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Nota di contenuto	Cover -- Title Page -- Copyright -- Contents -- Foreword -- Preface -- Acknowledgments -- PLENARY -- The United Nations International Year of Glass-2022 -- ABSTRACT -- INTRODUCTION -- GENESIS AND HISTORY OF THE INTERNATIONAL YEAR OF GLASS -- RATIONALE FOR 2022 -- ENDORSEMENTS -- IYOG2022 AND THE UN SUSTAINABILITY DEVELOPMENT GOALS -- FROM VISION TO REALITY -- PLANNED EVENTS -- CONCLUDING REMARKS -- ACKNOWLEDGMENTS -- REFERENCES -- Re-Balancing the Issue-Driven Sustainability Dialogue That is Hurting Glass. How We Got Here and What We Do About It -- ABSTRACT -- INTRODUCTION -- SUSTAINABILITY, "EXTERNALITIES," AND THEIR RELATIONSHIP SUSTAINABILITY AND BALANCE -- SUSTAINABILITY AND "EXTERNALITIES" -- OUR HARD-WIRED DECISION-MAKING -- OUR MULTIPLE-PERSONALITY DECISION MAKER -- STATUS-QUO, RISK-AVERSE, LOSS-AVOIDER DECISIONS ARE THE DEFAULT -- NUDGED TO THE STATUS QUO? -- CONNECTING THE DOTS -- PROPOSALS AND THOUGHTS ON JOINING THE DIALOGUE -- CONCLUSION -- REFERENCES -- Collaboration in Competitive Spaces -- ABSTRACT -- INTRODUCTION -- THE THREAT -- THE RATE OF CHANGE -- THE CHALLENGE IN CHANGE -- TAKE OFF YOUR PRODUCTION HAT -- NO CHALLENGE TOO BIG -- CONCLUSION -- The Green Story of Cardinal FG -- ABSTRACT -- COMMITMENT -- CONCLUSION --

REFRACTORIES -- Mullitisation: The Key to Regenerating Regenerators -- ABSTRACT -- MULLITISATION -- LOW TEMPERATURE ALKALI SALT INGRESS-A TRULY GLOBAL ISSUE -- SUMMARY AND CONCLUSIONS -- ACKNOWLEDGMENTS -- Know What's In Your Furnace: All Bonded AZS Refractory Brick Are Not The Same -- ABSTRACT -- INTRODUCTION -- MINERAL-BASED MATERIALS -- EXAMPLE BRICK PRODUCTS -- EXAMPLE DEFECTS -- CONCLUSIONS -- REFERENCES -- How Efficient Non-Destructive Controls of Fused-Cast AZS will Support High Quality Glass Melting -- ABSTRACT -- INTRODUCTION -- IMPACT OF AZS COLOR AND CONTROL PROTOCOL. CONSEQUENCES OF SHRINKAGE CAVITY AND FILLING OPTIMIZATION -- SURFACE QUALITY - UPCOMING IMPROVEMENTS -- DATA COLLECTION AND NEW PRODUCT DEVELOPMENT -- CONCLUSION -- DATA, CHEMISTRY, AND ENERGY -- Ultrafast Glass Engineering -- ABSTRACT -- INTRODUCTION -- ULTRAFAST LASER PROCESSING -- GYTRON-BASED PROCESSING -- DISCUSSION -- ACKNOWLEDGEMENT -- REFERENCES -- Operating a Heat Exchanger on Guardian Glass Carleton, Michigan Float Glass Plant -- ABSTRACT -- THE PROJECT -- HEAT EXCHANGER DESIGN -- OPERATIONAL EXPERIENCE -- CONCLUSION -- REFERENCE -- ENERGY/COMBUSTION -- Thermoelectric Waste Heat Recovery in an Oxyfuel Melter -- INTRODUCTION -- THERMOELECTRIC GENERATOR TECHNOLOGY -- WASTE HEAT SOURCES IN AN OXYFUEL GLASS FURNACE -- THERMOELECTRIC WASTE HEAT RECOVERY MODULE DESIGN -- IN-PLANT TEST OF WASTE HEAT RECOVERY WITH TE TECHNOLOGY -- ECONOMIC ANALYSIS AFTER IN-PLANT TRIAL -- CONCLUSIONS -- REFERENCES -- Glass Melt Quality Optimization by Mathematical Modeling of Redox and Bubbles in the Glass Melt -- ABSTRACT -- INTRODUCTION -- REDOX CHEMISTRY OF CONTAINER GLASSES WITH CHROMIUM -- REDOX REACTIONS UNDER REDUCING CONDITIONS -- REDOX REACTIONS IN THE FULL 3D MODEL -- BUBBLE PREDICTION IN THE FULL 3D MODEL -- APPLICATION OF THE MODEL IN AN INDUSTRIAL SITUATION -- CONCLUSIONS -- REFERENCES -- SENSORS/ENERGY -- Carbon Reduction Comparison of Electric or Hydrogen Power -- ABSTRACT -- INTRODUCTION -- REFERENCES -- Preparing for Sustainable Glass Production - Technical and Economic Investigation of Next Generation Fuels for Glass Melters -- INTRODUCTION -- H2-BASED COMBUSTION SYSTEMS -- EFFECTS OF HIGHER WATER VAPOR IN FLUE GAS -- HYDROGEN PRODUCTION -- OTHER LOW CARBON / RENEWABLE FUELS -- SUMMARY -- REFERENCES -- In-Furnace Thermal Imaging Survey of a Float Furnace for Combustion Optimization -- ABSTRACT -- INTRODUCTION. THERMAL SURVEY AT PHOENICIA GLASS PERFORMED 19 TO 23 MAY 2019 -- EXECUTIVE SUMMARY -- BACKGROUND -- THEORY -- PROPOSED PLAN -- EQUIPMENT AND PERSONNEL -- DETAILED STEPS OF WORK PERFORMED -- OBSERVATIONS STEP 1 - ASSET PROTECTION FURNACE SUPERSTRUCTURE AND THERMAL PROFILE -- CONCLUSIONS -- REFERENCES -- EULA.

## Sommario/riassunto

"The United Nations General Assembly formally approved a resolution declaring the year 2022 "The International Year of Glass". This is a seminal and celebratory moment for the global glass community. It is noteworthy that this is the first time that United Nations has accorded such a recognition to a specific material and represents an acknowledgment of the vital role glass has played and will continue to play in the advancement of human society. The UN resolution was the culmination of enormous efforts of many individuals and organizations from all over the world under the leadership of the International Glass Commission (ICG) president, Alicia Duran. The vision for the

International Year of Glass originated with L. David Pye (ICG president, 1997-2000) in 2018. Under the chief editorship of Pye, the International Journal of Applied Glass Science published special issues on the themes of "Glass and Light" (to mark the 2015 UN International Year of Light and Light-based Technologies), and "Glass Age". This was followed by a series of presentations at several international forums during 2016-2018 by the then ICG President Manoj K. Choudhary and David Pye and to promote and rally support for the theme of "Glass Age". This paper provides background information on the UN resolution and discusses the scientific, technological, and economic significance of glass, a vitally important material for meeting the challenges of climate change and developing equitable and sustainable society. Also highlighted is the role glass has played in arts and advancing human civilization throughout the history and concludes with an outline of various events planned around the world to celebrate the year 2022 as the International Year of Glass

**INTRODUCTION** In this paper we describe the rationale, the history, and the massive international effort undertaken to have the United Nations General Assembly (UNGA) approve the resolution to declare the year 2022 as the "International Year of Glass". We also describe the goals and the plans for celebration of all things glass in 2022. Since 1959 the United Nations has declared several International Years to focus on particular topics, themes, or events"--

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