



RESEARCH FOUNDATION

RESEARCH FOR THE NFPA MISSION

Project Idea Form

Instructions:

- This form is intended to gather project ideas from our stakeholders. It is not an application for a research grant. The consideration and implementation of all project ideas will be in accordance with [FPRF Policies, Operating Principles, and Vetting Criteria](#).
- By submitting this form to the FPRF, the submitter acknowledges that the Foundation may conduct a research project by issuing an open request for proposals for a project contractor in accordance with the FPRF Policies (unless waived in certain circumstances).
- This project idea form may be considered for the Research Fund selection process. For more information about the Research Fund evaluation process, please visit www.nfpa.org/NFPAresearchfund.
- To submit a research project idea, complete all fields below and send to research@nfpa.org.

1) Proposed Project Type (Select all that apply):

- Small Project (e.g. Literature Review, Gap Analysis, Code Comparisons, Loss Summaries)
- Large Project (e.g. Fire Testing, Computer Modeling, Field Surveys, Risk Assessments)
- Concept from NFPA Technical Committee
- Research Planning Meeting (e.g. Workshop)
- Other, please specify:

2) Proposed Project Title (75 characters or less):

Wildland Urban Interface Perimeter External Firewall System

- #### 3) Problem Statement (One or two sentences addressing "What is the problem?" Examples include: New/Emerging technology, Lack of technical substantiation or guidance) (750 character limit):
- Although most urban developments in WUI areas are protected from wildfires to some degree by firebreaks in nearby wildlands and a defensible space of 100 feet or more in developed lots, as well as noncombustible barriers or walls protecting some residential lots, an external firewall structure in or near the WUI perimeter is absent from the scene. Here, we explore the idea of a [comprehensive firewall system](#) devoted to protect a community of homes, not just one property, which system may include features like a subterranean heat sink, horizontal heat flue, superior sprinkler system, automatic emergency notification, firebrand screens, and more. What happens when an irresistible wildfire force comes up against an [Unsurmountable Firewall?](#)

- #### 4) Research Objective (One or two sentences addressing "What is needed to solve the problem?" Examples include: Develop guidance for a specific issue, Determine effectiveness of current code/standard requirement) (750 character limit):

The term 'firewall' is sometimes used to describe a firebreak in the wildlands. Now, we beg the question of whether an actual firewall structure offers added safety beyond that provided by an area simply cleared of vegetation. Does a firebreak adorned by a real firewall offer more protection than the firebreak by itself? If so, what specific dimensions, designs, features and enhancements may be critical to improving the potential fire protection promised? We invite the important role of the NFPA and the US Forest Service, and other institutions to take part in testing the technology and

formulating [guidelines and codes](#) to enable the added safety measures potentially offered by a WUI perimeter external firewall system (WUI-PEFS).

- 5) Project Description (One or two paragraphs describing how to achieve the objective, including expected tasks. Project tasks can include literature reviews, data collection, loss summaries, field usage surveys, code comparisons, statistical analysis, computer modeling, hazard analysis, risk assessments, fire testing, recommendation development, and gap identification.) (3000 char. limit):

Climatic Extremes Challenge

Extreme winds and heat especially in the Western States require adaptive infrastructure solutions. According to a new [climate change assessment](#) for California: the average area burned by wildfires will increase 77 percent by 2100, and the frequency of extreme wildfires—those that burn more than 25,000 acres—will increase by nearly 50 percent under a scenario with high global greenhouse gas emissions. In the areas that have the highest fire risk, wildfire insurance is estimated to see costs rise by 18 percent by 2055. The external firewall system we propose is designed to guard against [mountain waves](#) and [high pressure systems](#) known as Diablo Winds and Santa Ana Winds along the [Sierra Nevada](#), which historically drive many wildfires in California and are also addressed in the new assessment. These solutions also apply to a wide scope of [topographical scenarios](#) common to a range of ecological regions.

1. Heat: What sets this strategy apart from traditional firefighting tactics is the recognition that the vast majority of intense heat generated in a wildfire is not confined to the fire front, but is broadly distributed in large volumes of [hellfire heat](#) in vectors and wind streams widely extended in all three dimensions away from the fire front, and more so in wind-driven fires common to this climate. In many cases, dangerous heat also precedes and primes the vegetation to ignite the initial fuel source. The logistics proposed, for not just containing but also quenching these volatile heat vectors, center around key aspects of the firewall system, including the [subterranean heat sink](#), [horizontal heat flue](#), [superior sprinkler system](#) and [wind turbine integration](#). The basic premise with regard to wildfire heat is that containment is not enough, and should only be recognized as a final protective perimeter. We need sufficient heat quenching and treated dispersal only into safe locations like subterranean heat pits, not spewing raw into the air to keep firebrands and dangerous fuels warm and cozy.

2. Wind: In addition to a sizeable [wall structure](#) with various [reflecting surfaces](#), strategic preemptive solutions to mitigate [dangerous winds](#) that often prime the landscape for wildfire ignition, are designed with integrated firewalls and wind turbines on mountain crests and grassy plains.

3. Firebrands: Our focus on the hazards of [firebrands](#) includes tactics integrated with the firewall such as [firebrand screens](#), [water sprays](#) and cooling the [firebrand incubator](#) as well as promoting innovatively [repurposed wind turbines](#).

Our model of a comprehensive firewall system includes the following components and configurations:

1. [Wall Structure](#),
2. [Subterranean Heat Sink](#),
3. [Horizontal Heat Flue](#),
4. [Technological Solutions](#),
5. [Firebrands Protection](#),
6. [Superior Sprinkler System](#),
7. [Flood Control & Retaining Walls](#),
8. [Thinning & Firebreaks](#),
9. [Wind Turbine Integration](#).

- 6) Data Collection (If data collection is part of the project scope, does data exist? If data exists, is it available to be used in the study? Please identify potential data sources.) (750 character limit)

The height of the wall and other features also offer opportunities for testing. For example:

1. How does a firebreak with a parallel wall structure compare in effectiveness with a firebreak with no wall?
2. How frequently have fire fronts jumped over firebreaks in the past either by radiant heat, flames, firebrands, or other means?
3. What is the known failure rate of firebreaks based on firebreak width, vegetation type, wind speed and other risk factors?
4. Can firewall structures specifically protect against radiant heat in ways beyond the capacity of firebreaks?
5. What advantages can be measured by using the firewall to redirect advancing heat and flames into a subterranean heat sink?... Amplification and [references](#)...

- 7) Impact of Project Deliverables on relevant NFPA Document(s) (500 character limit):

Very High impact -- The primary focus of this proposal is the improved protection of residential developments in the WUI which now includes one-third of all homes in the United States. With the help of innovative external firewall systems more protection will be provided to an estimated 500-700 thousand new homes in the WUI each year, based on projections of continued growth at existing rates...Amplification and [references](#)...

- 8) Organizations That Could Possibly Fund (Examples: government grants, industry consortia, stakeholders) (500 character limit):

The largest stakeholders for the proposed external firewall systems are those who own most of the land in which these structures will be built, which are primarily public lands and parks managed or owned by the federal government and the states. The wildlands in question will also be the primary beneficiaries of these firewall systems on their property since most wildfires initiate in or near those WUI developments by which these structures are designed to be located.

- 9) When Do You Need Project Deliverables (when is information needed to coordinate with document revision cycles or other deadlines, sense of urgency) (100 characters):

[Yesterday...](#)

- 10) Submitted By and Date Submitted:

Point of Contact Name: Ray Cruz

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Date Submitted (again): 12/29/2018

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