry Programmes
SDG 4/14	Implement a national network of welder test centres.	• AWS National network of welder test centres, Reference [147] • CWB Group National network of welder test centres, Reference [92] • DVS National network of welder test centres, Reference [149]
SDG 4/15	Establish a Qualification and Certification Division to ensure that all personnel trained meet the required national or international standards in the different welding related industry sectors e.g. rail, road, water, power, construction etc.	• IIW IAB, Reference [34] • National Welding Institute/Society/ Association • National Standards Body • Government VET requirements • Reference [195]
SDG 4/16	Analyse and implement where appropriate the successful technologies which have been developed and implemented catering for the challenges of remoteness of both companies and individuals, and in particular disadvantaged communities, which could lead to more effective training, education, testing and auditing systems.	• IIW IAB, Reference [34] • National Welding Institute/Society/ Association • National Standards Body • CWB Group, Reference [92]
SDG 4/17	Analyse national and international programmes and implement programmes to promote lifelong learning of Young Professionals (YPs) such as "YP International Conferences" (Hungary), "Student Chapters" (IIW-India, AWS, CWB Group, DVS), "Youth Creates" (ASR-Romania), "Future Leaders" (AWS), "Welding Workforce Grants" (AWS), amongst others.	• Hungarian Welding Society • ASR, Romania, Reference [194] • IIW-India, Reference [159] • AWS, Reference [147] • AWS, Reference [156] • CWB Group, Reference [92] • DVS, Reference [57]
SDG 4/18	Each reader to continue to create additional projects to meet the country's needs.	

SDG 5 – Achieve Gender Equality and Empower All Women and Girls

Welding Industry Roles: The welding industry will help ensure that the necessary programmes, and their promotion and take-up, are available for women and girls to give them equality and empowerment.

Item #	Possible Project	Examples of Potential Resources, Government and Industry Programmes
SDG 5/1	Introduce programmes to improve the image of welding as a career particularly targeted at young people including females.	• AWS, Foundation Grants and Awards, Reference [147] • DVS, Reference [149] • CWB Group, Women of Steel Programmes, Reference [58] • CWB Group, Foundation Grants and Awards, Reference [92] • TWI The Tipper Group, Reference [153] • TWI Living Our Values Campaign, Reference [153] • TWI Women in Leadership Programmes, Reference [153]
SDG 5/2	Develop and implement a national skills respect culture.	• NPI South Africa, Reference [56]
SDG 5/3	Conduct local, regional and national welding competitions to encourage young people in their welding careers as well as participating in international skill competitions.	• JWES, Reference [157] • BWS, Reference [158] • IIW-India, Reference [159] • Arc Cup Competition, Reference [160] • DVS, Reference [149] • WorldSkills International, Reference [49]
SDG 5/4	Conduct local and national welded art exhibitions and competitions to encourage young people in their welding careers as well as participating in international welded art exhibitions.	• IIW, References [48], [113] • ASR, References [48], [113] • BWS, References [48], [113] • IIW-India, References [48], [113] • WildThings NSW, Reference [115] • AWS, Reference [147] • CWB Group, Reference [92]

Item #	Possible Project	Examples of Potential Resources, Government and Industry Programmes
SDG 5/5	Analyse existing national and international programs and lobby governments to improve and/or introduce programs to assist women to access resources including finances, insurances and other matters, which might be constraints, to start their own MSMEs with the support of the welding related industries thereby accelerating their economic empowerment which can lead to pursuing opportunities in welding related fields.	• NPI South Africa, Reference [56] • Indian Government, Reference [28] • Basic Finance, Reference [63]
SDG 5/6	Implement a plan to provide scholarships and support for Science, Technology, Engineering and Mathematics (STEM) initiatives to encourage women and girls to build careers in the welding industry.	• Engineers Australia
SDG 5/7	Implement a plan to enable women and girls to show that they are competent to perform any type of welding industry related work by achieving the required qualification and certification criteria specified for a particular type of work or application.	• IIW-IAB, Reference [34] • National welding standards • AWS National network of welder test centres, Reference [147] • CWB Group National network of welder test centres, Reference [92] • DVS National network of welder test centres, Reference [149]
SDG 5/8	Analyse existing national and international programmes and introduce similar programmes to encourage and attract girls and women to take up careers and work in the welding industry. Examples could include, Cell C Take a Girl Child to Work Day®, On-campus Skilled Development and Welding Excellence Centre, Women of Steel.	• Cell C, Reference [67] • INOXCVA, Reference [63] • CWB Group, Reference [58]
SDG 5/9	The welding industry could implement a project to encourage employer organisations, trade unions, governments, individual companies to have equal pay for men and women performing the same work as well as support UNICEF's projects on preventing abuse of child labour.	• UNICEF
SDG 5/10	Analyse the problems and challenges facing women and girls in relation to issues such as finance, transport to schools, amenities at schools, learning opportunities in industry amongst others, and in conjunction with governments and industry implement solutions.	• Sabooj Sathi, Reference [64] • SPARK, Reference [66] • Kanyashree Prakalpa Yojana, Reference [65] • Basic Finance, Reference [63]
SDG 5/11	Each reader to continue to create additional projects to meet the country's needs.	

SDG 6 – Ensure Availability and Sustainable Management of Water and Sanitation For All

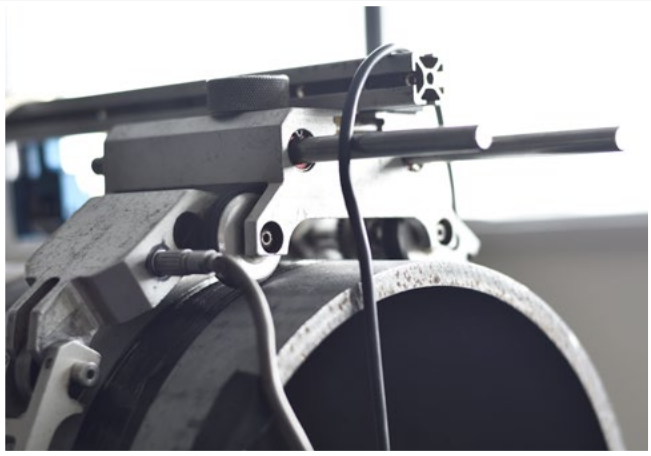
Welding Industry Roles: The welding industry will help ensure that the necessary facilities, technologies and skills are available to design, manufacture, build, repair and maintain the appropriate plant and equipment for the water and sanitation activities required in the country.

Item #	Possible Project	Examples of Potential Resources, Government and Industry Programmes
SDG 6/1	Implement a plan to work closely with government and industry organisations both prior to, and after, a decision has been made to establish an **Industry Sectoral Project (ISP)** for the Water Industry.	• NWC and SDG Flagship Programme Lead Organisation • ISP Water Industry, References [144], [216] • OzWeld Technology Support Centres Network Model, Reference [39] • Water Associations, Reference [227] • Pipeline Associations • Standards Organisations • Industry Associations for Materials and Construction
SDG 6/2	Analyse, create and implement a plan for transferring welding and joining technologies needed to contribute to meeting objectives to manufacture, construct and maintain the various types of plant required for climate-resilient water sources such as desalination plants, water recycling plants and sewerage infrastructure amongst others.	• ISP Water-Plant, References [144], [216] • OzWeld Technology Support Centres Network Model, Reference [39]
SDG 6/3	Analyse, create and implement a plan for transferring welding and joining technologies needed to contribute to meeting objectives of local manufacturing, laying, repair and maintenance of pipelines transporting water, sewage and other products including examples such as those developed and implemented by IIW Members in their welding industry networks.	• ISP Water-Pipelines, References [144], [216] • OzWeld Technology Support Centres Network Model, Reference [39]
SDG 6/4	Implement a plan to ensure that there are sufficient competent companies which use and benefit from improved welding fabrication and construction technologies to manufacture, construct and maintain the various types of plant required for climate-resilient water sources such as desalination plants, water recycling plants and sewerage infrastructure amongst others.	• ISP Water-Plant, References [144], [216] • IIW ISO MCS 3834, Reference [34] • Standards Organisations. • Industry Associations for Materials and Construction • Water Associations • Pipeline Associations

Item #	Possible Project	Examples of Potential Resources, Government and Industry Programmes
SDG 6/5	Implement a plan to ensure that there are sufficient competent companies which use and benefit from improved welding fabrication and construction technologies to manufacture, construct and maintain the various types of pipelines required for transporting water, sewage and other products.	• ISP Water-Pipelines, References [144], [216] • IIW ISO MCS 3834, Reference [34] • Standards Organisations • Industry Associations for Materials and Construction • Water Associations • Pipeline Associations
SDG 6/6	Implement a plan to work with government and industry to create initiatives including connecting the major rivers and water areas with the help of welded pipelines so that water can be supplied to areas where there is drought from areas where water is in abundance.	• ISP Water-Pipelines, References [144], [216] • IIW ISO MCS 3834, Reference [34] • Standards Organisations • Industry Associations for Materials and Pipeline Construction • Water Associations • Pipeline Associations
SDG 6/7	Implement a plan to ensure that a competent workforce exists in the geographical areas where plant construction such as desalination and water recycling plants and sewerage infrastructure amongst others needs to be carried out.	• ISP Water-Plant, References [144], [216] • IIW IAB, Reference [34] • ISO 14731 • VET Colleges • Standards Organisations • Industry Associations for Materials and Construction • Water Associations • Pipeline Associations
SDG 6/8	Implement a plan to ensure that a competent workforce exists in the areas where plant maintenance and repairs need to be carried out on such plants as desalination and water recycling plants and sewerage farms amongst others.	• ISP Water-Plant, References [144], [216] • IIW IAB, Reference [34] • ISO 14731 • VET Colleges • Standards Organisations • Industry Associations for Materials and Construction • Water Associations • Pipeline Associations
SDG 6/9	Implement a plan to ensure that a competent workforce exists in the geographical areas where pipeline construction needs to be carried out.	• ISP Water-Pipelines, References [144], [216] • IIW IAB, Reference [34] • ISO 14731 • VET Colleges • Standards Organisations • Industry Associations for Materials and Construction • Water Associations • Pipeline Associations

Item #	Possible Project	Examples of Potential Resources, Government and Industry Programmes
SDG 6/10	Implement a plan to ensure that a competent workforce exists in the geographical areas where pipeline maintenance and repairs need to be carried out.	• ISP Water-Pipelines, References [144], [216] • IIW IAB, Reference [34] • ISO 14731 • VET Colleges • Standards Organisations • Industry Associations for Materials and Construction • Water Associations • Pipeline Associations
SDG 6/11	Investigate potential projects with respect to leaking water pipes in urban areas and make recommendations to implement and perform projects where necessary.	• ISP Water-Pipelines, References [144], [216] • IIW IAB, Reference [34] • ISO 14731 • IIW ISO MCS 3834, Reference [34] • VET Colleges • ISSF, Reference [70] • Standards Organisations • Industry Associations for Materials and Construction • Water Associations • Pipeline Associations
SDG 6/12	Each reader to continue to create additional projects to meet the country's needs.	

IIW Commissions II and IX: Involved with knowledge and expertise on materials and processes in welded fabrication



IIW Commission XI: Involved with engineering technology in pressure equipment and pipeline fabrication

SDG 7 – Ensure Access to Affordable, Reliable, Sustainable and Modern Energy For All

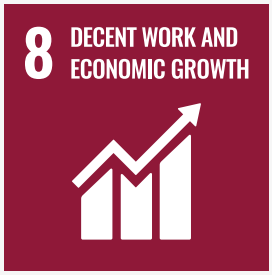
Welding Industry Roles: The welding industry will help ensure that the necessary facilities, technologies and skills are available to design, manufacture, build, repair, repurpose, maintain and decommission the appropriate plant and equipment for both the existing power facilities and future required facilities including renewable power sources.

Item #	Possible Project	Examples of Potential Resources, Government and Industry Programmes
SDG 7/1	Implement a plan to work closely with government and industry organisations both prior to, and after, a decision has been made to establish an **Industry Sectoral Project (ISP)** to both sustain and grow both the use of present and future energy sources as considered appropriate by the government and industry.	• NWC and SDG Flagship Programme Lead Organisation • OzWeld Technology Support Centres Network Model, Reference [39] • Energy Associations • Industry Associations for Materials, Manufacturing and Construction • Standards Organisations
SDG 7/2	Implement a plan with the power generation industry to analyse the requirements and solutions to help the development of affordable, reliable, sustainable existing energy sources for the country, including developing industries competent to manufacture and maintain the appropriate equipment.	• ISP Energy, References [144], [216] • OzWeld Technology Support Centres Network Model, Reference [39] • IIW ISO MCS 3834, Reference [34] • Energy Associations • Industry Associations for Materials, Manufacturing and Construction • Standards Organisations
SDG 7/3	Implement a plan to transfer the required welding related technologies to the appropriate implementers of existing energy sources such as coal, gas, nuclear, hydro etc.	• ISP Energy, References [144], [216] • OzWeld Technology Support Centres Network Model, Reference [39] • Energy Associations • Industry Associations for Materials, Manufacturing and Construction • Standards Organisations
SDG 7/4	Implement a plan to transfer the required welding related technologies to the appropriate implementers of newer energy sources.	• ISP Energy, References [144], [216] • OzWeld Technology Support Centres Network Model, Reference [39] • Energy Associations • Industry Associations for Materials, Manufacturing and Construction • Standards Organisations • Namibia-BAM, Reference [228]

Item #	Possible Project	Examples of Potential Resources, Government and Industry Programmes
SDG 7/5	Implement a plan to ensure that there are sufficient companies competent to locally design, produce, install, maintain and decommission welded fabrications and structures for wind farms.	• ISP Energy, References [144], [216] • IIW ISO MCS 3834, Reference [34] • Energy Associations • Industry Associations for Materials, Manufacturing and Construction • Standards Organisations
SDG 7/6	Implement a plan to ensure that there are sufficient companies competent to locally design, produce, install, maintain and decommission welded fabrications and structures for solar energy farms.	• ISP Energy, References [144], [216] • IIW ISO MCS 3834, Reference [34] • Energy Associations • Industry Associations for Materials, Manufacturing and Construction • Standards Organisations
SDG 7/7	Implement a plan such that irrespective of the type of energy source used either now or in the future, sufficient competent companies will be available to be employed to varying degrees in the design, manufacture, repair and maintenance of the structures producing the energy or components using the energy source.	• ISP Energy, References [144], [216] • IIW ISO MCS 3834, Reference [34] • Energy Associations • Industry Associations for Materials, Manufacturing and Construction • Standards Organisations
SDG 7/8	Implement a plan to ensure that a competent workforce exists in the areas where manufacture and construction of wind farms needs to be carried out.	• ISP Energy, References [144], [216] • IIW IAB, Reference [34] • ISO 14731 • VET Colleges • Energy Associations • Industry Associations for Materials, Manufacturing and Construction • Standards Organisations
SDG 7/9	Implement a plan to ensure that a competent workforce exists in the areas where repair and maintenance of wind farms needs to be carried out.	• ISP Energy, References [144], [216] • IIW IAB, Reference [34] • ISO 14731 • VET Colleges • Energy Associations • Industry Associations for Materials, Manufacturing and Construction • Standards Organisations
SDG/ 7/10	Implement a plan to ensure that a competent workforce exists in the areas where manufacture and construction of solar energy plant needs to be carried out.	• ISP Energy, References [144], [216] • IIW IAB, Reference [34] • ISO 14731 • VET Colleges • Energy Associations • Industry Associations for Materials, Manufacturing and Construction • Standards Organisations

Item #	Possible Project	Examples of Potential Resources, Government and Industry Programmes
SDG 7/11	Implement a plan to ensure that a competent workforce exists in the areas where repair and maintenance of solar energy plant needs to be carried out.	• ISP Energy, References [144], [216] • IIW IAB, Reference [34] • ISO 14731 • VET Colleges • Energy Associations • Industry Associations for Materials, Manufacturing and Construction • Standards Organisations
SDG 7/12	Implement a plan to ensure that there are sufficient companies competent to locally design, produce, install, maintain and decommission welded fabrications and structures for coal, gas, nuclear or hydro power plants.	• ISP Energy, References [144], [216] • IIW ISO MCS 3834, Reference [34] • Energy Associations • Industry Associations for Materials, Manufacturing and Construction • Standards Organisations • Emmanuel Gyasi, Reference [218] • CWB Group, References [183], [184]
SDG 7/13	Implement a plan to ensure that a competent workforce exists in the areas where manufacture and construction of power plant using existing energy sources such as coal, gas, nuclear, hydro needs to be carried out.	• ISP Energy, References [144], [216] • IIW IAB, Reference [34] • ISO 14731 • VET Colleges • Energy Associations • Industry Associations for Materials, Manufacturing and Construction • Standards Organisations
SDG 7/14	Implement a plan to ensure that a competent workforce exists in the areas where repair and maintenance of power plant using existing energy sources such as coal, gas, nuclear, hydro needs to be carried out.	• ISP Energy, References [144], [216] • IIW IAB, Reference [34] • ISO 14731 • VET Colleges • Energy Associations • Industry Associations for Materials, Manufacturing and Construction • Standards Organisations
SDG 7/15	Each reader to continue to create additional projects to meet the country's needs.	

SDG 8 – Promote Sustained, Inclusive and Sustainable Economic Growth, Employment and Decent Work For All



Welding Industry Roles: The welding industry will proactively lead an NWC and SDG Flagship Programme across all aspects such as education, training, qualification, certification, research and development, technology transfer, cultures, networks, marketing and promotion to promote inclusive and sustainable economic growth.

Item #	Possible Project	Examples of Potential Resources, Government and Industry Programmes
SDG 8/1	Implement a National Welding Capability (NWC) project for the country.	• National Welding Institute/Society/ Association • Welding Industry • Reference [4]
SDG 8/2	Implement strategies to assist companies with new and appropriate technologies arising out of the NWC project.	• National Welding Institute/Society/ Association • OzWeld Technology Support Centres Network Model, Reference [39]
SDG 8/3	Implement strategies creating networks of education and training organisations with efficient access to all the opportunities arising from the NWC Project.	• National Welding Institute/Society/ Association • OzWeld Technology Support Centres Network Model, Reference [39]
SDG 8/4	Implement and/or expand the International Institute of Welding (IIW) Education, Training, Qualification and Certification programmes to ensure world class personnel will be available in the welding industry in a country.	• IIW-IAB, Reference [34] • VET Colleges • Universities • DVS, Reference [196]
SDG 8/5	Implement positive influences on cultures related to ethics, skills respect, productivity, quality, work, health and safety, environment, innovation and service excellence amongst others in the welding related industries and showcase success stories of how these can contribute to an excellent national welding capability.	• Reference [33] • Reference [56] • Reference [117] • Reference [209]
SDG 8/6	Implement a plan to ensure that local companies satisfy, or are approved to, the appropriate national standards called up in project specifications.	• CWB Group, Reference [92] • AWS/ANSI, Reference [147] • IIW ANBCCs, Reference [34]
SDG 8/7	Implement and/or expand the International Institute of Welding (IIW) IIW Manufacturers Certification Scheme According to ISO 3834 (IIW MCS ISO 3834) to ensure world class companies will be available in the welding industry in a country.	• IIW IAB, Reference [34] • IIW MCS ISO 3834, Reference [34]

Water, Renewable Energy and Food

Item #	Possible Project	Examples of Potential Resources, Government and Industry Programmes
SDG 8/8	Implement a plan to ensure that local companies satisfy, or are approved to, the appropriate overseas or ISO standards called up in project specifications.	• ISO 3834, ISO 14731, ISO 9712, ISO 17024, ISO 17021, ISO 14001, ISO 45011 • ASME (USA), Reference [163] • European Standards (EN)
SDG 8/9	Harness the country's industry and R&D capabilities regarding technology, facilities, equipment etc by having a full record of national capabilities and creating networks and alliances to maximise use of the capabilities, rationalise critical equipment e.g., heavy rolls, heavy presses and spinning for heads, forging facilities and large heat treatment furnaces.	• HEIAA Reference [142]
SDG 8/10	Each reader to continue to create additional projects to meet the country's needs.	

SDG 9 – Build Resilient Infrastructure, Promote Inclusive and Sustainable Industrialisation and Foster Innovation

Welding Industry Roles: The welding industry will proactively lead the implementation of activities necessary to foster innovation leading to resilient infrastructure and inclusive and sustainable industrialisation.

Item #	Possible Project	Examples of Potential Resources, Government and Industry Programmes
SDG 9/1	Implement an annual plan for organized seminars for the industry, dedicated to the development and implementation of new standards, and for newsletters and posting of information via other traditional and social media thus providing news on international and national standards.	• National Welding Institute/Society/ Association • Standards Organisations
SDG 9/2	Implement a plan to ensure that the welding industry continues its involvement through the national welding body as a member of the national standards organisation by contributing experts to the development of national and international standards which are essential to ensure the integrity and reliability of welded components and resilient infrastructure,	• National Welding Institute/Society/ Association • Standards Organisations • D Barnett, References [3], [140]
SDG 9/3	Implement a plan to ensure the development and introduction of sufficient people as both technology deliverers and technology receptors to ensure that innovation can take place throughout the industry.	• National Welding Institute/Society/ Association • IIW ANB, Reference [34] • Universities/Colleges • OzWeld Technology Support Centres Network Model, Reference [39]
SDG 9/4	Implement a plan to create an innovation culture in companies themselves so that they recognise the importance of new technology to their business, and hence R&D, so that the market demand for new technologies continuously improves and the level of technology uptake at the individual company level increases.	• National Welding Institute/Society/ Association • OzWeld Technology Support Centres Network Model, Reference [39] • TWI Industry Groups, Reference [153] • Reference [42] • Reference [204] • IIW White Paper, Reference [16] • D Barnett, Reference [140]

Innovation in Human Settlements

Item #	Possible Project	Examples of Potential Resources, Government and Industry Programmes
SDG 9/5	Assist the implementation of innovative ideas and processes especially for smaller firms, by creating effective links between the firms themselves and sources of technology including establishing a plan whereby research and development outcomes link in well with effective technology diffusion mechanisms thus increasing market awareness of the R&D outcomes and increased innovation.	• OzWeld Technology Support Centres Network Model, Reference [39] • TWI Industry Groups, Reference [153] • DVS, Reference [149] • JWES, Reference [157]
SDG 9/6	Implement a plan to encourage industry and government to invest in local R&D and technology transfer.	• OzWeld Technology Support Centres Network Model, Reference [39] • UNESCO Science Reports, Reference [161] • Howard Report, Reference [204] • See SDG1/1 to SDG1/6
SDG 9/7	Implement a series of Colloquia held annually based on the IIW Welding Research and Collaboration Colloquia (WRCC) to encourage the cooperation and collaboration of researchers, scientists, engineers and technologists in the country and in the region.	• IIW WRCC documentation, Reference [34] • Appendix 3.6
SDG 9/8	Each reader to continue to create additional projects to meet the country's needs.	

SDG – 10 Reduce Inequality Within and Among Countries

Welding Industry Roles: The welding industry will proactively lead an NWC and SDG Flagship Programme across all aspects such as education, training, qualification, certification, research and development, technology transfer, cultures, networks, marketing and promotion to improve the quality of life in the country and in other countries where appropriate and reduce inequalities.

Item #	Possible Project	Examples of Potential Resources, Government and Industry Programmes
SDG 10/1	Conduct a needs analysis in the country to establish exactly what is required from the welding industry to improve the quality of life in the country and have solutions to improve equality.	• National Welding Institute/Society/ Association • Standards Organisations • CRC-MW&J Report, Reference [82] • EWI, Reference [86] • IIW White Paper, Reference [16]
SDG 10/2	Analyse examples of how such needs analyses have been conducted in a number of countries and the appropriate strategies and action plans which were successfully developed and implemented.	• National Welding Institute/Society/ Association • Standards Organisations • CRC-MW&J Report, Reference [82] • EWI, Reference [86]
SDG 10/3	Create and implement mutually beneficial agreements to cooperate and collaborate with the welding related industries in other countries.	• OzWeld Technology Support Centres Network Model, Reference [39]
SDG 10/4	Introduce programmes to show how to conduct periodic strategic planning exercises involving a range of people and organisations, conduct periodic surveys/ needs analysis of industry's requirements, show the importance of issuing regular progress reports and results of independent audits/reviews of such progress, increase industry involvement in projects, products and services, create good governance and stable finances including not asking people to put money into a bottomless pit by continually losing money, as well as being able to show the value to the country of the benefits from the project.	• Appendices 3.4, 3.5 • Reference [238]
SDG 10/5	Introduce a programme of workshops to show how the country can benefit from improved national welding capability, technology innovation and good governance amongst others.	• Appendices 3.4, 3.5 • Reference [238]

Japanese magnetic levitation train

Millau Viaduct, France

Item #	Possible Project	Examples of Potential Resources, Government and Industry Programmes
SDG 10/6	Establish a country's own not-for-profit National Welding Institute/Society/Association which will become the National Welding Capability (NWC) Project Lead Organisation as well as become the country's representative in the 51 Member country International Institute of Welding (IIW).	• AWS Organisational Structure, Reference [147] • CWB Group Organisational Structure, Reference [92] • SAIW Organisational Structure, Reference [164] • DVS Organisational Structure, Reference [149] • TWI Organisational Structure, Reference [153]
SDG 10/7	Implement programmes allowing fair and correct paths for assessment, recognition and accreditation of qualifications and certifications of both local people, and immigrants, for welding related training and employment in a country.	• CWB Group, Reference [192] • ILO, Reference [74]
SDG 10/8	Each reader to continue to create additional projects to meet the country's needs.	

SDG 11 – Make Cities and Human Settlements Inclusive, Safe, Resilient, and Sustainable

Welding Industry Roles: The welding industry will help ensure that the necessary facilities, technologies and skills are available to design, manufacture, build, repair and maintain the appropriate structures, plant and equipment for the activities required in the country to make human settlements safe and resilient.

Item #	Possible Project	Examples of Potential Resources, Government and Industry Programmes
SDG 11/1	Implement a plan to cooperate and collaborate with other national institutes/organisations heavily involved in developing and applying relevant welding fabrication and construction technologies for use in many applications in human settlements as well as with appropriate organisations related to the metals, rail, road, pressure equipment and structural steel industries.	• National Industry Institute/Society/ Association • Standards Organisations • OzWeld Technology Support Centres Network Model, Reference [39]
SDG 11/2	Implement a plan to work closely with government and industry organisations both prior to, and after, a decision has been made to establish an **Industry Sectoral Project (ISP)** for the **building and construction industry.**	• ISP Building and Construction, References [144], [216]
SDG 11/3	Implement a plan to transfer the required welding related technologies for the **building and construction industry** to the appropriate implementers of structures such as houses, factories, offices, hospitals, etc.	• ISP Building and Construction, References [144], [216] • National Industry Institute/Society/ Association • OzWeld Technology Support Centres Network Model, Reference [39] • Standards Organisations • Industry Associations for Materials, Building and Construction • Water Associations • Pipeline Associations

Item #	Possible Project	Examples of Potential Resources, Government and Industry Programmes
SDG 11/4	Implement a plan to ensure that there are sufficient competent companies which use and benefit from improved welding fabrication and construction technologies to design, manufacture, construct and maintain the various types of infrastructure required in the **building and construction industry**.	• ISP Building and Construction, References [144], [216] • IIW ISO MCS 3834, Reference [34] • EN 1090 series of codes • EU Certification requirements • Canadian Certification Requirements • Standards Organisations • Industry Associations for Materials, Building and Construction • Water Associations • Pipeline Associations
SDG 11/5	Implement a plan to ensure that a competent workforce exists in the areas where the manufacture and construction of infrastructure needs to be carried out for the **building and construction industry**.	• ISP Building and Construction, References [144], [216] • IIW IAB Reference [34] • ISO 14731 • VET Colleges • Standards Organisations • Industry Associations for Materials, Building and Construction • Water Associations • Pipeline Associations
SDG 11/6	Implement a plan to ensure that a competent workforce exists in the areas where repair and maintenance of infrastructure needs to be carried out for the **building and construction industry**.	• ISP Building and Construction, References [144], [216] • IIW IAB, Reference [34] • ISO 14731 • VET Colleges • Standards Organisations • Industry Associations for Materials, Building and Construction • Water Associations • Pipeline Associations
SDG 11/7	Implement a plan to work closely with government and industry organisations both prior to, and after, a decision has been made to establish an **Industry Sectoral Project (ISP)** to increase local production and installation of **rail track**.	• ISP Rail Track, References [144], [216] • National Industry Rail Track Association • Rail Track Regulator
SDG 11/8	Implement a plan to transfer the required welding related technologies to the appropriate implementers of **rail tracks**.	• ISP Rail Track, References [144], [216] • National Industry Rail Track Association • Standards Organisations • OzWeld Technology Support Centres Network Model, Reference [39] • Rail Track Regulator • Institute of Rail Welding, UK, Reference [193]

Item #	Possible Project	Examples of Potential Resources, Government and Industry Programmes
SDG 11/9	Implement a plan to ensure that there are sufficient competent companies which use and benefit from improved welding fabrication and construction technologies to manufacture, construct and maintain the various types of **rail track** required.	• ISP Rail Track, References [144], [216] • IIW ISO MCS 3834 • Rail Track Regulator • OzWeld Technology Support Centres Network Model, Reference [39] • National Industry Rail Track Association • Institute of Rail Welding, UK, Reference [193]
SDG 11/10	Implement a plan to ensure that a **competent workforce** exists in the geographical areas where the **manufacture and construction of rail track** needs to be carried out.	• ISP Rail Track, References [144], [216] • IIW IAB, Reference [34] • ISO 14731 • VET Colleges • Standards Organisations • Rail Track Regulator • Institute of Rail Welding, UK, Reference [193] • OzWeld Technology Support Centres Network Model, Reference [39] • National Industry Rail Track Association
SDG 11/11	Implement a plan to ensure that a **competent workforce** exists in the areas where **repair and maintenance of rail track** needs to be carried out.	• ISP Rail Track, References [144], [216] • IIW IAB, Reference [34] • ISO 14731 • VET Colleges • Standards Organisations • Rail Track Regulator • Institute of Rail Welding, UK, Reference [193] • OzWeld Technology Support Centres Network Model, Reference [39]
SDG 11/12	Implement a plan to work closely with government and industry organisations both prior to, and after, a decision has been made to establish an **Industry Sectoral Project (ISP)** to increase **local production of Railway Rolling Stock**.	• ISP Railway Rolling Stock, References [144], [216] • ISO 14731 • VET Colleges • Standards Organisations • Railway Rolling Stock industry • Railway Rolling Stock Regulator
SDG 11/13	Implement a plan to transfer the required welding related technologies to the appropriate implementers of **railway rolling stock**.	• ISP Railway Rolling Stock, References [144], [216] • National Welding Institute/Society/ Association • Standards Organisations • OzWeld Technology Support Centres Network Model, Reference [39] • Railway Rolling Stock Industry • Railway Rolling Stock Regulator

Item #	Possible Project	Examples of Potential Resources, Government and Industry Programmes
SDG 11/14	Implement a plan to ensure that there are sufficient competent companies which use and benefit from improved welding fabrication and construction technologies to manufacture, construct and maintain the various types of **rail rolling stock**.	• ISP Railway Rolling Stock, References [144], [216] • IIW ISO MCS 3834, Reference [34] • EN 15085, Suite of Standards-Certification • Railway Rolling Stock Industry • Railway Rolling Stock Regulator • Standards Organisations
SDG 11/15	Implement a plan to ensure that a competent workforce exists in the areas where the manufacture and construction of **rail rolling stock** needs to be carried out.	• ISP Railway Rolling Stock, References [144], [216]. • IIW IAB, Reference [34] • ISO 14731 • VET Colleges • Standards Organisations • EN 15085, Suite of Standards-Certification • Railway Rolling Stock industry • Railway Rolling Stock Regulator
SDG 11/16	Implement a plan to work closely with government and industry organisations both prior to, and after, a decision has been made to establish an **Industry Sectoral Project (ISP)** to increase local production of **roads, flyovers, bridges (roads, rail and pedestrian)**.	• ISP Roads and Bridges Infrastructure, References [144], [216]
SDG 11/17	Implement a plan to transfer the required welding related technologies to the appropriate implementers of **roads, flyovers, bridges (roads, rail and pedestrian)**.	• ISP Roads and Bridges Infrastructure, References [144], [216] • National Welding Institute/Society/ Association • OzWeld Technology Support Centres Network Model, Reference [39] • Standards Organisations • Roads and Bridges Infrastructure Industry
SDG 11/18	Implement a plan to ensure that there are sufficient competent companies which use and benefit from improved welding fabrication and construction technologies to manufacture, construct and maintain the various types of **roads, flyovers, bridges (roads, rail and pedestrian)** required.	• ISP Roads and Bridges Infrastructure, References [144], [216] • IIW ISO MCS 3834, Reference [34] • OzWeld Technology Support Centres Network Model, Reference [39] • Standards Organisations • Roads and Bridges Infrastructure Industry
SDG 11/19	Implement a plan to ensure that a **competent workforce** exists in the areas where the **manufacture and construction** of **roads, flyovers, bridges (roads, rail and pedestrian)** need to be carried out.	• ISP Roads and Bridges Infrastructure, References [144], [216] • IIW IAB, Reference [34] • ISO 14731 • VET Colleges • Standards Organisations • Roads and Bridges Infrastructure Industry • OzWeld Technology Support Centres Network Model, Reference [39]

Item #	Possible Project	Examples of Potential Resources, Government and Industry Programmes
SDG 11/20	Implement a plan to ensure that a **competent workforce** exists in the areas where the **repair and maintenance** of **roads, flyovers, bridges (roads, rail and pedestrian)** need to be carried out.	• ISP Roads and Bridges Infrastructure, References [144], [216] • IIW IAB, Reference [34] • ISO 14731 • VET Colleges • Standards Organisations • Roads and Bridges Infrastructure industry • OzWeld Technology Support Centres Network Model, Reference [39]
SDG 11/21	Implement a plan to work closely with government and industry organisations both prior to, and after, a decision has been made to establish an **Industry Sectoral Project (ISP)** to increase local production of **pressure equipment**.	• ISP Pressure Equipment, References [144], [216]
SDG 11/22	Implement a plan to transfer the required welding related technologies to the appropriate implementers of **pressure equipment** related applications in human settlements.	• National Welding Institute/Society/ Association • Standards Organisations • OzWeld Technology Support Centres Network Model, Reference [39] • Pressure Equipment Industry • Pressure Equipment Regulators
SDG 11/23	Implement a plan to ensure that there are sufficient competent companies which use and benefit from improved welding fabrication and construction technologies to manufacture, construct and maintain the various types of **pressure equipment** required.	• ASME (USA), Reference [163] • IIW MCS ISO 3834, Reference [34] • Standards Organisations • OzWeld Technology Support Centres Network Model, Reference [39] • Pressure Equipment Industry • Pressure Equipment Regulators
SDG 11/24	Implement a plan to ensure that a competent workforce exists in the areas where the manufacture and construction of **pressure equipment** needs to be carried out.	• NBBPVI (USA), Reference [162] • ASME (USA), Reference [163] • SAQCC (IPE), South Africa, Reference [164] • IIW IAB, Reference [34] • Standards Organisations • OzWeld Technology Support Centres Network Model, Reference [39] • Pressure Equipment Industry • Pressure Equipment Regulators • CWB Foundation, References [183], [184]

Item #	Possible Project	Examples of Potential Resources, Government and Industry Programmes
SDG 11/25	Implement a plan to ensure that a competent workforce exists in the areas where the repair and maintenance of **pressure equipment** needs to be carried out.	• AICIP (Australia), Reference [165] • NBBPVI (USA), Reference [162] • SAQCC (IPE) South Africa, Reference [164] • SAQCC CP South Africa, Reference [164] • IIW IAB, Reference [34] • CWB Foundation, References [183], [184] • Standards Organisations • OzWeld Technology Support Centres Network Model, Reference [39] • Pressure Equipment Industry • Pressure Equipment Regulators
SDG 11/26	Introduce programmes related to **pressure equipment** to help ensure competent inspectors maintain the safety of pressure equipment in a wide range of applications including **major industrial installations, medical facilities, residential, domestic and personal usage**.	• AICIP (Australia), Reference [165] • NBBPVI (USA), Reference [162] • SAQCC (IPE) South Africa, Reference [164] • SAQCC CP South Africa, Reference [164] • IIW IAB, Reference [34] • Standards Organisations. • OzWeld Technology Support Centres Network Model, Reference [39] • Pressure Equipment Industry • Pressure Equipment Regulators
SDG 11/27	Introduce programmes for the certification of fabricators and construction companies to national, regional and international standards to build such products as bridges, flyovers and 'fast train' networks to ensure the reliability and integrity of the wide range of welded products and structures.	• CWB Group, Reference [92] • IIW MCS ISO 3834, Reference [34] • ASME (USA), Reference [148] • EN 15085, Suite of Standards-Certification • AS/NZS 5131 • EN 1090 Series
SDG 11/28	Compile and implement programmes to promote the uniform rollout and implementation of the appropriate national and international standards across the country to ensure the reliability and integrity of welded structures/ products.	• CWB Group, Reference [92] • DVS, Reference [149] • Other National institutes • Standards Organisations. • ISO, Reference [122]
SDG 11/29	Implement a plan to cooperate and collaborate with the organisations working on creating pre-fabricated affordable housing stock made available by clean and fast welding techniques, to meet the challenges of rapidly rising urbanisation and slum proliferation.	• NASH-Australia • Steel Making companies • Reference [91] • Bluescope Steel, Reference [215]

Item #	Possible Project	Examples of Potential Resources, Government and Industry Programmes
SDG 11/30	Cooperate and collaborate with the organisations working on creating safe and affordable buildings including housing as well as safe and efficient public transport particularly to make such structures resilient to disasters such as earthquakes, fires and floods as well as failures due to shoddy quality and explosions due to faulty equipment.	• HERA, Reference [226] • Standards New Zealand
SDG 11/31	Each reader to continue to create additional projects to meet the country's needs.	

SDG 12 – Ensure Sustainable Consumption and Production Patterns

Welding Industry Roles: The welding industry will proactively lead a National Welding Capability (NWC) Project across all aspects such as education, training, qualification, certification, research and development, technology transfer, cultures, networks, marketing and promotion to assist in ensuring sustainable consumption and production patterns.

Item #	Possible Project	Examples of Potential Resources, Government and Industry Programmes
SDG 12/1	Working with other organisations in its networks including Stainless Steel, Aluminium and Steel Associations, implement a plan to transfer information via seminars, workshops, guidance notes, education and training courses on dealing with wastes from the processes involved in the cutting, fabrication and construction of applications using metals.	● ISSF and members, Reference [200] ● ASI and Members, Reference [199] ● Steel Producers ● VET Colleges
SDG 12/2	Implement a plan to create an environmental culture in people and organisations which would improve individual and group values, attitudes, perceptions, competencies and patterns of behaviour that determine the commitment to, and the style and proficiency of, an organisation's environmental management.	● NWC Guidance Notes ● Reference [101] ● ISO 14000
SDG 12/3	Implement a plan to introduce environmental management systems (EMS) into welding related companies and training courses.	● References [94], [96], [97], [98], [99], [100] ● References [34], [43], [44], [45], [46], [47] ● VET Colleges ● Industry Associations
SDG 12/4	Introduce a programme with industry for Automotive Welding and Collision Repair.	● CWB Group, Reference [212]
SDG 12/5	Each reader to continue to create additional projects to meet the country's needs.	

SDG – 13 Take Urgent Action to Combat Climate Change and Its Impacts by Regulating Emissions and Promoting Developments in Renewable Energy

Welding Industry Roles: The welding industry will proactively lead in implementing relevant aspects related to emissions improvement and the support of renewable energy and existing energy infrastructure.

Item #	Possible Project	Examples of Potential Resources, Government and Industry Programmes
SDG 13/1	Promote the concept that Steel is at the core of a green economy, in which economic growth and environmental responsibility work hand in hand since once steel is produced it becomes a permanent resource because it is 100% recyclable without loss of quality and has a potentially endless life cycle.	• Governments • Industry Associations • Standards Organisations • Steel Producers • HERA, Reference [104] • SSA, Reference [211] • Reference [103]
SDG 13/2	Implement a plan for the national welding related institute and the welding industry to collaborate with governments and the steel producing industry to introduce solutions to meet the challenges ahead including the benefits to the SDGs during a significant growth in steel usage by 2030.	• Governments • Industry Associations • Standards Organisations • Steel Producers • Reference [188] , [235]
SDG 13/3	Introduce a zero carbon steel program that uses carbon offsetting for steel used in a country.	• HERA, Reference [104] • Thinkstep-anz, Reference [104]
SDG 13/4	Implement a programme to offer certified carbon credits sourced from projects that grow and protect forests ensuring that the programme is not abused.	• HERA, Reference [104] • Ekos, Reference [104] • Australian Conservation Foundation, Reference [105]
SDG 13/5	Each reader to continue to create additional projects to meet the country's needs.	

SDG 14 – Conserve and Sustainably Use the Oceans, Seas and Marine Resources for Sustainable Development

Welding Industry Roles: The welding industry will help ensure that the necessary welding related facilities, technologies and skills are available to manufacture, build, repair and maintain the appropriate structures, plant and equipment which may be used in marine applications.

Item #	Possible Project	Examples of Potential Resources, Government and Industry Programmes
SDG 14/1	Implement a plan to be the industry advocate to help link and thus provide the expertise in the welding industry networks to developers and owners of marine structures such as oil and gas pipelines, oil production platforms, ships, boats, tankers etc to avoid problems through failures which could lead to environmental damage.	• OzWeld Technology Support Centres Network Model, Reference [39] • HEIAA Australia, Reference [142] • TWI Global, Reference [153] • Pipeline Associations
SDG 14/2	Implement a plan to ensure that the correct technologies are transferred into the industry to ensure the high integrity and reliability of welded structures in marine applications are maintained to avoid failures which could result for example in fires and oil pollution from small spills to catastrophic damage.	• OzWeld Technology Support Centres Network Model, Reference [39] • TWI Global, Reference [153] • Pipeline Associations
SDG 14/3	Implement a plan to ensure that the great benefits of welding and industry's efforts for marine applications, can be realised with the proper design, materials, procedures, manufacture, conformity assessment, operations, including repair, repurposing and maintenance, as well as decommissioning leading to positive contributions to improving this SDG.	• OzWeld Technology Support Centres Network Model, Reference [39] • TWI Global, Reference [153] • Pipeline Associations
SDG 14/4	Working with governments at all levels, environmental protection agencies and contractors to ensure that wherever welded infrastructure is to be implemented, repaired, repurposed or maintained, proper codes of practice are developed and implemented to protect the marine environment including sea water, ground water and surface water.	• Governments • Industry Associations • National Standards Body
SDG 14/5	Implement a plan to educate people at all levels in industry on the importance of the integrity and reliability of welded structures to the marine environment.	• ISP Model, References [144], [216] • IIW IAB, Reference [34]

Marine Platforms and Food

Item #	Possible Project	Examples of Potential Resources, Government and Industry Programmes
SDG 14/6	Implement a plan to ensure that there are sufficient competent companies which use and benefit from improved welding fabrication and construction technologies to manufacture, construct and maintain the various types of **marine platforms.**	• IIW ISO MCS 3834, Reference [34]
SDG 14/7	Implement a plan to ensure that a competent workforce exists in the areas where repair and maintenance of marine platforms need to be carried out.	• IIW IAB, Reference [34]
SDG 14/8	Each reader to continue to create additional projects to meet the country's needs.	

SDG 15 – Protect, Restore and Promote Sustainable Use of Terrestrial Ecosystems, Sustainably Manage Forests, Combat Desertification, and Halt and Reverse Land Degradation and Halt Biodiversity Loss

Welding Industry Roles: The welding industry will help ensure that the necessary facilities, technologies and skills are available to manufacture, build, repair and maintain the appropriate structures, plant and equipment which may be used in land applications to meet this SDG.

Item #	Possible Project	Examples of Potential Resources, Government and Industry Programmes
SDG 15/1	Implement a plan to be the industry advocate to help link and thus provide the expertise in the welding industry networks to developers and owners of land applications and structures such as oil and gas pipelines, chemical plants, sewerage plants etc to avoid problems through failures which could lead to environmental damage such as spillages onto land and into rivers which is prevalent in many countries.	• OzWeld Technology Support Centres Network Model, Reference [39] • Pipeline Associations • Water Associations
SDG 15/2	Implement a plan to ensure that the correct technologies are transferred into the industry to ensure the high integrity and reliability of welded structures in land applications are maintained to avoid failures which could result for example in fires and oil pollution from small spills to catastrophic damage.	• OzWeld Technology Support Centres Network Model, Reference [39] • Pipeline Associations • Water Associations
SDG 15/3	Implement a plan to ensure that the great benefits of welding and industry's efforts for land applications, can be realised with the proper design, materials, procedures, manufacture, conformity assessment, operations, including repair and maintenance, as well as decommissioning and repurposing leading to positive contributions to improving this SDG.	• OzWeld Technology Support Centres Network Model, Reference [39] • Pipeline Associations • Water Associations • The Welding Institute, Reference [72] • EWI, Reference [189]
SDG 15/4	Working with Governments, analyse and implement plans for projects involving the welding industry to mitigate against disasters such as flooding, landslides, pollution etc.	• Governments • Industry Associations
SDG 15/5	Working with Governments, analyse and implement plans for projects involving the welding industry for both reforestation and rewilding of land areas.	• Governments • Industry Associations

The good and the ugly. Drone panoramic aerial view of illegal amazon deforestation, Mato Grosso, Brazil.

Item #	Possible Project	Examples of Potential Resources, Government and Industry Programmes
SDG 15/6	Working with governments, introduce policies, rules, regulations, education and training packages to prevent people causing catastrophic fires in forests, grassland and bushland due to welding, cutting and associated operations.	• Governments • Industry Associations • 7News, Reference [112]
SDG 15/7	Working with governments at all levels, environmental protection agencies and contractors to ensure that wherever welded infrastructure is to be implemented, repaired or maintained, proper codes of practice are developed and implemented to protect the terrestrial environment.	• Governments • Industry Associations • National Standards Body • DVS German Welding Society Reference [181]
SDG 15/8	Implement a plan to educate people at all levels in industry on the importance of the integrity and reliability of welded structures to the land environment.	• ISP Model, References [144], [216]
SDG 15/9	Implement a plan to transfer information via seminars, workshops, guidance notes, education and training courses on avoiding and dealing with possible causes of pollution from the welding related industries.	• References [96], [98], [99], [100], [101]
SDG 15/10	Each reader to continue to create additional projects to meet the country's needs.	

SDG – 16 Promote Peaceful and Inclusive Societies for Sustainable Development, Provide Access to Justice For All and Build Effective, Accountable and Inclusive Institutions at All Levels

Welding Industry Roles: The welding industry will proactively lead in implementing aspects related to assisting in building up effective accountable and inclusive organisations in the industry.

Item #	Possible Project	Examples of Potential Resources, Government and Industry Programmes
SDG 16/1	Introduce information and education programmes for people to understand the UN SDGs, the welding industry's roles in achieving these and the meanings of words, objectives and proposed solutions within the SDGs.	• National Welding Institute/Society/ Association
SDG 16/2	Implement technology transfer mechanisms to significantly influence people positively through the successful promotion and implementation in industry of ISO and national standards related to ethical behaviours.	• National Welding Institute/Society/ Association • ISO, Reference [122] • Standards Organisations
SDG 16/3	Implement a plan to create a culture of 'ethical leadership' in people at all levels so that successful leaders can inspire others to embrace a common goal through recognition of shared values and build and maintain effective relationships by living and leading with integrity.	• National Welding Institute/Society/ Association • Reference [209] • Reference [117] • ISO19600 • Reference [118]
SDG 16/4	Ensure that a national welding related organisation ostensibly representing the welding industry is an effective, accountable and inclusive institution and through its membership and industry committees, it is accountable to the broader industry and being a not-for-profit organisation, it puts the needs of industry and communities first.	• National Welding Institute/Society/ Association • ISO, Reference [122] • Standards Organisation.
SDG 16/5	Implement a plan to educate people at all levels in industry on the importance of national and international standards to be used in the welding industry.	• ISO, Reference [122] • Standards Organisations
SDG 16/6	Implement a plan to persuade all organisations, including governments, issuing welding related qualifications and certifications for personnel, to make all recipients of such qualifications and certifications sign and abide by a Code of Ethics.	• AWS, Reference [147] • TWI Global, Reference [153] • CWB Group, Reference [92] • SAIW, Reference [164] • AICIP, Reference [165]

Forest Management Training in Brazil

Item #	Possible Project	Examples of Potential Resources, Government and Industry Programmes
SDG 16/7	Work with governments to introduce electronic procurement, or "e-procurement", thus allowing many more companies to hear about procurement offers, ensure more bids can be submitted and help governments lose less money through corruption and waste. It is one of the world's most effective policies to reduce corruption at low cost, while making societies much better off.	• Bjorn Lomborg, Reference [198]
SDG 16/8	Implement a project to encourage welding industry organisations to become involved with national and international initiatives covering the SDGs such as the Aluminium Stewardship Initiative [199].	• ASI, Reference [199] • ISSF, Reference [200]
SDG 16/9	Each reader to continue to create additional projects to meet the country's needs.	

SDG 17 – Strengthen the Means of Implementation and Revitalise the Global Partnership for Sustainable Development

Welding Industry Roles: The welding industry will proactively lead in implementing aspects related to building up national and international networks and partnerships to provide cooperation and collaboration to achieve sustainable development.

Item #	Possible Project	Examples of Potential Resources, Government and Industry Programmes
SDG 17/1	Implement a plan to work closely with government and industry organisations both prior to, and after, a decision has been made to establish **Industry Sectoral Projects (ISPs)** for the welding industry to progress the UN SDGs using the national welding capability project as the basis.	• ISP Model, References [144], [216] • National Welding Institute/Society/ Associations • Industry Associations
SDG 17/2	Implement a plan to promote and market the ISPs as a national "Flagship Programme" including creating marketing and promotional documents, standard presentations and fact sheets showing the benefits of the Flagship Programme.	• ISP Model, References [144], [216] • National Welding Institute/Society/ Associations • Industry Associations • Flagship Programmes, Reference [152]
SDG 17/3	Build up a national not-for-profit organisation which could be the Lead Organisation in a National Welding Capability (NWC) Project working with the welding industry.	• Kazakhstan Welding Association, Reference [120] • CWB Group, Reference [92] • SAIW History, References [164], [166], [167]
SDG 17/4	Build up a Welding Association from x members to over 30x members over a ten year period whereby the hundreds of thousands of people welding in a country will create a quantum leap by the welding industry's involvement in progressing the SDGs thus making an enormous contribution to a government's endeavours.	• CWB Group, References [92], [187] • National Welding Institute/Society/ Association
SDG 17/5	Create a worldwide network of technological experts and organisations as Technology Support Centres (TSCs) with the appropriate technologies needed to be transferred into the country's welding related industries.	• OzWeld Technology Support Centres Network Model, Reference [39] • TWI Industry Groups, Reference [153]
SDG 17/6	In the TSC networks, produce a multitude of partnerships, both large and small, ready to work together on appropriate activities to assist in meeting SDG targets in the country.	• OzWeld Technology Support Centres Network Model, Reference [39] • National Welding Institute/Society/ Association
SDG 17/7	Create a global network of potential intermediaries or mentors, individuals or organisations, across the full spectrum of 17 SDGs.	• OzWeld Technology Support Centres Network Model, Reference [39] • National Welding Institute/Society/Assoc. • HEIAA, Reference [142]

Item #	Possible Project	Examples of Potential Resources, Government and Industry Programmes
SDG 17/8	Create International engagement and funding via the NWC Project Lead Organisation building up its connections with global, regional and national organisations to promote the programme in its country and obtain support for the implementation of the programme in its country.	• OzWeld Technology Support Centres Network Model, Reference [39] • Donor Organisations Appendix 3.8
SDG 17/9	Implement a plan for the production of reports showing the progress, success, value and benefits of the SDG programmes introduced.	• OzWeld Technology Support Centres Network Model, Reference [39] • HERA, References [22], [214] • UK Department of Trade and Industry, Reference [15] • National Welding Institute/Society/Association
SDG 17/10	Build up a knowledge resource centre which will contain resources such as documents, papers, reports etc as well as links and references to information which will be accessible to people wishing to improve the SDGs.	• OzWeld Technology Support Centres Network Model, Reference [39] • National Welding Institute/Society/Association
SDG 17/11	Build up a capabilities databank and register of equipment, facilities, resources related to the welding industry available for use in the country.	• OzWeld Technology Support Centres Network Model, Reference [39] • National Welding Institute/Society/Association • HEIAA, Reference [142]
SDG 17/12	Market and promote, both on a national and international level, each organisation involved in the Flagship Programme and the efforts being made and successes being achieved.	• HERA, Reference [22]
SDG 17/13	Implement a regular reporting and effective communications system with all NWC and SDG Flagship Programme organisations and staff to sustain a cooperative and collaborative effort of all organisations.	
SDG 17/14	Establish a group, not just from the welding sector, but also from other sectors to cooperate and collaborate in persuading governments, industries and aid/donor agencies to implement programmes to support a range of different industry sectors and technologies.	• Technology Consortium Australia (TCA), Reference [169]
SDG 17/15	Introduce a project to increase IIW's reach and influence throughout the world with regional welding groups and other associated national and international groups to help countries work together and learn from each other to ensure that the welding industry supports and drives progress in the 17 SDGs	• Section 5 of Volume 1 of the Long Report • Section 4.17 of Volume 1 of the Long Report
SDG 17/16	Each reader to continue to create additional projects to meet the country's needs.	

2. References and Links

References and links have been included in each section of the Long Report, in particular for each SDG in Section 4 of Volume 1 and projects in Section 1 of Volume 2. References have been provided to give examples of past experiences, best practices, sources of information, guidance documents etc, for consideration and possible use by the reader.

A consolidated list of these references and links has been included in this Section so that the knowledge and experiences of others can be harnessed where required.

Where possible, a reference has been linked to its source. Where no link exists, IIW is endeavouring to provide the reference document in an IIW National Welding Capability (NWC) Resource Centre presently being compiled for access on the IIW website.

Unfortunately, since over time the links in the references may disappear, be changed/moved on the relevant website or be taken off the relevant website, need updating etc, readers are advised to simply check out the reference themselves (for example putting the reference in their browser). IIW will also endeavour to put as many of the documents where links become a problem into the IIW NWC Resource Centre.

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3. Appendices

3.1 About IIW Including Current Member Countries

Information on IIW and its current members can be obtained on International Institute of Welding / IIW members (iiwelding.org)

Record attendance at the 63rd IIW Annual Assembly in Istanbul, Turkey in 2010 when almost 900 participants attended

3.2 IIW Commissions

Since its formation in 1948, one of the significant strengths of the now 51 member country International Institute of Welding (IIW), is the opportunity for seamless cooperation and collaboration between its different working units, continuously drawing together a broad spectrum of relevant experts from around the world to focus on particular issues.

The focus areas of its 18 Technical Working Units, known as Commissions, can generally be divided into Processes, Structural Integrity and Industrial Applications, and Human Factors, all coordinated through the IIW Technical Management Board (TMB).

The Commissions operate as 'think tanks' and engines for driving technical progress, focusing on current needs and challenges in industry and research organisations, and developing technical output to proactively support these needs.

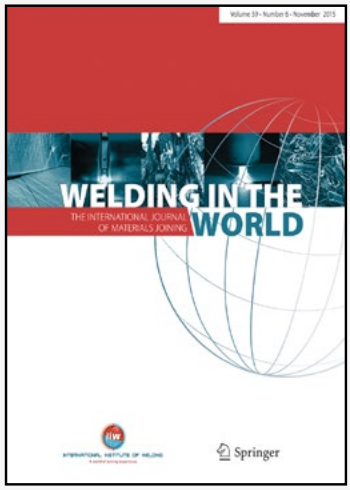
The results of the cooperative and collaborative work by the experts from its 51 member countries lead to the development of highly appreciated documents that assist and support the global industry through various technology transfer mechanisms.

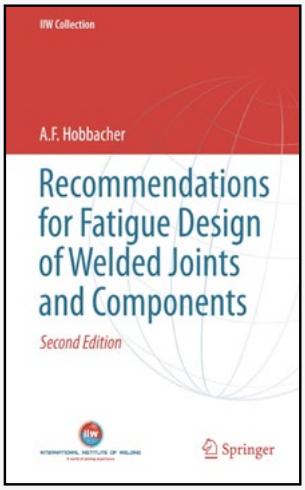
They include, amongst others, International Organization for Standardization (ISO), IIW Best Practices, IIW Position Statements, complemented by the numerous expert submissions, which lead to the improvement of the global quality of life and continuous improvement of the UN Sustainable Development Goals.

The current list of IIW Commissions is shown below and more information can be obtained via https://iiwelding.org/iiw-working-groups/

List of Commissions

I	Additive Manufacturing, Surfacing, and Thermal Cutting
II	Arc Welding and Filler Metals
III	Resistance Welding, Solid State Welding, and Allied Joining Processes
IV	Power Beam Processes
V	NDT and Quality Assurance of Welded Products
VI	Terminology
VII	Microjoining and Nanojoining
VIII	Health, Safety, and Environment
IX	Behaviour of Metals Subjected to Welding
X	Structural Performances of Welded Joints- Fracture Avoidance
XI	Pressure Vessels, Boilers and Pipelines
XII	Arc Welding Processes and Production Systems
XIII	Fatigue of Welded Components and Structures
XIV	Education and Training
XV	Design, Analysis, and Fabrication of Welded Structures
XVI	Polymer Joining and Adhesive Technology
XVII	Brazing, Soldering and Diffusion Bonding
XVIII	Quality Management in Welding and Allied Processes





3.3 IIW Annual Assemblies and International Conferences

IIW events such as the Annual Assembly and International Conference, hosted by Member Societies in locations around the world, provide unique opportunities for experts, practitioners and accompanying persons to meet and network at both professional and personal levels. Since 1983, a concurrent International Conference has facilitated access for the local welding industry and young professionals to international experts and leading-edge research and technology, and provided a platform for showcasing developments in the host nation to the welding world. The list of past IIW Annual Assemblies and International Conferences held concurrently is given below.

Year	Annual Assembly	Parallel International Conference
2023	Singapore 16 07 23 to 21 07 23	Advances in Welding, Joining and Additive Manufacturing
2022	Tokyo, Japan 16 07 22 to 22 07 22	Innovative Welding and Joining Technologies to achieve Carbon Neutrality and promote Sustainable Development
2021	Online 07 07 21 to 21 07 21	Artificial intelligence to innovate welding and joining
2020	Online 15 07 20 to 25 07 20	No Conference
2019	Bratislavia, Slovakia 07 07 19 to 12 07 19	New Progressive Materials and Welding Methods in the Automotive Industry
2018	Bali, Indonesia 15 07 18 to 20 07 18	Advanced Welding and Smart Fabrication Technologies for Efficient Manufacturing Processes
2017	Shanghai, P R China 25 06 17 to 30 06 17	Green Welding Technologies for Effective and Reliable Manufacturing
2016	Melbourne, Australia 10 07 16 to 15 07 16	From Concept to Decommission: The Total Life Cycle of Welded Components
2015	Helsinki, Finland 28 06 15 to 03 07 15	High Strength Materials – Challenges and Applications
2014	Seoul, South Korea 13 07 14 to 18 07 14	Advanced Technology in Welding and Joining for Heavy, Automotive and Electronics Industries
2013	Essen, Germany 11 09 13 to 17 09 13	Automation in Welding
2012	Denver, USA 08 07 12 to 13 07 12	Welding for Repair and life Extension of Plants and Infrastructure
2011	Chennai, India 17 07 11 to 22 07 11	Global Trends in Joining, Cutting and Surfacing Technology
2010	Istanbul, Turkey 11 07 10 to 16 07 11	Advances in Welding Science and Technology for Construction, Energy & Transportation Systems
2009	Singapore 12 07 09 to 17 07 09	Advances in Welding and Allied Technologies

Year	Annual Assembly	Parallel International Conference
2008	Graz, Austria 06 07 08 to 11 07 08	Safety and Reliability of Welded Components in Energy and Processing Industry
2007	Dubrovnik, Croatia 01 07 07 to 06 07 07	Welding and materials technical, economic and ecological aspects
2006	Québec City, Canada 27 08 06 to 01 09 06	Tubular Structures
2005	Prague, Czech Republic 10 07 05 to 15 07 05	Benefits of new methods and trends to economy, productivity and quality
2004	Osaka, Japan 11 07 04 to 16 07 04	Technical trends and future prospectives of welding technology for transportation, land, sea, air and space
2003	Bucharest, Romania 06 07 03 to 11 07 03	Welded construction for urban infrastructure
2002	Copenhagen, Denmark 23 06 02 to 28 06 02	Advanced processes and technologies in welding and allied processes
2001	Ljubljana, Slovenia 08 07 01 to 13 07 01	Joining technologies of dissimilar materials and structural integrity problems of jointed materials
2000	Florence, Italy 09 07 00 to 14 07 00	Welded constructions : Achievements and perspectives for the new millennium
1999	Lisbon, Portugal 18 07 99 to 23 07 99	The human factor and its environment
1998	Hamburg, Germany 13 09 98 to 18 09 98	Welding in Shipbuilding
1997	San Francisco, USA 13 07 97 to 18 07 97	Performance of dynamically loaded welded structures
1996	Budapest, Hungary 01 09 96 to 07 09 96	Welded structures, in particular welded bridges
1995	Stockholm, Sweden	Welding of stainless steel
1994	Beijing. P.R. China	Advanced techniques and low cost automation
1993	Glasgow, UK	Extending the life of welded structures
1992	Madrid, Spain	Engineering design in welded constructions
1991	The Hague, The Netherlands	Joining/Welding 2000
1990	Montreal, Canada	Advances in joining newer structural materials
1989	Helsinki, Finland	Welding under extreme conditions
1988	Vienna	Weld quality: the role of computers

Year	Annual Assembly	Parallel International Conference
1987	Sofia, Bulgaria	Stress relieving heat treatments of welded steel constructions
1986	Tokyo, Japan	Electron and laser beam welding
1985	Strasbourg, France	Automation and robotisation in welding and allied processes
1984	Boston, USA	Welding of Tubular Structures
1983	Trondheim, Norway	Underwater welding

Year	Annual Assembly
1982	Ljubljana, Slovenia
1981	Porto, Portugal
1980	Estoril, Portugal
1979	Bratislava, Slovakia
1978	Dublin, Ireland
1977	Copenhagen, Denmark
1976	Sydney, Australia
1975	Tel Aviv, Israel
1974	Budapest, Hungary
1973	Düsseldorf, Germany
1972	Toronto, Canada
1971	Stockholm, Sweden
1970	Lausanne, Switzerland
1969	Kyoto, Japan
1968	Warsaw, Poland
1967	London, UK
1966	Delft, The Netherlands
1965	Paris, France

Year	Annual Assembly
1964	Prague, Czechoslovakia
1963	Helsinki, Finland
1962	Oslo, Norway
1961	New York, USA
1960	Liège, Belgium
1959	Opatija, Croatia
1958	Vienna, Austria
1957	Essen, Germany
1956	Madrid, Spain
1955	Zurich, Switzerland
1954	Florence, Italy
1953	Copenhagen, Denmark
1952	Göteborg, Sweden
1951	Oxford, UK
1950	Paris, France
1949	Delft, The Netherlands
1948	Brussels, Belgium

3.4 IIW International Congresses

IIW International Congresses hosted by Member Societies in regions around the world, bring together people from industry, government and training bodies to promote appropriate welding technologies and share ideas on how the improvement of welding in the region could lead to raising the general quality of life of people through the IIW WeldCare programme. Congresses also promote the benefits available through IIW expertise, knowhow, and education, training, qualification and certification programmes for the advancement of nations in the region. The past list of International Congresses is shown below.

A calendar of future events is found on http://www.iiwelding.org/Pages/AllEvents.aspx

List of IIW International Congresses held since 1988:

Year	Host Country	Title of Congress
2020	INDIA	5th IIW International Congress, Mumbai.
2019	FRANCE	ICWAM 2nd Western Europe IIW International Congress.
2019	THAILAND	8th Asian Pacific IIW International Congress, Bangkok.
2018	SERBIA	4th South East European IIW International Congress, Belgrade.
2017	FRANCE	ICWAM 1ST Western Europe IIW International Congress.
2017	INDIA	4th IIW International Congress, Chennai.
2015	ROMANIA	3rd South East European IIW International Congress: Welding and Joining Technologies for a Sustainable Development and Environment, Timisoara.
2014	INDIA	3rd IIW International Congress: Advancement in Welding, Cutting & Surfacing Technologies for Improved Economy, Reliability & Sustainable Environment, New Delhi.
2014	CANADA	1st IIW International Congress in the Arctic Region, Vancouver.
2014	BRAZIL	1st Pan American IIW International Congress, Sao Paulo.
2013	SINGAPORE	7th Asian Pacific IIW International Congress: Recent Development in Welding and Joining Technologies.
2012	SOUTH AFRICA	3rd IIW International Congress: Advancing Science and Technology of Welding in Sub-Saharan Africa, Johannesburg.
2011	AUSTRALIA	6th Asian Pacific IIW International Congress: Improving quality of life Through Welding, Cairns.
2011	TURKEY	IIW International Congress: Advances in Welding Science & Technology for construction, Energy and Transportation Systems, Antalya.
2010	BULGARIA	2nd South East European IIW International Congress: Welding- HIGH-TECH Technology in 21st century, Sofia.
2010	TUNISIA	2nd North African IIW International Congress: Welding and Related Techniques, Hammamet.

Year	Host Country	Title of Congress
2010	THAILAND	2nd South-East Asia IIW International Congress: Technology-Education-Quality Management, Bangkok.
2010	ISRAEL	2nd IIW International Congress: Welding for Water Technologies, Tel Aviv.
2009	IRAN	4th IIW International Congress, Tehran.
2009	SLOVAKIA	1st Central European IIW International Congress: Progressive Structural Materials and their Joining Technologies, High Tatras.
2009	NIGERIA	1st West African IIW International Congress, Abuja.
2008	P.R. CHINA	Asian Pacific IIW International Congress: Change, Chance and Challenge in Welding Technology, Tianjin.
2008	BRAZIL	2nd Latin American IIW International Congress, Sao Paulo.
2008	INDIA	2nd IIW International Congress: Technological and Material Challenges in Welding, Fabrication and Inspection, Chennai.
2007	AUSTRALIA	5th Asian Pacific IIW International Congress, Sydney.
2006	THAILAND	1st South-East Asia IIW International Congress: Welding in South-East Asia: A Challenge for the Future, Bangkok, 20-23 November, 2006.
2006	ROMANIA	1st South-East European IIW International Congress: Welding and joining technologies for a sustainable development and environment, Timisoara, 23-25 May, 2006.

Audience at the opening ceremony of the IIW International Congress in Cairo, Egypt, 2004

Year	Host Country	Title of Congress
2006	SOUTH AFRICA	2nd IIW International Congress: Welding and related Inspection Technologies for the Development of Southern Africa, Cape Town.
2005	INDIA	1st IIW International Congress: Frontiers of Welding Science and Technology, Mumbai.
2005	ISRAEL	1st IIW International Congress: Welding and Joining 2005: Frontiers of Materials Joining, Tel Aviv
2004	EGYPT	1st North African IIW International Congress, Cairo.
2003	IRAN	3rd IIW International Congress, Tehran.
2002	SINGAPORE	3rd Asian Pacific IIW International Congress.
2002	IRAN	2nd IIW International Congress, Tehran.
2000	AUSTRALIA	IIW Asian Pacific International Congress, Melbourne.
1998	IRAN	1st IIW International Congress, Tehran.
1997	SOUTH AFRICA	1st IIW International Congress, Johannesburg.
1996	NEW ZEALAND	2nd Asian Pacific IIW International Congress, Auckland.
1992	BRAZIL	1st Latin American IIW International Congress, Rio De Janeiro.
1988	AUSTRALIA	1st Asian Pacific IIW International Congress, Hobart.

3.5 IIW Member Technology Innovation Workshops and National Welding Capability Workshops Held Since 2003

Since 2003, a range of successful workshops covering topics such as promoting the concepts of technology innovation, governance and a national welding capability have been held in various countries by IIW Members and reported on at IIW WG-RA meetings each year.

These are listed below.

Year	Host Country	Title of Workshop
2020	INDIA	Indian Institute of Welding (IIW-India), National Welding Capability (NWC) Workshop, 6 and 8 February, Mumbai.
2020	THAILAND	Welding Institute of Thailand (WIT), National Welding Capability (NWC) Workshop, 9 February, Bangkok.
2019	THAILAND	Welding Institute of Thailand (WIT), National Welding Capability (NWC) Workshop, 19 March, Bangkok.
2018	TURKEY	Gedik Education and Social Benefits Foundation (GEV), National Welding Capability (NWC) Workshop, 14 October, Istanbul.
2018	SERBIA	SEENET National Welding Capability (NWC) Workshop, 10 October, Belgrade.
2018	SOUTH AFRICA	Southern African Institute of Welding (SAIW), National Welding Capability (NWC) Workshop, 11-13 September, Johannesburg.
2018	NEW ZEALAND	Heavy Engineering Research Association (HERA), National Welding Capability (NWC) Workshop, 14-16 March, Auckland.
2015	ROMANIA	SEENET National Welding Capability (NWC) Workshop, 3 June, Timisoara.
2014	INDIA	Indian Institute of Welding (IIW-India), National Welding Capability (NWC) Workshop, 11 April, New Delhi.
2010	BULGARIA	SEENET Governance Workshop, 20 October, Sofia.
2010	EGYPT	Technology Innovation Workshop, 17 October, Cairo.
2009	NIGERIA	Nigerian Institute of Welding (NIW), Technology Innovation Workshop, 2 March, Abuja.
2009	SYRIA	Development of Welding Technology in the Arab World 7-9 January, Damascus (Organised by representatives from Syria, participants from Syria, Lebanon, Jordan, presenters from IIW Members).
2008	GREECE	SEENET Technology Innovation Workshop, 24-25 January, Athens.
2008	INDIA	Indian Institute of welding (IIW-India)Technology Innovation Workshop, 11 January, Chennai.
2007	SERBIA	SEENET Technology Innovation Workshop, 22-23 January, Belgrade.

Representatives from UNIDO, IAEA, DFID and the EU participating in the Technology Diffusion Workshop at the first IIW South-East European Welding Congress, Timișoara, Romania, May, 2006

Year	Host Country	Title of Workshop
2006	ROMANIA	SEENET Technology Innovation Workshop, 24 May, Timisoara (UNIDO, IAEA, EU, DFID attendees).
2005	BULGARIA	SEENET Technology Innovation Workshop, 27 January, Sofia.
2004	SOUTH AFRICA	SAIW Technology Innovation Workshop, 4 February, Johannesburg.
2004	ROMANIA	SEENET Technology Innovation Workshop, 20 January, Timisoara.
2004	ROMANIA	Romanian National R&D Institute for Welding and Material Testing (ISIM), Technology Innovation Workshop, 19 January, Timisoara.
2003	ROMANIA	Romanian Government, Technology Innovation Workshop, 4 July, Bucharest.

3.6 IIW Welding Research and Collaboration Colloquia (WRCC)

Welding Research and Collaboration Colloquia provide a unique opportunity for international researchers from universities, industries and governments to meet, present, and discuss the research and development work they are conducting, or planning to do, alone or in cooperation with other researchers. They provide unique networking and career promotion opportunities for young professionals and encourage participation in IIW Annual Assemblies and Technical Working Units. The list of past Colloquia is shown below.

Year	Host Country	Title of Colloquium
2017	UNITED KINGDOM	7th IIW Welding Research and Collaboration Colloquium, TWI, 19-20 September, Cambridge.
2016	INDIA	6th IIW Welding Research and Collaboration Colloquium, 7-9 April, Hyderabad.
2015	GERMANY	5th IIW Welding Research and Collaboration Colloquium, 28-30 October, Limburg.
2014	AUSTRALIA	4th IIW Welding Research and Collaboration Colloquium, 5-7 November, Wollongong.
2013	BRAZIL	3rd IIW European-South American School of Welding and Correlated Processes, 7-9 October, Salvador.
2012	AUSTRIA	2nd IIW European-South American School of Welding and Correlated Processes, 11-13 September, Wels.
2011	BRAZIL	1st IIW European-South American School of Welding and Correlated Processes, 18-20 May, Ouro Preto.

Participants in IIW Welding Research and Collaboration Colloquium, Hyderabad, India

3.7 Examples of IIW and IIW Member Young Professionals (YPs) Events and Activities

9.7.1 Introduction

IIW, Cameroon, India, France, Germany, Hungary, Romania and Thailand have held events and activities aimed at supporting young professionals (YPs) in the welding field. YP events have been held at the IIW Annual Assemblies in 2015 to 2019, again in Tokyo in 2022 and Singapore in 2023. Some examples are shown below of initiatives implemented by IIW and its members during the past decade.

9.7.2 International Institute of Welding (IIW)

- IIW Annual Assembly in Helsinki, Finland, 28 June-3 July, 2015.
- IIW Annual Assembly in Melbourne, Australia, 10-15 July, 2016.
- IIW Annual Assembly in Shanghai, China, 25-30 June, 2017.
- IIW Annual Assembly in Bali, Indonesia, 15-20 July, 2018.
- IIW Annual Assembly in Bratislava, Slovakia, 7-12 July, 2019.
- IIW Annual Assembly in Tokyo, Japan, 16-22 July, 2022.
- IIW Annual Assembly in Singapore 16-21 July, 2023.

9.7.3 Cameroon

The Cameroon Welding Association (CWA) created the Cameroonian branch of the IIW Young Professionals (YPs) and the 237welders group in 2017 [52]. CWA is also extending its assistance with YPs to the Economic and Monetary Community of Central Africa (CEMAC) which includes Gabon, Cameroon, Central African Republic (CAR), Chad, Republic of Congo and Equatorial Guinea.

A number of forums have been held under the International Forum of Welding Trades (FIMS).

- FIMS 2017: INTERNATIONAL FORUM OF WELDING TRADES 1st Edition.
  Launch of the Cameroon Welding Association activities
  Douala, 8-9 September, 2017.
- FIMS 2020: 237 welders & YP Meeting
  Launch of the Welding Caravan
  Yaoundé, 10 November, 2020.
- FIMS 2021: INTERNATIONAL FORUM OF WELDING TRADES 3rd Edition.
  International Certifications.
  Douala, 10 April, 2021.
- FIMS 2022: INTERNATIONAL FORUM OF WELDING TRADES 4th Edition.
  Welding Workforce Planning:
  Education and Training to build capacity.
  Limbe, 22 April, 2022.

9.7.4 The Indian Institute of Welding (IIW-India)

The Indian Institute of Welding (IIW-India) started the young professional activity in 2017 with the objective to bring more and more young people to take up welding as their professional career. The campaign started in the Engineering colleges where Mechanical and Metallurgical streams are in force. IIW-India has succeeded in establishing 22 such colleges as Students' Chapters resulting in over 700 young professionals actively taking welding as a career. Some YP activities include:

- IIW-India, IIW International Congress, 17-19 January, 2017, in Chennai had the first YPIC event.
- IIW-India, IIW International Congress, 5-7 February, 2020, in Mumbai had an exclusive YPIC event.
- IIW-India National Welding Seminar, 5-7 May, 2022, in Pune had a YPIC session.
- IIW-India National Welding Meet, 14-15 October, 2022, in Kochi had YP sessions.
- January, 2023, at Chennai organised a YPIC.

9.7.5 France

- YPIC 2018 – 4th Young Professionals International Conference, 29-31 August, 2018, Yutz, France

9.7.6 German Welding Society (DVS)

The German Welding Society has always been at the forefront in the development of young professionals in the welding industry. A key reason for this has been the culture existing in German industry on the high importance of welding to the country.

- The reports on the IIW Young professionals can be found at the German link.

The 8th Asia Pacific IIW International Welding Congress, Bangkok, Thailand, 20-22 March, 2019. Young Professionals session

https://www.dvs-home.de/next-generation/students-young-professionals/international-unterwegs

- The content on the IIW Young professionals has also been added to the DVS English website. https://www.dvs-home.de/en/
- YPIC 2017 – 3rd Young Professionals International Conference, 16-18 August, 2017, Halle, Germany

9.7.7 Hungarian Welding Society

The Hungarian Welding Society established the Youth Forum in 2012, which unites university welding groups and provides national and international professional events, Conference of Young Welding Professionals, Welding Summer University, organized professional visits, and team building which are boosting and encouraging an active professional life and career building. In 2014, Hungary launched the IIW-recognized Young Professionals International Conference (YPIC) event series and other countries such as France and Germany followed suit with their own YPIC events. Some YP activities include:

- Youth Forum of the Hungarian Welding Association 2012.
- Hungarian Young Welding Professionals Conference, Obuda University, 8 March, 2013.
- Welding Competition for Young Professionals, 19 April, 2013, Hungary.
- Summer University of Welding, Miskoic University, 5-7 July, 2013, Hungary.
- YPIC 2014 – 1st Young Professionals International Conference, 17-20 September, 2014, Budapest, Hungary.
- YPIC 2015 – 2nd Young Professionals International Conference, 7-8 October, 2015, Budapest, Hungary.
- YPIC 2019 – 5th Young Professionals International Conference, 4- 6 July, 2019, Budapest, Hungary.

9.7.8 Romanian Welding Society (ASR)

The Romanian Welding Society (ASR) "YOUTH CREATES" competition aims to stimulate young people's interest in the field of welding and related processes. The competition is addressed to young people up to 35 years old, ASR members or supporters of the association, as well as to those who have concerns or work in the field of welding and related processes, single or collective authors, students and / or young engineers who, within scientific events, present the latest results in the field, obtained in universities, institutes and/or industry, based on the principle "FROM CONCEPTION TO USE".

One of the winners of the ASR contest "Youth Creates" is Andrei Becheru, at the time of the contest a master student at the Polytechnic University of Timisoara, currently an engineer at an automotive company. The work presented at the competition was about the application of additive manufacturing in the automotive area.

9.7.9 Welding Institute of Thailand (WIT)

A good example of a developing country in the Asian region progressing its national welding capability and SDGs is Thailand. The Welding Institute of Thailand (WIT) held the 8th IIW Asia Pacific International Congress 2019 (IIWAP2019) in Bangkok in March, 2019, which also included sessions for Young Professionals.

Although the Covid 19 Pandemic followed shortly afterwards, WIT has been able to expand the number of IIW Approved Training Bodies from five to seven to assist industry. More training courses and programs are to follow in 2023 and onwards for young people and young professionals to come together for career path development through IIW courses, welding seminars and workshops.

Among this, the plan is also to up-skill welding teachers and educators with the right skill and knowledge to teach and share welding knowledge and subjects to young students and the community to improve the quality of life.

On 3 July, 2023,the Office of Human Resource Development and Education (EEC HRD) in Thailand organized a seminar on the network of Human Resource Development Centers in the Eastern Economic Corridor to respond to the development of 12 targeted industries in line with the government's policy to drive the country's economy [210].

3.8 List of Potential Development Aid Organisations for Cooperation and Collaboration with the Welding Industry

The range of activities which the welding industry, both globally and nationally in a country, could be involved in, complements many of the programmes being presented by the United Nations and other national aid agencies. The names of such organisations, in alphabetical order, and their contact details are given below.

- Agence Française de Développement (AFD, French Development Agency)

  Development Assistance – Ministry for Europe and Foreign Affairs (diplomatie.gouv.fr)

  AFD funds, supports and accelerates the transition towards a fairer and more sustainable world.

  It focuses on climate, biodiversity, peace, education, urban planning, health and governance. With a presence in 115 countries through 85 offices, the AFD funds and monitors more than 4,000 development projects. Thanks to its extensive network of researchers and experts, it also takes part in dialogue on public policy, shares its knowledge, and raises awareness of issues related to development and international solidarity. Its activities support France and the French people's commitment to the Sustainable Development Goals.
- The Canadian International Development Agency (CIDA)

  Canadian International Development Agency (CIDA) | Devex

  The Agency is Canada's lead agency for development assistance. Its aim is to reduce poverty, promote human rights, and support sustainable development. CIDA was established in 1968 to administer the bulk of Canada's official development assistance program. CIDA works in concert with its development partners, fragile states and countries in crisis, selected countries and regions, and the Canadian population and institutions. The measure of its success lies in its contribution to the achievement of the Millennium Development Goals and Canada's broader international policy objectives.

  Canadian funding for international development projects
- China International Development Cooperation Agency (CIDCA)

  cidca.gov.cn

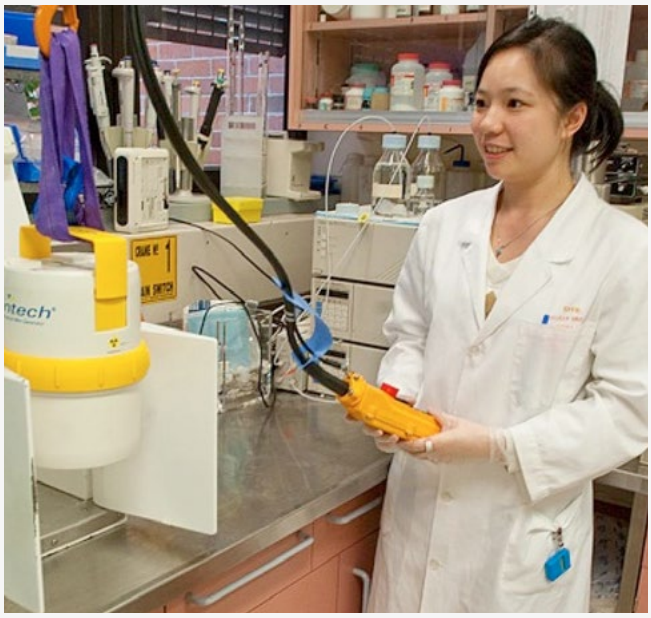
  The agency aims to formulate strategic guidelines, plans and policies for foreign aid, coordinate and offer advice on major foreign aid issues, advance the country's reforms in matters involving foreign aid, and identify major programs and supervise and evaluate their implementation. Specific assignments are allocated to different departments.
- The Directorate General for International Development (EuropeAid)

  EuropeAid – EURADA

  EuropeAid is the European Commission agency responsible for designing European international cooperation and development policy and for delivering aid throughout the world. It is also referred to as DEVCO.

  The Commission's Directorate-General for International Cooperation and Development (DG DEVCO) is responsible for designing European international cooperation and development policy and delivering aid throughout the world. DG DEVCO is in charge of development cooperation policy in a wider framework of international cooperation, adapting to the evolving needs of partner countries. This encompasses cooperation with developing countries at different stages of development, including with countries graduated from bilateral development assistance to cover the specific needs of these countries during the transition period between low income countries and upper middle income countries.

- International Atomic Energy Agency (IAEA)
  International Atomic Energy Agency | Atoms for Peace and Development (iaea.org) Vienna, Austria.
  The International Atomic Energy Agency (IAEA) serves as the world's foremost intergovernmental forum for scientific and technical cooperation in the peaceful use of nuclear energy. The IAEA strengthens the global nuclear safety and security framework. It identifies and promotes best practices and safety standards and implements programs to assist states in applying these standards. The IAEA is also a key player in the effort to prevent nuclear terrorism.
- Foreign, Commonwealth and Development Office (FCDO) UK
  Official Development Assistance (ODA): FCDO International Programme- GOV.UK (www.gov.uk)
  Formerly known as 'strategic and bilateral programmes' and 'FCO departmental programmes', the FCDO International Programme finances projects that promote economic development and welfare of developing countries. It underpins the FCDO's wider diplomatic effort and foreign policy in support of UK interests overseas.
- The German Agency for International Cooperation (GIZ)
  http://www.giz.de/en/
  It is an international enterprise owned by the German Federal Government, operating in many fields across more than 130 countries. As a federal enterprise, it supports the German Government in achieving its objectives in the field of international cooperation for sustainable development. GIZ offers demand-driven, tailor-made and effective services for sustainable development. GIZ operates in many fields: economic development and employment promotion, governance and democracy, security, reconstruction, peace-building and civil conflict transformation, food security, health and basic education, environmental protection, resource conservation, and climate change mitigation.
- United Nations Conference on Trade and Development (UNCTAD)
  Home | UNCTAD
  Palais des Nations, 8-14, Av de la Paix, 1211, Geneva 10, Switzerland.
  UNCTAD supports developing countries to access the benefits of a globalized economy more fairly and effectively. It helps to equip them to deal with the potential drawbacks of greater economic integration. To do this, it provides analysis, facilitates consensus-building, and offers technical assistance. This helps them to use trade, investment, finance, and technology as vehicles for inclusive and sustainable development. Together with other UN departments and agencies, it measures progress by the Sustainable Development Goals, as set out in 2030 Agenda.
- The Japan International Cooperation Agency (JICA)
  About JICA | JICA
  It is a governmental agency that delivers the bulk of Official Development Assistance (ODA) for the government of Japan. It is chartered with assisting economic and social growth in developing countries, and the promotion of international cooperation. JICA has become one of the largest bilateral development organizations in the world with a network of 97 overseas offices, projects in more than 150 countries, and available financial resources of approximately 1 trillion yen (USD8.5 billion).
- Organization for Economic Co-operation and Development (OECD)
  Development Centre – OECD
  The OECD helps developing countries and emerging economies find innovative policy solutions to promote sustainable growth, reduce poverty and inequalities, and improve people's lives. It facilitates a policy dialogue between governments, involving public, private and philanthropic actors. Within its Development



The generator containing Tc-99 used in nuclear medicine produced at ANSTO in Sydney.
Photo courtesy of ANSTO.

https://www.ansto.gov.au/products/nuclear-medicine/facilities/nuclear-medicine-processing-and-distribution

Tc-99m is the most important and commonly used nuclear medicine in the world today. Tc-99m is used to diagnose a variety of heart, lung, cancer and skeletal conditions.

Centre, countries from Africa, Asia and Latin America participate as full members in the Centre where they interact on an equal footing with OECD members. Official development assistance (ODA) flows to countries and territories on the Development Assistance Committee (DAC) list of ODA Recipients and to multilateral development institutions.

- United Nations Development Programme (UNDP)
  Home | United Nations Development Programme (undp.org) New York, USA
  UNDP is the United Nations' lead agency on international development. It supports countries and communities as they work to eradicate poverty, implement the Paris Agreement on climate change and achieve the Sustainable Development Goals. It advocates for transformative change, and connects countries to the resources they need to help people build a better life.
- United Nations Educational, Scientific and Cultural Organization (UNESCO)
  Home | UNESCO Paris, France.
  UNESCO uses education, science, culture, communication and information to foster mutual understanding and respect for our planet. It aims at promoting world peace and security through international cooperation in education, arts, sciences and culture. It works to strengthen the intellectual and moral solidarity of humankind and bring out the best in our shared humanity. As a knowledge-based organization, UNESCO publishes global data and scientific information to guide public policies. UNESCO Institute for statistics produces a wide range of indicators in the fields of education, science, culture, communication and information.
  UNESCO has published its UNESCO Science Report, the race against time for smarter development, which also contains very good information on the different efforts of various regions of the world [161].
  UNESCO Science Report: the race against time for smarter development – UNESCO Digital Library
- United Nations Childrens Fund (UNICEF)
  UNICEF New York, USA
  UNICEF, was originally called the United Nations International Children's Emergency Fund in full, now officially United Nations Children's Fund. It is an agency of the United Nations responsible for providing humanitarian and developmental aid to children worldwide.
  The use of child labour has always been of major concern to UNICEF and unfortunately has just seen its first increase in two decades [174]. UNICEF has promoted Technical and Vocational Education and Training as a tool against child labour and this is worth considering by the welding industry where appropriate [175].
  Technical and Vocational Education and Training as a tool against child labour (unicef.org)
  Child labour rises to 160 million – first increase in two decades (unicef.org)
- United Nations Industrial Development Organization (UNIDO)
  UNIDO | United Nations Industrial Development Organization Vienna, Austria
  UNIDO is the specialized agency of the United Nations with a unique mandate to promote and accelerate sustainable industrial and economic development. It supports countries to industrialize in ways that foster digital and green transitions and accelerate progress with the Sustainable Development Goals. UNIDO implements numerous actions to contribute to the SDGs and due to the interlinked nature of the SDGs, many of its activities contribute to more than one SDG [170].
- United States Agency for International Development (USAID), 1300 Pennsylvania Avenue, Washington DC 20004
  U.S. Agency for International Development (usaid.gov)
  USAID leads international development and humanitarian efforts to save lives, reduce poverty, strengthen democratic governance and help people progress beyond assistance.
  U.S. foreign assistance has always had the twofold purpose of furthering America's interests while improving lives in the developing world. USAID carries out U.S. foreign policy by promoting broad-scale human progress at the same time it expands stable, free societies, creates markets and trade partners for the United States, and fosters good will abroad.
  USAID works in over 100 countries to promote global health, support global stability, provide humanitarian assistance, catalyse innovation and partnership, empower women and girls.

Earth's Custodian

Ian Haggerty and Mike van Dam. IIW 2023 Digital Collection, Reference [113]

- World Bank Group
  What We Do (worldbank.org) About the World Bank
  The World Bank provides **low-interest loans, zero to low-interest credits, and grants to developing countries**. These support a wide array of investments in such areas as education, health, public administration, infrastructure, financial and private sector development, agriculture, and environmental and natural resource management.
  The World Bank is a vital source of financial and technical assistance to developing countries around the world. It is not a bank in the ordinary sense but a unique partnership to reduce poverty and support development.
  The World Bank Group comprises five institutions managed by their member countries. It is headquartered in Washington, D.C. and has more than 10,000 employees in more than 120 offices worldwide.
  The World Bank Group has set two goals for the world to achieve by 2030: End extreme poverty by decreasing the percentage of people living on less than $1.90 a day to no more than 3%, Promote shared prosperity by fostering the income growth of the bottom 40% for every country.

3.9 List of Acronyms

ABS Brazilian Welding Association (ABS)

AFD, French Development Agency

AFRA African Regional Cooperative Agreement for Research, Development and Training related to Nuclear Science and Technology

AFSA Aluminium Federation of South Africa

AICIP Australian Institute for the Certification of Inspection Personnel

AM Additive Manufacturing

ANB Authorised Nominated Body

ANBCC Authorised Nominated Body for Company Certification

API American Pipeline Institute

ARASIA Cooperative Agreement for Arab States in Asia for Research, Development and Training related to Nuclear Science and Technology

ARCAL Regional Cooperation agreement for the Promotion of Nuclear Science and Technology in Latin America and the Caribbean

ASME American Society of Mechanical Engineers

AS/NZS 5131 Structural steelwork-Fabrication and erection.

ASR Romanian Welding Society

AWF Asian Welding Federation

AWRA Australian Welding Research Association

AWS American Welding Society

B3W Build Back Better World

BBIN Bangladesh, Bhutan, India, Nepal Networks

BERL Business and Economic Research Limited

BIMSTEC Bay of Bengal Initiative for Multi-Sectoral and Economic Cooperation

BWRA British Welding Research Association

BWS Bulgarian Welding Society,

CBIP Certification Board for Inspection Personnel

CETIME Centre Technique des Industries Mecaniques et Electriques Tunisia

CIDA Canadian International Development Agency

CIDCA China International Development Cooperation Agency

CMRDI Central Metallurgical Research & Development Institute Egypt

CRC Cooperative Research Centre

CRC-MW&J Cooperative Research Centre for Materials Welding and Joining

DGE&T Directorate General of Employment and Training

DUZS Serbian Welding Society

DVS German Welding Society

E, T, Q and C Education, Training, Qualification and Certification.

ETT Expert Technology Tool

EU European Union

EWF European Welding Federation,

EWI Edison Welding Institute

FAO Food and Agriculture Organization

FDA US Food and Drug Administration

FCDO Foreign, Commonwealth and Development Office, UK

GDP Gross Domestic Product

GIW Ghanaian Institute of Welding

GIZ German Agency for International Cooperation

GN Guidance Note

GTRA The German-Thai Railway Association

HEIAA Heavy Engineering Industry Action Agenda

HERA Heavy Engineering Research Association

HSE Health and Safety Executive UK

IAB International Authorisation Board

IAMQS International Additive Manufacturing Qualification System

IAEA International Atomic Energy Agency

ICNDT International Committee for Non-destructive Testing

IIW International Institute of Welding

IIW-India The Indian Institute of Welding

IIW MCS ISO 3834 Manufacturers Certification Scheme According to ISO 3834

ILO International Labour Organization

INSTEPR Institute for Energy Policies and Research

ISIM Romanian National R&D Institute for Welding and Material Testing
ISO International Organization for Standardization
ISP Industry Sectoral Project
ISSDA Indian Stainless Steel Development Association
ITMBU ITM (SLS) Baroda University
IWE International Welding Engineer
IWT International Welding Technologist
IWS International Welding Specialist
IWP International Welding Practitioner
IWIP International Welding Inspection Personnel
IW International Welder
JICA Japanese International Cooperation Agency
JWES Japan Welding Engineering Society
KAZWELD Kazakhstan Welding Association
KMUTNB King Mongkut's University of Technology North Bangkok
LAPROSOLDA Center for Research and Development of Welding Processes
MES-SDI Modular Employable Skill under Skill Development Initiative Scheme.
MNEs Multinational Enterprises
MSME Micro, Small and Medium-sized Enterprise
NASH National Association for Steel Framed Housing
NBBPVI National Board of Boiler and Pressure Vessel Inspectors
NIW Nigerian Institute of Welding
NDT Non-Destructive Testing
NWC National Welding Capability
NZIST New Zealand Institutes of Skills and Technology
OECD Organization for Economic Co-operation and Development
PMSEIC Australian Prime Ministers Science, Engineering and Innovation Council
R&D Research and Development
RVIE Railway Vehicles and Infrastructure Engineering
SAARC South Asian Association for Regional Cooperation
SAFCTF South African Fabrication and Construction Training Trust Fund
SAIW Southern African Institute of Welding
SAQCC CP South African Qualification and Certification Committee for Competent Persons
SAQCC (IPE) South African Qualification and Certification Committee for Inspectors of Pressurised Equipment
SAQCC (NDT) South African Qualification and Certification Committee for Non-destructive Testing Personnel
SASSDA Southern Africa Stainless Steel Development Association
SCNZ Steel Construction New Zealand
SDG Sustainable Development Goal
SEENET South East European Network for Technology Transfer
SFC Steel Fabricator Certification
SME Small and Medium-sized Enterprise
TAFE Australian Technical and Further Education Institutes
TCA Technology Consortium Australia
TGN Technical Guidance Note
TIFAC Technology Information, Forecasting and Assessment Council
TMB Technical Management Board
TWF The Welding Federation
TWI The Welding Institute
UFU Uberlandia Federal University
UNCTAD United Nations Conference on Trade and Development
UNDP United Nations Development Programme
UNESCO United Nations Educational, Scientific and Cultural Organization
UNICEF United Nations Childrens Fund
UNIDO United Nations Industrial Development Organization
USAID United States Agency for International Development
USMCA US-Mexico-Canada Agreement
VET Vocational; Education and Training
Weld-Ed National Centre for Welding Education and Training
WGI Welding Greek Institute
WG-RA IIW Board of Directors Working Group Regional Activities and Liaison with Developing Countries
WHS Work Health and Safety
WRCC IIW Welding Research and Collaboration Colloquia
WTIA Welding Technology Institute of Australia

3.10 List of Quoted Standards (Undated)

ISO 3834 Quality requirements for fusion welding of metallic materials
ISO 14731 Welding coordination-Tasks and responsibilities
ISO 9000 is a series of standards, developed and published by the International Organization for Standardization (ISO). It defines, establishes and maintains an effective quality assurance (QA) system for manufacturing and service industries
ISO 19600 Compliance Management Systems – Guidelines
ISO 26000 Social Responsibility Guidance Document
ISO/IEC 17024: Conformity assessment – General requirements for bodies operating certification of persons
ISO 56000 Standard on Innovation Management Systems (IMS)
ISO 9712 Non-destructive testing – Qualification and certification of NDT personnel
ISO 45011 Occupational health, safety management systems
ISO/IEC 17065 Requirements for bodies certifying products, processes and services
ISO/IEC 17021 Conformity assessment – Requirements for bodies providing audits
ISO 14001 Environmental Management Systems Standard
ISO 50001 Energy Management Systems
EN 1090 Execution of steel structures and aluminium structures

IIW Vision, Mission and Core Values

Vision

The leading global welding community linking industry, research and education

Mission

Advance welding and joining through a worldwide network

Core Values

IIW is committed to the advancement of welding and joining for a safer and sustainable world

IIW operates based on mutual respect for diversity, culture and languages

Joining to the future